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INTEGRATED LOGISTICS SUPPORT PLAN FOR INTEGRATED LAUNCH AND REC--ETC(U)
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LAKEHURST, NEW JERSEY 08733

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(6) INTEGRATED LOGISTICS SUPPORT PLAN
for

INTEGRATED LAUNCH AND RECOVERY
TELEVISION SURVEILLANCE SYSTEM
(ILARTS)

(9) Final rept.,

PREPARED BY D.K. Reichard

(10) D.K. Reichard

APPROVED BY K.A. Tate

K.A. Tate

26 Oct 1977 (14)
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AIRCRAFT CARRIERS
LOW LIGHT LEVEL TV
VIDEO TAPE RECORDER
MAINTENANCE
LOGISTIC SUPPORT

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report identifies essential logistic support criteria, objectives, and action requirements for the ILARTS (Integrated Launch and Recovery Television Surveillance) Acquisition program. ILARTS is a closed circuit television system to be installed on all aircraft carriers to monitor and record air operations for training debriefing and accident analysis, and to provide line-up and glide slope information to the landing signal officer.

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ILARTS - Integrated Logistic Support Plan

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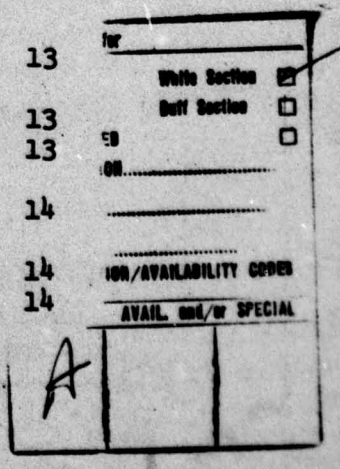

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I. Introduction

A. Plan Purpose

The purpose of this document is to identify and record essential logistic support criteria, objectives, and action requirements for the ILARTS Acquisition Program.

B. Program Background

ILARTS is an acronym for Integrated Launch And Recovery Television Surveillance System. The ILARTS program was initiated in 1973 as a development effort by the Naval Air Engineering Center, Ship Installation Department, Lakehurst, N. J., under authority and direction of Naval Air Systems Command, AIR-5372. The objective of the program is to develop new equipment designs to replace those of PLAT (Pilot Landing Aid Television) and CAHALS (Catapult Hook-up and Launch Surveillance) TV facilities as presently installed on CV/CVN ships. The plan is to provide TV camera and signal processing equipment having common integrated design features applicable to either aircraft launch or recovery events. The rationale for ILARTS stems basically from the support difficulties encountered in maintaining present obsolete and accelerating failure rate PLAT and CAHALS equipment. A corollary factor is that, by modern standards, the picture quality of the older systems is grossly deficient and limiting to overall system effectiveness, especially under restricted visibility conditions in which the application to recovery monitoring may be essential to mission success and personnel safety. The program implementation plan is to introduce ILARTS to the fleet as a series of subsystem service changes to the PLAT and CAHALS systems. Unit replacements will be planned so that, as each ILARTS counterpart becomes available and is installed, normally scheduled Launch and Recovery monitoring will continue without interruption.

C. System Description

A schematic of the ILARTS system is shown in Figure 1. Except for Camera Imaging and Display Cathode Ray Tubes, all active electronic components will be solid state. All system elements will conform to conventional standards for operation with 525 line, 2:1 interlaced, 30 frame per second, composite TV video. The system will have 6 identical TV surveillance cameras, located as follows:

(1) Two cameras will be installed in existing PLAT centerline deck mounts, one with short range wide angle optics and the the other with long range telephoto optics. Both will operate simultaneously but with capability for separate (redundant) operation in the event of failure of one.

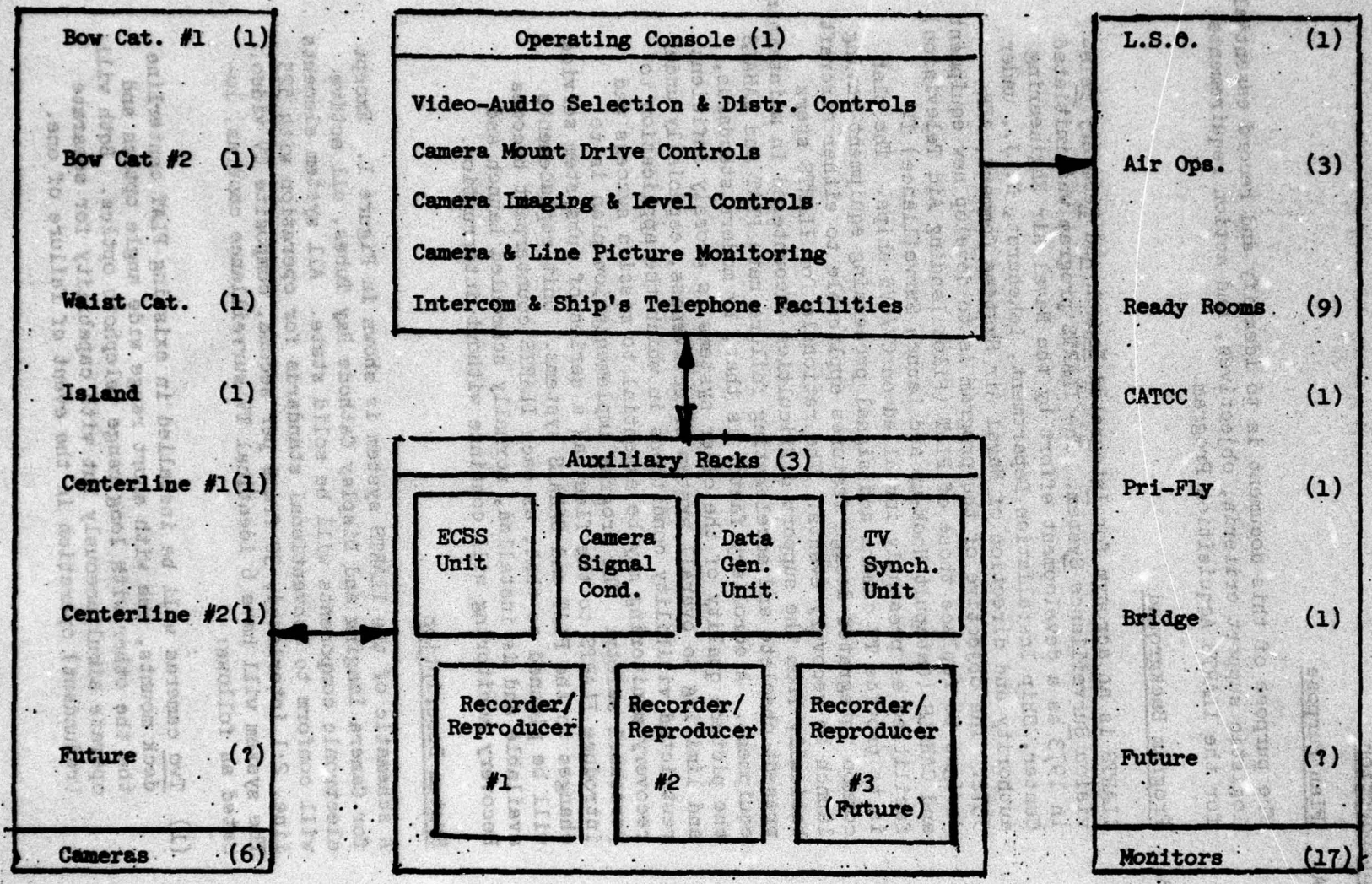

Figure 1 - ILARTS System

(2) Two deck edge (port and starboard) mounted cameras with variable pan, tilt, and zoom, remotely controlled by either manual or programmed positioning inputs. Each camera will be assigned to separately track and monitor launches from each bow catapult.

(3) One deck edge camera (same as above) will be assigned to track and monitor launches from one or more waist catapults.

(4) One Island mounted camera with variable pan, tilt, and zoom manually controlled, with means for optional (future) remote control.

ILARTS cameras and supporting equipment will be capable of high resolution TV pictures over varying distances and with daylight to starlight illumination. Image magnification and resolution will permit discernment of 1" diameter objects on the aircraft or hook-up devices.

ILARTS video circuits will have provision for synchronously combining camera signals with those of a concurrently developed synthesized video alphanumeric data display source, and from a pitch-roll stabilized reference cursor generator, designated as ECSS (Electronic Crosshair Stabilization System).

An ILARTS operating console with rack mounted electronics will be located in an area presently occupied by PLAT-CAHALS consoles and support equipments. The console will contain all necessary monitors and controls for camera imaging and video distribution to external monitors and/or recorders. ILARTS will provide new high resolution monitors as replacements for existing PLAT monitors and have reserve capacity for future monitor additions. Also, ILARTS will replace the PLAT Video-Audio recorders with modern design high resolution units. Both monitors and recorders will be standard commercially available types.

D. System Mission and Use

The mission of ILARTS is to effect television monitoring of aircraft carrier launch and recovery operations. The televised information may be recorded and subsequently examined to assist in analysis of an event, or displayed in real time for supervisory control, as by the Landing Signal Officer (L.S.O.) in detecting flight path deviations and coordinating pilot/aircraft approach maneuvers. ILARTS is intended to supersede, with mission equivalence, both PLAT and CAHALS television monitoring facilities.

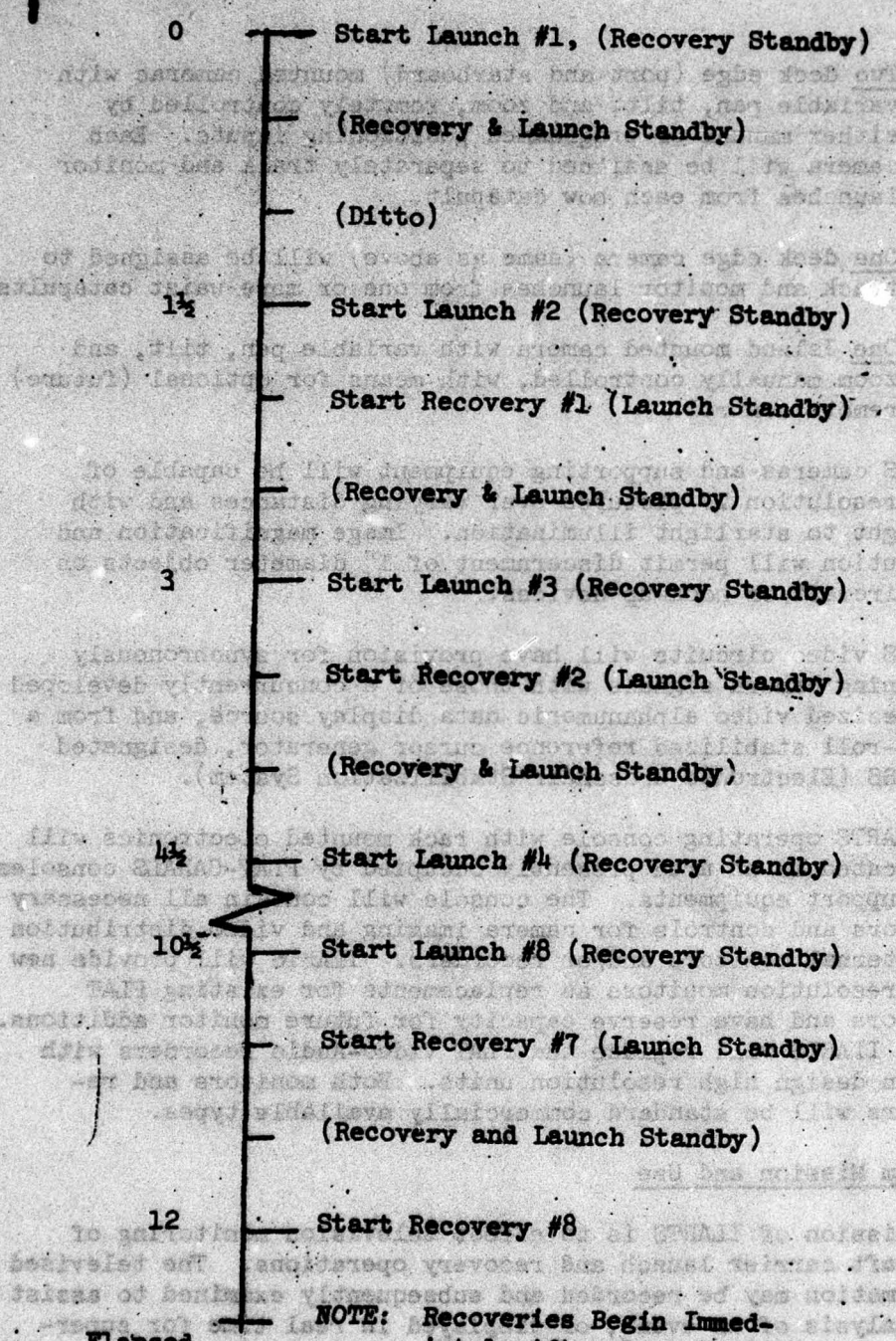

Fig.2 Launch & Recovery Schedule

When used in recovery operations, the aircraft final approach and landing will be televised for real time display monitoring and recorded for later playback monitoring and briefing, immediately after each recovery period. Under conditions of poor visibility and when ACLS (Automatic Carrier Landing System) tracking data are not available to the L.S.O., the centerline recovery cameras become the principal, if not sole, source of approach line-up information, which, depending on the circumstances, may be critical to the safety of the landing.

When used in launch operations, the recorded history of hook-up and tensioning, visual signalling, aircraft configuration during acceleration and takeoff, etc., is singularly important as a means of analyzing and correcting system defects, in the event of a launch malfunction.

The ILARTS equipment will be manned and activated during all aircraft launch and recovery operations. These will normally occur in 8 cyclic groups, spaced at contiguous 1½ hour intervals during an operational day. Launches will commence at the start of each interval and upon completion be immediately followed by recoveries from the prior launch group. When that group's recoveries are completed, a "standby" period will exist until the start of the next interval. For purposes of establishing the worst case ILARTS duty cycle, for either launch or recovery assigned equipment, a minimum average standby period of 1 hour is assumed. (See Figure 2)

Environmental factors having primary influence on equipment design are those common to the flight deck environment. These are as follows:

Air Temperature: Ambient temperature 30-100°F, not varying more than 30°F in a 12 hour operating day.

Moisture and Precipitation: Continuous exposure to moist salt air infrequent exposure to rain and snow, with heavy precipitation brief and unsustained. Icing also brief and unsustained.

Max. Wind Velocity: 60 knots over the deck.

Air Quality: Occasional stack emission gusts with high SO_2 content.

Vibration: Low Frequency, light to moderate amplitude vibration, depending on hull prop speeds.

Sunlight: On the average, 70% of all operations will occur between sunrise and sunset with clear skies normally prevailing.

Shock: Due to aircraft recovery impacts.

Electromagnetic Interference: Due to ship's radar near fields.

E. Major Assemblies Description

ILARTS has 7 major sub-system categories. A description of each of the categories follows:

(1) Operating Console -

One control and video monitoring console is supplied for the entire system. The console contains the following components:

6 - Camera Video Remote Control Panels
6 - Camera Monitor
1 - Preview Monitor
1 - Line Monitor
1 - Wave Form Monitor
1 - Video Distribution Switching Unit
2 - Video Tape Recorder Remote Control panel
1 - Intercom Unit
1 - Audio Remote Control Panel
1 - Audio Distribution Control Panel
3 - Camera Mount Control Panel (Part of Mount Programmer Unit)
1 - E.C.S.S. Remote Control Panel
1 - Video Distribution Amplifier Multi-Unit Ass'y

(2) Cameras

Six cameras of identical design will be employed (see Ref. 2).

(3) Camera Mounts

Three new camera mounts with remote control pan and tilt drives for monitoring bow and waist catapult launches will be developed. Existing mounts for the PLAT centerline and Island cameras will be retained for ILARTS.

(4) Mount Programmer Unit

Installed in the console, the mount programmer unit provides drive signals for the 3 catapult camera mounts. The unit outputs are programmed to command pan, tilt, and zoom for each catapult camera mount and camera lens, in accordance with preset input control instructions for each launch condition.

(5) Recorders

Two new wide bandwidth recorders will be employed. The use of 2 units will permit recording and playback of 2 different events occurring simultaneously. Design provisions shall be made to anticipate a third future recorder.

(6) Data Display Units

A unit will be developed to produce alphanumeric symbols compositely with camera video, so as to display data descriptive of the televised event on the same field as the event.

(7) System Integration Components

Consisting of:

17 - Remote CRT Viewing Monitors
3 - Electronic Support Equipment Racks, containing:

2 - CRT Monitors
1 - Synch Generator
1 - Data Display Unit (Separate subsystem)
1 - E.C.S.S. Unit
1 - Test Equipment Assembly
2 - Video Tape Recorders (Separate subsystem)
6 - Camera Control Units

1 - Lot, Intra- System Cabling

F. Special Logistics Provisions

ILARTS will be introduced into the fleet as a series of service changes over an extended period. Each service change will involve replacement of PLAT or CAHALS hardware with one or more of the ILARTS counterpart subassemblies, each of which will entail unique logistic considerations. Support activities for part provisioning, training, etc., may, or may not, be consolidated time wise, depending in each case upon final service change schedules, which are subject to changes due to development and/or funding availability factors.

II. Management

A. Government

Table I lists government management personnel responsible for key ILARTS program elements.

TABLE I

Function	Name	Activity & Code	Autovon
Acquisition Mgr.	R.L. Smith	NAVAIR 53722	222-3290
Program Logistics Manager	R.L. Smith	NAVAIR 53722	222-3290
Project Manager	D.K. Reichard	NAEC 91319	624-2931
Logistics Planner	D.K. Reichard	NAEC 91319	624-2931
Inventory Control Manager	W. Vogel	SPCC	277-3925

B. Contractor & Government Interface

Contractor-Government management interface specifics, if and where applicable, will be defined in the contract requirements for the related hardware and/or support service procurements.

C. Funding

The Acquisition Manager, R. L. Smith, NAVAIR 53722, is responsible for authorizing and coordinating funding actions by NAVAIR to NAEC.

III. ILS Planning Factors

A. Program Information

(1) Development and Procurement Status

Key Development and Procurement milestones are given in Table II.

TABLE II

Sub. Assembly Title	Design Status % Complete	Production Contract Date	Initial Prod. Delivery Date	Material Support Date	Navy Support Date
Oper. Console	50%	6/78	1/79	4/79	10/80
Camera	50%	10/77	4/78	7/78	1/80
Camera Mount	90%	4/79	4/79	7/79	1/81
Mount Programmer	50%	6/79	1/80	4/80	1/81
Recorder	90%	3/78	7/78	10/78	4/80
Data Display	60%	2/79	7/79	10/79	4/81
Sys. Integ. Comp.*	90%-30%	11/76-5/78	1/78-6/79	3/77-10/79	9/79-4/81

(*Comprises miscellaneous interface hardware.)

(2) Equipment Distribution

Complete ILARTS Systems will be distributed as follows:

15 - CV/CVN Ship Installations
1 - N.A.E.C., Lakehurst, N.J. (Engineering Reference)
1 - Great Lakes Training Center (Training)
1 - N.A.R.F., Norfolk, Va. (Fleet Spare)
1 - N.A.R.F., San Diego, Cal. (Fleet Spare)

6 Disc Recorder - Reproducers (Integration Component) required for tape (single frame) TV picture viewing will be distributed as follows:

2 - N.A.E.C., Lakehurst, N.J. (1 avaliable spare, 1 eng. reference)
1 - COMNAVAIRLANT, Norfolk, Va.
1 - COMNAVAIRPAC, San Diego, Cal.
1 - COMFAIRMED
1 - COMFAIRWESTPAC

B. Life Cycle Factors

The maximum average utilization rate of ILARTS will be 768 hours per year (based on 7700 Launch/Recovery operations per ship per year, at a rate of 120 operations per 12 hour operational day). The maximum duty cycle factor for solid state components of ILARTS will be 33% (based on a standby operating mode for 66% of the operational day) and 110% for non-solid state components (Cathode Ray tubes and heating devices).

The average service life of all ILARTS components is anticipated to be 10 years, at which time, wear out factors, plus state-of-the-art improvements, will justify replacement by either new production of the same item or items of improved design.

The design of ILARTS components is expected to mitigate the need for any major refurbishment type of maintenance at regular ship overhaul periods except for deck edge mechanical components subject to weather. Occasional refurbishments and/or replacements of flight deck installed hardware, due to accidential damage, can be expected, however. For planning purposes it is assumed that 20% of all catapult camera mounts and cameras will require replacement at least once during the normal service life due to accidential damage.

C. Maintainability and Reliability

A model analysis of the ILARTS System Reliability is currently in process. Contacts with various component manufacturers have been made and are continuing, in order to obtain design and failure rate data on existing products.

The purpose of the analysis is to determine and set the highest attainable system MTBF, consistent with limitations of cost and state-of-the-art, as well as subsystem criticality, redundancy, mission essentiality, etc.

Tentatively, a working guideline of the program requires that "new design" components have a minimum design goal MTBF of 1000 hours, and standard (industry design) components have as minimum warranted MTBF of 1000 hours. Based on these objectives and preliminary failure rate estimates, it is anticipated that the system MTBF for recovery surveillance (which has the greater mission essentiality) will substantially exceed 1000 hours, with a Reliability factor in excess of .9995 for the normal 1/2 hour maximum recovery operating period.

An analysis of Maintainability is concurrently in process. A tentative design goal for system "Mean Time to Repair" (MTTR) is 2.0 hours, predicated on a failure within any of the major subassemblies, and based upon repair by unit module replacements, performed at the organizational level.

Final determination of MTBF for each of the 7 major subassemblies will occur during the test and evaluation of preproduction models. Schedules for these events are provided in Section XV of this document.

D. Component Pilot Rework/Repair Program

No Pilot Rework/Repair program requirements are anticipated for ILARTS support.

E. MEA (Maintenance Engineering Analysis)

An MEA will be prepared for each major subassembly of ILARTS. The work will be done in conjunction with the preparation of the Overhaul and Maintenance Manuals.

F. LOR (Level of Repair Analysis)

Preliminary studies indicate that all ILARTS components will be of modular design, thus permitting broad LOR classifications as follows:

1. Organizational level - Fault isolation, module replacement, unit check out, specified preventive maintenance.

2. Intermediate level - Repair of all electronic/electro mechanical modules by part replacement (except for designated discardable components and items listed below) and including calibration against secondary standards (less than major overhaul tasks) and specified preventive maintenance.

3. Depot Level - Repair (or disposition) of damaged equipments, repair and calibration of specialized hardware, eg., optical components, video recorder heads, integral gear trains, etc.

No additional LOR analysis is required. Hence a separate LOR Report will not be prepared.

G. Verification, Demonstration, and Evaluation

Procurement contracts for each of the ILARTS subassemblies will include acceptance requirements delineating specific design demonstration and verification criteria. For equipments in which performance is more critically affected by shipboard environmental factors, acceptance will also require an on-board performance verification demonstration.

IV. Plan to Maintain

A. Maintenance Concept

ILARTS components will be designed to facilitate rapid fault isolation and verification. Complex items, such as the camera, will include self-check and self-test features. All equipments will include test measurement points and means for easily accessing internal parts by extendar cards, inspection covers, etc., where necessary. Provisions will also exist to quantitatively judge overall video quality at any point in the system and to compensate certain deficiencies by control adjustments at the central console.

When a fault condition exists, an Intercommunication (IC) Technician (2nd Class Rating of higher) will be assigned to isolate and trace the condition to its source. Suspect modules within the major component will be removed and replaced until the fault is cleared. Final checkout will then be coordinated and verified nu the operator at the central console, where complete system monitoring facilities are located.

Faulty modules designated as "On-Board Repairable" will be repaired by ILARTS shipboard maintenance personnel. Following repair and test, the module will be certified RFI (Ready for Issue) and retained as an operating space spare. Designated "Consumable" modules will be coded as such and may be discarded on failure. Faulty modules designated by code as "D.O.P. Repairable" will forwarded directly to the appropiate D.O.P., and be tagged to identify, if possible, the fault consition, hours of use, and equipment from which removed.

In addition to corrective maintanence, scheduled preventive maintenance will be conducted in accordance with PMS (Planned Maintenance System) requirements.

B. Maintenance Levels

Organizational and intermediate level responsibilities will be combined.

C. Depot Level

Depot Level maintenance will be conducted at authorized NARF Activities. The present plan anticipates that NARF facilities at NAVAIRPAC, San Diego, Cal., and NAVAIRLANT Norfolk, Va., will be sufficient for fleet requirements. Depot level responsibilities will be in accord with Para. III F. 3 of this plan. Depots will inventory spares of the 7 ILARTS subassemblies, in anticipation of fleet requirements for immediate replacements in the event of catastrophic damage.

Separate Depot Level maintenance data for ILARTS will be prepared. Data will include detail drawings identifying all standard parts and related sources, dimensioned drawings of manufactured parts and part assemblies, manufacturers test data, maintenance procedures and special facility requirements as determined by N.A.E.C., Lakehurst, N.J.

D. Contractor Level

Contractor Level maintenance requirements will be established in accordance with final MEA conclusions, upon completion. Preliminary data indicate that in the case of the Tape Recorder/Reproducer, overhaul by the manufacturer may be more cost effective, relative to overhaul by a depot.

V. Personnel Training, Training Equipment, and Engineering Technical Services.

A. Training and Training Equipment

Great Lakes Training Center (GLTC) currently conducts programs on PLAT and CAHALS equipments for TYCOM designated IC level personnel. NAEC will furnish GLTC with ILARTS components and technical data, following production availability, for incorporation and substitution in existing instructional routines. In addition, initial on-board training for the more critical subsystems will be given to fleet personnel at the time of installation. Tentatively, operating and maintenance training of this type is planned for the ILARTS Camera and Video Tape Recorder/Reproducer.

B. Engineering Technical Services

Fleet Technical Service Department (FTSD) technical services will be made available as required.

VI. Test Support Equipment

A. Organizational and Intermediate Levels

The following special tools and test equipment are required at the organizational and intermediate levels:

(1) Digital volt meter (multimeter type)
(2) Retina 10 gray scale chart plus horizontal and vertical resolution charts
(3) P.C. Board Extenders (as applicable)
(4) Megohmmeter
(5) Portable Oscilloscope
(6) Test Signal Generator

B. Depot Level

In addition to the items required for the Organizational and Intermediate levels, it is anticipated that the Depot level may need specialized fault diagnostic equipments for testing of modules, optical elements, etc. Where applicable, these will be described in the appropriate maintenance and overhaul manuals as determined by NAEC and provided by NAEC as required.

VII Supply Support

A. Parts Inventory

The Program Support Inventory Control Point (PSICP) will be the Ship Parts Control Center (SPCC), Mechanicsburg, Pa. Supply support will consist of inventorying consumable spares, repairable modules and sub-assemblies, and any parts applicable to Depot level overhaul and/or maintenance. Selected repairable items will be supported on a rotary pool basis with appropriate D.O.P.'s.

B. Provisioning

Provisioning conferences will be held. NAEC will provide data on recommended minimum component provisioning requirements.

C. Support Dates

The MSD (Material Support Date) and the NSD (Navy Support Date) are tentatively established, and are recorded in Section III, Para A. (1), of this plan.

VIII. Facilities

A. Shipboard Maintenance Facilities

On board maintenance facilities will be accomodated within existing space assigned to PLAT and CAHALS maintenance.

B. Depot Maintenance Facilities

Depot Maintenance (NARF) Facilities presently used for PLAT and CAHALS are adequate for ILARTS.

IX. Packaging, Handling, Transportation, and Storage

Except for camera tubes and recorder head assemblies, to be specified later, there are no ILARTS components requiring special procedures or methods for packaging, handling, transporting, or storing. Level A preservation and packaging per MIL-STD-794A will be a general requirement.

X. Interim Support

Interim Support (parts inventory) will be provided by NAEC.

XI. Technical Logistics Documentation

A. Manuals

Operation and Maintenance manuals will be prepared by NAEC (Printing and Distribution by NATSF) and by equipment manufacturers under contract to NAEC. Seperate manuals will be prepared for each of the following items:

OPERATING CONSOLE
CAMERA
DECK EDGE MOUNT AND PROGRAMMER
VIDEO RECORDER
DATA DISPLAY
SYSTEM INTEGRATION COMPONENTS

B. Engineering Drawings and Data

Engineering Drawings and Data will be developed for all NAEC designed hardware, and on all purchased items for which proprietary rights will be acquired by NAEC (requirements for proprietary rights may vary with each of the major subsystems). Original drawings and data shall remain in the custody of NAEC throughout the life cycle.

C. MRCs (Maintenance Requirement Cards)

MRCs shall be prepared for all of the ILART subsystems by NAEC.

XII. Interservice Support

No interservice support will be involved in the present application of ILARTS.

XIII Funding

TABLE IV

Program Funded Item	Responsible Activity	Type Budget	Funds Source
Design Corrections - Preproduction	NAEC	O&MN	NAVAIR (AIRTASK)
Service Hardware Acquisition	NAEC	Procurement	NAVAIR (AIRTASK)
Interim Support	NAEC	O&MN	NAVAIR (AIRTASK)
Support Documentation	NAEC	Procurement + O&MN	NAVAIR (AIRTASK)
Initial Outfitting Spares	NAEC	Procurement	NAVAIR (AIRTASK)
Parts Inventory Spares	SPCC	Procurement	NAVSUP
Fleet Technical Services	CAFSU	O&MN	NAEC (AIRTASK)
Depot Maintenance	NARF	O&MN	NAVAIR
Training	GLTC	EOB	OPNAV

XIV. Records, Reports, Configuration Control and Data Collection

A. MDCS (Maintenance Data Collection Subsystem)

The MDCS procedures of the 3-M (Navy Maintenance and Material Management) system will be implemented in accordance with OPNAVINST 4790.4. Further detail requirements are not yet established.

B. UR's (Unsatisfactory Material/Condition Reports)

Fleet users will submit UR's to NAEC for unsatisfactory material/conditions requiring prompt corrective action.

C. Configuration Control

Configuration control is the responsibility of the Naval Air Engineering Center. Engineering Change Proposals (ECPs) will be submitted first to NAEC for endorsement. Such ECPs will then be forwarded to COMNAVAIRSYSCOM for approval for funding and implementation (reference NAVAIRINST 5215.8A).

XV. Summary Planning & Milestone Charts

(see pages 18-24)

MATERIAL ACQUISITION PLAN

SHEET 1 OF 6

NO: ENG-7935

PLANNING CHART: CONSOLE DATE: 5/18/77

PROJ./SYSTEM: ILARTS

MILESTONE CODE	
OLSP COMPLETED	▽
DESIGN FIRM	✓
1st PRODUCTION ARTICLE	†
TRAINING PLAN COMPLETE	x
SERV. CHANGE REQUEST	+
SERVICE APPROVAL	#
FLEET INTRODUCTION	*

TASK/ITEM	F.Y.	77	78	79	80	81	82
	CAL	77	78	79	80	81	82
	MO.	ONDJFMAMJJASONDJFMAMJJASONDJFMAMJJASONDJFMAMJJASONDJFMAMJJASONDJFMAM					
1.0 PROTOTYPE DEVELOPMENT							
1.1 Analysis & Design		COMPLETE					
1.2 Model & Test							
2.0 PRE-PROD. ENGINEERING							
2.1 Prepare Data Req'm'nts							
2.2 Pre-Prod. Manufacture		NOT REQUIRED					
2.3 Pre-Prod. Test & Eval.		NOT REQUIRED					
3.0 SERVICE ACQUISITION							
3.1 Procurement Data Prep.		COMPLETE					
3.2 Pre-Contract Proced'rs							
3.3 Production Contract							
MILESTONES:		x ✓ # ▽ +		†	*		

MATERIAL ACQUISITION PLAN

SHEET 2 OF 6

NO: ENG-7935

PLANNING CHART: CAMERA MOUNT DATE: 5/18/77

PROJ./SYSTEM: ILARTS

MILESTONE CODE	
OLSP COMPLETED	▽
DESIGN FIRM	✓
1st PRODUCTION ARTICLE	†
TRAINING PLAN COMPLETE	x
SERV. CHANGE REQUEST	+
SERVICE APPROVAL	#
FLEET INTRODUCTION	*

TASK/ITEM	F.Y. / CAL / MO.
1.0 PROTOTYPE DEVELOPMENT	
1.1 Analysis & Design	COMPLETED
1.2 Model & Test	COMPLETED
2.0 PRE-PROD. ENGINEERING	
2.1 Prepare Data Req'm'nts	COMPLETED
2.2 Pre-Prod. Manufacture	
2.3 Pre-Prod. Test & Eval.	
3.0 SERVICE ACQUISITION	
3.1 Procurement Data Prep.	
3.2 Pre-Contract Proced'rs	
3.3 Production Contract	
MILESTONES:	x ▽ ✓ + # † *

F.Y.: 77 78 79 80 81 82

CAL: 77 78 79 80 81 82

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MILESTONE CODE	
DLSP COMPLETED	▽
DESIGN FIRM	✓
1st PRODUCTION ARTICLE	†
TRAINING PLAN COMPLETE	x
SERV. CHANGE REQUEST	+
SERVICE APPROVAL	#
FLEET INTRODUCTION	*

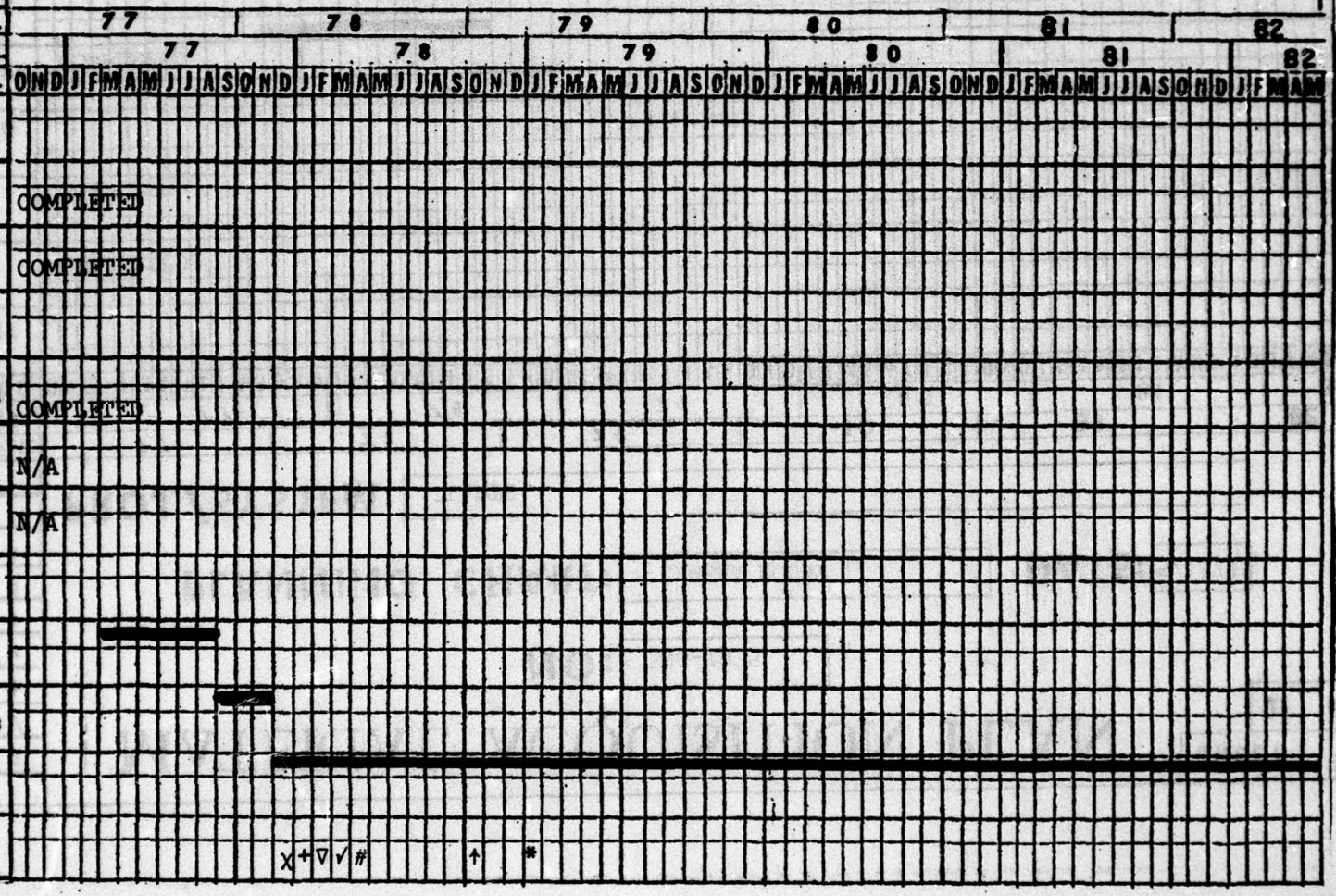
MATERIAL ACQUISITION PLAN

SHEET 3 OF 6

NO: ENG-7935

PLANNING CHART: CAMERA DATE: 5/18/77

PROJ./SYSTEM: ILARTS



MATERIAL ACQUISITION PLAN

SHEET 4 OF 6

NO: ENG-7935

PLANNING CHART: MOUNT PROGRAMMER DATE: 5/18/77

PROJ./SYSTEM: ILARTS

MILESTONE CODE	
OLSP COMPLETED	▽
DESIGN FIRM	✓
1st PRODUCTION ARTICLE	†
TRAINING PLAN COMPLETE	x
SERV. CHANGE REQUEST	+
SERVICE APPROVAL	#
FLEET INTRODUCTION	*

TASK/ITEM	F.Y.	77	78	79	80	81	82
	CAL	77	78	79	80	81	82
	MO.	O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M
1.0 PROTOTYPE DEVELOPMENT		
1.1 Analysis & Design		COMPLETED
1.2 Model & Test		COMPLETED
2.0 PRE-PROD. ENGINEERING		
2.1 Prepare Data Req'm'nts		
2.2 Pre-Prod. Manufacture		
2.3 Pre-Prod. Test & Eval.		
3.0 SERVICE ACQUISITION		
3.1 Procurement Data Prep.		
3.2 Pre-Contract Proced'rs		
3.3 Production Contract		
MILESTONES:		x ▽ ✓ # + † *

MATERIAL ACQUISITION PLAN

SHEET 5 OF 6

NO: ENG-7935

PLANNING CHART: RECORDER DATE: 5/18/77

PROJ./SYSTEM: ILARTS

MILESTONE CODE	
OLSP COMPLETED	∇
DESIGN FIRM	√
1st PRODUCTION ARTICLE	†
TRAINING PLAN COMPLETE	x
SERV. CHANGE REQUEST	+
SERVICE APPROVAL	#
FLEET INTRODUCTION	*

TASK/ITEM	F.Y.	77	78	79	80	81	82
	CAL	77	78	79	80	81	82
	MO.	O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M
1.0 PROTOTYPE DEVELOPMENT		
1.1 Analysis & Design		COMPLETED
1.2 Model & Test		N/A
2.0 PRE-PROD. ENGINEERING		N/A
2.1 Prepare Data Req'm'nts		
2.2 Pre-Prod. Manufacture		
2.3 Pre-Prod. Test & Eval.		
3.0 SERVICE ACQUISITION		
3.1 Procurement Data Prep.		
3.2 Pre-Contract Proced'rs		
3.3 Production Contract		
MILESTONES:		√ x ∇ + # † *

MATERIAL ACQUISITION PLAN

SHEET 6 OF 6

NO: ENG-7935

PLANNING CHART: DATA DISPLAY UNIT DATE: 5/18/77

PROJ./SYSTEM: ILARTS

MILESTONE CODE	
OLSP COMPLETED	▽
DESIGN FIRM	√
1st PRODUCTION ARTICLE	†
TRAINING PLAN COMPLETE	x
SERV. CHANGE REQUEST	+
SERVICE APPROVAL	#
FLEET INTRODUCTION	*

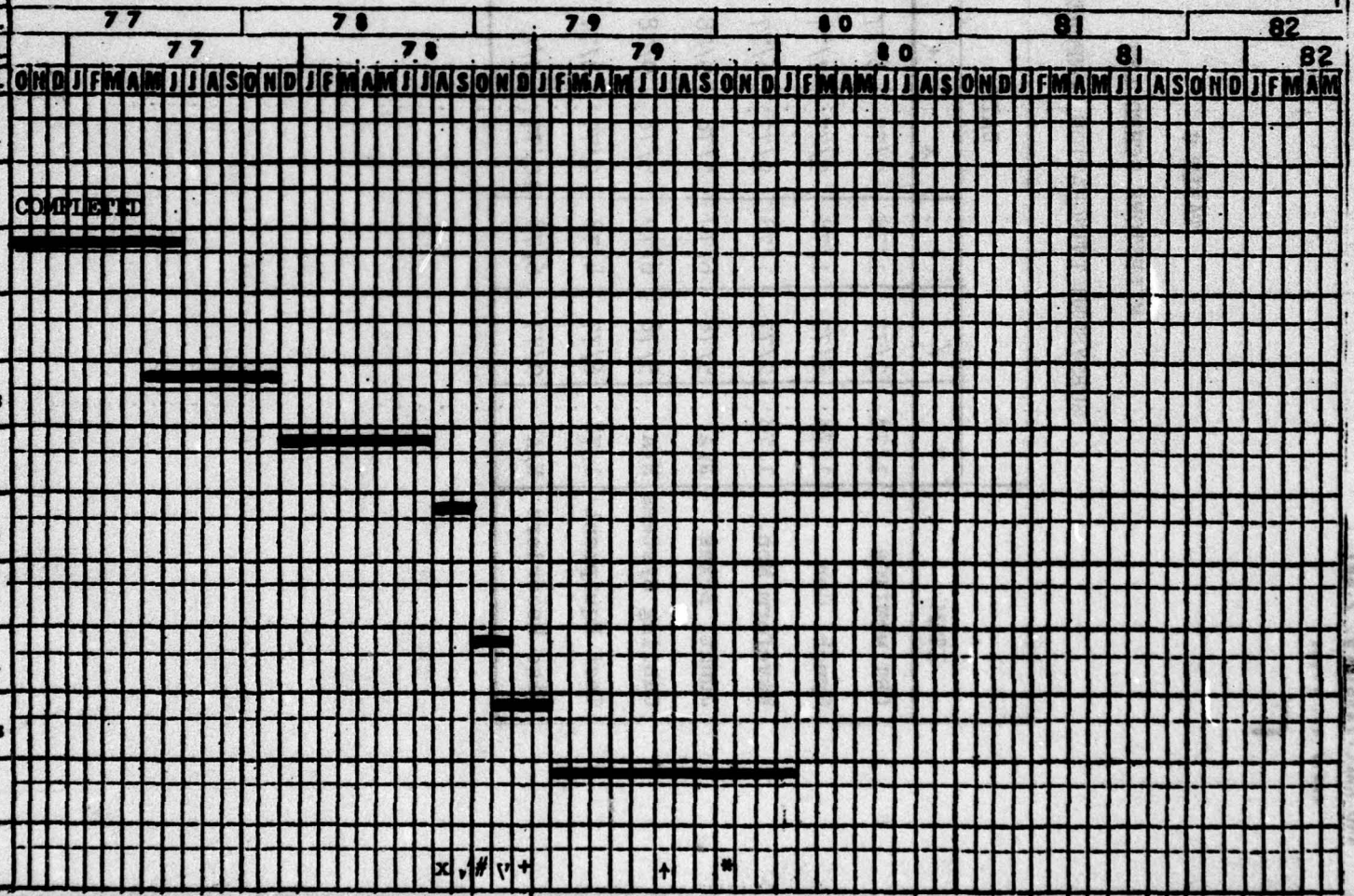


TABLE V

MILESTONE SCHEDULES

SUBSYSTEM INTEGRATION COMPONENTS

ITEM	DATE						
	▽	✓	+	x	+	#	*
CRT MONITOR	1/78	2/77	1/78	9/77	6/77	N/A	3/78
Synch. Gen.	1/78	6/77	1/78	9/77	7/77	N/A	3/78
Waveform Mon.	1/78	2/77	1/78	9/77	6/77	N/A	3/78
Junct. Boxes	N/A	5/78	6/79	5/78	9/78	N/A	8/79
Cabling Systems	N/A	5/78	6/79	5/78	9/78	N/A	8/79
Test Equipment	1/78	6/77	4/78	9/77	8/77	N/A	6/78
Disc Recorders	N/A	9/77	6/78	10/77	N/A	N/A	N/A

Appendix

A. References

1. Material Acquisition Plan, Integrated Launch and Recovery Television System (ILARTS), August 1, 1976

2. AS-4537, Purchase Description, Camera System, Television-Surveillance, Dec. 1, 1976.