NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

MBA PROFESSIONAL REPORT

GROUP 3 UNMANNED AIRCRAFT SYSTEMS MAINTENANCE CHALLENGES WITHIN THE NAVAL AVIATION ENTERPRISE

December 2017

By: John D. Park

Advisors: Keebom Kang
Anthony Pollman

Approved for public release. Distribution is unlimited.

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE	*Form Approved OMB No. 0704–0188*

1. AGENCY USE ONLY	**2. REPORT DATE** December 2017	**3. REPORT TYPE AND DATES COVERED** MBA professional report

4. TITLE AND SUBTITLE
GROUP 3 UNMANNED AIRCRAFT SYSTEMS MAINTENANCE CHALLENGES WITHIN THE NAVAL AVIATION ENTERPRISE

5. FUNDING NUMBERS

6. AUTHOR John D. Park

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey, CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES)
N/A

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB number ____N/A____.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release. Distribution is unlimited.

12b. DISTRIBUTION CODE
A

13. ABSTRACT
The Naval Aviation Maintenance Program (NAMP) creates maintenance and manpower inefficiencies for current Group 3 unmanned aircraft systems (UAS) (55 to 1,320 lbs). The primary output of this study was the creation of maintenance policy that is specific to Naval Group 3 UAS. Current Department of the Navy (DON) UAS policy results in double the maintenance man-hours per sortie than other DOD Group 3 UAS users. Even with the added manpower and regulations, DON mishap rates are actually slightly higher than the rest of DOD. Group 3 UAS are significantly less expensive than manned aircraft because of their size and they lack the same engineering redundancy. Ultimately, they are expendable. Whereas other services and special operations units have implemented less restrictive UAS maintenance policies, the Naval Aviation Enterprise's conservative approach to UAS maintenance categorizes them under the same NAMP requirements as manned Naval aircraft, including the F-35 Joint Strike Fighter. Quantitative modelling and Qualitative comparisons show the inefficiencies of the NAMP and demonstrate the need for new policy. After analyzing all maintenance actions for the RQ-7B Shadow and the RQ-21 Blackjack, the new policy offers a 53% maintenance manpower savings. This study proves that Group 3 UAS mishaps are primarily attributable to their lack of system reliability, not maintenance practices. Once the new maintenance policy is adopted, the resultant manpower savings can be reinvested into reliability and engineering. The proposed policy will drastically reduce maintenance manpower, increase sortie generation, and balance operational flexibility with oversight and compliance.

14. SUBJECT TERMS
Unmanned Aircraft System, UAS, Maintenance Manpower, Group 3 UAS

15. NUMBER OF PAGES
313

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540–01-280-5500 Standard Form 298 (Rev. 2–89)
Prescribed by ANSI Std. 239–18

THIS PAGE INTENTIONALLY LEFT BLANK

GROUP 3 UNMANNED AIRCRAFT SYSTEMS MAINTENANCE CHALLENGES WITHIN THE NAVAL AVIATION ENTERPRISE

Major John D. Park, United States Marine Corps

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

from the

NAVAL POSTGRADUATE SCHOOL
December 2017

Approved by: Dr. Keebom Kang

Dr. Anthony Pollman

Dr. Aruna Apte
Academic Associate
Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

GROUP 3 UNMANNED AIRCRAFT SYSTEMS MAINTENANCE CHALLENGES WITHIN THE NAVAL AVIATION ENTERPRISE

ABSTRACT

The Naval Aviation Maintenance Program (NAMP) creates maintenance and manpower inefficiencies for current Group 3 unmanned aircraft systems (UAS) (55 to 1,320 lbs). The primary output of this study was the creation of maintenance policy that is specific to Naval Group 3 UAS. Current Department of the Navy (DON) UAS policy results in double the maintenance man-hours per sortie than other DOD Group 3 UAS users. Even with the added manpower and regulations, DON mishap rates are actually slightly higher than the rest of DOD. Group 3 UAS are significantly less expensive than manned aircraft because of their size and they lack the same engineering redundancy. Ultimately, they are expendable. Whereas other services and special operations units have implemented less restrictive UAS maintenance policies, the Naval Aviation Enterprise's conservative approach to UAS maintenance categorizes them under the same NAMP requirements as manned Naval aircraft, including the F-35 Joint Strike Fighter. Quantitative modelling and Qualitative comparisons show the inefficiencies of the NAMP and demonstrate the need for new policy. After analyzing all maintenance actions for the RQ-7B Shadow and the RQ-21 Blackjack, the new policy offers a 53% maintenance manpower savings. This study proves that Group 3 UAS mishaps are primarily attributable to their lack of system reliability, not maintenance practices. Once the new maintenance policy is adopted, the resultant manpower savings can be reinvested into reliability and engineering. The proposed policy will drastically reduce maintenance manpower, increase sortie generation, and balance operational flexibility with oversight and compliance.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

AAMO	assistant aircraft maintenance officer
ABO	aviators breathing oxygen
ACE	air combat element
ADB	aircraft discrepancy book
ADRL	automatic distribution requirements list
ADW	aviation data warehouse
AIMD	aircraft intermediate maintenance department
AIR	aircraft inventory record
ALE	automated logistics environment
ALIMS	aviation logistics information management and support
ALSS	aviation life support systems
AMI	aviation maintenance inspection
AMMRL	aircraft maintenance material readiness list
AMMT	aircraft maintenance management team
AMTRP	Aviation Maintenance Training and Readiness Program
APU	auxiliary power unit
ASM	Advanced Skills Management
ATO	aircraft transfer order
AUL	authorized users list
AVO	air vehicle operator
AWBS	aircraft weight and balance system
BTR	broken tool report
BUNO	bureau number
CAD	cartridge activated device
CDI	collateral duty inspector
CDQAR	collateral duty quality assurance representatives
CECR	change entry certification record
CIN	course identification number

CNAF	Commander, Naval Air Forces
CNATTU	Center for Naval Aviation Technical Training Unit
CO	commanding officer
COA	certificate of authority
COC	combat operations center
COMNAVAIR	Commander, Naval Air Systems Command
COMSEC	communications security
CRIPL	consolidated remain in place list
CSE	common support equipment
CSEC	computerized self-evaluation checklist
CTPL	central technical publications library
CVN	multi-purpose aircraft carrier, nuclear
DA	Department of the Army
D&T	daily and turnaround
DFARS	Defense Federal Acquisition Regulation Supplement
DOD	Department of Defense
DON	Department of the Navy
DSN	defense switched network
DTG	date time group
DTPL	dispersed technical publications library
ED	engineering disposition
EHR	equipment history record
EI	engineering investigation
ELMS	enhanced library management system
EMI	electro-magnetic interference
EO	electro-optical
EOC	equipment operational capability code
ERAC	electronic rapid action change
ERT	emergency reclamation team
ESD	electric static discharge

ETR	engine transaction report
FAL	focus area list
FC	flight critical
FCF	functional check flight
FOD	foreign object damage
FRC	fleet readiness center
FRS	fleet replacement squadron
FSR	field service representative
FST	fleet support team
GMVO	ground maintenance vehicle operator
HAZMAT	hazardous material
HAZWASTE	hazardous waste
HMC&M	hazardous material control and management
HMMWV	high mobility multipurpose wheeled vehicle
HMR	hazardous material report
HPOL	high probability of loss
IAW	in accordance with
IETM	interactive electronic technical manual
IH	industrial hygienist
IMRL	individual material readiness list
IR	infra-red
IRAC	interim rapid action change
INS	inertial navigation system
ISR	intelligence, surveillance, and reconnaissance
ISSC	in-service support center
IST	in-service training
IT	information technology
ITX	integrated training exercise
JCN	job control number
JDRS	Joint Discrepancy Reporting System

JQR	job qualification report
JTDI	Joint Technical Data Integration
LCP	local command procedure
LHA	landing ship, helicopter assault
LHD	multi-purpose, amphibious assault ship
LMRC	local maintenance requirements card
LPD	amphibious transport dock
MAF	maintenance action form
MALS	Marine Aviation Logistics Squadron
MARFORSYSCOM	Marine Forces System Command
MARSOC	Marine Special Operations Command
MAW	Marine Aircraft Wing
MCI	material condition inspection
METCAL	meteorological and calibration
MEU	Marine Expeditionary Unit
MILSPEC	military specification
MILSTRIP	military standard requisitioning and issue procedures
MIS	maintenance information system
MMCO	maintenance material control officer
MMH	maintenance man-hours
MMP	monthly maintenance plan
MO	maintenance officer
MOS	military occupational specialty
MPA	maintenance program assist
MPO	mission payload operator
MPS	maintenance program assessment
MRC	maintenance requirement card
MTBF	mean time between failures
NALCOMIS	Naval Aviation Logistics Command/Management Information System

NAMDRP	Naval Aviation Maintenance Discrepancy Reporting Program
NAMP	Naval Aviation Maintenance Program
NAMPSOP	Naval Aviation Maintenance Program Standard Operating Procedure
NAS	Naval Air Station
NATEC	Naval Air Technical Data and Engineering Service Center
NATOPS	Naval Air Training and Operating Procedures Standardization
NAVAIR	Naval Air Systems Command
NAVOSH	naval occupational safety and health
NAVSEA	Naval Sea Command
NAVSUP	Naval Supply Systems Command
NFC	non-flight critical
NIAC	Naval Innovation Advisory Council
NDI	non-destructive inspection
NIIN	national item identification number
NMA	needs more attention
NMC	non-mission capable
NMCS	non-mission capable-supply
NOAP	Naval Oil Analysis Program
NOMP	Naval Ordnance Management Policy
NRFI	non-ready for installation
OEM	original equipment manufacturer
OIC	officer in charge
OJT	on-the-job-training
OOMA	Optimized-Organizational Maintenance Activity
OPNAV	Office of the Chief of Naval Air Operations
ORM	operational risk management
OSHA	occupational safety and health
PBL	performance based logistics
PC	plane captain

PEMA	portable electronic maintenance aid
PGCS	portable ground control stations
PHA	physical health assessment
PM	periodic maintenance
PMD	preventative maintenance daily
PMIC	periodic maintenance information card
PN	part number
POC	point of contact
PQDR	product quality deficiency report
PSI	pounds per square inch
QA	quality assurance
QAO	quality assurance officer
QAR	quality assurance representative
QPT	qualified and proficient technician
RAC	risk assessment code
RFI	ready for installation
RPM	rotations per minute
SECNAV	Secretary of the Navy
SEPMS	support equipment planned maintenance system
SERNO	serial number
SFF	safe for flight
SM&R	source, maintenance, and recoverability
SRC	scheduled removal component
SRS	Small Tactical Unmanned Aircraft System Retrieval System
SWAP	size, weight, and power
TAD	temporarily assigned duty
TAMMS	The Army Maintenance Management System
T&R	training and readiness
TCP	Tool Control Program
TD	technical directive

TECOM	Training and Education Command
TFOA	things falling off aircraft
TM	technical manual
TMDE	test, measurement, and diagnostic equipment
TMS	type model series
T/O	table of organization
TPDR	technical publication discrepancy report
TPL	technical publication library
TPS	tactical paint scheme
TTP	tactics, techniques, and procedures
TYCOM	type commander
UA	unmanned aircraft
UAC	unmanned aircraft commander
UAS	unmanned aircraft system
UAS-I	Unmanned Aircraft System-Initiative
UAV	unmanned aerial vehicle
ULSS	user’s logistics support summary
USMC	United States Marine Corps
USN	United States Navy
VMAQ	Marine Tactical Electronic Warfare Squadron
VMU	Marine Unmanned Aerial Vehicle Squadron
W&B	weight and balance
WO	work order
WRA	weapons repairable assembly
WTI	Weapons and Training Instructor

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

Rain or shine, the flights must go out. Aircraft maintainers are the overworked, underpaid driving force that makes it happen. Whether at home station, aboard ship, or forward deployed, your work ethic, technical proficiency, and ability to still find humor at the end of a 14-hour shift are the reason I come to work. To all the Smallings, Millers, Greenfields, Turners, Ganns, Curtises, Hulses, Romos, Favelas, Slaughters, Guiens, Novicks, Bowlins, Meekess, Trumans, Guerras, Albalanovases, Alvarados, Cazareses, and hundreds of others, thank you and *Semper Fi*.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

There is a revolution happening in autonomous and unmanned systems and the Marine Corps is lagging woefully behind. It is not that we do not have talented, innovative Marines, but rather we are blinded by our own policy and the status quo, especially with our unmanned aircraft squadrons. We are self-imposing legacy manned aviation maintenance policies onto unreliable, and ultimately expendable, Group 3 Unmanned Aircraft Systems (55–1320 lbs). An overhaul to existing policy can cut the Marine Unmanned Aerial Vehicle Squadrons (VMU) maintenance manpower requirements in half while simultaneously increasing operational effectiveness, responsiveness, and flexibility,

I, like many before me, fell into the same trap when I checked in as the Aircraft Maintenance Officer of Marine Unmanned Aerial Vehicle Squadron 1 (VMU-1). I was raised under the zero defect Naval Aviation mentality. I was keenly aware that the maintenance policies contained in the 1,563-page Commander, Naval Air Forces 4790.2 Naval Aviation Maintenance Program (NAMP) were all written in blood. I joined VMU-1 fresh from a tour with the F-35 program, and even though my newly assigned 450 lb RQ-7B unmanned aircraft cost less than $1 million apiece (a ridiculously cheap amount in aviation), I was determined to uphold the same high programmatic standards that had always ensured that the number of pilots taking off equaled the same number of pilots safely landing.

The Marines all worked had, and meeting the flight schedule was the easy part. The real work was ensuring the NAMP-required programs mirrored what I was accustomed to with manned aviation. The most talented maintainers were pulled from their flight duties and corralled into an office in order to pump out the myriad of reporting requirements associated with aircraft maintenance. Even though we had different computer systems than manned squadrons, by the grace and tradition of Marine Corps heroes Chesty Puller and Alfred A. Cunningham, we would hand jam and double-document reports to mirror those of manned aviation. The fact that the majority of those reports were not used by anyone upline did not matter so long as we were able to satisfy inspection checklist requirements.

Everything was going swimmingly for the first year. By this time, we had introduced the 135 lb RQ-21 Blackjack unmanned aircraft system (UAS) in addition to the RQ-7B. The new unmanned aircraft came with its own new computer system, which required a new set of reporting procedures. This was an easy problem to solve. We could simply pull additional non-commissioned officer (NCOs) off the flightline to hand jam additional redundant reports. Then one day, an unmanned aircraft commander (UAC) radioed that his aircraft was losing power and he was going to perform an emergency belly landing at a distant airfield in Twentynine Palms, CA. Although it was a perfectly executed belly landing, the resulting $719,000 in damage made it uneconomical to repair the aircraft, and it was struck from the inventory (Naval Safety Center, 2017).

After the mishap, the aircrew had to provide blood and urine samples to test for drugs and alcohol, just like all other manned aviators, and the maintenance records were screened with a fine-toothed comb. We consulted with the engineers, and weeks later the cause was determined to be a faulty fuel pump. Although the mishap was a setback, we were all proud of the maintainers for upholding high programmatic standards. As more of the new RQ-21 aircraft were delivered, we had to pull more of our top maintainers off the flightline in order to maintain the increasing, unnecessary, administrative upkeep. Then we had another mishap due to high cross winds. We again went through the mishap processes and reviewed training and maintenance records. A couple months later, there was a third crash, this time due to a non-maintenance-related software issue.

The mishaps were bothering me, the Marines were doing everything by the book, and yet we had three crashes within a year. We had just passed a major maintenance inspection and received fantastic results. Leading up to the inspection, the Marines worked 12 on, 12 off to prepare. Our programs were locked tight. I asked myself how we could have so many mishaps if we were graded as one of the best maintenance departments within the 3D Marine Aircraft Wing (MAW). It was inconceivable that we could simultaneously hold the honor of having one of the highest maintenance scores and also the dishonor of the highest mishap rate in the Wing. The phrase that I had told my Marines so many times kept repeating in my head: "Efforts do not equal results."

I began to look at the other VMUs and found they had similar, if not worse, mishap rates. At least we were not alone, but this did nothing to assuage the grumblings amongst the NCOs. They were getting worn out. They were frustrated that they were spending the majority of their time pushing paper to look good for the inspections required by the manned aviation paradigm. Double documentation was at an all-time high, and yet there was no corresponding increase in sortie generation or safety. I knew we had a Category 3 flight clearance, but at the time, I really did not understand the significance. I knew it meant that we had less reliability than manned aircraft, and that our flight operations were limited to restricted airspace away from densely populated areas.

Now I fully understand what a Category 3 flight clearance truly means. It means there is a high probability of loss (HPOL); it means that there is a greater than one out of 10,000 flight hours' probability of losing an aircraft. To compare, the MV-22 has a Category 1 flight clearance with a less than one out of 100,000 flight hours probability of loss. The Navy flight clearance policy, NAVAIR Instruction 13034.10, states,

> Category 3 flight clearances are issued for UAS that are not designed to accepted engineering standards and/or do not possess adequate engineering data to determine their compliance with accepted standards. As such, Category 3 flight clearances are issued with owner/sponsor acknowledgement of a higher probability of loss of the UAS. (Department of the Navy Naval Air Systems Command, 2010, p. 17)

The RQ-21 currently has a mishap rate of 366 for every 100,000 flight hours (Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office, 2017). With an average sortie length of five hours, approximately one out of 50 flights will result in a reportable mishap. With planned improvements and system maturity, the RQ-21 mishap rate is expected to decrease to 59 mishaps per 100,000 flight hours, but this is still 60 times greater than manned aviation.

With this new found information, I committed the cardinal sin in aviation; I asked "*why?*." Why were the Marines working so hard to meet manned aviation maintenance standards? Why were we double documenting reports? Why were we managing programs that duplicated responsibilities that were already being carried out by the prime contractor? Why were we self-imposing additional restrictions that drastically increased our manpower and decreased our operational effectiveness? Why were we maintaining F-35 oversight requirements for a 135-lb unmanned aircraft that a Marine can assemble in 10 minutes using only a slotted screw-driver, a T-15 torque bit, a 3/32 hex head, and 18 fasteners?

Shortly after I departed from the squadron in 2016, VMU-1 underwent a Commander, Naval Air Forces maintenance inspection. This is the Super Bowl; it is the grand poo-bah aviation maintenance inspection that takes place typically once every two to three years. VMU-1 received a perfect 100% grade. They are the very best in all of Navy and Marine Corps aviation. Despite this prestigious honor and despite the thousands of hours of preparation, they put two aircraft in the dirt within the following three months (Naval Safety Center, 2017). Both mishaps were due to aircraft reliability, not maintenance practices.

If we, the Marine Corps, with all our rules and procedures, are having these sorts of problems, you would imagine that Army unmanned aviation units would be much worse. Wrong—they have similar mishaps rates that we do with the RQ-7B. But here is the kicker: the Army uses half the manpower to execute the same number of flight ops. Our maintenance policy is over 1,500 pages, while the Army's RQ-7B guide is only 29 pages (Department of the Army, 2017). At recruit training, my drill instructor instilled a pride about how the Marine Corps does more with less. That is not the case with Group 3 unmanned aviation. The Army is eating our lunch, and it hurts my heart.

We have been able to mask the inefficiencies of our self-imposed maintenance requirements because our maintenance department had over 100 maintainers. That manning has just been cut to 38 maintainers (Salas, 2017). To compound the problem, each VMU is being assigned more aircraft. Each squadron's 12 RQ-7Bs are being phased out and replaced with 30 RQ-21s. Some basic math for Marines demonstrates that Current Maintenance Policy + More Aircraft – Decrease in Maintainers does not equal increased readiness and sortie generation rates.

One of the strengths of Group 3 unmanned aviation is the ability to set up a forward deployed control station that aircrew can operate while collocated within a company or battalion combat operations center (COC). Unmanned aircraft can be launched from a distance of up to 50 miles away, and handed off to the forward control station in order to give the ground commander their own dedicated intelligence, surveillance and reconnaissance (ISR) support. The VMUs commonly practice this tactic, technique, and procedure (TTP) during large Marine Corps exercises such as Integrated Training Exercise (ITX) and Weapons and Tactics Instructor Course (WTI). Recent updates to Naval aviation maintenance policy have severely hamstringed this unique capability. The updated policy requires that before taking control of the aircraft from the forward spoke site, UACs must sign a piece of paper stating that they have reviewed the maintenance records. They have to sign this paper despite the fact that aircrew at the launch site already did this before takeoff and if the unmanned aircraft senses a major system fault, it will prevent the forward spoke from taking control. In the worst case, where the aircraft experiences complete link loss, it will autonomously return to the pre-programmed launch site. Often the forward deployed COC or spoke does not have network connectivity with the launch and recovery site. Like any good Marine, we overcome and adapt. The current solution that is being applied today at WTI Course 1-18, is to send a high mobility multipurpose wheeled vehicle (HMMWV) from the launch site out to the forward spoke site to get a physical signature from the UAC. I fail to see how this makes an already airborne aircraft any safer or how it provides better support to the warfighter. It makes absolutely no sense in garrison, let alone in combat.

Our own self-imposed restrictions are hamstringing the VMUs. To be honest, Group 3 unmanned aircraft are not sexy. They do not possess even half of the capabilities of a multi-sensor medium altitude long endurance platform like the MQ-9 Reaper. The greatest strength of the VMUs is that Marines are at the controls and those control stations can be collocated with the battlefield commander. Current maintenance policies have doubled the required manpower, which has further narrowed the VMUs limited capability to support our customers. We have so many restrictions that supported units see more burden than benefit. Marine Expeditionary Units (MEUs) are losing artillery pieces and boat spaces to accommodate bloated VMU detachments. The original VMU MEU detachment size was supposed to be eight Marines. That number has ballooned to 22 Marines, primarily because of Naval maintenance policies. MARSOC no longer wants to work with the VMUs because we are all tail and no tooth. Instead, MARSOC is pursuing a Group 2 UAS (less than 55 lbs) that is exempt from the NAMP. The microization of sensors and powerplants will allow these smaller UAS to supplant the role of Group 3 UAS within a few years. Until then, we are allowing dogmatic policies to stop the VMUs from performing in the operational environment prescribed in the Commandant's FRAGO #1, which will "encompass not just the domains of land, air and sea, but also space and the cyber domain. It will include information operations and operations across the electromagnetic spectrum. It will involve rapidly changing and evolving technologies and concepts, which will force us to be more agile, flexible and adaptable" (Neller, 2016, p. 2).

The Marine Corps is in the early stages of the acquisition processes for a large, armed, long-endurance unmanned aircraft, but this capability will not be available until the late 2020s and will cost hundreds of millions of dollars. This capability will provide Marines with an unblinking overwatch that can stay airborne for over 24 hours, host multiple sensors and software-defined radios, and when necessary, deliver precision guided munitions. However, in 2017, with just a signature and zero expense, we can change Group 3 UAS maintenance policy and get the most out of our current RQ-7B and RQ-21 unmanned aircraft. We can save manpower and begin to deliver the support that we say we do on paper. No matter how much maintenance policy we slap on the Group 3 UAS pig, the airframe will never match the engineering redundancy of a manned aircraft that costs 70 times more. The new policy should have provisions to reduce redundant oversight, abolish double documentation, incorporate aircrew into the maintenance process for system emplacement/set up, and reduce programmatic requirements in areas in which risk can be assumed due to the nature of Group 3 UAS.

First Lieutenant Olivia Garard, a current VMU-1 aircraft commander, identified a glaring irony and made a fitting analogy. One of the books on the Commandant's reading list is *Moneyball: The Art of Winning an Unfair Game* (Marine Corps University, 2017).

Moneyball, is the true story of how the underdog Oakland A's, the poorest team in baseball, changed the game by using statistics to identify and recruit underrated players. If the MV-22 and the F-35 are the New York Yankees, then our VMUs are the Oakland A's. We do not have the money, personnel, reliability, or system engineering to compete at the manned aviation game. We need to change the rules we play by. Group 3 UASs are cheap, simple to maintain, easy to operate, and ultimately expendable. The pilot will always walk away from a crash. We can provide better support with half of the manpower if we change the maintenance policy. The Army has proved that it can be done and that mishap rates will not change. We know Marines work harder; it is time to work smarter.

With Group 3 UAS reliability in mind, this project has four goals. The first is to quantitatively compare USMC and Army RQ-7B UAS maintenance. The second is to qualitatively assess the maintenance programmatic risk severities between manned and unmanned aviation. The third goal is to quantitatively assess all the maintenance data for the RQ-21 to determine if a change to maintenance policy will have a corresponding positive increase to manpower management. Finally, the fourth and most important goal, is to create a new Group 3 UAS maintenance policy (Appendix A) that will maintain quality maintenance practices, while increasing operational effectiveness and decreasing maintenance manpower requirements. To achieve this goal, participation and guidance was sought and received from Headquarters Marine Corps, Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office (PMA-263), Secretary of the Navy Naval Innovation Advisory Council (NIAC), Commander Naval Air Forces (N42), and most importantly, the Enlisted Marines and Officers of the VMUs who live by this policy day in and day out.

THIS PAGE INTENTIONALLY LEFT BLANK

II. QUANTITATIVE COMPARISON AND MODELLING OF MARINE CORPS AND ARMY RQ-7B MANPOWER REQUIREMENTS

A. ARMY AND MARINE CORPS RQ-7B SIMILARITIES AND DIFFERENCES

The Army and Marine Corps both operate the RQ-7B Shadow. Both services operate in similar environments including tropical, coastal, and desert climates. The aircraft and the ground control stations are exactly the same, and both services share the same Performance Based Logistics contract with Textron for the supply system and depot level maintenance. Intelligence, surveillance, and reconnaissance (ISR) and control of fires are the primary missions for both Army and Marine Units. Marine Corps and Army RQ-7B operators and maintainers even attend the same RQ-7B schoolhouse at Fort Huachuca, AZ. Both services utilize the same RQ-7B specific information technology systems (Qinetiq, North America, 2012). They even have the same field service representative support personnel who rotate between Army and Marine Corps units.

There are only two major differences between Army and Marine Corps RQ-7B units. The first and less significant difference is that the Army typically task organizes around a Shadow Platoon, which consists of one RQ-7B Shadow system with four aircraft (Slaughter, 2017). A Marine Corps RQ-7B Shadow Squadron has three systems with 12 aircraft and the necessary aircrew and maintainers to employ the three systems. A Marine unit has the same RQ-7B equipment set as three Army Shadow Platoons.

The second, and more important, difference between the Army and Marine Corps is each service's maintenance policy. The Army follows *The Army Maintenance Management System* (TAMMS; Department of the Army, 2005), while the Marine Corps and Navy follow the *Naval Aviation Maintenance Program* (Department of the Navy [DON], 2017). All things being equal, the Army and Marine Corps should have similar maintenance manpower per sortie requirements, but this is not the case. The Marine Corps expends significantly more maintenance man-hours per flight than the Army does

(Slaughter, 2017). Despite the increased maintenance effort, Marine Corps mishaps are slightly higher than the Army.

B. ARMY AND MARINE CORPS RQ-7B MAINTENANCE PERFORMANCE

RQ-7B maintenance and flight data is captured using the UAS-I data system. In order to compare Army and Marine Corps performance, all UAS-I data was pulled and analyzed for a two-year period spanning 2015 to 2016. The Army naturally had greater overall numbers because the Army has 82 RQ-7B units while the Marine Corps only had four units (Rosenburg, 2017). The Marine Corps used five different UAS-I data servers over 2015 and 2016, and for the purposes of our calculations, we treated each USMC server as a separate unit. Not all RQ-7B units are provisioned the same. Some units have fewer aircraft due to crashes, while other units may have extra portable ground control stations (PGCSs) because of deployment requirements. To account for this variation, we simply calculated a unit's total yearly scheduled maintenance and divided the total number of flight hours/sorties. We did the same for unscheduled maintenance man-hours, total number of work orders, and number of mishaps. A summary of RQ-7B Army and Marine Corps flight and maintenance data is shown in Table 1.

A direct comparison between the Army and Marine Corps, without any smoothing or modeling having been used, is displayed in Table 1. Some of the variation can be explained away by the vastness of the Army flight operations compared to the Marine Corps. The Marine Corps had only 1/25 of the flights that the Army did, and therefore a single mishap skewed the numbers much greater than it did for the Army. Additionally, not every unit is as disciplined at documenting maintenance data within UAS-I, or submitting their monthly data-base data to the central UAS-I repository. Even considering these variations, the Marine Corps still has almost double the manpower expenditure than the Army. Despite the extra maintenance man-hours expended per sortie, the Marine Corps still has higher mishap rates.

Table 1. Summary of Marine Corps and Army RQ-7B Flight, Mishap, and Maintenance Data

2015 and 2016 Totals	USMC	Army
Maintenance Man Hours per Sortie (Scheduled & Unscheduled)	11.8	5.8
Work Orders per Flight Hour (Scheduled & Unscheduled)	6.0	7.9
Work Orders per Sortie (Scheduled & Unscheduled)	18.7	14.4
Maintenance Man Hours per flight hour (unscheduled maintenance)	1.8	2.0
Maintenance Man Hours per Sortie (Unscheduled)	5.8	3.3
Work Orders per Flight Hour (Unscheduled)	2.1	3.3
Work Orders per Sortie (Unscheduled)	6.8	5.7
Maintenance Man Hours per Flight Hour (Scheduled)	1.9	1.3
Maintenance Man Hours per Sortie (Scheduled)	6.1	2.5
Work Orders per Flight Hour (Scheduled)	3.8	4.6
Work Orders per Sortie (Scheduled)	11.9	8.7
Total flight hours	3,248.7	51,762
Sorties	1,030.0	27,172
Mishaps (All Causes)	7.0	43
Mishaps (Maintenance Related)	2.0	5
Mean Flight Hours between Mishaps	464.1	1,203.8
Mishap per 10,000 Flight Hour	21.5	8.3072
Mean Flight Hours between Maintenance Related Mishaps	1,624.4	10,352
Maintenance Related Mishaps per 10,000 Flight Hour	6.2	0.966
Mean Sorties between Mishaps (All Causes)	147.1	631.91
Mishaps (All Causes) per 10,000 sorties	68.0	15.825
Mean Sorties between Maintenance Related Mishaps	515.0	5,434.4
Maintenance Related Mishaps per 10,000 Sorties	19.4	1.8401

Note: Table adapted from QinetiQ, North America. (2012). Unmanned Aircraft Systems Initiative [Computer Software]. Retrieved from https://www.qinetiq-na.com/wp-content/uploads/MAC/UAS-I.pdf; Rosenburg, D. (2017). Mishap rate by system, tail number, month 3–8-2017 [Data File]. Redstone Arsenal, AL: Program Management Unmanned Aircraft Systems UAS, Department Manager and System/Program Analyst. Slaughter, J. (2017). All units, UAS-I scheduled and unscheduled maintenance 4–18-2017 [Data File]. Huntsville, AL: Contractor, PeopleTec, Inc.

C. CRYSTAL BALL SIMULATION

To further illustrate the disparity in RQ-7B maintenance requirements between the Army and Marine Corps, we created a capacity simulation to determine the optimal number of maintainers required to fly 1,000 sorties in one year. We used Oracle Crystal Ball software to run a Monte Carlo simulation 100,000 times (Oracle, 2012). The model assumed that all things between the Army and Marine Corps were equal aside from Army and Naval maintenance policy. The model was based on all RQ-7B maintenance data from 2015 and 2016 (Slaughter, 2017).

1. Model Assumptions

The following are the assumptions that were used in this maintenance manpower simulation:

- The average maintainer provides 3.9 direct maintenance hours per day with a standard deviation of 0.10.

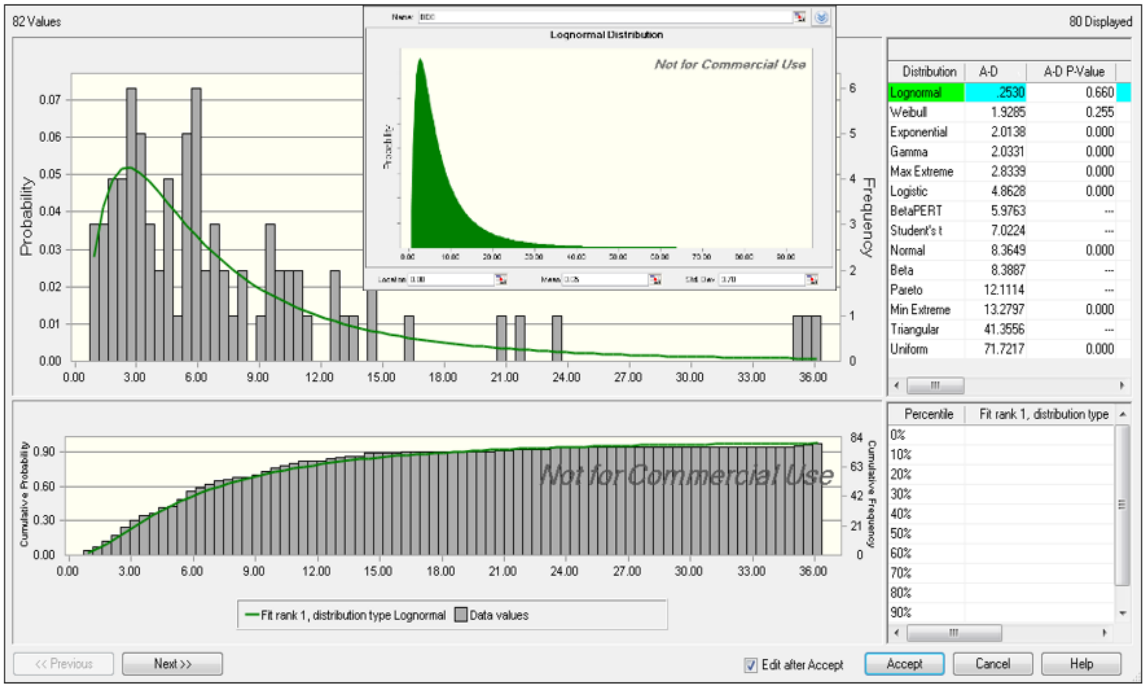
- There is a (.21) negative correlation between scheduled maintenance man-hours per sortie and unscheduled maintenance man-hours per sortie. The more time spent on scheduled/preventative maintenance, the less time will be required for unscheduled maintenance. This correlation assumption was based off findings from a RAND study of Air Force F-4 scheduled, unscheduled, and depot maintenance (Dade, 1973).

- Only 250 days out of the year are fly days due to weekends, holidays, block leave, etc.

2. Decision Variables

The decision variables for this Crystal Ball model are scheduled maintenance man-hours per sortie, unscheduled maintenance man-hours per sortie, and daily maintenance man-hours per maintainer per day. The Army had 82 units, which allowed the use of the "best fit" function within Crystal Ball to determine the best distribution to use. Both the Army scheduled and unscheduled maintenance man-hours fell into a log normal distribution. Crystal Ball uses this distribution to generate random variables to predict future Army scheduled and unscheduled maintenance man-hours over 100,000 simulations. The Army lognormal distribution used in this model is shown in Table 2.

Table 2. Army Scheduled and Unscheduled Maintenance Man Hour Lognormal Distribution

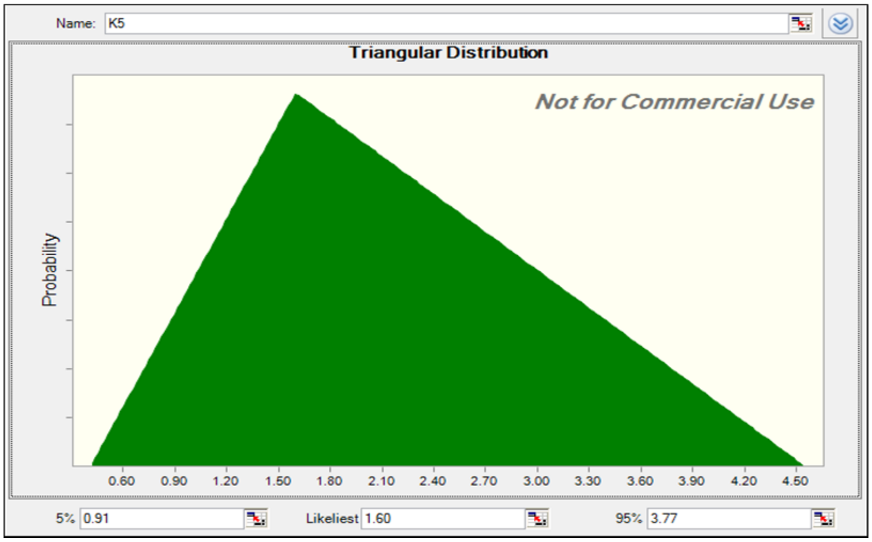


Note: Adapted from Oracle. (2012). Oracle Crystal Ball (Version 11.1.2) [Computer Software]. Retrieved from http://www.oracle.com/us/products/middleware/bus-int/crystalball/cb-brochure-404904.pdf; Qinetiq, North America. (2012). Unmanned Aircraft Systems Initiative [Computer Software]. Retrieved from https://www.qinetiq-na.com/wp-content/uploads/MAC/UAS-I.pdf; Rosenburg, D. (2017). Mishap rate by system, tail number, month 3–8-2017 [Data File]. Redstone Arsenal, AL: Program Management Unmanned Aircraft Systems UAS, Department Manager and System/Program Analyst. Slaughter, J. (2017). All units, UAS-I scheduled and unscheduled maintenance 4–18-2017 [Data File]. Huntsville, AL: Contractor, PeopleTec, Inc.

3. Distributions

A triangular distribution was used for the Marine Corps because there were only five units within the sample, and the Crystal Ball program requires at least 15 data elements to use the best fit function (Oracle, 2012). We used the Marine Corps minimum, maximum, and median of the combined scheduled and unscheduled maintenance man-hours per sortie to build the expected values. As expected, the USMC triangular distribution, shown in Table 3, has a large right tail, which is consistent with the Army's lognormal distribution. This signifies that maintenance man-hours per sortie are generally consistent unless an unforeseen unscheduled maintenance event must be addressed.

Table 3. Marine Corps Combined Scheduled and Unscheduled Maintenance Man Hour Triangular Distribution



Note: Adapted from Oracle. (2012). Oracle Crystal Ball (Version 11.1.2) [Computer Software]. Retrieved from http://www.oracle.com/us/products/middleware/bus-int/crystalball/cb-brochure-404904.pdf; Qinetiq, North America. (2012). Unmanned Aircraft Systems Initiative [Computer Software]. Retrieved from https://www.qinetiq-na.com/wp-content/uploads/MAC/UAS-I.pdf; Rosenburg, D. (2017). Mishap rate by system, tail number, month 3–8-2017 [Data File]. Redstone Arsenal, AL: Program Management Unmanned Aircraft Systems UAS, Department Manager and System/Program Analyst; Slaughter, J. (2017). All units, UAS-I scheduled and unscheduled maintenance 4–18-2017 [Data File]. Huntsville, AL: Contractor, PeopleTec, Inc.

4. Objectives

The model's objective is to forecast the number of maintainers required to support 1,000 sorties in a year for one system with four aircraft. The historical scheduled and unscheduled maintenance man hour data for this model was derived from over 50,000 flight hours in 2015 and 2016. The model from Crystal Ball with the expected values is shown in Table 4. Green blocks signify the decision variables that the Crystal Ball software manipulates to randomly generate values based on the defined distributions and correlations from historical data (Oracle, 2012). The cyan blocks are the forecasts that Crystal Ball will define after 100,000 simulations.

Table 4. Crystal Ball Monte Carlo Model

	Unscheduled MMH per Sortie	Schedued MMH per Sortie	MMH for 1000 sorties	MMH per day (250 flight days)	Average Hours per day per maintainer	Total Maintainers Required
Army	3.23	2.53	5760.00	23.04	3.90	5.91
USMC	5.31	6.91	12218.66	48.87	3.90	12.53

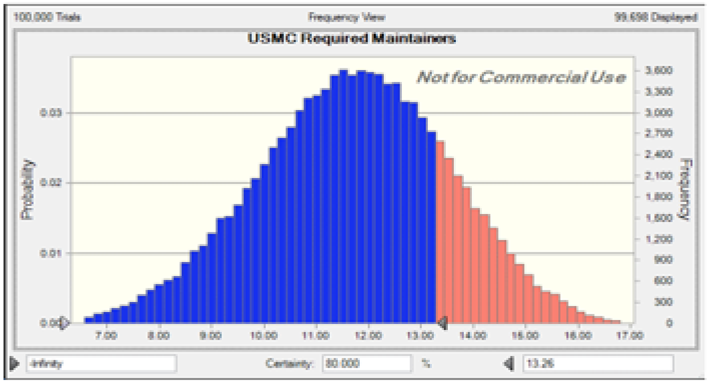
Note: Adapted from Oracle. (2012). Oracle Crystal Ball (Version 11.1.2) [Computer Software]. Retrieved from http://www.oracle.com/us/products/middleware/bus-int/crystalball/cb-brochure-404904.pdf; Qinetiq, North America. (2012). Unmanned Aircraft Systems Initiative [Computer Software]. Retrieved from https://www.qinetiq-na.com/wp-content/uploads/MAC/UAS-I.pdf; Slaughter, J. (2017). All units, UAS-I scheduled and unscheduled maintenance 4–18-2017 [Data File]. Huntsville, AL: Contractor, PeopleTec, Inc.

D. SIMULATION RESULTS

We ran the Crystal Ball simulation 100,000 times. Army maintenance was much more efficient than the Marine Corps. In general, Department of Defense Aviation is funded to a 70–80% readiness level. Assuming a corresponding 80% confidence level for the number of maintainers required to sustain 1,000 sorties per year per system, the Army has an expected value of 5.91 or 6 maintainers (Table 5). To support the same number of annual sorties, the Marine Corps requires more than double the number of maintainers for a total of 12.53 or 13 maintainers (see Table 5). Assuming only 10 maintainers were available per system, the Army would have less than a 1% value at risk of accomplishing the 1,000 annual sorties. Value at risk is a way of statistically measuring the probability of success or failure over a given time horizon. The Marine Corps would have an 81.71% value at risk. In other words, the Marine Corps has a greater than 80% chance of failing to make 1,000 flights in a year with only 10 maintainers per system (see Table 6). These sort of odds are unacceptable to any Commander. In summary, all other things being equal except for maintenance policy, the Marine Corps requires twice the maintenance man-hours spent per flight, which annually requires double the number of maintainers.

Table 5. USMC and Army Maintainers Required for 1,000 Sorties

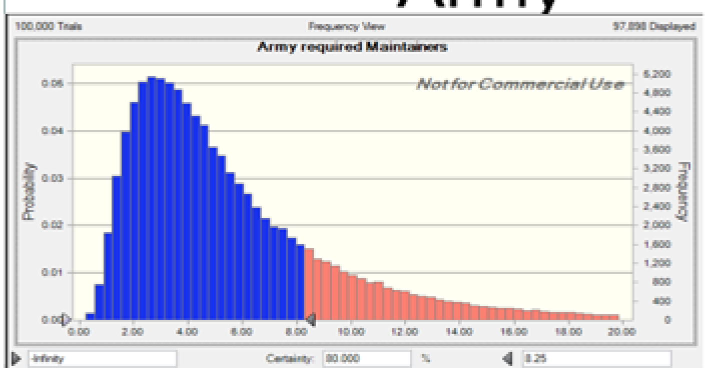
USMC



Forecast: USMC required Maintainers	
Statistic	Forecast values
Trials	100,000
Base Case	12.53
Mean	11.68
Median	11.73
Mode	'---
Standard Deviation	1.83
Variance	3.33
Skewness	-0.1313
Kurtosis	2.8
Coeff. of Variability	0.1563
Minimum	5.08
Maximum	17.81
Mean Std. Error	0.01

13.26 USMC Maintainers required to support 1000 annual sorties at 80% confidence level

Army

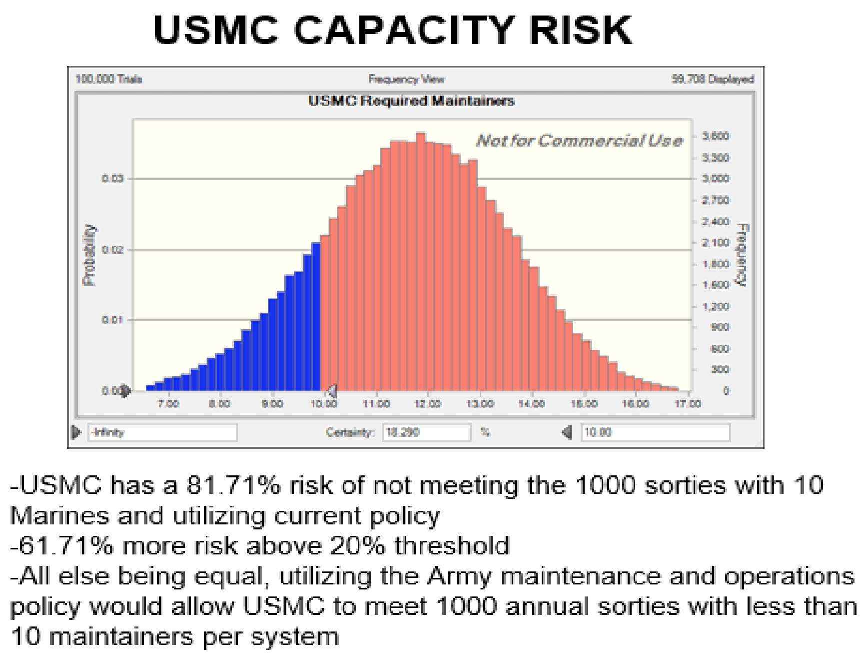


Forecast: Army required Maintainers	
Statistic	Forecast values
Trials	100,000
Base Case	5.91
Mean	5.89
Median	4.54
Mode	'---
Standard Deviation	4.98
Variance	24.77
Skewness	3.65
Kurtosis	32.73
Coeff. of Variability	0.8444
Minimum	0.24
Maximum	126.4
Mean Std. Error	0.02

8.25 Army Maintainers required to support 1000 annual sorties at 80% confidence level

Note: Adapted from Oracle (2012). Oracle Crystal Ball (Version 11.1.2) [Computer Software]. Retrieved from http://www.oracle.com/us/products/middleware/bus-int/crystalball/cb-brochure-404904.pdf; Qinetiq, North America. (2012). Unmanned Aircraft Systems Initiative [Computer Software]. Retrieved from https://www.qinetiq-na.com/wp-content/uploads/MAC/UAS-I.pdf; Slaughter, J. (2017). All units, UAS-I scheduled and unscheduled maintenance 4–18-2017 [Data File]. Huntsville, AL: Contractor, PeopleTec, Inc.

Table 6. USMC Value at Risk for 1000 Sorties



Note: Adapted from Oracle. (2012). Oracle Crystal Ball (Version 11.1.2) [Computer Software]. Retrieved from http://www.oracle.com/us/products/middleware/bus-int/crystalball/cb-brochure-404904.pdf; Qinetiq, North America. (2012). Unmanned Aircraft Systems Initiative [Computer Software]. Retrieved from https://www.qinetiq-na.com/wp-content/uploads/MAC/UAS-I.pdf; Slaughter, J. (2017). All units, UAS-I scheduled and unscheduled maintenance 4–18-2017 [Data File]. Huntsville, AL: Contractor, PeopleTec, Inc.

E. LIMITATIONS OF THE MODEL

This model has several limitations. Foremost, it does little to address spikes in demand during surge operations. It also ignores the impacts of weather or poor coordination between RQ-7B operational units and the forces they support. The model looked strictly at the daily support requirements of one maintenance crew for one system of four aircraft. This model ignored the need for dual shift maintenance operations that occur from time to time. Despite these limitations, this model is based off of two years of Army and Marine Corps maintenance data and clearly shows that the Marine Corps is expending double the maintenance man-hours per sortie that the Army is expending. The next chapter explores the qualitative factors of the Naval Aviation Maintenance Program that significantly contribute to greater maintenance requirements of the Marine Corps.

THIS PAGE INTENTIONALLY LEFT BLANK

III. MAINTENANCE PROGRAM RISK

A. FLIGHT CLEARANCES

Naval aircraft can have one of three flight clearances based on their probability of loss (see Table 7). Manned aircraft such as a C-130 and MV-22 have a Category 1 flight clearance, which means the aircraft is engineered to have less than one mishap per every 100,000 flight hours. A Category 2 flight clearance is expected to have less than one loss per every 10,000 flight hours, and a Category 3 flight clearance is for aircraft with a high probability of loss (HPOL), meaning expected losses of greater than one for every 10,000 flight hours, or unknown mishap rates (Department of the Navy Naval Air Systems Command, 2010). In order to mitigate the risk associated with a Category 3 flight clearance, flight operations are limited to restricted airspace far from densely populated areas. These aircraft are determined to be expendable. All Navy and Marine Corps Group 3 UAS have a Category 3 flight clearance. Naval Aviation wants to maintain and reuse these assets as best as possible, but at the end of the day they are ultimately expendable.

Table 7. UAS Flight Clearance Categories. Adapted from Adams (2017).

UAS Flight Clearance Category	Intended Usage	Airworthiness Standards & Data	Cumulative Probability of Catastrophic Failure or Probability of Loss of Aircraft*
CAT 1	• All Classes of Airspace • All Population Densities	• Airworthiness and safety of flight equivalent to manned • Design engineering review	≤ 1 UA Loss in 100,000 flt hrs
CAT 2	• All Classes of Airspace • Limitations on Flight over Densely Populated and Congested Areas	•Higher PLOA than Manned Aircraft •Tailored Airworthiness Criteria & Standards •Design engineering review	≤ 1 UAV in 10,000 flt hrs
CAT 3	• Over Water or over Sparsely Populated or Unpopulated Areas • Limitations on flight over personnel •Restricted/Warning Areas, Maritime Environment, Combat Zones, International Airspace, Specific Ranges, NAS Class G or COA	Safety of Flight • Risk of Material Loss Accepted, HPOL** •Engineering Review and Risk Assessment • Not designed to accepted engineering standards and/or insufficient data	> 1 UAV in 10,000 Flt hrs or Unknown

During UAS program development, Navy program office engineers use the risk management assessment tools of the NAVAIRINST 5000.21B to measure, assess, track, and mitigate aircraft risk (Naval Air Systems Command, 2008). Flight clearances are issued based off the associated risk with the loss of aircraft. Each individual risk area is assigned a risk manager who uses a waterfall chart to track steps to mitigate the risk.

B. RISK ANALYSIS

Marine Corps Order 3500.27C contains the Operational Risk Management (ORM) process used by the Marine Corps to mitigate risk and maximize mission accomplishment (Headquarters Marine Corps, 2014). This order is similar to the processes contained within NAVAIRINST 5000.21B (Naval Air System Command, 2008). It is a five-step procedural framework used to identify and assess the severity and frequency of hazards, make risk decisions, implement risk controls, and supervise those controls (Headquarters Marine Corps, 2014). This risk measuring process can be applied to the maintenance program oversight for both manned and unmanned aircraft to better assess the risks associated with flight operations. Aviation maintenance departments are evaluated on their compliance to the COMNAVAIFORINST 4790.2c Naval Aviation Maintenance Program (DON, 2017). The NAMP demands compliance for 43 different programs that are deemed critical to safety. It is intuitive that there is more risk associated with manned flight operations, but let us take a closer look at risk through the lens of maintenance program compliance. Each of the 43 programs has a different risk severity and frequency for manned and unmanned aviation. While subjective, each of the 43 programs are briefly described and assigned a risk assessment code (RAC) based off risk severity and risk frequency shown in Tables 8, 9, and 10. This risk assessment is conducted for both manned and unmanned aviation. The risk ratings are determined under the assumption that current NAMP procedures are being utilized for both manned and unmanned aviation.

Table 8. Frequency Criteria. Source: Headquarters Marine Corps (2014).

Category	Description
A	Likely to occur immediately or within a short period of time. Expected to occur frequently to an individual item or person Expected to occur continuously over a service life for a fleet, inventory of items, or group
B	Probably will occur in time Expected to occur several times to an individual item or person Expected to occur frequently over a service life for a fleet, inventory of items or group.
C	May occur in time Can reasonably be expected to occur sometime to an individual item or person Can reasonably be expected to occur several times over a service life for a fleet, inventory of items, or group
D	Unlikely to occur, but not impossible.

Table 9. Severity Criteria Table. Source: Headquarters Marine Corps (2014).

Category	Description
I	Loss of the ability to accomplish the mission Death or permanent total disability Loss of a mission-critical system or equipment Major facility damage Severe environmental damage Mission-critical security failure Unacceptable collateral damage
II	Significantly degraded mission capability or unit readiness Permanent partial disability or severe injury or illness Extensive damage to equipment or systems Significant damage to property or the environment Security failure Significant collateral damage
III	Degraded mission capability or unit readiness Minor damage to equipment, systems, property, or the environment Minor injury or illness
IV	Little or no adverse impact on mission capability or unit readiness Minimal threat to personnel safety or health Slight equipment or systems damage, but fully functional and serviceable Little or no property or environmental damage

Table 10. Risk Matrix. Source: Headquarters Marine Corps (2014).

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

1. Maintenance Training Program

The primary purpose of the Maintenance Training Program is to ensure that only qualified personnel are performing maintenance on the aircraft. The more complicated an aircraft becomes, the more different technical specialties are required to support flight operations. A typical aviation maintenance department is comprised of avionics technicians, power plant mechanics, air frame mechanics, ordnance technicians, egress technicians, and aviation life support technicians (DON, 2017). Overall program management is difficult because each specialty must meet individual training standards and certification, qualification, and licensing requirements. Group 3 UAS maintenance only requires one Military Occupational Specialty (MOS). Group 3 aircraft and ancillary equipment are much less complex with fewer moving parts. Overall, the program management for Group 3 UAS is much simpler, as seen in Table 11, and should not be held to the same training program standards as manned aviation.

Table 11. Maintenance Training Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	 2	3
	II	1	2	3	4
	III	2	3	4 	5
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). Naval aviation maintenance program (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). Risk management (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

2. Fuel Surveillance Program

The Fuel Surveillance Program oversees aircraft fuel sampling procedures. It ensures that an aircraft does not have contaminants or water in the fuel tanks. On a typical aircraft, fuel samples are taken from each fuel tank and auxiliary fuel drop tank (if equipped) prior to the first flight of the day. These samples are critical to ensure that water does not buildup in the fuel system over time, which can be catastrophic for gas turbine engines powering aircraft with humans on board (DON, 2017). Group 3 unmanned aircraft utilize a sealed fuel system. The tank is filled prior to flight, then the system is purged of remaining fuel after the aircraft lands so water cannot build up. Additionally, Group 3 unmanned aircraft do not use gas turbine engines. They use either rotary Wankle or piston driven engines with much simpler fuel delivery systems such as carburetors or fuel injection. Lastly, Group 3 unmanned aircraft do not have sampling ports on the aircraft. Fuel samples are instead taken from the fuel source prior to fueling the aircraft. With the system inherent characteristics of Group 3 UAS and their decreased consequences of fuel contamination, unmanned aviation has lower qualitative risk than manned aviation as depicted in Table 12. Group 3 UAS should not be held to the same fuel surveillance programmatic standards as manned aviation.

Table 12. Fuel Surveillance Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	 2	3
	II	1	2	3	4
	III	2	3	4 	5
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). Naval aviation maintenance program (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). Risk management (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

3. Naval Oil Analysis Program

In order to prevent against an impending engine failure due to bearing wear down, the Naval Oil Analysis Program takes oil samples from the oil scavenge pump and uses a spectrum analyzer to burn samples and identify metal content. The results of this test can identify trace bearing metals indicative of engine wear. Group 3 UAS do not have gas turbine engines, and the relatively low cost of engine replacement has precluded the engineering efforts to develop NOAP standards and pay for spectrum analyzer equipment/support. While critical to manned aviation, this program is not applicable to Group 3 UAS and therefore has no risk, as shown in Table 13.

Table 13. Naval Oil Analysis Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	 2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). Naval aviation maintenance program (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). Risk management (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

4. Aviators Breathing Oxygen Surveillance Program

Hypoxia is a condition that deprives pilots of oxygen resulting in reduced coordination, impaired decision making, and ultimately loss of consciousness. The Aviators Breathing Oxygen Surveillance Program creates an overall maintenance framework for the maintenance of applicable oxygen systems and control of the associated tooling and parts. Key tenets of the program include training and material handling that prevent the introduction of contaminants into the system and reduce the risk of fire while working on highly flammable liquid oxygen systems (DON, 2017). While absolutely critical to aircrew safety, this program is not applicable to unmanned aircraft that are piloted remotely from the ground and therefore has no risk as shown Table 14.

Table 14. Aviators Breathing Oxygen Surveillance Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	 2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). Naval aviation maintenance program (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). Risk management (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

5. Hydraulic Contamination and Control Program

The NAMP has a Hydraulic Contamination and Control Program. Manned aircraft use hydraulics to actuate flight control surfaces, brakes, and retract and extend landing gear. If air, water, or other contaminants are introduced to the closed loop hydraulic system, it can be catastrophic. Air and other contaminants compress at a much greater rate than hydraulic fluid and can prevent the proper operation of a flight control surface (DON, 2017). These systems are under extreme pressure and regularly operate in excess of 4,000 pounds per square inch (PSI). Even a pinhole leak can kill or severely injure a maintainer. Group 3 UAS avoids the risks associated with hydraulic contamination on the aircraft by using electric servos to operate all flight control surfaces. While many Group 3 UAS use hydraulic powered launchers to catapult the unmanned aircraft into the air, these systems never leave the ground, and all personnel are kept at a safe distance during launcher operation. The Hydraulic Contamination and Control Program is not applicable to Group 3 UAS and has no risk, as depicted in Table 15.

Table 15. Hydraulic Contamination and Control Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	 3	4
	III	2	3	4	5
	IV	3	4	5	5 

Risk Assessment Codes
1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible

Note: Adapted from Department of the Navy. (2017). Naval aviation maintenance program (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). Risk management (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

6. Tire and Wheel Maintenance Safety Program

A KC-130 Hercules has a gross operating weight in excess of 83,000 pounds. An FA-18F Super Hornet can land on a carrier at a maximum weight of 44,000 pounds and decelerate to a complete stop in less than two seconds. These incredible feats are enabled by extremely high-pressure, nitrogen-filled tires. Although rare, these tires can explode, releasing a lethal amount of energy that can kill or maim anyone in close proximity. Because of the danger, the NAMP mandates compliance with the Tire and Wheel Maintenance Safety Program. This program dictates training and procedures that keep maintainers safe while storing, handling, and servicing aircraft tires (DON, 2017). This program is not applicable to Group 3 UAS. Current Naval Group 3 unmanned aircraft include the RQ-21 Blackjack and the RQ-7B Shadow. The tires on the RQ-7B are only filled to 35 PSI, and the RQ-21 does not utilize landing gear. Therefore, this program should not be applied to Group 3 UAS activities. It could be argued that the tires on HMMWVs and their associated trailers should fall under the NAMP Tire and Wheel Maintenance Safety Program; however, these tires have much lower PSIs than manned aircraft, and these tires are already governed under the much less restrictive procedures contained in the ground-maintenance logistics regulations. Manned and unmanned Tire and Wheel Program risks are shown in Table 16.

Table 16. Tire and Wheel Maintenance Safety Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	4
	III	2	 3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). Naval aviation maintenance program (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). Risk management (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

7. Quality Assurance Program

In order to maintain compliance with the 43 programs required by the NAMP, the NAMP has a program titled the Quality Assurance Program. This program mandates quality assurance principles and personnel certifications to perform quality assurance tasks. This program details the duties for the quality assurance officer (QAO), quality assurance chief (QAC), quality assurance representative (QAR), collateral duty quality assurance representative (CDQAR), and collateral duty inspector (CDI). It also delineates the duties for program managers and program inspectors. Program managers are assigned for each of the NAMP programs, and a corresponding QAR is assigned to monitor and inspect each of the programs for compliance. The Quality Assurance Program also dictates oversight requirements for equipment maintenance. In short, it states that every maintenance task will be inspected by a separate QA certified individual (DON, 2017). The complexity of manned aircraft demands the intense quality assurance practices dictated in the Quality Assurance Program. While this program is also applicable to unmanned aircraft, the intensity and level of oversite can be decreased because of the associated risk levels shown in Table 17. Many maintenance tasks do not need a second set of inspections, because of the simplicity of unmanned aircraft. Aircrew already inspects much of the aircraft while it is on the launcher just before flight, and an additional quality oversight check is not necessary. Additionally, the programmatic requirements levied upon maintenance departments are manpower intensive, which is difficult to staff with current manpower levels within Group 3 UAS units.

Table 17. Quality Assurance Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	 2	3
	II	1	2	3	4
	III	2	3	4 	5
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). Naval aviation maintenance program (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). Risk management (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

8. Navy Occupational Safety and Health Program

Maintenance safety is always paramount in aviation, whether it is for manned or unmanned aircraft safety. The Navy Occupational Safety and Health Program (NAVOSH) is the Navy equivalent to the civilian Occupational Safety and Health Program (OSHA). This program mandates safety precautions such as steel-toed boots, fall protection, and eye protection (DON, 2017). It also requires continuous safety training. This program is just as applicable to maintainer safety for unmanned aircraft as it is to unmanned aircraft maintenance departments. The only risk difference between manned and unmanned aviation is the severity of risks associated with manned aviation due to their larger size and ability to inflict more severe injury to maintainers. The manned and unmanned associated risk assessment codes are shown in Table 18.

Table 18. Navy Occupational Safety and Health Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	 2	3
	II	1	2	3	4
	III	2	3	 4	5
	IV	3	4	5	5
Risk Assessment Codes: 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). Naval aviation maintenance program (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). Risk management (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

9. Naval Aviation Maintenance Discrepancy Reporting Program

The Naval Aviation Maintenance Discrepancy Reporting Program (NAMDRP) is part of the larger Department of Defense Joint Discrepancy Reporting System (JDRS). It is used to document sub-par aircraft components and generate technical publication deficiency reports. This program is used in the same manner for manned and unmanned aircraft maintenance, and in both cases, JDRS discrepancy reports are the genesis for engineering investigations and technical publication updates (DON, 2017). Once a report is submitted into the system for engineers to review, all other units can see the status of the report and thus gain better maintenance situational awareness across the fleet. Manned and unmanned NAMDRP program risk is depicted in Table 19. While this program is applicable to both manned and unmanned aviation, the risk consequence severity for unmanned aviation is less due to the reduced risk to life and lower associated dollar value.

Table 19. Naval Aviation Maintenance Discrepancy Reporting Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	 3	4
	III	2	3	4	5
	IV	3	4	5 	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). Naval aviation maintenance program (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). Risk management (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

10. Aviation Confined Space Program

Fuel vapor can be very harmful for maintainers working inside of an aircraft fuel tank. Special precautions, such as the use of respirators, need to be taken to protect maintainers. Fuel tanks must be emptied and purged with forced air before they are safe to enter. The Aviation Confined Space Program regulates the training and qualifications of maintainers working in fuel cells and sets forth many of the aircraft preparation and marking requirements before fuel cells can be opened (DON, 2017). This is critical to the safety of maintainers; however, Group 3 unmanned aircraft are relatively small and the danger from fuel vapors is negligible as shown in Table 20. Current Group 3 UAS have sealed fuel tanks, and there is no way to open them, making the program not applicable for the current unmanned fleet.

Table 20. Aviation Confined Space Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	 2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

11. Foreign Object Damage Program

The Foreign Object Damage (FOD) Program aims to protect aircraft from debris. Rocks, tools, and unaccounted fasteners can do millions of dollars of damage if ingested by a gas turbine engine. A forgotten rag in a fuel system can clog a filter, choking off fuel at high rotations per minute (RPM). Unaccounted-for tools can become lodged in flight control cables. All of these instances can cause crashes and potentially kill a pilot. Every morning aviation units perform an all-hands FOD walk to mitigate this threat (DON, 2017). While FOD poses a mortal threat to manned aviation, it has minimal impacts on Group 3 unmanned aircraft. The sealed fuel system precludes the chance of FOD in the fuel tank. FOD ingestion into the engine is a forlorn threat because the small Wankle or piston engines inhale air at infinitesimal rates compared to gas turbine engines, and they have air filters. Flight control surfaces are almost impossible to bind from a lost tool because they are operated by sealed electric servos instead of traditional cables and bell cranks. There is still the possibility of leaving a tool on the launcher rail, which would be catastrophic to an unmanned aircraft, but a completely destroyed unmanned aircraft is around one million dollars compared to a $70 million MV-22. Group 3 UAS should not devote the same manpower as manned squadrons on FOD prevention. Group 3 UAS typically operate in austere FOD-riddled environments and has built in FOD resiliency to overcome potential FOD dangers and thus has a much lower risk, as shown in Table 21.

Table 21. Foreign Object Damage Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	 1	2	3	4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

12. Tool Control Program

Similar to the FOD Program, the Tool Control Program aims to protect aircraft from unaccounted for tools that could bind flight controls or destroy a gas turbine engine. The Tool Control Program also dictates how tools and tool boxes will be set up, inventoried, managed, reordered, and even etched (DON, 2017). It dictates that on each maintenance work order, the maintainer must annotate which tool box was used to perform maintenance. A tool box can only be assigned to one task at a time, and each box must be inventoried by a CDI each time maintainers begin and stop work. The intent is to be able to trace the use of every tool in the event of a mishap. With Group 3 UAS, good housekeeping and tool control are tenets of good sound maintenance, but the intent can be met without the same level of regulation as manned aviation. The tolerance for risk is much greater when dealing with Group 3 UAS (see Table 22).

Table 22. Tool Control Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	 2	3
	II	1	2	3	4
	III	2	3	4	5 
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

13. Corrosion Prevention and Control Program

Today we are still flying CH-53 Super Stallion helicopters, which were introduced during Vietnam. Naval aircraft operate in salt-water environments, which can quickly cause corrosion. Legacy F/A-18 Hornets have had their service life extended multiple times, and it is critical that their frames are not weakened from corrosion during high-speed, high G-force maneuvers. Over the past decades, corrosion has been such a problem that Naval aviation leadership implemented the Corrosion Prevention and Control Program to ensure that Naval aircraft can meet their expected life limits in inhospitable salt-water operating environments (DON, 2017). While corrosion is a threat to all aircraft, Group 3 UAS are more resilient to the effects of corrosion. First off, they have much shorter service lives than manned aircraft. Unmanned technology is constantly changing, and their low cost allows for quick replacement in order to capitalize on emergent technologies. In just my three years at VMU-1, we saw the sundown of the RQ-7B, and the introduction of the RQ-7B V2 and RQ-21. The legacy RQ-7B was sundowned after less than 10 years of service at VMU-1, which is less than a third of the lifespan of other Naval manned air frames. The primary structure of Group 3 unmanned aircraft are composite materials that are much more corrosion-resistant than steel and aluminum. They fly at much slower speeds and G-forces than manned aircraft and do not require the same corrosion prone metal spars and supports and have much lower risk as shown in Table 23. When not in use, Group 3 UAS are disassembled and kept out of the elements in containers. They do not sit on the flight line like manned aircraft. These facts, coupled with well written manufacturer corrosion control procedures, negate all the reasons that the Corrosion Control Program was originally created for, and should not be applied to Group 3 UAS in the same manner as it is for manned aircraft.

Table 23. Corrosion Prevention and Control Program Risk Analysis

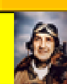
Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	 2	3	4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

14. Plane Captain Qualification Program

In the movies, a maintainer is often pictured performing final aircraft checks and saluting the pilot as he takes off. This maintainer is known as the plane captain. The plane captain is certified by the Commanding Officer, and is the last set of eyes before the aircraft takes off. He assists the pilot in conducting preflight checks and after the engines start, he ensures there are no fluid leaks and that the flight controls respond to the pilot's inputs (DON, 2017). The Plane Captain Qualification Program is used to manage the training, testing, certification, and continuous proficiency of plane captains. They need to have emergency procedures memorized and know what to do in any situation. This is a very important qualification, and has the same level of importance for both manned and unmanned maintenance. The radio and hand signal communications are very similar for both. The only difference between the manned and unmanned aviation is that unmanned aircraft have fewer systems that need to be checked before takeoff (see Table 24).

Table 24. Plane Captain Qualification Program Risk Analysis

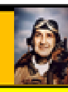
Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	 3	4
	III	2	3	4 	5
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

15. Explosives and Egress System Check-Out Program

The Explosives and Egress System Check-Out Program is important for manned aviation to prevent the accidental activation of explosives in the canopy, seat, emergency landing gear blow down devices, and any other Cartridge Activated Devices (CADs) (DON, 2017). Maintainers often have to enter the cockpit to perform routine scheduled or unscheduled maintenance and it is imperative that they do not accidently touch the wrong handle, which could inadvertently activate the ejection seat rockets. While important to manned aviation, current Group 3 UAS do not have any CADs, making this program not applicable, and this is reflected in Table 25.

Table 25. Explosives and Egress System Check-Out Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	 2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

16. Support Equipment Training and Licensing Program

In aviation, there are hundreds of pieces of support equipment that range from tow tractors to hydraulic carts, oxygen carts, gas turbine air carts, and so on. The use of many of these pieces of support equipment is not intuitive, and thus the Support Equipment Training and Licensing Program governs the licensing of individuals to use the equipment. An individual is required to attend an introductory course for each piece of support equipment, then complete required reading, conduct a minimum of three on-the-job training sessions, take a written test and a practical application test, then be approved by superiors via a routing chain including the work center supervisor, division officer, maintenance chief, assistant aircraft maintenance officer, and finally the maintenance officer (DON, 2017). While some argue that this process is too cumbersome compared to Air Force procedures, the argument is nil for Group 3 UAS, because current unmanned aircraft do not operate any support equipment governed under the Support Equipment Training and Licensing Program. While it is important to train maintainers on the use of this equipment, the administrative programmatic licensing requirements are relatively low risk for both manned and unmanned aviation (see Table 26).

Table 26. Support Equipment Training and Licensing Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	4
	III	2	 3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). Naval aviation maintenance program (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). Risk management (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

17. Support Equipment Planned Maintenance System

Aside from Group 3 unmanned aircraft and the F-35, all Naval aviation units document maintenance using the Optimized-Organizational Maintenance Activity (OOMA) version of Naval Aviation Logistics Command/Management Information System (NALCOMIS). In addition to documenting maintenance on the aircraft and subcomponents, OOMA is also used to track special tools under the auspice of the Support Equipment Planned Maintenance System (SEPMS) Program (DON, 2017). Each piece of support equipment receives an electronic record jacket that is maintained along with the gear. The record is transferred with the gear. Group 3 UAS units do not have OOMA and have thus far been exempt from the SEPMS program. That may change with an initiative to introduce OOMA to Group 3 UAS activities. Proponents argue that this change will bring the Group 3 units more in concert with other manned aviation units. Opponents argue that the SEPMS program will generate an additional administrative burden to the unit without a corresponding increase to readiness or support equipment management. This program is strictly administrative in nature and has the same low risk to safety for both manned and unmanned aviation as depicted in Table 27.

Table 27. Support Equipment Planned Maintenance System Program Risk Analysis

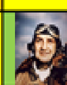
Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	 5 	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

18. Technical Data Management Program

Aircraft maintenance manual publications typically contain several thousand pages. They are constantly updated. Changes include minute administrative corrections or part number updates, but can also include critical changes resulting from an identified faulty procedure or upgrade of a system. The Technical Data Management Program manages version control for all the different publications. It is critical that maintainers use the most up-to-date version of a technical manual, and the importance is just as critical to manned aviation as it is to unmanned aviation. When fully functioning and adequately staffed, publication updates are timely. The downside of this program for Group 3 UAS is that it does not account for the increased reliance on Original Equipment Manufacturer (OEM) publications used by Group 3 UAS. Group 3 program offices typically have a small technical data management team compared to the much larger program offices of manned aircraft. Often times, the OEM will provide technical material much more rapidly than the Group 3 office can keep up with, and the restrictive procedures of the technical data management program can slow down the incorporation of the most up-to-date content. The frequency of a technical data management related mishaps are infrequent, but if one did occur, the result would be much greater for manned aviation as shown in Table 28.

Table 28. Technical Data Management Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	 4
	III	2	3	4	5 
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

19. Naval Aviation Metrology and Calibration Program

Calibration of torque wrenches, test sets, and test benches is accomplished through the Naval Aviation Metrology and Calibration Program. Naval calibration labs maintain calibration standards and tooling that they use to calibrate the fleet's tools (DON, 2017). While Group 3 UAS has a much narrower equipment set requiring calibration, this program is just as integral to safe maintenance as it is for manned aircraft. Not following this program can lead to improperly calibrated equipment that could be used on an aircraft. In the extremely rare circumstance where a tool was exponentially out of calibration it could lead to mishap, but this risk is very remote as shown in Table 29. Unmanned aviation has less program risk to personnel than manned aviation, but the Naval Aviation Metrology and Calibration Program is still an important part of a safe, professional maintenance program.

Table 29. Naval Aviation Metrology and Calibration Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	 4
	III	2	3	4	5 
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

20. Nondestructive Inspection Program

The Nondestructive Inspection (NDI) Program assesses material condition to detect the presence of cracks or other conditions that could cause an impending failure. Typical NDI methods include liquid dye penetrate, X-rays, and Eddy-current testing. The NDI program governs the training and certification requirements for certified NDI technicians. Various NDI techniques are common-place for manned aviation to inspect metals such as gas turbine engine blades and hold down restraining equipment, but these inspection are not typically used for unmanned aviation. The relatively low cost and smaller size of Group 3 UAS generally preclude the need for the NDI program (see Table 30).

Table 30. Nondestructive Inspection Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	 2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

21. Hazardous Material Control and Management Program

Both federal and state laws govern the management and use of hazardous materials (HAZMAT) that can be harmful to both the environment and personnel. The Hazardous Material Control and Management Program directs the storage and personal protective equipment use for HAZMAT. The program requires indoctrination and follow-on training for all individuals who will be exposed to the many different HAZMATs associated with aircraft maintenance (DON, 2017). This program is just as applicable to unmanned aviation maintenance as it is for manned aviation maintenance departments, the only difference is that manned aviation uses greater quantities of HAZMATs, that if spilled would be harder to clean up than in unmanned aviation. This risk severity is reflected in Table 31.

Table 31. Hazardous Material Control and Management Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	 3
	II	1	2	3	4 
	III	2	3	4	5
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

22. Electric Static Discharge Protection and Electro-Magnetic Interference Reporting Program

The Electric Static Discharge (ESD) Protection and Electro-Magnetic Interference (EMI) Reporting Program has two functions. First, it aims to bring attention and education to the handling of ESD sensitive components. When very expensive avionics boxes are removed from the aircraft, they must be ground before they are worked on because even a small ESD discharge from the human body can destroy a component worth a couple hundred thousand dollars. Extreme care is taken to handle and package these weapons repairable assemblies (WRA). Maintainers need indoctrination and follow-on training to help reduce the risk of inadvertent damage through ESD. Second, the program wants to document EMI. This serves to identify if the enemy is jamming the equipment, or if there is an environmental condition present that is causing interference. Reports are collected from the fleet so engineers can study them and take action if needed to harden equipment (DON, 2017). This program is applicable to both manned and unmanned aviation maintenance, and Table 32 depicts the associated risks. Unmanned aircraft operate at line of sight distances of up to 50 miles from the control station. They often experience intermittent link loss. These link hits are normal, and happen at least a few times every flight, but under current program requirements, a report is required to be generated for each occurrence. The program is important, but needs to be updated to reflect the normal characteristics of unmanned aviation.

Table 32. Electric Static Discharge Protection and Electro-Magnetic Interference (EMI) Reporting Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	4
	III	2	 3	4	5
	IV	3	4 	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

23. Technical Directive Compliance Program

Major weapon systems are complicated, especially with aircraft. Spiral development ensures new capabilities are continuously introduced to keep aircraft up to date with the threat environment. The Technical Directive Compliance Program manages the processes and policies to update aircraft. This program tracks all the available technical changes, and tracks the incorporation for each separate end item. This program is applicable to both manned and unmanned aviation. It is critical for controlling configuration management. Both manned and unmanned aviation have the same probability of a technical directive related mishap and therefore have the same associated risks, as shown in Table 33.

Table 33. Technical Directive Compliance Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	4
	III	2	3	 4 	5
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

24. Manpower Management Program

The Manpower Management Program is a simple program to ensure maintenance department leadership is looking at their staffing. Oftentimes a unit is focused on meeting the daily flight schedule and can overlook long-term manpower and talent management. This program helps the Maintenance Department evaluate current qualifications and project future shortages. This program has the same importance and associated risks for manned and unmanned aviation as depicted in Table 34.

Table 34. Manpower Management Program Risk Analysis

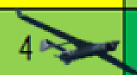
Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	 5 
Risk Assessment Codes: 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

25. Maintenance Control Program

The Maintenance Control Program is arguably the single most important program to the maintenance effort for both manned and unmanned aviation. The NAMP states, "Maintenance Control is responsible for the efficient attainment of aircraft and equipment readiness in support of operational objectives" (DON, 2017, p. 5-1). The Maintenance Control Program serves as the central nervous system of the maintenance department. Each day Maintenance Control prioritizes, synchronizes, and delegates the workload in order to meet flight requirements. Maintenance Control personnel are responsible for reviewing aircraft records and administratively certifying that aircraft are safe for flight. Associated manned and unmanned aviation maintenance control program risks are shown in Table 35. While this program is of significant importance, the current procedures outlined in the NAMP do not meet the unique requirements for unmanned aviation.

Table 35. Maintenance Control Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	 2	3
	II	1	2	3	4
	III	2	3	4 	5
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

26. Weight and Balance Program

Aircraft have a center of gravity. Flight control surfaces move in a manner that adjusts the pitch, roll, and yaw of an aircraft around its center of gravity. As fuel, components, and/or munitions are added to an aircraft, the center of gravity is changed. Each aircraft has different tolerances on what can be added to the aircraft without exceeding weight and balance limitations. The Weight and Balance Program dictates how aircraft will be weighed, loaded, and fueled. It tracks every new component added via the technical directive program (DON, 2017). This program is much more difficult for manned aviation, which are bigger, are more complicated, and have many more technical directives during their service life (see Table 36). There is more program risk associated with manned aircraft than unmanned aircraft simply because of costs and risks to human life.

Table 36. Weight and Balance Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	 3
	II	1	2	3	4
	III	2	3	4	5 
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

27. Aircraft Records and Reports and Engine Account Program

The Aircraft Records and Reports and Engine Account Program is a strictly administrative program that aims to manage the efficiency of the maintenance effort, not necessarily to track the safety of components installed on aircraft. This program has an extremely low probability of causing a mishap, but the consequences are much greater for manned aviation as depicted in Table 37.

Table 37. Aircraft Records and Reports and Engine Account Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	 3	4
	III	2	3	4	5
	IV	3	4	5 	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

28. Logs and Records Program

The Logs and Records Program differs slightly from the Aircraft Records and Reports and Engine Account Program. The Logs and Records Program outlines administrative procedures that ensure all life-limited components are tracked, digitally or via physical medium, and replaced in accordance with their life-cycle requirements. It includes the notation requirement for the rework, extension, and specifically directed inspection of aircraft systems and components. Like most of the other programs listed in the NAMP, the Logs and Records program is applicable to both manned and unmanned aviation; however, the consequences are more severe for manned aviation as shown in Table 38.

Table 38. Logs and Records Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	 3	4
	III	2	3	4	5
	IV	3	4	5 	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

29. Phase Maintenance Program

The Phase Maintenance Program is only applicable to manned aviation. A phase inspection typically happens every 200 flight hours. Aircraft panels are removed and maintainers inspect the material condition of the aircraft. Different phase inspections inspect different areas of the aircraft. Group 3 UAS does not have phase inspections because they are small and can be easily inspected without a prescribed phase inspection cycle. Therefore, UAS maintenance has zero risk in this program area, as shown in Table 29.

Table 39. Phase Maintenance Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	 4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

30. Data Analysis Program

The Data Analysis Program is another administrative program that looks to measure maintenance effectiveness. COMNAVAIRFORINST 4790.2c outlines the procedure to create reports and analyze performance (DON, 2017). It looks at the downtime due to maintenance and parts shortages. The NAMP focuses the procedures on using the Optimized Organization Maintenance Activity (OOMA) maintenance information system (MIS), which does not apply to current UAS; however, the intent can still be met. While maintenance efficiency is important, this program is low risk to safety for both manned and unmanned aviation, as shown in Table 40.

Table 40. Data Analysis Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	 5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

31. Material Control Program

The Material Control Program tracks individual aircraft piece parts such as nuts, bolts, screw, and other fasteners. The Material Control Program accompanies the Foreign Object Damage program to ensure each and every fastener does not become a potential source of damage to aircraft and engines. Additionally, the Material Control Program dictates the processes associated with requisitioning, tracking, and turning in material requirements. It outlines which codes to use to assign priorities to requisitions, and how to update them as the material condition of the aircraft change. While this is an administratively important program, it has a relatively low impact on aircrew safety, especially for unmanned aviation (see Table 41).

Table 41. Material Control Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	 3	4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

32. Aircraft Maintenance Material Readiness List Program

The Aircraft Maintenance Material Readiness List (AMMRL) Program helps manage the fleet distribution of special test sets and gives fleet wide traceability of assets. This program aims to track equipment status and manage upgrades to test sets. For example, an upgrade to the AV-8B weapons management system may require an update to a test set; the AMMRL program will allow the program office to collect and modify all the test sets, or redistribute a test set to a squadron who may be deploying soon. This program has minimal effect on safety, but is important to logistical management. Manned Naval aircraft have mature policies to manage special test equipment. Most Group 3 UAS programs have much less refined support equipment management policies, but the intent is the same. Again, this program is important for logistics, but has a limited effect on safe flight operations, and therefore both manned and unmanned aviation both have the lowest risk assessment code in Table 42.

Table 42. Aircraft Maintenance Material Readiness List Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	 5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

33. Taxi, Turn-Up, and Auxiliary Power Unit Licensing Program

The Taxi, Turn-up, and Auxiliary Power Unit Licensing Program manages the certification and recertification of maintainers who operate aircraft in conjunction with ground maintenance checks. Pilots go through years of training before they get behind the controls of an aircraft. A large part of the training includes switchology and emergency procedures. Maintainers who perform engine run-ups need to know the same procedures, and the Taxi, Turn-up, and Auxiliary Power Unit Licensing Program manages the training. Group 3 UAS has the option of using aircrew to perform the engine run ups under the auspice of the aircrew training program. The aircrew is removed from the actual cockpit of the aircraft and thus unmanned aviation has lower inherent risks compared to manned aviation, which is illustrated in Table 43.

Table 43. Taxi, Turn-Up, and Auxiliary Power Unit Licensing Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	 4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

34. Vibration Analysis Program

Dynamic rotating components can cause severe vibrations. Extreme vibrations can rip a rotating assembly apart and cause a catastrophic loss of aircraft. Helicopters and gas turbine engines are especially susceptible to this condition, and thus the Vibration Analysis Program was created to manage the periodic vibration measurement of certain rotating assemblies. Program compliance can have life and death consequences for manned aviation, but this program is not applicable to current Group 3 unmanned aircraft. These different risk severities and probabilities are shown in Table 44.

Table 44. Vibration Analysis Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	 1	2	3
	II	1	2	3	4
	III	2	3	4	5 
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

35. Aerial Refueling Stores Program

The Aerial Refueling Stores Program manages the storage and upkeep of mission equipment used during aerial refueling. The genesis of the program was the years of costly degradation of refueling equipment that degraded during periods of nonuse. While this program is not applicable to many manned platforms, it is completely not applicable to Group 3 UAS platforms. This program has little effect on aircrew safety, and the associated program risks are shown in Table 45.

Table 45. Aerial Refueling Stores Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	 5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

36. Battery Maintenance Safety Program

Lithium ion batteries are among the most powerful chemical reaction batteries available today. Many aircraft use this battery technology to power extremely high capacity electronic systems. If not stored and maintained correctly, batteries can experience a thermal runaway, which can destroy an aircraft and/or severely injure a maintainer. The Battery Maintenance Safety Program contains safety procedures on how to store and upkeep aircraft batteries to prevent a safety incident. The program directs quarterly safety training requirements including emergency action drills on how to handle a thermal runaway (DON, 2017). Unmanned aircraft use similar battery technology as manned aircraft, but on a smaller schedule. The Battery Maintenance Safety Program holds the same significance as in manned aviation, but the risk severity is lower which for unmanned aircraft (see Table 46).

Table 46. Battery Maintenance Safety Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	 3	4
	III	2	3	4	5
	IV	3	4	5 	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

37. Compass Calibration Program

Unmanned aircraft only use GPS and digital inertial navigation systems (INSs). Manned aircraft also utilize these instruments for navigation, but also have a stand-by wet compass as a backup in case of emergency. The Compass Calibration Program creates a requirement for manned aircraft to be positioned on a compass rose to calibrate the wet compass. It is important for a manned aircraft to have a backup compass, especially at sea where there is no other divert runway other than an aircraft carrier, but this program is not applicable to unmanned aviation and thus has no risk which is depicted in Table 47.

Table 47. Compass Calibration Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	4
	III	2	3	4	 5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

38. Laser Hazard Control Program

Most high-powered lasers are not visible to the naked eye, but nonetheless can cause permanent blindness. The Laser Hazard Control Program is applicable to both manned and unmanned aviation. It details safety procedures to ensure that a maintainer or unattended victim on a training range is not blinded by the inadvertent firing of a laser. This program protects against inadvertent firing of the laser and has the same associated risks with both manned and unmanned aviation as depicted in Table 48.

Table 48. Laser Hazard Control Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	3	 4 
	III	2	3	4	5
	IV	3	4	5	5
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

39. Naval Ordnance Management Policy, Explosive Handling Personnel Qual & Cert, Aircraft Armament Systems Programs

Aviation units are inspected on three ordnance related programs: the Naval Ordnance Management Policy, the Explosive Handling Personnel Qualification and Certification Program, and the Aircraft Armament Systems Program. The aims of these three programs are to add additional safety steps to upkeep, store, and track explosive ordnance and weapons racks (DON, 2017). These three programs are absolutely vital to the safety and training of personnel associated with manned aircraft that carry ordnance, but they are not applicable to Group 3 unmanned aviation, and this is reflected in Table 49.

Table 49. Consolidated Risk Analysis for the Naval Ordnance Management Policy, Explosive Handling Personnel Qual & Cert, Aircraft Armament Systems Programs

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	 3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

40. Aviation Life Support System Program

The Aviation Life Support System (ALSS) Program accompanies the Aviators Breathing Oxygen Surveillance Program. While the Aviators Breathing Oxygen Surveillance Program focuses on the aircraft, the ALSS Program is aimed at pilot flight equipment. Flight equipment inspections are not tied to the same inspection cycle of a specific aircraft, and thus need to be tracked individually. Flight equipment includes survival equipment such as radios, life vests, flotation devices, and pen flares. Unmanned aircraft aircrew are not in danger if an unmanned aircraft goes down, and therefore this program is not applicable to Group 3 UAS (see Table 50).

Table 50. Aviation Life Support System (ALSS) Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	 3
	II	1	2	3	4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

41. Low Observable Program

The Navy and Marine Corps now have their first stealth aircraft with the introduction of the F-35 Joint Strike Fighter. The new aircraft has low observable coatings that reduce the radar cross section. To maintain these stealth coatings, the Low Observable Program was created. While critically important to pilots penetrating enemy air defenses, this program has few safety consequences to maintainers. Additionally, current Group 3 UAS platforms do not utilize low observable coatings and thus have zero risk, which is shown in Table 51.

Table 51. Low Observable Program Risk Analysis

Risk Assessment Matrix		Probability			
		A	B	C	D
SEVERITY	I	1	1	2	3
	II	1	2	 3	4
	III	2	3	4	5
	IV	3	4	5	5 
Risk Assessment Codes 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible					

Note: Adapted from Department of the Navy. (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf, and Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf.

C. RISK ANALYSIS SUMMARY

In conclusion, using the risk assessment framework from Marine Corps Order 3500.27C, each of the total 43 COMNAVAIRFORINST 4790.2C maintenance programs were evaluated. In aggregate, the average risk scoring for manned aviation is 3.05, which is considered a moderate risk. Unmanned aviation received a risk assessment score of 4.74, which is almost negligible. The primary two factors that drove the difference in risk were the fact that Group 3 UAS aircraft are not piloted and they also have relatively low replacement costs compared to manned aircraft. Therefore, unmanned aviation maintenance should not be held to the same standards, and they can assume much greater risk tolerance.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. RQ-21 MAINTENANCE

The RQ-21 Blackjack is the newest Group 3 UAS in the Navy and Marine Corps inventory. It is replacing the Army managed RQ-7B Shadow program. The major components of the RQ-21 system consist of five aircraft, two ground control stations, a launcher, a Small Tactical Unmanned Aircraft System Retrieval System (SRS), a ground generator, four HMMWVs, and additional associated radios and ancillary equipment. Each VMU Squadron will retire their three RQ-7B systems and receive six RQ-21 systems.

Over the past five years (October 2012 to 2017), there have been 29 mishaps involving the RQ-21 (Naval Safety Center, 2017). During this period, there were only 60 aircraft fielded to the fleet including early operational capability (EOC) aircraft (Seemayer, 2017). Although the RQ-21 is governed under the same maintenance policy as the MV-22 and the F-35, the RQ-21 mishaps are several magnitudes greater than other manned Naval aircraft. A significant portion of RQ-21 mishaps occurred during recovery when the aircraft struck the mast of the SRS, which accounted for 17% of reportable mishaps. These aircraft were able to be expeditiously repaired and put back into service. Currently the RQ-21 has a mishap rate of 366 for every 100,000 flight hours (Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office, 2017). A manned aircraft with a Category 1 flight clearance is required to have a mishap rate of less than 1 for every 100,000 flight hours (Department of the Navy Naval Air Systems Command, 2010).

The RQ-21 was intended to fill a capability gap to have a UAS that could operate with the Marine Expeditionary Unit (MEU) from the sea. The original vision was to have an RQ-21 detachment consisting of one system and eight Marines that could operate from modified LPD amphibious combat ships. As of October 2017, there have been three MEUs that have deployed with RQ-21 detachments. NAMP requirements have led to a significant increase in manpower. The original eight Marines have bloated to 22 Marines (Deputy Military Class Desk, 2017). Originally, there were only to be four operators and four maintainers. The contractor-designed curriculum trained aircrew on basic maintenance such as system assembly and launch and recovery operations. Today, aircrew does not perform any maintenance or assembly tasks. The current 22-man RQ-21 MEU detachment is shown in Table 52.

Table 52. Marine Expeditionary Unit VMU Detachment. Adapted from Deputy Military Class Desk (2017).

BILLET DESCRIPTION	GRADE	MOS
OIC/UAS PILOT	CAPT	7315
UAS PILOT	CAPT	7315
UAS PILOT	1STLT	7315
UAS PILOT	1STLT	7315
UAS PILOT	SSGT	7314
UAS PILOT	SGT	7314
UAS PILOT	CPL	7314
UAS PILOT	CPL	7314
MAINTENANCE CONTROL CHIEF	CIV	6012
MAINTENANCE CONTROL	CIV	6012
AVIONICS/MAINTENANCE TECHNICIAN	CIV	6314/6018
AVIONICS/MAINTENANCE TECHNICIAN	CIV	6314/6018
AVIONICS/MAINTENANCE TECHNICIAN	SGT	6314
AVIONICS/MAINTENANCE TECHNICIAN	LCPL	6314
AVIONICS/MAINTENANCE TECHNICIAN	LCPL	6314
AVIONICS/MAINTENANCE TECHNICIAN	LCPL	6314
AVIONICS/MAINTENANCE TECHNICIAN	LCPL	6314
UTILITIES MAINT	CPL	1142
IMAGERY ANALYST	SGT	0241
INTEL ANALYST	CPL	0231
DATA SYSTEM TECHNICIAN	CPL	0651
FIELD RADIO OPERATOR	LCPL	0621

By summarizing each of the 7,580 work orders for the RQ-21 since it was introduced in 2012 through March 31, 2017, the true maintenance requirements emerge. This information can demonstrate the maintenance manpower requirements under both NAMP compliant policy and for a unique Group 3 UAS maintenance policy. During this time, there were a total of 5,597 elapsed maintenance man-hours. *Elapsed maintenance man-hours* is the actual time it took to accomplish the task, whereas *maintenance man-*

hours is the sum of the total time it took for each individual involved in the task (i.e., a task that took three people one hour to complete would be a total of three maintenance man-hours and an elapsed maintenance time of one hour). Under the current NAMP paradigm, a worker cannot inspect his or her own work, and a separate maintenance controller cannot certify an aircraft safe for flight if he or she performed the maintenance or performed the inspection. Therefore, the 5,597 elapsed maintenance hours is really a minimum 11,194 maintenance man-hours. This does not take into account that there is usually an additional maintenance Marine under training, plus the man-hours worked by a maintenance controller who is administratively reviewing each maintenance record once a work order is completed. When accounting for the plane captain required for each flight, and the requirement for a minimum of two aircrew per flight, as well as the Officer of the Day, then a minimum six Marines is needed per shift for each RQ-21 system. By adding a little redundancy with the incorporation of a radio operator and a generator mechanic, the detachment quickly grows to 22 Marines to operate just one system for two sorties a day, totaling 10 flight hours each day during sustained dual shift operations (Deputy Military Class Desk, 2017).

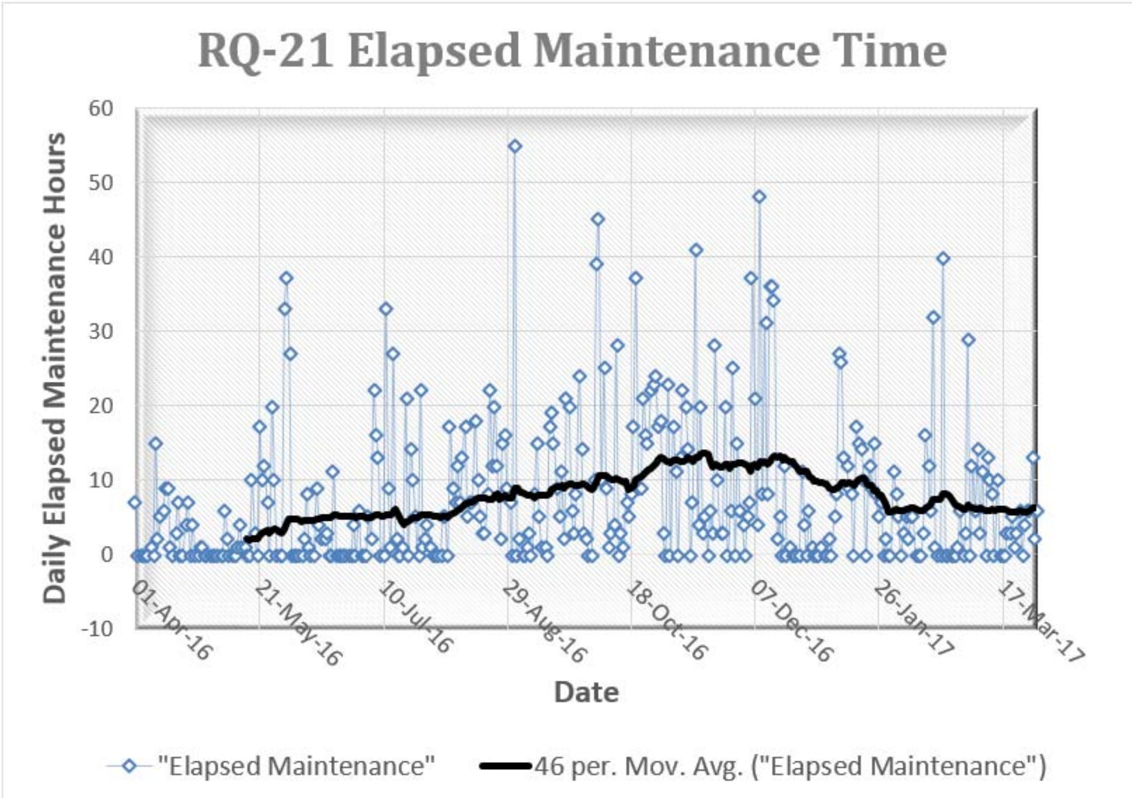
Table 53. RQ-21 Maintenance Man-Hours

Aug 2012-Mar 2017	Assembly/Disassembly, Scheduled Maintenance, and Corrosion Control Elapsed Maintenance Time	Unscheduled and Corrective Maintenance and Technical Directive Elapsed Maintenance Time	Total Elapsed Maintenance Time
Aircraft	1584	1303	2887
Launch and Recovery Equipment	1555	1156	2710
Total	**3139**	**2459**	**5597**

Note: Adapted from Seemayer, C. (2017). *RQ-21 MX actions hours* [Data File]. Naval Air Station Patuxent River, MD: Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office (PMA-263), Assistant Program Manager Logistics, and Kocher, K. (2017). RQ-21 maintenance actions and hours [Data File]. Patuxent River, MD: Assistant Program Manager-Logistics, Small Tactical Unmanned Air Systems, Program Management Activity 263.

Assembling the RQ-21 aircraft and emplacing the launcher and SRS are very basic tasks that can be accomplished in well under an hour. Even though the NAMP currently requires each of these tasks to be inspected by a separate maintenance inspector who was not involved in the maintenance, they are again independently inspected during the preflight walk-around inspection. These assembly/emplacement tasks could be accomplished by aircrew. Looking at all maintenance tasks between April 1, 2016 and March 31, 2017, which included the maintenance actions for the two MEUs that deployed with RQ-21 detachments, we can evaluate the benefits that could be gained by having aircrew perform aircraft assembly and emplacement of the SRS and launcher. Aircrew learns these tasks as part of the contractor-led training curriculum. Additionally, if aircrew members who are not scheduled for that day's flight duties assisted with basic scheduled maintenance and corrosion control, an even greater manpower savings could be achieved. During the April 1, 2016-March 31, 2017, period there were a total of 3,743 elapsed maintenance hours, meaning that at a minimum, there were 7,486 maintenance man-hours plus the additional time for maintenance controllers to review maintenance records. Of that, 1,942 elapsed maintenance hours were attributed to assembly and scheduled inspections (Seemayer, 2017). If aircrew could perform at least 80% of these tasks, it would be a maintenance man-hour savings of 3,107 hours, or a total reduction of 41.5% of the total maintenance man-hours during that year. The Army has been executing this policy for over a decade with the RQ-7B.

Table 54. April 2016–May 2017 RQ-21 Maintenance



Note: Adapted from Seemayer, C. (2017). *RQ-21 MX actions hours* [Data File]. Naval Air Station Patuxent River, MD: Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office (PMA-263), Assistant Program Manager Logistics, and Kocher, K. (2017). RQ-21 maintenance actions and hours [Data File]. Patuxent River, MD: Assistant Program Manager-Logistics, Small Tactical Unmanned Air Systems, Program Management Activity 263.

To further minimize manpower requirements and capitalize on the RQ-21's simplicity, the collateral duty inspector requirement should be removed for any task that is independently inspected during the pre-flight inspection. Based on an average five-day work-week, from April 1, 2016, to March 31, 2017, across all delivered systems, maintainers had an average of 18.31 work orders per day, or 9.15 per shift. With an average work order length of around one hour, two maintainers, plus one inspector and one maintenance control are required for each shift per system.

Table 55. April 2016–May 2017 RQ-21 Maintenance Man-hour Breakdown

1 Apr 2016-31 Mar 2017	Scheduled Maint (including Assembly and Corrosion Prevention)	Unscheduled Maint (including Corrective, Technical Directive)	Total
Aircraft Elapsed Maintenance Man Hours	684.68	1209.81	**1894.49**
LRE Elapsed Maintenance Man Hours	1257.77	590.76	**1848.53**
Aircraft Average Work Order Length	0.77	0.66	**0.70**
LRE Average Work Order Length	0.86	1.04	**0.91**
Aircraft Average Work Orders Per Day	3.43	7.06	**10.49**
LRE Average Work Orders Per Day	5.63	2.19	**7.82**
Total Average Work Orders Per Day	9.06	9.25	**18.31**

Note: Adapted from Seemayer, C. (2017). *RQ-21 MX actions hours* [Data File]. Naval Air Station Patuxent River, MD: Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office (PMA-263), Assistant Program Manager Logistics, and Kocher, K. (2017). RQ-21 maintenance actions and hours [Data File]. Patuxent River, MD: Assistant Program Manager-Logistics, Small Tactical Unmanned Air Systems, Program Management Activity 263.

If the inspection requirements are adjusted and aircrew can be employed for 80% of emplacement and basic scheduled inspection tasks, the MEU detachment size can be reduced from nine to four maintainers. This is an overall 53.6% maintenance manpower reduction. The 2015 typical Table of Organization (T/O) had over 70 aircraft technicians (6314 MOS; United States Marine Corps, 2017). The new T/O has only 38 maintainers (Salas, 2017). These 38 Marines will have to cover down across six RQ-21 systems, maintenance control, and quality assurance. This reduction represents a 45.74% decrease in maintenance manpower. To solve this problem, the only feasible way forward is to change current maintenance policy and use aircrew to augment the maintenance effort for basic system emplacement and scheduled maintenance tasks. Although this is a daunting problem, this problem is surmountable with some critical thought and the stroke of a pen to change policy, the maintenance manpower shortage can be solved.

V. RECOMMENDATIONS FOR FUTURE STUDIES AND CONCLUSIONS

A. RECOMMENDATIONS FOR FUTURE STUDIES

Unmanned aircraft of all different sizes and capabilities are proliferating throughout the DOD and civilian sector. The pace at which new technologies are being delivered is daunting. This report looked strictly at the maintenance policy for Group 3 UAS, however, there are several other studies that are recommended to balance cost with capability and deployability. These topic areas must be carefully studied because they will influence how the Marine Corps trains, equips, and fights over the next decade.

1. Cost Benefit Analysis of Proposed RQ-21 Capability and Reliability Improvements

The primary improvement in the works for the RQ-21 is the upgrade from the Alticam 11 to the Alticam 14 EO/IR payload. This new payload will improve imagery and add a laser designator. This improvement comes with added weight and drag. To combat this, a new heavy fuel Cosworth engine is in development. This engine should provide the required thrust and improve reliability, but it adds additional weight. In order to accommodate the heavier payload and engine, the fuselage will have to be redesigned and the launcher will have to be modified. A study should be undertaken to examine the trade space between costs and capability for this endeavor.

2. Cost Benefit Analysis of New Group 2 UAS vs. Improved RQ-21

The Stalker XE is currently being procured by MARSOC. It is a Group 2 UAS (less than 55 lbs) that is exempt from the NAMP. It can be operated and maintained by just two Marines and has a significantly smaller logistical footprint. It operates with a fuel-cell powered electric engine and can thus fly undetected at lower altitudes. Although it has a less powerful camera, it can achieve similar image quality because of its ability to fly undetected at lower altitudes. Miniaturization efforts have created the ability for this small UAS to host additional sensors and radios that were once only available on much larger aircraft. A cost benefit analysis should be conducted to determine if the Stalker XE or other Group 2 UASs can be procured at a lower price than the cost of improvements to the RQ-21. Manpower costs should be an integral part of this analysis.

3. Future Maintenance Manning for the VMUs

The Marine Corps is in the early stages of the acquisition process for a Group 5 UAS. This will be a complicated aircraft and have maintenance requirements akin to today's manned, gas turbine engine aircraft. This new unmanned aircraft will be delivered as early as 2025. The Marine Corps should conduct a study to determine how many maintainers each VMU squadron will require, and the exact maintenance specialties that will be required. Currently, VMUs have one maintenance specialty with their 6314 Avionics Technicians. All other T/M/S aircraft have a mix of Avionics, Power Plants, Air Frames, Ordnance, Egress, and Ordnance specialties. Obviously Egress and Flight Equipment Marines will not be needed with a Group 5 UAS, but the other specialties will most likely be needed to maintain avionics and communications systems, an electronic warfare suite, gas turbine engines and dynamic components, weapons, and advanced composites. Although the manpower structure of VMAQ EA-6B squadrons has been redistributed among other MOSs across the Marine Corps, it is recommended to examine converting the existing VMAQ EA-6B Squadrons, which are currently being phased out, to take on the Group 5 UAS mission considering they currently fulfill electronic attack missions for the Marine Corps. They also currently have an MOS structure that could support the maintenance requirements for a Group 5 UAS much easier than trying to grow that capability internally within a VMU that only has one maintenance MOS. Other considerations to include in this study are training options. If the MQ-9 Reaper fills the Group 5 gap, Air Force maintainer and aircrew schools would help save costs.

4. Study to Examine whether or not the Next Group 5 UAS must be Capable of Launching from Amphibious Shipping

Operating from a ship imposes many challenges. The size of the future Group 5 UAS will be limited due to constrained deck space. A current LHA/LHD already has a full complement of F-35, MV-22, CH-53, UH-1, and AH-1 aircraft. There is no room for additional aircraft or equipment without reducing the current complement. A reduction in current manned aircraft numbers will impact ship-to-shore movement or strategic strike capability. A study needs to be conducted to determine the effective combat radius a Marine Group 5 UAS must have to be capable of supporting MEU operations without being required to be launched and recovered from the ship. Current and future basing rights and potential conflict areas need to be evaluated as part of this process. The new MQ-9 extended range is capable of flying for 40 hours with weapons. Considering the operational environment, is this enough loiter time to negate the need of launching from a ship?

B. CONCLUSIONS

Group 3 UAS are different from manned aviation. They have a Category 3 flight clearance, they do not receive independent engineering certification; and they do not have the system redundancy found with manned aircraft. These factors all attribute to much higher mishap rates than manned aviation. They must operate in restricted airspace away from densely populated areas. Over the past five years, the Marine Corps has experienced 29 RQ-21 mishaps, which is significantly high considering that during those past five years, the Marine Corps has only fielded 60 RQ-21 aircraft.

1. Naval and Army Group 3 UAS Comparisons

Manned Naval aviation maintenance requirements have been pushed onto Group 3 UAS even though the associated risks and costs are much lower. This project has quantitatively shown that NAMP compliance does improve mishap rates. The Army uses half the maintenance manpower that the Marine Corps uses for the RQ-7B, yet actually has slightly lower mishap rates. The Army policy is only 29 pages, whereas the Navy and Marine Corps' policy is over 1,500 pages. A smaller, more concise policy allows maintainers to focus on the most important tasks without getting bogged down on superfluous administrative tasks. The less time maintainers are spending on administrative requirements, the more they are out on the flightline mentoring and training junior maintainers. To decrease manpower requirements, the Army uses aircrew to perform emplacement and inspection tasks; additionally, the Army has reduced oversight requirements. After comparing all Army, USMC, and contractor RQ-7B maintenance data, the results show that additional maintenance man-hours do not decrease mishap rates, suggesting that mishaps are spawned by the limitations of aircraft engineering and not the stringency of maintenance programs.

2. Program Risk Assessment Conclusions

A qualitative examination of each COMNAVAIRFORINST 4790.2 NAMP-required program was conducted using the risk management framework outlined within MCO 3500.27C (Headquarters Marine Corps, 2014). This assessment examined the risk probability and severity of each of the 43 NAMP required programs and assigned a risk assessment code for each section. The result was a moderate risk score of 3.05 for manned aviation units that are following the NAMP. Unmanned aviation units under the NAMP receive a risk assessment score of 4.74, which is almost negligible. This qualitative analysis shows that current maintenance policy holds Naval Group 3 UAS to a lower risk threshold than manned aviation, which is counterintuitive considering that Group 3 UAS have a high probability of loss, are expendable, and do not endanger the lives of aircrew.

3. RQ-21 Maintenance Conclusions

Building off the lessons learned from the previous two sections, all RQ-21 maintenance work orders were quantitatively analyzed. The results show that roughly 50% of maintenance hours are associated with system emplacement and scheduled maintenance. Recommended policy changes would allow aircrew to participate in these tasks, and the result would be up to a 41.5% total decrease in required maintainers. This would significantly reduce the size of MEU detachments, which have already increased from eight to 22 Marines primarily due to Naval maintenance policies. It is rare that this level of savings can be achieved with zero expenses, and the opportunity should be capitalized upon.

C. SUMMARY OF CONCLUSIONS

Based upon the findings of this project and the best practices from the Army and Special Operations Command, a new Naval Group 3 UAS maintenance policy was created. This was identified as a need and action item by the USMC UAS Transition Task Force and the UAS Operation Advisory Group. The policy created during this project received crucial inputs and guidance from Headquarters Marine Corps, Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office (PMA-263), Secretary of the Navy Naval Innovation Advisory Council (NIAC), Commander Naval Air Forces (N42), and most importantly, the enlisted Marines and officers of the VMUs. While the changes, deletions, and additions to the current policy are too numerous to itemize, the new policy contained in Appendix A is 160 pages compared to the current 1,563 pages. The new policy is a much more concise set of rules governing the management of Group 3 UAS. In a few areas, the policy mirrors manned aviation policy, but in many other areas, it differs drastically. It also adds new policy for the use of additive manufacturing which has yet to be used/managed in current Naval aviation platforms. Ultimately, this new policy maintains the same tenets of safe, efficient, and effective maintenance practices that are the hallmark of Naval aviation. To round out this project, Appendix B was created with Fleet input. Appendix B contains a computerized self-evaluation checklist that pared down the current 92 pages of questions to a tailored 37-page document. This document can be used by inspectors to measure the effectiveness and compliance to Appendix A for unmanned aviation maintenance departments.

This project shows why policy matters and demonstrates the benefits that can be gained with a change. This topic is becoming increasingly important as autonomous systems proliferate. The NAMP was written in the blood of aircrew and maintainers, but it is time to innovate and adjust to the reality of unmanned systems. These new technologies are changing the way we fight, and policy must adjust accordingly or our legacy procedures will limit the capabilities of these paradigm-shifting technologies.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A. RECOMMENDED GROUP 3 UAS MAINTENANCE POLICY

Note: This appendix contains a new supplemental maintenance policy for Group 3 UAS. It supplements the Commander, Naval Air Forces Naval Aviation Maintenance Program (COMNAVAIRFORINST 4790.2). Language from the original document has been both retained and revised

DEPARTMENT OF THE NAVY
NAVAL AIR FORCE PACIFIC SAN DIEGO CA 92135-7051
NAVAL AIR FORCE ATLANTIC NORFOLK VA 23551-2427

COMNAVAIRPAC/
COMNAVAIRLANTINST 4790.X
N422
1 Nov 17

COMNAVAIRPAC/COMNAVAIRLANT INSTRUCTION 4790.X

From: Commander, Naval Air Force, Pacific
Commander, Naval Air Force, Atlantic

Subj: NAVAL AVIATION MAINTENANCE PROGRAM SUPPLEMENTAL GUIDANCE FOR GROUP 3 UNMANNED AIRCRAFT SYSTEMS

Ref: (a) COMNAVAIRFORINST 4790.2C

Encl: (1) Supplemental Guidance

1. **Purpose**. This is a joint Commander, Naval Air Force, Pacific (COMNAVAIRPAC)/Commander, Naval Air Force, Atlantic (COMNAVAIRLANT) instruction promulgating supplemental maintenance policy guidance for Group 3 Unmanned Aircraft Systems.

2. **Cancellation**. Not Applicable

3. **Background**. Group 3 Unmanned Aircraft and its associated programs have unique processes not currently addressed, or are not within the scope of reference (a). These processes require specific supplemental maintenance and logistics support guidance to operate safely, efficiently, and to optimize its capabilities and utilization.

4. **Scope**. This instruction is the bridging document between existing Commander, Naval Air Forces (reference (a)) policies and specific Group 3 Unmanned Aircraft System requirements.

5. **Action**. This instruction is a highly dynamic document that will be updated as Group 3 Unmanned Aircraft Systems management, maintenance, and logistics support processes mature.

6. **Records Management**. Records created as a result of this instruction, regardless of media or format, must be managed per Secretary of the Navy Manual 5210.1 of January 2012.

7. **Review and Effective Data**. Per OPNAVINST 5215.17A, Commander, Naval Air Force, Pacific (COMNAVAIRPAC)/Commander, Naval Air Force, Atlantic (COMNAVAIRLANT) will review this document annually on the anniversary of its effective date to ensure applicability, currency, and consistency with Federal, DoD, SECNAV, and Navy policy and statutory authority using OPNAV 5215/40 Review of Instruction. This instruction will automatically expire 5 years after effective date unless reissued or cancelled prior to 5-year anniversary date, or an extension has been granted.

W. L. EWALD
Chief of Staff

D. L. CHEEVER
Chief of Staff

Releasability and distribution:
This instruction is cleared for public release and is available electronically via:

COMNAVAIRPAC HIP
https://cpf.portal.navy.mil/sites/cnap/default/aspx

COMNAVAIRLANT HIP
https://usff.navy.deps.mil/sites/cnal/default.aspx

Table of Contents

43. Maintenance Training

44. Aviation Maintenance Inspection, Maintenance Program Assessment, and Material Condition Inspection Program

45. Additive manufacturing

Group 3 Unmanned Aircraft System (UAS) Maintenance Supplemental

1 Introduction

1.1 While the basic principles of professional maintenance are the same, Group 3 UAS has unique operational considerations that require different maintenance management. Hub and spoke operations and extended small unit detachments require flexibility in policy in order to meet mission requirements. This supplemental provides Naval Aviation Maintenance Program (NAMP) guidance for Group 3 UAS maintenance including:

a. Cannibalization within a system

b. Unique IT systems

c. Management of ancillary ground equipment

d. Unique supply systems and support equipment

e. Contract maintenance and Field Service Representatives (FSR).

f. Use of non-standard manuals

1.2 Some traditional NAMSOP programs do not apply to Group 3 UAS, and other programs have the same intent, but apply differently to Group 3 UAS. Figure 1-1 shall be used by Group 3 UAS activities and inspection agencies to determine program area applicability.

Area	Program Title	Applicability
200	Maintenance Training	Applicable with changes
300	Fuel Surveillance	Applicable with changes
400	Navy Oil Analysis and Consumption Monitoring	Applicable with changes for RQ-7B, not Applicable for RQ-21
500	Aviators Breathing Oxygen Surveillance	Not Applicable
600	Hydraulic Contamination Control	Not Applicable
700	Tire and Wheel Maintenance Safety	Not Applicable
800	Quality Assurance	Applicable with changes
900	Maintenance Department / Division Safety	Applicable
1000	Naval Aviation Maintenance Discrepancy Reporting	Applicable with changes
1100	Aviation Confined Space Program	Not Applicable
1200	Foreign Object Damage Prevention	Squadron will create procedures at local level
1300	Tool Control	Squadron will create procedures at local level
1400	Corrosion Prevention & Control	T/M/S Model Manager will create procedures
1500	Plane Captain Qualification	Applicable with changes
1600	Explosives and Egress System Check-out	Not Applicable
1700	SE Operator Training and Licensing	Not Applicable
1800	SE Planned Maintenance System	T/M/S Model Manager desktop procedures
1900	Technical Data Management	Applicable with changes
2000	Naval Aviation Metrology and Calibration	Applicable with changes
2100	Nondestructive Inspection	Not Applicable
2200	Hazardous Material Control & Management	Applicable
2400	ESD Protection and EMI Reporting	Applicable with changes
2600	Technical Directive Compliance	T/M/S Model Manager will create procedures
2800	Manpower Management	Applicable
2900	Maintenance Control	Applicable with changes
3100	Weight & Balance	Applicable with changes
3200	Aircraft Records & Reports / Engine Accounting	Applicable with changes
3300	Logs & Records	Applicable with changes
3400	Phase Maintenance	Not Applicable
3600	Data Analysis	Applicable with changes
3700	Material Control	Applicable with changes
3800	Aircraft Maintenance Material Readiness List	T/M/S Model Manager will create procedures
3900	Vibration Analysis	Not Applicable
4000	Taxi / Turn-up / APU Licensing	Not Applicable
4300	Aerial Refueling Stores	Not Applicable
4500	Battery Maintenance Safety	Applicable
4600	Aircraft Compass Calibration	Not Applicable
4700	Laser Hazard Control	Applicable
4800	NOMP AWCAP	Not Applicable
4900	Explosive Handling Personnel Qual & Cert	Not Applicable
5000	Aircraft Armament Systems	Not Applicable
5200	Aviation Life Support Systems	Not Applicable
6000	Low Observable	Not Applicable

Figure 1-1: Group 3 Program Applicability Table

2 Group 3 UAS Fuel Surveillance Program

2.1 References

a. NAVAIR 01-1A-35, Aircraft Fuel Cells and Tanks.

b. NAVAIR 00-80T-109, Aircraft Refueling NATOPS Manual.

c. MIL-HDBK-844B (AS), Aircraft Refueling Handbook for Navy/Marine Corps Aircraft.

d. NAVAIR 15-01-500, Preservation of Naval Aircraft.

e. NAVAIR 01-1A-20, Aviation Hose and Tube Manual.

2.2 Introduction

2.2.1 The Fuel Surveillance Program establishes the minimum requirements for sampling fuel Group 3 UAS.

2.2.2 Fuel sampling can detect water, debris, and other contaminants that can negatively impact aircraft engine performance. Harmful effects of fuel contamination include low performance, erratic or incorrect fuel quantity indication, fuel system icing, and damage to engine and fuel system components.

2.3 Requirements

2.3.1 Aircraft Fuel Sampling

WARNING: AVGAS, 100-LL, F-24, JP-4, JP-5, AND JP-8 CAN CAUSE SEVERE BURNS, IRRITATIONS, AND BLINDNESS. AVOID PROLONGED SKIN CONTACT WITH ANY AVIATION FUEL.

2.3.1.1 Some Group 3 UAS have sealed fuel systems that do not have fuel sampling points. A fuel sample shall be taken from the fueling source prior to fueling the aircraft. If not immediately flown, an aircraft shall be defueled after a maximum of seven days to prevent the buildup of water within the fuel system.

2.3.1.2 Fuel sampling will be conducted per the T/M/S maintenance technical manuals. For aircraft without specified fuel sampling procedures, follow the general requirements of NAVAIR 01-1A-35. Additional general requirements:

a. Allow maximum possible time before sampling. Whenever possible, fueling source should have a minimum of two hours settling time before sample is taken in order to allow water and solids to settle. This not applicable when using fueling jug for RQ-21.

b. PPE, including chemical resistant gloves, must be worn while taking, and disposing of fuel samples.

c. Take approximately one pint of fuel using a one-quart, clear, clean glass container.

d. The Plane Captain, CDI, CDQAR, QAR, or a NATOPS qualified Aircrewman will visually inspect samples ensuring there is no visible water or sediment by swirling and checking directly under the swirl vortex for any discoloration, water, cloudiness, or sediment per NAVAIR 00-80T-109.

1. If contaminants are present, retain the contaminated sample, drain approximately 1 gallon of fuel into bucket or other suitable container, and take another sample.

2. If the second sample is contaminated, immediately notify Maintenance Control, initiate a downing discrepancy work order (WO) against the aircraft and/or fueling source, and give both samples to a CDQAR or QAR for inspection.

e. Sample bottles must be emptied and cleaned after each use. Fuel samples are not required to be maintained for duration of the flight. Immediately upon inspection, fuel samples should be properly disposed of unless otherwise specified by the TM.

f. Fuel samples must be disposed of per local hazardous waste (HAZWASTE) procedures. Clean samples should be poured back into fuel source.

2.4 Responsibilities

2.4.1 T/M/S Model Manager:

a. Publish a training syllabus oriented to the T/M/S aircraft operated to include:

(1) Specific procedures and requirements for fuel sampling as outlined in NAVAIR 01-1A-35, NAVAIR 00-80T-109, MIL-HDBK-844 (AS), T/M/S maintenance technical manuals, and the NATOPS manuals.

(2) Procedures for maintaining fuel system integrity during maintenance.

(3) PPE, safety precautions, and HAZWASTE procedures for fuel handling.

2.4.2 Maintenance Officer (MO):

a. Designate a Fuel Surveillance Program Manager. Designation will be in writing via the Monthly Maintenance Plan (MMP).

b. Publish an LCP per Appendix D if required to direct geographic, T/M/S-specific, or command-directed actions for fuel surveillance

2.4.3 Program Manager:

a. Perform an assessment using the Computerized Self Evaluation Checklist (CSEC) within 30 days of being designated as Program Manager, and annually thereafter per section 7 of this supplemental.

b. Provide Fuel Surveillance Program indoctrination training to personnel. Training must be specific to the duties the individual performs and will be documented on the NAMP Indoctrination Training sheet (Figure 10.1-3) in the individual's qualification/certification record or ASM.

c. Maintain a program file to include:

(1) List of equipment requiring fuel sampling.

(2) POCs.

(3) Program related correspondence and message traffic.

(4) References or cross reference locator sheets.

(5) Most recent CSEC assessment checklist.

2.4.4 QAO:

Designate, a Fuel Surveillance Program Monitor. Designation will be in writing via the MMP.

2.4.5 Fuel Surveillance Program Monitor:

a. Perform audits using CSEC, per the procedures of section 7 of this supplemental.

b. Immediately conduct an investigation of the source of fuel contamination. If the contamination is suspected to have come from the refueling source (truck, fueling station, or S-4 source), immediately notify the S-4, station, or ship Fuels Officer and provide them a sample for analysis, per MIL-HDBK-844B (AS).

2.4.6 Maintenance Control:

a. Immediately issue a downing discrepancy WO and notify QA to conduct an investigation whenever aircraft or fuel source contamination is reported.

b. When embarked, use only the ship’s fuel to avoid the use of fuel with a lower flash point than JP-5. If fuel is brought aboard, ensure it is first checked by flight deck control to determine the flash point is about 120 degrees Fahrenheit.

3 Group 3 UAS Oil Consumption Monitoring Program

3.1 Introduction

3.1.1 The Oil Consumption Monitoring Program establishes requirements for monitoring the usage rate oil in Group 3 aircraft in order to detect impending failures.

NOTE: **The Oil Consumption Monitoring Program is not applicable to the RQ-21 because oil is premixed into the fuel prior to flight and burns at a constant rate.**

3.2 Requirements

3.2.1 Training

a. Personnel certifying aircraft Safe for Flight, Work Center Supervisors, and maintenance personnel responsible for servicing must receive job specific training on servicing requirements, and maximum oil consumption limits

3.2.2 Oil Consumption Monitoring

Oil consumption will be monitored for engines with oil consumption rates (such as ounces per flight hour) specified in applicable maintenance technical manuals.

3.2.3 Oil Consumption Documentation

a. Oil consumption will be documented in the Engine Oil Consumption record (Figure 3-1) or locally created sheet in the quantity specified in applicable maintenance technical manuals, such as, ounces per flight hour. The quantity and grade of oil added to each engine will also be annotated in block 6 of the Aircraft Inspection and Acceptance Record (OPNAV 4790/141).

b. The current working copy of the Engine Consumption Record will be maintained with Maintenance Control

3.3 Responsibilities

3.3.1 Maintenance Officer:

a. Designate a as the Navy Oil Analysis and Consumption Program Manager. Designation will be in writing via the Monthly Maintenance Plan (MMP).

b. Publish LCPs per Appendix D if required to direct T/M/S specific or other command directed actions for oil analysis and oil consumption monitoring not addressed.

3.3.2 Program Manager:

a. Perform an assessment using the CSEC within 30 days of designation as the Program Manager and annually thereafter.

b. Provide NAMP indoctrination training to personnel relating to their specific Navy Oil Analysis and Consumption Monitoring Program responsibilities.

c. Maintain a program file to include:

(1) Program correspondence and message traffic as applicable.

(2) Most current CSEC assessment checklist.

3.3.3 Maintenance Control:

a. Verify oil consumption rates for engines are within limits specified in T/M/S instructions prior to releasing aircraft Safe for Flight. If oil consumption rate exceeds the authorized limits, initiate a work order (WO) to take actions directed in Technical Manuals.

b. Annotate the quantity and grade of oil added to each engine in block 6 of the Aircraft Inspection and Acceptance Record (OPNAV 4790/141).

c. Maintain an up-to-date Engine Oil Consumption Record (Figure 3-1) or locally created tracking sheet in the aircraft discrepancy book (ADB).

3.3.4 Quality Assurance (QA) Officer:

Designate a Navy Oil Analysis and Consumption Program Monitor. Designation will be in writing via the MMP.

3.3.5 Program Monitor:

a. Perform audits using the CSEC.

3.3.6 Work Center Supervisors:

a. Personally conduct a daily inspection of assigned oil servicing units and verify they are clean and free of contamination.

3.3.7 Maintenance Personnel:

a. Strictly follow servicing and sampling procedures specified in the maintenance technical manuals.

b. Inspect and verify servicing units are clean and free of contamination prior to each use.

c. Verify servicing units have the correct oil grade prior to each use.

d. Know the oil consumption limits of engines, and immediately notify the Work Center Supervisor and Maintenance Control whenever excessive oil consumption is suspected.

3.3.8 Aircrew:

a. Review oil consumption rates documented on the Engine Oil Consumption Record (Figure 3-1) or locally generated tracking sheet and block 6 of the Aircraft Inspection and Acceptance Record (OPNAV 4790/141) prior to flight.

BUNO: __________ Engine S/N: _______________
Maximum allowable Oil Consumption is ________ oz. per flight hour.

DATE	FLIGHT HOURS	OZ. CONSUMED	CONSUMPTION RATE (OZ. PER F/H	SERVICING PERSONNEL SIGNATURE	MAINTENANCE CONTROL SIGNATURE

Figure 3-1: Engine Oil Consumption Record (Sample)

4 Aviators Breathing Oxygen (ABO) Surveillance Program

4.1 The ABO Surveillance Program is not applicable to Group 3 UAS.

5 Hydraulic Contamination Control Program

5.1 The Hydraulic Contamination Control Program is not applicable to Group 3 UAS.

6 Tire and Wheel Maintenance Safety Program

6.1 The Tire and Wheel Maintenance Safety Program is not applicable to Group 3 UAS.

7 Group 3 UAS Compliance Auditing Program

7.1 Reference

NAVAIRINST 4855.1, Corrective and Preventive Action Process Instruction

7.2 Introduction

7.2.1 The Group 3 UAS Compliance Auditing Program is a systematic process for aviation maintenance activities to verify their adherence.

7.2.2 Auditors are responsible for verifying compliance by thoroughly examining aircraft, equipment, records, documentation, and personnel involved in the process. The key factors to the effectiveness of an audit are the auditor’s knowledge of the process being examined, their attention to detail, and sampling a sufficient percentage of the aircraft, equipment, records, and personnel involved.

7.2.3 Group 3 UAS Compliance Audit Categories:

a. Program Manager assessments are in-depth examinations of the status of a program throughout the activity, and are performed by the designated Program Manager.

b. Quality Assurance (QA) audits are random sample audits conducted on certain programs throughout the activity, and are performed by the QA Representative designated as Program Monitor.

c. Work center audits are compliance reviews performed jointly by the Division Officer and Division Chief to assess individual work centers for:

(1) Adequate numbers of certified or designated personnel assigned to accomplish the workload, for example; Collateral Duty Quality Assurance Representatives (CDQAR), Collateral Duty Inspectors (CDI), and Plane Captains.

(2) Adequate material condition of equipment, tools, and facilities.

(3) Compliance with maintenance safety requirements and Navy Occupational Safety and Health or Occupational Safety and Health Administration regulations.

(4) Cleanliness and condition of workspaces.

(5) Compliance with all processes or programs the work center is required to comply with, for example; tool inventory procedures, foreign object damage (FOD) prevention, and electrostatic discharge protection.

(6) Compliance with fire and safety regulations.

d. Special audits are performed to investigate suspected or known compliance problems in specific programs or work centers.

7.2.4 The Computerized Self Evaluation Checklist (CSEC) is the standardized list of questions and references for conducting Compliance Audits. Additionally, the CSEC database serves as the repository for collecting and tracking discrepancy and corrective action data.

e. The CSEC database is divided into three categories that denote which activity is conducting the audit: Aviation Maintenance Management Team (AMMT), Type Wing, and Activity.

(1) The AMMT database is used by COMNAVAIRFOR and COMNAVAIRSYSCOM AMMTs when conducting Aviation Maintenance Inspections (AMI) and Maintenance Program Assessments (MPA).

(2) The Wing database is used by Type Wings and Marine Aircraft Wing (MAWs) when conducting MPAs.

(3) The Activity database is used by O-level activities when auditing programs and individual work centers.

f. COMNAVAIRFOR N422C NAMP Policy is the lead for the O-level CSEC. CSECs can be downloaded from the NAVAIR Web site at (http://www.navair.navy.mil/logistics/csec).

7.3 Requirements

7.3.1 Conduct Program Manager assessments, QA audits, and work center audits for applicable programs at least once every 12 months.

7.3.2 The most current version of the CSEC will be used for conducting audits.

7.3.3 Audit discrepancies will be entered in QA's CSEC database.

a. Discrepancies will be corrected within 10 working days from the completion of the audit.

b. Corrective action for Program Manager assessments and QA audits will be tracked by the designated Program Manager.

c. Corrective action for work center audits will be tracked by the responsible Division Officer or Division Chief.

7.3.4 Special audits will be conducted as necessary.

7.4 Responsibilities

7.4.1 Maintenance Officer (MO):

a. Designate a Program Manager for each applicable program listed in Section 1, Figure 1-1, of this supplemental. Designation will be in writing via the Monthly Maintenance Plan (MMP).

b. Designate the Quality Assurance Chief as the Compliance Auditing Program Manager. Designation will be in writing via the Monthly Maintenance Plan (MMP).

c. Review Program Manager assessments and QA audits and provide direction on corrective actions, as required.

d. Direct special audits when deemed necessary, and specify the scope of the audit and who will conduct it.

e. Publish an LCP per Appendix D, if required to specify command audit procedures not addressed in this NAMPSOP.

7.4.2 Quality Assurance Officer:

a. Designate Program Monitors for each applicable program listed in Section 1, Figure 1-1, of this supplemental. Designation will be in writing via the MMP:

(1) Program Monitors should be assigned for a minimum of one year.

(2) CDQARs may be assigned as Program Monitors to ease the workload of QARs assigned to the Quality Assurance Work Center.

(3) Program Monitors will not be assigned to monitor the same program for which they have been designated as the Program Manager.

b. Provide the Program Manager and MO with recommendations for improving quality and preventing recurrence of common discrepancies.

c. During the audit routing process, the QAO shall ensure each program manager is aware of the appropriate corrections that need to be made and work with OICs to ensure that program managers are afforded ample time to make program corrections. Additionally the QAO will recommend to the MO, program corrections and get well strategies for off track and NMA program audits.

7.4.3 Group 3 UAS Compliance Auditing Program Manager:

a. Perform a Program Manager assessment of the Group 3 UAS Compliance Auditing Program within 30 days of designation and annually thereafter.

b. Provide training to Program Managers, Program Monitors, Division Officers, Division Chiefs, and Work Center Supervisors on their auditing responsibilities, and procedures for entering data in the CSEC and printing audit reports.

c. Maintain the CSEC database

d. Check for an updated CSEC the second week of January, April, July, and October. Download the updated CSEC and distribute copies of applicable sections to designated Program Managers.

e. Coordinate the auditing schedule with Program Managers and Division Officers, and publish an annual schedule of Program Manager assessments, QA audits, and work center audits in January of each year.

f. Track the completion of audits and verify results are entered in the CSEC database.

g. Review discrepancies in QA audits and special audits for indications of poor quality or unsafe maintenance practices. Provide corrective action recommendations to the QA Officer to improve quality and prevent recurrence.

h. Route completed QA audits and special audits to the MO, via the QAO. When returned from the MO, provide copies of the audit to the designated Program Manager.

i. Maintain the last two QA audits (electronic or hardcopy) on file. The audit file must include, at a minimum, the completed CSEC discrepancy sheets, corrective actions, and accompanying routing forms.

j. Maintain a program file to include:

(1) POCs.

(2) Program related correspondence and message traffic.

(3) References or cross-reference locator sheets.

(4) Most current CSEC assessment.

7.4.4 Program Monitors:

a. Be thoroughly familiar with the CSEC sections applicable to their programs.

b. Perform the annual QA audit for designated programs.

c. Conduct a random sample of at least 25% of the population of aircraft, equipment, records, documentation and personnel.

7.4.5 Program Managers:

a. Be thoroughly familiar with the CSEC sections applicable to their programs.

b. Complete an initial Program Manager assessment of their programs within 30 days of assignment and annually thereafter. The initial assessment must examine at least 25% of the population of aircraft, equipment, records, documentation, and personnel. The annual assessment must examine at least 50% of the aircraft, equipment, records, documentation, and personnel involved in the process. Workload permitting, 100% of the process should be covered.

NOTE: **The annual assessment may be divided into segments over the course of the year.**

c. No later than 10 days after completion of a Program Manager assessment, forward the completed CSEC and a memorandum to the MO with amplifying information on any outstanding discrepancies with the program.

d. Notify Division Officers and Division Chiefs of discrepancies in their division, and track completion of corrective actions.

e. Analyze Program Manager assessments and QA audits, and take action to correct contributing factors to common recurring discrepancies.

f. Provide Division Officers and Division Chiefs with training on the critical requirements to inspect during work center audits.

g. As deemed necessary, seek assistance from experts from within or outside the command to perform or assist in assessments.

h. Create a program file containing points of contact, program references, correspondence, and most recent CSEC.

7.4.6 Division Officers and Division or Branch Chiefs:

a. Jointly perform a work center audit at least once every 12 months (annually).

b. No later than 10 days after completion of a work center audit, forward a memorandum to the MO with amplifying information on any outstanding discrepancies.

c. Track corrective action for discrepancies in work center audits, Program Manager assessments, and QA Audits.

8 Group 3 UAS Technical Data Management

8.1 References

a. DOD Instruction 8500.01, Cybersecurity.

b. DOD Instruction 8560.01, Communications Security (COMSEC) Monitoring and Information Assurance (IA) Readiness Testing.

c. CNAF M-3710.7, NATOPS General Flight and Operating Instructions.

d. NAVAIRINST 13630.5, Optimizing Weapon System Avionics Support Using Automatic Test Systems.

e. NAVAIRINST 13650.1D, Aircraft Maintenance Material Readiness List (AMMRL) Program.

f. NAVAIR 00-25-100, Naval Air Systems Command Technical Publications Library Management Program.

g. COMNAVAIRFORINST 13650.3, Aircraft Maintenance Material Readiness List (AMMRL) Program.

h. NAVAIR 00-25-604, Naval Air Systems Command Fleet Support/Integrated Program Team Acquisition and Sustainment of NAVAIR Technical Manuals.

i. Department of Defense Federal Acquisition Regulation Supplement (DFARS) Clause 52.227-7013.

8.2 Introduction

8.2.1 Aviation maintenance activities are responsible for using approved, up-to-date technical data to perform maintenance. This program is applicable to all Group 3 UAS.

NOTE: **Proprietary Data (drawings, specifications, processes, etc.) will not be released to contractors. Material containing proprietary data cannot be discussed with, forwarded, carried, or provided to any contractor or person outside the Department of Defense without the written permission from the owner of the data per Department of Defense Federal Acquisition Regulation Supplement Clause 52.227-7013.**

8.2.2 NAVAIR 00-25-100 is the governing policy document for the Naval Air Systems Command (NAVAIR) Technical Publications Library Management Program, and provides procedures related to technical manuals (TM) and Technical Publications Library (TPL) operations.

8.2.3 These procedures are applicable to all forms of technical data used to perform or support aviation maintenance, to include:

a. TMs and other publications listed in NA 00-25-100, WP 004 00, NAVAIR Related Documentation Controlled by Other Navy or DOD Elements.

b. NAVAIR approved and numbered technical publications.

c. Commercial technical publications.

d. Publications issued by Naval Sea (NAVSEA), Naval Ordnance (NAVORD), Naval Supply (NAVSUP), Naval Facilities (NAVFAC), and Marine Corps (MARCORPS) used to perform or support aviation maintenance.

e. NAVAIR Pre-Final Technical Data approved for use by COMNAVAIRFOR (N422).

NOTE: **Activities must contact the NATEC (AIR-6.8.5) Customer Service Division by phone at (619) 545-1888/DSN 735-1888 or by e-mail at nani_customerservice@navy.mil for disposition when pre-final technical data does not contain a current authorization letter signed by COMNAVAIRFOR (N422).**

f. Military Specifications and Standards (MILSPEC/STD).

g. Technical data issued by other U.S. armed services (Army, Air Force, and Coast Guard).

h. Technical data issued by NAVAIR In-Service Support Center (ISSC), such as Engineering Dispositions (ED).

i. Maintenance related policy instructions, such as CNAF M-3710.7 (NATOPS), COMNAVAIRFORINST 4790.2 (NAMP), COMNAVAIRPAC/COMNAVAIRLANTINST 4790.23 (FAME), Type Wing and MAW instructions, and local command procedures (LCP).

j. Other non-NAVAIR technical data that has been approved per procedures in 8.3.6.

NOTES: 1. Operational Test Program Sets (OTPS) are, managed per NAVAIRINST 13630.5.

2. Media Trax training aids are not classified as TMs. Media Trax training aids will not be placed in the Enhanced Library Management System (ELMS), and TMs will not be placed in Media Trax.

8.2.4 NATEC Customer Service can provide assistance in obtaining technical data. Requests may be submitted on line via (https://mynatec.navair.navy.mil), by email to nani_customerservice@navy.mil, or by phone to (619) 545-1888/DSN 735-1888.

8.3 Requirements

8.3.1 Authorized Technical Publications

Technical publications specified in paragraph 8.2.3 of this supplemental are the only authorized references for performing aircraft and aviation equipment maintenance.

8.3.2 Technical Data Inventory and Currency Verification

All technical data held by an activity will be inventoried and verified for currency at least once every 6 months. The inventory and verification may be completed in segments, as long as 100 percent of the technical data is verified every 6 months.

8.3.3 Portable Electronic Maintenance Aids (PEMA)

a. PEMAs are the primary authorized hardware device for installing electronic TMs and Automated Logistics Environment (ALE) programs. Other computers and/or Toughbooks issued with unmanned aircraft system may also be used to store electronic publication and instructions (including LCPs), but the same management principles will be used to ensure the most up to date version is in use.

b. PEMA system software will be updated no later than 10 working days after receipt of a PEMA Service Pack. PEMA Service Packs are issued quarterly. Updates must be downloaded from the Joint Technical Data Integration (JTDI)

Web site (https://www.jtdi.mil). If the PEMA is deployed with a detachment, then it shall be updated when adequate internet connection is available or upon return from deployment.

NOTE: **Only System Administrators and designated CTPL personnel will have administrative privileges for updating PEMA software and technical data.**

c. The Cybersecurity Procedures of DOD Instruction 8500.01 and DOD Instruction 8560.01 will be adhered to.

d. PEMAs will be managed as Common Support Equipment (CSE) per NAVAIRINST 13650.1.

NOTE: **PEMAs are not subject to Support Equipment Preventive Maintenance System, Optimized Organizational Maintenance Activity (OOMA) Automated Log Sets (ALS), or Support Equipment History/Maintenance Records (OPNAV 4790/51).**

e. Requests for assistance in resolving PEMA hardware or software operation problems, and questions regarding PEMA replacement, warranty repair, software imaging, and software updates will be submitted via email to the PEMA Fleet Support Team (FST) at pema@navy.mil.

NOTE: **General information on PEMA certifications, PEMA training, PEMA system software, PEMA FAQ, and PEMA Users Logistics Support Summary (ULSS) is available from the NAVAIR PMA 260 Web site (https://pma260.navair.navy.mil).**

8.3.4 Local Maintenance Requirements Cards (LMRC)

a. LMRCs for scheduled maintenance requirements not covered by other TM must be published:

(1) When directed in a technical directive (TD) or Interim Rapid Action Change (IRAC).

(2) When required for support equipment, per the SEPMS Program.

(3) When required to add new requirements to existing NAVAIR MRC decks.

(4) When the operating activity determines Periodic Maintenance (PM) is required and no other source of information specifies PM procedures.

b. LMRC decks will be numbered with the activity’s three-digit Organization Code and a sequential number containing the following elements:

(1) The applicable two digit general subject classification listed in NAVAIR 00-25-100, WP 004 00, Figure 2, followed by “600” to denote MRC. For example, 19-600 denotes a ground servicing equipment MRC.

(2) A locally assigned two digit sequential number to identify the deck.

(3) Either “6-1” to identify a Pre-Operational Inspection or “6-2” to identify a PM requirement.

Example: “PK2 19-600-22-6-1” is an LMRC issued by Organization Code PK2 for a Pre-Operational Inspection (6-1) SE (19-600), it is the 22nd LMRC deck issued by PK2, and it is for PM (6-1).

(4) All card numbers will be listed on the deck’s A Card (List of Effective Cards) or a separate 5x8 card formatted like the A Card.

c. LMRC title cards for SE must list the model number, designation, and part number. Generic nomenclatures, such as “Grinder”, “Metal Shears”, and “Radar Test Bench” are unacceptable.

d. The PM interval, such as “Daily”, “28 Day”, or “364 Day” will be entered in the block between CHANGE No. and ELECT PWR. Any reference directing the LMRC, such as a TD or IRAC, will be entered immediately below the interval.

e. Personnel rate and military occupational skill (MOS) requirements will be listed in the rating (RTG) and MOS block.

f. Power and air conditioning requirements will be listed in the electric power (ELEC PWR), hydraulic power (HYD PWR) and air conditioning (COND AIR) blocks.

g. Detailed information on consumables, tools, personal protective equipment (PPE), and WARNING or CAUTION requirements will be listed in the body (lower right hand block). Specific tools and materials will be listed, for example, "Wrench, 3/8, Open End"(not just "Wrench") and "Oil, VV-L-800 or Equivalent” (not just "Oil").

h. Inspection and maintenance procedures will be numbered and listed in sequence in the body.

Example:

1. Unfold the ladder.

2. Inspect and verify braces are not bent and hardware is secure.

3. Inspect each step for security, rivets in place, and no corrosion.

4. Place the ladder on a flat surface and verify it is not bent or warped.

i. Group 3 UAS activities must submit LMRCs (except those directed by TD or IRAC) to their Type Wing or MAG for approval. LMRCs will be submitted by naval letter with a statement of why the LMRC is needed, a summary of the proposed inspection or maintenance procedures, and a statement of whether the LMRC is recommended for local use only or has Fleet-wide impact. Figure 8-1 is an example. If the Type Wing or MAG approves the LMRC, they will distribute it to other affected Wing/MAG activities, and provide an information copy to the ACC Class Desk and the T/M/S aircraft or equipment ISSC/FST/PMA. Any LMRC deemed to have wider than local application will be forwarded by naval letter to the ISSC with sufficient information on why a Fleet-wide LMRC is recommended.

j. LMRCs must be reviewed and updated every 12 months, based on the date block. LMRCs inserted into NAVAIR MRCs must also be reviewed when there is a change or revision to the MRC. The review will be documented by initialing the LMRC A Card.

NOTE: **LMRCs do not have to be resubmitted for approval if requirements are not changed during the annual review.**

8.3.5 Pre-Final Technical Data. Pre-final technical data is preliminary TMs, interim manuals, interim maintenance support packages, and redline manuals, to include technical publications, schematics, and drawings. Pre-final technical data may be used only if certified by COMNAVAIRSYSCOM (6.8.5) and authorized by COMNAVAIRFOR (N422) per NAVAIR 00-25-604, WP 009 01, Requests for Deviation to use Preliminary TMs.

8.3.6 Use of non-NAVAIR Technical Data

a. Group 3 UAS technical data is not always available via NAVAIR. In cases when technical data is available outside of NAVAIR distribution channels, (i.e. Army service bulletins or manufacturer notices), Group 3 UAS organizational activities shall request permission to use the tech data via their Fleet Support Team (FST). If their T/M/S does not have an established FST, the unit shall request permission from their Type Wing or parent MAG.

b. Upon approval from either FST or the Type-Wing/MAG, organizational units shall notify the T/M/S lead squadron Quality Assurance Officer and Chief, so the T/M/S can notify the rest of the fleet as necessary.

c. Organizational activities shall submit a Technical Publication Discrepancy Report (TPDR) or T/M/S equivalent in each case where tech data is available for use from non-NAVAIR sources.

d. Organizational activities will maintain a listing of all non-NAVAIR technical data that has been approved for use by the FST or Type-Wing/MAG. This listing will be reviewed annually to determine if the non-NAVAIR technical data has been incorporated into approved Technical Data via the TPDR process.

8.4 Responsibilities

8.4.1 Maintenance Officer (MO):

a. Designate the Quality Assurance Officer as the Technical Data Management Officer. Designation will be in writing via the Monthly Maintenance Plan (MMP).

b. Review and validate the requirement for proposed LMRCs prior to forwarding to the Type Wing or MAW for approval.

c. Ensure only FST or Type-Wing/MAG approved non-NAVAIR technical data is used for maintenance. Ensure a listing of the non-NAVAIR technical data is maintained and the listing is reviewed annually to determine if the non-NAVAIR technical data has been incorporated into approved Technical Data via the TPDR process.

d. Designate a Central Technical Publications Library (CTPL) Manager for the CTPL program Designation will be in writing via the MMP.

NOTE: **DTPL Assistants are not required for every Work Center or location where technical publications are maintained outside the CTPL. DTPL Assistants will be assigned only if the CTPL Manager is unable to manage the technical data held in the DTPL.**

8.4.2 Quality Assurance (QA) Officer:

a. Designate a Quality Assurance Representative (QAR) as the Technical Data Management QA Monitor.

b. Review proposed LMRCs, prior to forwarding to the MO.

c. Maintain a program file, to include:

(1) POCs.

(2) References or cross-reference locator sheets, correspondence, messages, and lesson guides.

(3) Memorandums documenting completion of technical data inventories and verifications.

(4) Copies of the most current Program Manager Assessment and QA Audit.

8.4.3 Technical Data Management QA Monitor:

a. Complete the CNATTU Aeronautical Technical Publication Library Management course (Course C-555-0007) within 90 working days of assignment.

b. Perform audits per section 7 of this supplemental.

8.4.4 Quality Assurance Representatives (QAR):

a. Review newly received technical publications and directives to determine application to the Maintenance Department.

b. Review new LMRCs for accuracy and correct procedures, prior to submission to the QA Officer.

c. Submit Technical Publications Deficiency Reports (TPDR) per the NAMDRP program or T/M/S equivalent reporting procedures.

8.4.5 CTPL Technical Data Program Manager:

a. Be responsible for the currency of all technical data held by the command, to include technical data dispersed outside the CTPL.

b. Complete the CNATTU Aeronautical Technical Publication Library Management course (Course C-555-0007) within 90 days of assignment.

c. On assignment and turnover, inventory and verify the currency of all technical data held in the CTPL and at least 25 percent of the technical data held in each DTPL. The incoming and outgoing CTPL Manager should jointly perform the turnover inventory and verification whenever possible. Completion will be documented in a memorandum signed by the Quality Assurance Officer.

d. On assignment and prior to each inventory, review the ELMS Frequently Asked Questions (FAQ) section located on the ELMS Main Menu.

e. Maintain a CTPL Transaction file, and the directives and manuals required to operate a TPL per NA 00-25-100, WP 013 00, Central/Dispersed Technical Publications Library Operating Procedures.

f. Download electronic NAVAIR manuals from the NATEC TMAPS Web site and JKCS server.

g. Incorporate IRACs, Rapid Action Changes (RAC), and Electronic Rapid Action Changes (ERAC) within 2 working days of receipt and incorporate formal changes, routine revisions and notices within 5 working days of receipt.

NOTE: **If changes are given to a DTPL Assistant to incorporate, the CTPL must issue a Change Entry Certification Record (CECR) per NAVAIR 00-25-100, and must physically inspect the manual for correct incorporation prior to closing the CECR.**

h. Dispose of cancelled or updated technical data on receipt of the new version, update the ELMS Program, and record disposed manuals in the ELMS History File, per NAVAIR 00-25-100, WP 013 00, paragraph 10-3.

i. Coordinate with the Command Security Manager on classified technical data receipt, stowage, distribution, inventory, and disposition.

j. Coordinate NATOPS manual requirements with the Operations Department.

k. Provide training to DTPL Assistants on assignment, and provide refresher training as needed.

l. Register with NATEC as the ELMS Customer Account POC, and act as the activity's single POC for the Automatic Distribution Requirements List (ADRL).

m. Maintain an accurate ADRL for all TMs used by the activity.

NOTE: **NATEC will send automatic email notifications of updates to all TMs listed on the ADRL.**

n. Enter locally produced reference materials into ELMS. Examples include LCPs, LMRCs, and printed copies of all or portions of electronic TMs.

o. List the location of all manuals held in ELMS using the Locator Listing option.

p. Enter pre-final technical data into ELMS.

q. Maintain a master file of applicable Technical Directives (TD) per section 10 of this supplemental.

r. Manage PEMAs per section 8.3.3.f of this supplemental, to include:

(1) Maintain PEMA administrative privileges for updating technical data and installing PEMA Service Pack updates.

(2) List all PEMA technical data and system software in the ELMS PEMA Management Module on the NATEC Web site (https://mynatec.navair.navy.mil) per reference (h).

(3) Install PEMA system software updates per the applicable PEMA T/M/S specific directions on the NAVAIR PMA260 Web site at (https://nll.navsup.navy.mil).

(4) Document which PEMAs are distributed to work centers.

(5) Tailor the tech data loaded on PEMAs to the needs of the work center assigned.

(6) Maintain accurate accounting in ELMS of each PEMA serial number, work center issued to, and most current PEMA Service Pack update (if required).

(7) Inventory all PEMAs and verify PEMA Service Pack currency at least once per year.

(8) Maintain a current local PEMA inventory sheet with hardware nomenclature, serial number, LAN number (if applicable), quantity, location, operational status, and part number.

(9) Coordinate with the IMRL Manager to return PEMAs for repairs and replacement.

s. At least once every 6 months, physically inventory and compare all technical publications (including TMs on PEMAs) against the activity’s ADRL, per the procedures of NAVAIR 00-25-100, WP 010 00, Naval Air Technical Data and Engineering Service Center Technical Publications Library Program. The review will include Work Center Supervisor verification that each publication is required. Annotate changes and discrepancies on the Complete Work Center Listing Report, take corrective action, update the ADRL in ELMS, and maintain the annotated listing in the CTPL transaction files.

t. Reconcile ELMS each week per the following procedures:

(1) Perform the ELMS Library Audit function and compare the activity’s database to the latest information in TMAPS.

Any manuals flagged as discrepant with a red “D” will be verified for need and placed on order, if required.

(2) Verify incorporation of TM updates by reviewing Checked Out TMs, Issued CECRs, and Overdue CECRs in ELMS per the procedures of NAVAIR 00-25-100, WP 010 00.

(3) Verify the Weekly IRAC and TM Tracker (NAVAIR 00-25-100, WP 014 00, Central/Dispersed Technical Publications Library Verification/Audit Requirements). This report is issued weekly by naval message and is also available on the NATEC Web site (https://mynatec.navair.navy.mil/). On receipt, an appropriate review and annotation must be conducted by the CTPL Manager and SME to verify that all applicable IRACs and TMs have been received.

(4) Verify the Weekly Summary for Issued TDs per the procedures of the Group 3 UAS Technical Directive Compliance Program per section 10 of this supplemental. This report is issued by naval message and is also available on the NATEC Web site (https://mynatec.navair.navy.mil/).

8.4.6 Dispersed Technical Publications Library (DTPL) Assistants:

a. On assignment, complete an inventory and verify the currency of all technical data held in the DTPL. The inventory and verification should be conducted jointly with the CTPL Manager.

b. Maintain the currency of all technical data held in the dispersed library.

c. Coordinate with the CTPL to maintain the accuracy of ELMS.

d. Give the CTPL any maintenance publication received directly from other sources, for example, commercial maintenance publications delivered with new equipment.

8.4.7 IMRL Manager:

a. Accept, inventory, and transfer PEMAs as CSE, per NAVAIRINST 13650.1 and COMNAVAIRFORINST 13650.3, as applicable, and this instruction.

b. Update LAMS to reflect “F2” (NRFI) status for non-operable PEMAs, and coordinate PEMA repairs and replenishment. When the SECA provides the authorization number, transfer the PEMA to Jacksonville Cass Staging Facility (JAXCSF) with a copy of Transaction Report and information on the failure.

c. Resolve PEMA allowance shortages.

8.4.8 Work Center Supervisors:

a. Provide technical data indoctrination training to work center personnel. Training will include:

(1) Responsibilities for using only approved technical data.

(2) TPDR procedures or T/M/S specific publication discrepancy reporting procedures.

(3) PEMA procedures, to include responsibility to utilize PEMAs for work-related functions only, and storage and security requirements when not in use.

b. Submit requests for new or contractor owned technical data to the CTPL.

Ser N42/123
18 May 2017

From: Maintenance Officer, Unmanned Aerial Vehicle Squadron Three
To: Commanding Officer, Marine Aircraft Group 24

Subj: LOCAL MAINTENANCE REQUIREMENT CARD (LMRC) FOR RQ-7B ALTERNATOR, P/N 123456789-10

Ref: (a) COMNAVAIRFORINST 4790.2C
Encl: (1) VMU-3 LMRC number PK3-01-600-33-6-2, RQ-7B ALTERNATOR PREVENTATIVE MAINTENANCE

1. Per reference (a), enclosure (1) LMRC is submitted for approval.

2. Justification of need: RQ-7B Alternators can develop corrosion on the shaft especially in a tropical environment. Enclosure (1) LMRC directs a 28-day PM to inspect alternator shaft for corrosion and treat as necessary.

3. This LMRC has Fleet-wide application for all units operating in a humid environment. VMU-3 POC: GySgt Beltbuckle, phone (123) 456-7899, DSN 456-7899, email: robo.master@.mil.

J. D. UNMANNED

Figure 8-1: Local Maintenance Requirement Card (LMRC) Submission Letter (Sample)

9 Group 3 UAS Naval Aviation Maintenance Discrepancy Reporting Program (NAMDRP)

9.1 References

a. CNAF M-3710.7, NATOPS General Flight and Operating Instructions.

b. OPNAVINST 3750.6, Naval Aviation Safety Management System.

c. NAVAIRINST 4423.12, Assignment and Application of Uniform Source, Maintenance and Recoverability Codes.

d. OPNAVINST 5102.1, Navy and Marine Corps Mishap and Safety Investigation, Reporting, and Record Keeping Manual.

e. OPNAV M-8000.16, The Naval Ordnance Management Policy (NOMP) Manual.

f. SECNAVINST 4855.3, Product Data Reporting and Evaluation Program.

g. DTR 4500.9-R, Defense Transportation Regulation, Part II - Cargo Movement.

h. NAVSUP Publication 485, Naval Supply Procedures.

i. NAVSUP Publication 723, Navy Inventory Integrity Procedures.

j. DOD Instruction 4000.25, Military Standard Requisitioning and Issue Procedures (MILSTRIP).

9.2 Introduction

9.2.1 The Naval Aviation Maintenance Discrepancy Reporting Program (NAMDRP) establishes requirements for reporting material deficiencies, substandard workmanship, and improper procedures in technical publications.

Group 3 UAS managed under a Navy Program Lead will follow NAMDRP procedures laid out in section 10.9 of this supplemental. Other Group 3 UAS managed under a sister service program office (such as RQ-7B) will comply with the procedure below.

9.3 JDRS requirements remain the same for all DOD Group 3 aircraft with the exception of TPDRs. In lieu of a TPDR, Army managed Group 3 UAS platforms utilize the Redstone, Department of the Army 2028 form or electronic submission to generate discrepancy reports with T/M/S specific publications.

9.3.1 Responsibilities for activities with Group 3 UAS managed by Army program office

9.3.1.1 The Quality Assurance Officer shall ensure:

a. All QARs, CDQARs, and CDIs have access the DA 2028 website.

b. Maintain a DA 2028 tracker which includes

1. Date of submission

2. Topic

3. Report Control Number (RCN) beginning with 0001

4. Submitted by

5. Closed out date (leave blank if open)

c. Ensure that all Squadron DA 2028s are tracked at home base which includes deployed detachments.

d. On a quarterly basis, send the DA 2028 tracker to PMA-263 to keep them apprised of publication deficiencies.

e. Ensure the MO reviews and approves all DA2028s prior to leaving the command.

10 Group 3 UAS Technical Directive (TD) Compliance Program

10.1 References

a. NAVAIR 00-25-300, Naval Air Systems Command Technical Directives System.

b. OPNAVINST 8000.16, Naval Ordnance Management Policy Manual.

c. NA500C Aeronautical Technical Directive Index Report.

d. DECKPLATE-TDRS, NAT02, SE TD Listing.

e. DECKPLATE-TDRS, NAT04, Aviation Aircrew Equipment TD Listing.

f. DECKPLATE-TDRS, REP07, Technical Directive Compliance Report.

g. DECKPLATE-TDRS, LIST01, Technical Directive Applicability Listing.

h. DECKPLATE-TDRS LIST 02, TD Requirements.

i. DECKPLATE-TDRS LIST 04, Incorporation (INC) Listing for Equipment.

j. DECKPLATE-TDRS LIST 04H, Historical INC Listing for Equipment.

k. NATEC San Diego, Code 6.8.5.3, Weekly Summary for Issued TDs.

l. NAVAIRINST 13100.17, Red Stripe Memorandum System.

m. NAVAIR 00-25-100, Naval Air Systems Command Technical Publications Library Management Program.

10.2 Introduction and Applicability

10.2.1 The Technical Directive (TD) Compliance Program directs procedures for TD compliance. NAVAIR issues TDs for inspecting or altering the configuration of aircraft, engines, systems, weapons, or equipment.

10.2.2 Currently Group 3 UAS TD processes reside outside of traditional Naval Aviation Processes. Eventually Group 3 UAS may be fully incorporated into the TD program management and processes. Until fully incorporated, the T/M/S model managers will create T/M/S specific TD procedures that will meet the intent of COMNAVAIRFORINST 4790.2 chapter 10.10.

10.2.3 Certain Group 3 UAS programs include TD management under the performance based logistics (PBL) contract. For example, RQ-7B currently follows this paradigm, but may switch to government in the future. If the OEM, contractor, or sister service is handling a T/M/S TD program, then this program is N/A for Naval Aviation units operating that T/M/S in order to avoid duplicate effort. In this case the T/M/S model manager shall notify each T/M/S squadron/unit that they do not need to maintain this program.

10.2.4 The MO shall designate the Maintenance Material Control Officer (MMCO) as the T/M/S TD Compliance Program Manager (TDPM). Designation will be in writing via the Monthly Maintenance Plan (MMP).

10.3 Group 3 UAS T/M/S Model Manager

10.3.1 T/M/S Procedures

a. The Model Manager shall develop TD procedures to be used by all units operating that T/M/S. The Model Manager will tailor processes to create, incorporate, and track TDs unique to that platform.

b. The T/M/S Model Manager MO shall gain concurrence of the TD procedures from both the MAG/Type Wing MO and TYCOM before approving and disseminating the T/M/S specific TD compliance requirements to other Group 3 UAS T/M/S units.

10.3.2 Model Manager Procedures shall address:

a. Explanation of categories based on type, urgency, and purpose:

(1) Immediate Action - Assigned when unsafe conditions exist which, if uncorrected, could result in fatal or serious injury to personnel, or extensive damage or destruction of valuable property; and the conditions embody risks calculated to be unacceptable.

(2) Urgent Action - Assigned when potentially hazardous conditions exist which, if uncorrected, could result in personal injury or damage to valuable property or reductions in operational readiness; and conditions that would compromise safety or embody risks calculated to be acceptable within defined time and performance limits.

(3) Routine Action - Assigned to retrofit changes when the urgency does not warrant assignment of Immediate Action or Urgent Action categories, and the risk is acceptable within broad time limits.

b. Specifically identify the agency who approves TDs and identify where the T/M/S TD summary can be found. TDs will typically be disseminated via a Naval Message.

c. Maintain an Aeronautical TD Index Report which provides a list of active TDs, applicable to each type/model/series (T/M/S) aircraft and engine (akin to 500C).

d. No configuration changes will be made to naval aviation UAS assets including aircraft, engines, ground control system components, aircraft launch and recovery equipment, aviation SE unless directed by a TD.

NOTES: 1. Aircraft Controlling Custodian (ACCs) and Type Commander (TYCOMs) may authorize one prototype installation of a proposed change.
2. Approval to do more than one prototype requires COMNAVAIRSYSCOM concurrence.

e. Aircraft, engines, SE, equipment, and components will be restricted from use if TDs are not complied with, before expiration of the specified due date, time, or event.

(1) Immediate Action TDs must be complied with prior to the next flight or use of the affected aircraft, engine, or equipment.

(2) Urgent Action TDs affecting operational Group 3 UAS must be complied with prior to launching the aircraft on a mission that will exceed the compliance due date, time, or event.

f. Compliance Deviation Procedures

(1) Operational Commanders may authorize deferral of compliance for Immediate Action, Urgent Action, and Routine Action TDs, if required due to combat operational necessity.

(2) Group 3 UAS activity Commanding Officers (COs) may approve a one-time deferral of compliance for Routine Action TDs if parts or kits are on order, but not received, or if the ability to accomplish mission-essential flight operations will be affected by downing the affected aircraft or equipment.

(3) Deferral will be granted to a specific bureau number (BUNO) system and associated aircraft or to a specific serial number (SERNO) equipment or component.

(4) The affected aircraft or equipment has not already been granted a compliance deferral for the subject TD.

(5) Deferral cannot exceed the next compliance due date, time, or event, for example, next Phase Inspection.

NOTE: **Deferral beyond the one-time CO contingency deviation requires ACC approval.**

(6) A naval message must be sent to the ACC, Type Wing or MAW, and CVW or ACE to inform them of the contingency deviation. The message will contain details on the conditions of the deviation, to include:

(a) T/M/S and BUNO or nomenclature, model number and serial number (equipment).

(b) TD number and a summary of the TD requirement.

(c) Compliance due date, time, or event specified on the TD and when due for the affected aircraft or equipment.

(d) Circumstances necessitating the deviation, for example “COMPLIANCE DEFERRAL IS REQUIRED DUE TO LACK OF PARTS.” or “COMPLIANCE DEFERRAL IS REQUIRED TO MEET MISSION ESSENTIAL FLIGHT OPERATIONS.” If deferral is needed due to lack of parts or kits, the NIIN and part number, requisition number, and estimated delivery date will be included.

(e) Length of time deferral is needed, for example “TD WILL BE COMPLIED WITH UPON RECEIPT OF PARTS” or “TD WILL BE COMPLIED WITH NO LATER THAN NEXT PHASE.”

g. T/M/S specific procedures shall discuss how to document compliance deviations within system/equipment records/database. Entries must include the name and title of the approving activity, and the S/N and Date Time Group (DTG) of the authorization letter or message.

Example 1 - Routine Action PPC 123 deferred for compliance due to lack of parts, in accordance with Group 3 UAS Maintenance Supplemental Commanding Officer one-time deferral authority. Reference message STRKFITRON ONE TWO THREE 310001Z OCT 16.

Example 2 - Routine Action PPC 123 NINC due to issuance while engine was in the reassembly stage. Waiver granted until next induction to I-level or D-level for repair, per COMNAVAIRLANT N421M Engine Class Desk message COMNAVAIRLANT NORFOLK VA 150001Z NOV 2016.

Example 3 - Routine Action AFC 456 NINC due to lack of parts. Waiver granted until next induction for PMI per COMNAVAIRLANT N421 F/A-18 Class Desk ltr Ser 4790/001 dated 01 December 2016.

h. Develop procedure to issue a WO or MAF for each outstanding TD to track compliance deadlines.

10.3.3 TD Compliance Verifications

a. A “BASELINE” TD compliance verification must be conducted upon receipt of an unmanned aircraft system or ancillary equipment.

b. The following reports will be reviewed during verifications, and the T/M/S procedures will define the process for retrieving these reports:

(1) T/M/S list of all applicable TDs

(2) BUNO list of incorporated TDs

(3) BUNO list of outstanding TDs

c. During the inventory validate and document each TD as INC (Incorporated), NINC (Not Incorporated), CANCELLED, or NA (Not Applicable) next to each TD.

10.3.4 TD Applicability Reviews

The T/M/S specific TD procedures shall include a process to review each new TD prior to incorporation by subject matter experts (QAR or CDQAR).

10.3.8 TD Compliance Documentation

A work order (WO) or maintenance action form (MAF) will be used to document TD compliance. The Discrepancy block will be annotated with the due NLT compliance time or event, for example, “Comply with NLT next 10 flight hours”.

10.3.8 TD Compliance Program Manager (MMCO):

a. Perform an assessment of the TD Compliance Program within 30 days of designation as Program Manager, and annually thereafter.

b. Develop a method to track incorporated and outstanding TDs.

c. Develop processes to order required parts for outstanding TDs.

d. Ensure that CTPL tracks all copies of TDs.

11 Group 3 UAS Foreign Object Damage (FOD) Prevention Program

11.1 Reference

OPNAVINST 3750.6, Naval Aviation Safety Management System.

11.2 Introduction

11.2.1 The FOD Prevention Program directs actions to identify, eliminate, and report the causes of FOD. FOD presents a risk to aircraft, equipment, and personnel, wastes maintenance man-hours, and reduces operational readiness. Preventing FOD is a command wide effort and must be supported by all personnel involved with naval aviation regardless of their duty assignment.

11.2.2 Group 3 UAS have a much greater FOD resiliency than manned aircraft. They do not have gas turbine engines, lack hydraulic systems, and flight control servos are sealed. Additionally, fuel and oil connections typically incorporate FOD resistant quick disconnects. Group 3 UAS operate in austere environments away from a FOD controlled flight line. UAS operations are normally co-located with FOD riddled ground equipment such as HMMWVS, 7-tons, and generators; aircraft are designed with the capability of landing on unimproved surfaces.

11.2.3 The primary purpose of a Group 3 UAS FOD program is not necessarily to protect the unmanned aircraft, but rather to protect other manned aircraft when operating in close proximity or aboard ships. Most Group 3 UAS squadrons have a ground maintenance department that operates under NAMP-conflicting FOD/tool control/HAZMAT/housekeeping/etc. procedures.

11.2.4 Because of inherent Group 3 UAS FOD resiliency, diverse operating environments, and conflicting ground maintenance housekeeping regulations within the squadron, each Group 3 Squadron is authorized to create their own FOD procedures.

11.3 Purpose:

11.3.1 The purpose of this section is to allow units to build a comprehensive FOD program that reflects the unique operational environment of a Group 3 UAS Squadron. Units should create a single synergistic FOD prevention program which satisfies both aviation and ground maintenance requirements.

11.4 Minimum Requirements:

11.4.1 Local FOD Procedures will, at a minimum, address the following requirements:

a. Accounting for tools, equipment, and materials used in performing maintenance tasks.

b. Post-maintenance cleaning as well as inspection of work performed and work areas.

c. Periodic FOD Walk Downs to collect debris.

d. Additional FOD mitigation steps if operating on a flight line or aboard a ship in close proximity to manned aviation.

e. The assignment of a FOD Prevention Program Manager and FOD indoctrination training for the entire unit.

f. Procedures for replacing or annotating missing or loose fasteners that present a FOD hazard.

g. Procedures to ensure spare or removed fasteners and consumables do not present a FOD Hazard.

h. Tool accountability procedures to ensure tools, rags, and brushes do not present a FOD Hazard.

i. Direction to ensure work spaces will be kept free of debris to minimize the risk of foreign objects migrating to areas where aircraft or engines are operated.

j. FOD indoctrination training will include:

(1) Types of FOD, how and where FOD occurs, and consequences of FOD.

(2) Identification of FOD prone areas specific to the types of aircraft, engines, launcher, and ancillary equipment operated/supported.

(3) Identification of FOD hazards specific to the command’s operational and maintenance environment.

(4) FOD prevention methods, with emphasis on the individual’s specific job assignment.

k. The Maintenance Officer (MO) FOD duties will include:

(1) Designate a FOD Prevention Program Manager via the Monthly Maintenance Plan (MMP).

(2) Publish tailored Local FOD Procedures that meet the minimum requirements of this Group 3 UAS section 11.4 of this supplemental.

(3) Promote all hands participation and monitor FOD Walk Downs.

(4) Review FOD Program audits and direct actions to correct deficiencies.

l. The FOD Prevention Program Manager duties will include:

(1) Perform an assessment within 30 days of designation as Program Manager and annually thereafter.

(2) Provide indoctrination training for all command personnel, regardless of their specialty.

(3) Conduct spot checks of FOD prone areas, such as work spaces, hangar bays, runways, the flight deck, or taxiways.

(4) Maintain a program file to include POCs, program references, cross-reference locator sheets, correspondence, messages, and lesson guides.

(5) Brief contractor and field maintenance teams on FOD Prevention Program requirements and periodically spot check work in progress to verify compliance.

m. Maintenance Control will issue a downing discrepancy WO against affected aircraft/equipment whenever missing objects are determined to be a potential threat to airworthiness.

12 Group 3 UAS Tool Control Program (TCP)

12.1 Reference

NAVAIR 17-1, Tool Control Manual (series)

12.2 Introduction

12.2.1 The Group 3 UAS Tool Control Program (TCP) establishes minimum requirements for controlling tools used to perform maintenance on naval aviation aircraft, engines, components, and equipment.

12.2.2 The primary objective of the TCP is the elimination of foreign object damage (FOD) to aircraft and equipment caused by misplaced tools.

12.2.3 Many Group 3 UAS squadrons are comprised of different T/M/S unmanned aircraft. Tool provisions are provided via different contracts and entities, which makes a standardized Tool Control Manual impractical and potentially wasteful, since common hand tools can be shared between different T/M/S.

12.2.4 MOs of Group 3 UAS squadrons/units are authorized to create a local TCP that best reflects their needs and operational conditions. It is encouraged to create a holistic TCP which merges with ground maintenance procedures. The MO will coordinate with MAG/Type Wing prior to publishing a local Group 3 UAS TCP per this section. If not creating local tool control procedures, the activity shall follow Model Manager TCP.

12.3 Group 3 UAS TCP Minimum Requirements

12.3.1 Group 3 UAS Squadrons choosing to create their own local TCP will at a minimum be required to address the following:

a. Procedures to account for tools within a tool box both pre and post maintenance.

b. Procedures to silhouette tools within a tool box.

c. Creation of a master inventory and layout diagram/pictures for each box as well as a method to identify tool shortages. These will be located in each box.

d. Procedure to secure tool boxes.

e. Procedures to secure and account for spare tools when not in use.

f. Indoctrination and follow-on training of maintenance personnel on TCP and accountability procedures and missing tool procedures.

g. Procedures to notify maintenance control and quarantine aircraft/equipment in event of a missing tool, including procedures to release aircraft/equipment in the event that the tool is not found.

h. Processes to ensure tools are not modified without permission from Type Wing/MAG.

i. Tools do not have to be etched if the unit develops an alternative accountability method; however, if tools are etched, then local TCP must include a process to account for multiple-piece toolsets and tools too small or unsuitable for etching/marking.

j. If tool tags are utilized for checking out other support equipment then local TCP must cover tool tag processes and unique tool tag identifiers.

k. Procedures whereby tools, tool containers, and tool lockers will be kept clean.

l. Processes to check out tools.

m. Processes to track calibration due dates.

n. Processes to identify and replace broken/worn tools.

o. If embarked upon ship, Group 3 UAS will coordinate with higher command to determine TCP procedures.

p. Procedures to immediately investigate a missing tool. The investigator will personally conduct a search for the tool and complete a WO or MAF for potential FOD. If the tool was found during the investigation, the corrective action block will read “Missing tool investigation completed. Tool found.” If the tool was not found, the corrective action block will read “Missing tool investigation completed. Tool not found.” If the tool was not found, the QA Officer will provide the MO a recommendation for the affected aircraft, ancillary equipment, or component.

q. The MO will release aircraft and equipment for flight or operation only after a thorough search/investigation is completed only if satisfied the tool does not present a FOD hazard.

NOTE: **The CO, Assistant MO or Detachment/Site OIC will assume MO responsibilities for missing tools if the MO is not available.**

r. The MO will designate a Group 3 TCP manager via the MMP. The MMCO is a recommended TCP program manager.

s. The Group 3 TCP Program Manager will perform an assessment within 30 days of designation as the Program Manager and annually thereafter.

t. Processes to dispose of broken/worn tools.

u. Processes to instruct contractors on local TCP procedures.

v. Processes to provide local TCP indoctrination training for maintenance personnel.

w. Process to sub-custody tool containers to detachments lasting more than 45 days.

y. Process to inventory tool containers at least semi-annually to ensure no unauthorized additions or deletions have occurred, and to reconcile any outstanding tool shortages.

13 Group 3 UAS Corrosion Prevention and Control Program

13.1 References

a. OPNAVINST 5100.19, Navy Safety and Occupational Health (SOH) Program Manual for Forces Afloat.

b. OPNAVINST 5100.23, Navy Safety and Occupational Health Program Manual.

c. NAVAIR 17-1-125, Support Equipment Cleaning, Preservation and Corrosion Control.

d. NAVAIR 01-1A-509-1, Cleaning and Corrosion Control, Volume I, Corrosion Program and Corrosion Theory.

e. NAVAIR 01-1A-509-2, Cleaning and Corrosion Control, Volume II Aircraft.

f. NAVAIR 01-1A-509-3, Cleaning and Corrosion Control, Volume III Avionics and Electronics.

g. NAVAIR 01-1A-75, Airborne Weapons and Associated Equipment Consumable Material Applications and Hazardous Material Authorized Use List.

h. NAVAIR 00-80T-123, Chemical, Biological, Radiological, and Nuclear Defense NATOPS Manual.

i. NAVAIR 15-01-500, Preservation of Naval Aircraft.

j. COMNAVAIRFORINST 4750.4, Guidance for the Application of Polyurethane Paints in Aircraft and Related Equipment While Embarked Onboard CVNs.

k. MIL-STD-2161C(AS), Paint Schemes and Exterior Markings for U.S. Navy and Marine Corps Aircraft.

l. OPNAVINST 5215.17, Navy Directives Management Program.

13.2 Introduction

13.2.1 The Group 3 UAS Corrosion Prevention and Control Program establishes general policy for preventing and controlling corrosion damage to aircraft, ancillary UAS components, and support equipment (SE).

13.2.2 Group 3 UAS is unique in that a squadron must balance its corrosion control effort across multiple T/M/S, IT systems, program offices, and even between aviation and greenside rolling stock. This Group 3 UAS Corrosion Control section authorizes the model manager for each T/M/S to establish procedures for all other Group 3 Squadrons operating that particular T/M/S.

13.2.3 The Model Manager will establish fleet wide corrosion control procedures. He or she will coordinate with his or her MAG/Type Wing prior to disseminating to the fleet.

13.3 Group 3 UAS Corrosion Control Minimum Requirements

13.3.1 At a minimum the Group 3 UAS Corrosion Control Program will address:

a. T/M/S specific Focus Area Lists (FAL).

b. Procedures for inspection and PM of UAS ancillary ground equipment if not already addressed by T/M/S specific manuals.

c. Processes to preserve aircraft/equipment if not addressed by T/M/S specific publications.

d. Retention of at least one qualified painter.

e. All personnel engaged in aircraft, engine, component, or SE maintenance must complete one of the following corrosion control training courses:

(1) CNATT Aviation "A" School courses: AD C-601-2011, AM C-603-0175, PR C-602-2043, AME C-602-2033, AT-I C-100-2017, AT-O C-100-2018, AE C-602-2039, AO C-646-2011, or AS C-602-2026.

(2) CNATT Basic Corrosion Control course (Course CIN CNATT-000-BCC-025-002-C0) or Avionics Corrosion course (Course CIN CNATT-000-ACC-025-001-C0) available at https://www.nko.navy.mil under the Learning tab.

(3) CNATT Corrosion Control (Basic) course (Course CIN C-600-3180).

(4) Aircraft Corrosion Control course (Course N-701-0013) or CNATT Aircraft Corrosion course (Course CIN C-600-3183).

(5) Aviation Professional Apprentice Career Track course (Course CIN C-950-0011).

NOTES: 1. Personnel that completed Aviation "A" School between April 1992 and October 2005 or Aviation Warfare Apprentice Training course (Course CIN C-100-2021) between March 2010 and March 2015 received corrosion control training equivalent to that listed in COMNAVAIRFORINST 4790.2, paragraph 10.13.3.1.a(1).

2. Course information for all NAVAIR and CNATT courses is available on CANTRAC at https://main.prod.cetars.training.navy.mil.

f. Procedures to ensure each Detachment lasting longer than 60 days has at least one person who completed the Aircraft Corrosion Control course (Course CIN N-701-0013) or Aircraft Corrosion course (Course CIN C-600-3183) within 60 days of assignment, if not previously completed.

g. Personnel assigned as painters must complete the Aircraft Paint Touch Up and Markings course (Course CIN N-701-0014) or Aircraft Paint/Finish course (Course CIN C-600-3182) prior to performing painting operations. This qualification is valid indefinitely.

NOTES: 1. Completion of Aircraft Corrosion Control course (Course CIN N-701-0013) or Aircraft Corrosion course (Course CIN C-600-3183) is a prerequisite for the Aircraft Paint/Finish Course (Course CIN C-600-3182) and the Aircraft Paint Touch Up and Markings Course (Course CIN N-701-0014).

2. The use of self-contained Touch-Up pens does not require completion of the Aircraft Paint Touch Up and Markings course (Course CIN N-701-0014).

3. NATEC and D-level Mobile Training Teams can provide on-site training. Requests for on-site training will be submitted via the activity’s ACC. NATEC can provide the Aircraft Corrosion Control course (Course CIN N-701-0013) or Aircraft Corrosion course (Course CIN C-600-3183) Paint/Finish course (Course CIN-701-0014/C-600-3182), if authorized in writing by the course manager. D-level Mobile Training Teams can provide the Aircraft Corrosion Control course (Course CIN N-701-0013) and the Aircraft Paint Touch-up and Markings course (Course CIN N-701-0014). Depot

FRC and NATEC representatives providing formal course support are required to be qualified instructors. Setup, facilities, materials, publications, attendance, and other considerations are the requesting unit's responsibility.

h. Group 3 UAS activities will conduct indoctrination training on corrosion control detection and identification for newly assigned maintenance and aircrew personnel. Training will be conducted by technicians who have completed the Aircraft Corrosion Control course (Course CIN N-701-0013) or the Aircraft Corrosion course (Course CIN C-600-3183).

i. A current Industrial Hygienist (IH) survey is required for all facilities where aircraft painting is conducted. The survey must cover the requirements specified in OPNAVINST 5100.19 and OPNAVINST 5100.23, to include a workplace and exposure assessment of all aircraft and aeronautical equipment painting operations.

j. Activities performing corrosion control must comply with the Respirator Protection Program directed in references OPNAVINST 5100.19 and OPNAVINST 5100.23.

k. Personnel assigned duties involving the opening, mixing, or application of coating materials must receive pre-placement training, medical surveillance evaluations, respirator fit testing, and respirator use as recommended by the IH in OPNAVINST 5100.19 and OPNAVINST 5100.23.

l. Personnel assigned duties involving exposure to potentially harmful dusts, mists, or vapors must use the personal protective clothing and equipment required by OPNAVINST 5100.19,OPNAVINST 5100.23, NAVAIR 17-1-125, NAVAIR 01-1A-509-2, NAVAIR 01-1A-509-3, NAVAIR 01-1A-75, and as specified in the Industrial Hygiene Survey Report.

m. Unprotected personnel will be restricted from areas with exposure to potentially harmful dusts, mists, or vapors.

n. Unprotected personnel will be restricted from areas where polyurethane or other potentially hazardous coatings are used, including opening, mixing, and application. Refer to Safety Data Sheets and the IH survey to determine the specific coating or maintenance material hazards.

13.3.2 Emergency Reclamation Team (ERT).

a. Activities responsible for operating or supporting aircraft operations must have an ERT consisting of personnel deemed necessary by the T/M/S Model Manager.

b. The ERT must conduct and semi-annual training and drills to refresh team members in emergency reclamation actions. The drills will encompass specific reclamation procedures for the T/M/S aircraft and ancillary Group 3 UAS components.

NOTES: 1. Drills do not require the physical removal of components, or washing of aircraft, SE, or components.

c. The T/M/S specific Emergency Reclamation procedures will identify high priority removal items and required PPE per NAVAIR 01-1A-509-2 and NAVAIR 01-1A-509-3.

13.3.3 Aircraft, Engine, and Equipment Preservation Requirements.

a. Aircraft will be preserved per NAVAIR 15-01-500 and aircraft technical manuals. If an aircraft is expected to exceed 90 days of non-flight, the aircraft must be preserved per the most appropriate level specified in NAVAIR 15-01-500. Factors to consider in determining the level of preservation include whether the aircraft is being actively maintained (repairs are ongoing and scheduled maintenance is being performed), impact to aircraft integrity of missing parts, environmental conditions, temperature and humidity levels, proximity to salt water, etc.)

b. T/M/S Model Manager will establish preservation requirements for launch and recovery equipment and ground control stations if not already established within T/M/S publications.

13.3.4 Aircraft and Equipment Painting Requirements.

a. Aircraft and equipment coating systems will be per NAVAIR 01-1A-509-2, MIL-STD-2161C(AS), and COMNAVAIRFORINST 4750.4.

b. Aircraft painting.

(1) Squadron logo and insignia is restricted to aircraft tail(s) only.

(2) Squadron logo and insignia on Tactical Paint Scheme (TPS) aircraft will use only the low contrast shade of TPS gray against gray background. Camouflage painted aircraft will use black (color number 37038 is recommended) against land camouflage background.

(3) Aircraft side numbers and squadron identifier may be painted in flat black or TPS gray.

(4) Aircrew, plane captain, and ship name may be added with letters not exceeding two inches in size in flat black or TPS gray.

(5) Deviations from the specified reference MIL-STD-2161C(AS) paint scheme will only be considered for tactical reasons, for example, to evaluate an alternate paint scheme, and must be approved by the ACC prior to application.

NOTE: **One aircraft per squadron (two aircraft for FRS) is authorized to be painted with the squadron or air wing colors. Areas authorized to deviate from TPS include: the tails, alphanumeric characters, national star insignias, and no more than 25 percent of the aircraft fuselage. For example, aircraft side and BUNO numbering, and pilot and plane captain names may be painted in squadron colors to include a shadowing effect (if desired). Squadron colors and logos, such as striping, may be painted on the fuselage. TPS and camouflage integrity must be restored prior to deployment. Non-deploying squadrons transferring aircraft to a deploying squadron must return non-compliant aircraft to TPS prior to transferring the aircraft.**

(6) Only the painting processes and paints specified in reference MIL-STD-2161C(AS) will be used for aircraft painting. The use of any non-approved process is strictly prohibited. Because state and local government agencies are empowered to restrict the use of maintenance chemicals, paints, and processes, all activities are responsible to be knowledgeable of and comply with these regulations.

(7) Touch-up painting will be restricted to only that amount required to repair damage during the corrosion repair process.

(8) Repainting of aircraft or entire sections of the aircraft by O-level and I-level maintenance activities is specifically prohibited, except when authorized in writing by the ACC.

(9) Manufacturer’s thinning instructions must be followed to ensure volatile organic compound (VOC) limits are not exceeded. Commands will consult the Station or Ship Safety Officer, Environmental Officer, or IH to determine if coating conforms to local environmental regulations per paragraph COMNAVAIRFORINST 4790.2 and paragraph 10.19.

c. Ancillary UAS equipment painting. Complete touch up and repainting of ancillary components as necessary. Whenever possible, painting will be done in a paint booth by I-level personnel.

d. Safety precautions.

(1) Unprotected exposure of hexamethylene diisocyanates or toluene diisocyanate must be limited to a concentration of 0.005 PPM averaged over an 8 hour period. Additionally, unprotected workers must not be exposed to toluene diisocyanate concentrations exceeding 0.02 PPM for any 15-minute period.

(2) Half-face organic vapor (charcoal) air purifying respirators used to protect against toluene diisocyanate or hexamethylene diisocyanates cannot be used when the concentration of these contaminants exceed 0.005 PPM.

NOTE: **Isocyanate substances cannot be detected by smell or taste should the respirator cartridge fail or become ineffective due to overloading.**

(3) Supplied-air respirators must be used for touch-up operations requiring more than 8 ounces of paint containing isocyanates per 8 hour period. Unless recommended otherwise by the responsible IH, half face or full face organic vapor air purifying respirators may be used for short term touch-up operations using 8 ounces or less of paint containing isocyanates.

(4) Paint volatile organic compound content must not exceed local environmental restrictions.

(5) Personnel conducting touch-up processes must be medically qualified and receive training specific to the types of touch-up they perform.

(6) A cartridge change schedule must be established and followed for organic vapor cartridges.

e. Approval to deviate from using specified material and processes must be requested in writing to the ACC prior to use. Copies of changes to the authorized material list must be provided to the host safety office and the responsible IH.

13.4 Responsibilities:

13.4.1 COMNAVAIRSYCOM (NAVAIR)

a. T/M/S Aircraft ISSC and FST:

(1) Coordinate the development of FALs.

(2) Coordinate with T/M/S Model Manager and fleet to prioritize actions to improve the material condition of corrosion prone areas identified in the FAL.

(3) Review and update the FAL at least every two years.

13.4.2 MO:

a. Designate a Corrosion Prevention and Control Program Manager. Designation will be in writing via the Monthly Maintenance Plan (MMP) or Subject Matter Expert (SME) listing.

b. In addition to the Group 3 T/M/S Corrosion Control Procedures, if applicable, the MO will publish an LCP per Appendix D to address any corrosion control and prevention or emergency reclamation procedures not addressed in the T/M/S model manager Corrosion Control procedures.

c. Designate Emergency Reclamation Team members, per T/M/S Corrosion Control procedure requirements. Designation will be in writing via the MMP.

13.4.3 Program Manager:

a. Perform a program assessment within 30 days of designation as Program Manager and annually thereafter.

b. Keep current in the requirements of all applicable references cited in this instruction and maintenance technical manuals.

c. Coordinate with the IH to conduct facility surveys, and verify the IH survey.

d. Provide Corrosion Prevention and Control Program NAMP indoctrination training.

e. Periodically spot check work in progress to verify required PPE is being used by personnel assigned duties involving exposure to potentially harmful dusts, mists, or vapors.

f. Train and supervise the ERT.

g. Procure and maintain materials, equipment, and tools required to perform corrosion prevention, treatment, and emergency reclamation.

h. Verify personnel assigned duties involving the use of paints, primers or chemical conversion coating materials have received pre-placement training, a medical evaluation, and respirator fit testing prior to performing coating operations, and verify personnel complete periodic medical surveillance evaluations.

i. Maintain a program file to include:

(1) POCs.

(2) Syllabi identifying the activity’s corrosion prevention and control and ERT training requirements.

(3) Program related correspondence and message traffic.

(4) References or cross reference locator sheets.

(5) A copy of the current IH survey of the activity’s facilities.

14 Group 3 UAS Plane Captain Qualification Program

14.1 References

a. NAVAIR 00-80T-113, Aircraft Signals NATOPS Manual.

b. NAVAIR 00-80T-105, CV NATOPS Manual.

c. NAVAIR 00-80T-106, LHA/LHD NATOPS Manual.

d. NAVAIR 00-80T-122, Helicopter Operating Procedures for Air-Capable Ships NATOPS Manual.

e. CNAF M-3710.7, NATOPS General Flight and Operating Instructions.

f. NAVAIR 01-1A-17, Aviation Hydraulics Manual.

g. NAVAIR 01-1A-509 (series), Cleaning and Corrosion Control.

h. NAVAIR 04-10-506, Aircraft Tire and Tubes.

i. NAVAIR 17-1-125, Support Equipment Cleaning, Prevention and Corrosion Control.

14.2 Introduction

14.2.1 The Plane Captain Qualification Program establishes the minimum procedures for training and qualifying personnel to perform plane captain duties. Group 3 UAS squadrons will either maintain a Plane Captain Program or a Ground Maintenance Vehicle Operator Program per CNAF M-3710.7 NATOPS. Group 3 UAS squadrons are not required to maintain both programs for a single T/M/S. The T/M/S Model Manager MO will publish guidance on which program to follow. Additionally, aircrew who are NATOPS current are authorized to perform PC/GMVO duties. The T/M/S model manager MO will include any additional aircrew training requirements within the T/M/S specific PC/GMVO procedures.

14.2.2 If Model Manager chooses to utilize the PC program vice the GMVO, then he or she will publish T/M/S specific PC syllabus. The syllabus will be coordinated with MAG/Type Wing prior to approval and dissemination to all other Group 3 T/M/S units.

14.3 Group 3 UAS Plane Captain Minimum Requirements (If utilizing PC Program and not the GMVO program).

14.3.1 Plane Captain Program Requirements

a. All plane captains will be designated, in writing, by their Commanding Officer (CO)

b. Prior to initial designation, plane captains must complete the T/M/S standardized training syllabus.

c. Plane captains pass a written examination administered by a Quality Assurance Representative (QAR) with a passing score of 90%.

d. Plane captains pass a practical examination administered by a QAR that is currently qualified as a plane captain.

e. Plane Captains be interviewed and recommended by the Plane Captain Selection Board.

f. Naval aircrewmen (MPO, AVO, UAC) who perform the functions of a plane captain shall complete the aircrewman NATOPS training syllabus which must include critical plane captain qualification requirements. Completion of the training curriculum and the designation as a naval aircrewman (NATOPS Evaluation Report (OPNAV 3710/7)) qualifies the aircrewman for plane captain duties. Naval aircrewmen qualified as plane captains, per their NATOPS training syllabus, are not required to take a separate plane captain examination, appear before the Plane Captain Selection Board, or be designated on the Plane Captain Designation form (OPNAV 4790/158) (Figure 14-1). Aircrewmen qualifications do not need to be tracked within the MMP or ASM, because they are tracked within the Operations Department.

g. Maintainer Plane captains must be monitored for proficiency semi-annually (every 6 months) by a QAR or CDQAR currently designated as a plane captain.

NOTES: 1. Electronic proficiency signoff in ASM suffices for documentation of currency; additional documentation such as a D&T do not need to be scanned into ASM

2. Semi-annual monitors are required, at a minimum, every 6 months and must be completed no later than the last day of the month due.

3. The MO may designate enlisted NATOPS Instructors, Assistant NATOPS Instructors to perform semi-annual monitors.

h. Plane captains that have not performed plane captain duties for over 6 months, for example, TAD, convalescent leave, or other special assignment away from the activity, must complete the Wing/MAW refresher training syllabus and be interviewed by the Plane Captain Qualification Program Manager prior to resuming plane captain duties.

i. Newly assigned personnel that are qualified and have a current Plane Captain Monitor in the same T/M/S aircraft from their previous command may be designated as a plane captain by their new command if they pass a practical examination, and are interviewed and recommended by the new command’s Plane Captain Selection Board. Requalification will be documented on the Plane Captain Designation form (OPNAV 4790/158), or ASM equivalent.

j. Personnel that have had their Plane Captain Designation revoked will complete the entire training syllabus, pass the practical and written examinations, and be interviewed and recommended by the Plane Captain Selection Board. Requalification will be documented on the Plane Captain Designation form (OPNAV 4790/158), or ASM equivalent.

k. The T/M/S model manager shall:

(1) Publish a standard plane captain training syllabus for initial designation and refresher training to including practical and written examinations for the T/M/S UAS, for which they are responsible. Personnel Qualification Standards (PQS), and T&R requirements must be integrated into the training syllabus. The Plane Captain Training Syllabus Topics (Figure 14-2) provides guidance on the areas to be covered for initial designation. The Plane Captain Refresher Training Syllabus (Figure 14-3) provides an example of a refresher training syllabus.

(2) Coordinate PC syllabus with MAG/Type Wing prior to dissemination to Fleet and incorporation into ASM.

(3) Verify the training syllabus and related forms are available in ASM.

l. Commanding Officer (CO):

(1) Establish a Plane Captain Selection Board, chaired by the Maintenance Officer (MO), consisting of the Quality Assurance Plane Captain Program Monitor, Plane Captain Branch Supervisor, Plane Captain Program Manager, Squadron Safety Officer, and others as deemed necessary.

(2) Designate plane captains, in writing, using the Plane Captain Designation (OPNAV 4790/158) (Figure 14-1) or ASM equivalent.

(3) Revoke designations of plane captains who display a disregard for safety or aircraft maintenance/handling procedures. Designations will only be reinstated after the individual has completed the requirements of paragraph 14.3.1.j of this supplemental.

NOTE: **In squadrons which employ contractors to perform plane captain duties, the Contractor Site Manager will nominate to the CO qualified contractors for assignment as plane captains. The Contractor Site Manager must not delegate this authority.**

(4) The CO may delegate authority to the MO to designate, revoke, and requalify plane captains. COs of squadrons that deploy detachments in excess of 45 days may delegate authority to the Detachment Officer in Charge (OINC) to designate, revoke, and requalify plane captains while deployed if all training, testing, and board requirements can be accomplished by the detachment. Delegation of authority must be made in writing and by name, for each MO or Detachment OINC.

m. Maintenance Officer (MO):

(1) Designate a Division Officer as the Plane Captain Qualification Program Manager. Designation will be in writing via the Monthly Maintenance Plan (MMP).

Note: **Traditionally the Plane Captain Qualification Program Manager is assigned from within the Maintenance Department; however, since Aircrew are intimately involved with Group 3 UAS preflight operations, the Aircrew Division Officer or a DOSS Officer may also be designated as the Plane Captain Qualification Program Manager.**

(2) Develop local command procedures (LCPs) per Appendix D, if required, to direct geographic, T/M/S specific, or command directed actions for plane captain training and designation not addressed elsewhere. LCPs can be useful when operating more than one Group 3 UAS T/M/S.

(3) Chair the Plane Captain Selection Board. The board will personally review training documentation and interview plane captain candidates. The interview must cover all areas of the Group 3 UAS T/M/S Plane Captain Training Syllabus to verify candidates are fully qualified.

(4) Recommend revocation of Plane Captain Designations to the CO.

n. Plane Captain Qualification Program Manager:

(1) Upon designation as Program Manager, an assessment must be performed within 30 days and annually thereafter.

(2) Initiate the Plane Captain Designation form (OPNAV 4790/158, Figure 14-1) or ASM equivalent, and request a Plane Captain Selection Board once the trainee has completed all training requirements, passed the written and practical examinations, and is deemed fully prepared and capable of assuming the responsibilities of a plane captain.

(3) Verify designated plane captains assigned away from plane captain duties for over 6 months, for example, TAD, convalescent leave, or other special assignment away from the activity, receive refresher training (Figure 14-3) and are interviewed prior to resuming plane captain duties.

(4) Maintain a program file to include POCs, program related correspondence and message traffic, references or cross-reference locator sheets, and the most current CSEC assessment checklist.

o. Quality Assurance (QA) Officer:

Designate a QAR as Plane Captain Qualification Program Monitor. Designation will be in writing via the MMP or SME listing. The QAR, designated as the Program Monitor, must be currently qualified as a plane captain or a NATOPS Instructor, Assistant NATOPS Instructor, or Instructor

Flight Engineer as the Plane Captain Qualification Program Monitor.

p. Plane Captains:

(1) Maintain currency and practical proficiency in all areas covered in the plane captain training syllabus.

(2) Closely supervise the training of plane captain trainees.

NOTE: **During the training cycle, responsibility for conducting and signing off inspections lies with the designated plane captain.**

OPNAVINST 4790.2 (Series)
COMNAVAIRFORINST 4790.2 (Series)

PLANE CAPTAIN DESIGNATION

PART I

1. NAME - LAST, FIRST, MIDDLE INITIAL:	2. RATE/GRADE:	3. DEPARTMENT/DIVISION:
4. AIRCRAT TYPE MODEL/SERIES:	5. TYPE DESIGNATION: ☐ INITIAL DESIGNATION ☐ REQUALIFICATION	

6a. DATE OF WRITTEN EXAM:	6b. GRADE:	7a. DATE OF PRACTICAL EXAM:	7b. GRADE:

PART II

I certify that I understand my responsibilities as set forth in the current COMNAVAIRFORINST 4790.2 (Series).

8a. PRINTED NAME OF MEMBER:	8b. SIGNATURE DATE:	8c. SIGNATURE OF MEMBER:
9a. PRINTED NAME OF OFFICIAL RECOMMENDING DESIGNATION:	9b. SIGNATURE DATE:	9c. SIGNATURE OF OFFICIAL RECOMMENDING DESIGNATION:

PART III

Candidate has appeared before the Plane Captain Selection Board, and is fully qualified and recommended for designation as a Plane Captain.

10a. PRINTED NAME OF QUALITY ASSURANCE PLANE CAPTAIN PROGRAM MONITOR:	10b. SIGNATURE DATE:	10c. SIGNATURE OF QUALITY ASSURANCE PLANE CAPTAIN PROGRAM MONITOR:
11a. PRINTED NAME OF PLANE CAPTAIN BRANCH SUPERVISOR:	11b. SIGNATURE DATE:	11c. SIGNATURE OF PLANE CAPTAIN BRANCH SUPERVISOR:
12a. PRINTED NAME OF PLANE CAPTAIN QUALIFICATION PROGRAM MANAGER:	12b. SIGNATURE DATE:	12c. SIGNATURE OF PLANE CAPTAIN QUALIFICATION PROGRAM MANAGER:
13a. PRINTED NAME OF SAFETY OFFICER:	13b. SIGNATURE DATE:	13c. SIGNATURE OF SAFETY OFFICER:
14a. PRINTED NAME OF MAINTENANCE OFFICER:	14b. SIGNATURE DATE:	14c. SIGNATURE OF MAINTENANCE OFFICER:

PART IV

DESIGNATED AS A PLANE CAPTAIN EFFECTIVE THIS DATE.

15a. PRINTED NAME OF COMMANDING OFFICER:	15b. SIGNATURE DATE:	15c. SIGNATURE OF COMMANDING OFFICER:

PART V

DESIGNATION HAS BEEN ENTERED IN THE MEMBERS' SERVICE RECORD.

16a. PRINTED NAME OF MILITARY PERSONNEL OFFICER:	16b. SIGNATURE DATE:	16c. SIGNATURE OF MILITARY PERSONNEL OFFICER:

ORIGINAL TO: Individual's Qualification/Certification Record.

OPNAV 4790/158 (Rev 08/2016)

Figure 14-1: Plane Captain Designation (OPNAV 4790/158) (Sample)

PLANE CAPTAIN TRAINING SYLLABUS TOPICS

1. Indoctrination interview
2. Required reading (applicable sections)
   a. COMNAVAIRFORINST 4790.2C
   b. NAVAIR 00-80T-106, LHA/LHD NATOPS Manual
   c. NAVAIR 00-80T-113, Aircraft Signals NATOPS Manual
   d. NAVAIR 01-1A-509 (series), Cleaning and Corrosion Control
3. Safety Ashore and Afloat PQS (if applicable)
4. Flight Deck Familiarization (if applicable)
5. Flight Line/Flight Deck Safety
6. Noise Hazards
7. Exhaust Blast Hazards
8. Propeller Hazards
9. General or Avionics Corrosion Control Course
10. FOD Prevention Program
11. Tool Control Program
12. Fuel Surveillance Program
13. Hazardous Material Control and Management Program
14. Technical Publications
15. Moving Aircraft
16. Cleaning Aircraft
17. Aircraft Fastener Integrity Inspection
18. Daily and Turnaround Inspections
19. Special Inspections
20. Conditional Inspections
21. Fueling and Defueling
22. T/M/S NATOPS Procedures
23. Hand Signals
24. Launch/Recovery Procedures
25. T/M/S Standard Emergency Procedures
26. T/M/S PQS (if applicable)
27. Aircraft security, tie-down, and heavy weather procedures

Figure 14-2: Plane Captain Training Syllabus Topics

PLANE CAPTAIN REFRESHER TRAINING TOPICS:

1. Review Danger Areas
2. Review Danger Areas
3. Review Emergency Procedures
4. Review Aircraft Refueling Procedures
5. Perform Walkaround
6. Launch Aircraft
7. Recover Aircraft
8. Fuel Sampling Procedures

Figure 14-3: Plane Captain Refresher Training Syllabus Topics

15 Egress/Explosive System Checkout Program

15.1 The Egress/Explosive System Checkout Program is not applicable to Group 3 UAS.

16 Support Equipment (SE) Operator Training and Licensing Program

16.1 The SE Operator Training and Licensing Program is not applicable to Group 3 UAS. HMMWVS and other ground vehicles will be licensed under ground logistics licensing programs.

17 Group 3 UAS Support Equipment (SE) Planned Maintenance System (PMS)

17.1 References

a. NAVAIR 17-1-125, Section XI, Support Equipment Cleaning, Preservation, and Corrosion Control.

b. NAVAIR 17-1-114.1, Inspection and Proof Load Testing of Lifting Slings for Aircraft and Related Components.

17.2 Introduction

17.2.1 The Support Equipment Planned Maintenance System (SE PMS) establishes requirements for the maintenance of SE.

17.2.2 This program is **Not Applicable** to RQ-7 or any other Group 3 UAS T/M/S that manages SE under a PBL contract.

17.2.3 Group 3 UAS that utilize OOMA will follow the SEPMS procedures in COMNAVAIRFORINST 4790.2, chapter 10.17.

17.2.4 Group 3 UAS that do not currently utilize OOMA and do not fall under a SE PBL contract, such as RQ-21, will follow the procedures in this section. For Group 3 UAS in this category, the T/M/S model manager MO will publish specific SEPMS desktop procedures for that T/M/S. The T/M/S desktop guide will include procedures to meet the minimum requirements set forth in section 17.3 of this supplemental.

17.2.5 PEMAs and UAS T/M/S provided laptops are exempt from SEPMS.

17.2.6 This Program does not apply to equipment managed under NAVSEA or NAVSUP or MARCORSYSCOM requirements, such as HMMWVS, Trailers, forklifts, and flight deck scrubbers.

17.3 Group 3 UAS T/M/S Unique Procedure Minimum Requirements

17.3.1 The Group 3 UAS T/M/S Unique desktop guide will at a minimum address:

a. Procedures for Acceptance and Transfer of Support Equipment

b. Procedures to repair or return NRFI Support Equipment

c. Preventative Maintenance (PM) requirements to include where procedures and schedule can be located (i.e. IETMS or manufacturers publication).

(1) If PM status cannot be verified for newly received SE, all PM requirements must be performed before placing the SE in service.

(2) The PM cycle for newly manufactured SE that has never been placed into service will be established based on the acceptance inspection completion date. The first PM is not required until the prescribed inspection interval has been reached.

d. Procedures to identify if SE requires NDI or Proof Load. The MO can delegate this responsibility in writing for detachments.

e. Procedures to create a local MRC if equipment meets one or more of the following criteria:

(1) Publications lack pre and post operational inspections or PM.

(2) The equipment requires NDI or proof load testing per NAVAIR 17-1-114.1.

Note: **Injury to personnel or damage to equipment may occur if the equipment fails during use. This includes equipment whose operation involves moving parts, hazardous chemicals, or discharge of material, extreme heat or cold, or electrical shock.**

f. Procedures to restrict SE from use if past due for scheduled preventative maintenance. SE requiring Load Test or NDI will be coordinated through I-level.

g. Procedures to address incorporation of Technical Directives (TD)

h. Procedures to preserve SE that will not be used for an extended period of time.

i. Procedures for who and where calibrated SE will be calibrated. The squadron MO can extend calibration for up to 30 days, any extension greater than 30 days must be routed to MAG/Type Wing Commander.

j. Procedures on how to track major PMs and TDs

k. Procedures to account and inventory SE at least on a quarterly basis.

18 Group 3 UAS Metrology and Calibration (METCAL) Program

18.1 References

a. NAVAIRINST 13640.1C, Naval Aviation Metrology and Calibration Program.

c. OPNAVINST 3960.16A, Navy Test, Measurement, and Diagnostic Equipment (TMDE), Automatic Test Systems (ATS), and Metrology and Calibration (METCAL).

h. NAVAIR 17-35QAL-15, Naval Aircraft Carrier and Amphibious Assault Ships Metrology and Calibration (METCAL) Program Manual.

j. NAVAIR 17-35POP-01B, Metrology and Calibration Program Operations Process Manual.

k. NAVAIR 17-35TR-8, Technical Requirements for Calibration Labels and Tags.

m. NAVSUP Publication 700, Common Naval Packaging.

18.2 Introduction

18.2.1 The Procedures contained in the COMNAVAIRFORINST 4790.2 chapter 10.18 METCALNAMPSOP are applicable to group 3 UAS. There are only minor changes to the METCAL program for Group 3 UAS, which include:

a. Currently not all Group 3 UAS TMDE can be calibrated through organic cal labs. Calibration of unique TMDE items will be coordinated directly between the organization squadron and the program office or prime contractor predicated upon PBL/contractual procedures.

b. Group 3 UAS Squadron Commanding Officers are authorized to grant in writing, up to a 30 day calibration extension in order to meet mission requirements. The Commanding Officer can delegate this authority to the Maintenance Officer or Detachment Officer in Charge in writing. Any extension longer than 30 days will follow section COMNAVAIRFORINST 4790.2 section 10.18 METCAL procedures.

19 Hazardous Material Control and Management Program

19.1 Group 3 UAS units will follow the Hazardous Material Control and Management (HMC&M) Program NAMSOP contained in COMNAVAIRFORINST 4790.2 section 10.19.

20 Group 3 UAS Electrostatic Discharge (ESD) Protection and Electromagnetic Interference (EMI) Reporting Program

20.1 The Electrostatic Discharge (ESD) Protection and Electromagnetic Interference (EMI) Reporting Program remains the same as the procedures outlined in COMNAVAIRFORINST 4790.2 section 10.21 with the exception of EMI reporting. An EMI HMR report will be filed on the ASEMICAP Web site (https://asemicap.navair.navy.mil) if link loss is in excess of 5 minutes consistent.

21 Group 3 UAS Non-Destructive Inspection (NDI) Program

21.1 There is no current NDI requirement for Group 3 UAS and thus the program is not applicable. If requirements arise in the future, Group 3 UAS units shall submit a work request to the local I-level for NDI support.

22 Group 3 UAS Explosives Handling Personnel Qualification and Certification Program

22.1 Group 3 UAS has no requirement for the Explosives Handling Personnel Qualification and Certification Program and therefore the program is not applicable. If Group 3 UAS gain explosive devices in the future, then Group 3 UAS units shall follow the non-NAMPSOP procedures in COMNAVAIRFORINST 4790.2 section 3.2.2.2.

23 Group 3 UAS Aircraft Maintenance Material Readiness List (AMMRL) Program

23.1 The AMMRL Program is the title of the overall program which provides the data required for the effective management of SE at all levels of aircraft maintenance. The program covers over 37,000 end items of aircraft maintenance SE and OTPS elements (IMRL items) used throughout the Navy and Marine Corps by aircraft maintenance activities.

a. Group 3 UAS units have limited AMMRL equipment items such as PEMAs and ESD grounding mats. These standard AMMRL items will be managed per the procedures set forth in COMAVAIRFORINST 4790.2 section 3.2.2.6. All other Group 3 UAS specific support equipment is managed outside of traditional Naval processes via contracts and Performance Based Logistics agreements with prime vendors. Different Group 3 UAS T/M/Ss have different SE management procedures.

b. The MO of each Group 3 UAS T/M/S shall publish fleet AMMRL procedures defining specific T/M/S AMMRL requirements.

23.2 Minimum Requirements.

a. At a minimum the MO will ensure the following minimum requirements are addressed in the T/M/S specific AMMRL procedures.

(1) Protection of SE from the elements by using active cleaning, corrosion control, preservation, and storage programs.

(2) Procedures to maintain an active asset inventory control.

(3) Procedures to forward up SE failure data to be used by engineers to improve SE material readiness, safety, and use.

(4) Calibrated SE should be sent to local calibration activity. If unsupported, then peculiar SE should be sent back to manufacturer per T/M/S contractual agreements.

(5) Establish SE authorized allocation quantities

(6) Identify procedures to return broken SE and request replacement SE.

24 Group 3 UAS Weight and Balance (W&B) Program

24.1 The Group 3 UAS W&B Program directs procedures to verify unmanned aircraft weight and center of gravity are within established limits.

a. Group 3 UAS will follow W&B procedures set forth in COMNAVAIRFORINST 4790.2 section 3.2.2.8 Weight and Balance non-NAMPSOP program.

b. An exception is Group 3 UAS that are not an established with a AWBS profile. In this circumstance, T/M/S specific W&B procedures will be followed in lieu of a traditional W&B program. For example, the RQ-21 maintenance manuals explain procedures to balance aircraft. The RQ-21 does not have the traditional Form A, B, C, F, and Chart E.

c. Group 3 UAS units that fall under the traditional W&B program, the CO may delegate W&B authority down to an E-5 given that Marine or Sailor attends the required training set forth in COMNAVAIRFORINST 4790.2 section 3.2.2.8.

d. Group 3 UAS units that have unique W&B requirements will still perform an inventory and update electronic W&B data when aircraft are received and prior to transfer.

25 Group 3 UAS Naval Ordnance Management Policy (NOMP)

25.1 The NOMP program is not applicable to Group 3 UAS. If Group 3 UAS gains an ordnance capability in the future, then the NOMP Non-NAMPSOP program contained in COMNAVAIRFORINST 4790.2 section 3.2.2.13 will apply.

26 Group 3 UAS Engine Turn-up Licensing Program

26.1 The Taxi/Turn up procedures contained within COMNAVAIRFORINST 4790.2 section 3.2.2.20 are applicable to group 3 UAS if utilizing the program. Maintainers are also authorized to operate aircraft under the NATOPS procedures of the Ops Department.

27 Group 3 UAS Laser Hazard Control Program

27.1 Group 3 UAS units will follow the Laser Hazard Control Program procedures contained within COMNAVAIRFORINST 4790.2 section 3.2.2.14. Activities operating and maintaining laser equipment shall establish a Laser Hazard Control Program per OPNAVINST 5100.27/MCO 5104.1.

28 Group 3 UAS Vibration Analysis Program

28.1 Group 3 UAS will maintain a vibration analysis program only if T/M/S requires vibration analysis. Refer to COMNAVAIRFORINST 4790.2 Paragraph 3.2.2.22 and for additional requirements for O-level vibration analysis.

29 Group 3 UAS Maintenance Control

29.1 Maintenance Control

Maintenance Control is responsible for the efficient attainment of aircraft and equipment readiness in support of operational objectives. Group 3 UAS Maintenance Control procedures are significantly different than manned aviation because they need to address:

a. Hub and spoke operations in that a single aircraft may be control by several different aircrew at different locations.

b. Not all equipment utilized during a flight can be inspected and administratively screened and safed at the location from where the flight originates.

c. Equipment such as control stations, launchers, and recovery equipment are used simultaneously for multiple flights and therefore cannot be administratively safed for a single sortie event.

d. A system level BUNO containing multiple unmanned aircraft and ancillary ground equipment significantly diverges from manned aviation. Group 3 UAS can have downing work orders against the system BUNO, however, still execute flight operations using other mission capable aircraft.

e. Group 3 UAS units must quickly mission task organize, and the cannibalization of aircraft and ancillary equipment within and between Group 3 UAS systems requires different processes than described within COMNAVAIRFORINST 4790.2 Chapter 5.

f. Group 3 UAS units utilize different maintenance Management Information Systems (MIS) that do not contain many of the data fields and report requirements outlined within COMNAVAIRFORINST 4790.2 Chapter 5.

NOTE: **When Group 3 UAS units are implemented with Naval Aviation Logistics Command Management Information System (NALCOMIS) Optimized Organization Maintenance Activity (OOMA) the application and use of the system will continue to vastly differ from traditional COMNAVAIRFORINST 4790.2 Chapter 5 Maintenance Control procedures.**

g. Group 3 UAS units often do not have the IT hardware and communication assets required to operate utilizing COMNAVAIRFORINST 4790.2 Chapter 5 Maintenance Control Procedures. For example, during ship to shore movement, a hasty spoke ashore cannot report back equipment status to maintenance control aboard the ship. There are mission requirements that necessitate other voiceless aircraft transfers where radio silence must be maintained. Many hub and most spoke locations do not have internet access.

h. Each Group 3 Activity shall create an offline contingency plan to document maintenance when the electronic maintenance data system is down. The MO shall approve the procedures.

29.2 Group 3 UAS T/M/S model managers, will publish desktop procedures for their unique Maintenance Information Systems (MIS).

29.3 System Administrator/Analyst (SA/A) Responsibilities

a. The SA/A shall provide qualitative and quantitative analytical information to the Maintenance Officer (MO) allowing a continuous review of the management practices within the activity/department. A system administrator/analyst (SA/A) billet will monitor, control, and apply the MIS or configuration management (CM) within the activity. Additionally, the SA/A shall have a full working knowledge of the principles of foundation, mid, and top tier data replication and information available in the aviation data warehouse (ADW).

b. The SA/A must be trained in MIS procedures to include data processing capabilities, data replication and the techniques of statistical analysis. It is imperative the SA/A receive the complete support of the MO, division officers, and work center supervisors.

NOTES: 1. Organizational maintenance activity (OMA) NALCOMIS Optimized squadrons will have two System Administrators (SA) attend the NALCOMIS OOMA system analyst course (Course C-555-0049).

2. All Squadrons shall have all AZs with NEC 6303, 6304, or MOS 6049 attend the NALCOMIS System Analyst Refresher course (Course C-555-0055).

c. The primary analyst responsibilities of the SA/A include the following:

(1) Ensure all life-limited components are tracked, digitally or via physical medium, and replaced IAW their life cycles and required inspection cycles. This shall include notation of rework, extension, and any specifically directed or over-limit inspection with details for abnormal conditions.

(2) Provide management with data, in graphic and narrative form, necessary to make qualitative decisions about aircraft, equipment, support equipment (SE), material condition, readiness, utilization, maintenance workload, or failure trends.

(3) Screen decision knowledge programming for logistics analysis and technical evaluation (DECKPLATE) maintenance reports.

(4) Operations Clerks and Logs and Records Clerks shall validate flight hours and landings.

(5) Conduct and coordinate MIS training of Maintenance Department personnel in all facets of documentation and in the content and use of available data products.

(6) If operating NALCOMIS, the SA/A will also follow procedures identified in COMNAVAIRFORINST 4790.2 chapter 5 section 5.1.1.1.

d. The technical functions of the SA/A include the following:

(1) Review maintenance reports and workload reports to identify trends.

(2) Use the MIS to assist in identifying possible deficiencies in technical training or documentation procedures.

(3) Assist the Maintenance Officer (MO) and other supervisory personnel in determining the specific goals for new types of data reports required for managing the maintenance effort.

(4) Identify and apply analytical techniques to areas of material deficiencies, high man-hour consumption, or other pertinent trends.

(5) Provide assistance to Maintenance Control in determining material consumption and projected usage based on reports/inquiries.

(6) Verify local MIS data is reported up-line to the top-tier and central repository.

29.3.2 Aviation Logistics Information Management and Support (ALIMS) (Marine Corps Only)

The ALIMS specialists will provide direct maintenance, system administration, and installation support for all MIS assigned. ALIMS specialist duties include installing, implementing, managing, monitoring, and sustaining MIS. ALIMS will support deployed network installation and configuration in direct support of MIS and associated systems. MCO 2020.1 provides the standardized policy and procedures for ALIMS operations.

29.3.3 Releasing UAS Safe for Flight

NOTES: 1. Newly established squadrons and squadrons transitioning from one type, model, and series (T/M/S) aircraft to another assigned to COMNAVAIRSYSCOM Aircraft Reporting Custodian/ACC (RTD&E), must comply with Safe for Flight Operations Certification per NAVAIRINST 3700.4.
2. Newly established squadrons and squadrons transitioning from one T/M/S aircraft to another within COMNAVAIRFOR, must comply with Safe for Flight Operations Certification per COMNAVAIRFORINST 5400.1.

a. One of the most critical aspects in aviation is the release of an aircraft and equipment for flight.

b. The person certifying a Safe for Flight condition has the overall responsibility to provide the aircrew with a mission capable aircraft and ancillary equipment configured for the scheduled mission. All personnel authorized to release UAS Safe for Flight must complete the T/M/S specific SFF syllabus, and must be designated in writing by the Commanding Officer (CO). Personnel certifying Safe for Flight must comply with the following requirements at a minimum, prior to releasing the aircraft/equipment for flight:

NOTES: 1. Group 3 UAS maintainers can simultaneously maintain CDI, CDQAR, QAR, PC, and SFF qualifications regardless of Work Center. However, individuals will not Safe an unmanned aircraft if they have performed QA functions since the last flight.

2. For squadron Maintenance Departments that employ contractors, the CO will designate contract personnel as SFF once the Contractor Site Manager, has provided his or her endorsement.

(1) Review the aircraft discrepancy book (ADB) or MIS to verify all discrepancies are accurately annotated as up, partial mission capable (PMC), or non-mission capable (NMC). Ensure all downing discrepancies and flight safety Quality Assurance (QA) inspections are signed off, and a valid daily/turnaround or PMD inspection is completed.

NOTES: 1. Primary Control Stations, Backup Control Stations, Launch Equipment, and Recovery Equipment are not required to be released Safe for Flight separately from the unmanned aircraft (UA). UAS Naval Air Training and Operating Procedures Standardization (NATOPS) preflight and T/M/S system check procedures must be performed before the ancillary equipment is utilized.

2. Safe for Flight personnel will verify the Control Station, Backup Control Station, Launch Equipment and Recovery Equipment do not have any downing discrepancies prior to assigning the equipment to the flight schedule or directing its use by aircrew.

3. At spoke locations where administrative Maintenance Information System (MIS) status cannot be reviewed, UAS Naval Air Training and Operating Procedures Standardization (NATOPS) preflight and T/M/S system check procedures must be performed before taking control of an unmanned aircraft. Maintenance Control will ensure control stations and other ancillary equipment are mission capable prior to sending it out to a spoke location.

4. Activities are encouraged to use electronic means to review aircraft and equipment status to certify SFF. Paper aircraft discrepancy books (ADB) are not required if equipment status can be determined electronically.

5. At a minimum, electronic backups must be performed each working day.

(2) Verify fuel samples have been taken and inspected per T/M/S maintenance technical manuals. Specific intervals for fuel samples are listed in the applicable aircraft maintenance requirement cards (MRC). Unless otherwise specified in aircraft MRCs, fuel samples must be taken within 24 hours preceding the aircraft's initial launch and are valid for no more than 24 hours.

NOTE: **Fuel samples for UAS with sealed fuel systems will be taken prior to aircraft fueling. Sample will remain valid until aircraft is defueled.**

(3) Review Engine Oil Consumption Records and verify consumption is within the limit specified in the maintenance technical manuals prior to every flight (as required).

(4) Verify aircraft Weight & Balance (W&B) form F has been updated for each flight as applicable per T/M/S weight balance requirements.

(5) During hot seating operations, review any new discrepancies with the debarking UAC to verify no flight safety discrepancies were noted, and have the debarking UAC sign block 10 of the Aircraft Inspection and Acceptance Record (OPNAV 4790/141) (Figure 29-1) to certify the unmanned aircraft is Safe for Flight. In circumstances where the debarking UAC is out on a spoke, a SFF maintenance controller will annotate block 10 "UAC unavailable, no discrepancies reported".

(6) Ensure current flight time is up to date.

c. The UAC must review the electronic or paper records for the unmanned aircraft, control station, and launch and recovery equipment. The UAC will review all open discrepancies and the last 10 closed work orders or all closed work orders since the last flight; whichever is greater. After review, the UAC must sign block 11 of the Aircraft Inspection and Acceptance Record (OPNAV 4790/141) (Figure 29-1), assuming full responsibility for the safe operation of the aircraft. If the oncoming UAC is out at a spoke, a SFF maintenance controller will annotate block 10 "UAC unavailable, no discrepancies reported".

d. The Aircraft Inspection and Acceptance Record (OPNAV 4790/141) (Figure 29-1) provides for:

(1) The UAC's acceptance of the unmanned aircraft, control station, and ancillary launch and recovery equipment in their present condition.

(2) Identification of Unmanned Aircraft Serial Number or BUNO, T/M/S, reporting custodian, and primary control station for the flight.

(3) Fuel, oil mix (if applicable), special equipment, and limitations.

(4) Maintenance Control certification of the aircraft’s readiness for flight.

e. The Aircraft Inspection Record (OPNAV 4790/141) (Figure 29-1) will be filled out as follows:

Block 1 - BUNO/SERNO. Enter the unmanned aircraft BUNO or Serial Number.

Block 2 - T/M/S. Enter the UAS T/M/S.

Block 3 - RPT. CUST. Enter the aircraft reporting custodian.

Block 4 - OXY. Not applicable to UAS.

Block 5 - FUEL. Enter grade and quantity of fuel. If applicable, annotate if the fuel was mixed with oil.

Block 6 - OIL. If applicable enter grade and quantity of oil added to each engine.

Block 7 - DATE. Enter date of UAC acceptance.

Block 8 - ORDNANCE/SPECIAL EQUIPMENT /LIMITATIONS/REMARKS. List Nomenclature and S/N for the primary Control Station.

Block 9 - SIGNATURE OF PLANE CAPTAIN. Signature and rank or rate of the plane captain or Qualified Aircrewman who inspected the aircraft for the Turnaround or PMD.

Block 10 - SIGNATURE. Signature and rank or rate of the person certifying the aircraft Safe for Flight. If the aircraft is away from home and qualified releasing authority is not available, the UAC must sign the certification in the Safe for Flight block. The debarking pilot of a hot seating crew must sign block 10 to certify the aircraft is safe for flight. In circumstances where the debarking UAC is out on a spoke, a SFF maintenance controller will annotate block 10 “UAC unavailable, no discrepancies reported”.

Block 11 - SIGNATURE OF PILOT IN COMMAND. Signature and rank of UAC accepting the aircraft. If the oncoming UAC is out at a spoke, a SFF maintenance controller will annotate block 10 “UAC unavailable, no discrepancies reported”.

f. The Aircraft Inspection and Acceptance Record (OPNAV 4790/141)(Figure 5-1) will remain at the place of first takeoff.

29.3.4 Hot Seating

a. Unmanned Aircraft Hot Seating. An operational evolution where the UAC/crew of a UAS aircraft is changed while the aircraft is still airborne.

b. During hot seat evolutions, a new Aircraft Inspection and Acceptance Record (OPNAV 4790/141) (Figure 29-1) will be initiated. At a minimum, "Hot Seat" shall be entered in block 8, and the new UAC shall review the ADB and sign block 11. Performance of these actions will signify a physical continuation for flight of an inspected, serviced, and certified aircraft with a change in UAC or crew and adherence to hot seat servicing and inspection minimums. The debarking UAC shall sign block 10.

NOTE: **1. When the debarking UAC is unavailable due to spoke operations, and a real time review of the electronic MIS and signatures cannot be supported, a SFF maintenance controller will annotate block 10 “UAC unavailable, no discrepancies reported”.**
2. All applicable NATOPS checklists shall be complied with during such control station transfers.

29.3.5 Functional Check Flights (FCF)

a. Unless directed by the applicable T/M/S NATOPS manual, UAS do not require an FCF.

NOTE: **UAS operational checks can be performed with an engine run on the launcher, therefore FCFs are not required. UAS aircraft do not require a FCF when not flown for 30 or more days.**

29.3.6 Unmanned Aircraft and Equipment Inspection Procedures and Responsibilities

a. Scheduled maintenance requirements ensure timely discovery and correction of defects.

(1) Aircraft and equipment inspections are scheduled per the interval specified in applicable maintenance technical manuals.

(2) Inspections shall be scheduled by each activity so a minimum number of aircraft are undergoing inspection at any one time.

(3) The first inspection interval for inspections based on calendar time commences on the date of delivery to a fleet or test activity.

(4) The first inspection interval of those inspections based on flight hours, operating hours, cycles, or events shall include any hours or events accumulated prior to Navy acceptance.

NOTE: **1. Displaced and properly store UAS are exempt from TFOA and scheduled inspections. Upon removal from storage, all pass due scheduled inspections shall be completed before flight.**
2. Calendar based forced removal items will still be performed when in storage.

b. Aircraft Preservation. The MO shall determine when an aircraft will be placed in preservation. T/M/S maintenance technical manuals provide procedures to perform aircraft preservation. For aircraft not having preservation maintenance technical manuals, preservation shall be performed per NAVAIR 15-01-500. The T/M/S Baseline Manager will ensure requirements of NAVAIR 15-01-500 are built into the baseline for aircraft not covered by preservation maintenance technical manuals.

c. Deviations. To meet unusual situations or to ease workload scheduling, reporting custodians may apply plus or minus deviations to inspection intervals, if specified in T/M/S MRCs or commercial aircraft derivative task cards. The next inspection must be scheduled as if no deviation occurred. If deviations are not specified in T/M/S technical manuals or commercial aircraft derivative task cards, the following maximum deviations may be applied:

(1) Plus or minus 3 days, or a portion thereof, may be applied to the authorized inspection interval of all inspections, including preservation, which are performed in increments of calendar days. The next inspection is scheduled as if no deviation had occurred. Deviations within the plus or minus 3 day interval do not require logbook entry.

(2) Plus or minus 10 percent, or a portion thereof, may be applied to the authorized inspection interval of scheduled maintenance requirements based on flight hours, operating hours, cycles, or events.

NOTES: 1. A one-time deviation in excess of the high (+) limits described per paragraph 29.1.6b of this supplemental may be granted due to operational necessity or aircraft ferry schedule only. Reporting custodians must submit the deviation request to the cognizant Wing, COMFAIR, CVW, or Aviation Combat Element (ACE) commander. The Wing COMFAIR, CVW, or ACE commander may grant up to one additional high (+) limit interval. Authorization for additional deviations must be approved by the ACC. Deviation requests must contain sufficient detail on the conditions of the deviation. Requests will clearly state the deviation being requested, for example, "Request deviation to go 10 flight hours beyond the 10 percent "plus" high limit for the 200 Hour engine inspection on BUNO 161234." The request must state the circumstances necessitating the deviation, for example, "Deviation is required to support MEU Operations." The request must state the estimated completion of the deferred inspection, for example "200 hour inspection will be performed post exercise support." If applicable, the request will provide details of any logistics deficiency related to the deviation, such as requisition number, National Item Identification Number (NIIN) and part number, and status.

2. The plus 10 percent extension is not authorized for structural life limited components (listed in NAVAIRINST 13120.1, NAVAIRINST 13130.1, and applicable PMICs as

“RETIRE”) that have reached their basic life limitations or would reach those limitations during the extension.

3. After the inspection interval plus 3 days or plus 10 percent (as applicable) high limit has expired, UAS, and UAS Control Stations are restricted from flight operations until completion of the applicable inspection.

4. During combat, operational commanders are authorized to defer scheduled maintenance of otherwise functional equipment, including replacement of high time components. Deferral authority cannot be delegated below the CO. ACC notification is not required except for deferral of replacement of high time components, which will be reported to the ACC by priority message when installed components are at or beyond high time. Notification will include the following information: T/M/S, BUNO, Component Nomenclature, PN, Replacement Due Time/Cycles, Current Time/Cycles, and applicable requisition numbers and status. Operational commander deferral of scheduled maintenance during combat should not exceed one interval of that maintenance event. The ACC will be consulted before authorizing further deferrals. As soon as operations permit, deferred maintenance actions must be brought current.

5. Inspections may be done earlier (rebased) than the low limit of the interval, (minus 3 days, minus 10 percent). When an inspection is done earlier than the low limit of the interval, the next inspection is due based on the hour or cycle the inspection WO was initiated.

d. T/M/S preflight inspection supersede the requirement for daily and turnaround inspections. If the T/M/S does not specify a preflight inspection requirement, then aircraft daily and turnaround inspections are documented on a Preflight/Daily/Turnaround/Postflight Maintenance Record (OPNAV 4790/38) (Figure 29-2). The records may be destroyed on completion of the next like inspection. All other inspections are documented on a Work Order (WO). The Preflight/Daily/Turnaround/Postflight Maintenance Record (OPNAV 4790/38) is completed by entering the following information:

Block 1 - PREFLIGHT, DAILY, TURNAROUND, and POSTFLIGHT blocks. Check the type of inspection being performed.

Block 2 - DATE AND TIME. Date and time the inspection is performed.

Block 3 - T/M/S. Aircraft/system T/M/S being inspected.

Block 4 - BUNO. BUNO of aircraft/system being inspected.

Block 5 - SIDE NO. Side number of aircraft being inspected.

Block 6 - ACTIVITY. Activity performing inspection.

Block 7 - CARD NUMBER/RTG/MOS. Separate entries are required for each MRC, for example, PC-1, PC-1.1, and PC-1.2 would be three separate line entries. If desired, rating or MOS may be included. When using checklists enter one step number per line for example, steps 1, 2, 3, 4, would be four separate line entries.

Block 8 - TOOL CONTAINER NUMBER. Tool container number, entered once, on the line where the using technician's name first appears.

Block 9 - DISCREPANCY / JCN*. Enter a brief narrative description of each discrepancy.

Block 10 - CORRECTED. Check in YES column if discrepancy in Block 9 is corrected; check in NO column if discrepancy has not been corrected. If NO is checked, there must be a JCN in Block 9.

Block 11 - SIGNATURE AND RATE / MOS**. Signature and rate or MOS of the individual performing the inspection. A signature and rate or MOS must appear for each line entry.

NOTE: **For inspections requiring only one individual to perform all applicable MRC/checklist numbers, the first and last card number are required to be signed (with an arrow connecting both signatures) by the individual performing the inspection (Figure 29-2)**

Block 12 - MAINTENANCE CONTROL REPRESENTATIVE. Signature and rate or rank indicating maintenance control has reviewed the inspection record.

e. Types of Aircraft Inspections, T/M/S specific inspection requirements supersede these inspections.

NOTE: **These inspections only apply to Unmanned Aircraft. Preflight, postflight, daily, and turnaround inspections for control stations and ancillary equipment shall be done iaw T/M/S publications, but are not required to documented on (OPNAV 4790/38) (Figure 29-2)**

(1) Daily Inspection. This inspection is conducted to inspect for defects to a greater depth than the turnaround inspection. The daily inspection is valid for a period of 72 hours commencing from the date and time the inspection is completed, provided no flight occurs during this period and no maintenance other than servicing has been performed. Aircraft may be flown for 24 hours without another daily. This 24 hour period begins with the first launch following accomplishment of the daily inspection. The 24 hours cannot exceed the 72 hour expiration of the daily unless the expiration occurs during a mission, in which case the aircraft will require a daily before the next flight. Turnaround requirements are not included in the daily inspection and must be accomplished separately. Accomplishment of a turnaround does not affect the 72 hour validity of the daily inspections (Figure 29-2).

NOTES: 1. In the event maintenance, other than servicing, must be performed after the daily inspection or turnaround inspection is completed, Maintenance Control must determine if a complete or partial daily or turnaround inspection is required, or if no portion of either inspection is required.

2. COs may authorize UACs to conduct applicable T/M/S NATOPS inspections, ensure servicing requirements are accomplished, and sign the Aircraft Inspection and Acceptance Record (OPNAV 4790/141) (Figure 29-1) in the certification block while operating away from home without qualified maintenance personnel. In these cases, the daily inspection must be completed immediately prior to the commencement of the mission.

(2) Turnaround Inspection. This inspection is conducted between flights to verify the integrity of the unmanned aircraft for flight, verify proper servicing, and to detect degradation that may have occurred during the previous flight. The turnaround inspection is valid for a period of 24 hours commencing from the date and time the inspection is completed, provided no flight and no maintenance other than servicing occurs during this period. The

accomplishment of the daily inspection does not satisfy the turnaround inspection requirements, unless otherwise specified in T/M/S technical manuals.

(3) Special Inspection. Special inspections are scheduled inspections with a prescribed interval other than daily or phase. Special Inspection intervals are based on elapsed calendar time, flight hours, operating hours, or number of cycles or events, as specified in applicable maintenance technical manuals. Examples: 7, 28 days; 50, 100, 200 hours; 10, 100 arrestments.

(4) Conditional Inspection. Conditional maintenance requirements are unscheduled events required as the result of a specific over limit condition, or as a result of circumstances or events which create an administrative requirement for an inspection.

(5) Acceptance and Transfer Inspection:

(a) An acceptance and transfer inspection shall be performed when a reporting custodian accepts or transfers an ATO unmanned aircraft system under XRAY Action Code R (Appendix E). Acceptance and transfer inspections shall include:

1. Inventory of all equipment listed in the AIR.

2. Configuration verification.

3. Aircraft acceptance conditional inspection technical publication requirements (if applicable).

(b) If possible, a joint transfer and acceptance should be completed by transfer and gaining activities.

(c) Administrative requirements of unmanned aircraft system acceptance include:

1. Submission of XRAY and DECKPLATE ETR(s).

2. Electronic receipt of unmanned aircraft systems and associated equipment.

(d) Operating units that transfer unmanned aircraft/systems between home guard and detachments are not required to perform an acceptance inspection.

(e) Operating units that accept a short-term transfer (less than 45 days) of unmanned aircraft/systems are not required to perform an acceptance/transfer inspection

(f) The handbook of W&B data, and electronic files will be transferred with the UAS.

29.3.7 Unmanned Aircraft and Equipment Cannibalization Management

a. Cannibalization is an acceptable management choice only when necessary to meet operational objectives. Commands are responsible for eliminating unnecessary cannibalization that provides no benefit to accomplishment of the mission. Cannibalization has a direct negative impact on morale.

b. Commands are encourage to assess the effectiveness of their cannibalization by tracking related measurements, such as material availability rate, A-799 rate, I-level TAT, supply response time, cannibalization per 100 sorties, and average maintenance man-hours per cannibalization.

c. Group 3 UAS is designed to be able to cannibalize aircraft, equipment, and components internally to each system, between systems, and between sister squadrons. Instead of unitizing pool stock assets or managing large amounts of individual repairable components, Group UAS utilizes additional aircraft within a system that can be cannibalized as required to meet the mission. Therefore the traditional manned aviation cannibalization approval procedures are not required for Group 3 UAS. All cannibalizations will be documented within the electronic MIS, but do not require permission outside of the organizational unit.

29.3.8 Monthly Maintenance Plan (MMP)

a. The purpose of the MMP is to provide scheduled control of the predictable maintenance workload, for example, inspections, transfer or receipt of aircraft, and compliance with TDs. By scheduling predictable maintenance, the capability for accomplishing unscheduled work can be determined. In addition, requirements for SE, material, manpower, and other factors affecting the maintenance operation can be determined in advance of actual need.

b. The MMCO is responsible for preparing and publishing the MMP.

c. The MMP shall contain the following minimum information:

(1) Projected known operational commitments, including number of flights, flight hours, and aircraft requirements obtained from the Operations Department.

(2) Dates of scheduled receipts or transfers of unmanned aircraft and Unmanned Aircraft Systems (as applicable).

(3) TMDE calibration requirements include lists of TMDE due for calibration and TMDE not yet returned from calibration. MEASURE format 800, if verified as accurate, may be published in the MMP.

(4) Schedule of technical training.

(5) Current list of QA personnel; QARs, CDQARs, and CDIs, and Plane Captains.

(6) List of QA audited programs as well as program managers and monitors.

(7) A narrative or visual assessment metric from service unique maintenance personnel, which demonstrates the organization’s ability to perform expected maintenance with the current level of qualified personnel.

29.3.9 Preservation Procedures and Responsibilities

a. Preservation is designed to protect the material condition of aircraft which are not expected to be flown for extended periods of time. An unmanned aircraft may be preserved at any time, regardless of the material condition reporting status, when it is determined to be in the best interest of the aircraft or activity. The MO is responsible for determining when an aircraft is required to be placed in preservation. For aircraft placed in preservation per T/M/S maintenance technical manuals, all scheduled special inspections may be deferred until the aircraft is removed from preservation. For aircraft without preservation maintenance technical manuals, preservation shall be performed per NAVAIR 15-01-500. Aircraft may be removed from preservation at the discretion of the MO. All scheduled special inspections shall be performed on unmanned aircraft not in preservation. Aircraft T/M/S maintenance technical manuals shall be used to perform system operational checks when not placed in preservation.

b. Levels of preservation for aircraft and ancillary equipment are defined below. Dehumidification (Level III) is the preferred method of preservation.

(1) Level I: 0 - 90 days.

(2) Level II: 0 - 1 year.

(3) Level III: 0 - indefinite.

c. Corrosion Prevention and Control. QA will monitor to determine if:

(1) A preventive maintenance program is in effect that ensures compliance with NAVAIR 01-1A-509 (series), NAVAIR 15-01-500, NAVAIR 17-1-125, NAVAIR 17-35FR-06, and other existing directives.

(2) Only authorized and current shelf life corrosion prevention/control materials are used.

AIRCRAFT INSPECTION AND ACCEPTANCE RECORD

1. A/C BU/SER NO	2. T/M/S	3. RPT. CUST.	4. OXY	5. FUEL		6. OIL					7. DATE
				GRADE	QTY	GRADE	1	2	3	4	

8. ORDNANCE / SPECIAL EQUIPMENT / LIMITATIONS / REMARKS		
	9. I have personally inspected this aircraft IAW the applicable MRCs/checklists. Any discrepancies noted have been entered on CNAF 4790/38.	
	SIGNATURE OF PLANE CAPTAIN	RANK/RATE
	10. Certification of safe for flight condition by personnel authorized by the Commanding Officer to release aircraft Safe For Flight	
	SIGNATURE	RANK/RATE
	11. I have reviewed the discrepancy reports of the 10 previous flights, insured proper filing of weight and balance data, and accept this aircraft for flight	
	SIGNATURE OF PILOT IN COMMAND	RANK

OPNAV 4790/141 (12-89)

Figure 29-1, Aircraft Inspection and Acceptance Record (OPNAV 4790/141)

PREFLIGHT / DAILY / TURNAROUND / POSTFLIGHT MAINTENANCE RECORD

1. ☐ PREFLIGHT ☐ DAILY ☐ TURNAROUND ☐ POSTFLIGHT

2. DATE AND TIME STARTED ____________ COMPLETED ____________	3. T/M/S	4. BUNO	5. SIDE NO.	6. ACTIVITY

7. CARD NUMBER / RTG/MOS	8. TOOL CONTAINER NUMBER	9. DISCREPANCY / JCN *	10. CORRECTED YES	10. CORRECTED NO	11. SIGNATURE AND RATE / MOS **

* JCN NOT REQUIRED FOR CORRECTED SERVICING ACTIONS. ** SIGNATURES CERTIFY THAT MRCs HAVE BEEN COMPLIED WITH, VIDS /MAFS HAVE BEEN INITIATED FOR DISCREPANCIES, AND ALL TOOLS ARE ACCOUNTED FOR.	12. MAINTENANCE CONTROL REPRESENTATIVE *(Signature and rate /rank)*

Figure 29-2, Preflight/Daily/Turnaround/Postflight Maintenance Record (OPNAV 4790/38)

30 Group 3 UAS Material Control

30.1 Group 3 UAS Material Control functions and responsibilities outlined below are applicable to all Group 3 UAS Navy and Marine Corps activities.

30.1.1 Turn-in of Defective Components

a. Repairable material will be removed from an unmanned aircraft or system and made available for turn-in when a replacement is requested, unless specifically authorized to remain in place by the CRIPL. When the replacement CRIPL item is received, turn-in of the old item must be made within 24 hours. Supporting Supply activities shall strictly enforce the one-for-one exchange of repairables using the CRIPL to identify the authorized exceptions.

b. All defective repairable components shall be wrapped using a cushioning material, cellular plastic film (bubble wrap) PPP-C-795, class 1 or class 2, for short term protection of equipment from handling and shock when the component is turned in to Supply. Refer to, COMNAVAIRFORINST 4790.2 paragraph 10.21, for packaging, handling, and storage requirements of ESDS components.

NOTE: **All solid state electronic components and assemblies containing such components are considered ESDS items unless otherwise directed by higher authority. Refer to COMNAVAIRFORINST 4790.2, paragraph 10.21, for guidance and direction for the identification, handling, and protection of ESDS components.**

c. For an ASR, EHR, or SRC tracked component, ensure the appropriate ASR, EHR, or SRC card is enclosed in a plastic envelope and attached to the component. Also ensure that electronic records are transferred via the electronic MIS.

d. Under no circumstances shall spare repairable components of any type, RFI or NRFI, be allowed to be held in any activity, unless authorized by higher authority.

e. For defective material awaiting EI or PQDR disposition, refer to, COMNAVAIRFORINST 4790.2 paragraph 10.9.

f. Embarked Detachments will turn-in NRFI repairables to the host air capable ship for retrograde shipment to the supporting shore site POE.

30.1.2 Source, Maintenance, and Recoverability (SM&R) Codes

a. SM&R Codes are used to communicate maintenance and supply instructions to various logistic support levels and using commands for the logistic support of systems, equipment, and end items. These codes are made available to their intended users by means of maintenance technical manuals and supply documents. SM&R Codes are assigned to each supported item based on the logistic support planned for the end item and its components.

b. The primary objective is to establish uniform policies, procedures, management tools, and means of communication to promote inter-Service and integrated material support within and among military services. Thus, the establishment of uniform SM&R codes is an essential step toward improving overall capabilities for more effective inter-Service and integrated support.

30.1.3 Requisition Validation

a. Validate UAS requisitions each work day to ensure material is still required.

b. Update NMCS/PMCS requisitions with appropriate status codes.

c. Update requisition status when aircraft of ancillary equipment go out of reporting.

d. Ensure requisitions move along with aircraft or equipment are cannibalized or transferred to another system or activity.

30.2 Group 3 Financial Managements

30.2.1 Group 3 UAS will follow all financial management procedures outlined in COMNAVAIRFORINST 4790.2 chapter 4 (USMC only), and chapter 5. This includes the procurement of repairables, consumables, flight equipment, Hazardous Materials.

30.2.2 If a Group 3 UAS T/M/S has program specific requisition and material control procedures, then that will supersede the procedures of this instruction.

30.2.3 Flight packets will be managed iaw with COMNAVAIRFORINST 4790.2 Chapter 4 and 5.

NOTE: **Detailed information on flight packets is in NAVSUP Publication 485 and current ACC or TYCOM instructions.**

30.3 Group 3 UAS Aircraft Inventory Records (AIRs)

30.3.1 Group 3 UAS will follow the AIRs procedures outlined in COMNAVAIRFORINST 4790.2 paragraph 5.1.3.11. If a specific Group 3 T/M/S does not have a Master Aircraft Inventory Record (MAIR), then the original delivery Hand Receipts shall be used for inventory and acceptance/transfer purposes. The T/M/S model manager can also publish a T/M/S specific AIR in lieu of hand receipts.

a. If the Model Manager decides to create an AIR vice utilizing Hand Receipts, it shall be created iaw COMNAVAIRFORINST 4790.2 section 5.1.3.11.e-j.

30.4 Predeployment Planning

30.4.1 Group 3 UAS that utilize traditional supply chains will plan deployment material support in accordance with COMNAVAIRFORINST 4790.2 paragraph 5.1.3.12.

30.4.2 Group 3 T/M/S that utilize a supply chain outside of traditional naval supply channels are responsible for their own pre deployment planning. Prior to deployment Group 3 UAS organizational units with nonstandard supply chains shall:

a. If a determination is made to provide support by means of a pack up, the unit will coordinate with supply activities to provide, on a temporary custody basis, a limited pack up based on the length of shore operation, normal usage data, and overall ship support requirements.

b. Squadrons aviation usage data, mission and flying hour projection, and proposed maintenance plans provide the basic elements of aviation supply planning.

30.5 Surveys

30.5.1 A survey is the procedure required when Navy property and Defense Logistics Agency (DLA) material, including IMRL equipment/SE, in Navy custody is lost, damaged, or destroyed.

30.5.2 A DD 200 survey will be completed for all blue/aviation UAS lost, damaged, or destroyed property regardless if it is procured through Naval or PBL channels. Survey procedures are outlined in COMNAVAIRFORINST 4790.2 paragraph 5.1.3.14.

31 Group 3 UAS Quality Assurance

31.1 Group 3 UAS Quality Assurance Objectives:

a. Improve the safety of flight and ground operations.

b. Improve the quality, uniformity, and reliability of unmanned aircraft and equipment.

c. Improve the quality of maintenance materials, technical data, and processes.

d. Improve the skills and consistency in performance of maintenance personnel.

e. Eliminate unnecessary man-hours and material expenditures.

31.2 Responsibility

QA is the responsibility of every individual involved with naval aviation maintenance. Although the QA Officer (QAO) is responsible for managing the overall quality assurance effort.

31.3 Terms

a. Inspection is the physical examination and testing of aircraft, engines, equipment, components, parts, and materials to determine conformance to specifications.

(1) Final inspections are specific QA functions performed following the completion of a maintenance task when proper accomplishment of the task can be determined by visual inspection.

(2) In-process inspections are required during the performance of maintenance where satisfactory accomplishment of the task cannot be determined after the task has been completed. Requirements for an in-process inspection include, but are not limited to, witnessing application of torque, functional testing, adjusting, assembly, servicing, and installation. The notation “QA” appears on each Maintenance Requirement Card (MRC) containing an in-process QA task.

b. Auditing is the periodic or on-condition evaluation of compliance with specified policies and procedures. Examples of audits include QA program audits, Division Officer work center audits, and program manager assessments. Refer to section 7 of this supplemental for guidance on auditing.

c. Monitoring is the physical observance of a process to verify compliance with procedures, for example, a Quality Assurance Representative (QAR) watching a fuel sample being taken to verify correct procedures are being adhered to and all safety precautions are being followed.

31.4 Quality Assurance Division Organization

31.4.1 At home station, each Group 3 UAS activity will maintain a QA Division comprised of at a minimum:

a. Quality Assurance Officer (QAO)

b. Quality Assurance Chief

c. Central Technical Publication Librarian

31.4.2 The Maintenance Officer (MO) will determine the number of additional Quality Assurance Representatives (QAR) assigned to the QA Division, and the number of Collateral Duty Quality Assurance Representatives (CDQAR) and Collateral Duty Inspectors (CDI) assigned to production work centers based on operational requirements, QA workload, and number of work shifts.

NOTES: 1. The QA Officer and QA Supervisor assignments will not be collateral duties assigned to other maintenance billets.
2. QA Supervisors may also be designated as QARs in their areas of technical expertise.

31.4.3 During Detachments or single system deployments for greater than 90 days, the MO shall send at least one CDQAR. The detachment is not responsible for standing up new programs or performing program audits. They will be covered under the home station unit’s programs and processes.

a. The (QAO) shall maintain contact with the deployed CDQAR and provide programmatic guidance/oversite throughout the deployment/exercise/detachment.

b. If a detachment is integrating into the Air Combat Element (ACE) of a Marine Expeditionary Unit (MEU), the ACE commander can decide whether to bring the Group 3 UAS detachment under the auspice of the ACE Quality Assurance Program, or allow the detachment to continue to be governed from their parent unit.

31.5 Quality Assurance Personnel

Personnel assigned to QA duties are the direct representative of the Commanding Officer (CO) for ensuring the quality of aircraft, engines, components, and equipment, and must possess the highest standards of professional integrity. In addition to inspection duties, QARs, CDQARs, and CDIs serve as trainers and mentors in their areas of expertise.

31.5.1 Quality Assurance Representative (QAR)

QARs are permanently assigned to the Quality Assurance Division. QAR qualifications:

a. Paygrade E-4 or above.

b. (Navy) Fully qualified in the Qualified and Proficient Technician (QPT) syllabus in their technical field for the type/model/series (T/M/S) aircraft supported.

c. (Marines) Fully qualified in the Aviation Maintenance Training and Readiness Program (AMTRP) syllabus in their technical field for the T/M/S aircraft supported.

d. Complete the QAR training syllabus applicable to their billet assignment, and pass the written examination administered by QA.

NOTE: **Completion of the Naval Aviation Logistics Command Management Information System (NALCOMIS) (Optimized) Organizational Level Maintenance Activity (OMA) Quality Assurance Administration course (Course C-555-0046) is recommended, but not required.**

31.5.2 Collateral Duty Quality Assurance Representative (CDQAR)

CDQARs are assigned to work centers when needed to supplement the QA Division’s capacity to perform QAR-level inspections. CDQARs are responsible to the QA Officer when performing QA functions. CDQAR qualifications:

a. Paygrade E-4 or above.

b. Complete the same training and testing syllabus as QARs assigned to the QA Division.

NOTES: 1. Except where specifically stated in this instruction, CDQARs will not be assigned to perform non-inspection functions, such as QA audits, when a commensurate billet exists in the QA Division.

2. A CDQAR may perform initial qualification sign-off and subsequent proficiency and practical examinations specified to be performed by a QAR, if they are fully qualified in the respective area.

31.5.3 Collateral Duty Inspector (CDI)

CDIs inspect all work and comply with the required QA inspections during all maintenance actions performed by their production work center. CDIs are responsible to the QA Officer when performing QA functions. CDI qualifications:

a. Qualified in the NAMP programs and processes applicable to their work centers.

b. Complete the CDI training syllabus applicable to their assignment, and pass the written examination administered by QA.

31.5.4 Training

31.5.4.1 QAR, CDQAR, and CDI training syllabus or PQS must have a written test for each Navy Enlisted Classification (NEC) or MOS and work center assignment, for each T/M/S aircraft supported. The training syllabus or PQS, and the test, must cover the QA requirements for test, inspection, and administrative processes specific to the QAR, CDQAR, or CDI assignment. Specific areas to be covered in the syllabus include:

a. QPT or AMTRP requirements.

b. Formal school requirements to their QA billet (if applicable).

c. Testing and inspection procedures, for example; measuring tolerances, corrosion focus area list (FAL) inspection techniques, conditional inspection requirements, in-process and final QA witnessed requirements for torque, functional testing, assembly, etc.

d. Required reading, applicable to the QA billet.

e. QA sign-off and certification procedures.

f. Data collection and monitoring procedures for areas applicable to the QA billet description.

g. Auditing and monitoring techniques for the NAMP programs the billet is responsible for.

h. Written test, with questions on this section, applicable NAMPSOPs, and other technical and administrative areas applicable to the billet.

i. A practical examination to verify skill in the use of inspection equipment or other QA procedures.

j. Topics for the oral interview by the QA Officer and QA Supervisor.

31.5.4.2 The QA Officer is responsible for ensuring QARs, CDQARs, and CDIs are trained and current in the QA processes related to their QA billet and work center assignment. If a QAR is assigned to perform inspections outside of their billet assignment, the QA Officer must verify they receive cross-training in any QA functions they perform that are not in their NEC or MOS area of expertise. If applicable, cross-training will include Center for Naval Aviation Technical Training Unit (CNATTU) training courses, on-job training (OJT), rotation of assignments, and task specific elements of the QAR training syllabus or PQS.

31.5.5 Designation

a. Division Officers will review the qualifications of QAR, CDQAR, and CDI candidates and personally interview the candidate prior to endorsing the recommendation.

b. The QA Officer and QA Supervisor will verify the qualifications of QAR, CDQAR, and CDI candidates, and conduct an oral board, prior to endorsing the recommendation.

c. The MO will approve the designation.

31.5.6 MOs of activities that deploy detachments may authorize detachment officers in charge (OINC) to designate QA personnel (CDQARs and CDIs), provided the deployment period is in excess of 45 days and all procedures and requirements for designating QA personnel are accomplished by the detachment.

31.5.7 QARs, CDQARs, or CDIs that are TAD to another command operating or supporting the same T/M/S aircraft may be designated as a QAR, CDQAR, or CDI by the TAD unit CO without re-completing QAR, CDQAR, or CDI training.

31.6 Quality Assurance Division Responsibilities

31.6.1 Quality Assurance Division must:

a. Manage the programs prescribed in paragraph 31.10 of this supplemental.

b. Perform mandatory QA inspections as specified in maintenance technical manuals, technical directives (TD), and other directives.

c. Monitor inspections and tests of aircraft, engines, components, and equipment to verify correct procedures are being followed.

d. Manage the Central Technical Publications Library (CTPL) per section 8 of this supplemental, and control classified technical publications for the department.

e. Analyze quality related data and take action to improve the quality of maintenance; for example, providing training on troubleshooting and repair procedures for components with recurring Action Taken Code “A” Malfunction Code “799” (No Defect) or When Discovered Code “Y” (Found defective upon receipt). At a minimum, QA will track:

(1) Action Taken & Malfunction Code A-799: NO REPAIR REQUIRED - NO DEFECT. Track by part number (P/N), serial

number (S/N), bureau number (BUNO) or equipment removed from, removing work center, and technician.

f. Maintain a list of personnel assigned as QAR, CDQAR, and CDI.

g. Lead the effort to collect data required for NAMDRP, HMR, and other reports.

31.7 QA Inspection and Certification

31.7.1 Only designated QA personnel (QARs, CDQARs, and CDIs) are authorized to perform specified QA inspections. When QARs, CDQARs, or CDIs sign an inspection report, they are certifying:

a. They personally inspected the work.

b. The work was completed in accordance with current instructions and directives.

c. The work is satisfactory in all respects.

d. Any parts or components removed were properly replaced and secured.

e. The item is Safe for Flight or use.

31.7.2 QARs, CDQARs, and CDIs will not inspect their own work unless it can be operationally checked or is physically inspected as part of the Daily and Preflight inspection such as the wing camber locks, or replacing a fiber optic cable between the control stations and data terminal.

NOTES: 1. Excludes any maintenance that requires a torque value, or specifically identified as a QA function within the maintenance manuals

2. Excludes system emplacement before the first flight.

31.7.3 A CDQAR or a QAR will inspect the launch and recovery site upon emplacement prior to the commencement of the flight operations for that exercise/detachment/operational period. The intent is to get a holistic perspective of the system in its entirety to look at safety and system integrity/layout.

31.7.4 It is recommended to have at least a CDI set up and inspect a spoke site, however, it is not required. The completion of aircrew NATOPs and technical manual operational checks must be performed prior to taking control of unmanned aircraft from the spoke location.

NOTES: 1. Spoke operations are unique in that if the control station at the spoke location does not operate satisfactorily, it will be unable to take control of the aircraft, or the aircraft will automatically return to its preprogrammed home location. This redundancy allows for greater flexibility and risk mitigation, thus a CDI inspection is only recommended, but not required.

2. It is recommended to have maintenance personnel at the spoke location to increase the probability of a successful mission, but a UAS activity can task organize as the mission dictates.

a. Spoke sites can be emplaced, inspected, and pre-operationally checked by trained aircrew at spoke location without a QAR, CDQAR, CDI, or maintainer present.

b. Emplacement and displacement Work Orders (WO) are not required for spoke locations, however, all corrective maintenance will be documented via a WO. Routine corrective maintenance, such as component swaps or cable replacement can be performed by a trained maintainer or aircrew at the spoke site without CDI oversite as long as the system is op-checked prior to taking control of an unmanned aircraft. The WO will be back fitted into the MIS upon completion of the spoke operation. Aircrew performing maintenance will:

c. Adequate maintenance was performed to correct the discrepancy.

d. Maintenance areas are free of foreign objects.

e. Opened panels or doors are correctly closed.

f. If maintenance involves flight safety, a CDI must re-inspect the repairs on return to home base.

31.7.5 QA MRCs or QA callouts within technical manuals are provided for certain maintenance tasks that, if improperly performed, could cause equipment failure or jeopardize the safety of personnel. The QA appearing on MRCs and technical manuals signifies a QA function is required.

a. Each QA callout will be performed by at least a CDI, however, Commands can locally require a higher level inspection by a CDQAR/QAR as necessary.

b. If a command requires that certain inspections must be performed by a CDQAR or QAR, (aside from initial launch and recovery site emplacement), then a list of cards or tasks will be listed in the MMP. Maintenance Control will take a copy of the list for detachments.

31.8 Inspection Certification

31.8.1 General certification requirements:

a. Completion of a QA inspection must be certified by electronic signoff or signature.

b. The Inspected By block on work orders (WO) and maintenance action forms (MAF) will only be signed by the QAR, CDQAR, or CDI that actually inspected the work.

NOTE: **CDIs will verify correct Work Unit Code, Malfunction Description Code, Action Taken Code, Transaction Code, Type Maintenance code, Installed/New Item data, and an accurate and complete Corrective Action statement prior to signing the WO or MAF.**

31.8.2 Inspection certification procedures:

a. If all in-process inspections of a maintenance action are performed by a single QA inspector, the individual in-process inspections are not required to be documented on the WO. The Inspected By block on the WO indicates the inspector completed all required in-process inspections and the final inspection for the entire maintenance action.

b. When multiple in-process inspections are performed by a single QA inspector, these may be documented on the WO by a single in-process annotation as opposed to listing each in-process individually, for example, “Inspected in-process steps A-J”.

c. Group 3 UAS publications/IETMs are often evolving and maturing. From time to time a maintenance task may be missing. In these unique circumstances, the QAR, CDQAR, or CDI must notify QA and the MO or Detachment OINC.

(1) The Field Support Team (FST) should be contacted to request procedures. FST can authorize interim procedures until the technical manual/IETM is updated.

(2) If the UAS T/M/S does not have an established FST, then the Field Service Representative will be asked to perform and signoff the maintenance per paragraph 31.9 of this supplemental.

(3) If the FSR is not physically present, he or she may provide Group 3 UAS activities with procedures via email or over the phone. The QA representative who inspects the maintenance will sign off the WO annotating the FSR provided written or verbal instructions.

(4) The MO or Detachment OINC must approve any maintenance using any procedures obtained from FST or an FSR prior to commencement.

(5) Additionally, QA will submit a TPDR for each circumstance where the IETM is insufficient and other references were used.

31.9 Field Service Representatives (FSR).

31.9.1 FSRs fulfilling SFF, QAR/CDQAR/CDI, and PC functions will be designated in writing.

a. The MO or CO will not sign off the designation until an endorsement is received via the FSR site lead. The site lead may endorse him or herself as applicable.

b. A formal Navy/Marine Corps training syllabus is not required for each FSR fulfilling SFF, QA, or PC functions. The FSR site lead will ensure each FSR is properly trained prior to providing endorsement.

c. FSR qualifications shall be listed in the MMP.

d. FSRs will document all maintenance using the same Maintenance Information System or method as Sailors and Marines.

e. FSRs can sign off their own work per contract or FSR site lead guidance.

f. If an FSR must use a reference that is not available to service members, then he or she will consult the QA, and the MO or detachment OINC.

(1) Additionally, the FSR will work with QA to submit a TPDR for each circumstance where the IETM is insufficient and other references are required.

(2) The FSR will annotate the reference used on the WO.

31.10 Group 3 UAS Quality Assurance (QA) Division Program Management

The QA Division is responsible for managing the following processes:

a. Group 3 UAS Compliance Auditing per section 7 of this supplemental.

b. Naval Aviation Maintenance Discrepancy Reporting Program (NAMDRP) per section 9 of this supplemental.

c. Technical Data Management per section 8 of this supplmenatal.

d. Maintenance Department Safety per paragraph 32 of this supplemental, COMNAVAIRFORINST 4790.2, sections 7.6.1 and 6.2.4, OPNAVINST 3750.6, OPNAVINST 5100.23, and OPNAVINST 5100.19.

32 Group 3 UAS Maintenance Department Safety

32.1 The Maintenance Department Safety Program is applicable to Group 3 UAS activities as outlined in paragraphs COMNAVAIRFORINST 4790.2 sections 7.6.1 and 6.2.4, OPNAVINST 3750.6, and OPNAVINST., OPNAVINST 3750.6 and OPNAVINST 5100.23 for ashore activities and OPNAVINST 5100.19 for afloat activities.

32.2 For group 3 UAS activities the CO or MO shall create a local policy for the use of fall protection PPE cranials.

a. While aboard ship, Group 3 UAS detachments will follow the procedures of the air combat element (float coats and cranials)

b. While ashore, the CO or MO will create procedures that apply consistently across the entire unit. For example a 7-ton MTVR mechanic will have the same local rules as maintenance personnel whether it include or exclude the use of cranials.

NOTE: **Hearing protection requirements will not be altered from the guidance in paragraph 32.1 of this supplemental.**

33 Group 3 UAS Confined Space Program

33.1 The Confined Space Program is not applicable to Group 3 UAS because the size restrictions for Group 3 unmanned aircraft mitigate the hazard to maintainers working on the fuel system.

34 Group 3 UAS Aircraft Compass Calibration

34.1 Group 3 UAS does not have a “wet stand-by compass” therefore does not require the annual calibration.

35 Group 3 UAS Manpower Management

35.1 The Manpower Management program area is applicable for Group 3 UAS activities including paragraphs COMNAVAIRFORINST 4790.2 sections 3.4.4.7, 10.7.3.4, and 10.7.4.8 and BUPERSINST 1080.54.

36 Group 3 UAS Phase Maintenance

36.1 The Phase Maintenance Program Area is not applicable because Group 3 UAS does not have phases within the inspection cycle. All calendar based inspections can be competed without the need of a phase meetings and a phase work center.

37 Group 3 UAS Aerial Refueling Stores

37.1 The Aerial Refueling Stores Program Area is not applicable because Group 3 UAS do not have an aerial refueling capability.

38 Group 3 UAS Battery Maintenance Safety

38.1 The Battery Maintenance Safety program area is applicable to Group 3 UAS in accordance with COMNAVAIRFORINST 4790.2 paragraphs 10.7.4.8, 10.7.3.4 (a) and (b) and the NAVAIR 17-15BAD-1.

39 Group 3 UAS Armament Systems

39.1 The Aircraft Armament Systems program area is not applicable to Group 3 UAS because there are no armament systems within fielded Group 3 UAS.

40 Group 3 UAS Aviation Life Support Systems

40.1 The Aviation Life Support Systems program area is not applicable to Group 3 UAS because the aircraft is unmanned.

41 Group 3 UAS Low Observable Program

41.1 The Low Observable Program is not applicable because Group 3 UAS do not have low observable surfaces.

42 Group 3 Aircraft Records and Reports/ Accounting

42.1 Group 3 UAS will be evaluated on the Aircraft Records and Reports/ Accounting program area.

42.2 The MO will designate in writing via the MMP the MMCO as the program manager and the MMCO will perform initial and annual program audits using the CSEC, per the procedures of section 7 of this supplemental.

42.3 DECKPLATE - AIRRS is the Navy's official aircraft and UAS inventory program of record for all Navy and Marine Corps aircraft from initial acceptance to final disposition at AMARG, FMS or disposal. DECKPLATE-AIRRS provides the Offices of the Secretary of Defense, DON, and subordinate commands with comprehensive, current and historical data on Navy and Marine Corps aircraft location, status, and service in sufficient depth to support naval aviation inventory management, planning, and budgeting processes.

42.3.1 Function of the XRAY (Aircraft Custody and Status Change)

The XRAY is the primary means of recording UAS status changes. The XRAY records aircraft and UAS custody, status and service life factor changes, include Depot rework.

42.3.2 XRAY Deadlines

Category 1 strike XRAYs for lost, (not recovered) or destroyed aircraft, must be submitted no later than 2400 on the day of occurrence. All outstanding XRAY corrections and other XRAY transactions must be reported within 5 days. The action date reported on the XRAY will be the date the transaction occurred, regardless of the date the XRAY report is actually transmitted.

NOTE: **For Group 3 UAS utilizing a system BUNO, an XRAY will still be submitted against an individual aircraft S/N, vice the entire system BUNO.**

42.3.3 Activities not operating OOMA will submit XRAYs directly into DECKPLATE-AIRRS (http://www.navair.navy.mil/logistics/DECKPLATE/index.html)

42.3.4 XRAYs must be submitted by reporting custodians to document status changes, such as acceptance into the naval inventory, transfer of custody, changes of location, rework, damage or strike from the inventory, and other situations defined in Appendix E. A change of location XRAY report is required when the change of location will last more than 45 days.

42.3.5 When an UAS is temporarily in the physical custody of an activity that is not the designated reporting custodian, the physical custodian is responsible for submitting all XRAYs required during the period of temporary custody. The most common situations occur when UAS are being used by another unit for an exercise.

42.3.6 All UAS will remain out of Mission Capable Reporting Status (OUT MCRS) during D-level standard rework, regardless of location.

42.3.7 Status codes and examples of how to complete an XRAY can be found in COMNAVAIRFORINST 4790.2 paragraphs 5.3.3 through 5.3.18., and Appendix E.

42.3.8 Component Life Tracking

a. All life-limited components shall be tracked, digitally or via physical medium, and replaced IAW their life cycles and required inspection cycles. This shall include notation of rework, extension, and any specifically directed or over-limit inspection with details for abnormal conditions.

b. Reporting Custodians are required to report BUNO Life at the end of each quarter.

c. Quarterly Hours in Life must be submitted via the DECKPLATE-AIRRS Web site by the fifth working day of January, April, July, and October.

42.3.9 Engine Transaction Reports are not applicable to Group 3 UAS because of the lower mean time between failure (MTBF), cost, and modular nature of Group 3 unmanned aircraft.

42.3.10 All other end of month and quarter aircraft reporting requirements are at the discretion of the activity MO or higher headquarters.

43 Group 3 UAS Aviation Maintenance In-Service Training Program

43.1 References

a. NAVMC 4790.1A, Aviation Maintenance Training and Readiness Program.

b. OPNAVINST 3500.34G, Personnel Qualification Standards Program.

c. NAVEDTRA 43100-1L, Unit Coordinator’s Guide.

d. NAVEDTRA 43100-2H, PQS Manager and PQS Model Manager’s Guide.

e. OPNAVINST 5100.19E Vol 1, Navy Safety and Occupational Health (SOH) Program Manual for Forces Afloat.

f. OPNAVINST 5100.23G CH-1, Navy Safety and Occupational Health Program Manual.

43.2 Introduction

43.2.1 The Aviation Maintenance In-Service Training (IST) Program directs the implementation of Group 3 level training requirements. Group 3 squadrons are responsible for ensuring their personnel are adequately trained and skilled in their duties.

43.2.2 The Advanced Skills Management Program (ASM) is an unclassified Management Information System (MIS) that contains job task requirements, documents completed training, qualifications, certifications, duty or billet assignments, and tracks personnel progress in completing QPT or AMTRP. ASM is the primary training database for Group 3 maintenance activities when connectivity allows. Group 3 activities may use paper based training products to document OJT when ASM is forecasted to be unavailable for more than 2 weeks due to connectivity.

43.3 Requirements

43.3.1 QPT

Navy personnel performing duties covered by the QPT Program must complete the QPT certification commensurate with their duties and paygrade. Completion of only one QPT certification level PQS is adequate, if the related work is clearly aligned to the QPA or QPJ certification level.

43.3.2 AMTRP

Marine Corps Group 3 personnel must complete the AMTRP requirements for their MOS.

43.3.3 JQR

Qualification for a maintenance duty not covered by the QPT Program, AMTRP or a NAVEDTRA PQS must be conducted per a published JQR. The JQR must include (as applicable):

a. Formal training courses (CNATTU) required.

b. Required reading.

c. IMI.

d. Related general qualifications, for example, flight deck firefighting and cardiopulmonary resuscitation (CPR).

e. SE license requirements as applicable.

f. OJT in specific maintenance and administrative tasks related to the job. Figure 43-1 provides an example of an OJT syllabus.

43.3.4 OJT

OJT will be performed under the supervision and instruction of qualified and designated personnel (generally a Plane Captain or Collateral Duty Inspector who is signed off in the task area). Designated qualifiers will sign-off completion of tasks (line items), only if the individual demonstrates thorough knowledge of and a practical application of the task.

a. As applicable, OJT will include:

(1) General administrative duties, for example, work order (WO) or maintenance action form (MAF).

(2) Use of technical manual, reports, and reference material.

(3) Use of tools and test equipment.

(4) Inspection and maintenance procedures.

(5) General or equipment specific corrosion control inspection, treatment and prevention procedures.

(6) Quality assurance (QA) certification requirements.

(7) Post task question and answer session to assess the trainee’s level of comprehension.

NOTES: The preferred method of OJT is hands-on performance of the task. Simulation may be used when it is impractical to perform the actual task.

b. OJT must be conducted and documented in a task until the trainee is qualified. Supervisors will recommend final qualification only when confident the individual is knowledgeable and skilled in that area. Once the Work Center Supervisor certifies an individual as qualified in a task, OJT documentation for that task is no longer required.

43.3.5 Lesson Guides and IMI

a. Lesson guides or IMI will be used to conduct non-OJT maintenance training. T/M/S specific Lesson guides will be managed and created by the T/M/S model manager. All Group 3 UAS activities are encouraged to reach out to the training model manager to recommend new topics for lesson guides.

NOTES: 1. A lesson guide is not required if the topic is fully covered by IMI.
2. IMI is available on Navy eLearning at (https://www.aas.prod.nel.training.navy.mil). A list of In Service training courses is also available by navigating to: Course Catalog, Navy Learning Centers and Programs, Center for Naval Aviation Technical Training (CNATT), and then In-Service.

b. Lesson guides must include the following elements, as a minimum:

(1) Lecture number.

(2) Time to conduct the lesson.

(3) Date prepared.

(4) Date reviewed.

(5) Prepared or reviewed by.

(6) Title.

(7) Objective.

(8) Instructional aids (if required) and where they can be obtained.

(9) References.

(10) Presentation. If the lesson is covering a procedure in a maintenance technical manual or instruction, the presentation section will state, “Cover the procedures of (reference) with emphasis on (primary points)”. All safety precautions, emergency procedures, and QA requirements must be thoroughly covered.

(11) Summary. As a minimum, the summary must include any safety precautions and emergency procedures covered in the lesson.

(12) Question and answer period.

43.3.6 Required Reading

Information directed to be read must be logged on the Required Reading and Maintenance Information Record (OPNAV 4790/34) (Figure 43-2). The reading material will be maintained in a readily accessible Required Reading File (hardcopy or electronic). A Required Reading Cross-Reference Locator Sheet will be used to list the location of any reading material not feasible to be maintained in the file. For large publications and instructions, the Required Reading Cross-Reference Locator Sheet will itemize the specific chapters and paragraphs required to be read. Information no longer required to be read will be purged from the file.

43.3.7 Group 3 UAS NAMP Indoctrination and Refresher Training

a. Indoctrination Training must be provided to personnel reporting for their first aviation assignment, and to experienced personnel reporting from duty with a non-aviation command. NAMP Indoctrination Training must be:

(1) Completed within 45 days of reporting to the Maintenance Department.

(2) Taught by a program expert, normally the Program Manager, Program Monitor, QAR, or CDI using the NAMP Indoctrination Training Sheet (Figure 43-3) as a guide.

b. NAMP Refresher Training is required only if specifically directed in another section of this supplemental.

43.3.8 Navy Occupational Safety and NAVOSH and Safety Training

All personnel assigned to the Maintenance Department must receive NAVOSH and Safety Training applicable to their duties. NAVOSH and Safety Training requirements are extensive. Each command must review OPNAVINST 5100.19 and OPNAVINST 5100.23, and complete the minimum training requirements applicable to their operating environment. Figure 43-4 provides an example for documenting NAVOSH and Safety Training.

43.3.9 Individual Qualification/Certification Record

a. ASM serves as the Individual’s Qualification/ Certification Record.

(1) An Individual Qualification/Certification Record must be initiated in ASM for each enlisted member of the Maintenance Department. Aircrew performing maintenance tasks are exempt from maintaining an ASM account if they have an alternate training documentation system/method.

(2) All letters of designation, qualification, certification, course completion, medical certification, and completed PQS and JQR will be filed in the individual’s qualification/certification record.

NOTES: 1. Duplicate paper records and forms are not authorized in activities using ASM. In the event a qualification/certification equivalency within ASM does not

fulfill the requirements of the NAMP, the command's ASM Fleet Administrator will contact the Model Manager for resolution. Paper records may be used until the ASM deficiency is corrected.

2. Scanned images of individual training documents are not required to be maintained in ASM once the subject course, qualification, or license has been signed electronically within ASM.

3. If medical or qualification records are tracked via another process or system they are not required to be double documented in ASM, i.e. if the unit's Corpsman tracks audiograms and PHAs, then these are not required to be tracked in ASM.

b. Activities not using ASM must maintain a hardcopy Individual Qualification/Certification Record that contains the following:

(1) Current letters and certificates of designation, in the following order:

(a) Quality Assurance Representative/Inspector Recommendation/Designation and all current designation letters/certifications/qualifications.

(b) Current medical certifications required for duties, for example, audiograms, X-ray screening, laser eye testing, flight deck physical, and CPR certification.

(c) Course completion certificates, for example, CNATTU completion letters and certificates, including SE Phase I and Phase II training.

(d) PQS completion certificates, for example, NAVPERS 1070/604 for shipboard damage control, maintenance and material management (3M), and completed JQR.

(2) Billet descriptions and assignments and maintenance training history, in the following order:

(a) Billet descriptions and assignments.

(b) NAMP Indoctrination Training Sheet.

(c) NAVOSH (for current and past 4 years) and Safety Training.

c. Individual Qualification and Certification Record Transfer Procedures:

(1) Transfer between Commands using ASM. The transferring command will perform Permanent Change of Station (PCS) check out in ASM upon transfer of each individual. The gaining command will perform PCS check in upon reporting.

(2) Transfer from ASM Command to Non-ASM Command. The ASM command will transfer the electronic version onto a CD in pdf format. Once the CD record is created, the ASM Fleet Administrator will PCS check out and PCS check in the record to the non-ASM unit.

(3) Transfer from Non-ASM Command to ASM Command. The Non-ASM command will scan and make a CD copy of the entire training jacket and provide it to the transferring individual. The ASM command will enter the individual's qualification and certifications into ASM when the individual reports.

43.4 Responsibilities

43.4.1 Maintenance Officer (MO):

a. Designate the Assistant Maintenance Officer (AMO) as the Aviation Maintenance Training Program Manager. Designation will be in writing via the Monthly Maintenance Plan (MMP).

b. Designate an E-4 or above as the ASM Fleet Administrator.

c. Publish local command procedures (LCP) per Appendix D, if required to direct geographic, Group 3 UAS T/M/S specific, or command directed actions for maintenance training not addressed in this Publication. LCPs must be submitted to the Group 3 UAS training T/M/S model manager.

43.4.2 Aviation Maintenance Training Program Manager:

a. Manage maintenance training for the Maintenance Department.

b. (Deploying activities) Develop and track the accomplishment of a Deployment Turnaround Maintenance Training Plan with the specific training requirements and personnel proficiency goals required to meet the operational events of the turnaround cycle and deployment. As a minimum, the plan will identify qualification requirements (number and type of QARs and CDIs, number of personnel qualified as Plane Captains, etc.) and required quotas for training courses.

c. (Non-deploying activities) Develop and track the accomplishment of an Annual Training Plan with specific training requirements and personnel proficiency goals required to sustain the Maintenance Department. As a minimum, the training plan must identify qualification requirements (number and type of QARs and CDIs, number of personnel qualified as Plane Captains, etc.) and required quotas for training courses. Commands with both a non-deploying element and deploying elements must develop an annual training plan that encompasses non-deploying and deploying elements.

d. Obtain quotas and prioritize attendance of formal training courses.

e. Publish a Monthly Training Schedule in the MMP or a separate document, to include:

(1) Maintenance tech training, Follow-on and NAVOSH requirements for the month.

(2) Current list of qualifications (this can be cross referenced to a training management system).

f. Monitor QPT and AMTRP overall percentage certified for each work center.

g. Submit ASM software discrepancies and ASM Master Task List (MTL) change recommendations to the Type Wing or MAW coordinator.

h. Review personnel documents (Career Management System and Interactive Detailing, Activity Manning Document, and PCS orders) and verify arriving personnel either possess the requisite skills (NEC or MOS) or will receive training to qualify for the billet. If incoming personnel do not have required skills, coordinate with manpower and training activities to resolve deficiencies.

i. (Navy) Utilize the FLTMPS Command 12 Month Training Plan and associated FLTMPS ADHOC reports to manage accomplishment of F-School and T-School graduate requirements.

j. Forward discrepancies in QPT OR AMTRP content to the respective T/M/S model manager.

k. Maintain a program file to include:

(1) POCs.

(2) Program related correspondence and message traffic.

(3) References or cross-reference locator sheets.

(4) Most current Computerized Self Evaluation Checklist (CSEC) assessment.

43.4.3 ASM Fleet Administrator:

a. Complete the following training (as applicable):

(1) NAVEDTRA PQS 43401 Advanced Skills Management (301) Basic ASM Administrator Watch station.

(2) NAVEDTRA 43401 Advanced Skills Management (302) ASM Remote Administrator Watch station.

b. Manage the ASM program within the activity, and assist the Program Manager, Type Wing Manager/Developer, and site representative in matters pertaining to ASM.

c. Provide ASM training to personnel. If needed, contact ASM Site Representatives or the ASM Help Desk to request training from the ASM Support Team. Video teleconference and Web based training are also available.

d. Submit ASM software discrepancies and MTL change recommendations to the Aviation Maintenance IST Program Manager.

e. Monitor defect reports and correspond with the ASM Help Desk for resolution (as applicable).

f. Maintain ASM system security per SECNAVINST 5211.5.

g. Assign, modify, or delete ASM user access privileges and passwords.

h. Perform ASM PCS check out or in when individuals transfer or report.

43.4.4 Sea Operational Detachment (SEAOPDET) Coordinator (Navy): Schedule, coordinate, and track completion of training requirements to qualify SEAOPDET personnel for their deployed billet.

43.4.5 Division Officers:

a. Perform an initial review of each Individual's Qualification/Certification Record within 30 days of the member reporting to the division.

b. Review Work Center Supervisor quarterly Qualification/ Certification Progress Reports.

c. Review each member's QPT or AMTRP individual training syllabus prepared by Work Center Supervisors, and verify the syllabus has been appropriately tailored for past experience and training.

NOTE: **QPT or AMTRP training syllabus and quarterly progress reviews may be delegated to the Division or Branch Chief.**

d. Brief newly reporting personnel on QPT, AMTRP, PQS, and JQR qualification requirements and the expected completion timelines required for career progression.

e. Verify division training is conducted per the training schedule.

f. Monitor projected personnel attrition vs. projected numbers of qualified personnel, and verify a sufficient number of qualified personnel will be available to support the division's workload.

g. Submit recommendations for changes to ASM MTL and test question data banks to the ASM Fleet Administrator, as needed, to maintain currency related to division duties.

43.4.6 Work Center Supervisors:

a. Track completion of work center personnel training.

b. Verify training, qualifications, and certifications are documented in each Individual's Qualification/Certification Record within 5 working days of completion.

c. Review the Individual's Qualification/Certification Record of newly reported personnel and recommend a training syllabus to the Division Officer within 30 days of their reporting.

d. Provide a quarterly Qualification/Certification Progress Report to the Division Officer for each work center member. The report must note whether the member's progress is satisfactory and provide recommendations for any changes to their syllabus deemed necessary.

e. Assign qualified personnel to conduct OJT.

f. Sign off qualification in OJT task areas only if the individual has demonstrated sufficient knowledge and skill to independently perform the task.

g. Recommend personnel for final qualification, certification, or designation, only when confident the nominee is knowledgeable and skilled in the area.

h. Direct refresher training for personnel that demonstrate a lack of knowledge or skill in areas they were previously signed off as qualified.

i. Coordinate with the ASM Fleet Administrator to provide ASM training to work center personnel.

j. Review syllabi, lesson guides, and IMI annually to verify material is relevant and current. Submit discrepancies to the Aviation Maintenance Training Program Manager for forwarding to the respective T/M/S model manager for resolution.

k. Review the Required Reading File monthly to ensure the material is current and work center personnel are logging their progress (Figure 43-2).

l. Provide transferring individuals with their Individual Qualification/Certification Record and original designation letters prior to transfer, per paragraph 43.3.9.c of this supplemental.

43.5 Detachments

Group 3 UAS activities that send out detachments have the choice of how to manage deploying individuals' training records. The home station Division Officer and Work Center Supervisor can continue to monitor skill progression, or that record review responsibility can be transferred to the Detachment OIC as applicable.

Note: **This distinction is made specifically for (but not limited to) small detachments deploying with a Marine Expeditionary Unit (MEU) that do not have the resident expertise and manpower to manage a standalone maintenance training program. This includes records management, syllabus progression, and technical training oversite.**

43.6 Initial Qualifier

a. When a new Group 3 UAS T/M/S is introduced, the FRS will receive training from the contractor. The CO/MO will designate an initial qualifier for each pertinent qualification, certification, and license.

b. One individual can be the initial qualifier for more than one certification (i.e. for both Plane Captain and Collateral Duty Inspector).

c. In order to accommodate split site or dual shift operations, an activity can designate up to 2 initial qualifiers for each qualification, certification, or license given that they both receive the same contractor or equivalent training.

d. The FRS will travel to other Group 3 UAS activities who are receiving a new T/M/S in order to provide initial certification. In cases where the FRS is unable to travel to provide initial certification, then those activities may assign initial qualifiers per this section.

43.7 Field Service Representatives (FSR).

a. FSRs fulfilling SFF, QAR, CDQAR, CDI, and PC functions will be designated in writing.

b. The MO or CO will not sign off the designation until an endorsement is received via the FSR site lead. The site lead may endorse himself or herself as applicable.

c. A formal Navy/Marine Corps training syllabus is not required for each FSR fulfilling SFF, QA, or PC functions. The FSR site lead will ensure each FSR is properly trained prior to providing endorsement.

d. FSR qualifications shall be listed in the MMP.

e. FSRs do not need to maintain ASM accounts.

43.8 Required and optional maintenance courses for Group 3 UAS Maintenance Activities

Figure 43-5 contains all required and optional courses available to a Group 3 UAS maintenance activity.

OJT SYLLABUS: 9101 NAME: ____________
A/S32A-45 MID-RANGE TOW TRACTORS

EQUIPMENT	INST	DATE	INST	DATE	INST	DATE	W/C SUP	DATE
TA-75 A/B								
PMs								
Carburetor Adjustment								
R&R Carburetor								
Adjustment Rocker Arms								
Tune Up								
R&R Spark Plugs								
R&R Fan Belts								
R&R Alternator								
Flush Radiator								
R&R Steering Box								
Adjustment Trans Bands								
R&R Power Steering Pump								
R&R Ring Gear								
R&R Starter								
R&R Manifold Gasket								
Brake Job								
Repair Park Brake								
Rebuild Front End								
QEC Engine								
QEC Transmission								
ADDITIONAL TASKING								

A/S32-45 Page 1 of 1

Figure 43-1: OJT Syllabus (Sample)

OPNAVINST 4790.2
COMNAVAIRFORINST 4790.2

REQUIRED READING AND MAINTENANCE
INFORMATION RECORD

DIVISION

NAME	RATE	SUBJECT											

OPNAV 4790/34 (REV 1/2015) Page 1 of 1

Figure 43-2: Required Reading (OPNAV 4790/34)

NAME:______________________________

TOPIC	Instructor	Date
Fuel Surveillance Program		
Navy Oil Analysis and Consumption Monitoring Program		
Quality Assurance Audit Program		
Naval Aviation Maintenance Discrepancy Reporting Program		
Technical Directive Compliance Program		
Foreign Object Damage Prevention Program		
Tool Control Program		
Corrosion Prevention and Control Program		
Plane Captain Qualification Program		
Naval Aviation Metrology and Calibration Program		
Hazardous Material Control and Management Program		
Electromagnetic Interference/Electrostatic Discharge Program		
Emergency Reclamation		
Maintenance Department Safety Program		

Figure 43-3: Indoctrination Training

NAVOSH/SAFETY TRAINING

NAME: ______________________ RATE/RANK: ____________

DATE REPORTED: ____________

TOPIC	INSTRUCTOR/DATE	INSTRUCTOR/ DATE	INSTRUCTOR/ DATE
NAVOSH Program (Annually)			
NAVOSH: Identification of key personnel and chain of command. (Annually)			
NAVOSH: Mishap Reporting (Annually)			
HAZARD Identification (Annually)			
Safety Precautions and Standards (Annually)			
First Aid and Survival Training (Annually)			
Mishap Prevention (Annually)			
Back Injury Prevention (Annually)			
Hearing Conservation (Annually, if applicable)			
Sight Conservation (Annually)			
First Aid (Quarterly, if applicable)			
Fire Prevention/Equipment (Annually)			
Radio Frequency Radiation (Annually)			
Laser (Annually)			
Battery Safety (Quarterly)			
Cardiopulmonary Resuscitation (CPR) (If applicable)			
Asbestos Hazards (Annually, if applicable)			
Lead (Annually, if applicable)			
Man-Made Mineral Fiber (Annually, if applicable)			
Confined Space Entry (Annually, if applicable)			
Hazard Communication (Annually)			
Hazard Communication OJT (MSDS) (Annually)			

NOTE: This figure is not all inclusive. Refer to applicable instructions for additional requirements.

Figure 43-4: NAVOSH/Safety Training

COURSE INFORMATION			
Course	**CIN**	**Required For**	**Remarks**
NAMO/DETMO	C-555-0034	AMO, AAMO, DivOs (pilots)	Or C-4D-2012/2013
A/C W&B	D-516-0001	MMCO/Filled by AMO School as well	Recommended for Program Monitor
Material Control	D-555-0051	Expeditors/MC personnel	Recommended for Ground MxO's & Material Control personnel
QA	D-555-0046	QAO, QAC, All QARs	Recommended for CDQARs & CDIs
ATPL	C-555-0007	CTPL Tech Data Program Manager & Monitor, TD Monitor	Recommended for DTPLs, TD Mgr/coord pending Model Mgr
WCS (OOMA)	C-555-0045	All O-level WCS	With OOMA
SE Asset Manager	D-555-0026	IMRL Manager (before assignment)	6042 If T/M/S has IMRL
Corrosion Control (Basic)	C-600-3180	All Maintainers need one of these CC courses if completed "A" School after Oct 2006	
A/C Corrosion	C-600-3183	All personnel involved in CC/ All QARs	Within 60 days of assignment or designation/crosses with 701-0013
A/C Corrosion Ctrl	N-701-0013	All QARs, all painters prior to paint/touch up course	Within 60 days of assignment or designation/crosses with 600-3183
A/C Paint Touchup & Mkings	N-701-0014	All personnel performing A/C & SE Painting operations shall complete one of these courses prior to painting.	Class is good for unlimited time period.
A/C Paint/Finish	C-600-3182	All personnel performing A/C & SE Painting operations shall complete one of these courses prior to painting.	Class is good for unlimited time period.
Shipboard Fire Fighting	J-495-0413	Personnel for MEU/Shipboard Ops	
Analyst Refresher	D-555-0055	NALCOMIS / 6049s at O and I level	All Marines w/ 6049 MOS annually
Config Mgmt for O&I Levels (L&R)	D-555-0059	OOMA NALCOMIS / 6046 and TD Monitor	OOMA Squadrons TD Program Mgr/Coord pending model mgr
SE Config Mgmt	C-555-0057	OOMA NALCOMIS / 6046	6046 with OOMA and SEPMS
OPTAR Financial Management	C-555-0018	Mat Cont Officer/6002/6004/6302 (Group 3 UAS)	Within 6 Months of assignment
M/C Mgmt (OOMA)	D-555-0053	OOMA NALCOMIS / Maint Control / TD Mon (NOT REQUIRED FOR NON OOMA UNITS)	All personnel authorized to approve WO's or SFF Certified, TD Mgr and Coord pending Model Mgr procedures
Basic Docum. (OOMA)	D-555-0047	OOMA NALCOMIS / Intro Course	Recommended for Marines new to OOMA, Not Reqd
Sys Admin (OOMA)	D-555-0049	OOMA NALCOMIS O Level Sqdn requires at least 2 Admin Marines attend and 1 per det longer than 90 days.	
Senior Enlisted Aviation	C-600-3210	Recommended E6+	Not Reqd

NAMP Management Course	C-4D-2013	6002/6004 Required	Recommended for UAC Mx Dept Officers & Senior Enlisted
AOOCP C-4E-0010 Level I	NA	Required for 6591 E7+ & new WO's	If Group 3 asset carries ordnance
AOOCP C-4E-0011 Level II	NA	Recommended for 6591 E7+ & Officers	If Group 3 asset carries ordnance
AOOCP C-4E-0012 Level III	NA	Recommended for 6591 E7+ & Officers	If Group 3 asset carries ordnance
Respiratory Protection Program Management (RPPM)	A-493-0072	Req for RPPM before assignment	NIOSH 593 or OSHA Training Course 2220/2225 also auth.
Introduction to Hazardous Materials (Ashore)	A-493-0331	Required for HAZMAT Program Manager and Supervisor. Initial Training. (equivalent to A-493-0031).	http://www.public.navy.mil/navsafecen/navsafenvtracen/Documents/CourseSchedule.aspx
Introduction to Hazardous Waste Generation and Handling	A-493-0080	Required for HAZMAT Program Manager and Supervisor. Initial Training. NOTE: HMC&M Supervisors based at a detachment location in a different state than their parent command must complete the Hazardous Waste Generation and Handling course (Course A-493-0080) requirements for that state.	https://www.netc.navy.mil/centers/csfe/cecos/CourseDetail.aspx?CID=34
RCRA Hazardous Waste Review Course	A-493-0081	Required for HAZMAT Program Manager and Supervisor annually	Annual refresher for HAZMAT personnel
Basic Corrosion Ctrl CNATT-000-BCC-025-002-C0		All Maintainers need one of these CC courses if completed "A" School after Oct 2006	
Avionics Corrosion Ctrl CNATT-000-ACC-025-001-C0		All Maintainers need one of these CC courses if completed "A" School after Oct 2006	
Logistics Chain Management	NAVAIR-LCM-0001.3	Required for MMCO & DivOs	On My Navy Portal
Information Systems Technician System Admin	A-150-1980	All ALIMS	Covers Security+ req
CCNA-Network Fundamentals		All ALIMS	
CISCO VoIP		All ALIMS	
A+ Certification		All ALIMS	
Security +		All ALIMS	
Network +		All ALIMS	
GCCS-J Database Fundamentals 4.3, Level 1 (E2AAR3D054)		Recommended for MA and MC	
GCCS-J Oracle Administration 4.3, Level 2 (E2AAR3D054)		Recommended for MA and MC	

Figure 43-5: Required Maintenance Courses

44 Group 3 UAS Aviation Maintenance Inspection (AMI), Maintenance Program Assessment (MPA), and Material Condition Inspection Program (MCI)

44.1 Introduction

An AMI is a formal Aircraft Controlling Custodian (ACC) inspection to verify compliance with Group 3 UAS maintenance policy and related directives. AMIs include drills and practical examinations to validate proficiency and application of correct procedures. The AMI is based on the Group 3 UAS Computerized Self Evaluation Checklist (CSEC) standards used by Group 3 UAS activities to self-audit their maintenance compliance.

44.2 An MPA is performed by the ACC, Type Wing, or MAW to determine areas of deficiency and assist in performance improvement. MPAs are conducted using the CSEC and Wing Supplemental CSEC, if applicable.

44.2.1 MCIs are formal inspections by the ACC, Type Wing, or MAW to assess the material condition of aircraft/ or equipment and adherence to corrosion prevention and treatment procedures. O-level MCIs are conducted by Type Wing or MAW Corrosion Inspectors using standardized type/model/series (T/M/S) Panel/Area Lists.

NOTE: **T/M/S Panel/Area Lists and related Focus Area Lists (FAL) are available on the CNAP Share portal.**

44.3 Requirements

44.3.1 AMI Periodicity:

a. Deploying squadrons must receive an AMI prior to deployment. AMIs for deploying squadrons will be completed no earlier than 120 days and no later than 60 days prior to deployment. Time between AMIs for deploying activities will not exceed 30 months

NOTE: **To meet short notice deployments, COMNAVAIRFOR (N422) may direct the Type Wing or MAW to conduct an MPA, in lieu of an AMI. The MPA results will be provided to COMNAVAIRFOR (N422) for review. If the results of the MPA are determined acceptable, COMNAVAIRFOR may extend the AMI due date by a maximum of 12 months.**

b. Squadrons that deploy detachments will receive home guard AMI every 24 months, not to exceed 30 months.

c. Non-deploying squadrons or units, for example, Training Wing (TRAWING), Fleet Replacement Squadron (FRS), and Test Evaluation Squadron (VX), will receive an AMI every 30 months, not to exceed 36 months.

44.3.2 AMI Grading Criteria:

a. Programs and processes will be graded as “On-Track”, “Off-Track”, or “Needs More Attention” based on the criticality and scope of deficiencies. Definitions:

Critical - The discrepancy creates a hazardous or unsafe condition that directly affects the airworthiness of aircraft, or causes risk of death or injury to maintenance personnel.

Major - The discrepancy is less than “Critical”, but increases the risk of aircraft or SE failure, degrades the quality of maintenance performed, increases the cost or man-hours to perform maintenance, or increases the risk of a maintenance accident or health impact to maintenance personnel.

Minor - Does not meet the criteria of “Critical” or “Major”, but is a deviation from specified procedures.

b. Drills and practical examinations will be graded “Satisfactory” or “Unsatisfactory” based on the activity’s ability to accurately complete the task in accordance with specified procedures, correctly respond to emergent situations, availability and proper use of personal protective equipment (PPE), and adherence to safety precautions.

c. Squadrons will receive a point grade for overall performance on the AMI. Details on the AMI grading process, including information on “Critical” and “Major” discrepancies, drills, and practical examinations are posted on the CNAP Share portal.

44.3.3 MPA Periodicity:

a. MPAs for deploying squadrons will be conducted by the Type Wing or MAW, mid-cycle between AMIs. MPAs are optional for non-deploying activities. If performed, MPAs for non-deploying activities will be performed mid-cycle between AMIs.

NOTE: **MPAs performed solely to prepare an activity for an AMI are not required.**

44.3.4 MPA Grading Criteria:
MPAs will be graded in the same manner as AMIs per paragraph 44.3.2 of this supplemental

44.3.5 MCI

44.3.5.1 MCIs will be performed by the Type Wing or MAW. Activities with multiple T/M/S aircraft, for example, VMUs, VX-9, VMX-1, and NSAWC will request an MCI from the closest Type Wing or MAW with responsibility for that T/M/S aircraft.

44.3.5.1 MCI Periodicity:

a. Deploying squadrons, detachments, and expeditionary units will receive the following MCIs:

(1) Pre-deployment MCI, no later than 60 days prior to deployment.

(2) Post-deployment MCI, no later than 60 days after return.

NOTES: 1. Permanently forward deployed activities will receive an MCI every 18 months.
2. Marine Corps Unit Deployment Program Squadrons/detachments that assume custody of permanently sited aircraft will receive an MCI 30 to 60 days prior to the end of their deployment.
3. Time between MCIs for deploying activities will not exceed 24 months.

b. Non-deploying squadrons, for example, FRS and squadrons that deploy detachments will receive an MCI every 24 months.

c. Two aircraft or 25% (whichever is greater) of assigned aircraft must be inspected. Post-deployment MCIs must include at least one of the aircraft inspected during the pre-deployment MCI. In squadrons or detachments with four or less aircraft, the post-deployment inspection must also include any aircraft not inspected during the pre-deployment or mid-deployment MCIs.

d. FAL areas with O-level MRC correlation must be inspected during MCI events. Waivers may be requested through COMNAVAIRFOR (N422). T/M/S MCI Panel/Area Lists are posted on the Share portal.

e. A minimum of 25% of assigned mission equipment must be inspected.

NOTE: **The MCI Team Officer may expand the scope of the MCI if deemed necessary to determine the extent and causal factors of unsatisfactory conditions in the initial group of aircraft inspected.**

44.3.5.2 MCI Grading Criteria:

NOTE: **MCI assessment is for unmanned aircraft and launch and recovery equipment only. Other ancillary gear will can be looked at, but discrepancies will be marked as comments only.**

a. Material Discrepancies:

Non-Flight Critical (NFC) (1 point). Any discrepancy that is not directly related to safety of flight and there is no visible sign of corrosion or corrosive attack; for example, working rivets, delamination, and loose hardware.

Foreign Objects (2 points). Two points will be assessed for soft foreign objects, such as plastic wire bundle straps, accumulated dirt, and liquids. Hard foreign objects near flight control components or engine control components will be graded as Flight Critical (FC) and assessed 5 points.

Flight Critical (FC) (5 points). Any discrepancy directly related to safety of flight or aircrew.

NOTE: **Any flight-critical discrepancy is a grade of “Fail” for the discrepant aircraft. The aircraft must be restricted from flight until the discrepancy is corrected.**

b. Corrosion Discrepancies:

Category 1: Light Corrosion (1 point). Protective coating is scarred, or etched, and the condition of the metal is characterized by discoloration. White/red/black corrosion products are present on the surface of the component being evaluated, but no significant attack is present. This type of corrosion can normally be removed by light sanding.

Category 2: Moderate Corrosion (2 points). Appearance is similar to light corrosion, with the addition of blistering, or evidence of scaling and flaking of the coating or paint system. Mild white/red/black corrosion products are present on the component surface. This type of corrosion normally requires extensive hand sanding or light mechanical sanding to remove.

Category 3: Severe Corrosion (3 points). The general appearance is similar to moderate corrosion, with the addition of severe inter-granular corrosion, blistering, scaling, flaking, or exfoliation. Corrosion attack has resulted in significant base metal loss. Voluminous white/red/black corrosion products are present on the component surface. The structural integrity of the component may or may not be compromised. Extensive mechanical sanding or grinding is required to remove this type of corrosion.

Category 4: Flight Critical Corrosion (5 points). Perforation of the base metal has occurred. No metal remains at the point of severest corrosion attack. The component has lost structural integrity.

NOTE: **Any Category 4 corrosion discrepancy is a grade of “Fail” for the discrepant aircraft. The aircraft must be restricted from flight until the discrepancy has been corrected.**

44.4 Responsibilities

a. Take immediate action to correct critical safety of flight and safety of personnel discrepancies.

b. Within 30 days of completion of the inspection, provide the Wing or MAW with a Corrective Action Report for any “Fail” discrepancies noted during MCIs, and any programs graded Off-Track or Needs More Attention, and any safety of flight or safety of personnel discrepancies noted during AMIs and MPAs.

45 Additive Manufacturing

45.1 Introduction

Additive manufacturing is an emerging technology that enables the local 3D printing of flight control surfaces and piece parts. There are several different methods for additive manufacturing, and each has its own strengths and drawbacks. This technology enhances readiness and increases the flexibility of the logistics infrastructure.

45.2 Requirements

a. Group 3 UAS activities will not unilaterally create their own unmanned aircraft parts via additive manufacturing. Group 3 UAS activities must gain prior approval from their respective FST or program office.

b. FST or program office will manage and distribute electronic piece part models. They will be managed in accordance with DOD and DON information assurance standards.

c. Group 3 UAS activities are encouraged to experiment, create, and build parts via additive manufacturing; however, these prototype parts will not be flown on the aircraft without prior approval from FST or program office. Group 3 UAS activities are authorized to fit/attach 3D printed parts to unmanned aircraft and ancillary equipment, however, these parts will not be flown without approval.

45.3 Maintenance documentation

a. When a locally generated 3D printed part is installed on the aircraft or ancillary equipment, the installation WO will include the note “This part was 3D printed”.

b. When a 3D printed part fails, cracks, shears, or is found to be NRFI, the activity will notify the FST or program office and request disposition instructions. The unit will provide:

(1) Date of failure

(2) Aircraft component was installed on

(3) Time on wing

(4) Where 3D printed part was created or procured

(5) Circumstances surrounding failure

45.4 Configuration Management

a. For serialized life limited components, a SRC, EHR, or T/M/S equivalent record will be created for additive manufactured components.

b. A local S/N will be generated.

c. The record will contain the electronic model used to create the part as well as when, where, and the S/N and model of the machine the part was manufactured.

d. Unless otherwise specified by the FST or program office, Additive manufactured components will have the same life limits as the OEM equipment, and will be tracked as such.

45.5 Requisition and Supply

a. When a Group 3 UAS activity uses an additive manufactured component instead of procuring the component through the supply system, the activity shall still initiate a supply requisition document. The activity shall coordinate with local supply to inform them not to push the requisition off station and that the requisition will be filled with an additively manufactured component. The intent is to track component usage, which is important to determine Mean Time Between Failures (MTBF), track costs, and usage.

b. NRFI serialized OEM components shall be turned into supply per SM&R codes, even if replaced with an additive manufactured component.

c. NRFI additive manufactured components will be dispositioned per section 44.b of this supplemental.

d. FST or program office shall create SM&R codes for high use additive manufactured components.

45.6 Maintenance and upkeep of Additive Manufacturing Printers/Devices

a. Additive manufacturing devices/printers are an emerging technology. Until they are commonplace and rolled into the AMMRL program, Group 3 Activities shall use OEM preventative maintenance procedures to maintain the additive manufacturing equipment (if applicable).

b. Personnel are encouraged to attend contractor training in order to best utilize equipment.

c. Group 3 UAS activities are authorized to submit work requests to MALS/AIMD or other entities who have additive manufacturing equipment. The same restrictions of section 45 of this supplemental still apply to additive manufactured components that were made outside of the local unit.

APPENDIX B. RECOMMENDED GROUP 3 UAS—COMPUTERIZED SELF EVALUATION CHECKLIST

Note: This appendix contains a revised government document originally written by N42, Naval Air Forces (NAVAIR). Language from the original document has been both retained and revised.

Complete Checklist
NAVAIR
Service Type: Both (NAVY and USMC)
Maintenance Level: Organizational

NUMBER		QUESTION	Yes	No
201 C	P	Has the AMO/AAMO been designated, in writing via the MMP/SME Listing, as the Aviation Maintenance In-Service Training Program Manager? Ref. Group 3 UAS Supplemental section 43.4.1	_____	_____
202 C	P	Does the Program Manager maintain a Program File which includes elements listed in the Group 3 UAS Supplemental? Ref. Group 3 UAS Supplemental 43.4	_____	_____
203 C	P	Did the Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5, 43.4	_____	_____
204 C	P	Is the Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.3.3 (a)	_____	_____
205 C	P	(USN ONLY) Have all Navy Personnel within the Maintenance Department been assigned or completed QPT requisite to their Rating, Paygrade and Billeted NEC? Ref. Group 3 UAS Supplemental 43.3.1	_____	_____
206 C	W	Has NAMP Indoctrination Training been provided to onboard personnel reporting for their first aviation assignment, and to experienced personnel reporting from duty with a non-aviation command within the 45 days of reporting to the Maintenance Department? Ref. Group 3 UAS Supplemental 43.3.7 (a)	_____	_____
207 C	W	Is NAVOSH Training being provided as specifically directed in OPNAVINST 5100.19 and OPNAVINST 5100.23? Refs. Group 3 UAS Supplemental 43.3.8, OPNAVINST 5100.19 and OPNAVINST 5100.23.	_____	_____
208 C	P	Has the Maintenance Officer designated an E-4 or above as the ASM Fleet Administrator? Ref., Group 3 UAS Supplemental 43.4.1 (b)	_____	_____
209 C	P	Has the ASM Fleet Administrator completed (Navy) NAVEDTRA PQS 43401 Advanced Skills Management (301) Basic ASM Administrator Watch station and NAVEDTRA 43401 Advanced Skills Management (302) ASM Remote Administrator Watch station or (USMC) ASM Fleet Administrator (MC) Task List via TECOM? Ref. Group 3 UAS Supplemental 43.4.3 (a)	_____	_____

NUMBER			QUESTION	Yes	No
211	C	P	Has the Aviation Maintenance In-Service Training Program Manager developed a Deployment Turnaround Maintenance Training Plan/Annual Training Plan that effectively outlines the specific training requirements and personnel proficiency goals required to meet the operational requirements and/or sustain the Maintenance Department? Ref. Group 3 UAS Supplemental 43.4.2 (b).	_____	_____
212	C	P	(USN ONLY) Does the Aviation Maintenance In-Service Training Program Manager ensure that the required number of F and T School graduates are maintained as identified in the FLTMPS 12 Month Training Plan report? Ref. Group 3 UAS Supplemental section. 43.4.2 (i)	_____	_____
213	C	P	Does the Aviation Maintenance In-Service Training Program Manager publish a Monthly Training Schedule in the MMP or separate document and is training documented in each Individual's Qualification/Certification Record within 5 working days of completion? Ref. Group 3 UAS Supplemental 43.4.2 (e) and 43.4.6 (b)	_____	_____
214	C	P	Is a Qualification/Certification Record initiated in ASM for each enlisted member of the Maintenance Department and any personnel assigned outside the Maintenance Department that require a NAMP qualification, license, certification or designation? Ref. Group 3 UAS Supplemental 43.3.9 (a) (1)	_____	_____
215	C	W	Are Personnel ASM Qualification/Certification Records being reviewed within 30 days of the member reporting to the division and quarterly thereafter (Quarterly Review can be delegated to Branch/Division Chief or SNCO) with comments in the review box provided by ASM on Qualifciation/Certification tabs in addition to QPT, AMTRP, PQS, and JQR qualification requirements and the expected completion timelines required for career progression? Ref. Group 3 UAS Supplemental 43.4.5 (a-g)	_____	_____
216	C	W	Are Lesson Guides and/or IMI (as applicable) being utilized to conduct all non-OJT maintenance Training? Ref. Group 3 UAS Supplemental 43.3.5 (a)	_____	_____
217	C	W	Do Supplemental Lesson Guides include the required elements and are they reviewed annually? Ref. Group 3 UAS Supplemental 43.3.5 (b) (1-12)	_____	_____
218	C	W	Are Required Reading files properly established, maintained and reviewed? Ref. Group 3 UAS Supplemental 43.3.6 and 43.4.6 (k)	_____	_____
220	C	P	Has the Aviation Maintenance In-Service Training Program Manager ensured that, at a minimum, the O-Level Material Control Supervisor and personnel assigned responsibility for maintaining the Requisition/OPTAR Log have attended the Financial Management for Naval Aviation Operating Target Accounting course (Course C-555-0018)? Ref. Group 3 UAS Supplemental figure 43-5	_____	_____
221	C	P	Has the Aviation Maintenance In-Service Training Program Manager ensured that all Safe for Flight Personnel have completed the Naval Aviation Maintenance Control Management course (Course C-555-0053), and/or that an adequate number of assigned personnel have been scheduled to attend? Ref. Group 3 UAS Supplemental figure 43-5	_____	_____

NUMBER		QUESTION	Yes	No
222 C	P	Has the Aviation Maintenance In-Service Training Program Manager ensured personnel designated as (OMA) NALCOMIS Optimized System Administrators (SA) have attended the NALCOMIS OOMA system analyst course (Course C-555-0049) and the NALCOMIS System Analyst Refresher course (Course C-555-0055) as required? Ref. Group 3 UAS Supplemental figure 43-5	_____	_____
224 C	P	Has the Aviation Maintenance In-Service Training Program Manager scheduled personnel assigned to the Material Control work center to attended the Naval Aviation Material Control Management course (Course C-555-0051)? Ref. Group 3 UAS Supplemental figure 43-5	_____	_____
225 C	P	Has the Aviation Maintenance In-Service Training Program Manager ensured that all Logs and Records personnel have complete the Logs and Records Configuration Management for Organizational and Intermediate Activities course (Course C-555-0059)? Ref. Group 3 UAS Supplemental figure 43-5	_____	_____
226 C	P	Has the Aviation Maintenance In-Service Training Program Manager ensured that all unrestricted line officers assigned to the Squadron Maintenance Department have attended, or are scheduled to attend, the Aviation Officer Maintenance Fundamentals course (Course C-555-0034) prior to or within 60 days after assuming their duties? Ref. Group 3 UAS Supplemental figure 43-5	_____	_____
227 C	P	Has the Aviation Maintenance In-Service Training Program Manager ensured that the QA Officer has attended, or are scheduled to attend, the NALCOMIS (Optimized) OMA Quality Assurance Administration Course (Course C-555-0046) prior to or within 60 days after assuming their duties? Ref. Group 3 UAS Supplemental figure 43-5	_____	_____
228 C	P	Has the Aviation Maintenance In-Service Training Program Manager ensured that the IMRL Manager has attended the Support Equipment (SE) Asset Manager course (Course C-555-0026) (USN) or holds the 6042 MOS (USMC) by completion of (IMRL Asset Manager Course C-555-2020) ? Ref. Group 3 UAS Supplemental figure 43-5	_____	_____
230 C	P	Has the Aviation Maintenance In-Service Training Program Manager ensured that all personnel designated as Work Center Supervisors have attended the Naval Aviation OMA Work Center Supervisor’s course (Course C-555-0045) or IMA Work Center Management Documentation Procedures (Optimized) course (Course C-555-0041), as applicable? Ref. Group 3 UAS Supplemental figure 43-5	_____	_____
301 C	P	Has the MO designated, in writing via the MMP, a Fuel Surveillance Program Manager? Ref. Group 3 UAS Supplemental figure 2.4.2 (a)	_____	_____
302 C	P	Has the Quality Assurance Officer designated, in writing via the MMP, a QAR as the Fuel Surveillance Program Monitor? Ref. Group 3 UAS Supplemental 2.4.4	_____	_____
304 C	P	Are all publications available for use by personnel responsible for maintaining and carrying out the Fuel Surveillance Program? Ref. Group 3 UAS Supplemental 8.4.5 (s)	_____	_____
307 C	P	Is the Program Manager maintaining a Program File with the elements listed in the Group 3 UAS Supplemental? Ref. Group 3 UAS Supplemental 2.4.3 (c)	_____	_____

NUMBER			QUESTION	Yes	No
308	C	P	Does the Program Manager provide indoctrination training to personnel relating to their responsibilities regarding the Fuel Surveillance Program? Ref. Group 3 UAS Supplemental 2.4.3 (b)	_____	_____
309	C	P	Are fuel samples taken from fueling source prior to fueling aircraft? Ref. Group 3 UAS Supplemental 2.3.1.1	_____	_____
310	C	P	Is the minimum fuel settling time adhered to prior to taking samples? Ref. Group 3 UAS Supplemental 2.3.1.2 (a)	_____	_____
313	C	P	Are samples, approximately one pint, collected in one quart clear, clean, glass containers? Ref. Group 3 supplemental 2.3.1.2 (c); NAVAIR 01-1A-35, WP 007 00, par. 25 (b) (2); NAVAIR 00-80T-109 par. 13.3.3.1 (12) (a)	_____	_____
314	C	P	Are samples inspected for presence of water, particulate matter, micro-biological growth, emulsions and miscellaneous material, etc.? Ref. Group 3 UAS supplemental 2.3.1.2 (d), NAVAIR 01-1A-35, WP 007 00, par. 25 (a) and NAVAIR 00-80T-109 pars. 9.5.1, 9.5.2	_____	_____
315	C	P	Are samples with dark colored stringy or fibrous material that tend to float in the fuel immediately forwarded to the nearest Navy petroleum laboratory for microbiological growth determination? Ref. NAVAIR 01-1A-35, WP 007 00, par. 25 (b) (3) NOTE	_____	_____
316	C	P	Are proper fuel sampling procedures followed and verified? Ref. Group 3 UAS Supplemental 2.3.1, 2.3.2 and NAVAIR 01-1A-35, WP 007 00, par. 25	_____	_____
317	C	P	Are sample bottles emptied and cleaned after each use? Refs. Group 3 UAS Supplemental 2.3.1.2 (e), and NAVAIR 00-80T-109, par. 9.3.1(2) and NOTE	_____	_____
318	C	P	Are fuel samples disposed of per local HAZMAT procedures? Ref. Group 3 UAS Supplemental 2.3.1.2 (f), 2.3.2.1(g), and 2.4.7 (f)	_____	_____
319	C	P	Is adequate PPE, including chemical-resistant gloves, chemical-resistant apron, and goggles, worn while taking, handling, and disposing of fuels? Ref. Group 3 UAS Supplemental 2.3.1.2 (b), 2.3.2.1 (b) and applicable current SDS.	_____	_____
326	C	P	Did the Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.8 (b)	_____	_____
801	C	P	Is the QA Division organized IAW the NAMP? Ref. Group 3 UAS Supplemental 31.4.1 (a-c)	_____	_____
802	C	P	Is a current list of all QARs, CDQARs, and CDIs included in the MMP? Ref. Group 3 UAS Supplemental 29.3.8 (c)(5)	_____	_____
803	C	P	Do all QARs, CDQARs and CDIs meet the minimum paygrade and qualification requirements? If not, has the CO notified the Wing, MAG or ISSC of each deviation, and the constraints preventing assignment of a qualified individual? Ref. Group 3 UAS Supplemental 31.5.1(a)	_____	_____
804	C	P	Are QARs, CDQARs and CDIs designated in writing via Quality Assurance Representative/Inspector Recommendation/Designation (OPNAV 4790/12) or ASM equivalent? Ref. Group 3 UAS Supplemental 31.5.5 (a-c)	_____	_____

NUMBER			QUESTION	Yes	No
806	C	P	Does the QA Officer and QA supervisor verify the qualifications of QAR, CDQAR and CDI candidates and conduct an oral board prior to endorsing the recommendation? Ref. Group 3 UAS Supplemental 31.5.5 (b)	_____	_____
807	C	P	Have QARs, CDQARs, and CDIs completed the specified training track for their billet? Ref. Group 3 UAS Supplemental 31.5.4	_____	_____
808	C	P	Does the QAR, CDQAR and CDI Training and qualification include the minimum elements as outlined in the Group 3 UAS Supplemental? Ref. Group 3 UAS Supplemental 31.5.4	_____	_____
809	C	P	Are QARs assigned to perform inspections outside of their billet assignment receiving cross-training in any QA functions that are not in their NEC or MOS area of expertise? Ref. Group 3 UAS Supplemental 31.5.4.2	_____	_____
810	C	P	Does QA administer CDI tests? Ref. Group 3 UAS Supplemental 31.5.3 (b)	_____	_____
816	C	P	Has the command determined who will perform the QA functions listed in maintenance publications (at a minimum, CDIs)? Ref. Group 3 UAS Supplemental 31.7.5(a)	_____	_____
817	C	P	Is the Inspected By block on work orders (WO) and maintenance action forms (MAF) being signed or stamped by the QAR, CDQAR, or CDI that actually inspected the work per command procedures? Ref. Group 3 UAS Supplemental 31.7.5 (a-b)	_____	_____
819	C	P	Are CDIs verifying the correct information is entered on MAFs, such as Work Unit Code, Action Taken Code, Transaction Code, Type Maintenance code, Installed/New Item data, and an accurate and complete Corrective Action statement prior to signing the WO or MAF? Ref. Group 3 UAS Supplemental 31.8.1 NOTE	_____	_____
827	C	P	Does QA review all incoming technical publications and directives to determine their application to the maintenance department? Ref. Group 3 UAS Supplemental 8.4.4 (a)	_____	_____
829	C	P	Does QA verify work guides, check-off lists, check-sheets, and MRCs are complete and current? Ref. Group 3 UAS Supplemental 8.4.4	_____	_____
833	C	P	Is QA tracking and analyzing quality related data and taking action to improve the quality of maintenance; for example, providing training on troubleshooting and repair procedures for components with recurring Action Taken Code “A” Malfunction Code “799” (No Defect) or When Discovered Code “Y” (Found defective upon receipt)? Ref. CO Group 3 UAS Supplemental 31.6.1 (e)	_____	_____
839	C	P	Has the MO assigned a Program Manager for each applicable program? Ref. Group 3 UAS Supplemental 7.4.1(a)	_____	_____
840	C	P	Has the MO designated the QA Supervisor as the Group 3 UAS Compliance Auditing Program Manager? Ref. Group 3 UAS Supplemental 7.4.1 (b)	_____	_____
841	C	P	Has the QAO designated qualified Program Monitors for all applicable programs specified to be monitored by QA? Ref. Group 3 UAS Supplemental 7.4.2(a)	_____	_____

NUMBER			QUESTION	Yes	No
842	C	P	Has the Group 3 UAS Compliance Auditing Program Manager loaded the current CSEC database on a QA Division computer? Ref. Group 3 UAS Supplemental 7.4.3 (c and d)	_____	_____
843	C	P	Has the Group 3 UAS Compliance Auditing Program Manager published the annual schedule of Program Manager assessments, QA audits, and work center audits? Ref. Group 3 UAS Supplemental 7.4.3 (e)	_____	_____
844	C	P	Does the Group 3 UAS Compliance Auditing Program Manager track the completion of audits and verify results are entered in the CSEC database? Ref. Group 3 UAS Supplemental 7.4.3 (f)	_____	_____
845	C	P	Does the Group 3 UAS Compliance Auditing Program Manager provide training to Program Managers, Program Monitors, Division Officers, Division Chiefs, and Work Center Supervisors on their auditing responsibilities, and procedures for entering data in the CSEC and printing audit reports? Ref. Group 3 UAS Supplemental 7.4.3 (b)	_____	_____
846	C	P	Does the Group 3 UAS Compliance Auditing Program Manager route completed QA audits and special audits to the MO, via the QAO, and when returned from the MO, provide copies of the audit to the designated Program Manager? Ref. Group 3 UAS Supplemental 7.4.3 (h)	_____	_____
847	C	P	Does the Group 3 UAS Compliance Auditing Program Manager maintain the last two QA audits (electronic or hardcopy) on file with, at a minimum, the completed CSEC discrepancy sheets, corrective actions, and accompanying routing forms? Ref. Group 3 UAS Supplemental 7.4.3 (i)	_____	_____
850	C	P	Are QA audits for applicable programs performed by their monitor at least once every 12 months? Ref. Group 3 UAS Supplemental 7.4.4 (b)	_____	_____
852	C	P	Are Program Monitors randomly sampling at least 25% of the population of aircraft, equipment, records, documentation and personnel during annual audits? If a program affects multiple divisions, does the sample include at least 25% of the process in each division? Ref. Group 3 UAS Supplemental 7.4.4(c)	_____	_____
854	C	P	Does the MO Review Program Manager assessments and QA audits and provide direction on corrective actions, as required? Ref. Group 3 UAS Supplemental 7.4.1(b)	_____	_____
855	C	P	Are discrepancies from Program Manager audits and QA audits being entered in QA's CSEC database? Ref. Group 3 UAS Supplemental 7.4.3(f)	_____	_____
901	C	P	Does QA manage the Department Safety Program with responsibilities and internal procedures and methods for administering the program's processes as defined in the NAMP and Group 3 UAS Supplemental? Ref. COMNAVAIRFORINST 4790.2, Chapter 7, pars. 7.6.(d) and 7.6.1.1 and Group 3 UAS Supplemental 32.1 and 31.2	_____	_____
902	C	P	Did the Maintenance Safety Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.7.4.8 (b)	_____	_____
903	C	P	Is the Maintenance Safety Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.7.3.4 (a) and (b)	_____	_____

NUMBER		QUESTION	Yes	No
905 C	P	Are OPNAVINST 3750.6, Naval Aviation Safety Program, OPNAVINST 5100.19, NAVOSH AFLOAT, and/or OPNAVINST 5100.23, NAVOSH ASHORE and the ACC/TYCOM directives available for use in conducting the unit's safety program (MCO 5100.8 for Marine activities)? Refs COMNAVAIRFORINST 4790.2, Chapter 7, pars.7.6.1.1-7.6.1.5	_____	_____
906 C	P	If a NAMDRP, HMR, or engineering report is required, does QA collect And provide data necessary for the report? Ref. Group 3 UAS Supplemental 31.6.1 (g)	_____	_____
907 C	P	Is QA inspecting maintenance equipment and facilities for adherence to fire and safety regulations, to include verifying that workspace environmental conditions are satisfactory, work center equipment is maintained in a safe operating condition, and equipment operator qualifications and licensing are being followed? Ref. COMNAVAIRFORINST 4790.2, Chapter 7, par. 7.6.1.3	_____	_____
909 C	W	Is safety training conducted for all personnel? Refs. COMNAVAIRFORINST 4790.2, Chapter 6, pars 6.2.4.1 thru 6.2.4.1.4 and OPNAVINST 5100.23, pg. 6-1, par. 0602	_____	_____
910 C	W	Are personnel trained in the selection, use, inspection and care of PPE; is the training documented and is the PPE utilized? Refs. OPNAVINST 5100.19, pg. B 12-1, par. B1202 and OPNAVINST 5100.23	_____	_____
911 C	W	Do applicable personnel wear appropriate foot protective devices at all times in a designated foot hazard areas? Refs. OPNAVINST 5100.23G para 2008, NAVMC 5100.8 para 13006, OPNAVINST 5100.19, D0802(d).	_____	_____
912 C	W	Are all personnel as defined in OPNAVINST 5100.19; OPNAVINST 5100.23 and NA 01-1A-35 qualified in CPR? Refs. OPNAVINST 5100.19, pg. B7-5, par. B0708, OPNAVINST 5100.23, pg. 6-6, par. 0602 (f) and NA 01-1A-35	_____	_____
913 C	W	Are emergency escape routes, fire lanes and egress points clear and direct (afloat activities only)? Refs. OPNAVINST 5100.19, pgs. C1-1 and C1-2, par. C0102 (a)	_____	_____
914 C	P	Do applicable flight deck personnel meet medical standards for critical/special flight deck duties (as assigned)? Ref. NAVMED P-117 Chapter 15, article 15-96 and 15-97	_____	_____
915 C	W	Are suitable fire extinguishing devices available where combustibles are stored (within 10 ft. outside the door opening if in a storage room, 10-25 ft, if material is located outside a room, but still in a building)? Refs 29 CFR 1910.106(d) (7) (i) (a) and 29 CFR 1910.106(d) (7) (i) (b)	_____	_____
916 C	W	Are shop hazard areas properly identified/color coded (e.g. for machinery: yellow/black stripes to mark strike against, stumbling, and falling hazards)? Ref 29 CFR 1910.176(a) and 29 CFR 1910.144(a)(3).	_____	_____
917 C	W	Is machinery designed for a fixed location securely anchored to prevent walking or moving? Ref. 29 CFR 1910.212(b)	_____	_____
918 C	W	Are designated hazardous noise areas and equipment identified with the appropriate warning signs? Refs. OPNAVINST 5100.19, pg. B4-6, par. B0404 (c) and OPNAVINST 5100.23, pg. 18-5, par. 1805	_____	_____

NUMBER			QUESTION	Yes	No
919	C	W	Are personnel working in designated noise hazard areas or with noise hazardous equipment entered in a hearing conservation program? Refs. OPNAVINST 5100.19, pg. B4-9, par. B0407 and OPN OPNAVINST 5100.23, pg. 18-6, par. 1806	_____	_____
920	C	W	Are sound attenuating devices available and are they utilized in all designated noise hazardous areas? Ref. OPNAVINST 5100.19, pg. B4-8, par. B0406 and OPNAVINST 5100.23, pg. 18-5, par. 1807 (a)	_____	_____
921	C	W	Are designated eye hazardous areas identified (posted) with the appropriate warning signs? Refs. OPNAVINST 5100.19, pg. B5-3, par. B0504 and OPNAVINST 5100.23, pg. 19-1, par. 1901	_____	_____
922	C	W	Do personnel wear appropriate eye protection equipment when performing eye hazardous operations, including handling corrosive liquids or solids, grinding, chipping, blasting or other particle generating job tasks? Refs OPNAVINST 5100.19, pg. B5-1, par. B0501 and pg. B5-A-1, Appendix B5-A and OPNAVINST 5100.23, Pg. 20-2, par 2004	_____	_____
923	C	P	Do eye wash stations meet all safety requirements? Refs. OPNAVINST 5100.19, pg. B5-5, par. B0508 and OPNAVINST 5100.23, pg. 19-1, par. 1902	_____	_____
924	C	W	Are eyewash stations periodically activated and functionally tested in accordance with the required periodic maintenance? Refs. OPNAVINST 5100.19, pg. B5-5, par. B0508 and OPNAVINST 5100.23, pg. 19-1 par. 1902	_____	_____
925	C	P	Were any safety violations observed? Refs. OPNAVINST 5100.23, par. 1001 and OPNAVINST 5100.19, par. A0203 (j) (1)	_____	_____
926	C	W	Are aviation maintenance managers and technicians incorporating risk management concepts into maintenance planning evolutions? Refs. COMNAVAIRFORINST 4790.2, Chapter 1, par. 1.5 and OPNAVINST 3500.39, enclosure (1), and MCO 3500.27	_____	_____
1002	C	P	Did the Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5	_____	_____
1003	C	P	Is the Program Manager tracking corrective action for audit discrepancies and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.3.3 (a)	_____	_____
1005	C	P	Are required DR reports reviewed by the Program Manager/QA Division to ensure that they are accurate, clear, concise and comprehensive? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.9.5.3 (c), and 10.9.5.4 (d)	_____	_____
1006	C	P	Does the Program Manager monitor the ISSC/Quality Team NAMDRP response time to ensure action is taken within required time frames? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.9.5.4 (h) (1-4) and 10.9.6.1	_____	_____
1007	C	P	Does the Program Manager perform follow-ups to NAMDRP reports when responses have not been received within prescribed time frames? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.9.5.4 (h) (1) and 10.9.6.1	_____	_____

NUMBER			QUESTION	Yes	No
1008	C	P	Does the Program Manager maintain file copies of ISSC/FST/manufacturer responses received external to JDRS for a minimum of one year or until closing action is received? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.9.5.4 (k) (2)	_____	_____
1009	C	P	Are CAT I Els (HMRs) submitted within 24 hours of discovery by the JDRS reporting system (if accessible) or by priority precedence message if the JDRS website is not accessible? Refs. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.9.3.1 Note 1 and	_____	_____
1010	C	P	Are CAT I TPDRs submitted within 24 hours from the time of discovery by the JDRS reporting system (if applicable) or by priority precedence message? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.9.3.5 (d) (3)	_____	_____
1011	C	P	Are CAT I PQDRs submitted within 24 hours from the time of discovery by the JDRS reporting system (if accessible) or by routine precedence message? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.9.3.4 (d) (1)	_____	_____
1014	C	P	Does the Program Manager issue locally assigned control numbers, sequentially throughout the calendar year, regardless of the type of report, beginning with 0001? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.9.3.2 (d) and 10.9.5.4 (g), Group 3 UAS Supplemental 9.3.1.1 (b) and (c)	_____	_____
1016	C	P	Is the Program Manager maintaining a Program file which includes elements listed in the NAMDRP NAMPSOP? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.9.5.4 (k)	_____	_____
1017	C	P	Are the technical dialog correspondence, digital pictures, and attachment features, i.e., RFI tag, contract number, turn in document or requisition number for EI/PQDRs within JDRS http://www.jdrs.mil/, used as required/necessary? Refs. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.9.3.4 (d) (2), 10.9.4.5 (b) and (c) NOTE, 10.9.5.4 (h) and http://www.jdrs.mil website	_____	_____
1018	C	P	Is there documentation to support that the MO reviews and approves all DR reports and DA 2028s? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.9.5.2 (b), Group 3 UAS Supplemental 9.3.1.1 (e)	_____	_____
1019	C	P	Upon designation as NAMDRP Program Manager has a self audit been performed within 30 days and annually thereafter using the CSEC and is the most current self audit retained within the program binder? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.9.5.4 (a), Group 3 UAS Supplemental 7.4.5 (b)	_____	_____
1020	C	P	Are exhibit handling procedures being followed throughout the work center, QA, and Supply Department? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.9.4.5	_____	_____
1021	C	P	Is the program manager performing audits of the unit users enrolled in JDRS on a monthly basis to update, delete, or change unit personnel profiles? Refs. COMNAVAIRFORINST 4790.2, Chapter 10, par.10.9.5.4 (j)	_____	_____
1022	C	P	Do all personnel listed as submitters within JDRS have delegated message release authority? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.9.5.2 c	_____	_____

NUMBER		QUESTION	Yes	No
1023 C	P	Is there documentation to support that the Aviation Safety Officer reviews all correspondence relating to aviation ground, flight, flight related, explosive mishaps? Refs. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.9.5.3 (e)	_____	_____
1024 C	P	Are AIDRs being submitted for aircraft which have been newly manufactured, modified, or reworked (to include zero Deficiency responses) within 5 calendar days after completing acceptance or post D-level check flight or within 5 calendar days after acceptance post D-level inspection for any on-site D-level maintenance not requiring check flight? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.9.3.7	_____	_____
1025 C	P	Are supplemental AIDRs being submitted (if applicable) within 30 calendar days of completion of the initial AIDR? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.9.3.7	_____	_____
1201 C	P	Has the MO designated, in writing via the MMP, a FOD Prevention Program Manager? Ref. Group 3 UAS Supplemental 11.4.1(k)(2)	_____	_____
1202 C	P	Did the FOD Prevention Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5	_____	_____
1203 C	P	Is the FOD Prevention Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.3.3 (a)	_____	_____
1204 C	W	Have all assigned personnel (regardless of their rate) received indoctrination and annual refresher training encompassing the importance of FOD Prevention and Fastener Control procedures. Ref. Group 3 UAS Supplemental 11.4.1 (j)	_____	_____
1205 C	P	Are activities inspecting assigned hangar and flight line/flight deck areas According to local FOD procedures? Ref Group 3 UAS Supplemental 11.4.1	_____	_____
1208 C	P	Has the Maintenance Officer developed Local FOD Procedures per the Group 3 UAS Supplemental? Ref. Group 3 UAS Supplemental 11.4.1(k)(2)	_____	_____
1213 C	P	Is the Program Manager maintaining a program file which includes elements listed in the Group 3 UAS Supplemental? Ref. Group 3 UAS Supplemental 11.4.1(l)(4)	_____	_____
1214 C	P	Does the Program manager monitor participation during FOD Walk Downs? Ref. Group 3 UAS Supplemental 11.4.1(k)(3)	_____	_____
1215 C	P	Has the Quality Assurance Officer designated in writing a QAR as the FOD Prevention Program Monitor via the MMP? Ref. Group 3 UAS Supplemental 7.4.2	_____	_____
1216 C	P	Is the Program Manager briefing contractor and field maintenance teams on FOD Prevention Program requirements and periodically spot checking work in progress to verify compliance? Ref. Group 3 UAS Supplemental 11.4.1(l)(5)	_____	_____
1217 C	P	Are effective aircraft/engine fastener control procedures established and enforced? Ref. Group 3 UAS Supplemental 11.4.1 (g)	_____	_____

NUMBER			QUESTION	Yes	No
1221	C	P	Is Maintenance Control issuing a downing discrepancy WO against affected aircraft/equipment whenever missing objects are determined to be a potential threat to airworthiness? Ref. Group 3 UAS Supplemental 11.4.1(m)	_____	_____
1224	C	W	Are loose or missing fasteners identified on aircraft, engines and ancillary equipment that pose a FOD hazard marked per local procedures? Are they documented? Ref. Group 3 UAS Supplemental 11.4.1 (m)	_____	_____
1227	C	P	Are personnel performing thorough post- maintenance inspections of tool containers, ducts, crevices, engine cavities and work areas? Ref. Group 3 UAS Supplemental 11.4.1 (b)	_____	_____
1301	C	P	Has the MO designated, in writing via the MMP, a Tool Control Program Manager? Group 3 UAS Supplemental 12.3.1 (r)	_____	_____
1303	C	P	Did the Tool Control Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 12.3.1(s)	_____	_____
1304	C	P	Is the Tool Control Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.4.3 (b)	_____	_____
1305	C	P	Has the MO developed local Tool Control procedures per the group 3 UAS supplemental (as required)? Ref. Group 3 UAS Supplemental 12.2.4	_____	_____
1306	C	P	Is there a procedure established for the accountability of those tools not suitable for etching? Ref. Group 3 UAS Supplemental 12.3.1 (i)	_____	_____
1310	C	P	Does the TCP Manager maintain a program file to include the required elements outlined in the Group 3 UAS Supplemental? Ref. Group 3 UAS Supplemental 7.4.5 (c)	_____	_____
1311	C	P	Does the TCP Manager maintain a master copy of each individual tool container inventory? Ref. Group 3 UAS Supplemental 12.3.1 (c)	_____	_____
1313	C	P	Are there documented procedures to identify and replace missing/broken/worn tools, and are procedures being followed? Ref. Group 3 UAS Supplemental 12.3.1 (n)	_____	_____
1315	C	P	Has the Maintenance Officer released the aircraft/equipment only after an investigation is conducted to confirm the missing tool or part of a tool is not in the aircraft/equipment? Ref. Group 3 UAS Supplemental 12.3.1(p), (q)	_____	_____
1319	C	P	Are there documented procedures to issue/subcustody tool containers to detachments lasting greater than 45 days? Ref. Group 3 UAS Supplemental 12.3.1 (w)	_____	_____
1320	C	W	Are tools/tool containers marked and tracked effectively? Ref. Group 3 UAS Supplemental 12.3.1 (i)	_____	_____
1321	C	P	Does the TCP Manager coordinate semiannual tool container inventories and reconcile/document semiannual inventories with master inventories to ensure no unauthorized additions/deletions to tool containers have occurred? Ref. Group 3 UAS Supplemental 12.3.1 (y)	_____	_____
1322	C	P	When broken or worn tools are no longer required, are they turned in for disposal? Ref. Group 3 UAS Supplemental 12.3.1 (t)	_____	_____

NUMBER			QUESTION	Yes	No
1324	C	P	Are all replacement tools not assigned to a toolbox secured and accounted for? Ref. Group 3 UAS Supplemental 12.3.1 (e)	_____	_____
1328	C	P	Does the TCP Manager provide indoctrination and follow-on training to personnel relating to their responsibilities regarding the Tool Control Program? Ref. Group 3 UAS Supplemental 12.3.1(f)	_____	_____
1329	C	W	Are all work center personnel aware of proper procedures for missing tools? Ref. Group 3 UAS Supplemental 12.3.1 (f)	_____	_____
1330	C	W	Are procedures developed to account for tools and PPE pre and post Maintenance and work stoppages? Ref. Group 3 UAS Supplemental 12.3.1 (a)	_____	_____
1334	C	P	Is a copy of the master inventory, layout diagram/picture, and current Shortage List maintained within all tool containers (except tool pouches) and firmly attached so they do not become a source of FOD? Ref. Group 3 UAS Supplemental 12.3.1 (c)	_____	_____
1336	C	W	Is the position of each tool within a container silhouetted? Ref. Group 3 UAS Supplemental 12.3.1 (b)	_____	_____
1340	C	W	Are all tool tags labeled with a command unique identifier and tracked? Ref. Group 3 UAS Supplemental 12.3.1 (j)	_____	_____
1345	C	W	Are all tool containers maintained in a clean condition? Ref. Group 3 UAS Supplemental 12.3.1 (k)	_____	_____
1350	C	P	Is the OMA in compliance with their local procedures? Ref. Group 3 UAS Supplemental 12.2.4	_____	_____
1351	C	P	Are proper security and control maintained over all tools and equipment assigned? Ref. Group 3 UAS Supplemental 12.3.1 (d)	_____	_____
1352	C	P	Are contractors and depot field maintenance teams briefed on tool control procedures upon initial arrival at the job site, to include inspecting and inventorying all field team tools, equipment, PPE, and consumables prior to the field team initially beginning work and at the completion of the job? Are the in-brief, initial inventory, and final inventory documented on a Contractor/Field Maintenance Team Brief (Figure 10.12-6)? Ref. Group 3 UAS Supplemental 12.3.1 (u)	_____	_____
1401	C	P	Did the MO assign a Corrosion Control Prevention and Control Officer? Supplemental manual? Ref. Group 3 UAS Supplemental 7.4.1 (a)	_____	_____
1402	C	P	Did the Corrosion Prevention and Control Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5 (b)	_____	_____
1403	C	P	Is the Corrosion Prevention and Control Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.4.5 (c)	_____	_____
1404	C	P	Is the Program Manager maintaining a Program File which includes elements listed in the Corrosion Prevention and Control Program NAMPSOP? Ref. Group 3 UAS Supplemental 7.4.5 (c), 13.4.3 (i)	_____	_____
1406	C	P	Does the Program Manager provide Corrosion Prevention and Control Program NAMP indoctrination training and emergency reclamation processes/procedures training? Ref. Group 3 UAS Supplemental 13.3.1 (h), 13.3.2 (b)	_____	_____

NUMBER			QUESTION	Yes	No
1408	C	P	Have all personnel, engaged in aircraft, engine, component, or SE maintenance, completed one of the mandatory minimum corrosion control training courses? Ref. Group 3 UAS Supplemental 13.3.1 (e)	_____	_____
1411	C	P	Have the individuals assigned as aircraft or SE painters attended the NADEP Course N-701-0014, aircraft Paint and Marking or Aircraft Paint/Finish course C-600-3182 prior to painting aircraft/SE? Ref. Ref. Group 3 UAS Supplemental 13.3.1 (g)	_____	_____
1412	C	P	Is the Program Manager knowledgeable of applicable references, instructions, publications, and are they available? Ref. Ref. Group 3 UAS Supplemental 13.3.4.b (6)	_____	_____
1413	C	P	Are only authorized and current shelf life corrosion prevention and control materials utilized? Refs. Ref. Group 3 UAS Supplemental 29.3.9.c (3); NAVAIR 01-1A-509, vol. II, app. A, pars. A-3 thru A-3.3.3; NAVAIR 01-1A-509, vol. IV	_____	_____
1414	C	P	Does a current Industrial Hygienist (IH) survey for all facilities where painting is conducted include a workplace and exposure assessment of all aircraft and aeronautical equipment painting operations. Refs. Ref. Group 3 UAS Supplemental 13.3.1 (i) and NAVAIR 01-1A-509, vol. ll, app. A, par. A-10.5.2.5	_____	_____
1415	C	P	Are workplace evaluations conducted by an Activity/Installation Industrial Hygienist periodically as required? Refs. OPNAVINST 5100.23, Chapter 8, par. 0802 and Appendix 8-B; OPNAVINST 5100.19, A0304 and NAVAIR 01-1A-509, vol. Il, app. A, par. A-10.5.2.5	_____	_____
1416	C	P	Are corrosion LCPs published with T/M/S Focus Area List or Corrosion Areas of Concern? Ref. Ref. Group 3 UAS Supplemental 13.3.2, and 13.3.1 (a)	_____	_____
1417	C	W	Do personnel assigned duties involving exposure to potentially harmful dusts, mists, or vapors use required PPE as specified in the Industrial Hygienist Survey? Refs. Group 3 UAS Supplemental 13.3.1 (l), and NAVAIR 01-1A-509, vol. ll, app. A, par. A-10.5.2.3	_____	_____
1418	C	W	Are all personnel assigned duties involving opening, mixing, or application of coating materials receiving pre-placement training, periodic medical surveillance evaluations, and respirator fit testing/use as recommended by the Industrial Hygienist? Refs. Ref. Group 3 UAS Supplemental 13.3.1 (k); NAVAIR 01-1A-509, vol. II, app. A, par. A-10.5.2.2; OPNAVINST 5100.19, B0605 (b), B0612 and OPNAVINST 5100.23, Chapter 15, pars. 1508 and 1511	_____	_____
1419	C	P	Has the MO established a written respirator protection program SOP governing the selection, care, issue, and use of respirators, and are worksite SOPs posted in the general work area? Refs. OPNAVINST 5100.23, Chapter 15, par. 1513 (a) (2) and OPNAVINST 5100.19, Chapter B6, pars. B602 and B603.	_____	_____
1420	C	P	Does the command have a certified Respiratory Protection Program Manager (RPPM) appointed in writing by the MO? Refs. OPNAVINST 5100.23, pars. 1503 (a) and 1513 (a) and OPNAVINST 5100.19, par. B0602 (a)	_____	_____

NUMBER		QUESTION	Yes	No
1422 C	P	Has the RPPM attended one of the required courses? Refs. OPNAVINST 5100.23, par. 1512 (a) thru (e) and OPNAVINST 5100.19, par. B0602 (b) and B0612 (b)	_____	_____
1423 C	P	Is a respirator cartridge change out schedule established and implemented to ensure cartridges are not used over eight hours? Refs. OPNAVINST 5100.23, Chap 15, par. 1513 (a) (11).	_____	_____
1424 C	W	Is proper respiratory training, both prior to use and annually thereafter, conducted for personnel required to wear respirators, their supervisors, persons issuing respirators and emergency rescue teams? Refs. OPNAVINST 5100.19, par. B0612 (a) and OPNAVINST 5100.23, Chapter 15, par. 1511 (a) thru (k)	_____	_____
1425 C	W	Are shore-based activities recording respiratory training in the appropriate section of an individual's qualification/certification record, and are they maintaining those records for 5 years? Ref. OPNAVINST 5100.23, Chapter 6, par. 0605 and Chapter 15, par. 1509 (c)	_____	_____
1426 C	W	Does each person required to use a respirator have a current PHA and are they "fit for duty" at the time of initial fitting and every year thereafter; and for afloat activities, are medical evaluations performed at specified intervals? Refs. OPNAVINST 5100.19, par. B0613 (a) and (b) and OPNAVINST 5100.23, Chapter 15, par. 1508	_____	_____
1427 C	W	Is the respirator fit test documented in the individual's qualification/certification record and does the documentation include: make, model, style and size, method of test and test results, strip chart recording or other recording of test results for quantitative fit test, test date and name of instructor/fit tester? Refs. OPNAVINST 5100.19, par. B0608 and OPNAVINST 5100.23, par. 1509 (c)	_____	_____
1429 C	W	Are respirators inspected, cleaned and stored properly? Refs. OPNAVINST 5100.19, par. B0609; OPNAVINST 5100.23, par. 1510 and 29 CFR 1910.134 (h) (1) thru 1910.134 (h)(4) (iii)	_____	_____
1431 C	P	Is an annual audit of the respirator program performed by the RPPM? Refs. OPNAVINST 5100.23, Chapter 15, par. 1513 (a) (8) and OPNAVINST 5100.19, Chapt B6, par. B603 (l), Appendix B-6A.	_____	_____
1432 C	P	Are LCPs published with procedures outlining processing procedures for emergency reclamation of aircraft, equipment components, and SE to include a required materials list and equipment priority removal list? Refs. Ref. Group 3 UAS Supplemental 13.2.3, and 13.3.2; NAVAIR 01-1A-509, vol. II, Chapter 9, par. 9-3 thru 9-3.4 and NAVAIR 01-1A-509, vol. II, Table 9-1	_____	_____
1433 C	P	Are required materials, equipment and tools available to support the Corrosion Control Program and emergency reclamation actions/procedures? Refs. NAVAIR 01-1A-509, vol. II, Chapter 9, Table 9-2	_____	_____
1434 C	P	Are semi-annual emergency reclamation team training and drills conducted? Ref. Ref. Group 3 UAS Supplemental 13.3.2 (b)	_____	_____
1435 C	P	Has the MO assigned Emergency Reclamation Team members, Ref. Group 3 UAS Supplemental 13.4.2 (c)	_____	_____

NUMBER		QUESTION	Yes	No
1439 C	P	Do aircraft, engines, components and SE meet preservation requirements? Refs. Group 3 UAS Supplemental 29.3.9 (b); NAVAIR 15-01-500; NAVAIR 17-1-125, section Xl; NAVAIR 01-1A-509, vol. Il, Chapter 8 and vol. lll, Chapter	_____	_____
1444 C	P	Are aircraft, SE, and equipment in compliance with painting requirements, and are they maintained with authorized paint schemes? Ref. Group 3 UAS Supplemental 13.3.4 (b)	_____	_____
1446 C	P	Does the Program Manager periodically conduct spot checks of work in progress to determine compliance with corrosion control, prevention, and treatment requirements? Ref. Group 3 UAS Supplemental 13.4.3 (e)	_____	_____
1447 C	P	Does the Program Manager conduct inventories to verify materials, equipment, and tools required to perform corrosion treatment, prevention, and emergency reclamation are available? Ref. Group 3 UAS Supplemental 13.4.3 (g)	_____	_____
1501 C	P	Has the MO designated, in writing via the MMP, a Maintenance Division Officer, Aircrew Division Officer, or DOSS Officer as the Plane Captain Program Manager? Ref. Group 3 UAS Supplemental section 14.3.1 (m)	_____	_____
1502 C	P	Did the Plane Captain Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Ref. Group 3 UAS Supplemental 14.3.1.n (1)	_____	_____
1503 C	P	Is the Plane Captain Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.4.5 (c)	_____	_____
1504 C	P	Is the Plane Captain Program Manager maintaining a Program File which includes elements listed in the Plane Captain Program NAMPSOP? Ref. Group 3 UAS Supplemental 7.4.5 (h)	_____	_____
1505 C	P	Has the Quality Assurance Officer designated, in writing via the MMP, a Plane Captain Program Monitor? Ref. Group 3 UAS Supplemental 7.4.2 (a)	_____	_____
1506 C	P	Has the Model Manager MO developed local command procedures? Ref. Group 3 UAS Supplemental 14.2.2	_____	_____
1507 C	P	Does the MMP list all currently designated plane captains and the due date of their next semi-annual monitor? Ref. Group 3 UAS Supplemental 14.3.1 (g)	_____	_____
1508 C	P	Has the activity established a plane captain selection and examination board consisting of all required personnel? Ref. Group 3 UAS Supplemental 14.3.1. (l)	_____	_____
1509 C	P	Did the Plane Captain Selection and Exam Board, chaired by the MO, review training documentation and conduct an interview of plane captain candidates to ensure each candidate is fully qualified before recommending designation to the CO. Ref. Group 3 UAS Supplemental 14.3.1 (m)	_____	_____
1510 C	P	Are plane captains designated in writing by the CO (unless delegated, in writing, to the MO or DET OINC), using OPNAV 4790/158 or in ASM? Ref. Group 3 UAS Supplemental 14.3.1 (l)	_____	_____

NUMBER		QUESTION	Yes	No
1512 C	P	Have personnel qualified in the same T/M/S aircraft from a previous command that have a current semi-annual monitor, at a minimum, demonstrated proficiency by practical examination and successfully completion of gaining command's Plane Captain Selection and Examination Board? Ref. Group 3 UAS Supplemental 14.3.1 (i)	_____	_____
1513 C	P	Is the OINC of the detachment deploying for a period in excess of 45 days, assigned in writing by the parent squadron CO to designate/recertify and suspend/reinstate plane captain designations? Ref. Group 3 UAS Supplemental 14.3.1 (l)	_____	_____
1514 C	P	Does the Model Manager publish a training syllabus for initial designation and refresher syllabus to include a practical and written examination for T/M/S aircraft for which they are responsible? Ref. Group 3 UAS Supplemental 14.3.1 (k)	_____	_____
1516 C	P	Does the Plane Captain training syllabus (formal/OJT) include the minimum requirements? Ref. Group 3 UAS Supplemental Figure 14-2	_____	_____
1517 C	P	In activities where aircrewmen perform the functions of plane captain, does their respective training syllabus include plane captain qualification requirements? Ref. Group 3 UAS Supplemental 14.3.1 (f)	_____	_____
1519 C	P	Are practical exams performed by a QAR that is a currently qualified plane captain? Ref. Ref. Group 3 UAS Supplemental 14.3.1 (d)	_____	_____
1522 C	P	Do plane captains assigned away from plane captain duties over 6 months days receive refresher training and are they interviewed by the Program Manager prior to assuming plane captain duties? Ref. Group 3 UAS Supplemental 14.3.1.n (3)	_____	_____
1523 C	P	Have revoked plane captains completed the entire plane captain training syllabus, pass the practical and written examinations, and been interviewed and recommended by the Plane Captain Selection Board? Ref. Group 3 UAS Supplemental 14.3.1 (j)	_____	_____
1524 C	P	Have all qualified plane captains and trainees completed the flight deck familiarization PQS before going aboard ship? Ref. Group 3 UAS Supplemental Figure 14-2	_____	_____
1525 C	P	Is the pre-deployment training lecture given to all qualified plane captains and trainees before going aboard the ship? Refs. NAVAIR 00-80T-105, par. 2.3.2 and NAVAIR 00-80T-106, par. 2.3.1	_____	_____
1801 C	P	Has the MO designated the SEPMS Program Manager in writing via The MMP? Ref: Group 3 UAS Supplemental 7.4.1 (a)	_____	_____
1802 C	P	Did the SE PMS Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5 (b)	_____	_____
1803 C	P	Is the SE PMS Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.4.5 (c)	_____	_____
1804 C	P	Has the MO developed local command procedures (if required) Ref: Group 3 UAS Supplemental 17.2.4	_____	_____

NUMBER			QUESTION	Yes	No
1810	C	P	Are acceptance/transfer inspections performed upon permanent or sub-custody acceptance and transfer of SE? Are acceptance inspections completed upon receipt? Are transfer inspections completed prior to transfer (OOMA only)? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.17.3.1 (a) , Group 3 UAS Supplemental 17.3	_____	_____
1811	C	P	With the exception of temporary loan, are acceptance/transfer inspections documented on a Support Equipment Acceptance/Transfer Checklist that includes all requirements (OOMA only)? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.17.3.1 (b)	_____	_____
1812	C	P	If records were not received with SE, does the new reporting custodian notify the previous reporting custodian, OMAWHOLE and SECA? (OOMA only) Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.17.3.1 (c)	_____	_____
1813	C	P	Do all items of SE with maintenance requirements specified in technical manuals or manufacturer's publications, or that require incorporation of an applicable TD have an SE Custody and Maintenance History Record (OOMA only)? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.17.3.6 (a) , Group 3 UAS Supplemental 17.3	_____	_____
1814	C	P	Is the current working copy and the last completed copy of the SE Custody and Maintenance History Record retained in Maintenance Control or Production Control? (OOMA only) Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.17.3.6 (f)	_____	_____
1818	C	P	Are applicable TDs and their respective status correctly annotated in the equipment's CM ALS record (OOMA only) Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.17.3.6 (e)	_____	_____
1827	C	P	Is SE overdue for PM restricted from further operation until completion of the subject inspection? Ref. Group 3 UAS Supplemental 17.3.1 (f)	_____	_____
1828	C	P	If PM status cannot be verified from newly accepted SE, is the new reporting custodian performing all PM inspections before placing SE in service? Ref (OOMA only) COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.17.3.2 (b). (non OOMA) Group 3 UAS Supplemental 17.3.1 (c)	_____	_____
1903	C	P	Is the Quality Assurance Officer assigned as the Technical Data Management Officer? Group 3 UAS Supplemental 8.4.1 (a)	_____	_____
1904	C	P	Did the Technical Data Management Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5 (b)	_____	_____
1905	C	P	Is the Technical Data Management Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Group 3 UAS Supplemental 7.4.5 (c)	_____	_____
1906	C	P	Did the QAR assigned as Technical Data Management Program Monitor complete the CNATTU Aeronautical Technical Publication Library Management course (Course C-555-0007) within 90 working days of assignment? Group 3 UAS Supplemental 8.4.3 (a)	_____	_____
1907	C	P	Are only authorized technical publications and directives used in the performance or in support of aviation maintenance? Ref. Group 3 UAS Supplemental 8.3.1	_____	_____

NUMBER		QUESTION	Yes	No
1908 C	P	Is the QA Technical Data Management Program Monitor performing an annual audit of the Technical Data Management Program? Ref. Group 3 UAS Supplemental 8.4.3 (b)	_____	_____
1909 C	P	Are QARs reviewing newly received technical publications and directives to determine application to the Maintenance Department? Ref. Group 3 UAS Supplemental 8.4.4 (a)	_____	_____
1910 C	P	Are QARs verifying work guides, check-off lists, check-sheets, and MRCs are complete and current.? Ref. Ref. Group 3 UAS Supplemental 8.4.4 (b)	_____	_____
1911 C	P	Did the CTPL Manager complete the CNATTU Aeronautical Technical Publication Library Management course (Course C-555-0007)? Ref. Group 3 UAS Supplemental 8.4.5 (b)	_____	_____
1912 C	P	At time of initial assignment and turnover, did the CTPL Manager complete an inventory and verify the currency of the technical data held in the CTPL and in each DTPL utilizing ELMS? Was the inventory documented in a memorandum signed by the Quality Assurance Officer? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.8.4.8 (c)	_____	_____
1914 C	P	Does the CTPL Manager have the required directives and manuals to operate a library? Ref. Ref. Group 3 UAS Supplemental 8.4.5 (c)	_____	_____
1915 C	P	Is the CTPL Manager maintaining an accurate ADRL for all TMs used by the activity? Ref. Group 3 UAS Supplemental 8.4.5 (l)	_____	_____
1916 C	P	Does the CTPL Manager maintain a master file of applicable TDs and enter them into the ELMS database as required? Ref. Group 3 UAS Supplemental 8.4.5 (l), and NAVAIR 00-25-100, WP 013 00, par. 20-2	_____	_____
1921 C	W	Does the ELMS database accurately reflect the publications and PEMA assets actually held and are all publications current? Ref. NAVAIR 00-25-100, WP 010 00, par. 1-4, WP 011 00, par. 9-3, WP 013 00, pars. 6-1 thru 6-7 & Ref. Group 3 UAS Supplemental 8.4.5 (a)	_____	_____
1923 C	W	Does the CTPL Manager issue an ELMS work center listing quarterly to each work center? Ref. NAVAIR 00-25-100, WP 013 00, par.12-4	_____	_____
1928 C	W	Are changes, notices, revisions, and IRACs correctly incorporated with the required time constraints into manuals and PEMA asset? Ref. NAVAIR 00-25-100, WP 012 00, pars. 2 thru 7 and Group 3 UAS Supplemental 8.4.5.t (3)	_____	_____
1935 C	P	If a CECR was issued to a DTPL to incorporate a change, did the CTPL physically inspect the manual for correct incorporation prior to closing the CECR? Ref. Group 3 UAS Supplemental 8.4.5.t (2)	_____	_____
1944 C	P	At least once every 6 months, is the CTPL Manager physically inventorying and comparing all technical publications (including TMs on PEMAs) against the activity's ADRL, per the procedures of NAVAIR 00-25-100, WP 010 00? Are changes and discrepancies annotated on the Complete Work Center Listing Report, and is corrective action, ADRL update in ELMS? Is the annotated listing maintained in the CTPL Transaction Files? Ref. Group 3 UAS Supplemental 8.4.5 (s)	_____	_____

NUMBER			QUESTION	Yes	No
1948	C	P	Are Local MRC (LMRC) correctly formatted and submitted to the applicable WING or MAW for approval? Ref. Group 3 UAS Supplemental 8.4.1 (b)	_____	_____
1957	C	P	Are electronic versions of NAVAIR TMs accessed from authorized sources? Ref. Group 3 UAS Supplemental 8.4.5 (f)	_____	_____
1959	C	P	Are paper manuals properly stored? Ref. NAVAIR 00-25-100, WP 013 00, par. 14-4 (a, b, c, d and g)	_____	_____
1963	C	P	Is cancelled or updated technical data correctly disposed of upon receipt of the new version? Is the ELMS Program updated, including recording disposed manuals in the ELMS History File? Refs. Group 3 UAS Supplemental 8.4.5 (h), and NAVAIR 00-25-100, WP 013 00, paragraph 10-3.	_____	_____
1964	C	P	Is the CTPL Manager coordinating with the Command Security Manager on classified technical data receipt, stowage, distribution, inventory, and disposition? Ref. Group 3 UAS Supplemental 8.4.5 (i)	_____	_____
1971	C	P	Does the CTPL Manager coordinate with the IMRL Manager to return PEMAs for repairs and replacement? Ref. Group 3 UAS Supplemental 8.4.7 (b)	_____	_____
1976	C	P	Is PEMA system software updated no later than 10 working days after receipt of a PEMA Service Pack? Ref. Group 3 UAS Supplemental 8.3.3 (b)	_____	_____
1978	C	P	Does the CTPL Manager have PEMA administrative privileges for updating technical data installed on PEMAs and installing, Service Pack updates and approved software? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par.10.8.4.8 (r)	_____	_____
1979	C	P	Does the CTPL Manager list all PEMA technical data and system software in the ELMS PEMA Management Module? Ref. Group 3 UAS Supplemental 8.3.3 Note.	_____	_____
1982	C	P	Does the CTPL Manager document PEMA distribution to work centers? Ref. Group 3 UAS Supplemental 8.4.5 (r)	_____	_____
2001	C	P	Has the MO designated, in writing via the MMP, a METCAL Program Manager? Ref. Group 3 UAS Supplemental 7.4.1 (a)	_____	_____
2002	C	P	Has the Quality Assurance Officer designated, in writing via the MMP, a QAR as the METCAL Program Monitor? Ref. Group 3 UAS Supplemental 7.4.2 (a)	_____	_____
2003	C	P	Is the METCAL Program Manager maintaining a Program File which includes elements listed in the Group 3 UAS Supplemental? Ref. Group 3 UAS Supplemental 7.4.5 (h)	_____	_____
2004	C	P	Did the METCAL Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5 (b)	_____	_____
2005	C	P	Is the Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.4.5 (c)	_____	_____
2009	C	W	Do Work Center Supervisors verify TMDE assigned to the work center is serviceable and that calibration labels are valid and not damaged? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.18.4.4 (b)	_____	_____

NUMBER		QUESTION	Yes	No
2011 C	P	Does the Program Manager ensure that all equipment is turned in complete with cables, accessories, charts, and peculiar technical data required during calibration? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.18.4.3 (d) (3) and 10.18.4.4 (c)	_____	_____
2013 C	P	Are all non-operational and suspect TMDE turned in regardless of actual calibration due date? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.18.4.4 (c)	_____	_____
2015 C	P	Is a current MEASURE Format 350 (O and I-level) and a current Format 802 (O-level only) or appropriate substitute available? Refs. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.18.4.3 (d) (7) and (14) (O-Level), and 10.18.4.4 (g) (I-Level)	_____	_____
2016 C	P	Is the activity responding to the recall schedule (Format 802) and submitting PME/TAMS to the supporting calibration activity whenever it is recalled for calibration? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.18.4.3 (d) (2)	_____	_____
2018 C	P	Does the O-Level Program Manager/I - Level Work Center Supervisor document changes on the Format 350 as they occur? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.18.4.3 (d) (7) (O-Level) and 10.18.4.4 (f) (I-Level)	_____	_____
2019 C	P	Does the Program Manager/ retain METER card (OPNAV 4790/58) pink copies until Inventory Format 350 reflects new calibration dates? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.18.4.3 (d) (5)	_____	_____
2020 C	P	Does the O-Level Program Manager verify the Format 350, resolve any differences, and return the report to the supporting calibration lab within 5 working days? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.18.4.3 (d) (6)	_____	_____
2201 C	P	Has the CO designated, in writing an officer as the Command HMC&M Program Manager? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.19.3.2a and 10.19.4.3	_____	_____
2202 C	P	Has the Command HMC&M Program Manager attended all required courses within 60 days of assignment? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.3.2 (a) (3-4)	_____	_____
2203 C	P	Did the Command HMC&M Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5 (b)	_____	_____
2204 C	P	Is the Command HMC&M Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.4.5 (c)	_____	_____
2205 C	P	Is the Command Hazardous Material Control and Management Program Manager ensuring that hazardous materials are being stored properly? Ref. OPNAVINST 5100.19E C2302 (e)	_____	_____
2208 C	P	Has the MO designated, in writing via the MMP or SME listing, a Command HMC&M Supervisor ? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.4.4 (a) and (b).	_____	_____
2209 C	P	Has the Command HMC&M Supervisor attended all required courses within 120 days of assignment? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.3.2 (b) (3-4)	_____	_____

NUMBER		QUESTION	Yes	No
2211 C	P	Is the Command HMC&M Supervisor performing all duties outlined by the NAMP? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.19.4.6 (a) thru (u) and NOTES (1-2)	_____	_____
2213 C	P	Is the HMC&M Program Monitor performing all duties outlined by the NAMP? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.4.8 (a) through (c)	_____	_____
2214 C	P	Has the MO publish an LCP per Appendix D, if required, to direct geographic, TMS specific, or command directed HMC&M actions not addressed in this NAMPSOP. O-level LCPs will be submitted to the Wing or MAW for consideration of developing a Wing LCP? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.4.4 (d)	_____	_____
2215 C	P	Have all Work Center Supervisors and Work Center HAZMAT Coordinators completed HAZMAT storage and handling training provided by HAZMINCEN or Command HMC&M Supervisor within 30 days of assignment? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.3.2 (C) and AMA 2017-07C	_____	_____
2218 C	W	Have all Work Center Supervisors and Work Center HAZMAT Coordinators completed HAZMAT storage and handling training provided by HAZMINCEN within 30 days of assignment? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.3.2 (C)	_____	_____
2219 C	W	Do containers containing HAZMAT have correct product labeling? Ref. OPNAV M-5090.1, Chapter 23, par. 23-3.2	_____	_____
2220 C	W	Are only HAZMATs listed in the Aviation Hazardous Materials List (AHML) used for aviation maintenance, and, if necessary, are questions concerning HAZMAT or AHML forwarded to navair.hazmat@navy.mil? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.2.3	_____	_____
2221 C	P	Has each item on the activities AUL been assigned a unique identifier (letter, number or alphanumeric)? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.3.3 (b) (4)	_____	_____
2222 C	P	Are all publications available for use by personnel responsible for ensuring ESOH compliance for the Hazardous Material Control and Management Program? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.19.1 (a) thru (h) and 10.19.3.1	_____	_____
2223 C	W	Do Work centers maintain a written or electronic log of HAZMAT present in the work center? HAZMAT lists will contain the unique identifier, NSN or NIIN, nomenclature, and MIL SPEC or part number. Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.3.3 (d).	_____	_____
2224 C	W	Do Work centers maintain a written or electronic log of HAZWASTE collected in the work center per local command procedures (LCPs). Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.3.3 (e).	_____	_____
2225 C	P	Does the Division Officer periodically spot check to verify HAZMAT used or stored in the division is being properly handled, collected, and disposed? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.19.4.9 (a).	_____	_____
2402 C	P	Has the MO designated an ESD Protection and EMI Reporting Program Manager? Ref. Group 3 UAS Supplemental 7.4.1 (a)	_____	_____
2403 C	P	Did the ESD/EMI Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5 (b)	_____	_____

NUMBER			QUESTION	Yes	No
2404	C	P	Is the ESD/EMI Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.4.5 (c)	_____	_____
2405	C	P	Is the ESD/EMI Program Manager/Coordinator maintaining a Program File which includes elements listed in the EMI/ESD Program NAMPSOP? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.21.4.4 (h) and 10.21.4.5 (f)	_____	_____
2407	C	P	Is the ESD/EMI Program Manager providing initial and annual refresher training on ESD protection? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par, 10.21.4.4 (d)	_____	_____
2408	C	P	Is the ESD/EMI Program Manager conducting monthly inspections of ESD protected work areas with the Work Center Supervisor to verify areas are maintained per paragraph 10.21.3.3 and ESD protective materials are available and being used? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par, 10.21.4.4 (e)	_____	_____
2409	C	P	Is the ESD/EMI Program Manager current on EMI problem historical data in ASEMICAP EMI Problem Database (https://asemicap.navair.navy.mil) for their T/M/S aircraft.? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par, 10.21.4.4 (f)	_____	_____
2410	C	W	Do maintenance personnel comply with ESD handling and protection requirements while performing maintenance on ESDS items? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par, 10.21.4.10	_____	_____
2411	C	P	Has the QA Officer designated, in writing a QAR as the ESD/EMI Program Monitor? Ref. Group 3 UAS Supplemental 7.4.2 (a)	_____	_____
2415	C	P	Has the Program Manager provided indoctrination and refresher training to all personnel who handle, inspect, package, or transport ESDS items? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars.10.21.4.4 (d) and 10.21.4.5 (c)	_____	_____
2419	C	P	Are ESDS WRAs, SRAs and electronic components treated as ESD sensitive? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par.10.21.3.2 (a)	_____	_____
2424	C	P	Are ESDS items placed in ESD safe condition immediately after removal from aircraft or equipment, and do they remain in ESD safe protective packaging until time of repair or re-installation? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par.10.21.3.2 (f).	_____	_____
2428	C	P	Is an ESD Field Service Kit used, when practical? When not practical to use a field service kit, are technicians using a wrist strap connected to the aircraft structure or achieve an equipotential grounding status by contacting the aircraft structure? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par.10.21.3.3 (h) (1) and NOTE	_____	_____
2431	C	W	Do ESD protective work areas contain, at a minimum, a properly configured Electrostatic Protected Area (EPA) per MIL-HDBK-263B, WP 004 00. Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.21.3.3 (b)	_____	_____
2433	C	P	Is all energized equipment isolated from the conductive ESD mat and other conductive materials? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.21.3.3 (d) WARNING	_____	_____

NUMBER			QUESTION	Yes	No
2434	C	P	Are prime static generators located at least 24 inches from ESD protective work areas? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.21.3.3 (e) and NAVAIR 01-1A-23, WP 004 00.	_____	_____
2435	C	P	Are preoperational checks for ESD protected work areas performed per NAVAIR 17-600-193ESD-6-1 or NAVAIR 17-600-193-6-1? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.21.3.3 (f)	_____	_____
2437	C	P	Is the Program Manager familiar with the reporting requirements for EMI incidents? Refs. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.21.3.4. and Group 3 UAS Supplemental section 20.1	_____	_____
2438	C	P	Has the Program Manager reviewed T/M/S specific EMI historical data contained in ASEMICAPs EMI Problem Database? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.21.4.4 (f)	_____	_____
2439	C	P	Do maintenance personnel receive a thorough debrief from pilots and aircrew when EMI occurs? Refs. COMNAVAIRFORINST 4790.2, Chapter 10, pars. 10.21.4.4 (g) and Group 3 UAS Supplemental section 20.1	_____	_____
2601	C	P	Has the MO designated, in writing via the MMP, the MMCO as the TD Compliance Program Manager? Ref. Group 3 UAS Supplemental section 10.2.4.	_____	_____
2602	C	P	Did the TD Compliance Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental section 10.3.8 (a)	_____	_____
2604	C	P	Is the TD Compliance Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental section 7.4.5 (c).	_____	_____
2611	C	P	Is the TDPM verifying WO or MAF status to “down” as soon as the compliance time or event becomes due? Ref. Group 3 UAS Supplemental section 10.3.1 (e).	_____	_____
2617	C	P	Are reviews for Immediate Action and Urgent Action TDs completed immediately upon receipt? Ref. Group 3 UAS Supplemental section 10.3.4	_____	_____
2619	C	P	Does the TDPC ensure Maintenance Control/Production Control issue applicable TD compliance MAF/WO? Ref. Group 3 UAS Supplemental section 10.3.2 (h)	_____	_____
2623	C	P	Are TD compliance deviation procedures adhered to and properly documented? Ref. Group 3 UAS Supplemental section 10.3.2 (f)	_____	_____
2629	C	P	Is a “BASELINE” TD compliance verification completed upon receipt of aircraft, engines, SE, maintenance trainers, and serial numbered weapon system components physically assigned to the activity’s custody? Ref. Group 3 UAS Supplemental section 10.3.2	_____	_____
2642	C	P	FOR NALCOMIS OPTIMIZED OMA/IMA (ACTIVITIES) Do log sets accurately reflect the TD configuration of the aircraft/component/equipment; to include ensuring all TD tasks are created and manually updated/force completed as required? Refs: COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.2.3.17	_____	_____
2644	C	P	Is the CTPL Manager maintaining copies of the Weekly Summary of Issued TDs with TDPC annotations on file for a period of 6 months? Ref. Group 3 UAS Supplemental section 8.4.5.t (4)	_____	_____

NUMBER		QUESTION	Yes	No
2802 C	P	Did the Program Manager complete the initial assessment and annually thereafter? Ref. Group 3 UAS Supplemental section 7.4.5 (b) par. 10.7.4.8 (b)	_____	_____
2803 C	P	Is the Program Manage tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental section 7.4.5 (c)	_____	_____
2804 C	P	(Navy Only) Does the AMO maintain AMM and Enlisted Command access in CMS-ID/BBD? Ref. BUPERSINST 1080.54, Par 4 (d)	_____	_____
2805 C	P	Does the Program Manager maintain and utilize an active account within Fleet Training and Management Planning System (FLTMPS)? Ref. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.4.4.2 (q)	_____	_____
2809 C	P	(Navy Only) When the AMO/AMM completes the review of Sailor alignments and if changes are required, transmit updates to the Placement Coordinator via email? Note. Special attention should be placed on reviewing Sailors that are within 1 month of becoming a PL (1 month prior to entering detailing window of 7-9 months). Realign a Sailor currently aligned to a different billet into this billet to preclude creation of a requisition. Ref. BUPERSINST 1080.54, par. 8 (c) (2)	_____	_____
2810 C	P	(Navy Only) Does the AMO/AMM address NEC inventory issues or discrepancies identified by a "Quality of Alignment" (QoL) error code of 4, 5 or 6 on command BBD with TYCOM Manpower Coordinator and Prospective Gain personnel with the command's Placement Coordinator, and submitting an Order Modification for personnel with no NEC School in route, if necessary? Ref. BUPERSINST 1080.54, par. 8 (b) (3)	_____	_____
2811 C	P	(Navy Only) Does the AMO review DNEC assignments and if changes are required, transmit updates to the Placement Coordinator via email or message? Ref. BUPERSINST 1080.54, par. 8 (c) (3)	_____	_____
2813 C	P	(Navy Only) Does the AMO review current and projected manning and report critical shortages to ISIC and or applicable TYCOM? If critical shortages are identified are there inputs to TYCOM, correspondence with Placement Coordinator, billet advertisement on CMS-ID, Tentative Gains on BBD or EMIR generated? Ref. BUPERSINST 1080.54, par. 8 (c) (1)	_____	_____
2815 C	P	Does the AMO determine the apportionment of maintenance personnel assigned to the department and monitor/coordinate the assignment of TAD personnel to other activities? (Navy Only) Ref. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.4.4.2 (g)	_____	_____
2819 C	P	Does the command utilize EMIRs to notify NAVPERSCOM (PERS-4013) of the units concern regarding significant enlisted personnel shortages and are EMIRs completed in accordance with MILPERSMAN 1306-108? (Navy Only) Ref. MILPERSMAN 1306-108, par. 4 (a) thru (e) and Exhibit 1	_____	_____
2901 C	P	Did the MMCO complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental section 7.4.5 (b)	_____	_____
2902 C	P	Is the MMCO tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental section 7.4.5 (c).	_____	_____

NUMBER			QUESTION	Yes	No
2903	C	P	Is the MMP prepared, distributed and managed properly by the MMCO and Maintenance Control? Refs. COMNAVAIRFORINST 4790.2, Ref. Group 3 UAS Supplemental section 29.3.8 (b)	_____	_____
2904	C	P	Does the ADB/equivalent accurately reflect the status of pending maintenance requirements as displayed in the appropriate data base and is it screened for accuracy for completed and outstanding WOs before the BUNO is certified safe for flight? Ref. Group 3 UAS Supplemental section 29.3.3 (b)	_____	_____
2906	C	P	Do aircraft Inspection and Acceptance Records (OPNAV 4790/141) contain all the required information and only authorized signatures? Ref. Group 3 UAS Supplemental section 29.3.3 (d)	_____	_____
2913	C	P	Are completed WOs for special inspections retained in the Maintenance Information System or ADB Ref. Group 3 UAS Supplemental section 29.3.3 (c)	_____	_____
2914	C	P	Are database backups performed each working day Ref. Group 3 UAS Supplemental section 29.3.3.b.1 Note 5	_____	_____
2915	C	P	In the event maintenance, other than servicing, must be performed after the daily inspection or turnaround inspection, does Maintenance Control determine if a complete daily or turnaround inspection or portion thereof is required? Ref. Group 3 UAS Supplemental section 29.3.6.e (1)	_____	_____
2916	C	P	Is Maintenance Control verifying fuel samples were taken within 24 hours preceding the aircraft's initial launch or as required by applicable MRC's? Ref. Group 3 UAS Supplemental section 29.3.3.b (2)	_____	_____
2919	C	P	Is the debarking UAC or a SFF Controller (when UAC is not available due to spoke operations) signing block 10 of the flight block of electronic "A" sheet, (OPNAV 4790/141), or he safe for during hot seat operations? Ref. Group 3 UAS Supplemental section 29.3.3.b (5)	_____	_____
2920	C	P	Are those persons authorized to certify an aircraft "SAFE FOR FLIGHT" designated in writing by the CO? Ref. Group 3 UAS Supplemental section 29.3.3.b	_____	_____
2922	C	P	(OOMA Only) Have all personnel using Optimized NALCOMIS OMA authorized to certify aircraft Safe for Flight completed the Naval Aviation Maintenance Control Management course (C-555-0053)? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.1 NOTE	_____	_____
2925	C	P	Is the W&B and configuration (Form F) verified prior to each flight? Ref. Group 3 UAS Supplemental section 29.3.3.c (4)	_____	_____
2934	C	P	Are Scheduled aircraft inspections completed within authorized deviations? Ref. Group 3 UAS Supplemental section 29.3.6 (c)	_____	_____
2937	C	P	Does the Maintenance Control change TD WO status to "down" as soon as compliance time or event becomes due? Ref. Group 3 UAS Supplemental section 10.3.1 (e).	_____	_____
2943	C	P	Is aircraft flight time current at all times? Ref. Group 3 UAS Supplemental section 29.3.3.b (6)	_____	_____
2949	C	P	Does Maintenance Control manage resources in an efficient manner, and demonstrate control of the various elements within their area of responsibility? Ref. Group 3 UAS Supplemental section 29.1	_____	_____

NUMBER			QUESTION	Yes	No
2950	C	P	Is Maintenance Control reviewing WOs for complete and accurate documentation at time of initiation and at time of completion, prior to approval? Ref. Group 3 UAS Supplemental section 29.3.3.b (1)	_____	_____
2951	C	P	Is the MMCPO/Aircraft Maintenance Chief monitoring the quality of WOs approved by Maintenance Control and, as needed, ensuring personnel receive training from the SA/A on screening and documentation procedures? Ref. Group 3 UAS Supplemental section 29.3.c (4)	_____	_____
3101	C	P	Is the MMCO designated by the aircraft reporting custodian CO as the Weight and Balance Officer? Refs. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.8 (h) (1) and; NAVAIR 01-1B-50, Section 8, par. 8.2.3 (e) (3), and Ref. Group 3 UAS Supplemental section 24.1	_____	_____
3102	C	P	Did the W&B Officer complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental section 7.4.5 (b)	_____	_____
3103	C	P	Is the W&B Officer tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. COMNAVAIRFORINST 4790.2, Chapter 10, par. 10.7.3.4 (a) and (b)	_____	_____
3104	C	P	For commands that employ temporary detachments away from the squadron, does the CO designate Weight and Balance personnel for the detachment? Refs. COMNAVAIRFORINST 4790.2, par. 3.2.2.8 (h) (1) and NAVAIR 01-1B-50 par. 8.2.3 (e) (3) (b), Group 3 UAS Supplemental 24.1(c)	_____	_____
3105	C	P	If utilized, are Weight and Balance designated personnel listed in the Monthly Maintenance Plan (MMP)? Refs. COMNAVAIRFORINST 4790.2 Par. 3.2.2.8 (h) (1) and NAVAIR 01-1B-50 par. 8.2.3 (e) (3) (d) Group 3 UAS Supplemental 24.1(c)	_____	_____
3107	C	P	Have the individuals assigned the responsibilities of accomplishing the various functions of Aircraft Weight and Balance successfully completed an approved course? Refs. COMNAVAIRFORINST 4790.2, Chapter 3, par 3.2.2.8 (h) (2) and NAVAIR 01-1B-50, Section 8, par. 8.2.4 (a). (1-4), Group 3 UAS Supplemental 24.1(c)	_____	_____
3109	C	P	Are the Weight and Balance Handbooks stored in a location readily available to the UAC and other personnel responsible for accomplishing weight and balance functions? Ref: NAVAIR 01-1B-50 par 3.7.1.	_____	_____
3110	C	P	Does the weight and balance handbook (s) include all items listed in the NAVAIR 01-1B-50? Ref. NAVAIR 01-1B-50, Section 3, par. 3.7.2 and Section 8, par. 8.2.2 (c)	_____	_____
3111	C	P	Does the Weight and Balance Officer ensure the weight and balance handbook for all assigned aircraft, including newly received aircraft, are complete, current, and maintained in the correct format? Refs. COMNAVAIRFORINST 4790.2, Chapter 3, par 3.2.2.8 (h) (3) and NAVAIR 01-1B-50, Section 8, par. 8.2.2 (c)	_____	_____
3112	C	P	Is the most recent release of AWBS in use? Ref. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.8 (h) (3) (f)	_____	_____
3113	C	P	Do all AWBS users maintain a login/password for the AWBS Website to ensure notification on AWBS updates, access to AWBS issue resolutions and access to the AWBS Central Server? Ref. NAVAIR 01-1B-50, Section 8, par. 8.2.15 (f).	_____	_____

NUMBER		QUESTION	Yes	No
3114 C	P	Are electronic weight and balance files backed up on the USN/USMC Central Server or in accordance with standard service computing requirements, and is the data backed up in a location other than that of primary storage? Refs. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.8 (h) (3) (j) and NAVAIR 01-1B-50, Section 3, par. 3.7.2.8.1 and Section 8, par. 8.2.15 (a) (e)	_____	_____
3115 C	P	Is the current Weight and Balance Officer listed on the last line of the Record of Weight and Balance Personnel Form (DD365)? Ref. NAVAIR 01-1B-50, Section 4, par. 4.1.1 and 8.1.2 (a) (1)	_____	_____
3116 C	P	Are weight and balance inventories performed when required? Refs. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.8.(h) (3) (i) and NAVAIR 01-1B-50, Section 4, pars. 4.2 and Section 8, par. 8.2.9, Group 3 UAS Supplemental 24.1(d)	_____	_____
3117 C	P	Is the aircraft weighed when required? Refs. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.8 (a) and NAVAIR 01-1B-50, Section 3, par. 3.9, Section 8, par. 8.2.8	_____	_____
3118 C	P	Whenever an aircraft is weighed, is the Chart C updated to show the new Basic Weight, simplified moment, and arm (or index) from the Form B? Ref. NAVAIR 01-1B-50, Section 4, par. 4.5.3.5	_____	_____
3119 C	P	Is the Chart C updated as changes occur to the Chart A? Ref. NAVAIR 01-1B-50, Section 4, pars. 4.5.3.1 thru 4.5.3.6	_____	_____
3120 C	P	During Acceptance and Transfer of aircraft, is a verification of all Technical Directives incorporated since the last weighing verified and Charts A and C updated as required? Ref: NAVAIR 01-1B-50 par. 8.2.9 (c), Group 3 UAS Supplemental 24.1(d)	_____	_____
3121 C	P	Are Weight and Balance impacts of modifications properly recorded on the weight and balance charts of affected aircraft? Refs. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.7 (f) (3), 3.2.2.8 (h) (3) (c); NAVAIR 00-25-300, pg. A-10, par. A-3.13 and NA 01-1B-50, Section 8, pars. 8.2.3 e. (4) and 8.2.12	_____	_____
3122 C	P	Is the current, NAVAIRSYSCOM (AIR-4.1.7) approved Chart E/loading manual being utilized? Ref: NAVAIR 01-1B-50 par. 8.2.3 (e) (4) (a).	_____	_____
3123 C	P	Is the aircraft CG within limits when the total weight and moment/index is compared to Chart E, Center of Gravity Table? Ref. NAVAIR 01-1B-50, Section 4, pars. 4.6.1, 4.7.2.14 and 4.7.2 and Section 7, par. 7.7	_____	_____
3124 C	P	Do the basic weight and moment/index figures entered on the Form F match the most current entries on Chart C? Ref. NAVAIR 01-1B-50, Section 4, pars. 4.7.2.2, 4.7.3.2 and 4.5.1	_____	_____
3125 C	P	FOR OOMA ACTIVITIES: Does the Weight and Balance Officer ensure the Basic Weight for each aircraft is accurately calculated and reflected (as appropriate) in all flight records or documents? Ref. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.8 (h) (3) (d) NOTE, Chapter 5 par. 5.1.1.3 (b) (5)	_____	_____
3126 C	P	Is an approved DD 365-4 Clearance Form F or an authorized substitute One-time Use or Canned Form F utilized for each flight? Refs. NAVAIR 01-1B-50 par. 8.2.7(a) (3) and 3.8.3	_____	_____
3127 C	P	Are Weight and Balance Flight Clearance Form F's (DD 365-4) completed in accordance with NAVAIR 01-1B-50? Ref. NAVAIR 01-	_____	_____

NUMBER		QUESTION	Yes	No
		1B-50, Section 4, pars. 4.7.2 and 4.7.3.		
3129 C	P	Are canned Forms F for each aircraft prepared for multiple uses when the aircraft Basic Weight and moment remain within certain specified tolerances? Ref. NAVAIR 01-1B-50, Section 3, pars. 3.8.3, 3.8.4	_____	_____
3130 C	P	If the command chooses the Canned Form F option, are existing Canned Forms F replaced when the aircraft's Basic Weight or Basic Moment changes? Ref: NAVAIR 01-1B-50 par. 8.2.7 (a) (4)	_____	_____
3131 C	P	Are all canned Forms F checked at least every 180 days for accuracy and a new Form F prepared as required? New Canned Forms F shall be prepared whenever Chart C Basic Weight and/or moment change. If no changes are required, the Form F may be re-dated and initialed, or a letter issued to state the review has been accomplished to certify its currency. This letter shall list the BUNO's and Forms F that were reviewed. Ref: NAVAIR 01-1B-50 par. 8.2.7 (a) (4)	_____	_____
3133 C	P	If an electronic Form F substitute is utilized, is the latest NAVAIRSYSCOM (AIR-4.1.7) version being utilized (as applicable)? Does the Weight and Balance Officer have a copy of the authorization letter on file? Ref: NAVAIR 01-1B-50 par. 8.2.3 (a) (12), Group 3 UAS Supplemental 24.1(b-d)	_____	_____
3202 C	P	Did the MMCO/PCO complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5(b), 42.2	_____	_____
3204 C	P	Is the MMCO/PCO tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.4.5(c)	_____	_____
3205 C	P	Are XRAY reports submitted within specified time frames? Ref. Group 3 UAS Supplemental 42.3.2	_____	_____
3206 C	P	Are XRAY reports submitted ~~via OOMA~~ whenever there is a change in custody or status? Ref. Group 3 UAS Supplemental 42.3.4	_____	_____
3207 C	P	Do XRAYs contain all required data? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.3.12, Group 3 UAS Supplemental 42.3.7	_____	_____
3208 C	P	Are correct aircraft Status codes used in XRAY reports? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.3.5.2, Group 3 UAS Supplemental 42.3.7, and Appendix E	_____	_____
3209 C	P	Are correct Action codes used in XRAY reports? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.3.12, 5.3.13, Group 3 UAS Supplemental 42.3.7, and Appendix E	_____	_____
3210 C	P	Does the XRAY Remarks Section contain detailed remarks and causal factors? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.3.12 (Remarks), Group 3 UAS Supplemental 42.3.7	_____	_____
3211 C	P	Are location change/aviation unit operational status category/fleet assignment XRAYs properly submitted? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.3.15, Group 3 UAS Supplemental 42.3.4	_____	_____
3212 C	P	Are XRAY correction procedures understood and complied with? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.3.3 and 5.3.9.2, Group 3 UAS Supplemental 42.3.7	_____	_____
3215 C	P	Is the quarterly hours in life report properly prepared and submitted? Ref. Group 3 UAS Supplemental 42.3.7	_____	_____

NUMBER			QUESTION	Yes	No
3327	C	P	Are Monthly Flight Summary Page/CM ALS, Flight Summary Record entries computed and annotated correctly? (OOMA Only) Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.2.1.13, 5.2.3.14 and 5.2.3.1	_____	_____
3328	C	P	Are the flight/operating hours of the equipment inspected entered on the Inspection Record? (OOMA Only) Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.2.1.14 and 5.2.3.15	_____	_____
3329	C	P	Is the Equipment Operating Record (EOR) within the AESR/CM ALS AESR maintained correctly? (OOMA Only) Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.2.1.26, 5.2.3.23	_____	_____
3331	C	P	When rework/repair is accomplished, does the activity accomplishing the action make the required entries on the Record of Rework Page/CM ALS if applicable? (OOMA Only) Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.2.1.15, 5.2.3.16 and 5.2.3.1	_____	_____
3333	C	P	Does the Miscellaneous History section/CM ALS contain all necessary entries as outlined in the NAMP? (OOMA Only) Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.2.1.17, 5.2.3.18 and 5.2.3.1	_____	_____
3342	C	P	Are aircraft logbooks/AESRs and CM ALS entries signed by authorized personnel? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.2.3.7 and 5.2.1.5	_____	_____
3344	C	P	Upon completion of EHR/SRC/ASR/MSR cards consolidation, is the activity making required entries in the "Repair/Rework/Overhaul" or "Maintenance Record" sections accordingly, and is the original EHR/SRC/ASR/MSR cards and a copy of the new card forwarded to the ATCM Central Repository at COMNAVAIRSYSCOM (AIR 6.8.4.3)/FST? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.2.1.27, 5.2.1.28, 5.2.1.29 (b) and 5.2.1.30 Group 3 UAS Supplemental 45.2 (additive manufacturing only)	_____	_____
3601	C	P	Is the System Administrator (SA), analyst and/or Maintenance Data Base Administrator (MDBA) trained in Maintenance Information System Procedures to include, data processing capabilities, and the techniques of statistical analysis? Ref. Group 3 UAS Supplemental 29.3 (b)	_____	_____
3603	C	P	Does the analyst coordinate and conduct specific qualitative and quantitative analytical training and guidance for all personnel assigned to the Maintenance Department from discovered analytical trends? Ref. Group 3 UAS Supplemental 29.3 (a), (c)	_____	_____
3607	C	P	Does the analyst provide management with 3M data, in graphic and narrative form to aid in their decision making process? Ref. Group 3 UAS Supplemental 29.3(c)(1)	_____	_____
3609	C	P	Does the SA coordinate corrections to flight records between Logs and Records and Operations? Ref. Group 3 UAS Supplemental 29.3(c)(3)	_____	_____
3611	C	P	Does the SA or MDBA identify user problems and submit TRs/CPs via ITSMS or to SPAWARSYSCEN per the NALCOMIS SA Manual and TYCOM directives? (OOMA Only) Ref. COMNAVAIRFORINST 4790.2, Chapter 13, pars. 13.1.2.2.2, (O-level) and 13.1.4.4.4 (e)	_____	_____

NUMBER			QUESTION	Yes	No
3614	C	P	Does the SA coordinate all Work Order delete actions with Maintenance Control to ensure all related actions are accomplished, and is the deleted Work Order justification block filled in with proper justification (i.e.: Refer to MCN B00D2NJ Duplicate gripe, Ref. to MCN B00JNME wrong aircraft, etc.)? Ref. COMNAVAIRFORINST 4790.2, Chapter 13, par. 13.1.3.4.2 (OOMA Only)	_____	_____
3615	C	P	Does the SA perform system and data base backups and restores (to include both on-site and off-site (i.e. different building) backup tapes), removal and restoration of history data, detachment processing functions? Refs. COMNAVAIRFORINST 4790.2, Chapter 13, par. 13.1.3.4.2 (OOMA Only), Group 3 UAS Supplemental 29.3.3 (b)(1) NOTE 5	_____	_____
3616	C	P	Does the SA coordinate and schedule all system non-availability periods? Ref. COMNAVAIRFORINST 4790.2, Chapter 13, par. 13.1.3.4.2	_____	_____
3617	C	P	Does the SA coordinate data transfer requirements between NALCOMIS OMA and all other Automated Information Systems (AISs)? Ref. COMNAVAIRFORINST 4790.2, Chapter 13, par. 13.1.3.4.2	_____	_____
3618	C	P	Does the SA perform all duties described in the OMA-UG (Optimized), and the System Securities Authorization Agreement (i.e. IAVA updates, DAP, and virus definition updates)? Ref. COMNAVAIRFORINST 4790.2, Chapter 13, par. 13.1.3.4.2	_____	_____
3628	C	P	FOR NALCOMIS OPTIMIZED OMA/IMA (ACTIVITIES) Does the SA ensure JDRS BTR/BCR daily summary of changes reports (located under the TMAPS menu at https://mynatec.navair.navy.mil) are reviewed and appropriate changes are made to ensure the unit's database is kept current. Additionally, the SA shall maintain all current Optimized OMA technical advisories (located at https://sailor.nmci.navy.mil) on file until canceled? Refs. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.1.1	_____	_____
3631	C	P	Does the SA or MDBA have established procedures to coordinate all system recovery and contingency process to include back fit process (i.e.NALCOMIS contingency plan) to be used in the event of a system failure or down time? Ref. COMNAVAIRFORINST 4790.2, Chapter 13, pars. 13.1.3.4.2 and 13.1.4.4.4	_____	_____
3632	C	P	Does the SA have an established and maintained system log, recording all down time, hardware failures, ITSMS/TR/CP/BTR requests, database saves and all other system requirements established in the OMA-SAM and OOMA System and Database Administration Guide? Refs. COMNAVAIRFORINST 4790.2, Chapter 13, par. 13.1.3.4.2; NALCOMIS OMA SA Manual and OOMA System and Database Administration Guide	_____	_____
3633	C	P	Have the assistant SA attended the NALCOMIS OOMA System Administrator course (Course C-555-0049) if using OOMA. Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.1.1 Note 3 Group 3 UAS Supplemental 29.3 (b) NOTE 1	_____	_____
3634	C	P	Does the SA have access to DECKPLATE ensuring data replication? Ref. COMNAVAIRFORINST 4790.2, Chapter 14, par. 14.3.1, Group 3 UAS Supplemental 29.3 (c)(2)	_____	_____

NUMBER		QUESTION	Yes	No
3635 C	P	FOR NALCOMIS OPTIMIZED OMA/IMA (ACTIVITIES) Does the MDBA strictly adhere to the ALS Transfer Requirements . Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.2.3.5	_____	_____
3636 C	P	Does the SA have access to the Sailor Website ensuring current information is obtained with the respective NALCOMIS server? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.1.1(c)(14) 5.1.2.9 (c) (9)(OOMA only)	_____	_____
3637 C	P	Does the SA/A email a copy of the Maint-2 Report monthly to CNAP-AV3M@NAVY.MIL and CC the COGNIZANT Type Wing and MAW e-mail address if using OOMA? Refs. COMNAVAIRFORINST 4790.2, Chapter 5, Chapter 14 and CNAF MSG DTG 170026ZMAR17(OOMA only)	_____	_____
3704 C	P	Is the MMCO/PCO tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.4.5 (c)	_____	_____
3707 C	P	When the turn-in of defective repairable components is made available for simultaneous exchange, is a signature obtained for retrograde material? Ref. Group 3 UAS Supplemental 30.1.1 (a)	_____	_____
3708 C	P	Are CRIPL components turned in within 24 hours of receipt? Ref. Group 3 UAS Supplemental 30.1.1 (a)	_____	_____
3709 C	P	Does Material Control ensure that project/priority codes are correctly assigned prior to forwarding requirements to supporting ASD? Refs. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.2.2 and NAVSUP P-485, par. 3048 and Appendix 6	_____	_____
3710 C	P	Does Material Control ensure components that require an ASR, EHR, or SRC have the appropriate card enclosed and attached to the component prior to turn-in to supporting ASD? Ref. Group 3 UAS Supplemental 30.1.1 (c)	_____	_____
3711 C	P	Are all RFI/non-RFI components properly packaged and handled to prevent damage and deterioration? Ref. Group 3 UAS Supplemental 30.1.1 (b)	_____	_____
3713 C	P	Are spare repairable components, RFI or non-RFI, held in the activity with approval from higher authority? Ref. Group 3 UAS Supplemental 30.1.1 (d)	_____	_____
3715 C	P	Is there accountability for all materials and equipment in custody? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.1.(c) (8)	_____	_____
3716 C	P	When U.S. Government property is determined to be lost, damaged or destroyed, is a Financial Liability Investigation of Property Loss (DD 200) initiated? Ref. Group 3 UAS Supplemental 30.5.1 (a)	_____	_____
3717 C	P	Is the original survey (DD 200) with all attachments retained at the activity? Refs. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.14 and NAVSUP P-485, par. 5050, Group 3 UAS Supplemental 30.5.1 (a)	_____	_____
3718 C	P	When a survey (DD 200) is approved, is an expenditure document number assigned IAW the MILSTRIP numbering system? Refs. NAVSUP P-485, part A, Section 1 Para. 5001, Group 3 UAS Supplemental 30.5.1 (a)	_____	_____

NUMBER		QUESTION	Yes	No
3719 C	P	Are surveys (DD 200) reviewed and approved by the appointing authority/CO? Refs. NAVSUP P-485, Vol I, pg 5-35 Para 5042 (6), Group 3 UAS Supplemental 30.5.1 (a)	_____	_____
3721 C	P	Are flight packets inventoried by the Supply Officer or Material Control Officer at least monthly and after each extended flight? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.7 (c)(9), Group 3 UAS Supplemental 30.2.3	_____	_____
3722 C	P	Do flight packets contain all required procurement documents? Refs. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.7 (c)(9) and NAVSUP P-485 VOL 1, par. 3331, Group 3 UAS Supplemental 30.2.3	_____	_____
3725 C	P	Are SF-44s in the flight packets controlled by a pre-printed serial control number on the document? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.7 (c)(9), Group 3 UAS Supplemental 30.2.3	_____	_____
3727 C	P	Is the Summary Filled Order/Expenditure Difference Listing (SFOEDL) reviewed and annotated with correct challenge codes when a transaction is considered invalid? Refs. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.7 (c)(8) and CNAF 4440.2C, Chapter 10 Group 3 UAS Supplemental 30.2.3	_____	_____
3728 C	P	Is the Aged Unfilled Order Listing (AUOL) reviewed and validated within 10 days of receipt from DFAS? Refs. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.7 (c)(8) and NAVSUP P-485 Vol I Part D, 9202, Group 3 UAS Supplemental 30.2.3	_____	_____
3733 C	P	Is an AIR completed upon receipt/transfer? Refs. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.11 (i) Group 3 UAS Supplemental 30.3.1	_____	_____
3734 C	P	Are shortage lists accurately prepared (signed by the inventorying activity's CO or representative authorized to sign by direction) and submitted? Refs. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.1.3.11 (J), Group 3 UAS Supplemental 30.3.1	_____	_____
3735 C	P	Are all shortages annotated on the shortage list (OPNAV 4790/112) including the action to correct the shortage? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.1.3.11 (j) Group 3 UAS Supplemental 30.3.1	_____	_____
3736 C	P	Does the equipment list (OPNAV 4790/111) column number match the certification and record of transfer (OPNAV 4790/104)? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.11 Group 3 UAS Supplemental 30.3.1	_____	_____
3737 C	P	Does the AIR contain a copy of the authorization for items missing/removed? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.11, Group 3 UAS Supplemental 30.3.1	_____	_____
3738 C	P	Are classified items properly indicated in the AIR? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.11 Group 3 UAS Supplemental 30.3.1	_____	_____
3739 C	P	Is the original, signed copy of the shortage list (OPNAV 4790/112) retained as a permanent record of transfer? Ref. Group 3 UAS Supplemental 30.3.1, COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.11	_____	_____

NUMBER		QUESTION	Yes	No
3740 C	P	Are AIR shortages, which have persisted for 90 days prior to aircraft transfer without proper authority/justification, noted in column D or E of the (OPNAV 4790/112) and forwarded to COMNAVAIRSYSCOM for resolution? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.11, Group 3 UAS Supplemental 30.3.1	_____	_____
3741 C	P	When shortages are discovered upon receipt of an aircraft and are not properly recorded in the AIR, does the receiving activity take the appropriate action to resolve the discrepancies? Ref. Group 3 UAS Supplemental 30.3.1, COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.11 (j)	_____	_____
3742 C	P	When a new AIR record is prepared, is the old record retained until completion of the second transfer inventory? Ref. Group 3 UAS Supplemental 30.3.1, COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.11	_____	_____
3749 C	P	Are NMCS/PMCS requisitions validated daily? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.1.(c) (10) and COMNAVAIRPAC/COMNAVAIRLANT INST 4415.1A Appendix D, Group 3 UAS Supplemental 30.1.3 (a)	_____	_____
3750 C	P	When a system goes "out of reporting" status, does material control update outstanding NMCS/PMCS documents against that aircraft with status code “730”? Ref. COMNAVAIRFORINST 4790.2, Chapter 15, pars. 15.2.2.2.(c) (3), Group 3 UAS Supplemental 30.1.3 (c)	_____	_____
3752 C	P	Are Aviation Fleet Maintenance funds (OFC-50) and Flight Operation funds (OFC-01) are used to procure only authorized material? Ref. COMNAVAIRFORINST 4790.2, Chapter 5, pars. 5.1.3.7.(c), Group 3 UAS Supplemental 30.2.2	_____	_____
3755 C	P	Does Material Control take proper custody of assigned pack-up materials, maintained accurate stock records and usage data, submit requisition for all materials used, return the balance of unused material to the supplying activity, and ensure all items sub-custodied are returned RFI or non-RFI to supply upon completion of usage? Refs. COMNAVAIRFORINST 4790.2, Chapter 5, par. 5.1.3.12 and COMNAVAIRFORINST 4419.1, par. 5 (b) (1)	_____	_____
3757 C	P	Is the policy of one-for-one exchange of Mandatory Turn in Repairable (MTR) components being strictly followed? Ref. COMNAVAIRFORINST 4415.1A, Chapter 7, par. 708 (1), Group 3 UAS Supplemental 30.2.1	_____	_____
3761 C	P	Is a semi-annual review of the activity Purchase Card Program (PCP) accomplished? Ref. NAVSUPINST 4200.99C, Chapter 5, pg. 5-5, par. 2 (b), Group 3 UAS Supplemental 30.2.1	_____	_____
3762 C	P	Is the Government Purchase Card Log properly maintained? Ref. NAVSUPINST 4200.99C, Enclosure 1, pg 4-5, para. 1 (a) 1-7, Group 3 UAS Supplemental 30.2.1	_____	_____
3763 C	P	Is the reconciliation package forwarded to the Approving Official for final certification within five working days? Ref. NAVSUPINST 4200.99C, Chapter 5, pg. 5-2, par. (b), Group 3 UAS Supplemental 30.2.1	_____	_____
3764 C	P	Are unauthorized items being purchased with the Government Purchase Card and AIR Card? Refs. NAVSUPINST 4200.97, Enclosure 1, pg. 6, NAVSUPINST 4200.99C, Enclosure 1, pg. 4-10 (6) and Appendix D, Enclosure 1, pg. D-6, par. 30, Group 3 UAS Supplemental 30.2.1	_____	_____

NUMBER		QUESTION	Yes	No
3765 C	P	Is the Agency/Organization Program Coordinator (A/OPC) appointed in writing by the Commanding Officer? Ref. NAVSUPINST 4200.99C, Chapter 2, pg. 2-1, par. 3 Group 3 UAS Supplemental 30.2.1	_____	_____
3766 C	P	Has the GCPC APC developed Command Internal Operating Procedures (IOP) which provide specific guidance for receipt, inspection and acceptance of supplies/services? Ref. to NAVSUPINST 4200.99C, Enclosure 1, pg. 2-5 (f) (4) Group 3 UAS Supplemental 30.2.1	_____	_____
3767 C	P	Have all participants in the GCPC Program completed mandatory training requirements? Ref. NAVSUPINST 4200.99C, Chap 3, para 5,6,7 Group 3 UAS Supplemental 30.2.1	_____	_____
3768 C	P	Has the AIR Card APC established files for all participants in the AIR Card Program? Ref. NAVSUPINST 4200.97 Enclosure 1, pages 11-12 (k) (1-6), Group 3 UAS Supplemental 30.2.1	_____	_____
3769 C	P	If Pre-Expended Bins (PEBs) exist, do commands coordinate with SRS for maintenance and management? Refs. COMNAVAIRFORINST 4790.2C, Chapter 9, par. 9.1.24.3 and NAVSUP P-485, Volume 1, Chapter 5, par. 6171, Group 3 UAS Supplemental 30.2.1	_____	_____
3770 C	P	Has the MMCO developed a list of consumable materials to be added in the PEB? Refs. COMNAVAIRFORINST 4790.2, Chapter 9, par. 9.1.24.3.(a) and NAVSUP P-485, par. 6171, Group 3 UAS Supplemental 30.2.1	_____	_____
3801 C	P	Did the AMMRL Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5 (b)	_____	_____
3802 C	P	Is the AMMRL Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Ref. Group 3 UAS Supplemental 7.4.5 (c).	_____	_____
3803 C P		(Group 3 UAS Activities with NON-NAVAL IMRL ONLY) Is the Activity following the Model Manager developed procedures. Ref. Group 3 UAS Supplemental 23.2	_____	_____
3804 C	P	Has an IMRL Asset Manager been assigned? Ref. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Chapter 1, pg. 1-6, par. 1002.1 (a) and COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.6.f.(3)(g)	_____	_____
3805 C	P	Has the annual physical wall to wall or Maintenance Officer relief inventory been conducted and reported to the SECA? Refs. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.6.f (3) (b) and COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Chapter 3, pg. 3-3, pars. 3002.1, pars. 3002.2	_____	_____
3806 C	P	Are quarterly Work Center reports signed by both the Work Center Supervisor and Division Officer no later than the last day of each quarter, are the original copies retained for one year, and is a copy of latest inventory report kept in work center as a working copy? Ref. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Appendix C, pg. C-1 & C-2, par.1	_____	_____

NUMBER			QUESTION	Yes	No
3807	C	P	Are Transaction Reports (4790/64 form) prepared, submitted and corrected to reflect changes to on-hand balances of IMRL assets? Refs. COMNAVAIRFORINST 4790.2 , Chapter 3, par. 3.2.2.6 and COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3, Chapter 3, pg. 3-2, par. 3001.4 and Appendix B, pg. B-1, par. 1 (c) (1)	_____	_____
3808	C	P	Has a complete quarterly physical wall to wall sub-custody inventory been and is it retained by the supporting activity's IMRL Asset Manager for one year? Ref. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Chapter 3, 3-3 3002.4 and Appendix C, pg. C-2 & C-3, par. 2	_____	_____
3811	C	P	Are DD Form 200 surveys initiated for IMRL assets that are determined to be missing, lost, or stolen? Refs: COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.6; NAVSUP P-485, par. 5128; COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3C, Appendix B, pg. B-3, para. 3 (b)(c) & para. 4 (a) (b)	_____	_____
3812	C	P	Are all lost, missing or stolen IMRL assets properly identified in F6 status and has this status not exceeded ninety days without resolution? Ref. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3, Appendix B, pg. B-2 and B-3, pars. 3 and 4.	_____	_____
3815	C	P	Are IMRL assets being reviewed and reconciled by the IMRL Asset Manager for appropriate corrective action? Refs. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.6.6 (3) (d) and COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Chapter 3, pg 3-4 par. 3003.1 (a) and Appendix D	_____	_____
3818	C	P	Are unmatched assets being reviewed and reconciled by the IMRL Asset Manager for appropriate corrective action? Refs. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Chapter 1, pg 1-9, par. 1006.1, (d) and Chapter 3, pg 3-4 par. 3003.1 (b)	_____	_____
3819	C	P	Is appropriate action being taken for all NRFI IMRL SE by the IMRL Asset Manager? Ref. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3, Chapter 1, pg 1-9, par. 1006.1 (e) and Chapter 3, pg 3-4, par. 3003.3, (a) and (b) and Appendix D pg. D-2 par. 2	_____	_____
3820	C	P	Has the IMRL Asset Manager processed current monthly LAMS' supplement files, AAI.txt and DRP.txt files within activity's LAMS and taken required corrective action? Ref. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Chapter 1, pg 1-9, par. 1006.1 (b) and pg. 1-10, par. 1006.1 (o) Appendix J pg. j-1, par. 1	_____	_____
3822	C	P	Does the IMRL Asset Manager maintain 100 percent LAMS to SERMIS inventory accuracy (AIRCOMP) and report the results quarterly? Refs. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Chapter 1, pg. 1-9 par. 1006.1, (g), Chapter 3, pg 3-3, par. 3001.5 Appendix E, pg. e-1, par. 3 (a) - (d)	_____	_____
3823	C	P	Has the IMRL Asset Manager provided a quarterly LAMS backup to the Area Commander? Ref: COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Chapter 1, pg. 1-10, par. 1006.1, (j)	_____	_____
3826	C	P	Does the IMRL Asset Manager maintain electronic record of all outstanding IMRL requisitions and conduct routine reconciliation? Ref. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Appendix F, pg. F-1, par. 1 (a) (5), Appendix G, pg. G-1, par. 1 (a) (5) and Appendix H, pg. H-2, par. 1 (a) 6	_____	_____

NUMBER		QUESTION	Yes	No
3828 C	P	Does the IMRL Asset Manager properly execute shipping procedures when transferring IMRL assets? Ref. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3, Appendix K ,pg. K-1, par. 1	_____	_____
3829 C	P	Does the IMRL Asset Manager properly execute receiving procedures when receiving IMRL assets? Ref. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3, Appendix K, pgs. K-1 to K-2, par.2	_____	_____
3830 C	P	Does the IMRL Asset Manager provide point of contact and shipping address changes to the SECA? Ref. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Chapter 1, pg 1-10, par. 1006.1 (n)	_____	_____
3831 C	P	Are deficit IMRL assets being reviewed and reconciled by the IMRL asset manager for appropriate corrective action, if applicable with T/M/S guidance? Ref. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Chapter 1, pg 1-10, par. 1006.1 (k) Chapter 3, pg 3-4, par. 3003.2	_____	_____
3832 C	P	Does the IMRL asset manager have an IMRL that is no more than 18 months old and have they reviewed its content for accuracy? Refs. COMNAVAIRPAC/COMNAVAIRLANTINST 13650.3 Chapter 1, pg. 1-9, par. 1006.1 (a) (1) (2) Chapter 2, pg. 2-2 par. 2002	_____	_____
4001 C	P	Did the Engine/APU Turn-up Licensing Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Ref. Group 3 UAS Supplemental 7.4.5 (b)	_____	_____
4003 C P		Is the Engine Turn-up Licensing Program Manager tracking corrective corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.4.5 (c)	_____	_____
4004 C	P	Is the OPNAV 4790/162 used to license personnel to turn-up engines Ref. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.20 (b)	_____	_____
4005 C	P	Are Engine Turn-up licenses issued by the CO. Ref. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.20 (b)	_____	_____
4006 C	P	Have Engine licensed personnel completed a training syllabus based on the NATOPS, and passed written and operational examinations? Ref. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.20 (b) (2) and (3)	_____	_____
4007 C	P	Prior to initial licensing, and annually thereafter, do personnel pass a written and operational test developed by a T/M/S NATOPS Officer and administered by a T/M/S NATOPS instructor Ref. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.20 (b) (3)	_____	_____
4008 C	P	Are Engine/APU licensed personnel re-qualified annually? Ref. COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.20 (b)	_____	_____
4010 C	P	Were proper procedures followed for all engine turn ups COMNAVAIRFORINST 4790.2, Chapter 3, par. 3.2.2.20 (b) OPNAVINST 3710.7U, par. 7.1.2.; NAVAIR 17-1-537, WP 004 00, par. 2-1 thru 2-7 and WP 012 00, par. 2-8	_____	_____
4505 C	P	Is approved PPE, including chemical splash-proof goggles, face shield, chemical gloves, and apron, available/utilized for the handling of batteries? Ref. NAVAIR 17-15BAD-1, pg. S-4, par. S.7 (p)	_____	_____

4506 C	P	Is a neutralizing agent readily available in case electrolyte is spilled? Ref. NAVAIR 17-15BAD-1, pg. 3-11, par. 3.9.4 (n) thru (p), pg. 4-16, par. 4.9.4 (p)	_____	_____
4509 C	P	Are procedures followed when thermal runaway (overheating) of NI-CD batteries occurs? Ref. NAVAIR 17-15BAD-1, pg. 4-11 and 4-12, par. 4.7.3 WARNINGS and (a) thru (e)	_____	_____
4538 C	P	Are exposed terminals insulated to prevent short circuits when removing lithium batteries from associated equipment? Ref. S9310-AQ-SAF-010, Chapter 5, pg. 5-1, par. 5-1.1	_____	_____
4539 C	P	Are all Lithium batteries being stored properly? Ref. S9310-AQ-SAF-010, pg. 7-1, pars. 7-1 thru 7-1.16	_____	_____
4701 C	P	Has a Laser Hazard Control Program been established if the activity operates or maintains laser equipment? Refs. OPNAVINST 5100.27B/MCO 5104.1C, encl. (6), par. 1	_____	_____
4702 C	P	Has the MO designated, in writing via the MMP, a Laser Hazard Control Program Manager? Ref. Group 3 UAS Supplemental 7.4.1 (a)	_____	_____
4703 C	P	Did the Laser Hazard Control Program Manager complete an initial Program Manager assessment and annually thereafter? Ref. Group 3 UAS Supplemental 7.4.5 (b)	_____	_____
4704 C	P	Is the Laser Hazard Control Program Manager tracking corrective action for audit discrepancies, and ensuring discrepancies are corrected within 10 working days? Ref. Group 3 UAS Supplemental 7.4.5 (5)	_____	_____
4705 C	P	Does QA monitor the Laser Hazard Control Program as established in OPNAVINST 5100.27/MCO 5104.1? Ref. Group 3 UAS Supplemental 7.4.4 (b)	_____	_____
4706 C	P	Is an LSSO appointed by the CO and has the name, code and telephone number been submitted to the ALA? Ref. OPNAVINST 5100.27B/MCO 5104.1C, par. 7 (e) (4) and encl. 6, par. (2) (b)	_____	_____
4707 C	P	Has the LSSO received formal classroom training in laser radiation hazards and the required Hazards Control Program? Ref. OPNAVINST 5100.27B/MCO 5104.1C, encl. (1), par. 2 (a) thru (d)	_____	_____
4710 C	P	Is an inventory of all military exempt lasers and all class 3b and class 4 lasers maintained at the command? Ref. OPNAVINST 5100.27B/MCO 5104.1C, encl. (1), par. 2 (a) (7) and encl. (6), par. 2 (h)	_____	_____
4711 C	P	Does the LSSO establish medical surveillance program requirements for laser maintainers/operators and ensure files are maintained? Ref. OPNAVINST 5100.27B/MCO 5104.1C, encl. (6), par. 2 (g)	_____	_____
4712 C	P	Prior to assignment, have personnel who work with lasers received formal training in methods of hazard control? Ref. OPNAVINST 5100.27B/MCO 5104.1C, encl. (6), par. 2 (k) and encl. (7), par. 4	_____	_____
4713 C	P	Are personnel using class 3b or class 4 lasers receiving annual training about the potential hazard associated with accidental exposure to this form of radiation? Ref. OPNAVINST 5100.27B/MCO 5104.1C, encl. (7), par. 4	_____	_____
4714 C	P	Is proper laser protective eye wear available and marked with optical density value and wavelength or appropriate LEP code? Ref. OPNAVINST 5100.27B/MCO 5104.1C, encl. (6), par. 2 (e)	_____	_____

NUMBER			QUESTION	Yes	No
4717	C	P	Is a laser fire log correctly maintained and utilized for at least three years? Refs. OPNAVINST 5100.27B/MCO 5104.1C, encl. (7), par. 1 (c) and SECNAV M-5210.1, SSIC 8240	_____	_____
4719	C	P	Are laser systems only fired at laser ranges that have been certified by an RLSS and approved by the activity LSSO? Ref. OPNAVINST 5100.27B/MCO 5104.1C, par. 7 (e) (5)	_____	_____
5601	C	P	Did the CDI inspect all work and comply with the required QA inspections during all maintenance actions performed? Ref. Group 3 UAS Supplemental 31.7.1	_____	_____
5603	C	P	Did the supervisor or CDI and the technician conduct an inventory and inspection of the tool container and its contents prior to starting work on the task and at completion of the task? Ref. Group 3 UAS Supplemental 12.3.1 (a)	_____	_____
5606	C	P	Do CDIs verify correct Work Unit Code, Malfunction Description Code, Action Taken Code, Transaction Code, Type Maintenance code, Installed/New Item data, and an accurate and complete Corrective Action statement prior to signing the WO or MAF. Ref. Ref. Group 3 UAS Supplemental Figure 31.8.1.b Note 2	_____	_____
5702	C	P	Did the plane captain perform a thorough daily/turnaround inspection? Ref. Group 3 UAS Supplemental Figure 14-2	_____	_____
5705	C	P	Did the plane captain demonstrate proficiency during fueling and defueling operations, including the application of pertinent safety procedures? Ref. Group 3 UAS Supplemental Figure 14-2	_____	_____
5706	C	P	Did the plane captain use the applicable technical publications necessary of the assigned T/M/S aircraft to carry out plane captain duties? Ref. Ref. Group 3 UAS Supplemental Figure 14-2	_____	_____
5707	C	P	For the current weather condition or shipboard operation, was the assigned aircraft properly secured? Ref. Group 3 UAS Supplemental, Figure 14-2	_____	_____
5709	C	P	During launch/recovery, did the plane captain demonstrate by practical application and proficiency, the standard hand signals and/or radio transmissions used for controlling aircraft? Ref. Group 3 UAS Supplemental Figure 14-2	_____	_____
5807	C	P	Are only authorized solvents and wiping materials utilized? Ref. NAVAIR 01-1A-17, WP 012 00 pars. 19-20, 24-32 and Table 1 and Table 3	_____	_____

LIST OF REFERENCES

Adams, R. (2017, March 10). *Unmanned aircraft system airworthiness and airspace integration*. Presented at Naval Innovative Science and Engineering Threat and Error Management, Naval Air Station Patuxent River, MD.

Dade, M. (1973). Examples of aircraft scheduled maintenance problems (Report No. R-1299-PR). Retrieved from RAND website: https://www.rand.org/content/dam/rand/pubs/reports/2006/R1299.pdf

Department of the Army. (2005). *The Army maintenance management system* (DA-PAM 750–8). Washington, DC: Secretary of the Army. Retrieved from http://www.apd.army.mil/epubs/DR_pubs/DR_a/pdf/web/p750_8.pdf

Department of the Army. (2017). *ARMS guide, shadow UAS ARMS working guide*. Washington, DC: Author.

Department of the Navy (DON). (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf

Department of the Navy Naval Air Systems Command. (2010, March 10). *Flight clearance policy for air vehicles and aircraft systems* (NAVAIRINST 13034.10). Patuxent River, MD.: Commander, Naval Air Systems Command

Deputy Military Class Desk. (2017). *VMU troop list* [Data File]. Naval Air Station Patuxent River, MD: Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office (PMA-263).

Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf

Kocher, K. (2017). RQ-21 maintenance actions and hours [Data File]. Patuxent River, MD: Assistant Program Manager-Logistics, Small Tactical Unmanned Air Systems, Program Management Activity 263.

Lewis, M. (2004). *Moneyball: The art of winning an unfair game*. New York, NY: W. W. Norton & Company.

Liebert, A., & Zimmerman, Z. (2007). *Textron Systems engineering investigations: RQ-7B mishaps for 2016 calendar year*. Presented at Quarterly Management Review, Hunt Valley, MD.

Marine Corps University. (2017, October 31). 2017 Commandant's professional reading list. Retrieved from: http://guides.grc.usmcu.edu/usmcreadinglist

Naval Air Systems Command. (2008, January 24). *Naval systems command risk management policy* (NAVAIRINST 5000.21B). Patuxent River, MD: Author. Retrieved from https://www.dau.mil/cop/risk/DAU%20Sponsored%20Documents/NAVSYSCOM%20RM%20Manual.pdf

Naval Safety Center. (2017). *Web-Enabled Safety System: RQ-21 mishaps*. Retrieved from: http://www.public.navy.mil/NAVSAFECEN/Pages/WESS/WESS.aspx

Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office. (2017, August). *Reliability improvements, field support team recovery damage reduction efforts*. Presented at USMC UAS Transition Task Force Conference, Cherry Point, NC.

Neller, R. (2016). *FRAGO 01/2016: Advance to Contact.* Retrieved from http://www.marforcom.marines.mil/Portals/36/CMC_FRAGO_1_2016.PDF

Oracle. (2012). Oracle Crystal Ball (Version 11.1.2) [Computer Software]. Retrieved from: http://www.oracle.com/us/products/middleware/bus-int/crystalball/cb-brochure-404904.pdf

Qinetiq, North America. (2012). Unmanned Aircraft Systems Initiative [Computer Software]. Retrieved from https://www.qinetiq-na.com/wp-content/uploads/MAC/UAS-I.pdf

Rosenburg, D. (2017). Mishap rate by system, tail number, month 3–8-2017 [Data File]. Redstone Arsenal, AL: Program Management Unmanned Aircraft Systems UAS, Department Manager and System/Program Analyst.

Salas, M. (2017, August). *Manpower and structure out-brief HQMC Aviation*. Presented at USMC UAS Transition Task Force Conference, Cherry Point, NC.

Seemayer, C. (2017). *RQ-21 MX actions hours* [Data File]. Naval Air Station Patuxent River, MD: Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office (PMA-263), Assistant Program Manager Logistics.

Slaughter, J. (2017). All units, UAS-I scheduled and unscheduled maintenance 4–18-2017 [Data File]. Huntsville, AL: Contractor, PeopleTec, Inc.

United States Marine Corps. (2017). *Unit table of organization and equipment (TO&E) report, Marine Unmanned Aerial Vehicle Squadron One, Marine Aircraft Group Thirteen, Third Marine Aircraft Wing, unit identification code* (UIC): M01480 [Personnel and Equipment Allowance Report]. Retrieved from Total Force Structure Management System.

THIS PAGE INTENTIONALLY LEFT BLANK

BIBLIOGRAPHY

Adams, R. (2017, March 10). *Unmanned aircraft system airworthiness and airspace integration*. Presented at Naval Innovative Science and Engineering Threat and Error Management, Naval Air Station Patuxent River, MD.

Army Unmanned Aircraft Systems Center of Excellence (2010). *U.S. Army Unmanned Aircraft Systems Roadmap 2010–2035: Eyes of the Army*. Fort Rucker, AL.: Army Unmanned Aircraft Systems Center of Excellence Retrieved from http://www.dtic.mil/dtic/tr/fulltext/u2/a518437.pdf

Blankemeyer, F. J. (1999). *An evaluation of the impact of the Target Force Planning Model (TFPM) on the manpower process at Headquarters, U.S. Marine Corps* (Master's thesis). Retrieved from http://calhoun.nps.edu/handle/10945/13579

Brunstetter, D., & Braun, M. (2011). The implications of drones on the just war tradition. *Ethics & International Affairs*, *25*(03), 337–358. Retrieved from: https://www.cambridge.org/core/journals/ethics-and-international-affairs/article/implications-of-drones-on-the-just-war-tradition/97ABF476B8494CC44A71E011DD8B7600

Buckley, P. (2016). U.S. Navy and Marine Corps family of unmanned aircraft systems [PowerPoint slides]. Presented at 2016 Tactical Aviation Precision Strike Annual Review, Patuxent River, MD.

Cuomo, S., Frith, M., & Flynn, G. (2016). *After action report for simulated enemy small unmanned aircraft systems (sUAS) capability against Marine rifle squad—TALON Reach VI.* Quantico, VA: Marine Corps Center for Lessons Learned.

Dade, M. (1973). Examples of aircraft scheduled maintenance problems (Report No. R-1299-PR). Retrieved from RAND website: https://www.rand.org/content/dam/rand/pubs/reports/2006/R1299.pdf

Department of the Army. (2005). *The Army maintenance management system* (DA-PAM 750–8). Washington, DC: Secretary of the Army. Retrieved from http://www.apd.army.mil/epubs/DR_pubs/DR_a/pdf/web/p750_8.pdf

Department of the Army. (2017). *ARMS guide, shadow UAS ARMS working guide*. Washington, DC: Author.

Department of the Navy (DON). (2017). *Naval aviation maintenance program* (COMNAVAIRFORINST 4790.2C). San Diego, CA: Commander, Naval Air Forces. Retrieved from http://www.navair.navy.mil/logistics/4790/library/COMNAVAIRFORINST%204790.2C.pdf

Department of the Navy Naval Air Systems Command. (2010, March 10). *Flight clearance policy for air vehicles and aircraft systems* (NAVAIRINST 13034.10). Patuxent River, MD.: Commander, Naval Air Systems Command

Deputy Military Class Desk. (2017). *VMU troop list* [Data file]. Naval Air Station Patuxent River, MD: Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office (PMA-263).

Downing, M. L., & MacMurdo, J. (2009). *Analysis of maintenance manpower structures for land-based naval aircraft using a knowledge value added approach* (Master's thesis). Retrieved From http://calhoun.nps.edu/handle/10945/4885

Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S., & Combs, B. (1978). How safe is safe enough? A psychometric study of attitudes towards technological risks and benefits. *Policy Sciences*, *9*(2), 127–152. Retrieved from: http://link.springer.com/article/10.1007%2FBF00143739?LI=true

Franke, U. (2013). On "Drones and U.S. strategy: Costs and benefits." *Parameters*, *43*(2), 119–124. Retrieved from http://ssi.armywarcollege.edu/pubs/Parameters/issues/Autumn_2013/CmmntrsRpls/1_Franke_CR.pdf

Futch, T. D. (2012). *An analysis of the manpower impact of unmanned aerial vehicles on subsurface platforms*. (Master's thesis) Retrieved from http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA560640S

Headquarters Marine Corps. (2014, November 24). *Risk management* (MCO 3500.27C). Washington, DC: Author. Retrieved from http://www.marines.mil/Portals/59/MCO%203500.27C.pdf

Kaufmann, J. P. (2005). *Restructuring the Marine unmanned aerial vehicle squadron.* (Master's thesis). Retrieved from http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA506427

Kocher, K. (2017). RQ-21 maintenance actions and hours [Data File]. Patuxent River, MD: Assistant Program Manager-Logistics, Small Tactical Unmanned Air Systems, Program Management Activity 263.

Lewis, M. (2004). *Moneyball: The art of winning an unfair game*. New York, NY: W. W. Norton & Company.

Liebert, A., & Zimmerman, Z. (2007). *Textron Systems engineering investigations: RQ-7B mishaps for 2016 calendar year*. Presented at Quarterly Management Review, Hunt Valley, MD.

Marine Corps University. (2017, October 31). 2017 Commandant's professional reading list. Retrieved from: http://guides.grc.usmcu.edu/usmcreadinglist

McCutcheon III, D. A. (1989). *Use of aviation 3-M information outputs by organizational maintenance users* (Master's thesis). Retrieved from http://calhoun.nps.edu/handle/10945/26319

Mullin, J., & Wahl, K. (2005). Marine Corps Combat Development Command and Marine Corps Systems Command coordinated unmanned aerial vehicle endorsement brief. [PowerPoint slides]. Washington, DC: Headquarters Marine Corps.

Nader, C. E. (2007). *An analysis of manpower requirements for the United States Marine Corps Tiers II & III unmanned aerial systems family of systems program* (Master's thesis) Retrieved from http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/23981471?accountid=12702

Naval Air Systems Command. (2008, January 24). *Naval systems command risk management policy* (NAVAIRINST 5000.21B). Patuxent River, MD: Author. Retrieved from https://www.dau.mil/cop/risk/DAU%20Sponsored%20Documents/NAVSYSCOM%20RM%20Manual.pdf

Naval Safety Center. (2017). *Web-Enabled Safety System: RQ-21 mishaps*. Retrieved from: http://www.public.navy.mil/NAVSAFECEN/Pages/WESS/WESS.aspx

Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office. (2017, August). *Reliability improvements, field support team recovery damage reduction efforts*. Presented at USMC UAS Transition Task Force Conference, Cherry Point, NC.

Neimer, N. O. (2010). *United States Marine Corps Next Generation UAS Training*. (Master's thesis). Retrieved from http://scholar.google.com/scholar_url?url=http%3A%2F%2Fwww.dtic.mil%2Fcgi-bin%2FGetTRDoc%3FAD%3DADA603171&hl=en&sa=T&oi=gga&ct=gga&cd=13&ei=wmMHWdShB8TWjAGCpLuIDA&scisig=AAGBfm2WnU93tovJinSlUZ_bxcw0wpWdvQ&nossl=1&ws=1600x733

Neller, R. (2016). *FRAGO 01/2016: Advance to Contact.* Retrieved from http://www.marforcom.marines.mil/Portals/36/CMC_FRAGO_1_2016.PDF

Office of the Secretary of Defense. (2005, August 4). Unmanned aircraft systems (UAS) roadmap, 2005–2030 [Memorandum]. Retrieved from https://fas.org/irp/program/collect/uav_roadmap2005.pdf

Oracle. (2012). Oracle Crystal Ball (Version 11.1.2) [Computer Software]. Retrieved from: http://www.oracle.com/us/products/middleware/bus-int/crystalball/cb-brochure-404904.pdf

Payton, L. T. (2011). *The future of unmanned aircraft systems in support of the Marine Expeditionary Unit* (No. NPS-CE-11-183). (Master's thesis). Retrieved from http://calhoun.nps.edu/handle/10945/10667

Qinetiq, North America. (2012). Unmanned Aircraft Systems Initiative [Computer Software]. Retrieved from https://www.qinetiq-na.com/wp-content/uploads/MAC/UAS-I.pdf

Rosenburg, D. (2017). Mishap rate by system, tail number, month 3–8-2017 [Data File]. Redstone Arsenal, AL: Program Management Unmanned Aircraft Systems UAS, Department Manager and System/Program Analyst.

Salas, M. (2017, August). *Manpower and structure out-brief HQMC Aviation*. Presented at USMC UAS Transition Task Force Conference, Cherry Point, NC.

Scharre, P. (2015). Yes, unmanned combat aircraft are the future [Blog comment]. Retrieved from: http://warontherocks.com/2015/08/yes-unmanned-combat-aircraft-are-the-future/

Schmorrow, D. D. (1998). *A human error analysis and model of naval aviation maintenance related mishaps*. (Master's thesis). Retrieved from http://calhoun.nps.edu/handle/10945/44430

Seemayer, C. (2017). *RQ-21 MX actions hours* [Data File]. Naval Air Station Patuxent River, MD: Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Program Office (PMA-263), Assistant Program Manager Logistics.

Slaughter, J. (2017). All units, UAS-I scheduled and unscheduled maintenance 4–18-2017 [Data File]. Huntsville, AL: Contractor, PeopleTec, Inc.

Stracker, M. C. (2007). *An operational manpower analysis of the RQ-8 fire scout vertical take-off unmanned aerial vehicle (VTUAV).* (Master's thesis) http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA474494

Taranto, M. T. (2013). *A human factors analysis of USAF remotely piloted aircraft mishaps*. (Master's thesis). Retrieved from https://www.hsdl.org/?view&did=741880

Taylor, R. M. (2006). *Human automation integration for supervisory control of UAVs*. Farnborough, UK: Defense Science and Technology Lab. Retrieved from http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA473313

Textron Systems. (2016). Aerosonde small unmanned aircraft system. [Fact Sheet]. Retrieved from http://www.textronsystems.com/sites/default/files/resource-files/TS%20US%20Aerosonde%20Datasheet.pdf

Tvaryanas, A. P., Thompson, W. T., & Constable, S. H. (2005). U.S. *military unmanned aerial vehicle mishaps: Assessment of the role of human factors using human factors analysis and classification system (HFACS)* (No. HSW-PE-BR-TR-2005-0001). Brooks Air Force Base, TX: Human Systems Wing (311TH). Retrieved from http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA421592

United States Marine Corps. (2017). *Unit table of organization and equipment (TO&E) report, Marine Unmanned Aerial Vehicle Squadron One, Marine Aircraft Group Thirteen, Third Marine Aircraft Wing, unit identification code* (UIC): M01480 [Personnel and Equipment Allowance Report]. Retrieved from Total Force Structure Management System.

Unmanned aerial vehicles: Emerging lessons and technologies. (2011). *The Military Balance, 111*(1), 20–26. Retrieved from http://libproxy.nps.edu/login?url=http://search.proquest.com/docview/870997911?accountid=12702

Van Bourgondien, J. (2012). *Analysis of the sustainment organization and process for the Marine Corps RQ-11B Raven Small Unmanned Aircraft System (SUAS).* (Master's thesis). Retrieved from http://calhoun.nps.edu/handle/10945/6883

Williams, K. W. (2004). *A summary of unmanned aircraft accident/incident data: Human factors implications* (No. DOT/FAA/AM-04/24). Oklahoma City, OK: Civil Aeromedical Institute. Retrieved from: http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA460102

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California