Operators and Technicians Handbook

For the

MULTI-MISSION SUITE

ELTA

DOCUMENT NO. 16814

Decrmber 2024

NOTICE: **This Multi-mission Suite Handbook has been evaluated by Mission Operations for use of Multi-mission Suite Aircraft.**
The data provided herein reflects all the ELTA Group B modifications for Mission Operation.

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List of Effective Pages

Dates of issue for original and changed pages are:

Material Dated	Reflects Update Type	Number	Date
July 2022	Basic Issue	-	
December 2022	1st Draft	0	16/12/2022
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Total number of pages in this publication is 108, comprising:

Chapter/ Page	Change No.
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FM-1 - FM-10	0
GI-1 - GI-10	0
NP-i - NP-ii	0
NP-1 - NP-16	0
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SO-1 - SO-24	0
TS-i - TS-ii	0
TS-1– TS-29	0
EP-i - EP-ii	0
EP-1 - EP-6	0

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Purpose

This document designated to guide and assist operators and technicians with operating the AMS.

This document contains general operating instructions, under different operating conditions, and operating instructions for handling system failures.

This document is intended for qualified operators and technicians only, who have undergone training courses for the knowledge and operation the AMS.

WARNING: **An operator or technician who has not passed the appropriate certifications may not operate the AMS.**

Introduction

The following document comprises the following chapters:

- Chapter 0 - Comprises Handbook introduction and AMS general information
- Chapter 1 - Comprises operator's normal procedure
- Chapter 2 - Comprises subsystems operation and ground procedures
- Chapter 3 - Comprises subsystems troubleshoot procedures
- Chapter 4 - Comprises abnormal and emergency procedures

Safety

Warnings and **Cautions** precede the text and follow the paragraph heading to which they apply. **Notes** may precede or follow applicable text, depending upon the material to be highlighted. Warnings, cautions or notes are concise statements used to emphasize important or critical data.

WARNING: *A warning highlights an essential or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in injury to, or death of personnel or long-term health hazards.*

CAUTION: *A caution highlights an essential or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment or loss of mission effectiveness.*

NOTE: **A note highlights or clarifies an essential system description or operating or maintenance procedure, condition or statement.**

Radiation Safety Distance:

Prior to transmitting on the ground, meet the safety pre-conditions and distances for electromagnetic radiation.

CAEW System Elements	Electromagnetic Radiation Distances [m]				Notes
	Personnel		Ordinance	Fuel	
	Occupational	General Public			
X-RADAR					
VHF Mission					
SDN					
LOS					
SATCOM					
UHF (E-RADIO)					From RAD/8400 [D-6]
VHF					From RAD/8391 [D-7]
* Aircraft communication system which operates below XXX MHz, there is no defined MPEF. There is a sweeping ban of 50 feet (15 m) safety distance from antenna to fueling operations/fuel-handling areas regardless the frequency.					

List of Abbreviations

AAU	Antenna Assembly Unit
A/C	Aircraft
AC	Alternating Current
ACS	Airborne Communication Section
ACU	Antenna Control Unit
ADS-B	Automatic Dependent Surveillance - Broadcast
AEA	AFT Equipment Area
AIS	Automatic Identification System
AJB	Audio Junction Box
AMS	Airborne Mission Segment
BIT	Built-in Test
CAS	Crew Alerting System
CB	Circuit Breaker
CB_AGS	GAC Project name
CCC	Communication Control Computer
CDL	LOS System
CLDU	Clock Distribution Unit
COMINT	Communication Intelligence
COMM	Communication
CTS	RDR Control and Status
DACP	Digital Audio Control Panel
DB	Database
DC	Direct Current
DCS	Datacom Switch
DDL	SDN System
DF	Direction Finding
DG	Double Group
DGA	Double Group Adaptor
DL	Data Link
DSE	Digital Spatial ELINT

DSGU	Double Super Group Unit
DSRP	Digital Spatial Receiver and Processor
ECS	Environment Cooling System
EIS	External Interface Server
ELINT	Electronic Intelligence
EMI	Electromagnetic Interference
EO/IR	Electro Optical / Infra-Red
EOWS	ESM Operator Workstation
ESM	Electronic Surveillance Measures
ESMP	ESM Processor
FE	Front End
FEP	Front End Processor
FER	Front End Receiver
GFE	Government Furnished Equipment
GIS	Graphic Information System
GPS	Global Positioning System
GSE	Ground Support Equipment
GUI	Graphic User Interface
HF	High Frequency
HMI	Human Machine Interface
HPA	High Power Amplifier
ICS	Internal Communication System
IES	Image Exploitation System
IFA	In Flight Alinement
INS	Inertial Navigation System
I/O	Input / Output
IOBC	Input Output Blanking Centre
IVA	Integrated Viewing Application
LCS	Liquid Cooling System
LOS	Line of Sight datalink system
LRU	Line Replaceable Unit

VHF	Very High Frequency
MC4I	Maritime C4I
MCCS	Multi-Channel COMINT Sensor
MCP	Mission Control Panel
MPD	Mission Parameters Data
MPDB	Main Power Distribution Box
MPW	Mission Plan Workstation
MRX	Main Receiver
MS	Mission System
MSDC	Multi-Sensor Display and Control
MTS	Mission Technical Server
NAV	Navigation Data Distribution
NCC	SDN computer / Network Communication Computer
OTS	Operator Training System
OWS	Operator Workstation
PDCS	Pilots Display and Control System
PDB	Power Distribution Box
PDU	Power Distribution Unit
PFM	Pre-Flight Message
PFL	Pilot Failure List
PTT	Push to Talk
RCU	Radar Control Unit
RF	Radio Frequencies
RFDU	RF Distribution Unit
RM	Removable Media
RRS	Recording Review System
RSP	Radar Signal Processing
TRB	Return to Base
Rx	Receiver
SAR	Synthetic Aperture Radar
SAT/SATCOM	Satellite Communication

SDN	SAKNAY Data Network
SIGINT	Signal Intelligence
SOS	System of Systems
SOT	Safety of Transmit
SWG	SAR While GMTI
SYMON	System Monitoring
TBD	To Be Determined
TRU	Transmit Receive Unit
TSU	Time Source Unit
Tx	Transmit
UHF	Ultra-High Frequency
UI	User Interface
USB	Universal Serial Bus
UTC	Universal Time Coordinated
VHF	Very High Frequency
VoIP / VOIP	Voice over Internet Protocol
WOW	Weight on Wheels

GENERAL INFORMATION

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Electrical Power Limitations

1. AMS can power on using external GSE, and switched to A/C engines power

2. However, AMS power **cannot** be switched from A/C engines power to external GSE

3. Current lower than 9A is not showed on MCP display (displayed 0A)

4. Typical current values for left and right 270VDC generators:

AMS excluding RDR	RDR	L Gen.	R Gen.	±
Auto power up	OFF	0	12	
All AMS excluding ELINT	OFF	10	12	5
All AMS	OFF	12	19	5
All AMS	STBY	38	38	5
All AMS	SAR Tx	44-50	50-54	5
All AMS	Weather Tx	42	42	5
All AMS	Sea Tx	68	78	10

5. During RDR SAR mode transmission, between photographs, RDR current may drop

6. Typical behavior for RDR **combined** modes

   a. During simultaneously SAR and Weather modes transmission, L and R GEN current expected to be fluctuating. Every 15 seconds the current can **increase** for 1 second by 12A

   b. During simultaneously SEA and Weather modes transmission, L and R GEN current expected to be fluctuating. Every 15 seconds the current can **decrease** for 1 second by 8A

   > **CAUTION:** **Working out of power limitations (current or voltage) is prohibited.**

7. After power OFF any power switch, it is essential to wait at least 10 seconds before power it ON again

   > **CAUTION:** **Power ON too soon, can cause a serious system fault.**

Cooling Limitations

Liquid Cooling System (LCS) Limitations

1. The LCS system is designed to supply cooling to the RDR system, ELINT system, and Racks 1-4 & 7

    NOTE: **To avoid liquid freezing, it is essential that LCS system will be activate during all flight.**

2. LCS Temperatures definitions:

    a. Nominal fluid supply temperature: 25°C

    b. Controlled range: 25 ±10°C.

    c. Typical actual range: 27 ±2°C

3. LCS Temperatures points of interest:

    a. Maximum temperature for transient operation: 40°C

    b. MS disconnect temperature: 50°C.

    c. Minimum temperature for MS operation start STANDBY: 0°C

    d. Minimum temperature for MS operation start full load: 10°C

MS Racks 1-4 Cooling Limitations

1. MS Racks 1-4 cooling system (Baggage compartment) is designed to provide cold air at maximum 40°C

    a. On ground operation, the air cooled by LCS cart, connected to loop B inlet. LCS MODE should be activated

    b. On flight operation

    (1) Before takeoff and up to 6Kf - ECS MODE should be activated. All OPR AREA ECS gaspers should be closed

    (2) Above 6Kf - LCS MODE must be activated. OPR AREA ECS gaspers can be opened

        NOTE: **For effective operation, it is essential that both baggage compartment doors will be closed**

MS Systems Cooling limitations
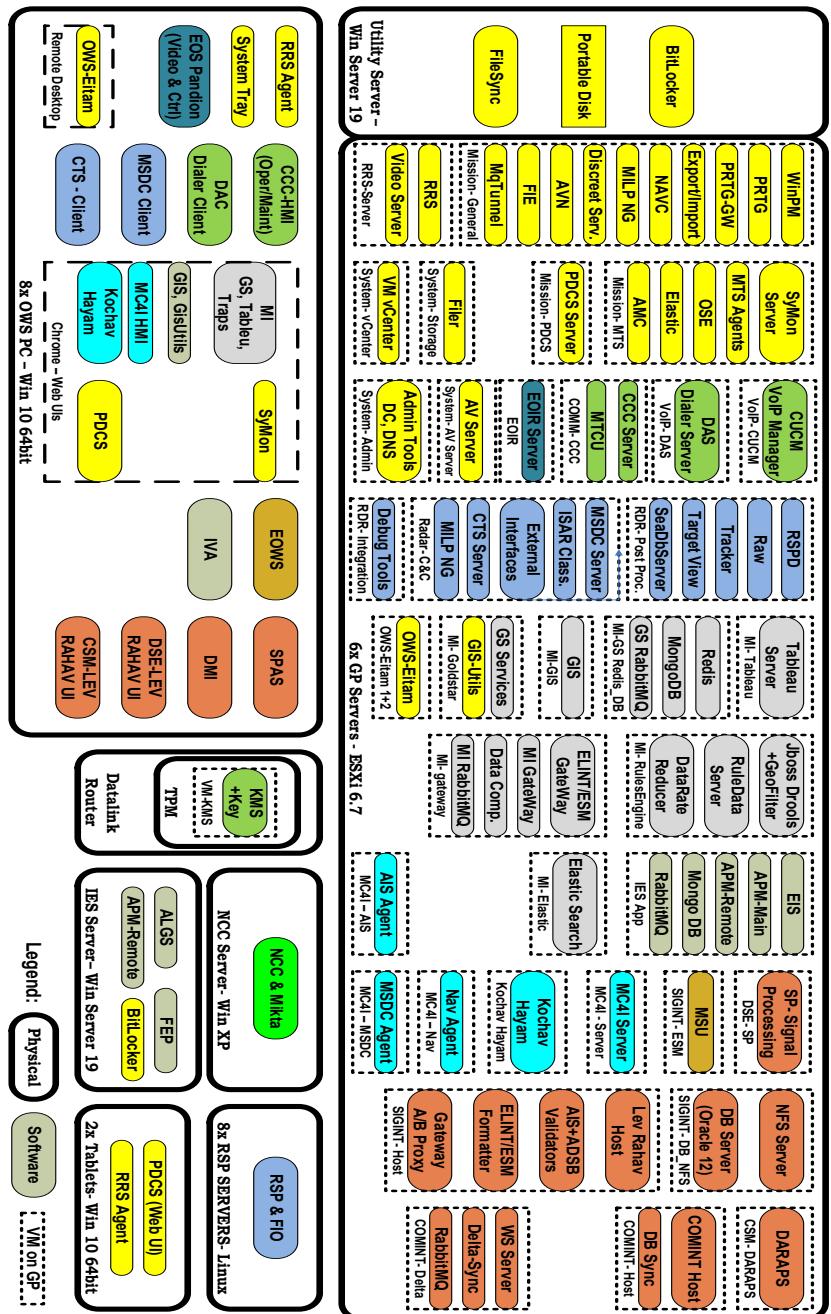
1. MS, RDR and ELINT systems must use LCS cooling

    a. Relevant LCS pump **must** be operate before power up those systems

        (1) LCS Loop A cooling

            (a) Partial RDR system

            (b) ELINT system

            (c) MS units at Rack7

        (2) LCS Loop B cooling

            (a) Partial RDR system

    b. LCS temperature must be monitored routinely

2. On ground, SAT and LOS transmission is restricted by direct external cooling to their amplifier in the boiler room

Systems Limitations

1. Communication system limitations

    a. Operating SAT & LOS systems simultaneously is prohibited

    b. SAT antenna must be powered on during taxi, takeoff and landing

2. EOIR System limitation

    a. EOIR must be powered on, on STOW mode, during taxi, takeoff and landing

3. COMINT System limitations

    a. In order to avoid Radio interference, during a COMINT mission

        (1) All E-RADIO radios should **not** set to E-RADIO mode (only single mode is allowed),

        (2) All on board radios transmissions (UHF, VHF, HF) must be coordinated with COMINT operators

4. PDCS System limitations

    a. In order to display AIS targets, MSDC application must be opened on some OWS, as **Master** user

Computers Setup

System	Virtual Machines (VM) On GP Servers
MISSION	MISSION-GENERAL
	MSN-MTS
	MSN-PDCS
	MSN-RRS-SERVER
COMM	CCC
	COMM-DAS
	CUCM
COMINT	DARAPS
	DELTA
	HOST
ELINT	SIG-DB
	DSE-SP
	SIG-HOST
ESM	ESM
IES	IES-APP
RDR	RADAR-CC
	RADAR-RPP
MULTI-INT	MI-ELASTIC
	MI-GATEWAY
	MI-GOLDMINE
	MI-GOLDSTARAPP
	MI-GOLDSTARRABBIT
	MI-RULESENGINE
	MI-GIS (Maps)
MC4I (NAVY)	AIS-AGENT
	KOCHAV
	NAV
	MSDC
	SERVER

Physical Computers
6x GP Server
8x RSP Server
IES FEP Server
Utility Server
8x OWS PC
NCC PC
2x PDCS Tablet
2x PDCS Tablet

Utility Server – Win Server 19: FileSync, Portable Disk, BitLocker

Remote Desktop: OWS-Eitam, System Tray, RRS Agent, EOS Pandion (Video & Ctrl)

CTS – Client, CCC-HMI (Oper/Maint), DAC Dialer Client, MSDC Client

8x OWS PC – Win 10 64bit / Chrome – Web UIs:
MI GS, Tableu, Traps, GIS, GisUtils, Kochav Hayam, MC4I HMI, PDCS, SyMon

IVA, EOWS, DMI, SPAS, CSM-LEV RAHAV UI, DSE-LEV RAHAV UI

Datalink Router: TPM, VM-KMS, KMS +Key

NCC Server– Win XP: NCC & Mikta

IES Server– Win Server 19: ALGS, APM-Remote, FEP, BitLocker

Legend: Physical, Software, VM on GP

2x Tablets: Win 10 64bit: PDCS (Web UI), RRS Agent

8x RSP SERVERS– Linux: RSP & FIO

Mission-General: RRS-Server, Video Server, RRS, MqTunnel, FIE, AVN, NAVC, MILP NG, Discreet Serv., Export/Import, PRTG-GW, PRTG, WinPM

Mission-MTS / Mission-PDCS: System-vCenter, VM vCenter, System-Storage, Filer, PDCS Server, AMC, Elastic, OSE, MTS Agents, SyMon Server, CUCM VoIP Manager

System-Admin / Mission-AV Server / COMM-CCC: Admin Tools DC, DNS, AV Server, EOIR, EOIR Server, MTCU, CCC Server, VoIP-DAS, DAS Dialer Server, VoIP-CUCM

RDR-Integration / Radar-C&C: Debug Tools, MILP NG, CTS Server, External Interfaces, ISAR Class., MSDC Server, RDR- Post Proc., SeaDbServer, Target View, Tracker, Raw, RSPD

6x GP Servers - ESXi 6.7: OWS-Eitam 1+2, GIS-Utils, GS Services, MI-Goldstar, MI-GIS, GIS, MI-GS Redis_DB, GS RabbitMQ, MongoDB, Redis, MI-Tableau, Tableau Server

MI RabbitMQ, Data Comp., MI GateWay, ELINT/ESM GateWay, MI- gateway, MI- RulesEngine, RuleData Server, DataRate Reducer, MI-RulesEngine, Jboss Drools +GeoFilter

MI- Elastic, Elastic Search, IES App, Mongo DB, RabbitMQ, APM-Main, APM-Remote, EIS

MC4I – AIS, AIS Agent, MC4I – Nav, Nav Agent, Kochav Hayam, Kochav Hayam, MC4I- Server, MC4I Server, SIGINT- ESM, MSU, DSE- SP, SP- Signal Processing

MC4I – MSDC, MSDC Agent, SIGINT- Host, Gateway AB Proxy, ELINT/ESM Formatter, AIS+ADSB Validators, Lev Rahav Host, SIGINT- DB, NFS, DB Server (Oracle 12), NFS Server

COMINT- Delta, RabbitMQ, Delta-Sync, WS Server, COMINT- Host, DB Sync, COMINT Host, CSM - DARAPS, DARAPS

Right column legend chips: MC4I, Mission, COMM, Multi-INT, Radar, IES, SIGINT, ESM, EOIR

Servers content (main software and functionality):

The following table describes the main content of each server.
In a troubleshooting manner, if some functionality doesn't work properly,
the operator can track back the server that might have to be reset.
Any server that not described as "physical" is a virtual server (VM).

System	Server	Contains	Functionality affected
General	GP#1-6 (physical)	VMs Cluster	All VM servers
	KMS (physical + VM)	Encryption keys for VM servers	VM servers power-up ability (during the "power on" process)
	AV	Antivirus and device management server	• Antivirus protection • External USB devices management
	DC	System policy Users admin DNS server	• Users management • IES & UTS keys • DNS names
	FILER	File storage	• All applications data storage • All systems logs storage • Mapping X: network drive • MPD\PFM local storage
	VCSA	VM server management	Enable access to the VM servers
Mission	UTS (physical)	RM canister File Sync	• Flight data from MSS (MPD\PFM) • Save flight data & SAR images onto RM

System	Server	Contains	Functionality affected
	MSN-GENERAL	Mission apps	• Mission operation o INS Navigation (exclude MSDC) o Symon data (FIE model) o AVN avionics discretes o IO2LAN discretes • Radar CTS server • EOIR video display in PDCS • MILP recording • PRTG – hardware monitoring on Symon
	MSN-MTS	Symon MCS legacy MTS agents	• SyMon connection • Agents - Interfaces to Mission apps o Power control o PDCS Navigation o LCS data o COMINT control and BIT o PFM loading to SDN, ESM, CCC (radio, LOS, SATCOM) o RPP control o Control and monitoring Linux & Windows services
	MSN-PDCS	PDCS server	PDCS
ELINT (+COMINT)	DSE-SP	-	ELINT PROXY
	HOST	-	ELINT HOST
	SIG-DB	ELINT & COMINT DB ELINT apps	ELINT DB ELINT DMI ELINT DSRP files COMINT DB
COMINT	HOST	HOST server	COMINT
	DARAPS	DARAPS server	COMINT

System	Server	Contains	Functionality affected
	DELTA	DELTA server	COMINT
ESM	ESM	ESM server (MSU)	ESM Host ESM OWS (EOWS)
EOIR	EOIR	EOIR server	EOIR app
Comm.	COMM-CCC	CCC server	CCC
	COMM-CUCM	CUCM	VoIP calls (DAC)
	COMM-DAS	Dialer server	VoIP calls (DAC)
	NCC (physical)	SDN NCC server	SDN
IES	IES (physical)	IES server	IES FEP (products processing) & Algorithms (GEO, ACD, ML, ATR)
	IES-APP	IES server	IES APM, EIS
MULTIINT	GIS	Maps server	Maps service for all apps GisUtils
	MI-GATEWAY	RabbitMQ Gateway TRAPS app.	• Messages \ Data traffic management \ Interfaces for all apps • MI products • MI Sites and rules creation
	MI-GOLDSTAR APP	Goldstar	MULTIINT Goldstar
	MI-GOLDSTAR RABBIT	DB & RabbitMQ	MULTIINT messages
	MI-RULESENGINE	Rules Engine	• MI TRAPS and rules management • MI Goldstar alerts
	MI-TABLEU	DB	MI Tableau

System	Server	Contains	Functionality affected
NAVY (MC4I)	MC4I-SERVER; Mission-plane	Navy server	Zoharim HMI
	MC4I-MSDC	Navy MSDC agent	MSDC/Radar Data
	MC4I-NAV	Navy Navigation agent	Navigation Data
	MC4I-AIS-AGENT	Navy AIS agent	AIS Data
	MC4I-KOCHAV	Kochav Hayam	Connection from MC4I server to Shen Zahav
RADAR	RADAR-CC	MSDC	MSDC client
	RADAR-RPP	RPP server	SAR images, GMTI, SS products
	RSP#1-8 (physical)	SAR images & GMTI processing	• SAR images with missing tile • GMTI tracks with missing area

NORMAL PROCEDURE

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Before Flight

1. Mission Planning at MSS

   a.   Prepare MPD and save it on the removable media

   b.   Check the removable media free space availability

2. Perform Technical Pre-Flight Procedure (SO-5) and Systems Serviceability Pre-Flight Procedure (SO-6)

NOTE: **ELTA recommends maintaining a System Book**

- **Separate from A/C Book**

- **Log system events on System Book**

- **Ensure SYSTEM BOOK has no overdue waivers**

- **Comprehend the configuration of the installation and what the existing system faults are**

Before Power up

1. On UTS server, insert the removable media containing MPD

2. Verify the following MS **C.B**s are in the correct state

    CAUTION   *An open and secured CB can be closed only when authorized*

    CAUTION: *Do not use the circuit breakers as on/off switches. Failure to comply may result in damage to electrical equipment*

    NOTE: **This paragraph (CBs state) can be done parallel to the next paragraph (Switches state)**

LOCATION		NAME	STATE
Cockpit		EFB L	CLOSE
		EFB R	CLOSE
REER		UHF#1	CLOSE
		UHF#2	CLOSE
MPDB		COLUMN 1	OPEN (NOP)
		COLUMN 2	OPEN (NOP)
		PDCS PWR	OPEN (NOP)
		BLR RM MS FANS	OPEN (NOP)
		All other MPDB CBs	CLOSE
Rack-6	PSD-6	CB-1	CLOSE
		CB-2	CLOSE
		VCU-1A/1B	CLOSE
		CAN2LAN	CLOSE
		P.S.FAN 1	CLOSE
		P.S.FAN 2	CLOSE
		BUS-D	CLOSE
		BUS-G	CLOSE
		BUS-H	CLOSE
	IO2LAN FRONT	12VDC	CLOSE
		DISCRETE	CLOSE
		5VDC	CLOSE
		RS232/422/485	CLOSE
Rack-7	Back panel	R7 FAN	CLOSE
	PDU-7	28V DC CONT	CLOSE

LOCATION		NAME	STATE
Operators Area	Behind OWS#7	L MS RACK	CLOSE
		R MS RACK	CLOSE
		FWD MS RACK	CLOSE
Rack-3	PSD-3	CON.	CLOSE
		UNI.	CLOSE
		P.S.3_1	CLOSE
		P.S.3_3	CLOSE
		BUS-D	CLOSE
		BUS-E	CLOSE
		BUS-F	CLOSE
		BUS-G	CLOSE
		CAN2LAN	CLOSE
		FAN_1 (2 CBs)	CLOSE
		FAN_2 (2 CBs)	CLOSE
	IO2LAN AFT	12VDC	CLOSE
		DISCRETE	CLOSE
		5VDC	CLOSE
		RS232/422/485	CLOSE
Rack-4	PSD-4	CAN2LAN	CLOSE
		ENCRYPTOR	CLOSE
		BUS-E	CLOSE
		BUS-F	CLOSE
		P.S. FAN	CLOSE

3.   Ensure the following MS switches are in the correct state

LOCATION		NAME / DESCRIPTION	STATE
Cockpit	Tablets outlets (x2)	ON/OFF EFB	DEPRESS
Rack-6	PDU#6 CTRL	PDU#6 CTRL	ON
	UTILITY PANEL	UTILITY PWR	OFF
	GPS PANEL	GPS SOURCE	AS REQUIRED
	IOBC	RDR Tx (Left)	DISABLE
		RDR Tx (Right)	DISABLE
		LASER Tx	NA (NOP)
	E-RADIO	ZEROIZE	SECURED

LOCATION		NAME / DESCRIPTION	STATE
RACK-7	PDU-7	SPARE-1	NA (NOP)
		SPARE-2	NA (NOP)
		GP-1	ON
		GP-2	ON
		GP-3	ON
		IES	ON
		RSP-1	ON
		RSP-2	ON
		RSP-3	ON
		RSP-4	ON
C1	PDB	Outputs Disable	ENABLE
C2	PDB	Outputs Disable	ENABLE
Operators Area	OWS#1	E-RADIO VCU - E-RADIO1	OFF
	OWS#2,3,4,5,7	E-RADIO VCU - E-RADIO1	OFF
		E-RADIO PTT BOX	AS REQUIRED
	OWS#5	KEY ERASE	DOWN
		FRONT RDR CONTROL	DISABLE
		E-RADIO PTT BOX	AS REQUIRED
	OWS#6	ODEM VHF Shirshur	AS REQUIRED
	OWS#8	(Navy) RCU	AS REQUIRED
		(Navy) VHF-2 CONTROL	CONTROL-RCU
			TRAFFIC-DATA
		ODEM VHF Makmash	AS REQUIRED
RACK-3	UTILITY	PDU#3 CTRL	ON
	ADS-B	STBY	I (ON)
	RFDU	POWER	ON
RACK-2	RFDU 1/2	LOCAL\REMOTE	REMOTE
		UHF (x3)	AUTO
		POWER	ON
	E-RADIO (x3) 2,3,4	ZEROIZE	SECURED
RACK-1	E-RADIO (x3) 5,6,7	ZEROIZE	SECURED
	RFDU 1/2	LOCAL\REMOTE	REMOTE
		UHF (x3)	AUTO
		POWER	ON
	DAIU	POWER	NORMAL
	CLDU	POWER	ON

LOCATION		NAME / DESCRIPTION	STATE
RACK-4	PDU#4 CTRL	PDU#4 CTRL	ON
	UTILITY PANEL	UTILITY PWR	OFF
	SDN CONTROL PANEL	CONTROL	NCC
		ANTENNA	Any
		SDN	ON
		ERASE	OFF
	NC2	ERASE	DOWN
	ENCRYPTOR	גע	ON

4. On MCP (OWS#3 ledge), verify **by touching**, that **all 23 switches** (5+18) are **NOT** pressed

Airborne Mission System (AMS) Operation

Mission Systems Power Up

1. Verify with ground crew/pilots, that AMS electrical power is available (115VAC and 270VDC), either by GSE or main engines

2. 115VAC power feed

    a. On the Flight Deck Overhead panel, MASTERS section, press the following switches (ensure that there are not illuminated = ON):

        (1) CABIN

        (2) GALLEY

        (3) MS POWER

    b. On MCP, press LAMP test switch and check LEDs illumination

    c. On MCP, press the A/C PWR switch, verify that ON is illuminated

3. 270VDC power feed

    a. If using an external 270VDC converter, on MCP press EXT PWR switch, verify that ON is illuminated

    b. If using engines generators

        (1) Ask pilots to engaged Mission generators, by pressing "MS L GEN" and "MS R GEN"

        (2) On MCP top segment, verify the generators indicators (L GEN and R GEN) displays ON

        (3) On MCP, ensure stable (5 seconds) voltage indication 270V for both generators

4. On MCP, select (press) and verify that ON is illuminated:

    a. MS PWR

    b. Racks and columns power

        (1) R123-A

        (2) R123-B

        (3) R4

  (4) R6-R7-A

  (5) R7-B

  (6) C1-A, C1-B, C1-C

  (7) C2-A, C2-B, C2-C

5. Wait six (6) minutes (for network establishment)

6. Turn on a single OWS (PC + monitor) and login

7. Open "Power ON-OFF" application, and press "Power ON"

 NOTE: **Power on script window will appear and a script should be running. It could run up to 20 minutes.**

8. Open and monitor "Pinger" application (sort by IP address)

9. Perform INTERCOM check

 a. All operators - check communication with other operators

 b. Mission Commander - check communication with cockpit

 c. On all DACPs, verify that all datalink channels (LOS1-4, SAT1-2) are off

10. On LCS control panel, verify/set:

 a. Press LAMP test switch and check LEDs illumination

 b. CNTRLR PWR is illuminated and display ON

 c. PUMP PWR switches (2) are NOT illuminated

 d. MODE switch is illuminated and display LOCAL

 e. ECS switch is illuminated and display ON

 f. LCS switch is NOT illuminated

 g. Close all ECS gaspers (air condition vents) at the operators' area

11. At TSU Front and TSU Aft front panels

 a. Verify four (4) green LEDs are illuminated

 b. Verify correct date & time and at least four (4) satellites

12. Wait until the power-on script finished running and its window closed

13. Power on and login all other OWSs and PDCS tablets

14. Verify that all "Pinger" indications are green, excluding:

    a. Other OWS stations

    b. RDR units

    c. PDCS Tablets

    d. NCC

15. At OWS, open SyMon

    a. Select NAVIGATION system, on its structure tree section press the NAVIGATION information ⓘ icon

        (1) Verify that "Active antenna" field (GPS source) is as required (ADA or Mission, as selected at GPS Source switch). If not, change the source:

            (a) At INS_GPS line (NAVIGATION structure tree) - globe icon, set the source as required (Immune/not immune option)

            (b) Ensure the "Active antenna" state has changed

NOTE: **Following GPS source switching, TSU will required time dada for approx. 60 sec.**

        (2) Verify that Hybrid FOM value is 26 and the NAV data is correct

    b. Select MISSION system. On its structure tree section press AVIONIC information ⓘ icon. Verify that the following states are OFF:

            (a) RDR SOT #1

            (b) RDR SOT #2

            (c) Weather SOT

16. Verify that Removable Media has established properly, by opening U: drive on OWS. Some libraries should be displayed

17. The following systems can be powered on, via SyMon power tree, as required

    a. COMINT

    b. AIS

    c. ADSB

    d. ESM

e.   SDN

f.   NAVY - DATALINK RADIO (Shen zahav)

g.   NAVY - VHF RADIO

18. Communication systems should be powered on automatically, via CCC - Radio, SATCOM, LOS

> **CAUTION:**   ***SATCOM system must be powered on during takeoff and landing***

> **CAUTION:**   ***It is forbidden to transmit SATCOM or LOS on the ground, without direct external cooling to their amplifier in the boiler room***

19. Select all E-RADIO VCUs and PTTs buttons as required (OWS#2,3,4,5,7), including E-RADIO1 (cockpit) and E-RADIO2 (OWS#1) control boxes configuration

20. Verify/Load PFM

a.   GIS - Infrastructure

b.   COMINT - Scan table

c.   ELINT - Mission

d.   IES - MPW mission and reference data

21. Set/Check COMM parameters

a.   At CCC

(1)   SAT frequencies

(2)   LOS channels and ground station

(3)   E-RADIO channels and frequencies

22. Set/Check

a.   SDN - Call sign, global and private

b.   ESM - Strategy

c.   PDCS

d.   Multi-INT - Rules

23. Open RRS Client status window and verify

    a. All 8 OWS stations and 2 tablets video channels are active recording

    b. Talk on Intercom channel and observe the relevant channel on RRS is recording

    c. Talk on Radio channel and observe the relevant channel on RRS is recording

24. If AMS powered up using an external 270VDC and 115VAC power, switch the power source to engines generators:

    a. Verify/ask cockpit to power up APU and main engines

    b. Check with cockpit that APU GENERATOR switch is **OFF**

> **CAUTION**   *Switching to engines power through APU will cause some AMS systems to shut down*

    c. Ask pilots to switch 115VAC source

    d. Ask cockpit to engaged **one** 270VDC generator **only**, by pressing either "MS L GEN" **or** "MS R GEN"

    e. On MCP top segment, ensure the selected generator indicator (L GEN or R GEN) display ON

    f. On MCP, ensure **stable** (5 seconds) voltage indication 270V (L GEN or R GEN)

> **CAUTION**   *Engaged second generator before first generator engagement is stabilized, will cause some AMS systems to shut down*

> **NOTE:**   **When switching from an external power, usually the generator connection fails (Aircraft anomaly) and it is required to connect the other generator**

    g. Ask cockpit to engaged the other 270VDC generator

    h. On MCP top segment, ensure the other generator indicator display ON

    i. On MCP, ensure stable (5 seconds) voltage indication 270V for both generators

    j. Notified cockpit that GSE can be disconnected from aircraft

25. Close AEA door

26. Verify that all loose articles are secured

27. Verify with cabin crew - seat belts buckled up and oxygen test OK

28. If Weather RDR is needed for takeoff, during taxi

    a. Verify with cockpit that PDCS tablet has powered on

    b. On LCS Control Panel, turn on NOSE/TAIL PUMP PWR and SIDE/IFF/MS RACKS PUMP PWR switches and verify they are illuminated and display ON

    c. On Rack #6 IOBC, set two (2) RDR Tx switches to ENABLE

    d. Power up RDR system, refer to RDR - Power up Procedure (SO-13)

    e. On Rack #6 IOBC, set two (2) RDR Tx switches to **DISABLE**

    f. On OWS#5 ledge, set FRONT RDR CONTROL switch to ENABLE

    g. Pilots can operate weather RDR

    h. Continually, monitor LCS temperatures

29. Notify the pilots that the AMS and cabin are ready for taxi and takeoff

After Takeoff

1. LOS or SAT can be operated and transmit

    NOTE: **LOS and SAT cannot transmit simultaneously**

2. Above 6 Kft, On the LCS control panel perform the following:

    NOTE: **LCS control panel switches, are controlled by pressing and holding them for about 1 second**

    a. Turn on NOSE/TAIL PUMP PWR and SIDE/IFF/MS RACKS PUMP PWR switches and verify they are illuminated and display ON

    b. Turn on LCS switch and verify ON is displayed

    c. Turn off the ECS and verify it's ON indication extinguishes

3. ECS gaspers can be opened at the operators' area

    NOTE: **The temperature on the LCS control panel should be monitored at least once every 5 minutes to ensure compliance with Liquid Cooling System (LCS) Limitations, refer to Cooling Limitations (GI-3)**

    NOTE: **ECS can be used up to 18 Kft. Operate ECS above 18 Kft will initiate a cockpit CAS massage**

4. RDR and ELINT systems can be activated as required

    CAUTION: ***Radar & ELINT must not be operated without effective LCS. constantly monitor LCS temperature for both loops. If temperature exceeds its limitation, RDR & ELINT systems must be shutdown***

    a. On Rack #6 IOBC, set two (2) RDR Tx switches to ENABLE

    b. Power up RDR system, refer to RDR - Power up Procedure (SO-13)

    c. ELINT system can be powered on via SyMon

Routine of Work

Ongoing Monitoring

1. 270VDC Current (MCP)
    a. Values
    b. Stabilization
2. Temperatures
    a. AMS Systems - SyMon
    b. LCS - Control Panel or SyMon
3. Time (TSU Front and TSU Aft front panels)
    a. No Holdover state
    b. 4 green LEDs
4. RRS recordings
    a. Displays
    b. Audio channels

Cabin Scanning

NOTE: **This procedure is recommended to be performed every hour**

1. Be aware for any suspicion indication, such as unusual odor or noise
2. Check for LCS leak or condensation
3. Check physical equipment temperature

On RTB (Return to Base)

Before Landing

NOTE: **"Before landing" activities can be started as soon as RTB was called.**

Excluding "Power OFF" activation, all activities MUST be completed before landing.

1. Via Symon, turn off ELINT system (SW & HW)

2. Via Symon, turn off COMINT system (SW)

3. Via Joystick or EosPandion application, Set EOIR to STOW mode

4. Via CCC, Set SAT antenna to TAKE OFF LANDING mode

5. Via CCC, Set LOS power mode to POWER OFF

6. Via Navy Command and Control HMI, stop "Mission Server" processes

7. On all DACPs, verify that all datalink channels (LOS1-4, SAT1-2) are off

8. Verify that all loose articles are secured

9. Verify with cabin crew - seat belts buckled up

10. If weather RDR is needed for landing

    a. On LCS Control Panel, verify/turn on NOSE/TAIL PUMP PWR and SIDE/IFF/MS RACKS PUMP PWR switches and verify they are illuminated and display ON

    b. On Rack #6 IOBC, set two (2) RDR Tx switches to ENABLE

    c. Power up RDR system, refer to RDR - Power up Procedure (SO-13)

    d. On Rack #6 IOBC, set two (2) RDR Tx switches to **DISABLE**

    e. On OWS#5 ledge, set FRONT RDR CONTROL switch to ENABLE

    f. Operate weather RDR

    g. Verify with cockpit that PDCS tablet has been switched on

    h. Below 18 Kft, at LCS Control Panel, MS Racks section

        (a) Set ECS switch to ON

(b)   Set LCS switch to OFF

i.   Continually, monitor LCS temperatures

11. If Weather RDR is **not** needed

a.   Shut down RDR system, refer to RDR - Shutdown Procedure
(SO-14)

b.   At IOBC Rack#6, set two (2) RDR Tx switches to DISABLE state

c.   At "Power ON-OFF" application, activate the "Power OFF"
command

NOTE: **"Power OFF" can be activated any time from now
on.**

d.   Below 18 Kft, at LCS Control Panel

(1)   At MS Racks section

(a)   Set ECS switch to ON

(b)   Set LCS switch to OFF

(2)   Set both LCS PUMP PWR switches to OFF

After Landing

1.   If weather RDR was operated during landing

a.   Shut down RDR system, refer to RDR - Shutdown Procedure
(SO-14)

b.   Turn off both LCS PUMP PWR

2.   If not done before landing, on SyMon, at "Power ON-OFF"
application, activate the "Power OFF" command

3.   At "Power ON-OFF" application, press the "Pinger" button and wait
until all LEDs have turned red (except current OWS, DCS1, DCS2,
DCS3)

NOTE: **Power off process takes approx. 10 minutes**

4.   Shutdown the current OWS computer that used for the shutdown
process

5.   Depress all OWSs power buttons

6.   Switch off all E-RADIO VCUs (OWS#1,2,3,4,5,7)

7. Wait for final parking

8. On MCP (OWS#3) depress:

    a. R123-A, R123-B, R4, R6-R7-A, R7-B

    b. MS PWR

    c. EXT PWR

    d. A/C PWR

9. Inform the pilots that the engines can be turned off

10. Verify with cockpit that the following switches are OFF

    a. CABIN

    b. GALLEY

    c. MS POWER

11. Set all AMS switches to their primary states, refer to the switches state table aforementioned, Before Power up (NP-2)

12. UTS Removable Media can be ejected

End of procedure

SYSTEM OPERATIONS

Table of Contents

MS Ground Operation Procedure (Technicians)

Power up AMS

1. Activate Normal Procedure, "Before Power up" chapter (NP-2)

2. Connect and operate external 115VAC and 270VDC power supplies

3. Connect and operate external LCS cart

4. 115VAC power feed

    a. On the Flight Deck overhead panel, MASTERS section, ensure the following switches are pressed and not illuminated (i.e. ON state):

        (1) CABIN

        (2) GALLEY

        (3) MS POWER

    b. On MCP, select (press) A/C PWR switch, verify that ON is illuminated

5. 270VDC power feed. On MCP press EXT PWR switch, verify that ON is illuminated

6. On MCP, select (press) and verify that ON is illuminated:

    a. MS PWR

    b. R123-A

    c. R123-B

    d. R4

    e. R6-R7-A

    f. R7-B

    g. If RDR is needed

        (1) C1-A, C1-B, C1-C

        (2) C2-A, C2-B, C2-C

7. Wait six (6) minutes (for network establishment)

8. Turn on a single OWS (PC + monitor) and login

9. Open "Power ON-OFF" application, and press "Power ON"

> **NOTE:**   **Power on script window will appear and a script should be running. It could run up to 20 minutes**

10. Open and monitor "Pinger" application (sort by IP address)

11. On LCS Control Panel

    a. Turn on NOSE/TAIL PUMP PWR and SIDE/IFF/MS RACKS PUMP PWR switches and verify they are illuminated and display ON

    b. At MS RACKS section, verify LCS is illuminated. To turn it ON, press the LCS switch

    c. At MS RACKS section, verify ECS is not illuminated in the MS RACKS. To turn it OFF, press the ECS switch and verify the ON indication extinguishes

    d. Ensure AEA door is closed

    e. Periodically, monitor LCS temperatures

12. At TSU Front and TSU Aft front panels

    a. Verify four (4) green LEDs are illuminate

    b. Verify correct date & time and at least four (4) satellites

13. Wait until the power-on script finished running and its window closed

14. If needed, power on and login all other OWSs and PDCS tablets

15. Verify that relevant "Pinger" indications are green

16. Verify that Removable Media has established properly, by opening U: drive on OWS. Some libraries should be displayed

17. RDR system can be operated

    a. On Rack #6 IOBC, set two (2) RDR Tx switches to ENABLE

    b. Power up RDR system, refer to RDR - Power up Procedure (SO-13)

    c. When finished, on Rack #6 IOBC, set two (2) RDR Tx switches to DISABLE

> **WARNING:**   *Setting RDR TX switches to enable, enabling RDR transmission on ground*

18. At OWS, open SyMon application. The following systems can be powered on, via SyMon power tree, as required

    a. COMINT

    b. AIS

    c. ADSB

    d. ESM

    e. SDN

    f. RADIO - ODEM

    g. NAVY

19. Communication systems should be powered on automatically, via CCC - Radio, SATCOM, LOS

    CAUTION: **It is forbidden to transmit SATCOM or LOS on the ground, without direct external cooling to their amplifier in the boiler room**

20. Load PFM as needed

    a. GIS - Infrastructure

    b. COMINT - Scan table

    c. ELINT - Mission

    d. IES - MPW mission and reference data

End of procedure

Shut down AMS

1. Shut off the operated systems (especially RDR, ELINT, COMINT, Navy C&C)

2. At "Power ON-OFF" application, activate the "Power OFF" command

3. At "Power ON-OFF" application, press the "Pinger" button and wait until all LEDs have turned red (except current OWS, DCS1, DCS2, DCS3, PDB1, PDB2)

    NOTE: Power off process takes approx. 10 minutes

4. Shutdown the current OWS computer that used for the shutdown process

5. Depress all OWSs power buttons

6. On LCS Control Panel, set both LCS PUMP PWR switches to OFF

7. On MCP (OWS#3) depress:

    a.   R123-A, R123-B, R4, R6-R7-A, R7-B

    b.   C1-A, C1-B, C1-C

    c.   C2-A, C2-B, C2-C

    d.   MS PWR

    e.   EXT PWR

    f.   A/C PWR

8. Depress cockpit AMS power switches

    a.   CABIN

    b.   GALLEY

    c.   MS POWER

9. UTS removable media can be ejected

10. Set all AMS switches to their primary states, refer to the switches state table, Before Power up (NP-2)

11. Shut off A/C power and GSE

End of procedure

Technical Pre-Flight Procedure

1. Ensure AMS logbook has no overdue waivers

2. Ensure there are no expired AMS carry over at the A/C logbook

3. Perform AMS external and internal visual inspection

    a. Ensure harmless and completeness of all AMS elements

    b. Ensure proper AMS installation - Panels, Bolts, Units, Cables, Consoles etc.

    c. Ensure absence of LCS leakage from visible LCS pipes connectors

4. Check for absence of Foreign Object Debris (FOD) as tools or materials

End of procedure

Systems Serviceability Pre-Flight Procedure

CAUTION: *Prior to transmitting on the ground, meet the safety pre-conditions and distances for electromagnetic radiation*

1. Power on AMS and the relevant systems, refer to MS Ground Operation Procedure (Technicians) (SO-1).

Mission System Sanity

1. At TSU Front and TSU Aft
   a. Verify four (4) green LEDs are illuminate
   b. Verify correct date & time and at least four (4) satellites
2. Open SyMon application
   a. Verify that navigation data is correct (Lat/Lon, Altitude, Heading)
   b. Verify that LCS parameters are OK
   c. Verify that RM have at least 30% free space
   d. Verify that FILER have at least 30% free space
   e. Open PRTG map and observe systems serviceability
3. Open PDCS tablets and verify ownship and map displayed
4. Open RRS Client status window and verify
   a. All 8 OWS stations and 2 tablets channels are active recording
   b. Talk on Intercom channel and observe the relevant channel on RRS is recording
   c. Talk on Radio channel and observe the relevant channel on RRS is recording

Radar System Sanity

CAUTION: *Operating RDR system without proper cooling can cause hardware damage for unit - verify proper LCS cooling (LCS pumps operate) is available for both loops.*

1. Power up RDR system, refer to RDR - Power up Procedure (SO-13)

2. Open MSDC Client application on Master mode

    a. Verify correct ownship position

    b. Set RDR to AG mode

3. Open IVA application, at MPW mode

    a. Select / Import the relevant mission

    b. Verify all leg's legality

    c. Upload the mission

    d. On top (beside 'Shalac' label) verify that mission ID loaded correctly

4. On PDCS, verify mission ID and instruction loading

Intercom System Sanity

1. Make a communication check with other OWS stations

2. Make a communication check with cockpit stations

Radio System Sanity

1. Make radios communication checks (UHF, VHF) with the control tower or other available station, on all relevant modes (AM, FM, Immune etc.)

ESM System Sanity

1. Open EOWS, verify ESM state is INIT

2. Operate ESMP

    a. Wait until ESM set to STBY mode

    b. On EOWS, on ESMP Monitoring tab, verify all ESM LRUs are green (except CommBCU).

3. Choose the required PFM

4. Choose the required Strategy

5. Set ESM to OPERATIONAL mode

6. Observe ESM LOBs of opportunity

SDN System Sanity

1. Via SyMon, operate SDN system

2. Connect to SDN-NCC computer with Remote Desktop

3. Operate NCC_Main application

4. Press on NCC button to change to NCC mode

5. Verify on NCC Serviceability section

    a. SDN system degraded (yellow)

    b. All green, except METEG, METEGUL

6. Verify on Saknay Box Status section, all green LEDs

7. Verify on MIKTA window

    a. All green LEDs

    b. Saknay Status = OPERATE (green)

8. Change Transmit from SILENCE to TRANSMIT

9. Change Transmit from TRANSMIT to SILENCE

SATCOM System Sanity

1. Open CCC Client, verify
   a. SATCOM system is ON
   b. Navigation data received ("Ins Receive Msg" checkbox is checked)

2. On SyMon load SATCOM PFM. Verify on CCC Client the required frequencies loaded

3. Check SATCOM with ground station
   a. Set SAT mode to AUTO TRACKING and verify SAT starts Search and Modem Lock
   b. To check full data channel, set SAT to TX OPERATE Verify for Link Quality 4

      CAUTION: **It is forbidden to transmit SATCOM on ground, without direct external cooling to the amplifier in the boiler room**

   c. When finish, Set SAT to TX STBY mode and Antenna to TAKEOFF LANDING mode

LOS System Sanity

1. Open CCC Client. Verify:
   a. LOS system is ON
   b. At the LOS hardware tree, all connections and units are green
   c. "Key status" led is green

2. Perform IBIT: On CCC Control menu select: LOS - IBIT. On system's tree the LOS should change to orange (maintenance) and back to green

3. If there is available and visible ground station
   a. Select the relevant ground station
   b. Direct the ground station to the A/C
   c. Set LOS Power mode to LOW
   d. Check link quality

> **CAUTION:** **It is forbidden to transmit LOS on ground, without direct external cooling to the amplifier in the boiler room**

4. When finish, Set LOS Power Mode to OFF

ELINT System Sanity

CAUTION: **Operating ELINT system without proper cooling can cause hardware damage for unit - verify proper LCS cooling (LCS pumps operate) is available for both loops.**

1. Via SyMon
   a. Power on ELINT system
   b. Observe no BIT warnings on sensor
   c. Power on AIS
   d. Power on ADSB

2. On DMI, upload the relevant EPL

3. Open ELINT HMI

4. Create a mission

5. Right click on the ownship icon and select "Add to mission & take control"

6. Verify correct scan table

7. Observe for ELINT LOBs of opportunity

8. Observe for AIS and ADSB targets of opportunity

9. Terminate the mission

10. Power off DSRP sensor

COMINT System Sanity

1. Via SyMon
   a. Power on COMINT system
   b. Wait for BIT state to finish and change to SCAN mode
   c. Verify that MCCS components are green

2. Open COMINT HMI
   a. Verify system statuses are green (servers, DB and navigation data)
   b. Verify LBA is green
   c. Verify frequencies availability at the scan table

3. On SyMon
   a. Select SW SHUTDOWN command
   b. After few (10) seconds, power off COMINT

MULTI-INT System Sanity

1. Open Chrome explorer, and select Multi-int tab
2. Open TRAP application and verify required traps' sites and rules
3. Open Goldstar, enter to Mission and verify
   a. Ownship visible
   b. Traps sites on map

NAVY System Sanity

1. Navy C&C (שו"ב)

    a. Via SyMon, NAVY system, power on DATA LINK RADIO

    b. On Chrome open Navy MSDC Agent - WatchDog running

    c. Open Navy NAV Agent - WatchDog running

    d. Open Navy AIS Agent - WatchDog running

    e. Open Navy Kochav UI

        (1) **שו"ב** is green

        (2) **מברקה** is green

        (3) At **תקשורת ת"ג/תג"מ** panel,

        (4) verify **ערוץ פיזי 0** & **ערוץ פיזי 1** are green

2. ODEM

    a. Via SyMon, NAVY system, power on VHF RADIO (ODEM)

    b. Verify on ODEM-CP connectivity to **מקמ"ש**

    c. Set required frequency and make a communication with ground radio (through VHF1 Intercom channel).

EO/IR System Sanity

1. At OWS, open EO/IR HMI (EOS Pandion)

2. Take control on the payload

3. Observe primary and secondary video display, EO and IR

4. Verify "Comm OK" and "Payload OK" indications

5. Press the "Pre-Flight" button, and wait for sucsses result

    NOTE: This action allowed only if the aircraft is not moving

6. On OWS#4 or OWS#8, control the camera with the joystick

End of procedure

RDR System - Operations Procedures

RDR - Power up Procedure

1. Verify that MS power up process accomplished

2. On Rack #6 IOBC, verify that two (2) RDR Tx switches are set to ENABLE

3. Power on - Open CTS application:

   a. Verify / Check ☑ the "Controller" check box

   b. CTS PDB status:

      (1) Verify PDB Left (C1) - 270 in / and Comm all in Green indication

      (2) Verify PDB Right (C2) - 270 in / and Comm all in Green indication

   c. Click on "Power Control" button

   d. On Power Control window - Click on "Global ON" button

   e. Verify that all "270V IN" for all units turned to Green position

   f. In case of any input powers does not turns to Green position Click on button/s with gray position input.

   g. On CTS main window, after RCU Comm led is green, validate in "RCU Status" window, all "DSGU PS On" numbers are green

   h. Wait until "Radar State" field set to STBY, at CTS main window

   i. On CTS main window, validate Radar status is "OK"

   j. In main window, verify green "PASS" status for all CAL/VER tests for relevant antennas

   NOTE: RDR Power up process could take up to 8 minutes

4. Start PSP application

   a. Double click on the PSP Launcher Icon on the desktop

   b. Click the "run all PSP" play button

   c. Wait for green indication of "PSP Mode & Communication" for all 8 PSP Units

5. Start MSDC application

    a. Double click on the MSDC Icon on desktop

    b. Enter User Name

    c. Select/Verify user: "Master"

       (1) If user is "Viewer", press "V2M" and verify again

    d. Verify communications: Click on the yellow button and verify that all connections to the radar are green (RCU, DSGU9, RPP)

    e. Verify that RDR is in STBY mode

    f. Click on "AG" button

    g. Click on "RTX" button

End of procedure

RDR - Shutdown Procedure

1. Close PSP Launcher application

2. Close MSDC application

3. Open CTS application

    a. Verify / Check ☑ the "Controller" check box

    b. CTS PDB status:

       (1) Verify PDB Left (C1) - 270 in / and Comm all in Green indication

       (2) Verify PDB Right (C2) - 270 in / and Comm all in Green indication

    c. Click on "Power Control" button

    d. On Power Control window - Click on "Global Off" button

    e. Wait until all DGA units will finish the "discharged" process

    f. Verify all units' buttons are in grey state

    g. On MCP (OWS#3) depress: (1) C1-A, C1-B, C1-C

                                       (2) C2-A, C2-B, C2-C

    h. On Rack #6 IOBC, set / verify that two (2) RDR Tx switches are set to DISABLE

End of procedure

RDR - IBIT Procedure

1. On MSDC Master user:
    a. Click the "setting" button
    b. Click on maintenance button - the IBIT window will be open
    c. Click on IBIT button
    d. Verify IBIT timer starts on IBIT window
    e. Verify radar state changed to "IBIT" mode
    f. ON CTS main window
        (1) Verify that all processes are accomplished for all relevant antennas
        (2) Verify PASS status for all CAL/VER tests for relevant antennas
    NOTE: **Radar IBIT process could take up to 3.5 minutes**
    g. When finished - "completed" message should appear on the IBIT window (disregard the fail reported on MSDC)
    h. Close the IBIT window
    i. Verify radar state changed back to "STBY" mode
    j. Click on AG button
    k. Click on RTX button

End of procedure

RDR - RPP Restart Procedure

1. On Symon system tree, select Radar and go to Processes
2. Select the RPP process group and press the restart button
3. Verify processes restart completion
4. On MSDC, verify good communication to RADAR RPP

End of procedure

RDR - Restart Procedure

1. Close PSP Launcher window

2. Close MSDC window

3. Open CTS application:

    a. Verify / Check ☑ the "Controller" check box

    b. Open the "Power Control" window

    c. Press "RCU" button, wait for it to turn grey

    d. Press "RCU" button again and wait for it to turn back green

    e. Wait until "Radar State" field set to STBY, at main window

    f. In main window, verify "PASS" status for all CAL/VER tests for relevant antennas

4. Start PSP as described at the "RDR - Power up Procedure"

5. Start RPP as described at the "RDR - RPP Restart Procedure"

6. Start MSDC as described at the "RDR - Power up Procedure"

    NOTE: Radar restart process could take up to 8 minutes

End of procedure

RDR - PSP Restart Procedure

1. On PSP Launcher application, press the "Stop All" icon

2. Wait until all RSPs processes stopped

3. Close PSP Launcher

4. Start PSP as described at the "RDR - Power up Procedure"

5. Start RPP as described at the "RDR - RPP Restart Procedure"

End of procedure

IFA (In Flight Alignment) Procedure

1. On SyMon power tree, verify that all Navigation components are powered ON

2. On SyMon functional tree, Navigation section

   a. Open the Navigation, INS_GPS and MACC information sections (**i** icons)

   b. At Navigation section, verify that GPS FOM value is less than 50

   c. At INS_GPS line, select Inflight Alignment option (Globe icon)

3. Verify that MACC State and Navigation State changed to: Inflight Alignment

4. Ask pilots to perform manufacturer maneuvering recommendation:

   "It is recommended that IFA be initially commanded during straight and level flight. Follow with straight and level flight until INS Heading Valid, and then a series of 90° to 180° turns (each pair of turns separated by one to two minutes of straight/level flight)"

5. Verify that INS State (at INS_GPS information) is set to "Navigate"

   Note: The IFA process should take up to 15 minutes. Counter is displayed at the MACC Init State field

End of procedure

Liquid Cooling System (LCS) Procedures

Liquid Cooling System (LCS) - Ground Preparation Procedure

1. Connect ground cooling cart hoses to the 2 (two) external heat exchanger inlets

2. Power on Ground Cooling Cart - as required, up to 1800 RPM

End of procedure

Liquid Cooling System (LCS) - Start Up Procedure

1. On MCP, Ensure AC PWR - ON

2. On the LCS control panel, press the LCS LAMP TEST and verify that all indicators, LEDs, push buttons' lamps and digital displays are illuminated

3. On the LCS control panel ensure CNTRLR PWR switch is ON (Depressed). Verify CNTRLR PWR - indicating BIT

4. After approximately 60 seconds, verify CNTRLR PWR switch BIT extinguishes and ON illuminates

5. On the LCS control panel, select/verify MODE switch in LOCAL position and LOCAL illuminates

6. Ensure baggage doors are closed (External and Internal).

7. LCS is ready for operation

    NOTE: A FAULT indication will appear at the MS RACKS section of the LCS Control Panel if LCS or ECS is not selected.

End of procedure

MS Racks Cooling - ECS Mode Operation Procedure

1. Insure that A/C ECS system is operating

2. In the MS RACKS section of the LCS control panel: Ensure ECS is illuminated (To turn ON press and hold the ECS switch for approximately 1 second)

3. In the MS RACKS section of the LCS control panel: Ensure LCS is not illuminated (To turn OFF press and hold the LCS switch for approximately 1 second). Verify no faults are illuminated on LCS Control Panel. If a fault is illuminated, refer to LCS Troubleshooting (TS–3)

4. Close all gaspers in operator's area

5. Verify no FAULT/WARNING in MS RACKS section of the LCS

    CAUTION: **At this point, do not turn on LCS pumps, if the airplane is on the ground and without the ground cooling cart attached to the external heat exchanger inlets. If pumps will be started, the fluid will heat up significantly over a short period of time.**

    NOTE: **In ECS mode, not all MS loads can be applied.**

    NOTE: **A MAINT/WARN indication will not inhibit operation. If a MAINT/WARN is indicated any time during operation let ground crew know so that proper maintenance can be performed if required.**

6. Periodically monitor LCS control panel

End of procedure

MS Racks Cooling - LCS Mode Operation Procedure

1. In the MS RACKS section of the control panel: Verify LCS AVAIL is illuminated

2. In the MS RACKS section of the LCS control panel: Ensure LCS is illuminated (To turn it ON, press and hold the LCS switch for approximately 1 second)

3. Ensure ECS is not illuminated in the MS RACKS. (To turn it OFF, press and hold the ECS switch for approximately 1 second and verify the ON indication extinguishes)

4. Gaspers in operator's area can be opened (if needed)

5. Verify no faults are illuminated on LCS control panel. If a fault is illuminated, refer to LCS Troubleshooting (TS–3)

   CAUTION: *At this point, do not turn on LCS pumps, if the A/C is on the ground and without the ground cooling cart attached to the external heat exchanger inlets. if pumps will be started, the fluid will heat up significantly over a short period of time.*

   NOTE: **A MAINT/WARN indication will not inhibit operation. If a MAINT/WARN is indicated any time during operation let ground crew know so that proper maintenance can be performed if required.**

6. Periodically monitor LCS control panel

   NOTE: **LCS data can be monitored also on SyMon application**

End of procedure

Liquid Cooling System (LCS) - Normal Operation Procedure

1. On the LCS Control Panel:
    Press and hold NOSE/TAIL PUMP PWR switch for approximately
    1 second and verify it illuminates ON

2. On the LCS control Panel:
    Press and hold SIDE/IFF/MS RACKS PUMP PWR switch for
    approximately 1 second and verify it illuminates ON

3. After approximately 1 minute, verify the PUMP PWR switches still
    illuminate ON and no SYSTEM FAULT or WARN is illuminated

4. Periodically Monitor LCS control panel

    NOTE: A MAINT indication will not inhibit operation. If a
                MAINT is indicated any time during operation let
                ground crew know so that proper maintenance can
                be performed if required.

    NOTE: LCS cooling in the Aft Equipment Area is only
                guaranteed within the applicable portion of the
                LCS envelope. Outside of the envelope, cooling
                may still be available depending on ambient
                conditions. If the LCS AVAIL extinguishes at any
                point, turn off all Mission Loads, refer to LCS
                Troubleshooting (TS–3).

End of procedure

Liquid Cooling System (LCS) - Turn Off Procedure

1. Ensure RDR system (hardware) is OFF

2. Ensure ELINT system (hardware) is OFF

3. Ensure all Rack#7 servers are OFF

4. On the LCS Control Panel

    a. Stop NOSE/TAIL PUMP PWR:
       Press and hold NOSE/TAIL PUMP PWR switch for
       approximately 1 second and verify the ON indication
       extinguishes

    b. Stop SIDE/IFF/MS RACKS PUMP PWR:
       Press and hold SIDE/IFF/MS RACKS PUMP PWR switch for
       approximately 1 second and verify the ON indication
       extinguishes

5. Press CNTRLR PWR button to power OFF LCS Controller

6. Verify ECS and LCS are not illuminated in the MS RACKS.

    NOTE: **To turn off the ECS, LCS, CNTRLR PWR press and
    hold the relevant switch for approximately
    1 second and verify the ON indication extinguishes**

7. Power OFF ground cooling cart (If connected).

End of procedure

Liquid Cooling System (LCS) - Data Download Procedure

1. Verify LCS system is powered ON

2. Open USB cover on LCS Controller, and plug in a DOK\USB. Left Indication light will turn on ORANGE

3. After a few minutes, Indication light flashes and then turnoff

4. When light turns off, perform Liquid Cooling System (LCS) - Turn Off Procedure (SO-22)

End of procedure

Liquid Cooling System (LCS) - Manual Override Operation

NOTE: **In the event of a Controller Failure, or a component failure that prevents AUTO operation of the pumps, the LCS may still be operated in Manual Override mode.**

1. On the LCS Control Panel:
    Press and hold the AUTO/MAN switch for the affected system for approximately 1 second and verify it illuminates MAN

2. On the LCS Control Panel:
    Press and hold the PUMP 1 switch for approximately 1 second for the affected system and verify it illuminates ON

3. Repeat Steps 1 and 2 for the opposite system if necessary

4. To turn off the pumps in MAN mode, press and hold the PUMP 1 switch for approximately 1 second for the affected system and verify the ON indication extinguishes

End of procedure

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TROUBLESHOOTING

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General Troubleshooting

1.   Troubleshoot procedures intended to solve systems problems in the **shortest and quickest way**.

2.   However, they probably do not cover all possible situations.

3.   On any case of undefined or unclear situation, consider of problem severity, perform this general conceptual procedure:

    a.   Reset the relevant system application

NOTE: It is recommended to use the "Servers content" tablet, at the General Information chapter.

4.   If problem persists:

    a.   Reset the relevant system computer (via Remote Desktop) or VM server (via VM-Center at Chrome browser)

    b.   Pay attention to other applications that using the same computer

5.   If problem persists:

    a.   Reset the relevant system HW

6.   If problem persists:

    a.   Reset all VM servers: Via "Power ON-OFF" application, select the "Power OFF VMs only" option

    b.   Power up the mission systems according to the power up procedure

7.   If problem persists:

    a.   Reset the whole AMS system (new start from "Black Mission" state)

       (1)   Shutoff the AMS, refer to Normal Procedures – "RTB" and "After Landing" sections

       (2)   Powerup the AMS, refer to Normal Procedures – "Mission Systems Power Up" and "After Takeoff" sections

    b.   After AMS Powerup was finished, perform IFA, refer to IFA (In Flight Alignment) Procedure (SO-17)

POWER

Fault Description	Follow-on Actions
270VDC Voltage is out of limit	Generator failure. 1. **Do not power up AMS** 2. Ask pilots to restart the faulty generator

270VDC Current value or behavior is out of limit	1. If RDR is transmitting
	  a. **Urgently**, stop RDR transmission
	  b. If current is OK, operate RDR at single mode only
	2. If RDR is not transmitting
	  a. Shutdown AMS and shutoff AMS power
	  b. Restart AMS power and systems

A/C generator or external **270VDC** power source fell down, during AMS operation	Restart AMS:
	1. Verify power availability, according to pilots\ground crew procedures
	2. Power up AMS normally
	3. After power up completion, on the "Power ON/OFF" Application
	  a. Select "Power OFF VMs only"
	  b. Select "Power ON"
	4. Wait for the script window to close and proceed with normal operation

A/C or external **115VAC** power source fell down, during AMS operation	Restart AMS: 1. Perform "After landing" procedure 2. Verify power correction, according to pilots\ground crew procedures 3. Perform "Mission Systems Power Up" procedure

LCS

Temperature Alert

Temp Range	Action
T<10°C	Set RDR & ELINT systems to OFF
10°C<T<35°C	Normal operation
35°C<T<40°C	Activate ECS to MS RACKS
40°C<T	Set RDR & ELINT to STANDBY mode
50°C<T	Shut down AMS

Fault Isolation and Follow-on Action

Fault Description	Follow-on Actions
Before AMS Power up, the AEA ambient temp is above 30°C (87°F) - Checked with cockpit	AEA needs to be cooled. Perform the following: 1. Operate LCS normal mode, refer to Liquid Cooling System (LCS) - Normal Operation Procedure (SO-21). 2. In the MS RACKS section of the LCS Control Panel: Verify LCS AVAIL is illuminated. 3. Apply both LCS & ECS cooling to MS RACKS - In the MS RACKS section of the LCS Control Panel press and hold the LCS switch for approx. 1 second. 4. Ensure both LCS & ECS are illuminated. 5. Continue with normal procedure.
If system **FAULT** (red) warning light is ON:	1. Shut down RDR & ELINT systems 2. Activate ECS to MS Racks, refer to MS Racks Cooling - ECS Mode Operation Procedure (SO-19) 3. Stop LCS system, refer to Liquid Cooling System (LCS) - Turn Off Procedure (SO-22) 4. Inform ground crew

Fault Description	Follow-on Actions
If either **WARN** / **MAINT** warning light is ON:	1. Check LCS temperature, refer to Temperature Alert (TS-3) 2. Troubleshoot by Fault Isolation table henceforth 3. Inform ground crew

Fault Name	Fault Description	Type (Fault or Caution)	Indication	Follow-on Actions
Single Pump Failure	Flow meter shows no flow and differential pressure (filter differential pressure) shows approximately zero and pump on command valid for loop.	Maintenance caution	Maintenance Light	1. Proceed with normal operation. 2. Ground crew to troubleshoot inoperative pump.
Flow Meter Failure	Flow meter shows no flow and differential pressure (filter differential pressure) shows non zero	Maintenance caution	Maintenance Light	1. Proceed with normal operation. 2. Ground crew to troubleshoot inoperative pump.
Loop Failure	Pump failure of both pumps on same loop	System fault	System fault Light	1. Discontinue LCS operation and select all mission loads OFF. 2. Ground crew to troubleshoot failures.

Fault Name	Fault Description	Type (Fault or Caution)	Indication	Follow-on Actions
Single Reservoir Out of Range	Any one reservoir level is less than 5% of full capacity or reservoir levels are out of range	Maintenance caution	Maintenance light	1. Proceed with normal operation. 2. Ground crew to troubleshoot
Multiple Reservoirs Out of Range	Two reservoirs on same loop are less than 5% of full capacity or are out of range.	System fault	System fault Light	1. Discontinue LCS operation and select all mission loads OFF. 2. Ground crew to troubleshoot failures.
MS Racks Fan Failure	No go signal is received indication that one or more fans have no reached desired speed,	MS rack fault	MS Rack Fault Light	1. Check 4 MS RACK FAN's CBs at MPDB 2. Proceed with normal operation. 3. Ground crew to troubleshoot
Reservoir level mismatch	Reservoir level difference of greater than 5%	Maintenance Caution	Maintenance Light	1. Proceed with normal operation. 2. Ground crew to troubleshoot

Fault Name	Fault Description	Type (Fault or Caution)	Indication	Follow-on Actions
Aft Equipment area supply or return air temperature sensor warning	Aft Equipment area supply air temperature out of operating range (-55°C to +10°C) or (+ 40°C to +80°C).	MS rack fault	MS Rack Fault Light	1. Closely monitor MS rack temp. 2. If fault clears, continue with normal operation. 3. If fault persist, select LCS and ECS switches ON. 4. Turn MS rack loads OFF. 5. Select ECS switch OFF when MS rack temperatures are verified to be within limits. 6. Ground crew to troubleshoot
Critical MS rack fault	System fault in loop B and LCS valve is open.	MS rack fault	MS rack fault light	1. Select ECS switch ON 2. Select LCS switch OFF 3. Continue normal operation monitoring MS rack temperatures closely. 4. Ground crew to troubleshoot
MS rack cooling source not selected	No command from MS computer or LCS control panel to open LCS bypass valve or ECS valve.	MS rack fault	MS rack fault light	Select ECS switch or LCS switch ON.

MISSION

System	Fault Description	Cause	Follow-on Actions
Network	At Mission Power up process, OWS not connect to the network (red X on network card icon) Or, On the "Pinger" application, DCS1 or DCS2 is red	Communication problem to DCS1 or DCS2	1. Visually check DCS1 and DCS2 2. If the DCSs are working properly, restart the OWS computer 3. If some DCS is not working, restart PDU6 with "PDU#6 control" switch 4. Wait 6 minutes and powerup OWS again 5. If the problem persist, call technician team
Network	On the "Pinger" application, DCS3 red	Communication problem to DCS3	1. Visually check DCS3 2. If the DCS3 is working properly, restart the "Pinger" application 3. If the DCS3 is not working, restart PDU3 with "PDU#3 control" switch 4. Wait 6 minutes and restart "Pinger" 5. If the problem persist, call technician team
Mission Startup	"Power ON-OFF" script have red lines	The "Red" system already powered up or stuck (due to abnormal shutdown)	1. Check the specific system connection at the "Pinger" app. 2. If the VM is red on "Pinger", open VM Center, right click on the faulty VM and select "Power Reset"

System	Fault Description	Cause	Follow-on Actions
Mission Startup	"Power ON-OFF" script stuck at VSAN step more than 20 min.	VM center problem	1. At c:\SM right click "poweron_novsan" and select "Run with powershell" 2. Inform technical team
Mission Startup	SyMon not connected **and** incorrect location and heading at PDCS	MTS processes are not running	Open VM Center and restart MSN-MTS VM
		RabbitMQ service have damaged	If problem persist, call technician team
Mission Startup	No map is displayed on all applications	Map server problem	On VM Center, reboot MI-GIS VM
Navigation data	**On ground**, on **Symon**, incorrect navigation data	INS not aligned	1. Via SyMon, perform GC Align 2. Wait up to 15 min.
	On air, on **PDCS**, **Symon** and **MSDC**, incorrect navigation data	INS not aligned	Perform IFA. Refer to refer to IFA (In Flight Alignment) Procedure (SO-17).
	On **IVA**, incorrect navigation data (PDCS data is correct)	NAV dissemination problem (IES or RDR-RCU)	1. On IVA, restart EIS 2. If problem persists, restart RDR system
	On **PDCS** only, incorrect navigation data (SyMon data is correct)	NAV dissemination problem	Open VM Center and restart MSN-MTS VM
PDCS	Blank display	GIS server problem	1. Check PDCS on another station 2. If all PDCS are the same, open Chrome browser and select VM-Center 3. Right click on MI-GIS and select "Reset guest OS"

System	Fault Description	Cause	Follow-on Actions
PDCS	Red alert is displayed on all PDCS clients: "No connection to PDCS server"	Datacom problem	1. Open Chrome browser and select VM-Center 2. Right click on MSN-PDCS VM and select "Reset guest OS"
SyMon	SyMon status has red heart icon (with a specific alert) More then 10 min. after SyMon powered up	"Server connection" - no connection to Symon server	Reset MSN-MTS VM
		"Rabbit connection" - no connection to RabbitMQ server	Reset MI-GATEWAY VM **NOTE: RabbitMQ service may be permanently corrupted. If problem persist, call for technic support**
		"Attributes" "Sensor tree" "Faults types list" - no connection to FIE-MODEL	reset MSN-GENERAL VM **NOTE: This action will affect NAV data and CTS functioning**
		"DB Connection" - no connection to Symon DB	On "events DB", select some old date range and delete old events
RRS	RRS is not recording at all. The RRS icon on the taskbar is surrounded by a red frame	Full disk	1. On RRS status window, check if the disk is full. If so, delete MRDs 2. Start recording
		RRS Server problem	Restart RRS VM server.
RRS	A client's video is not recording	RRS client is not working	At the client's desktop, open "RRS" folder and double-click "RrsStartClient"

System	Fault Description	Cause	Follow-on Actions
TSU	TSU Display shows 'TIME: HOLD OVER' '1PPS: HOLD OVER' more than 5 minutes after TSU power-up		Via SyMon, Reset TSU. Or, 1. On the TSU front panel: Press and hold the MENU button more than 2 seconds 2. Press on '↑' button to change the value to 76 and press ENTER 3. Press on '←' button to move the cursor to '15. RESET GPS' and press ENTER 4. Press on '→' button (yes) and then press ENTER 5. Wait up to 13 minutes for the TSU display to show: • TIME: GPS XX SV' • TSU-Front: '1PPS: GPS' • TSU-Aft: '1PPS: AUTO
TSU	1PPS/HQ/10MHz lamp on CLDU are red		Via SyMon, reset CLDU and TSU
TSU	Not received 1PPS signal		If TSU-Front/Aft 4 leds or GPS mode are not OK, Or CLDU 4 leds are not OK, Via SyMon Reset TSU-Front/Aft

System	Fault Description	Cause	Follow-on Actions
RM	Removable Media (RM) not recognized, and has no access; Or U: partition is not accessible	Partition locked and encrypted	1. Ensure RM inserted into its socket on UTS properly - RM led is illuminate. 2. Open Remote Desktop to UTS server ("uts") and run "Mount-Canister" shortcut 3. Verify D: partition (RM) is identified and presenting its content 4. On OWS, reconnect to U: partition (\\uts\rm path) 5. In SyMon, Mission system, reset "Mission Agent" process
	U: partition not recognized (has an X sign on the partition icon)	OWS uploaded and signed-in before UTS done upload	Do one of the following: • Sign-Out from the OWS and sign-in • Open CMD application and run the command "gpupdate"
RM / Filer	SyMon indicates less than 30% free space	The disk capacity reached it's limit	Do one of the following: • Delete manually old data from RM / Filer (network partition X:) • On UTS desktop, activate the "Delete old data" shortcut **CAUTION**: do not perform this action during an active mission/flight!

System	Fault Description	Cause	Follow-on Actions
VM center	Cannot browse to VCSA VM-Center		1. At "Power ON-OFF" application, Select "Reset VCSA VM" 2. Wait for fully upload of VM-Center interface 3. Browse normally to VCSA

RADAR

System	Fault Description	Cause	Follow-on Actions
SMS	All normal RDR indications are OK, but the RDR cannot transmit. On CTS, SMS alert is activated	SMS controller failure, or out of limit AMS power malfunction	1. On CTS, reset the alert 2. If problem persists, RTB
IVA	1. No navigation 2. AC icon fixed to north heading 3. CTS clock is different from station clock	RCU Time Jump	Perform RDR - Restart Procedures
IVA	1. No picture arriving to IVA 2. Partial picture arriving to IVA	RPP/PSP communication problem	1. Check if PSP status is OK in PSP Launcher - act accordingly 2. If PSP status is OK, perform RDR - RPP Restart Procedure
MSDC	MSDC lost communication with some of the radar processes	Communication problem	1. Start MSDC as described at RDR - Power up Procedure 2. if problem persist, restart the system which lost communication
MSDC	On CTS, observed current while transmitting is at STBY level	RDR in Silent mode	1. Validate RADAR-RCU connection to MSDC master 2. Validate RTX option is selected in MSDC master
PSP	One of the PSPs Start buttons is down	PSP App stopped	1. Press PSP start button on relevant PSP 2. If problem persists, perform RDR - PSP Restart Procedure

System	Fault Description	Cause	Follow-on Actions
PSP	One of the PSPs DBF buttons is down	DBF stopped	1. Press DBF start button on relevant PSP 2. If problem persists, perform RDR - PSP Restart Procedure
PSP	Gray indication of PSP Mode & Communication while PSP APP and DBF buttons are up	PSP To DBF connection	1. Click Stop and Start on relevant PSP 2. If problem persists, perform RDR - PSP Restart Procedure 3. If problem persists, reset the relevant PSP at Rack 7 4. After 5 min. from restart, press start on relevant PSP 5. If PSP not started, Perform RDR - PSP Restart Procedure 6. Perform RDR - RPP Restart Procedure
RDR	1. Radar State not reaching STBY mode 2. Radar state is FAIL	Radar software/Hardware problem	Perform RDR - Restart Procedure

System	Fault Description	Cause	Follow-on Actions
RDR	The following Problems occurred in concurrent: 1. Radar Fails on calibration 2. Observed current while transmitting is at STBY level 3. Received "Black" picture in IVA	IOBC discrete prevent RCU to transmit	1. Via SyMon power tree, Mission map - Avionics tree, Power OFF and Power ON the IOBC 2. Perform RDR - Restart Procedure
RDR	Tile or Sub-tile are red in HW MAP or Tile communication problem	Tile internal problem	1. Go to CTS window 2. Click on Power control Button 3. Click on RCU Control button 4. Turn off and turn on the relevant TILES of relevant DSGU 5. Perform IBIT process 6. Verify that the Tile / sub-tile status turns to green position
RDR	1. CTS SBM counter not progressing 2. DSGU Communication is red	RCU/DSGU malfunction	Perform RDR - Restart Procedure

System	Fault Description	Cause	Follow-on Actions
PDB	1. There is no green indication on PDB status 2. At list one of PDB 270VDC input indication is red	PDB Communication problem	Turn OFF RDR PDB inputs On MCP panel C1-A, C1-B, C1-C C2-A, C2-B, C2-C Wait 30 seconds Turn ON RDR PDB inputs On MCP panel C1-A, C1-B, C1-C C2-A, C2-B, C2-C

ELINT

System	Fault Description	Cause	Follow-on Actions
HMI	On HMI, "host_shlc" field is not displayed	No connection to the HOST	1. Via Symon, restart ELINT process: • HOST If problem persists: 2. On Chrome, select VM-Center. Right click on the following VMs and select "Reset Guest OS": • SIG-DB • SIG-HOST • DSE-SP **Note: This can affect COMINT system**
HMI / DMI	DB or DMI not connected. cannot create new mission or enter DMI	DB Oracle is not functioning (may happen as result of abnormal DB shutdown)	1. On Chrome, select VM-Center. Right click on the following VMs and select "Reset Guest OS": • SIG-DB • SIG-HOST • DSE-SP **Note: This can affect COMINT system**
AIS	On air, no target observed	No RF connectivity	1. Via SyMon, power up COMINT RFDU 2. On Rack#3, verify (visually) that RFDU Power switch is ON

ESM

System	Fault Description	Cause	Follow-on Actions
ESM	ESM state is UNKNOWN	Power fell down consequence	1. On Chrome, enter to VM-Center 2. Right click on ESM VM. At the "Power" menu select "Restart guest OS"
	The loaded PFM in ESM is DEFAULT and not the selected PFM		1. Ensure ESM is in standby mode 2. Load ESM PFM again
	ESM is stuck on INIT mode, more than 5 minutes after ESM processes are running		1. Via SyMon, reset ESMP 2. Wait 3 minutes and verify on OWSE window, system messages section, "ESMP connection was re-established" message is displayed
	MRX is RED		If problem doesn't recover automatically after 10 seconds, reset MRX via SyMon
	Nav Status = ARRV	No arrival of navigation data	Refer to MISSION Navigation Troubleshooting (TS-7)

COMINT

System	Fault Description	Cause	Follow-on Actions
COMINT HMI	DB not connected, no missions displayed at HMI	DB Oracle is not functioning (may happen as result of abnormal DB shutdown)	On Chrome, select VM-Center. Right click on the following VMs and select "Reset Guest OS": • SIG-DB **Note: This can affect ELINT system**
	"BEEP" sounds on CSM1-4 headphones; No heard CSM channels		Reset IC DAIU-AJB Via SyMon. • During the reset there will no intercom for all users

RADIO

System	Fault Description	Cause	Follow-on Actions
UHF	Radio not transmit	Radio shut off in E-RADIO mode	1. Change Radio to Single mode 2. Power off the URC, or switch the relevant VCU knob to off 3. Power on the Radio

INTERCOM

System	Fault Description	Cause	Follow-on Actions
ICS	Voice on headphones sounds vague		1. Check that headphone connectors inserted well to the Jack Panel 2. On Jack Panel, check HDPN/SPKR knob set to HDPN
	Pilots constantly hear the cabin, even though PLT or PVT channels are off		Via SyMon, Intercom system, Power Tree, shut off, then power on • AJB-DAIU • AJB-GW+RB **Note:** **All users will be affected**
	PVT or PLT selection doesn't produce an audio signal to the cockpit	Some other PVT\PLT is selected at cabin or cockpit	Deselect all PVT\PLT buttons at cabin and cockpit (include pilot observer)
		Irregular aircraft powerup	1. Ask pilot to reset cockpit intercom system – CB G4 MRC#1 (Left pilot overhead panel) 2. If problem persist, via SyMon reset AJB
DAC	"Busy" channel, while it is not selected at all work stations		1. Select and de-select the indicated channel on your DACP 2. If problem persist, on DAS VM, DAS link (on chrome), "CTI ports" tab, select the faulty channel notebook symbol, and change the "disabled OFF" field to ON. Confirm with "Apply"

SATCOM

System	Fault Description	Cause	Follow-on Actions
SATCOM	Modem Lock is RED Antenna On Target is RED		1. On CCC Control Panel, verify Rx frequency validation. Change PFM if required. 2. Verify with ground station: • Tx frequency validation. • Station transmitting.
	If problem persists, reset SAT system:		Via SyMon **or** via CCC Client: Power OFF SATCOM system and power ON. Wait up to 5 minutes for the SATCOM system to finish power up.
	Modem Lock is RED Antenna On Target is RED	AAU = RED	Via SyMon reset AAU unit.
	Modem Lock is RED Antenna On Target is RED Ins Receive Msg checkbox is empty		Refer to MISSION Navigation Troubleshooting (TS-7)
	Modem Lock is RED Antenna On Target is GREEN		On CCC Control Panel: 1. Verify SATCOM TX DataRate = High 2. Verify with ground station: TX DataRate = High

System	Fault Description	Cause	Follow-on Actions
	No data link (Quality=1) Modem Lock & Antenna On Target are GREEN		On CCC Control Panel: 1. Verify Tx Frequency validation. 2. Change PFM if needed.
	No data link (Quality =1) Modem Lock & Antenna On Target are GREEN	HPA=RED	On CCC Control Panel: Set SATCOM TX State to TX IDLE, then set to TX STBY or TX OPER.
	If problem persists:		On CCC Control Panel: Set SATCOM TX State to TX OFF, then set to TX STBY or TX OPER.
	No data link (Quality =1) Modem Lock & Antenna On Target are GREEN		Via SyMon, reset Encryptor.
	Antenna On Target fluctuate		On SATCOM tab 1. Set Antenna Mode to TAKE OFF LANDING 2. Set Antenna Mode to AUTO TRACKING.
	If problem persists, reset AAU		Via SyMon, reset SAT AAU unit.
	No voice link		Via SyMon, reset Encryptor

TROUBLESHOOTING

LOS

System	Fault Description	Cause	Follow-on Actions
LOS	Modem Lock is RED	LOS is not pointing the ground antenna. Ground station is not transmitting.	1. On LOS Control/Status tab, Verify that all parameters are correct (Up Ch#, Down Ch#, GND etc.) 2. Verify with the ground crew, parameters identity
	If problem persist, reset LOS system:		On the CONTROL tab, set LOS to OFF, then set LOS to ON. Or power OFF and ON via SyMon
	No data link (Quality=0 or 1) Modem Lock & Antenna On Target have green led.	LOS TRU isn't transmit, or the keys are not up to date	1. On CCC client verify Key Status & Enc Status leds are green 2. On LOS Control/Status tab, Verify LOS Operational mode is High.

IES

System	Fault Description	Cause	Follow-on Actions
IVA	Cannot see products (SAR, sub-images…) on IVA. Search results presents an empty table	IES D: Partition encrypted and locked (IES uploaded before DC server)	1. Remote desktop to IES server ("ies") 2. Activate "avago-mount-unlock-disk" shortcut
EIS / APM	EIS process cannot be activate in IVA, and the process doesn't load at IES-APP server. (APM & FEP processes are working well)	Windows Performance Counters error. Need to reset these counters.	1. At IVA processes window, stop APM process. 2. Remote desktop to IES-APP server 3. Stop Apm.Remote service. 4. Open manually the Apm.Remote, verify if there are error exceptions on screen. 5. Close all instances of Apm.remote. 6. Open CMD as administrator. 7. Run the command "lodctr /r". 8. Start the Apm.Remote service. 9. Verify EIS process is running. 10. Activate EIS on IVA.

MULTI-INT

System	Fault Description	Cause	Follow-on Actions

NAVY

System	Fault Description	Cause	Follow-on Actions
MC4I	No data sent or received	VHF2 control is on Voice mode	On OWS#8 ledge, VHF2-CONTROL panel, verify Control switch = RCU Traffic switch = Data
ODEM			
KOCHAV			
Agents			
SHOB			
SHEN			

SDN

System	Fault Description	Cause	Follow-on Actions
SDN	Not received 1PPS signal		1. Check TSU-AFT with 4 green leds, GPS mode 2. Check CLDU with 4 green leds 3. Via SyMon, reset TSU-AFT
SDN	No SDN Tracks Displayed on MSDC and PDCS	SDN_UNIT=RED	On NCC, Set SDN to Off and then set it back to Operational
			On NCC, close all NCC applications and operate "Ncc_main" shortcut
			Via Remote Deskop to NCC, Restart NCC computer
SDN	No NAV and TIME (TSRC) data on NCC application		Via SyMon, restart SDN hardware

EOIR

System	Fault Description	Cause	Follow-on Actions
EOIR	On EOS HMI, Primary or Secondary video is stuck or not displayed		Reset the EOS client
EOIR	System fault indication, on EOS HMI		Via SyMon, Reset EOIR power

ABNORMAL-EMERGENCY PROCEDURES

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Hand Over

NOTE:　　　**Hand Over activities are done without LCS cooling - all activities henceforth are designed to minimize time on ground**

1. On normal RTB procedure, perform all Before Landing steps (NP-14)

2. After landing

   a. **Do not** perform any normal "After landing" step

   b. If weather RDR was operated during landing

      (1) Shut down RDR system, refer to RDR - Shutdown Procedure (SO-14)

      (2) Turn off both LCS PUMP PWR

   c. Perform a quick operators'/pilots' hand over

   d. Notified pilots that the AMS is ready to taxi

3. If Weather RDR is needed for takeoff, during taxi

   a. Turn on NOSE/TAIL PUMP PWR and SIDE/IFF/MS RACKS PUMP PWR switches and verify they are illuminated and display ON

   b. On Rack #6 IOBC, set two (2) RDR Tx switches to ENABLE

   c. Power up RDR system, refer to RDR - Power up Procedure (SO-13)

   d. On Rack #6 IOBC, set two (2) RDR Tx switches to **DISABLE**

   e. On OWS#5 ledge, set FRONT RDR CONTROL switch to ENABLE

   f. Operate weather RDR

   g. Verify with cockpit that PDCS tablet has been switched on

   h. Continually, monitor LCS temperatures

4. Notified pilots that the AMS is ready to takeoff

5. After Takeoff, proceed with normal After Takeoff steps (NP-12)

End of procedure

Ferry/Pilots/Captaincy (חפ"ק) Flight

1. After engines are running, verify that electrical power is applied to AMS:

    a. 115VAC power

        (1) On the Flight Deck Overhead Panel, MASTERS section, ensure the following switches are pressed and not illuminated (i.e. ON state):

             (a) CABIN

             (b) GALLEY

             (c) MS POWER

        (2) On MCP, select (press) A/C PWR switch

    b. 270VDC power

        (1) Ask pilots to engaged generators, by pressing "MS L GEN" and "MS R GEN"

        (2) On MCP top segment, ensure the generators indicators (L GEN and R GEN) displays ON

        (3) On MCP, ensure stable (5 seconds) voltage indication 270V for both generators

2. On MCP, select (press):

    a. MS PWR

    b. R123-B (EOIR gimbals)

    c. R4 (SAT AAU gimbals)

    d. If cabin intercom is required, select R123-A

NOTE: **E-RADIO1 and E-RADIO2 can be operated as usual**

NOTE: **Operating Weather mode, required a full AMS procedure**

3. After landing and parking, depress all above switches

End of procedure

Emergency System Shutdown

1. In case of an emergency situation that requires an immediate AMS Power shutdown:

2. On MCP, press **EMERG DISC** button

    NOTE: **An EMERGENCY DISCONNECT can also initiated by the pilot using MS EMER DISC button, located in the cockpit overhead panel at MASTERS section.**

3. On MCP (OWS#3) depress:

    a. R123-A, R123-B, R4, R6-R7-A, R7-B

    b. C1-A, C1-B, C1-C

    c. C2-A, C2-B, C2-C

    d. MS PWR

    e. EXT PWR

    f. A/C PWR

4. At cockpit, on the Flight Deck Overhead panel at MASTERS section, depress:

    a. CABIN

    b. GALLEY

    c. MS POWER

    d. MS L GEN

    e. MS R GEN

5. Set all AMS switches to their primary states, refer to the switches state table, Before Power up (NP-2)

6. Depress EMERG DISC (or cockpit MS EMER DISC) button

End of procedure

AEP Generator Failure - Using the Tie Bus

NOTE: **In case of single AEP generator failure, there is a way to operate AMS using one AEP generator.**

CAUTION: *This procedure designated for emergency, one of kind event only! Otherwise, it is forbidden to test it or to use it.*

1. Verify that AMS is OFF (if needed, perform "after landing" procedure)

2. Verify with the cockpit that the failed AEP generator is switched off

3. Power up AMS, using normal Power up procedure, with two differences:

   a. Do not use an external GSE 270VDC converter. Use only aircraft engines power

   b. **Instead** of **270VDC power feed** paragraph, perform:

      (1) Ask pilots to engaged the serviceable Mission generator, by pressing "MS L GEN" or "MS R GEN" respectively

      (2) On MCP top segment, verify the generator indicator (L GEN or R GEN) display ON

      (3) On MCP, ensure stable (5 seconds) voltage indication 270V

      (4) On MCP press the TIE BUS switch

      (5) Verify that TIE BUS switch illuminated CLSD

4. Proceed with normal power up procedure

5. After system shut down process have accomplished, depress the TIE BUS switch

End of procedure

Global Erasure Procedure

CAUTION:　　**The following is a disruptive action. programs and data will be erased.**

1.　Power on AMS and all the classified systems

2.　Ensure all systems are initialized and set to STANDBY mode

3.　On SyMon, Mission Power tree, power ON the Mission Panel

4.　On the Mission Panel (OWS 5), raise its safety guard and push the SOFTWARE ERASE push button

5.　On the Mission Panel, raise its safety guard and activate (upward) the KEY ERASE switch

6.　On ODEM Control Panel (OWS 8), set the operation selector to **מחק**

7.　Power off AMS

End of procedure

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