# REPORT DOCUMENTATION PAGE

*Form Approved*
*OMB No. 0704-0188*



**1. REPORT DATE** *(DD-MM-YYYY)*
02-02-2012

**2. REPORT TYPE**
Applied Systems Design Project Paper

**3. DATES COVERED** *(From - To)*
July 2011 – Feb 2012

4. TITLE AND SUBTITLE
Operations and Maintenance Task Order (OMTO)/Southern Border Initiative (SBInet) Supply Chain Approach

**5a. CONTRACT NUMBER**
N/A

**5b. GRANT NUMBER**
N/A

**5c. PROGRAM ELEMENT NUMBER**
N/A

**6. AUTHOR(S)**
Karen A. Koenig

**5d. PROJECT NUMBER**
N/A

**5e. TASK NUMBER**
N/A

**5f. WORK UNIT NUMBER**
N/A

**7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)**

IU-UNC LogMBA Program Office
Institute for Defense and Business
1430 Environ Way
Chapel Hill, NC 27517

**8. PERFORMING ORGANIZATION REPORT NUMBER**

*201203*

**9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)**
*The Boeing Service Corporation*

3373 Breckinridge Blvd
Richardson, TX 75082

**10. SPONSOR/MONITOR'S ACRONYM(S)**

*BSC*

**11. SPONSOR/MONITOR'S REPORT NUMBER(S)**

**12. DISTRIBUTION / AVAILABILITY STATEMENT**

*Distribution A*

**13. SUPPLEMENTARY NOTES** This is an Applied Systems Design Project requirement for the IU-UNC LogMBA Program, a two-year joint MBA between Indiana University's Kelley School of Business and the University of North Carolina at Chapel Hill's Kenan-Flagler Business School.

**14. ABSTRACT** The problem researched for this project was: There was value in modifying the current Operations and Maintenance Task Order (OMTO)/Southern Border Initiative Network (SBInet) Supply Chain approach in the areas of lead times between repairs, spares inventory, and the identification of failure trends. The availability rate of the platform(s) needed to be improved because the current supply chain process enacted by the government did not work in a maintenance environment. The areas data was collected on were the Return Merchandise Authorization (RMA) and parts ordering process, the current spares model and inventory, and identifying key problem components with high failure rates. First, Boeing found the RMA process took 1-7 weeks to complete and the parts ordering process took from 1-3 weeks to complete. Too long of lead time(s) caused low spares inventory and it was proven if spares were available and lead time for receiving parts was minimal; systems were up and operational within hours as compared to days. Second, Boeing found there was a need to expand the spares inventory. More spares were needed to facilitate maintenance of the systems as the Mean-Time-Between (MTBF) rates were higher than projected; thus there were not enough current spares to cover the real failure rates. It was determined to engage the vendor(s) and compare failure data over the last two years to develop a more realistic MTBF. This RMA and returned asset data would be shared with the vendors to help determine realistic turn-around time to repair parts.

**15. SUBJECT TERMS**
*Supply process, SBInet, FAA*

| **16. SECURITY CLASSIFICATION OF:** *(Must fill out U, C, or S for fields 16 a, b and c)* | | | **17. LIMITATION OF ABSTRACT** | **18. NUMBER OF PAGES** | **19a. NAME OF RESPONSIBLE PERSON** Jodi D'Agostino |
|---|---|---|---|---|---|
| **a. REPORT** U | **b. ABSTRACT** U | **c. THIS PAGE** U | SAR | 17 | **19b. TELEPHONE NUMBER** *(include area code)* 919-969-8008 |

**Standard Form 298 (Rev. 8-98)**
**Prescribed by ANSI Std. Z39.18**

# IU-UNC *Log*Mba APPLIED PROJECT

## Operations and Maintenance Task Order (OMTO)/Southern Border Initiative Network (SBInet) Supply Chain Approach

**By:** Karen A. Koenig
January 2012

**Advisor:** Dr. Paul Stanfield

# TABLE OF CONTENTS

## LIST OF FIGURES

## LIST OF TABLES

# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| Ao | Operational Availability Rate |
| Block 1 | Fixed Tower System |
| CBP | Customs and Border Protection |
| CM | Corrective Maintenance |
| FAA | Federal Aviation Administration |
| ILSS | Integrated Logistics Support System |
| MSS | Mobile Surveillance System |
| MTBF | Mean-time-between-failure |
| OMTO | Operations and Maintenance Task Order |
| PDCU | Power Distribution Control Unit |
| PM | Preventive Maintenance |
| PSF | Primary Support Facility |
| RMA | Return Merchandise Agreement |
| SBInet | Southern Border Initiative Network |

## EXECUTIVE SUMMARY

The problem researched for this project was: There was value in modifying the current Operations and Maintenance Task Order (OMTO)/Southern Border Initiative Network (SBInet) Supply Chain approach in the areas of lead times between repairs, spares inventory, and the identification of failure trends. The availability rate of the platform(s) needed to be improved because the current supply chain process enacted by the government did not work in a maintenance environment.

The areas data was collected on were the Return Merchandise Authorization (RMA) and parts ordering process, the current spares model and inventory, and identifying key problem components with high failure rates.

First, Boeing found the RMA process took 1-7 weeks to complete and the parts ordering process took from 1-3 weeks to complete. Too long of lead time(s) caused low spares inventory and it was proven if spares were available and lead time for receiving parts was minimal; systems were up and operational within hours as compared to days.

Second, Boeing found there was a need to expand the spares inventory. More spares were needed to facilitate maintenance of the systems as the Mean-Time-Between (MTBF) rates were higher than projected; thus there were not enough current spares to cover the real failure rates. It was determined to engage the vendor(s) and compare failure data over the last two years to develop a more realistic MTBF. This RMA and returned asset data would be shared with the vendors to help determine realistic turn-around time to repair parts.

Lastly, Boeing identified key problem components that had high failure rates. This tracked data was used to provide cause/effect analysis on failure rates and to answer the question; why are those parts failing and/or were they causing other parts to fail? Root causes of failures were determined and the data to fix the issue was provided to the customer (Customs and Border Protection) so field bulletins could be issued out to the agents on how to correct the issue(s).

What was found was in order for the availability rate to be accurately portrayed to the government, Boeing, FAA, and/or other organizations within the OMTO contract would need to be held to the same standard for operational availability, otherwise the metrics were not accurate. Overall, despite the constraints enacted on Boeing, they exceeded the operational availability rate for over seven months, because the Supply Chain metrics were excluded from the calculations.

Project Proposal

There is value in modifying the current Operations and Maintenance Task Order (OMTO)/Southern Border Initiative Network (SBInet) Supply Chain approach in the areas of lead times between repairs, spares inventory, and the identification of failure trends.

Background

A division of the Department of Homeland Security (DHS) called Customs and Border Protection (CBP) has contracted The Boeing Corporation to provide Integrated Logistics for the OMTO contract. This consists of operations and maintenance tasks associated with an optical system mounted on a mobile platform and on fixed tower sites across four Southern Border States.

The key participants in this process are the Boeing Supply Support Office (SSO) which controls the supply chain process for Boeing, the Federal Aviation Administration (FAA) which controls the supply chain process for CBP, Boeing Field Service Representatives (FSRs) who maintain the mobile platform and fixed tower sites, and our customer the Border Patrol agent that are using the systems on the ground.

The objective of the project is to improve the limited availability of the systems. The improvement can be achieved by decreasing the time it takes to receive parts back from the repair process, expanding the spares inventory, and identifying the key problem components that have high failure rates and work with the vendors to develop solutions to help reduce the failure rate. Focusing on these three areas will highly improve the reliability rate on the mobile platform and fixed towers, ultimately increasing the number of apprehensions of illegal aliens, seizure of drugs and assisting in the national objective to secure the borders.

The current maintenance process for the MSS platform is shown in (Figure 1). The time it takes for the MSS system to develop a problem to the time the system is completely repaired takes anywhere from two hours to thirty-five days. In addition, the current maintenance process for the Block 1 platform is shown in (Figure 2). The time it takes for a tower to develop a problem to the time the system is completely repaired takes anywhere from four hours to fifty-five days.

The two systems differ in corrective maintenance time to fix the system because of the physical location of the MSS platforms and Block 1 towers and the ability of the troubleshooting skills of the technician. The two systems also differ in the amount of time to receive parts from the vendor because each vendor has a different lead time for repair of assets once they break or their availability of new parts to be issued. Turnaround time and Mean-Time-Between Failure (MTBF) data provided by each vendor for the top ten components is located for each system in Table 1 and Table 2.

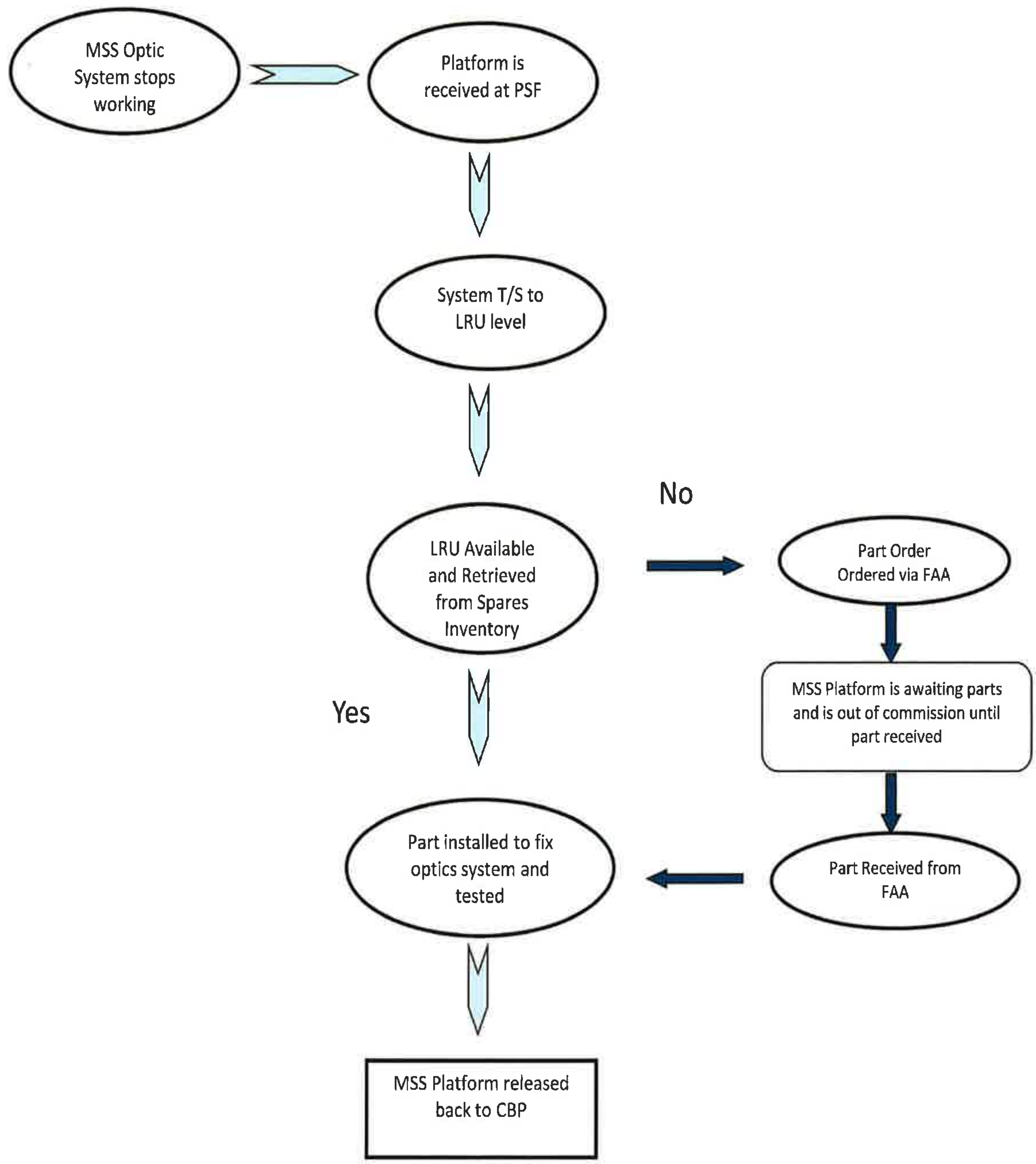



**Figure 1. Current Maintenance Flow - MSS System**

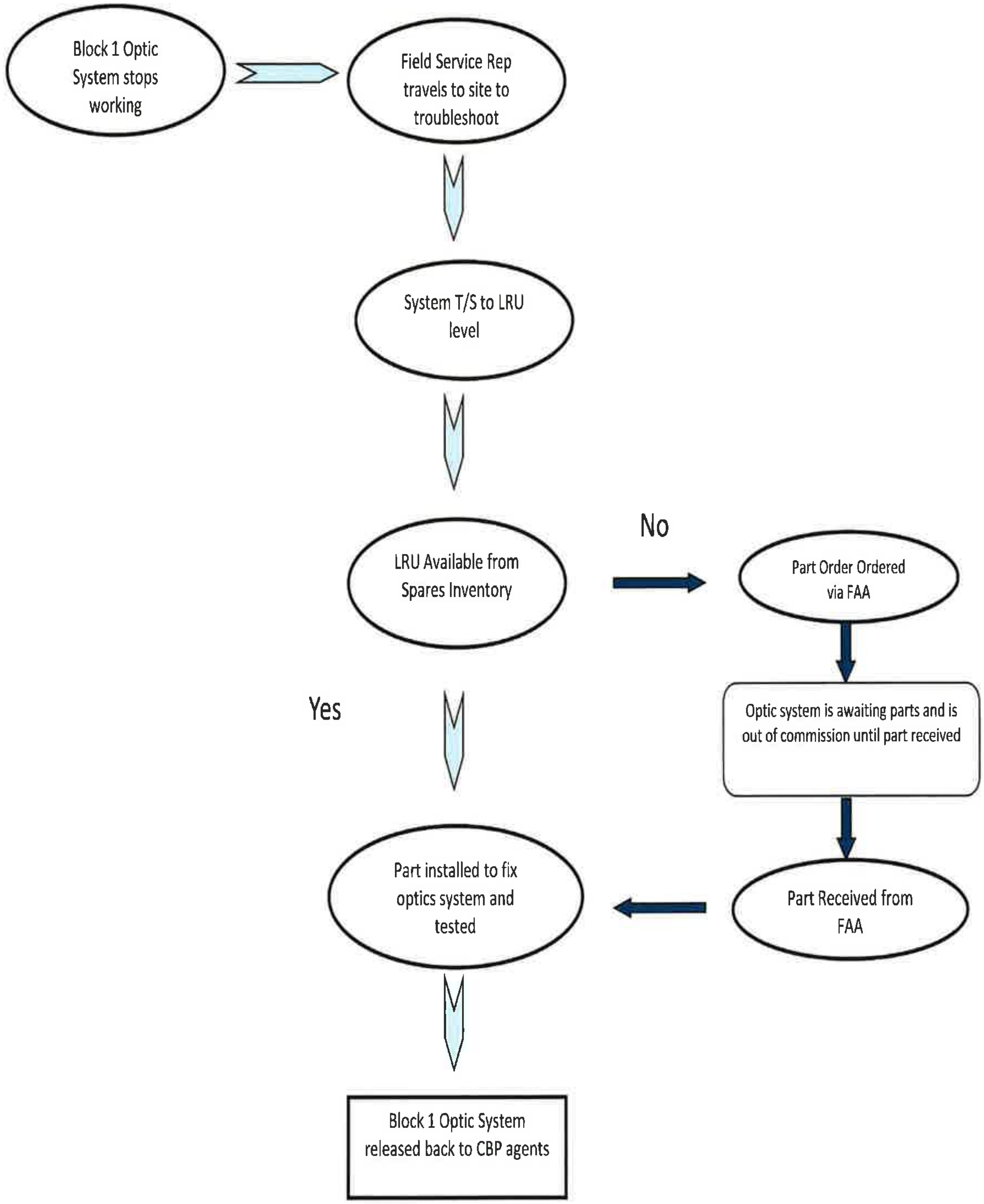



**Figure 2. Current Maintenance Flow - Block 1 Tower System**

A contributing factor to the low availability rates of the systems is the current Return Merchandise Agreement (RMA) process shown in (Figure 3). This process currently takes from one week to seven weeks to complete. If FAA has the spare part available the RMA process is very short, if they do not then the lead time to receive a part from the vendor is very long.

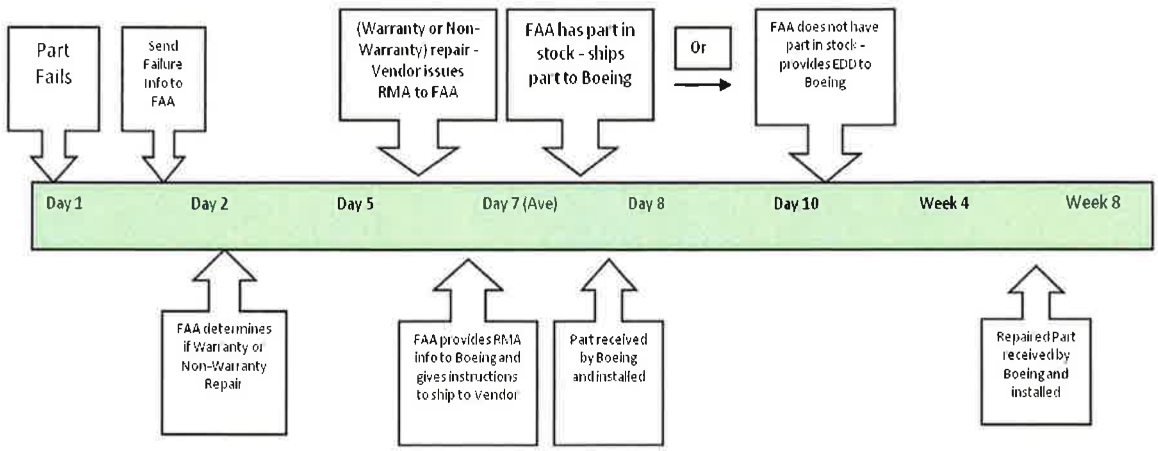



**Figure 3. RMA Process (Current)**

Another contributing factor to the low availability rates of the systems is the current status of the Parts Ordering process in contained in (Figure 4). This process currently takes from one to three weeks to complete. If Boeing or the FAA have the spare part available from the spares inventory the part receipt process is again very short, if the part is not readily available then the lead time to receive the part from the vendor is very long.

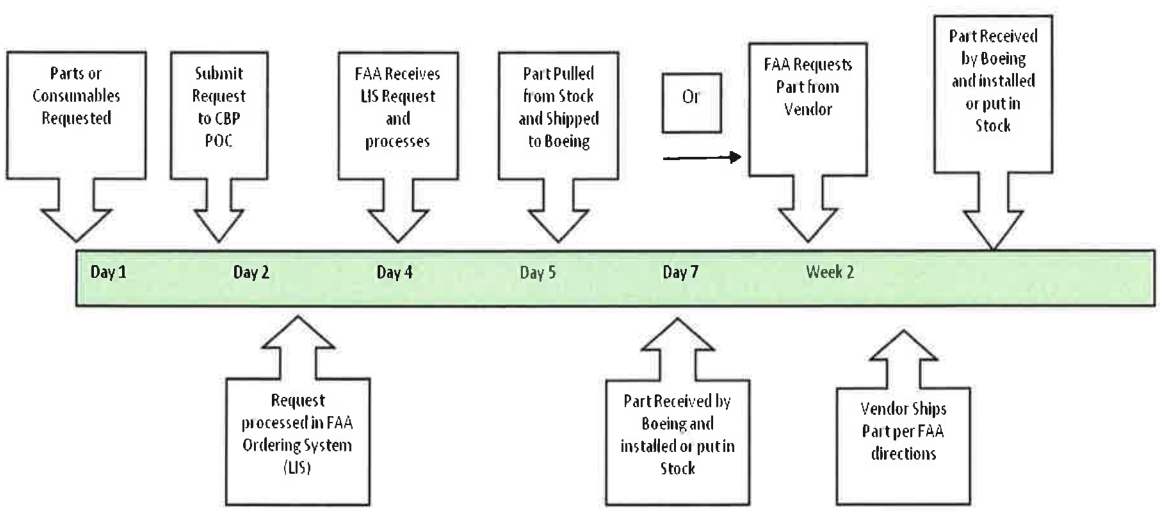



**Figure 4. Parts Ordering Process (Current)**

The current spares inventory for the Block 1 system was determined during the 2009 Spares Provisioning Conference which was held with Boeing and the customer (CBP). Table 1 shown below contains the top 10 LRUs used most often by the system. Assumptions for this sparing model was 1) System operating hours is 24/7/365, 2) Confidence Factor = 90%, and 3) Consumables based on 1 year of maintenance.

**Table 1. Spares provisioning Block 1 System**

| Nomenclature | Part No. | Total Sys Qty | MTBF | Repairable | Logistics K-factor | MTBD | Turn-Around Time (Days) | Spares to Procure |
|---|---|---|---|---|---|---|---|---|
| Camera, Night, Ranger HRC-U | 614005704/32A | 18 | 9,669 | Y | 1.5 | 6,446 | 45 | 6 |
| Camera, Daytime Video | 4107372 | 18 | 43,800 | Y | 1.5 | 29,200 | 45 | 2 |
| Pan Tilt Assy, Quickset Sentry 90 | 4107368 | 18 | 35,040 | Y | 1.5 | 23,360 | 45 | 2 |
| Radar Antenna | 366-1020-001 | 18 | 29,917 | Y | 1.5 | 19,945 | 90 | 4 |
| Pedestal, Radar Drive | 366-1500-001 | 18 | 63,453 | Y | 1.5 | 42,302 | 45 | 2 |
| AC Power Distribution Unit | 7608AD2012DN | 25 | 115,000 | N | 1.5 | 76,667 | 45 | 5 |
| Server, Industrial Device, 2 Port, RS-232/422/4850N | NPORT IA-5250 | 36 | 78,000 | N | 1.5 | 52,000 | 45 | 6 |
| Cable, SSCU to Radar | 06111343-2 | 18 | 175,200 | Y | 5 | 35,040 | 45 | 2 |
| Advanced Remote Terminal Unit (ARTU) | 9480BOE-01 | 29 | 23,360 | Y | 1.5 | 15,573 | 45 | 5 |
| Argus Controller | CXRF 018-557-20 | 25 | 43,800 | Y | 1.5 | 29,200 | 45 | 3 |

The current spares inventory for the MSS platform was also determined during the 2009 Spares Provisioning Conference which was held with Boeing and the customer (CBP). Table 2 shown below contains the top 10 LRUs used most often by the system. Assumptions for this sparing model was 1) System operating hours is 24/7/365, 2) Confidence Factor = 90%, and 3) Consumables based on 1 year of maintenance.

**Table 2. Spares provisioning MSS System**

| Nomenclature | Part No. | Qty per End | Qty of End | Total Sys | Repairable | MTBF | Logistics K-factor | MTBD | Turn-Around Time (Days) | Recommended Spares (60 Sys) |
|---|---|---|---|---|---|---|---|---|---|---|
| Camera, Infrared | 23047MZ | 1 | 60 | 60 | Y | 5,000 | 1.5 | 3,333 | 45 | 25 |
| Camera Assy, Daytime | T5855-0001-001 | 1 | 60 | 60 | Y | 43,800 | 1.5 | 29,200 | 45 | 4 |
| Pedestal, Pan & Tilt | 980015 | 1 | 60 | 60 | Y | 7,700 | 1.5 | 5,133 | 45 | 17 |
| Antenna, Radar | 366-1020-001 | 1 | 60 | 60 | Y | 29,917 | 1.5 | 19,945 | 45 | 6 |
| Pedestal, Drive, Radar | 366-1500-001 | 1 | 60 | 60 | Y | 63,453 | 1.5 | 42,302 | 45 | 3 |
| Remote Data Relay (RDR) | P/N CSCU-LR SA RDR | 1 | 60 | 60 | Y | 43,800 | 1.5 | 29,200 | 45 | 4 |
| Generator, Electrical Power (Diesel) | 5.5HDKBB2860C | 1 | 60 | 60 | Y | 20,000 | 1.5 | 13,333 | 45 | 8 |
| Cable, Radar, ARSS | 700422-01 | 1 | 60 | 60 | Y | 175,200 | 1.5 | 116,800 | 45 | 2 |
| Recorder, Digital Video | QDC | 1 | 60 | 60 | Y | 300,000 | 1.5 | 200,000 | 45 | 1 |
| Computer, Laptop | RNB230N | 1 | 60 | 60 | Y | 33,300 | 1.5 | 22,200 | 45 | 5 |

The current failure rates of the parts are charted in (Figure 5). This data contains the failure rates of all components for all systems for 2010 and 2011, but also contains the top ten components shown in the spares model for each system (Table 1 and 2).

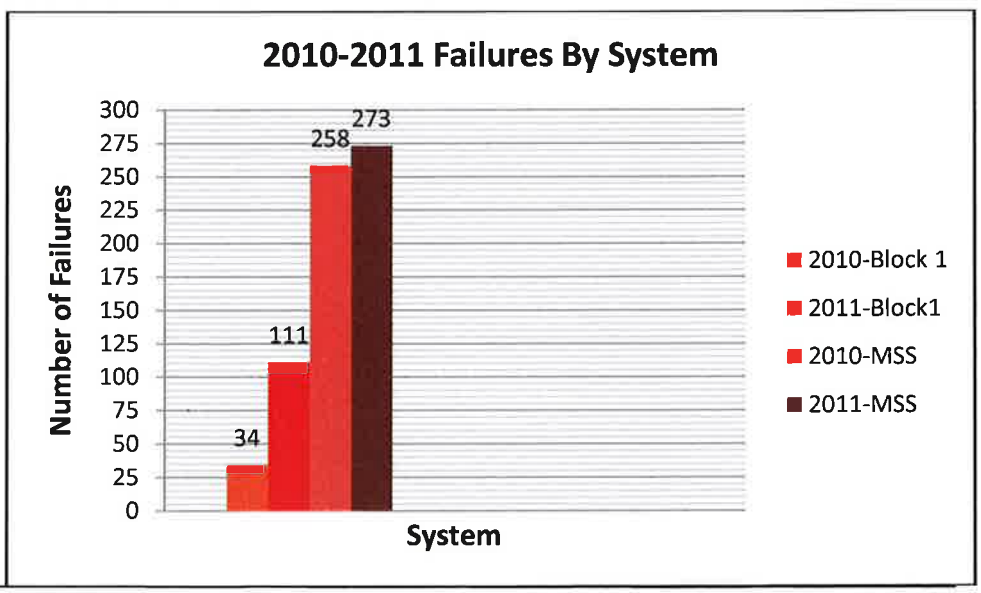



**Figure 5. 2010/2011 Total Failures (by system)**

Improvements

Boeing would like to reduce the lead time between repairs, improve the spares model, and identify the key components which have high failure rates. This will allow constant flow of parts for maintenance and sustainment of the system, and to assist in keeping the Operational Availability Rate (Ao) at a predetermined percentage rate set by the customer in the OMTO contract.

The first improvement Boeing would make is to decrease the lead time between repairs or to reduce the amount of time to receive parts back from the repair process. This will assist in keeping a higher volume of spares inventory to choose from when completing corrective maintenance. Compared to the current process the modified process will be one week or less see (Figure 6) below and refer for (Figure 3) for comparison.

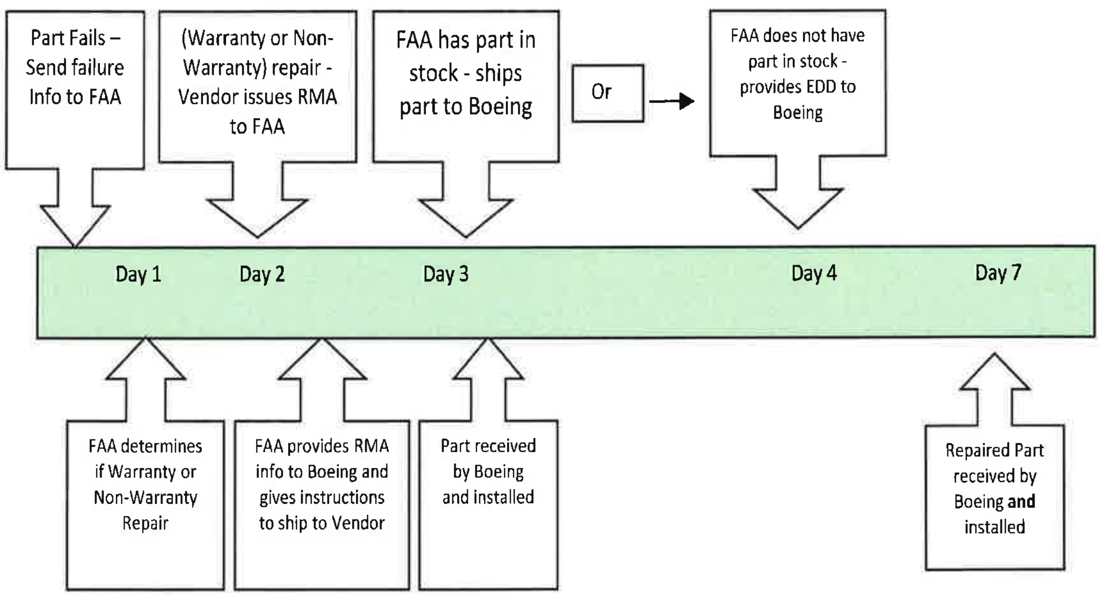



**Figure 6. RMA Process (Modified)**

In addition to modifying the RMA process Boeing would also decrease the Parts Ordering process. This process currently takes from one to three weeks to complete. The modified process will take one week or less; see Figure 7 below and refer for Figure 4 for comparison.

Decreasing both the RMA process and the Parts Ordering process will decrease the down time of both the MSS Platform and the Block 1 system. Boeing has proven when they have spares availability and the lead time for receiving parts is minimal the systems are up and operational within hours as compared to days.

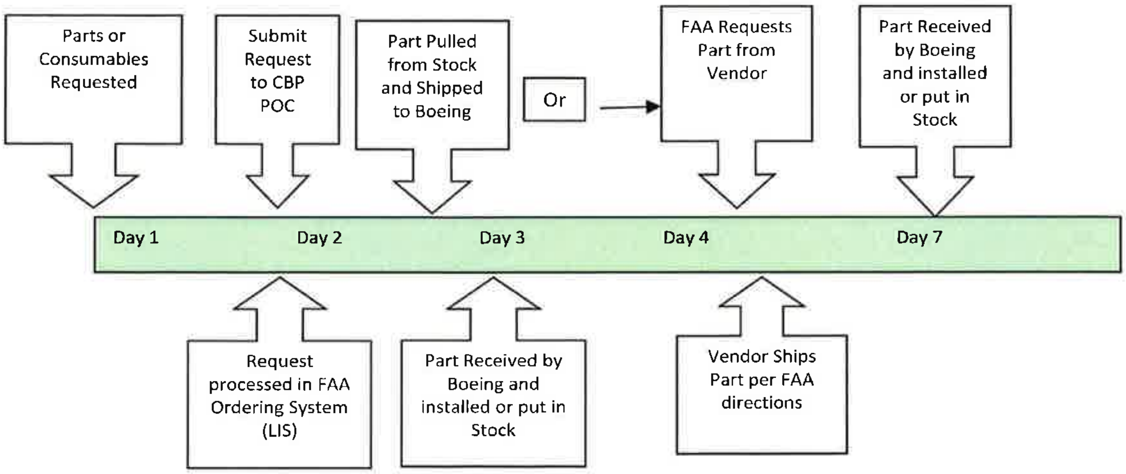



**Figure 7. Part Ordering Process (Modified)**

The second improvement Boeing would like to make is to expand the spares inventory currently in place. There is a defined amount of parts (spares) currently stocked at the Boeing Primary Support Facility (PSF) in Tucson, AZ and in some remote sites, but the bulk of the spares are housed in Oklahoma City, OK with the FAA.

The current issue is having enough spares in the inventory to cover the amount of failures (usage rate) being seen by the Mobile Surveillance System (MSS) and Block 1 (Fixed Tower System). The usage rate and lead time for repair are very high and even though the spares quantity was derived from mean-time-between-failure (MTBF) rates produced by the vendor, we do not have enough spares on the shelf to cover the real failure rate we are seeing. Bottom line, vendor(s) cannot keep up with the failures currently being seen by the system and the total cost curve of the program is being exceeded.

Referring to the spares tables (Table 1 and Table 2), Boeing would go back to the vendor and compare the failure data we have accumulated over the last two years to develop a realistic MTBF. We would also share the RMA and returned assets data with the vendors and help them to determine a more realistic turn-around time to repair their parts.

The last improvement Boeing would make is to identify the key problem components that have high failure rates and determine why those parts are failing and/or if they are causing other parts to fail. Under the current contract Boeing does not get paid to provide this data; however we feel we have tracked enough pertinent data to provide cause/effect analysis. One example of high failure items is provided in Figure 8; radar system cable with 91 failures, MOXA server with 12 failures and the Power Distribution Control Unit (PDCU) with 15 failures. When the MOXA fails, 24 volts (unregulated) travels up the system wiring and causes the PDCU and radar cable to fail; this happens as both are 12 volt parts. The MOXA is failing because the part is exceeding the temperature limit set by the manufacturer when the system is exposed to temperatures over 110 degrees.

| 2011 | | |
|---|---|---|
| **P/N** | **ITEM** | **QTY** |
| NPORT-IA-5250-T | SERVER, MOXA | 12 |
| 700422 | CABLE, ARSS, RVISION | 6 |
| 700422-FAA | CABLE, ARSS, FAA-BUILT | 65 |
| 700422-FAA REV A | CABLE, ARSS, FAA-BUILT | 20 |
| CSCU-LR-SA-PDCU | POWER DISTRIBUTION CONTROL UNIT | 15 |

**Figure 8. Part Failure Data**

<u>Research and Progress Reporting</u>

The data used for the research and analysis of this project is derived from information logged in the maintenance documentation system referred to as the Integrated Logistics Support System (ILSS). According to the contract, the customer has us utilize this system to track parts inventory and maintenance actions performed during corrective maintenance and preventive maintenance actions.

The failure rate of components shown in (Figure 5) for the Block 1 system has risen considerably from 2010 to 2011, but is skewed as Boeing didn't start sustainment maintenance on the Block 1 system until August of 2010. The MSS system has a noted increase of failures between the two years but is primarily caused by the life of the 5kw generator which was replaced by the 8kw generator this summer.

System failure information shown in (Figure 5) also supports the overarching theory that the parts are deteriorating over time and that some type of trend analysis is needed to see why there are so many failures on a relatively young system. To prove this theory, using extensive failure data contained in the file titled "MBAConsumption.xls (Appendix A), it was determined which top 10 Line Replaceable Units (LRUs) the system has had high failure rates on over the last two years. Concurrently, there is supporting data in (Table 1 and Table 2); LRU data provided for both systems that help prove the MTBF rates were not as indicated by the vendor and thus also contribute to the high failure rates seen by the systems.

In addition, after studying and charting out the current lead time for receipt of ordered parts and/or consumables; defining specifically how long it takes for parts to be ordered and received by FAA, and then installed on a system the outcome was on average anywhere from seven days to seven weeks from start to finish. The parts ordering and RMA process is broken and is contributing to a low availability rate of the systems which in turn affects the amount of apprehensions and drug seizures allowed in a given month for the CBP agents to keep the border safe.

Even though Boeing management believes we have enough data and proof to show the three areas can be improved by working hand-in-hand with FAA the processes for improvement will not be adopted or shared with the FAA. What has ultimately transpired over the months since starting this project is the customer (CBP) and the FAA have decided not to fix any of the areas described in this document and has instead instituted a Just-In-Time (JIT) parts concept for providing parts in a timely manner. FAA has decided to use the JIT concept for all programs they manage, of which the OMTO contract is just one of many.

Overall, despite current constraints Boeing has exceeded the operational availability rate for over seven months, only because the Supply Chain metrics were excluded from the calculations.

The overarching business case for Boeing, FAA or other organizations to modify their policies is to make sure the other entities are held to the same standard for operational availability, otherwise the metrics are not accurate.

Path Forward

Since the Supply Chain is owned by another company (FAA) and not by Boeing we have to abide by the changes implemented by the customer to the supply chain process. Even though this proposal will allow constant flow of parts for maintenance and sustainment of the system and to assist in keeping the operational availability rate (Ao) at an acceptable level, FAA and CBP will not entertain the ideas set forth in this proposal.

However, even if the customer does not use the information provided in this proposal to their advantage, the soft benefit will show the customer what Boeing can do for them outside of the current scope of the contract; which is Corrective Maintenance (CM) and Preventive Maintenance (PM) sustainment operations. The information provided will help Boeing show our value and what we bring to the table besides maintenance activities to help win future contracts and possible extension of the current maintenance contract (for years to come).

# Operations and Maintenance Task Order (OMTO) Supply Chain Approach


**2 February 2012**
**Karen Koenig**
**Field Service Manager**

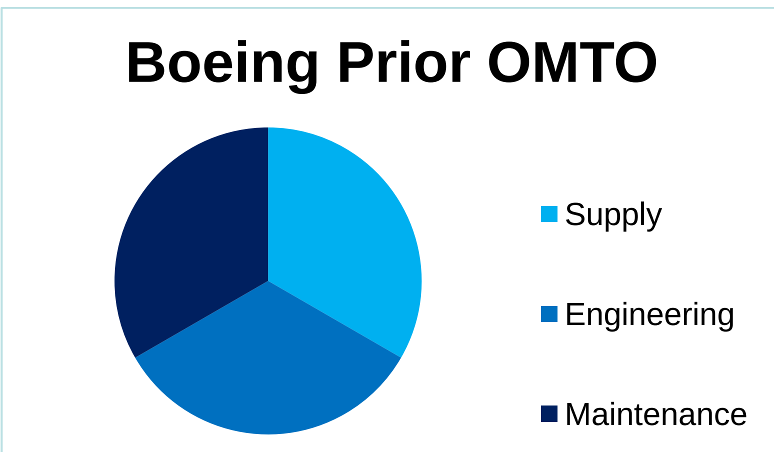


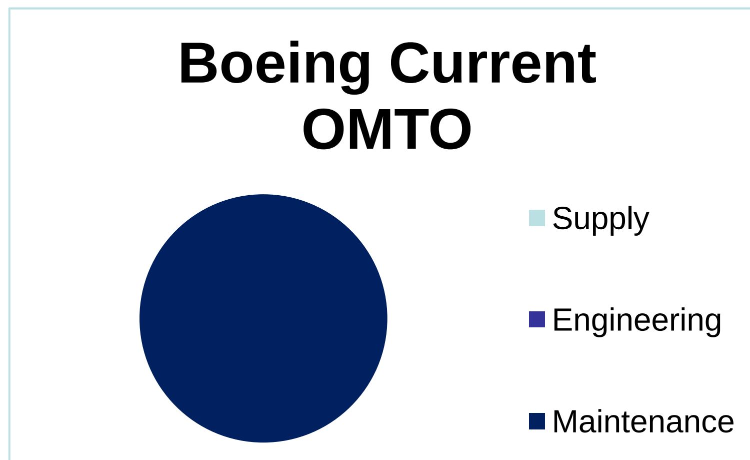
BOEING

# Agenda

Improve the availability rate of the platforms we work on because the current supply chain doesn’t work in a maintenance environment

**-Reduce Return Merchandise Authorization (RMA) & Parts Ordering Process**
**-Expand the Spares Inventory**
**-Identify Key Problem Components Which Have High Failure Rates**



# RMA/Parts Process

SBInet

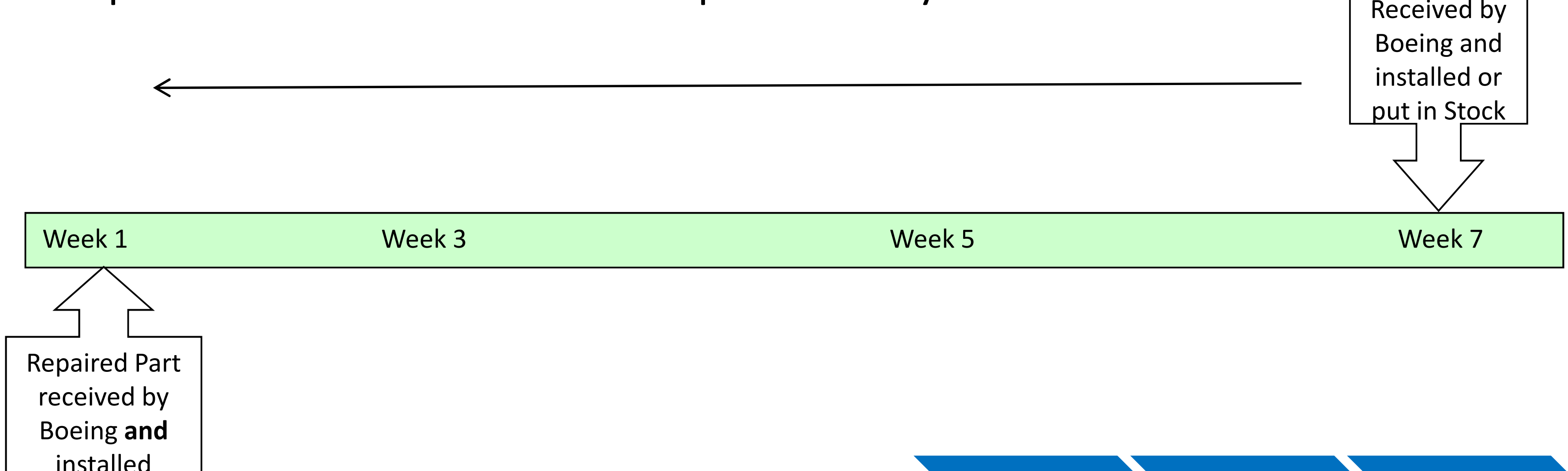
**Reduce the RMA and Parts Ordering Process**

-Current RMA process takes 1-7 weeks to complete

-Current Parts Ordering process takes from 1-3 weeks to complete

-Too long lead times causes low spares inventory

-Proven if have spares & lead time for receiving parts is minimal; systems are up and operational within hours as compared to days




**Reduce** | Expand | Identify

# Spares

SBInet

**Expand the Spares Inventory**

-Need more spares to facilitate maintenance of the systems

-Spares quantity derived by vendor provided Mean-Time-Between (MTBF) rates

-MTBF higher than projected; not enough spares to cover real failure rate

-Engage vendor & compare failure data over last two years to develop realistic MTBF

-Share RMA & returned assets data with the vendors; help determine realistic turn-around time to repair parts

**MSS Radar Antenna (TRA)**

Reliability below predicted value

15 of 16 spares in repair cycle

(5-7%) returned for repair/mo

**Radar Pedestal**

Reliability below predicted value

12 of 13 spares in repair cycle

(5%) returned for repair/mo

# Key Components

SBInet

**Identify Key Problem Components with High Failure Rates**

-Use tracked data to provide cause/effect analysis on failure rates

-Why are those parts failing and/or are they causing other parts to fail?

-Determine the cause

-Provide data to CBP to put Field Bulletin to the Agents

| 2011 | | |
|---|---|---|
| **P/N** | **ITEM** | **QTY** |
| NPORT-IA-5250-T | SERVER, MOXA | 12 |
| 700422 | CABLE, ARSS, RVISION | 6 |
| 700422-FAA | CABLE, ARSS, FAA-BUILT | 65 |
| 700422-FAA REV A | CABLE, ARSS, FAA-BUILT | 20 |
| CSCU-LR-SA-PDCU | POWER DISTRIBUTION CONTROL UNIT | 15 |

Reduce → Expand → **Identify**

BOEING

# Conclusion-Next Steps

-**Reduce the parts ordering and RMA process**
**-Expand the spares inventory**
**-Identify key problem components that have high failure**

-Despite current constraints we have exceeded the Operational Availability Rate (Ao) for 7 months straight (only because Supply Chain is excluded)

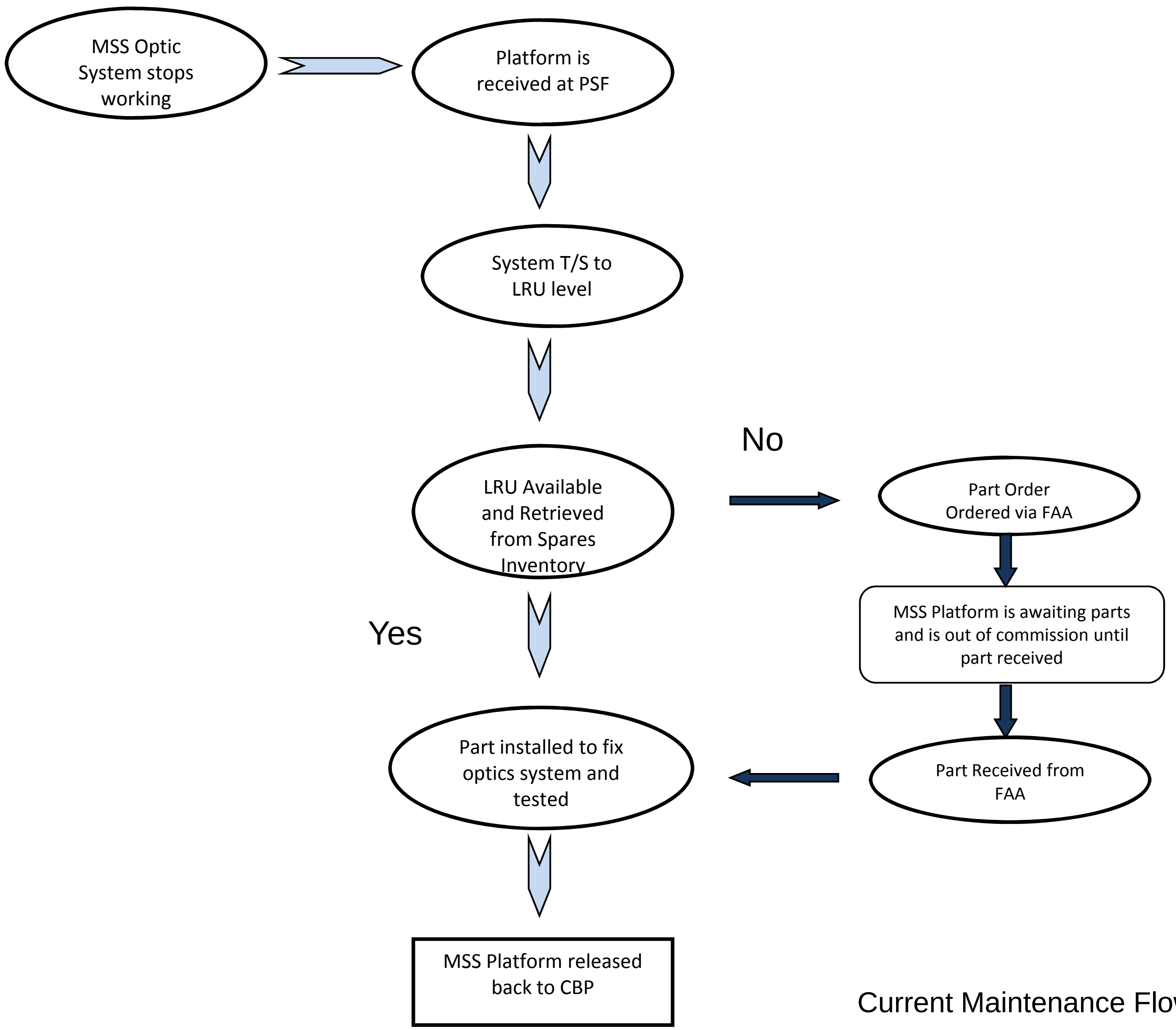
-FAA instituted a Just-In-Time (JIT) parts concept for providing parts in a timely manner across all projects they have jurisdiction over

-The business case for Boeing, FAA or other organization to modify their policies ; Being held to the same standard for Operational Availability (Ao)

- -Min Availability Rate
- -Incentive fee for higher threshold

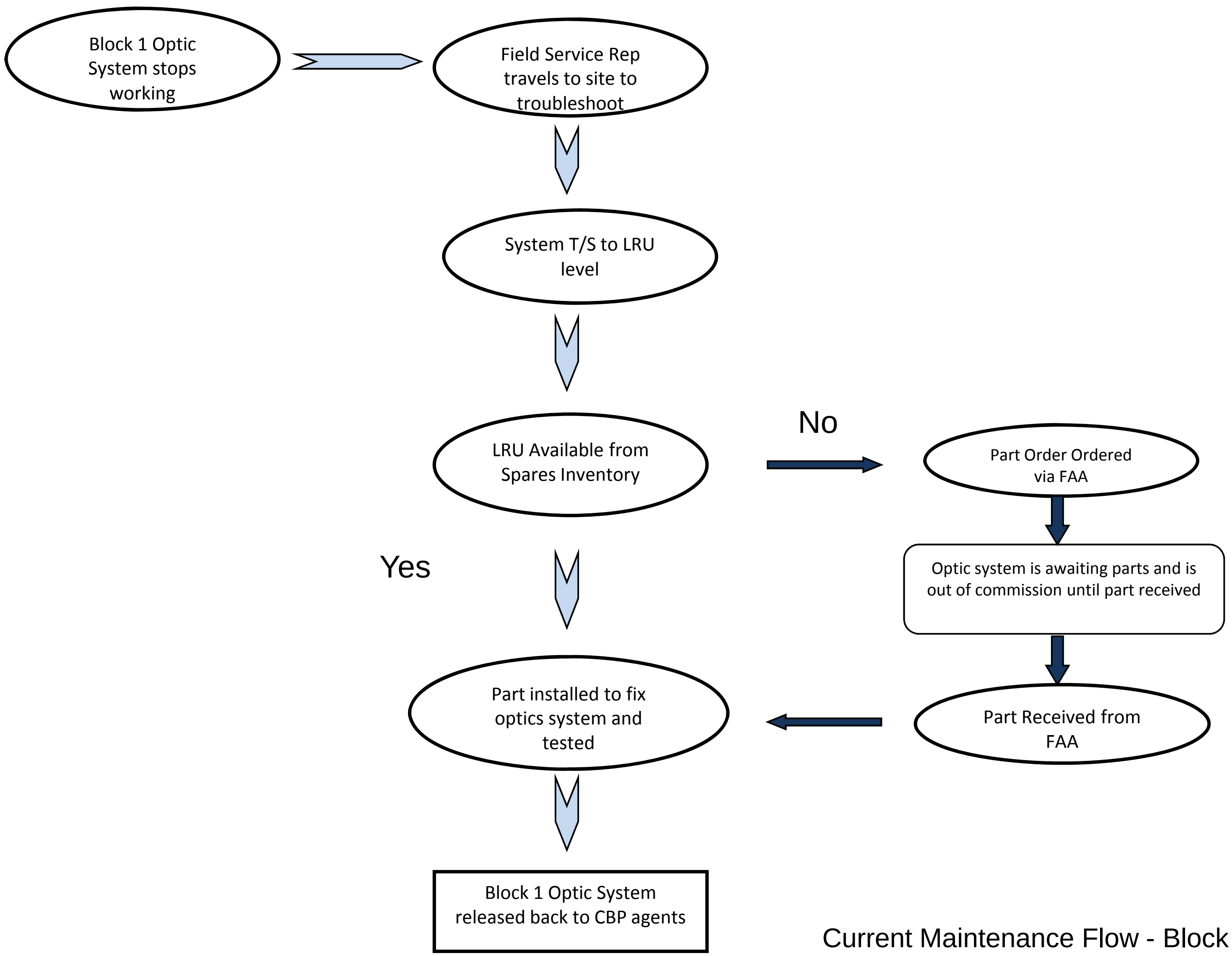
# Questions?

# Backup




Current Maintenance Flow - MSS System

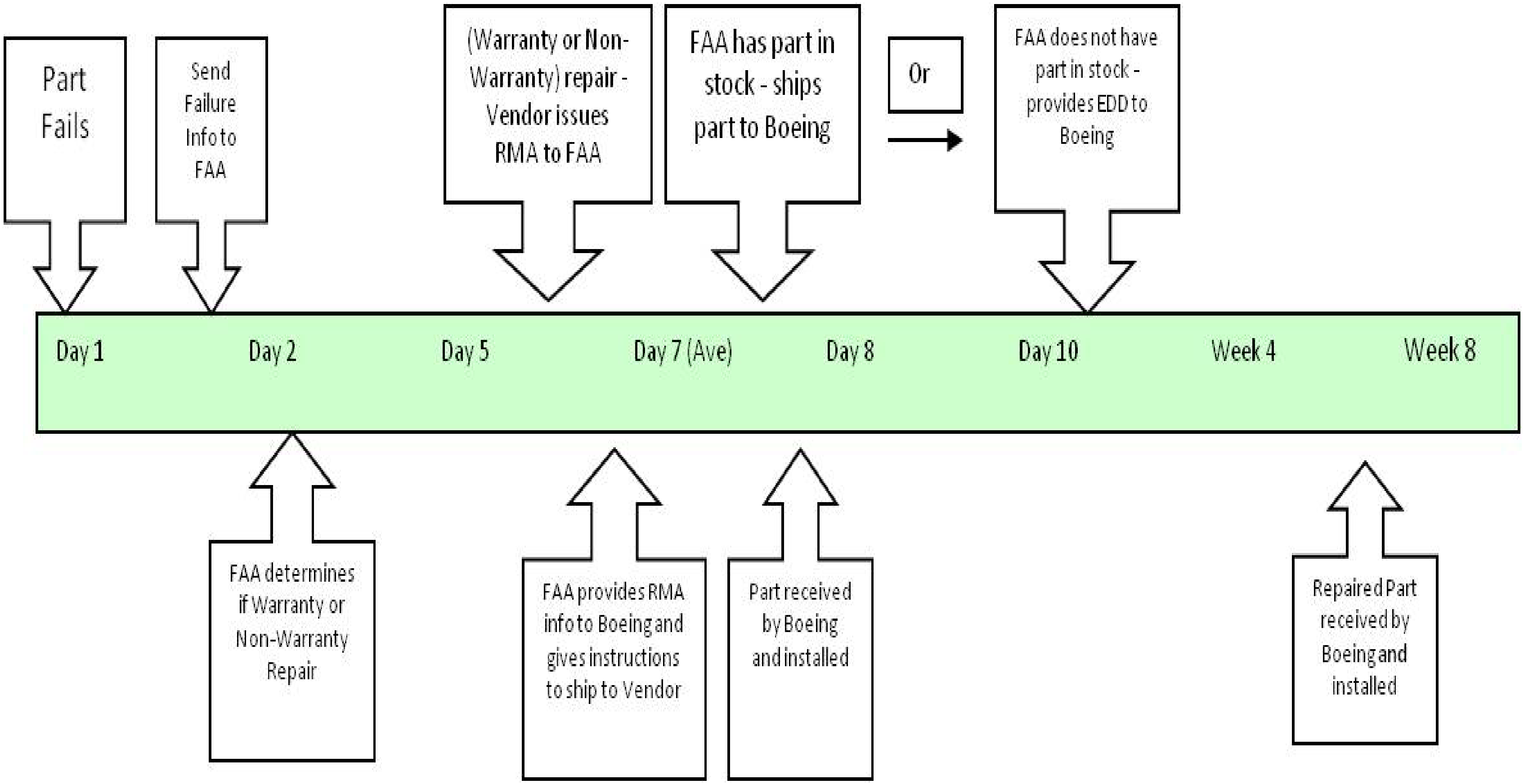
# Backup




Current Maintenance Flow - Block 1 Tower System

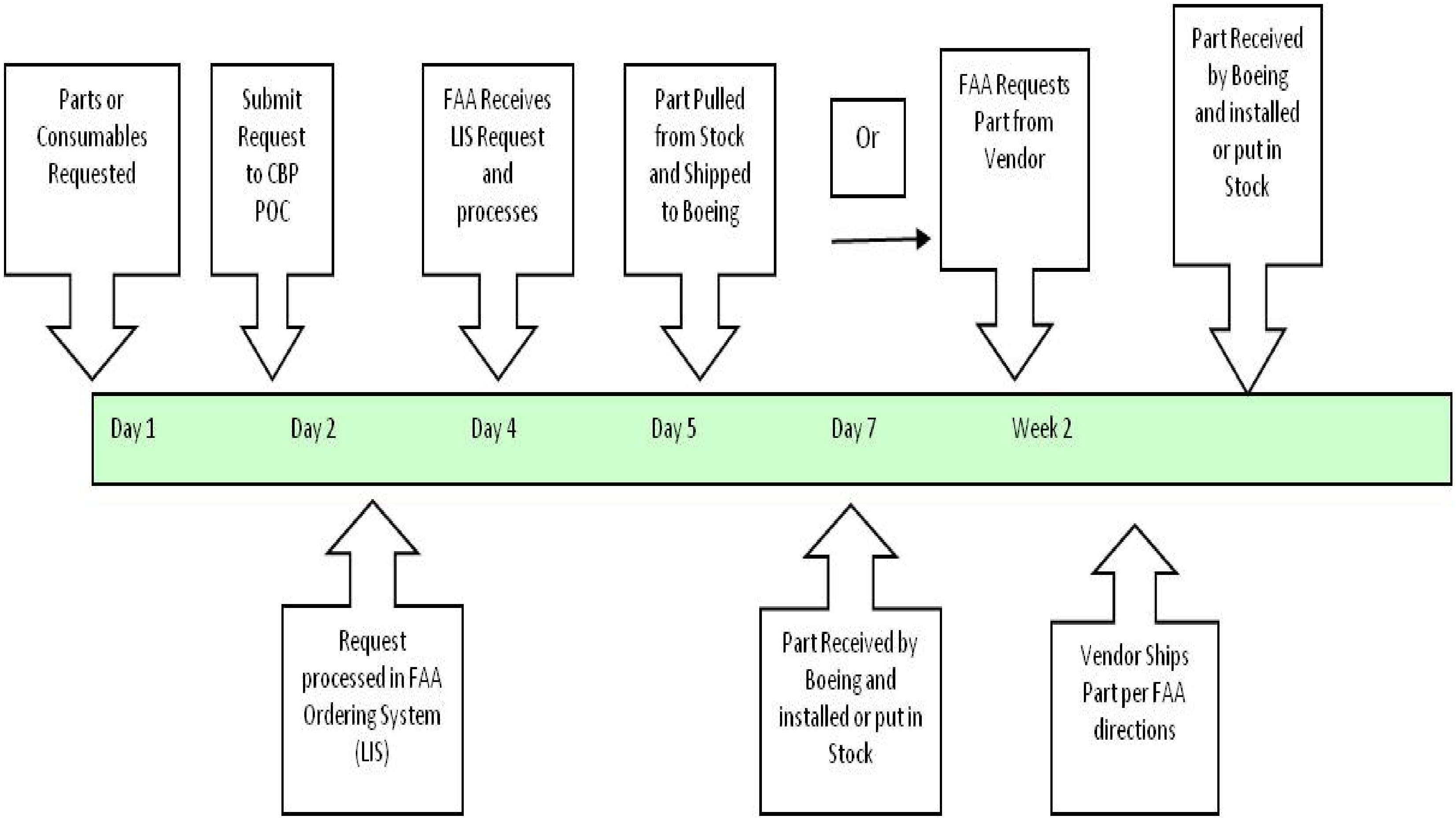
# Backup

## RMA Process



# Backup

## Parts Ordering Process



# Backup

SBInet

## Spares provisioning Block 1 System

| Nomenclature | Part No. | Total Sys Qty | MTBF | Repairable | Logistics K-factor | MTBD | Turn-Around Time (Days) | Spares to Procure |
|---|---|---|---|---|---|---|---|---|
| Camera, Night, Ranger HRC-U | 614005704/32A | 18 | 9,669 | Y | 1.5 | 6,446 | 45 | 6 |
| Camera, Daytime Video | 4107372 | 18 | 43,800 | Y | 1.5 | 29,200 | 45 | 2 |
| Pan Tilt Assy, Quickset Sentry 90 | 4107368 | 18 | 35,040 | Y | 1.5 | 23,360 | 45 | 2 |
| Radar Antenna | 366-1020-001 | 18 | 29,917 | Y | 1.5 | 19,945 | 90 | 4 |
| Pedestal, Radar Drive | 366-1500-001 | 18 | 63,453 | Y | 1.5 | 42,302 | 45 | 2 |
| AC Power Distribution Unit | 7608AD2012DN | 25 | 115,000 | N | 1.5 | 76,667 | 45 | 5 |
| Server, Industrial Device, 2 Port, RS-232/422/4850N | NPORT IA-5250 | 36 | 78,000 | N | 1.5 | 52,000 | 45 | 6 |
| Cable, SSCU to Radar | 06111343-2 | 18 | 175,200 | Y | 5 | 35,040 | 45 | 2 |
| Advanced Remote Terminal Unit (ARTU) | 9480BOE-01 | 29 | 23,360 | Y | 1.5 | 15,573 | 45 | 5 |
| Argus Controller | CXRF 018-557-20 | 25 | 43,800 | Y | 1.5 | 29,200 | 45 | 3 |

# Backup

SBInet

## Spares provisioning MSS System

| Nomenclature | Part No. | Qty per End Item | Qty of End | Total Sys Qty | Repairable | MTBF | Logistics K-factor | MTBD | Turn-Around Time (Days) | Recommended Spares (60 Sys) |
|---|---|---|---|---|---|---|---|---|---|---|
| Camera, Infrared | 23047MZ | 1 | 60 | 60 | Y | 5,000 | 1.5 | 3,333 | 45 | 25 |
| Camera Assy, Daytime | T5855-0001-001 | 1 | 60 | 60 | Y | 43,800 | 1.5 | 29,200 | 45 | 4 |
| Pedestal, Pan & Tilt | 980015 | 1 | 60 | 60 | Y | 7,700 | 1.5 | 5,133 | 45 | 17 |
| Antenna, Radar | 366-1020-001 | 1 | 60 | 60 | Y | 29,917 | 1.5 | 19,945 | 45 | 6 |
| Pedestal, Drive, Radar | 366-1500-001 | 1 | 60 | 60 | Y | 63,453 | 1.5 | 42,302 | 45 | 3 |
| Remote Data Relay (RDR) | P/N CSCU-LR SA RDR | 1 | 60 | 60 | Y | 43,800 | 1.5 | 29,200 | 45 | 4 |
| Generator, Electrical Power (Diesel) | 5.5HDKBB2860C | 1 | 60 | 60 | Y | 20,000 | 1.5 | 13,333 | 45 | 8 |
| Cable, Radar, ARSS | 700422-01 | 1 | 60 | 60 | Y | 175,200 | 1.5 | 116,800 | 45 | 2 |
| Recorder, Digital Video | QDC | 1 | 60 | 60 | Y | 300,000 | 1.5 | 200,000 | 45 | 1 |
| Computer, Laptop | RNB230N | 1 | 60 | 60 | Y | 33,300 | 1.5 | 22,200 | 45 | 5 |