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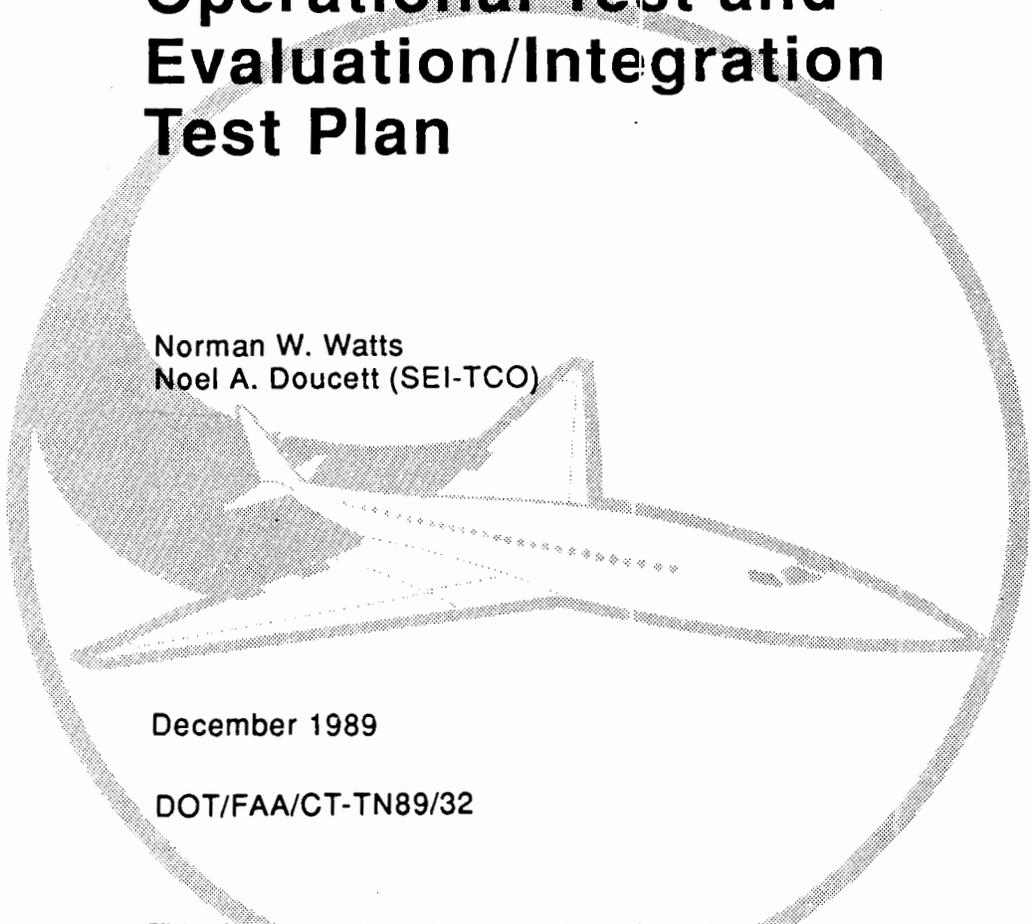
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Data Link Processor (DLP) Operational Test and Evaluation/Integration Test Plan

Norman W. Watts
Noel A. Doucett (SEI-TCO)



December 1989

DOT/FAA/CT-TN89/32

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16. Abstract The provision for two-way communication with aircraft, via a digital data link, has long been considered a means of providing significant enhancements for safe and efficient flight operations. The Data Link Processor (DLP) being tested will initially perform the ground-based data link processing functions necessary to provide appropriately equipped aircraft with pilot requested aviation weather data from a National Weather Data Base via the Mode Select Beacon System (Mode S). The weather data base will contain six products: Surface Observations (SA), Terminal Forecasts (FT), Pilot Reports (UA), Wind and Temperature Aloft Forecasts (FD), Radar Summaries (SD), and Hazardous Weather Advisories. The DLP Operational Test and Evaluation/Integration Test Plan depicts all systems that interface with the DLP, and identifies the data that will be communicated between them. This plan sets forth and defines the philosophy, approach, methods, organization, and schedules for the verification of the DLP requirements. This plan provides sufficient detail to define and direct the development of detailed test procedures and to identify the allocation of resources required to support those tests.					
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EXECUTIVE SUMMARY

The Data Link Processor (DLP) Operational Test and Evaluation/Integration Test Plan provides the overall philosophy and approach for the Integration Testing and Operational Evaluation of the DLP System. This document addresses the DLP integration requirements defined in the National Airspace System (NAS) Specifications (NAS-SS-1000) and in the documents for DLP's detail design specified in section 2. Because the DLP precedes most of the systems with which it interfaces, the tests defined in this plan require simulating multiple Mode Select Beacon System (Mode S), as well as multiple Mode S data link-equipped aircraft. For the same reasons, it will be necessary to use emulators of the Weather Message Switching Center Replacement (WMSCR) and Automated Weather Observation System (AWOS)/Automated Surface Observing System (ASOS) Data Acquisition System (ADAS) in the testing and evaluation of the DLP. Every effort will be made to perform end-state testing of the DLP utilizing live data and emulators.

The primary information contained within this plan consists of the following:

- a. The NAS-SS-1000, Volume-I (Appendix III), Volume-II, and Volume V DLP integration requirements, test objectives, test descriptions, and completion criteria;
- b. Configuration/Interface Categories and Test Categories;
- c. Test Verification Requirements Traceability Matrix (TVRTM).

1. INTRODUCTION.

The provision for two-way communication with aircraft, via a digital data link, has long been considered a means of providing significant enhancements for safe and efficient flight operations and reducing controller workload. The Data Link Processor (DLP) being tested will initially perform the ground-based data link processing functions necessary to provide appropriately equipped aircraft with pilot requested aviation weather data from a National Weather Data Base via the Mode Select Beacon System (Mode S) data link. The weather data base will contain six products: Surface Observations (SA), Terminal Forecasts (FT), Pilot Reports (UA), Wind and Temperature Aloft Forecasts (FD), Radar Summaries (SD), and Hazardous Weather Advisories. The DLP is being implemented in multiple phases; an initial state (build-one) DLP system is being tested, a build-two system that incorporates additional weather services and an initial set of ATC commands. The build-three system adds additional ATC services and finally, the end-state DLP system adds more weather services. The initial state will include a subset of the contemplated end-state requirements as given in the NAS System Requirements Specification (NAS-SR-1000) and the NAS System Specification (NAS-SS-1000). This document addresses exclusively the requirements of the initial DLP system as given in the Data Link Processor Software Segment Specification (FAA-OR-2802a) and the Data Link Processor Hardware Specification (FAA-E-2794a). In the event of a conflict, FAA-OR-2802a shall take precedence.

A major source of the National Aviation Weather Service data is currently the Weather Message Switching Center (WMSC) in Kansas City, MO. Under the National Airspace System (NAS) modernization plan, the WMSC will be replaced by two WMSC Replacement (WMSCR) systems; one located in Salt Lake City, UT, and the other located in Atlanta, GA. The WMSCR is currently scheduled to be operational in 1992. Automated Weather Observation System (AWOS) and Automated Surface Observing System (ASOS) will provide instantaneous surface observation type information automatically at their locations. The AWOS Data Acquisition System (ADAS) will concentrate minute-by-minute information from up to 137 AWOS/ASOS sites for transmission to one DLP. The ADAS is currently scheduled to be operational in 1992.

The Maintenance Processor Subsystem (MPS) will monitor, using polled requests, DLP's operational status and modes in real time. A non-end state version of MPS is currently available.

The Mode S is being developed under the auspices of the Federal Aviation Administration (FAA) as an upgrade to the present Air Traffic Control Radar Beacon System (ATCRBS), and will ultimately provide improved surveillance capability coupled with integrated ground-air-ground data links for air traffic control (ATC) and non-ATC communications. The DLP is currently scheduled for delivery and subsequent integration and operational evaluation testing at the FAA Technical Center before an operational Mode S systems will be available. Because the operational DLP must interface with up to 32 active Mode S systems, it will be necessary to use some means of simulating multiple Mode S sites. Similarly, the DLP must be capable of servicing up to 2000 data link-equipped aircraft. Because, at most, two prototype Airborne Data Link Processors (ADLP)/Avionics systems will be available at the FAA Technical Center in the integration testing time frame, it is imperative to simulate multiple data link-equipped aircraft.

MITRE Corporation is under contract to supply WMSCR and ADAS emulators for use in DLP Integration Testing and Operational Evaluation at the FAA Technical Center. ACD-320 will provide a Data Link and Transponder Analysis System (DATAS) for simulation of multiple Mode S sensors and more than 2000 Mode S data link-equipped aircraft for operational and functional integration testing of the DLP. ACD-320 will also provide at least two prototype ADLP/Avionics systems, including Mode S transponders. An in-flight operational demonstration of the DLP/Mode S/ADLP end-to-end performance testing will be conducted when a Mode-S sensor becomes available at the FAA Technical Center.

1.1 SCOPE.

This plan defines the test requirements which must be satisfied to assure that the DLP meets the minimum acceptable System Level Test and Evaluation (SLT&E) and the Integration Test and Evaluation (IT&E) requirements identified in the DLP Test Verification Requirements Traceability Matrix (TVRTM) presented in appendix A of this document. This plan shall be reviewed and approved by the FAA prior to the preparation of detailed integration test procedures.

1.2 PURPOSE.

The purpose of this plan is to define the approach, methods, resources, and schedules including DLP's error detection in all received messages, frames, and packets from interfacing systems, and protocol levels through the use of external simulators and emulators, for the verification of the DLP requirements. Detailed discussion of the test methods associated with operational and procedural type functions, such as system startup/restart, system update, on-line and off-line reports generation, etc., will be contained in the test procedures. This plan provides sufficient detail to define and direct the development of detailed test procedures and to identify the allocation of resources required to support this test. Detailed test procedures shall be developed under a separate document in accordance with FAA-STD-024a.

2. APPLICABLE DOCUMENTS.

2.1 GOVERNMENT DOCUMENTS.

2.1.1 FAA Specifications.

NAS PLAN	NAS Initial State Project
NAS-DD-1000	NAS Level I Design
NAS-SR-1000	NAS System Requirements Specification
NAS-SS-1000	NAS System Specification
FAA-OR-2802a	Data Link Processor Software Segment Specification
FAA-E-2794a	Data Link Processor Hardware Specification

FAA-W48-094	Data Link Processor Weather Data Processing and Retrieval Requirements
FAA-RD-80-14A	The Mode Select Surveillance and Communications, ATC and Non-ATC Link Protocols, and Message Formats
NAS-IR-25072503	WMSCR/DLP Interface Requirements Document
NAS-IR-25082503	DLP/ADAS Interface Requirements Document
NAS-IR-43020001	NADIN/X.25 Packet Mode Users Interface Requirements Document
NAS-IR-51030002	Maintenance Processor Subsystem to Automation Subsystems, Interface Requirements Document
NAS-IR-92020000	Coded Time Source Interface Requirements Document (Draft)
NAS-IC-25082503	DLP to ADAS Interface Control Document
NAS-IC-25036403	DLP to WMSC Interface Control Document
NAS-IC-25035103	DLP to MPS Interface Control Document
NAS-IC-25072503	DLP to WMSCR Interface Control Document
NAS-IC-34062503	DLP to Mode S Interface Control Document

2.1.2 FAA Standards.

FAA-STD-024a	"Preparation of Test and Evaluation Documentation"
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2.1.3 Occupational Safety and Health Administration (OSHA) Regulations.

OSHA-CFR-29	CFR 1910 OSHA Safety and Health Standards
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2.1.4 Other FAA Documentation.

FAA Ord 1800.8E	NAS Configuration Management
FAA Ord 1810.4b	FAA NAS Test and Evaluation Program
FAA Ord 1600.54b	FAA Automated Information System Security Handbook
NAS-MD-110	Test and Evaluation Terms and Definitions for the NAS
NAS-MD-790	Maintenance Processor Subsystem to Remote Monitoring Subsystems and Remote Monitoring Subsystem Concentrators, Interface Control Document
DLP MTP	DLP Master Test Plan

The documentation hierarchy and interrelationships are depicted in figure 2-1.

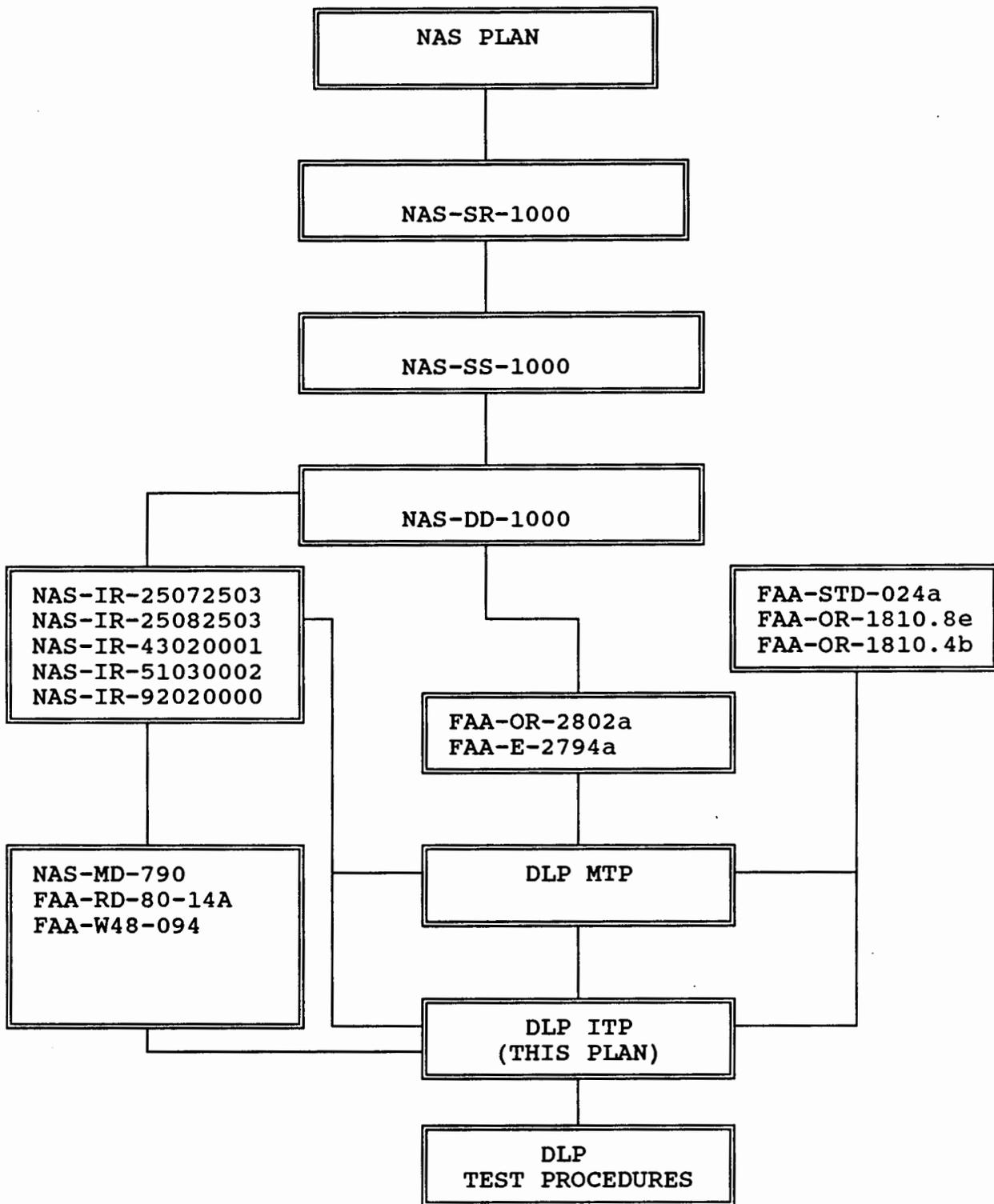


FIGURE 2-1. DLP INTEGRATION TEST PLAN DOCUMENTATION TREE

3. DLP OPERATIONAL AND INTEGRATION TEST PLAN OVERVIEW.

3.1 TEST AND EVALUATION PHILOSOPHY.

The integration and operational evaluation testing conducted at the FAA Technical Center will verify the system level integration requirements (e.g., performance, functional, and interface characteristics) of the DLP system. This plan and associated test procedures will accomplish the following:

- a. Verify the DLP's capability to properly interface and function with associated equipment.
- b. Provide early detection of interface design problems.
- c. Ensure that operationally effective and suitable systems are implemented into the NAS.

3.2 INTEGRATION TEST PLAN AND APPROACH.

Integration testing will require testing of the DLP system in an environment as near operational as possible. The DLP testing is based on the requirements defined in the NAS-SS-1000, Volume I (Appendix III), Volume II, and Volume V. These requirements have been reviewed and summarized; similar requirements have been assigned a unique category and test procedures will be developed to address each category. Six categories are listed in the following paragraphs and are defined in section 5 of this plan. The DLP operational configuration is shown in figure 3.2.1-1, and the test and evaluation configuration is shown in figure 3.2.1-2.

3.2.1 Test Category 01 Interface Requirements.

The test category 01, the seven systems that interface with the DLP system will be tested on an individual basis initially, then integrated into a fully configured system. Depicted below are the interfaces that will be tested. The following order does not establish a testing priority sequence:

- a. Mode Select Beacon System (Mode S)
- b. Avionics Data Link Processor (ADLP)
- c. Weather Message Switching Center Replacement (WMSCR)
- d. Weather Message Switching Center (WMSC)
- e. AWOS Data Acquisition System (ADAS)
- f. Maintenance Processor Subsystem (MPS)
- g. Coded Time Source (CTS)
- h. Full Configuration

Exhaustive testing of DLP error detection will be basic to interface message, frame, and packet processing.

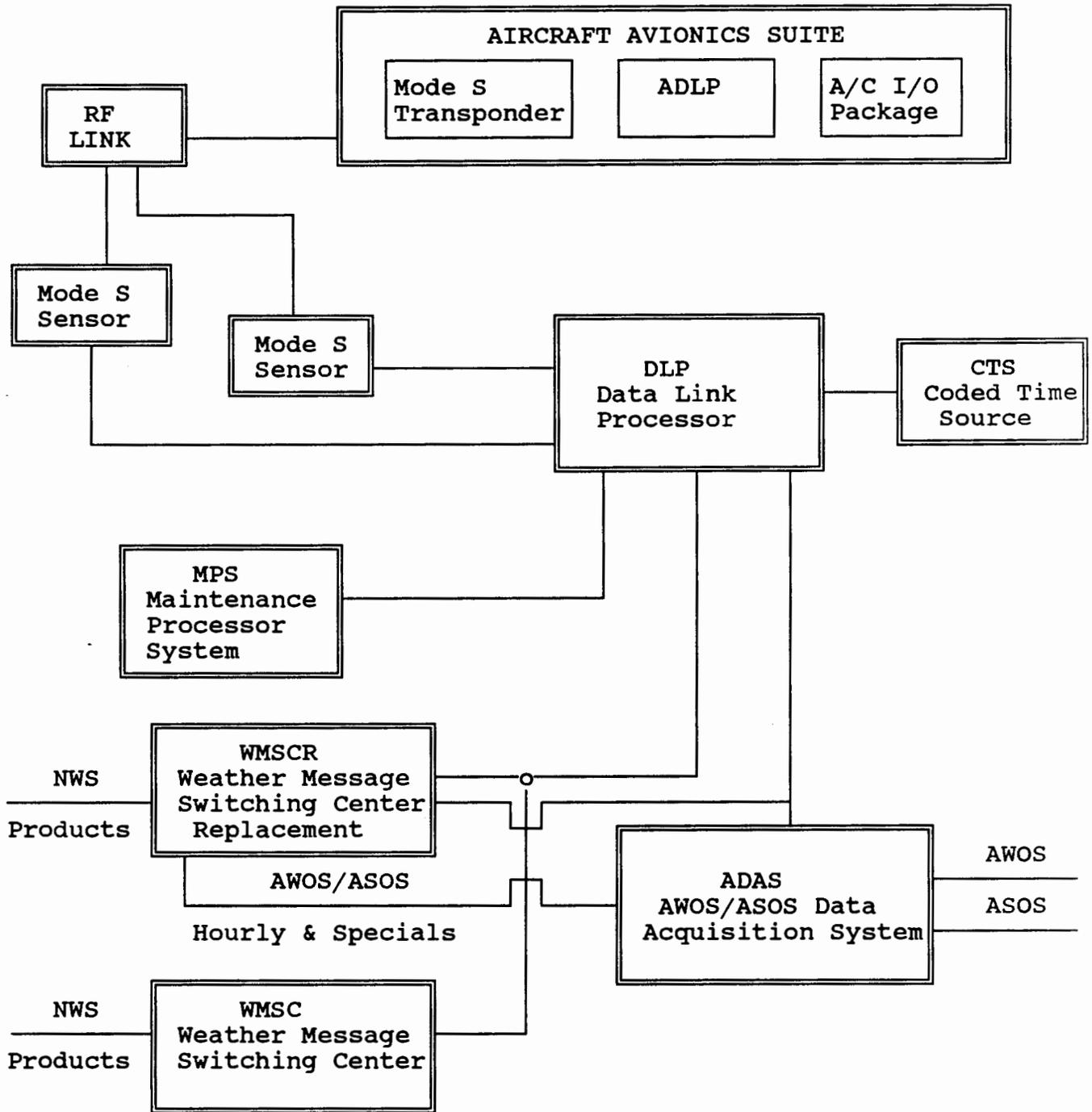


FIGURE 3.2.1-1. DATA LINK PROCESSOR SYSTEM END STATE CONFIGURATION

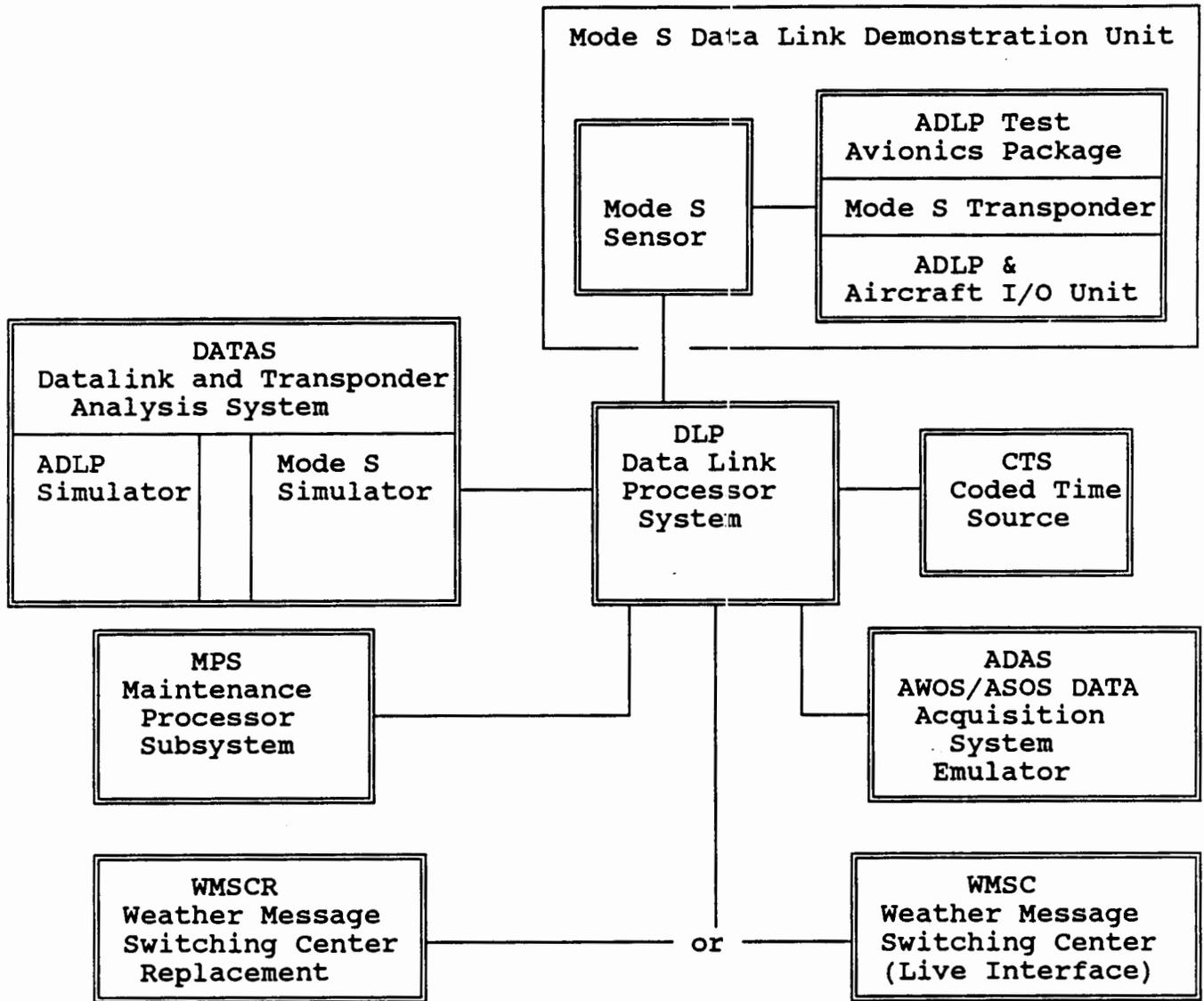


Figure 3.2.1-2 Data Link Processor System Test Configuration

3.2.2 Test Category 02 Basic Systems Operations.

The testing that will be conducted within test category 02 shall be based on the successful completion of tests conducted in test category 01. Within category 02, all functional and operational evaluation functions will be exercised at maximum capacity levels to ensure all systems satisfy all performance specifications. This test will simultaneously test all of the DLP's interfacing systems. Successful completion of this test will demonstrate that the DLP can function and operate in the NAS environment.

3.2.3 Test Category 03 Startup, Shutdown, and Restart.

The testing within test category 03, demonstrates the DLP can perform the indicated functions, and enable personnel to follow operational procedures typically used in an actual operational environment by site personnel.

3.2.4 Test Category 04 Reconfiguration.

Test category 04 will be conducted to ensure that changes in the operational configuration can be made by operational personnel.

3.2.5 Test Category 05 Diagnostics.

Testing conducted in this category will enable the operations personnel to evaluate the integrity of the alarms, alerts, and messages produced when errors are entered during testing.

3.2.6 Test Category 06 Security.

These tests will confirm that protective measures have been implemented.

4. DLP OPERATIONAL AND INTEGRATION TEST PLAN VERIFICATION CONTROL.

4.1 TVRTM.

The DLP Integration Test Plan TVRTM contained in appendix A was developed in accordance with FAA-STD-024a, appendix IV. The TVRTM lists the applicable requirements from the NAS-SS-1000, Volume I (Appendix III), Volume II, and Volume V NAS System Specification. Each of these requirements will be verified by the identified methods, i.e., test and/or demonstration, through the successful completion of the detailed integration test procedures.

5. DLP OPERATIONAL AND INTEGRATION TEST CATEGORIES.

The DLP operational and integration testing consists of one configuration and six test categories. This section will define each category identified in section 3.

5.1 TEST CATEGORY 01 INTERFACE REQUIREMENTS.

5.1.1 Mode S.

These tests will verify the requirements related to the DLP interface with the Mode S. All DLP integration testing with the Mode S system will be made using DATAS test scenarios. DATAS will satisfy all communication protocols of Mode S, i.e., any Mode S protocol directed responses to communications with the DLP will automatically and routinely be satisfied by DATAS. Each DATAS test scenario will be an input file to DATAS consisting of (1) communication messages including time of message transmission to the DLP, and (2) flags to direct and/or influence Mode S responses to messages received from the DLP.

5.1.1.1 Mode S Communications Protocol Testing.

DATAS will read a DLP communications protocol test scenario that exercises all measurable/testable X.25 Link Access Procedures Balance (LAPB) intercommunications protocol requirements. Because the DLP uses digital microprocessors to execute all line driver communications protocol functions, this test scenario will simulate functions, such as communications line dropouts, timeouts, and failures to verify DLP's communications protocol processing.

5.1.1.2 Mode S Testing.

The DATAS test scenario associated with Mode S interface testing will verify that every Mode S/DLP frame is processed and/or received by the DLP. The frames to be tested are the following:

a. DLP to Mode S Frames

1. Standard Uplink
2. Extended Length Message (ELM) Uplink
3. Request for Downlink Data*
4. Message Cancellation Request*
5. Data Link Capability Request
6. Request for Aircraft State
7. Request for Aircraft Position*
8. Test Message
9. ATCRBS ID Request

*frames not tested in build-one

b. Mode S to DLP Frames

1. Message Rejection/Delay Notice
2. Message Rejection Delay Notice with Sensor (Identifications (ID))
3. Sensor Recovery Notice
4. Uplink Delivery Notice
5. Pilot Downlink
6. Pilot Downlink with Position
7. Broadcast Downlink*
8. Broadcast Downlink with Position*
9. ELM Downlink*
10. ELM Downlink with Position*
11. Data Link Capability

12. Aircraft State
13. Aircraft Position
14. Track Drop
15. Test Response Message
16. Ground Initiated Downlink
17. Ground Initiated Downlink with Position
18. ATCRBS ID Code**
19. Track Alert Message**
 - *frames not processed, but archived by DLP
 - **frames not tested in build-one

This DATAS Mode S test scenario verifies that DLP will receive, process, archive, or transmit every message in the Mode S interface.

5.1.2 ADLP/Applications Testing.

Successful completion of these tests will verify the operational interface between the DLP and ADLP systems. The DATAS ADLP test scenario insures that every weather product in the weather database can be requested by simulated ADLP-equipped aircraft and that the DLP's responses to these requests are timely and accurate. All the messages associated with Mode S data link will be tested. ADLP integration testing will address transport level data units, Mode S Packets, and Mode S frames.

5.1.2.1 Mode S Message Testing.

The following tests will verify that every Mode S data link message can be received, processed, and responded to by the ADLP interface:

- a. Uplink and Downlink
 1. Application
 - (a) Weather Request Message
 2. Transport Data Units and Mode S Packets
 - (a) Transport Service Data Unit (TSDU)
 - (b) Transport Protocol Data Unit (TPDU)
 - (c) Point-To-Point Router Hello (PPRH) PDU
 - (d) Level 1 End-System Link State (L1-ELS) PDU
 - (e) Mode S Route Packet
 - (f) Long Mode S Packet (MSP)
 - (g) Short MSP

The DATAS test scenario must include communications protocol interactions between the Mode S sensor and the ADLP that force these messages to be sent to or received from the DLP.

5.1.2.2 Aircraft Application Weather Product Communications Processing.

The purpose of these tests is to verify that pilots can request weather products from the DLP via the ADLP to Mode S data link and receive the DLP's responses to these requests. Every weather product, and their associated parameters, will be requested by a DATAS test scenario which will include checking every possible error

message the DLP sends to the ADLP. Many of the tests conditions in the DATAS test scenario will be closely related to the weather database update tests of the WMSCR emulator and ADAS. Hence, successful DLP responses will verify both DLP's weather database management functions and DLP's processing of requests for weather information. The DATAS test scenarios will be based on requirements of FAA-OR-2802a, FAA-W48-094 (Revision 2), the MITRE document "Detailed Data Link Protocol for the Weather Communications Processor," dated 2 August 1988; and "U.S. National Aviation Standard for Data Link Applications of the Mode Select Beacon System, Appendix."

5.1.3 WMSCR Testing.

The testing of this interface will verify the operational and functional performance of the DLP with the WMSCR system. A MITRE-supplied WMSCR emulator will essentially be operationally and functionally equivalent to the WMSCR system. It will be used in all tests of this interface. The WMSCR emulator will receive weather product information from the WMSC in X3.28 protocol, reformat all product information for transmission to the DLP using X.25 communications protocol, and insert special weather messages to test DLP's weather database updates and maintenance. The WMSCR weather test scenario will be used in place of WMSC live data to weather database updates and maintenance. Many of the tests will be performed in conjunction with the ADLP's weather data requests via DATAS defined previously in section 5.1.2.2. The WMSCR emulator will be functionally and operationally equivalent to the WMSCR system as defined in the WMSCR Interface Control Document. WMSCR's weather information is identical to that of WMSC. Seven WMSCR test scenarios will be used to test the DLP to WMSCR interface. The test scenarios are the following:

- a. Surface Observation (SA) Products including:
 1. Record Special Observation (RS)
 2. Supplementary Observation (SW)
 3. Special Observation (SP)
 4. Urgent Special Observation (USP)
 5. Correction (COR)
- b. Terminal Forecast (FT) Products including International Civil Aviation Organization (ICAO) or Military Terminal Forecast (TAF)
- c. Forecast Winds and Temperature Aloft (FD)
- d. Pilot Report (UA) including Urgent Pilot Report (UUA)
- e. Radar Summary (SD)
- f. Hazardous Weather including:
 1. Airmen's Meteorological Information (AIRMET) (WA)
 2. Significant Meteorological Information (SIGMET) (WS)
 3. Urgent SIGMET (UWS)
 4. Convective SIGMET (WST)
- g. Product Interaction

5.1.3.1 WMSCR Communications Protocol Testing.

The WMSCR emulator will demonstrate and verify DLP's communications interface. The DLP and the WMSCR system will communicate using X.25 LAPB communications protocol.

5.1.3.2 Weather Product Database Testing.

The WMSCR weather product test scenarios will verify the DLP's reception, processing, and maintenance of each of the six weather products in the weather database. Scenarios will be developed for each weather product to verify its ability to handle errors in the text of the message and one scenario to verify interactions associated with maintenance of the six weather products in the weather database. Each weather product test scenario will be developed by MITRE Corporation and will require use of the WMSCR emulator. Verification of DLP's weather product database update and maintenance will be made primarily in conjunction with the DLP to ADLP interface testing. DLP stability testing of the WMSCR interface will be performed using live WMSC data reformatted by the emulator.

There may exist some conditions/criteria in weather product processing that cannot be realistically tested in these scenarios. MITRE will identify those conditions/criteria not tested.

5.1.4 WMSC Testing.

All testing of this interface will be made to demonstrate DLP's functional and operational performance with live weather communications from the WMSC system. No formal integration tests of the DLP's weather database creation and maintenance functions are planned for the interface between these systems. Because the format and contents of WMSC and WMSCR weather information are similar, WMSCR's controlled weather test scenarios will be used in all formal testing of DLP's weather database update and maintenance functions. Stability testing of DLP will be demonstrated using the WMSC system. Stability testing will consist of running the DLP for an 1-week period, with a live connection to the WMSC system. DATAS periodic requests for live data will be made during stability testing.

5.1.5 ADAS Testing.

The testing of this interface will verify the operational and functional performance of the DLP with the ADAS system. MITRE's ADAS emulator is basic to all testing of this interface. The ADAS emulator will provide minute-by-minute reports from simulated AWOS or the ASOS. The ADAS emulator will be functionally and operationally equivalent to the ADAS system defined in the ADAS Interface Control Document.

5.1.5.1 ADAS Communications Protocol Testing.

The ADAS emulator will demonstrate and verify DLP's communications interface. The DLP and the ADAS system will communicate using X.25 LAPB communications protocol.

5.1.5.2 ADAS Weather Product Database Testing.

AWOS/ASOS automatic sensed weather data has a fixed format except where a human operator intervenes and submits a remarks field report for the station. All ADAS weather database update and maintenance criteria are defined in FAA-W48-094,

Revision 2. It should be noted that the MITRE ADAS test scenarios do not test the logical expansion/interaction between bit fields. Testing of DLP's ADAS weather storage will be performed using DATAS weather request scenarios. The ADAS weather data received from the MITRE's ADAS emulator will be used in testing this interfacing system. Functional verification of this interface will be made in conjunction with the DATAS and the ADAS test scenario.

5.1.6 MPS Testing.

The tests specified in this section will demonstrate DLP's Remote Monitoring Subsystem (RMS) live inter-operability to the MPS. Each DLP MPS requirement will be validated by one or more tests and each test may cover more than one requirement. Traceability between the requirements and these tests is depicted in appendix A, table A-2.

The test activities will primarily focus on the DLP RMS functions which are accessible remotely via the MPS interface. Testing will be accomplished by executing these RMS functions via the MPS interface, utilizing the ACN-230 Test Communications (Testcom) software, or the Interim Monitoring and Control Software (IMCS). This will verify that, although link level communications between the DLP RMS and the MPS are conducted according to X.25 Link Access Protocol - Balanced (LAPB) at the application level the interface functions as specified in NAS-SS-1000, are correctly implementing DLP RMS monitoring, alarm, command, certification, and diagnostic functions.

5.1.6.1 Test Categories.

Six separate test sequences have been identified. For reference purposes, they are identified in the following sections as Integration Test 1 (IT1) through IT6. Among these tests, the following interdependencies have been identified:

- a. IT1 is independent of all other integration tests.
- b. IT2 through IT6 are dependent upon successful completion of IT1, but are independent of each other and may be conducted in any order.

5.1.6.1.1 IT1 Link Level Test.

The Link Level Interface Test will confirm that the link level communication path between the DLP RMS and the MPS can be established and maintained. To verify the link level path, the MPS running Testcom (or IMCS) is used to communicate with the RMS. Site Data Reports (SDRs), RMS response messages, and the recorded inspection data for the DLP will be analyzed to verify the results of this test.

5.1.6.1.2 IT2 Monitoring Test.

The Monitoring Test will confirm that each parameter, reported by the DLP RMS, is consistent with the state of the DLP system. SDRs will be generated at the DLP RMS and sent to the MPS. The SDRs, and recorded inspection status data for the DLP, will be analyzed to verify the results of this test.

5.1.6.1.3 IT3 Alarm Test.

The Alarm Test will confirm that the DLP RMS will correctly respond to the DLP alarm conditions via the MPS interface. The responses received by the MPS, and the recorded inspection data for the DLP, will be analyzed to verify the results of this test.

5.1.6.1.4 IT4 Command Test.

The Command Test will confirm that the DLP RMS will correctly respond to commands sent via the MPS interface. The responses received by the MPS, and the recorded inspection data for the DLP, will be analyzed to verify the results of this test.

5.1.6.1.5 IT5 Certification Test.

The Certification Test will confirm that the DLP RMS will correctly respond to the certification commands sent via the MPS interface. The responses received by the MPS, and the recorded inspection data for the DLP, will be analyzed to verify the results of this test.

5.1.6.1.6 IT6 Diagnostic Test.

The Diagnostic Test will confirm that the DLP RMS will correctly respond to diagnostic commands issued via the MPS interface. The responses received by the MPS, and the recorded inspection data, for the DLP will be analyzed to verify the results of this test.

5.1.7 CTS Testing.

This test will verify that the DLP can interface with and receive time from the CTS system. The CTS provides Julian day of year and time of day plus codes that indicate accuracy of time information. The exact format of the one message sent by the CTS shall be in accordance with the CTS (Interface Control Document (ICD)).

5.2 TEST CATEGORY 02 BASIC SYSTEMS OPERATIONS.

Tests successfully completed within this category will demonstrate that the DLP can be integrated into the NAS whenever all interfacing systems are available. This test incorporates all of the functional and operational characteristics of the DLP as identified in the category associated with each interfacing system. The full configuration operational and stability performance of the DLP is included in this test category. This test includes the following basic functional requirements of the DLP:

- a. Weather product acquisition storage and maintenance from the WMSCR and ADAS emulators plus live data from WMSC
- b. Weather product retrieval
- c. Weather product transmission to aircraft via Mode S sensors
- d. Maintenance of the aircraft ADLP to DLP communication link via Mode S

- e. MPS polling
- f. Capacity and performance testing

Testing of these functions will be performed on the DLP using appropriate scenarios for weather product sources and requests. These requirements will be tested using DATAS coupled with the WMSCR and ADAS emulators.

5.2.1 Test Description.

The following test description shows the interaction between testing the DLP's functions of storing and maintaining a weather database and the servicing of requests for weather information from this database. This interaction is summarized in figure 5.2.1-1.

a. Weather Product Acquisition, Storage, and Maintenance

During this test, the weather source will be the simulated WMSCR and ADAS emulators. The emulator test drivers will read previously prepared weather product data (canned weather) and transmit it in appropriate format to the DLP. This data will consist of valid data and will include at least one example of each type of weather product in the full variety of formats expected from WMSCR. The DATAS, using its test scenarios derived from the above emulator weather test scenarios, will then issue requests for all these products, and compare the DLP responses with predicted results based on the canned weather. If the weather product received by the DATAS simulated Mode S sensor agrees with the predictions based on the canned weather, it can be concluded that the canned weather product was properly acquired and maintained by the DLP.

The canned weather data will include a liberal mixture of erroneous data, and a sufficient spectrum of pilot reports and hazardous weather advisories to exercise the spectrum of weather requests. Date-time groups in the weather products will be adjusted to produce gradual and predictable expiration of the products. The DATAS will issue requests for all products in the canned weather and compare responses with predicted results.

At the end of the test, the weather reject log will be reviewed to ensure that all erroneous weather products have been properly logged, and that no valid weather products appear. The weather reject log and the transaction file will be reviewed to estimate the storage delay time, which is also available from the simulator logs.

b. Weather Product Request Processing

This test case is concerned with Mode S to ADLP communications. The testing under a. Weather Product Acquisition, Storage, and Maintenance, should be sufficient to demonstrate that the DLP processing of valid requests satisfies requirements.

Invalid and improperly constructed requests still need to be tested. The DATAS will issue a set of data link messages with all possible type codes (0-FF hexadecimal), as the first byte in an otherwise well constructed pilot downlink without position. Most of these are invalid and should be archived but elicit no response from the DLP.

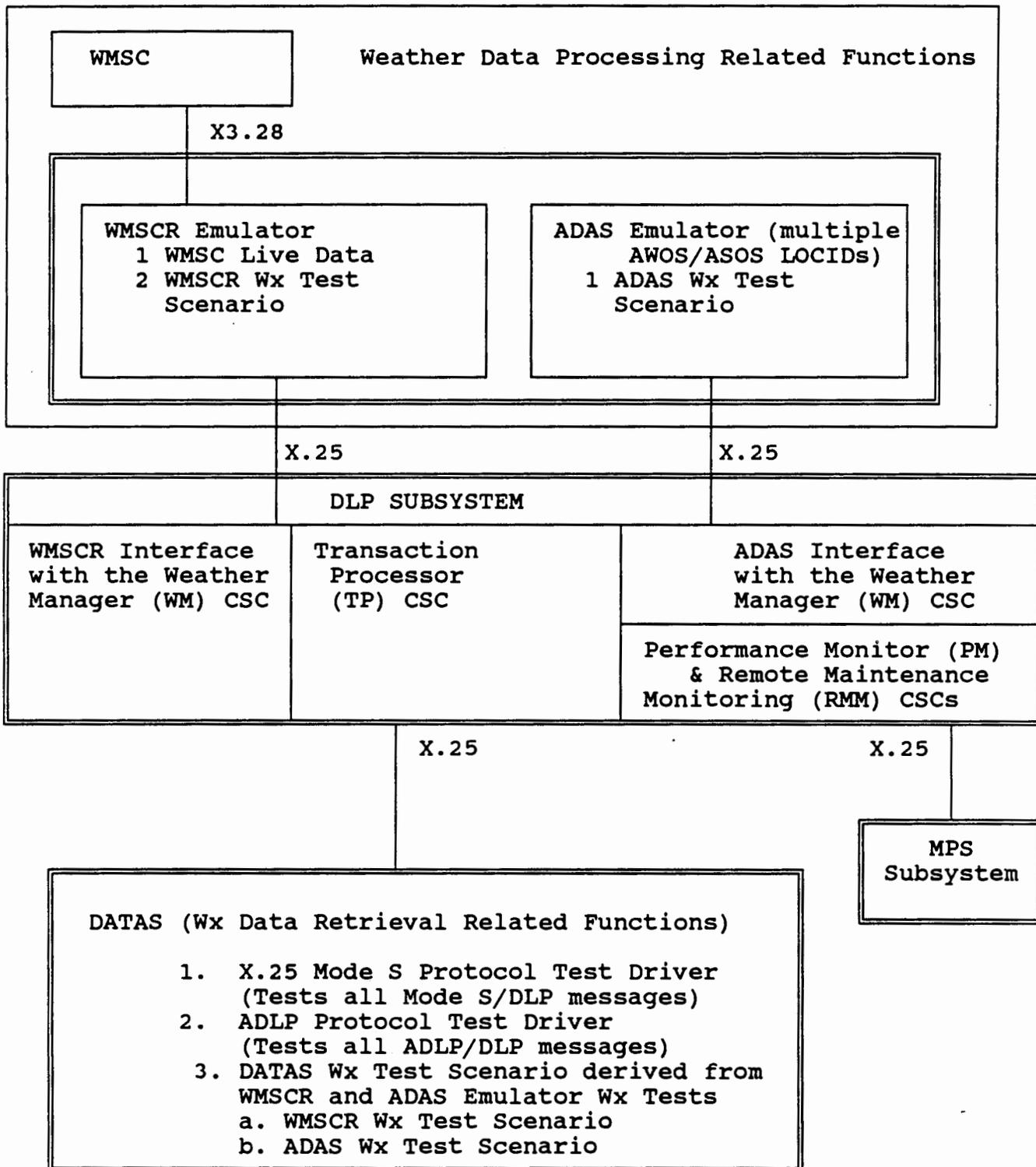


Figure 5.2.1-1 DLP Test Block Diagram

c. Weather Product Transmission

The previous test cases have adequately exercised the Mode S interface to demonstrate compliance with these requirements.

d. End-to-End Testing

This test involves the WMSC live weather product source (one or more live Mode S sensors in communication with deployed Mode S ADLP equipped aircraft issuing weather product requests). This test will be an important part of IT&E because it demonstrates the Mode S data link capability. DATAS will be used in conjunction with full end-to-end testing to provide additional assurance that the functional requirements to communicate with multiple targets have been met.

e. MPS Polling and DLP Responses

The MPS interface will be exercised via normal MPS polling of the DLP.

f. A test scenario will be executed by DATAS which exercises all DLP capacity constraints; namely, number of active aircraft (2000) and weather product request rates (throughput performance). Weather products storage capacity (i.e., number of SAs) will have previously been tested during ARCON's DT&E.

5.2.2 NAS Requirements.

This test shall verify the following requirements:

NAS-SS-1000 3.2.1.5.3.2.3, and SSS/DLP 3.1.1 through 3.1.4.2, 10.1 through 10.5.9.6.

5.2.3 Criteria of Success.

The successfully completed and approved verification of the requirements specified in 5.2.2 shall be considered as the criteria for success of this test procedure.

5.2.4 Test Configuration.

Category 02 tests shall be performed on the configuration shown in figure 3.2.1-2.

5.2.5 Support Hardware.

The following support hardware is required: DATAS's Mode S to ADLP Application simulation, the WMSCR and ADAS emulators, the Technical Center's MPS testbed, and a protocol analyzer model HP-4952. End-to-end testing requires a live Mode S sensor and an airborne avionics system, including a Mode S data link capable ADLP transponder, plus input output capabilities.

5.2.6 Support Software.

Software to support the DATAS's Mode S simulation, ACN-230 MPS Testcom, and the IMCS software is required.

5.2.7 Special Test Equipment.

No special test equipment has been identified to date.

5.2.8 Data Analysis.

This test will be precisely scripted WMSCR/ADAS emulator weather data test scenarios and the DATAS test scenarios derived from them. The deviation of system responses from these scripted test scenarios results in test failure. The normal outputs generated during this test will be archived by both DATAS and the DLP, with listings generated as required. These files are part of the documentation.

5.2.9 Documentation.

Documentation of Test Category 02 test performance and results shall be in accordance with section 7 of this document. The normal outputs, generated during this test, will be captured to a magnetic medium via the archiving feature of the DLP; listings will be generated as required. These files are a part of the documentation.

5.3 TEST CATEGORY 03 STARTUP, SHUTDOWN AND RESTART.

These tests shall demonstrate that Startup, Shutdown and Restart functions of the DLP can be performed with results in accordance with conditions and requirements specified in the TVRTM.

5.3.1 Test Description.

Test personnel shall execute test scenarios associated with Startup, Shutdown and Restart of the DLP. Each of the above functions shall produce results in strict accordance with requirements given in the TVRTM. Any deviation from these requirements shall constitute a failure of the function being tested.

5.3.2 NAS Requirements.

Tests in this category shall verify the following requirements:
SSS/DLP 3.1.4.3.1, 3.1.4.3.2, and 3.1.4.3.3.

5.3.3 Criteria of Success.

The successfully completed and approved verification of the requirements, as specified in section 5.3.2, and the TVRTM, shall be considered as the criteria for success of these tests procedures.

5.3.4 Test Configuration.

Category 03 tests shall be performed on the configuration shown in figure 3.2.1-2.

5.3.5 Support Hardware.

No support hardware has been identified to date.

5.3.6 Support Software.

No test support software has been identified for this testing.

5.3.7 Special Test Equipment.

No special test equipment has been identified to date.

5.3.8 Data Analysis.

This test is either pass or fail, based on the DLP's performance.

5.3.9 Documentation.

Documentation of Category 03 test performance and results shall be in accordance with section 7 of this document. The normal outputs, generated during this test, will be captured to a magnetic medium and listings generated as required. These files are a part of the documentation.

5.4 TEST CATEGORY 04 RECONFIGURATION.

Test personnel will use those menus associated with DLP operational parameter changes to verify changes in the operational configuration.

5.4.1 Test Description.

A test scenario will be executed by test personnel which exercises every requirement description listed in the DLP TVRTM.

5.4.2 NAS Requirements.

These tests shall verify the following DLP requirements:
SSS/DLP 3.1.4.3.4.1, 3.1.4.3.4.2, and 3.1.4.3.5.

5.4.3 Criteria of Success.

The successfully completed and approved verification of the requirements, as specified in section 5.4.1 and for each requirement specified in the TVRTM, shall be considered as the criteria for success of these test procedures.

5.4.4 Test Configuration.

These tests shall be performed on the configuration shown in figure 3.2.1-2.

5.4.5 Support Hardware.

No special support hardware has been identified for this test.

5.4.6 Support Software.

No special support software has been identified for this test.

5.4.7 Special Test Equipment.

No special test equipment has been identified to date.

5.4.8 Data Analysis.

All changes made in the DLP's operational configuration shall be in strict accordance with the operational parameters modified by the test scenario.

5.4.9 Documentation.

Documentation of these test performance and results shall be in accordance with section 7 of this document. The normal outputs, generated during this test, will be captured to a magnetic medium and listings generated as required. These files are a part of the documentation.

5.5 TEST CATEGORY 05 DIAGNOSTICS.

This test category includes inventory of hardware elements and support software controlling the basic hardware elements, such as memory, mass storage, tape drives, printers, Cathode Ray Tube (CRT) terminals, and communication interface devices. Diagnostic software, supplied with the DLP hardware configuration items, is tested, as well as the application and the system software diagnostic repertoire. The Reliability and Performance Demonstration (R&PD) is also included in this testing.

5.5.1 Test Description.

The test procedures developed for this testing shall verify the basic interfaces between FAA personnel and the new hardware that comprise the DLP system. They shall confirm the ability to perform the diagnostics and the accuracy of the supplied software and procedures. They shall demonstrate the ability of the system to meet the performance and reliability requirements. These tests are partitioned into two sub-tests: (1) Functionality Demonstration, and (2) R&PD.

5.5.1.1 Functionality Demonstration.

Test personnel shall power each associated unit up and down and observe the system reactions. They shall execute all features and options of the diagnostic software supplied with the DLP system. They also verify the functionality of the fault detection, isolation, and correction capabilities of the Sequoia computer system. These tests will primarily be the same as many of the hardware factory acceptance test run by CONTEL. They shall exercise such things as the mount, dismount, label, read, write, and protection capabilities of the magnetic tape hardware, and supporting software.

5.5.1.2 Reliability and Performance Demonstration.

The R&PD will consist of a continuously running DLP program operating with emulators and simulators providing weather data and Mode S/ADLP interfaces under normal load conditions. The DLP will be run continuously for 1 week to accumulate performance statistics and the mean time to failure of the system. DATAS will routinely make various requests for weather information during this test.

5.5.2 NAS Requirements.

These tests shall verify the following requirements:

SSS/DLP 3.1.1, 3.1.4.2.3, 3.1.4.5.9.1, 3.1.4.5.9.3, 3.1.4.5.9.4, 3.1.4.5.9.5, and 10.5.9.7ff.

HWS/DLP 3.1.1ff, 3.1.2ff, 3.1.3ff, 3.2.1ff, 3.2.3ff, and 3.2.4.3.

5.5.3 Criteria of Success.

The successfully completed and approved verification of the requirements, as specified in both section 5.5.2 and with the identified methods for each requirement in the TVRTM, shall be considered as the criteria for success of these test procedures.

5.5.4 Test Configuration.

Category 05 tests shall be performed on the configuration shown in figure 3.2.1-2.

5.5.5 Support Hardware.

All DLP hardware elements and simulators and emulators are required for these tests.

5.5.6 Support Software.

The defined R&PD program and data generators supporting simulation scenarios are required for the R&PD test.

5.5.7 Special Test Equipment.

No special test equipment has been identified to date.

5.5.8 Data Analysis.

a. With regard to the functional requirements being tested, this test will be precisely scripted in the test procedures so that deviations of system responses from the script result in test failure.

b. Performance and reliability requirements will require statistical analysis to evaluate the results, i.e., if no failures are observed, a lower limit on the mean time to failure may be estimated statistically.

5.5.9 Documentation.

Documentation of these tests performance and results shall be in accordance with section 7 of this document. The outputs generated during this test will be captured to a magnetic medium and listings generated as required. These files are part of the documentation.

5.6 TEST CATEGORY 06 SECURITY.

The need to implement security into the DLP software is a must to restrict unwanted access to the databases. Two levels shall be included with the first being a means to automatically generate a log-on record and enable the user general purpose utilization. The second level shall be more restrictive and be available for those who have a need to know.

5.6.1 Test Description.

Testing shall be conducted that will demonstrate that with correct access personnel will be permitted to properly operate the functional aspects of the DLP system. Equal testing will demonstrate that improper access will not be permitted.

5.6.2 NAS Requirements.

There are no specific requirements stated for this in the DLP specifications, but is required as per FAA Order 1600.54b.

6. DLP TESTING ORGANIZATIONAL ROLES AND RESPONSIBILITIES.

The principal groups involved in the DLP Integration Test activities are the test management group and the test support group.

6.1 DLP TEST MANAGEMENT GROUP.

6.1.1 Composition of the DLP Test Management Group.

The DLP test management group will be composed of representatives from FAA agencies and support contractors. Specifically, it will be composed of one member from each of the following organizations: ACN-220 (who will chair the group), ASM-160, AAC-942D, ACD-320, ACN-230, MITRE, MiTech, STI, and System Engineering and Integration (SEI)- Technical Center Operations (TCO).

6.1.2 Role of the DLP Test Management Group.

The role of this group is to direct all test efforts relative to the DLP Test and Evaluation (T&E) activities. The DLP test management group will coordinate and assign particular tasks to each organization represented in the DLP test support group.

6.1.3 Responsibilities of the DLP Test Management Group.

Specific responsibilities of the DLP test management group are the following:

- a. Establish and promulgate policies related to the DLP T&E activities.
- b. Concur with all test plans and procedures related to the DLP T&E activities.

c. Distribute DLP T&E activity related documentation to all participating organizations for review.

d. Assign roles and responsibilities to the DLP T&E test support group.

6.2 DLP TEST SUPPORT GROUP.

6.2.1 Composition of the DLP Test Support Group.

The DLP test support group will be composed of representatives from FAA agencies and support contractors. Specifically, it will be composed of specialists knowledgeable in specific technical areas and DLP TVRTM requirements selected by the test management group from the following organizations: ACN-220 (who will define, direct and manage the tests), ACN-210, ASM-160, ACD-320, AAC-942D, MITRE, MiTech, STI, and SEI. Each organization will be responsible to assign its personnel to accomplish its tasks as assigned by the DLP test management group. ALG-400 will designate a Quality Reliability Officer who will be responsible for quality assurance. The level of support required of each organization is specified below in section 6.4.2.2.

6.2.2 Role of the DLP Test Support Group.

The role of the test support group will be to support the DLP test management group in developing test requirements, plans, procedures, and scenarios. The test support groups will also conduct actual tests, write test reports, perform test analysis, and other such roles as the DLP management group may assign. Personnel from this group will provide the services necessary to establish, schedule, maintain, and control test facilities for conducting the DLP T&E effort.

6.2.3 Responsibilities of the DLP Test Support Group.

6.2.3.1 Specific Responsibilities of the DLP Test Support Group.

The DLP test support group are responsible for the following:

- a. Develop DLP test plans, scenarios, and procedures as directed by the DLP test management group.
- b. Review DLP test plans, scenarios, procedures, success criteria, and analyze documentation in assigned areas.
- c. Provide a detailed test schedule prior to the start of the test period.
- d. Conduct DLP testing.
- e. Maintain, analyze, and report DLP test results.
- f. Determine critical and non-critical testing issues, and actual test cases.
- g. Perform assigned test roles as directed by the TMG.

6.2.3.2 Primary Responsibilities and Support Functions.

The following defines tasking responsibilities:

- a. ACN-220 will prepare and review the DLP's Operational Test and Evaluation/Integration Test Plan and all associated procedures. ACN-220 will also review compliance of test programs with FAA Orders 1810.4a and 1600.54b, and will monitor Installation and Checkout (I&CO) of the first system. They will provide support to the Program Manager for all T&E phases and will be responsible for and conduct testing.
- b. ACN-220 will operate and maintain the test facility laboratories and the system test bed. They will also provide scheduling service to all shared resource laboratory users.
- c. ACD-320 will provide DATAS for extensive functional testing of the Mode S and ADLP systems and will provide the ADLP avionics package for end-to-end testing of the Mode S data link.
- d. ASM-160 will be responsible for the development and preparation of the Shakedown Test Plan and Test Procedures and the DLP Maintenance Handbook. It will be responsible for and will conduct shakedown testing at the FAA Technical Center.
- e. AAC-942D will be responsible for training.
- f. ACN-230 will provide an MPS system for testing the interface between DLP and the MPS.
- g. SEI will coordinate and assist in the development of all DLP test plans, procedures, and execution activities.

6.3 DLP INTEGRATION TEST MANAGEMENT.

6.3.1 Definition of Roles.

Definitions of the roles involved in the DLP T&E integration and verification effort follows. Every defined role need not necessarily be staffed for every test.

6.3.1.1 DLP Test Director (ACN-220).

The test director is responsible for the overall management of the DLP Operational Test and Evaluation effort, for conducting pretest and post-test briefings, and for the collection of all applicable data for subsequent analysis. The test director provides management guidance through the test coordinator and other members of the test team.

6.3.1.2 DLP Test Coordinator (ACN-220).

The test coordinator is responsible for the overall DLP test coordination to ensure that individual missions are properly structured and mission objectives are accomplished. The test coordinator will select the test manager for each test based upon suitability, expertise, and availability. The test coordinator will work with the test director on unresolved problems, recommend remedial action, and provide general support to the test director.

6.3.1.3 DLP Test Manager.

There will be one test manager per test. Issues will be logically addressed by individual test procedures.

The test manager will be responsible for the following:

- a. For the conduct of the specific test assigned.
- b. To ensure that all required equipment and personnel are available prior to the test.
- c. For completion of the open item status sheet described in section 7.
- d. For briefing the test team prior to the test.
- e. For debriefing the test team after the test.
- f. To ensure that the test mission log and summary described in section 7 are completed.
- g. To ensure that all required documentation relevant to the test has been completed.

During actual testing, the test manager will verify compliance with the test procedures specified for the test, ensure that all deficiencies are properly noted, and ensure that all recorded data is collected and forwarded to the test coordinator for analysis. The test manager will also report test results to the test coordinator.

6.3.1.4 DLP Test Monitor.

The test monitor will be responsible for ensuring that test scenarios and procedures are being followed by each test operator, and will assist the test manager in verifying that test data flow observations and/or measurements are recorded at each identifiable mission test model point. The test monitor will also report to the test manager, and will maintain and complete the test observer and test monitor notes.

6.3.1.5 DLP Test Observers.

Technically qualified test observers may be assigned to observe and record activities for specific test procedures, and to provide assistance to personnel staffing the test positions. Test observers will also assist the test monitor in maintaining and completing the test observer and test monitor notes.

6.3.1.6 DLP Test Operators.

Test operators will be non-hardware/software contractor personnel assigned to staff the test positions, defined by the DLP Test Procedures, during a particular test mission. Test operators, under the direct supervision of the test manager, will conduct the test in accordance with the DLP Test Procedures, and record all test anomalies encountered during the test.

6.4 DLP TESTING RESOURCE REQUIREMENTS.

The following sections define resource requirements for facilities and personnel to support the DLP T&E.

6.4.1 DLP Facility Requirements.

The facility requirements for the DLP shall be as presented in the FAA Technical Center Transition Plan.

6.4.2 DLP Personnel Requirements.

6.4.2.1 DLP Test Management Group.

The personnel requirements for the test management group are as stated in section 6.1.1.

6.4.2.2 DLP Test Conduct.

The test team for each test will consist of one test manager, one test monitor, one or more test operators as required by the integration test procedures, and as many test observers as determined by the DLP test management group.

6.4.3 DLP Facility Scheduling.

The test manager will coordinate scheduling the system support facility and other test support facilities through ACN-220, as discussed in section 9.

6.4.4 DLP Test Software.

The test coordinator will be responsible for providing the appropriate software to be used in conducting the integration testing.

7. DLP TEST DOCUMENTATION REQUIREMENTS AND CONTROL.

7.1 DOCUMENTATION.

This section describes the required documents for planning, conducting, and reporting the DLP T&E Integration activities. The required verification documentation consists of the following:

- a. Planning Documentation
 1. DLP Project Specifications
 2. DLP Test Verification Requirements Traceability Matrix (TVRTM)
 3. DLP Test Plan (this document)
 4. DLP Test Procedures
 - (a) Preliminary and final test scenarios
 - (b) Preliminary and final test procedures
 - (c) Preliminary and final test analytics

- b. Testing Documentation
 - 1. Open Item Status Sheet
 - 2. Test Mission Log
 - 3. Test Observer and Monitor Notes
 - 4. Test Evaluation Summaries

- c. Report Documentation
 - 1. Test Discrepancy Reports
 - 2. Quick-Look Test Report
 - 3. Final Test Report

7.1.1 Planning Documentation.

7.1.1.1 DLP Project Specifications.

- a. FAA-E-2794a Data Link Processor Hardware Specification
- b. FAA-OR-2802a Data Link Processor Software Segment Specification

7.1.1.2 DLP TVRTM.

The DLP TVRTM is contained in appendix A of this document.

7.1.1.3 DLP Operational Test and Evaluation/Integration Test Plan.

The DLP Operational Test and Evaluation/Integration Test Plan establishes the interface categories, identifies test issues, establishes test objectives, schedules, resource requirements, methodology, and management organization.

7.1.1.4 DLP Test Procedures.

Preliminary and final versions of DLP Test Procedures, addressing all DLP test requirements, will be produced in accordance with this plan and FAA-STD-024a, appendix III. This document will contain the step-by-step testing instructions, scenarios, required inputs, expected outputs, data collection forms, and methods to be employed to analyze the test results in order to assess compliance of the DLP system with its requirements.

7.1.2 Test Documentation.

7.1.2.1 Test Mission Log.

7.1.2.1.1 Open Item Status Sheet.

Before each pretest meeting, the test manager will obtain the open items for that test, and enter them on the open item status sheet as shown in appendix B. The completed sheets will become the first part of the test mission log, and will be used to document the test environment.

7.1.2.1.2 Pretest Entries.

The second part of the test mission log will be entered prior to test start and will include the test hardware configuration, the test software configuration, and the list of participants in the test.

7.1.2.1.3 During Test Entries.

During the test run, time-stamped entries will be made in the test mission log to indicate all significant events as they occur including, but not limited to, start-up procedures initiated and completed, data produced, problems encountered, anomalies and deviations observed, and shutdown procedures initiated and completed.

7.1.2.1.4 Post-Test Entries.

Upon completion of the test, the test mission log will be completed with entries providing a preliminary assessment of the test results, a recapitulation of anomalies and deviations observed, and a list of data collected and appended to the test mission log.

7.1.2.2 Test Observer/Monitor Notes.

Test observer/monitor notes will be maintained by the test monitor and/or each of the test observers to record all relevant events occurring during each test. These notes will be used at the end of the test by the test monitor to provide the preliminary assessment of the test results to be included in the test mission log at the end of the test. These notes will be appended to the test mission log.

7.1.2.3 Test Evaluation Summary.

Test evaluation summaries will be maintained by the test coordinator and will include (1) the test identification, (2) the purpose of the evaluation, (3) data to be evaluated, (4) evaluation method, and (5) evaluation results. The test evaluation test summary form is shown in appendix B.

7.1.3 Test Results Documentation.

7.1.3.1 Test Discrepancy Reports.

The test manager will ensure that all discrepancies observed during the test are properly documented as soon as possible after the test. These discrepancies will be documented using the proper forms, shown in appendix B, as follows:

a. Hardware related problems will be reported on FAA Form 6030-3, Hardware Discrepancy Report (HDR);

b. Program (software) problems will be reported on FAA Form 6100-1, Program Technical Report (PTR);

c. Problems related to a maintenance type discrepancy will be reported on NAS CT Form 6100-29, System Support Facility Trouble Report.

7.1.3.2 Quick-Look Test Report.

A quick-look test report will be prepared by the test director for each test. The report will consist of "as run" test procedures and a list of all test discrepancies. The quick-look test report will be distributed to appropriate FAA and contractor organizations within 10 working days after test completion.

7.1.3.3 Final Test Report.

A final test report will be prepared at the direction of the test director and forwarded to the appropriate organizations in accordance with FAA Order 1810.4a. This report will document test results of the DLP T&E verification program. It will include information obtained from (1) all recorded data, (2) test mission logs, (3) test monitor/observer notes, (4) discrepancy reports, (5) test evaluation summaries, and (6) any other relevant information. In addition, it will include (1) a list of all problems and/or concerns found during testing, (2) evaluation of any operational impacts arising from these problems and concerns, (3) identification of any outstanding problems, (4) all problems that have and have not been resolved, (5) all test results (both positive and negative), and (6) Conclusions and Recommendations.

7.2 REVIEWS.

The following subsections identify the type of reviews that will occur during DLP test activities.

7.2.1 Weekly Status Review Meetings.

The weekly status review meetings will serve to keep the DLP T&E support groups abreast of the status of the T&E effort. These meetings, chaired by the test director, will serve as a forum in which technical interchange may occur and appropriate issues and concerns discussed. Test plans, test procedures, scenarios, and analytics will be reviewed at these meetings.

7.2.2 Monthly Status Review.

These meetings, chaired by the test director, will provide a forum for the test management group to discuss the status of the T&E effort.

7.2.3 Test Readiness Review (TRR).

This meeting will review the test procedures and approve the final versions. Data collection will begin once the procedure has been accepted.

7.2.4 Pretest Review.

The pretest review, convened, and chaired by the test manager immediately before testing, will establish the readiness for conducting and witnessing a particular formal test. The review will include the status of prerequisites, software, system equipment, and test equipment. The procedure for conducting the test will be presented, and any deviations from the DLP test procedures will be indicated, discussed, and rationalized.

7.2.5 Post-Test Review.

The post-test review will be convened and chaired by the test coordinator. The full test team will attend and review the results of the test activity. Anomalies and discrepancies will be noted and discussed. An assessment will be made of the quality of the test, and of possible adverse impact on remaining tests due to problems encountered during the test.

7.2.6 Deployment Readiness Reviews (DRR).

Deployment Readiness Reviews (DRR) will be prepared, scheduled, and conducted in accordance with FAA Order 1810.4a, and ADL-1, "Interim Operating Procedure (IOP) for NAS Programs Deployment Readiness Review (DRR) Process", dated February 1987. The DRR process will provide the status on all of the DLP project activities, identify open issues, and enable the formulation of conclusions and recommendations to these issues. The DRR also ensures that adequate attention and resources are focused on these issues to effect timely resolution prior to deployment.

The DRR process commences not less than 180 days prior to the scheduled deployment of the DLP project to the first operational site, and includes two formal DRR presentations at 150 and 60 days prior to the deployment date.

Individuals involved with the DLP Integration Test activities should be prepared to support the DRR process for those areas identified in the DRR Checklist/Responsibility Matrix of the IOP.

8. DLP T&E SCHEDULES.

The DLP T&E activity utilizes hierarchal scheduling techniques that provide traceability from the daily shared resource utilization schedule to the NAS Program Master Baseline Schedule. The various levels of the schedule are milestone interlocked for quick response impact assessment.

The schedule is maintained in the Management Information Center (MIC) at the FAA Technical Center. Working copies are disseminated to the applicable DLP T&E Integration test organizations.

The DLP T&E scheduling activities are in compliance with the "Master Scheduling System Functional Description Document - NAS Transition Phase" (Draft), dated March 1986.

The Technical Center Test Activities Schedule, traceable to the long-range integrated milestone schedule, provides the support for the DLP T&E Integration Test Program. The DLP project test activity schedule identifies the individual task start and complete dates. These milestones are interlocked to the long-range schedule milestone dates.

The 30-day Technical Center Utilization Schedule identifies scheduled facility utilization for all activities that utilize the facilities. It will be used to establish priority should scheduling conflicts occur, and to provide information to the ACN Facility Control Office schedule. Appropriate ACN Facility Control Office schedule request forms are completed by the DLP test manager, and forwarded to ACN-300. The facility schedules are produced and distributed by ACN-300.

8.1 DLP MAJOR ACTIVITIES SCHEDULE.

Table 8.1-1, DLP Major Activities Schedule depicts the major activities required to complete the integration testing phase at the FAA Technical Center. The actual project delivery to the T&E site is contained in the NAS Program Master Baseline and the DLP Project Activity Schedules.

TABLE 8.1-1. DLP MAJOR ACTIVITIES SCHEDULE

<u>Number</u>	<u>Activity/Description</u>	<u>Date Due</u>
1	DLP Master Test Plan	Jan 30, 89
2	Operational Test and Evaluation (OT&E)/ Shakedown Test Plan Approved	May 19, 89
3	OT&E/Integration Test Plan Approved	Nov 02, 89
4	System Delivered to the T&E Site (FAA Technical Center)	Mar 06, 90
5	Development Test and Evaluation (DT&E) Test and Analysis Complete	Mar 20, 90
6	DT&E Test Report Complete	Apr 04, 90
7	OT&E/Integration Test and Analysis Complete	Jun 06, 90
8	OT&E/Integration Test Report Complete	Jul 19, 90
9	OT&E/Shakedown Test and Analysis Complete	Jul 12, 90
10	OT&E/Shakedown Test Report Complete	Jul 23, 90
11	Test Recommendation to DRR Executive Committee	Jul 24, 90

9. ABBREVIATIONS AND ACRONYMS.

ADAS	AWOS Data Acquisition System
ADLP	Airborne Data Link Processor
AIRMET	Airmen's Meteorological Information
ANST	American National Standards Institute
ASOS	Automatic Weather Surface Observing System
ATC	air traffic control
ATCRBS	Air Traffic Control Radar Beacon System
AWOS	Automated Weather Observation System
CCITT	Consultative Committee for International Telegraph and Telephone
COR	Correction
CRT	Cathode Ray Tube
CTS	Coded Time Source
DATAS	Data Link and Transponder Analysis System
DLP	Data Link Processor
DP	Data Points
DRR	Deployment Readiness Review
DT&E	Development Test and Evaluation
ELM	Extended Length Message
FAA	Federal Aviation Administration
FD	Wind and Temperature Aloft Forecasts
FT	Terminal Forecasts
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
I&CO	Installation and Checkout
ID	Identification
IMCS	Interim Monitoring and Control Software

IOP	Interim Operating Procedure
ISH	Intermediate System Hello
IT&E	Integration Test and Evaluation
LAPB	Link Access Procedures Balanced
LU	Logical Unit
MIC	Management Information Center
MMC	Maintenance Monitor Console
Mode S	Mode Select Beacon System
MPS	Maintenance Processor System
MSP	Long Mode S Packet
NAS	National Airspace System
OSHA	Occupational Safety and Health Administration
OT&E	Operational Test and Evaluation
PPRH	Point-to-Point Router Hello
RMS	Remote Monitoring Subsystem
R&PD	Reliability and Performance Demonstration
RS	Record Special Observation
SA	Surface Observations
SD	Radar Summaries
SDR	Site Data Report
SEI	System Engineering and Integration Contractor
SIGMET	Significant Meteorological Information
SLT&E	System Level Test and Evaluation
SP	Special Observation
TAF	Terminal Forecast
TBD	Timing Considerations
TCO	Technical Center Operations

T&E	Test and Evaluation
TPDU	Transport Protocol Data Unit
TSDU	Transport Service Data Unit
TSPU	Transport Protocol Data Unit
TVRTM	Test Verification Requirements Traceability Matrix
UA	Pilot Reports
USP	Urgent Surface Observation
UUA	Urgent Pilot Report
UWS	Urgent SIGMET
WA	Airmen's Meteorological Information
WMSC	Weather Message Switching Center
WMSCR	Weather Message Switching Center Replacement
WS	Significant Meteorological Information
WST	Convective SIGMET

APPENDIX A

TVRTM

TVRTM EXPLANATION.

NAS System, Volume II Paragraph Number.

This column lists the DLP NAS System requirements as specified in Volume II of the NAS-1000 specification. The complete statement of the requirement is not included in order to concisely tabulate the required data. (See the appropriate specification document for complete statements of the requirements.) Explanations for abbreviations appearing in this column are as follows:

Verification Method.

T Test. Test is a method of verification where performance is measured through systematic exercising of the item under test with controlled application of functional and environmental stimuli and collection, analysis, and evaluation of quantitative data to determine the degree of compliance with preestablished quantitative requirements.

D Demonstration. Demonstration is a method of verification where the properties being tested are determined qualitatively from observations alone; stimuli are applied, and the responses of the item are observed. Demonstration includes comparison of item design with scientific and technical principles, procedures, and practices to estimate the capability of the design to meet the mission and system requirements. It also includes verification by visual examination of the item, reviewing descriptive documentation, and comparing characteristics with predetermined standards.

X Not Applicable.

Cross Reference Column.

Referenced documents listed in this column provide explicit requirements of the software specifications document 2802a which correlate with the NAS requirements.

Remarks and or Test Category.

Title. Pertains to NA test method entry. The cited paragraph is simply a title; requirements are stated in the following subparagraphs.

Category. The number indicated e.g., 01, 02 ... 06 indicates which of the test categories this requirement is best satisfied.

TABLE A-1. DATA LINK PROCESSOR TVRTM NON-RMS REQUIREMENTS

NAS-SS-1000 VOL. II <u>PARA. NO.</u>	<u>TITLE</u>	S/W SPEC. 2802a <u>PARA. NO.</u>	<u>VERIFY METHOD</u>	<u>REMARKS/ TEST CAT.</u>
3.2.1.5.3.1.1.A	COMMUNICATIONS NODE	3.1.4.2.2	D	02
3.2.1.5.3.1.1.B	NON-ATC OUTPUT DL	3.1.4.2.2	D	02
3.2.1.5.3.1.1.C	NON-ATC SERV DATA RESPOND TO USER	3.1.4.1	D	02
3.2.1.5.3.1.2.A	GRAPHIC PRODUCTS	3.1.4		DEFERRED
3.2.1.5.3.1.2.B	ALPHANUMERIC PRODUCTS	3.1.4	D	02 05
3.2.1.5.3.1.2.C	TABLE OF PRIMARY AND SECONDARY SENSORS	10.5.3.1	D	02
3.2.1.5.3.1.2.D	AIRCRAFT ROUTE TABLE			DEFERRED
3.2.1.5.3.1.2.E	HARDWARE CONFIGURATION		D	
3.2.1.5.3.1.3	INPUT FROM MODE S EQUIPPED AIRCRAFT	3.1.4.2.1.1	T	02
3.2.1.5.3.1.4	INPUT FROM MODE S SENSOR			
3.2.1.5.3.1.4.A	D L SERVICE REQUEST	10.5.1.1 A.B	T	02
3.2.1.5.3.1.4.B	UPLINK MESSAGES	10.5.1.1.I	T	02
3.2.1.5.3.1.4.C	DATA LINK	10.5.1.1.N	T	02

TABLE A-1. DATA LINK PROCESSOR TVRTM NON-RMS REQUIREMENTS (Continued)

NAS-SS-1000 VOL. II <u>PARA. NO.</u>	<u>TITLE</u>	S/W SPEC. 2802a <u>PARA. NO.</u>	<u>VERIFY METHOD</u>	<u>REMARKS/ TEST CAT.</u>
3.2.1.5.3.1.4.D	AIRCRAFT STATE	10.5.1.1.L	T	02
3.2.1.5.3.1.4.E	AIRCRAFT POSITION	10.5.1.1.M	D	02
3.2.1.5.3.1.4.F	UPLINK DELIVERY	10.5.1.1.I	T	02
3.2.1.5.3.1.4.G	MESSAGE/REJECT DELAY	10.5.1.1.J.K	T	02
3.2.1.5.3.1.4.H	TRACK DROP	10.5.1.1.0	T	02
3.2.1.5.3.1.4.I	TEST MESSAGE	10.5.1.1.P	T	02
3.2.1.5.3.1.4.J	SENSOR RECOVERY	10.5.1.1.Q	T	02
3.2.1.5.3.1.5	MODE S SENSOR INPUT PROCESSING			TITLE
3.2.1.5.3.1.5.A	IGNORE INPUTS	10.3	X	02
3.2.1.5.3.1.5.B	PREPARE ERROR RESPONSE	10.3	T	02
3.2.1.5.3.1.5.C	EXTRACT AND STORE	10.3	D	02
3.2.1.5.3.1.5.D	CONVERT RHO/THETA A/C LOCATION DATA	10.3		DEFERRED
3.2.1.5.3.1.5.E	RECODE AND FORMAT MSG. FROM DATA LINK	10.3	T	02

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TABLE A-1. DATA LINK PROCESSOR TVRTM NON-RMS REQUIREMENTS (Continued)

NAS-SS-1000 VOL. II <u>PARA. NO.</u>	<u>TITLE</u>	S/W SPEC. 2802a <u>PARA. NO.</u>	<u>VERIFY METHOD</u>	<u>REMARKS/ TEST CAT.</u>
3.2.1.5.3.1.6	CHANGE MESSAGES	10.5.3	D	02
3.2.1.5.3.1.8	DATA INPUT	3.1.4.1.2	D	02
3.2.1.5.3.1.9	WEATHER GRAPHICS OUTPUT PROCESSING			TITLE
3.2.1.5.3.1.9.A	SEGMENT STORED, WEATHER RADAR DATA	3.1.4.1.3.6	D	02
3.2.1.5.3.1.9.B	ORIENTING DATA	3.1.4.1.3.6.1	D	02
3.2.1.5.3.1.10	OUTPUT TO MODE S EQUIPPED AIRCRAFT			LEAD-IN
3.2.1.5.3.1.10.A	ADVISORIES	3.1.4.1	D	02
3.2.1.5.3.1.10.B	ROUTE	3.1.4.1		DEFERRED
3.2.1.5.3.1.10.C	HAZARDOUS WEATHER	3.1.4.1.2.6	T	02
3.2.1.5.3.1.10.D	FORECASTS (TERMINAL)	3.1.4.1.2.2	T	02
3.2.1.5.3.1.10.E	SURFACE OBSERVATIONS	3.1.4.1.2.1	T	02
3.2.1.5.3.1.10.F	RADAR SUMMARIES	3.1.4.1.2.5	T	02
3.2.1.5.3.1.10.G	UPPER AIR FORECASTS	3.1.4.1.2.3	T	02
3.2.1.5.3.1.10.H	PIREPS	3.1.4.1.2.4	T	02

TABLE A-1. DATA LINK PROCESSOR TVRTM NON-RMS REQUIREMENTS (Continued)

<u>NAS-SS-1000</u> <u>VOL. II</u> <u>PARA. NO.</u>	<u>TITLE</u>	<u>S/W SPEC.</u> <u>2802a</u> <u>PARA. NO.</u>	<u>VERIFY</u> <u>METHOD</u>	<u>REMARKS/</u> <u>TEST CAT.</u>
3.2.1.5.3.1.11	OUTPUT TO MODE S SENSOR			TITLE
3.2.1.5.3.1.11.A	STANDARD UPLINK	10.5.1.2.A	T	02
3.2.1.5.3.1.11.B	ELM UPLINK	10.5.1.2.B	T	02
3.2.1.5.3.1.11.C	DOWNLINK DATA REQUEST	10.5.1.2.C		DEFERRED
3.2.1.5.3.1.11.D	CANCELLATION REQUEST	10.5.1.2.D		DEFERRED
3.2.1.5.3.1.11.E	CAPABILITY REQUEST	10.5.1.2.E	T	02
3.2.1.5.3.1.11.F	AIRCRAFT STATE	10.5.1.2.F	T	02
3.2.1.5.3.1.11.G	AIRCRAFT POSITION	10.5.1.2.G	D	02
3.2.1.5.3.1.11.H	TEST	10.5.1.2.H	T	02
3.2.1.5.3.1.12	ARCHIVING	3.1.4.4.5	T	03
3.2.1.5.3.1.13	MAINTENANCE MONITORING	3.1.4.5.4	T	05
3.2.1.5.3.1.14	MAINTENANCE DATA	3.1.4.5	X	05
3.2.1.5.3.1.15	MAINTENANCE COMMANDS	3.1.4.5.1.1	X	05
3.2.1.5.3.1.16	STANDARD TIME SOURCE	3.1.4.5.5	T	05
3.2.1.5.3.2.1	GENERATION OF OUTPUT D/L SERVICE MESSAGES	3.1.1.1.B	T	02

TABLE A-1. DATA LINK PROCESSOR TVRTM NON-RMS REQUIREMENTS (Continued)

NAS-SS-1000 VOL. II <u>PARA. NO.</u>	<u>TITLE</u>	S/W SPEC. 2802a <u>PARA. NO.</u>	<u>VERIFY METHOD</u>	<u>REMARKS/ TEST CAT.</u>
3.2.1.5.3.2.2	PROCESSING CAPACITY FOR NOT-ATC MESSAGES		X	
3.2.1.5.3.2.3	MODE S INTERFACE SUPPORT	3.1.1	LEAD-IN	02
3.2.1.5.3.2.4	MAINTENANCE DATA	3.1.4.5.1	T	05
3.2.1.5.3.2.5	ARCHIVING	3.1.4.4.5	T	05
3.2.1.5.3.2.6	PIREP HANDLING		T	
3.2.1.5.3.2.7	DATA BASE			D
3.2.1.5.3.2.8	STANDARD TIME REFERENCE	3.1.4.5.5	T	05
3.2.1.5.3.3-1	DLP INTERFACE CHARACTER	3.1.7		TABLE
3.2.1.5.3.3-1.A	ADAS DLP		T	
3.2.1.5.3.3-1.F	MODE S DLP	3.1.7	T	05
3.2.1.5.3.3-1.G	DLP MODE S	3.1.7	T	05
3.2.1.5.3.3-1.H	MPS DLP	3.1.7	T	05
3.2.1.5.3.3-1.I	DLP MPS	3.1.7	T	05
3.2.1.5.3.3-1.J	WMSCR DLP	3.1.7	T	05

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TABLE A-2. DATA LINK PROCESSOR TVRTM RMS REQUIREMENTS

<u>REFERENCE DOCUMENT/PARA. NO.</u> <u>NAS-SS-1000 VOL. I APP. III</u>	<u>REQUIREMENT</u> <u>DESCRIPTION</u>	<u>VERIFICATION</u> <u>METHOD</u>	<u>TEST</u> <u>ID</u>	<u>CROSS REFERENCE</u> <u>DLP INTEGRATION</u> <u>TEST PLAN</u>
30.1.1.1	Provide for the monitoring of designated subsystem performance parameters.	D	IT2	5.1.6.5.2.2
30.1.1.2	Provide subsystem operating status data including configuration and mode of operation.	D	IT2	5.1.6.5.2.2
30.1.1.3	Provide subsystem status reports that contain only state changes and alarms/alerts in response to a subsystem status request.	D	IT3 IT4	5.1.6.5.2.3 5.1.6.5.2.4
30.1.1.4	Automatically provide for the accumulation of current subsystem status and performance data in a local data file.	D	IT2	5.1.6.5.2.2
30.1.1.5	Provide subsystem data in response to requests from RMMS subsystems.	D	IT2 IT3 IT4	5.1.6.5.2.2 5.1.6.5.2.3 5.1.6.5.2.4
30.1.1.6	Provide an alarm when any designated subsystem monitored parameter is out of tolerance.	D	IT3	5.1.6.5.2.3

TABLE A-2. DATA LINK PROCESSOR TVRTM RMS REQUIREMENTS (Continued)

<u>REFERENCE DOCUMENT/PARA. NO.</u> <u>NAS-SS-1000 VOL. I APP. III</u>	<u>REQUIREMENT</u> <u>DESCRIPTION</u>	<u>VERIFICATION</u> <u>METHOD</u>	<u>TEST</u> <u>ID</u>	<u>CROSS REFERENCE</u> <u>DLP INTEGRATION</u> <u>TEST PLAN</u>
30.1.1.9	Provide a return-to-normal alarm when an initial alarm condition is cleared.	D	IT3	5.1.6.5.2.3
30.1.1.10	Provide an alert when selected subsystem parameters are outside a predetermined range.	D	IT3	5.1.6.5.2.3
30.1.1.11	Provide the capability to to set or change ranges for subsystem alarm or alert parameters.	D	IT3	5.1.6.5.2.3
30.1.1.12	Provide for the disabling of a subsystem alarm or alert by a specialist on-site.	D	IT3	5.1.6.5.2.3
30.1.1.13	Report the disabling of a subsystem alarm or alert as performance data.	D	IT2	5.1.6.5.2.2
30.1.1.14	Provide subsystem certification data in response to a certification exercise.	D	IT5	5.1.6.5.2.5
30.1.1.15	Provide subsystem diagnostic data in response to a diagnostic test request.	D	IT6	5.1.6.5.2.6

TABLE A-2. DATA LINK PROCESSOR TVRTM RMS REQUIREMENTS (Continued)

<u>REFERENCE DOCUMENT/PARA. NO.</u> <u>NAS-SS-1000 VOL. I APP. III</u>	<u>REQUIREMENT</u> <u>DESCRIPTION</u>	<u>VERIFICATION</u> <u>METHOD</u>	<u>TEST</u> <u>ID</u>	<u>CROSS REFERENCE</u> <u>DLP INTEGRATION</u> <u>TEST PLAN</u>
30.1.1.18	Provide for the control to change the current operating mode of a subsystem to any other proper operating mode including ON/OFF.	D	IT4	5.1.6.5.2.4
30.1.1.19	Provide the capability to adjust selected subsystem parameters.	D	IT3 IT4	5.1.6.5.2.3 5.1.6.5.2.4
30.1.1.20	Provide the capability to reset a subsystem.	D	IT1 IT4	5.1.6.5.2.1 5.1.6.5.2.4
30.1.1.21	Provide for the initiation subsystem diagnostic tests for the purpose of fault isolation.	D	IT6	5.1.6.5.2.6
30.1.1.22	Provide for the initiation of subsystem certification exercises.	D	IT5	5.1.6.5.2.5

TABLE A-2. DATA LINK PROCESSOR TVRTM RMS REQUIREMENTS (Continued)

<u>REFERENCE DOCUMENT/PARA. NO.</u> <u>NAS-SS-1000 VOL. V</u>	<u>REQUIREMENT</u> <u>DESCRIPTION</u>	<u>VERIFICATION</u> <u>METHOD</u>	<u>TEST</u> <u>ID</u>	<u>CROSS REFERENCE</u> <u>DLP INTEGRATION</u> <u>TEST PLAN</u>
3.2.1.1.2.2.2	Failure of RMMS subsystems or equipment shall not cause the loss or degradation of operational services.	T	TBD	TBD
3.2.1.1.2.2.4	The RMMS shall detect and present alarms and state changes within an average time of 10 seconds and a maximum time of 60 seconds.	T	TBD	TBD
3.2.1.1.2.2.5	The RMMS shall develop and present data for a single report within an average time of 2 minutes and a maximum time of 10 minutes.	T	TBD	TBD
3.2.1.1.2.2.6	The RMMS shall execute control commands within an average time of 5 seconds and a maximum time of 15 seconds.	T	TBD	TBD
3.2.1.1.2.2.7	The RMMS shall provide acknowledgement of a valid command within an average time of 15 seconds and a maximum time of 75 seconds.	T	TBD	TBD
3.2.1.1.2.2.8	The RMMS shall provide a priority scheme for collection of alarms and state changes to satisfy site-adaptive time requirements.	T	TBD	TBD

TABLE A-2. DATA LINK PROCESSOR TVRTM RMS REQUIREMENTS (Continued)

<u>REFERENCE DOCUMENT/PARA. NO.</u> <u>NAS-SS-1000 VOL. V</u>	<u>REQUIREMENT</u> <u>DESCRIPTION</u>	<u>VERIFICATION</u> <u>METHOD</u>	<u>TEST</u> <u>ID</u>	<u>CROSS REFERENCE</u> <u>DLP INTEGRATION</u> <u>TEST PLAN</u>
3.2.1.1.4.2.1	Detect an alarm/alert condition and provide an indication to the MPS within an average time of 2 seconds and a maximum time of 10 seconds.	T	TBD	TBD
3.2.1.1.4.2.2	Detect a change of state and provide an indication to the MPS within an average time of 2 seconds and a maximum time of 10 seconds.	T	TBD	TBD
3.2.1.1.4.2.3	Collect monitored parameter data for a single report and provide an indication to the MPS within an average time of 50 seconds and a maximum time of 4 minutes.	T	TBD	TBD
3.2.1.1.4.2.3	Collect diagnostic data for a single report and provide an indication to the MPS within an average time of 50 seconds and a maximum time of 4 minutes.	T	TBD	TBD
3.2.1.1.4.2.3	Collect certification test data for a single report and provide an indication to the MPS within an average time of 50 seconds and a maximum time of 4 minutes.	T	TBD	TBD

TABLE A-2. DATA LINK PROCESSOR TVRTM RMS REQUIREMENTS (Continued)

<u>REFERENCE DOCUMENT/PARA. NO.</u> <u>NAS-SS-1000 VOL. V</u>	<u>REQUIREMENT</u> <u>DESCRIPTION</u>	<u>VERIFICATION</u> <u>METHOD</u>	<u>TEST</u> <u>ID</u>	<u>CROSS REFERENCE</u> <u>DLP INTEGRATION</u> <u>TEST PLAN</u>
3.2.1.1.4.2.4	Execute control commands and provide an indication to the MPS within an average time of 2 seconds and a maximum time of 5 seconds.	T	TBD	TBD
3.2.1.1.4.2.5	Acknowledge receipt of a valid command to the MPS within an average time of 2 seconds and a maximum time of 5 seconds.	T	TBD	TBD
3.2.1.1.4.2.6	Provide for the transfer of messages of up to 4000 characters within an average time of 50 seconds and a maximum time of 100 seconds.	T	TBD	TBD
3.2.1.1.4.2.7	Provide positive indication of status for all subsystem operating modes.	T	TBD	TBD
3.2.1.1.4.2.8	Transfer messages to the MPS on a priority basis, with priority being status messages, message data, and performance data.	T	TBD	TBD

APPENDIX B

SAMPLE FORMS FOR DLP TESTING

DLP TEST CONDUCT LOG

DEVICE/POSITION: _____ PAGE _____ of _____

TEST: _____ DATE: _____ / _____ / _____

Procedure Step Page	Action Output Produced	Observations Noted
_____ /	_____ /	_____
_____ /	_____ /	_____
_____ /	_____ /	_____
_____ /	_____ /	_____
_____ /	_____ /	_____
_____ /	_____ /	_____
_____ /	_____ /	_____
_____ /	_____ /	_____
_____ /	_____ /	_____
_____ /	_____ /	_____
_____ /	_____ /	_____

TEST MANAGER _____

TEST MISSION LOG
OPEN ITEM STATUS SHEET

PROCEDURE # _____

PAGE ____ of ____

TEST MANAGER _____

DATE ____/____/____

OPEN ITEM ID NUMBER

DISPOSITION/ACTION

QUALITY

CONCURRENCE

TEST MISSION LOG

TEST PROCEDURE ↓ _____

PAGE _____ OF _____

TEST MANAGER _____

DATE ____/____/____

TEST OBJECTIVES:

- (1)
- (2)
- (3)

HARDWARE CONFIGURATION

SOFTWARE CONFIGURATION

LIST OF PARTICIPANTS

- 1.
- 2.
- 3.
- 4.

TEST SUMMARY LOG

TEST NUMBER: _____

DATE: _____

TEST TITLE: _____

TEST MANAGER: _____

PROCEDURE STEP	DATA RECORDED	SIGNIFICANT RESULTS/OBSERVATION NOTED

TEST SUMMARY LOG

TEST NUMBER: _____

DATE: ____/____/____

TEST TITLE: _____

PRELIMINARY ASSESSMENT OF TEST RESULTS:

ANOMALIES and DEVIATIONS:

TEST MANAGER _____

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PLEASE TYPE		PROGRAM TECHNICAL REPORT														<input type="checkbox"/> DUPLICATE PTR EXISTS									
TYPE OF REPORT <input type="checkbox"/> TROUBLE <input type="checkbox"/> IMPROVEMENT							TYPE OF FACILITY <input type="checkbox"/> ENROUTE <input type="checkbox"/> TERMINAL							ORGANIZATION <input type="checkbox"/> AF <input type="checkbox"/> AT											
PTR NUMBER		1	2	3	4	5	7	8	9	10	11	ARTS ONLY	SUSPECTED SUBPROGRAM						14	15	16	17	18	19	20
SECTION							MODEL			VERSION			SYSTEM TAPE IC		23	24	25	26	27	28	29	PRIORITY			
REFERENCE(S)											ATTACHMENT(S)														
DESCRIPTION OF PROBLEM																									
																						ORIGINATOR'S SIGNATURE			
ACTION TAKEN BY CENTRAL PROGRAMMING																									
CENTRAL PROGRAMMING USE ONLY											FACILITY USE ONLY														
PTR RECEIVED		DATE		INITIALS		PTR RECEIVED FROM CENTRAL PROGRAMMING						DATE		INITIALS											
PTR DISTRIBUTED TO SITES						PATCH AVAILABLE FOR USE																			
PATCH WAS AVAILABLE TO TEST GROUP						PATCH VERIFIED																			
PATCH VERIFIED BY TEST GROUP						PATCH USED OPERATIONALLY																			
PATCH DISTRIBUTED						PATCH NUMBER																			
INDICATES SOURCE CODE IS DEVELOPED AND WILL BE ON THE INDICATED SOURCE TAPE						SEE REVERSE SIDE FOR INSTRUCTIONS																			

INSTRUCTIONS FOR COMPLETING FAA FORM 6100-1

TROUBLE – If PTR describes an out of spec condition.

IMPROVEMENT – If PTR describes an improvement and does not change specifications.

ENROUTE - TERMINAL – Check one.

AF - AT – Check the service of the PTR originator.

PTR NO. – Box 1 & 2 – Contain month.
Box 3 & 4 – Contain day of month.
Box 5 – Contains last digit of year.
Box 7, 8 & 9 – Each site shall number their PTRs sequentially starting at 001 at the beginning of each calendar year. If more than 999 numbers are required Box 7 will contain an alphabetical character. Box 10 & 11 – Identifies the originating facility.

SUSPECTED SUBPROGRAM – The name (contraction) of the subprogram that is believed to cause the problem.

SECTION – Assigned by central programming to indicate the section of the Program Maintenance Status Report (PMSR) where this PTR is documented.

MODEL – Model number of the operational computer program the PTR is written against.

VERSION – Version number of the model.

SYSTEM TAPE ID – That the PTR was initially identified on:

Box 23 – A – Arts
C – CCC
D – CDC
E – DCC

Box 24 – A – Operational Programs
D – Diagnostic Programs
M – Maintenance Programs
N – Support Programs

Box 25, 26 & 27 – Sequential Number
(3rd digit may optionally be used as a descriptor)

Box 28 – Facility Adaptation Update Level.

Box 29 – Facility Patch Update Level.

PRI – Enter one of the following.

E – Emergency is a problem that prevents a site from continuing automation activities on this system tape.

H – High priority is a problem that can be procedurally handled but has an adverse affect on the system.

L – All others.

REFERENCES – Indicate the document(s) and paragraph that define(s) how the program should respond.

ATTACHMENTS – Indicate what type and number of attachments.

DESCRIPTION OF PROBLEM – State:

- (a) The problem in detail.
- (b) The expected results.
- (c) The actual results.
- (d) The system configuration (if pertinent).
- (e) The adaptation if unique to the problem.
- (f) Patches that may be a factor.
- (g) Route: If a factor (use UDS if possible).
- (h) Is problem transit or duplicatable?
- (i) Any other facts considered to be pertinent.
- (j) The suggested patch if one is available.
- (k) The suggested source changes (if developed).

ACTION TAKEN – The action taken to resolve the problem or close the PTR.

<i>Please Type</i>	HARDWARE DISCREPANCY REPORT															<input type="checkbox"/> DUPLICATE HOR EXISTS		
HOR NUMBER	1	2	3	4	5	7	8	9	10	11	TYPE FACILITY						ORGANIZATION	
											ENROUTE						AF	
											TERMINAL						AT	
HARDWARE SUBSYSTEM			HARDWARE TYPE			HARDWARE MODEL			SYSTEM TAPE ID		13	24	25	26	27	28	29	PRIORITY
REFERENCE(S)										ATTACHMENT(S)								
DESCRIPTION OF PROBLEM																		
ORIGINATOR'S SIGNATURE AND ROUTING SYMBOL																		
ACTION TAKEN BY AF-360																		
AF-360 USE ONLY			DATE			INITIALS			FACILITY USE ONLY			DATE			INITIALS			
HOR RECEIVED									HOR INCLUDED IN HMSR									
HOR INCLUDED IN HMSR									EEM AVAILABLE FOR USE									
FIX WAS AVAILABLE TO TEST									EEM INSTALLED									
FIX VERIFIED BY TEST GROUP									EEM NUMBER									
EEM DISTRIBUTED									SEE REVERSE SIDE FOR INSTRUCTIONS									

INSTRUCTIONS FOR COMPLETING FAA FORM 6030-3

ENROUTE - TERMINAL - Check one

Box 28 - Facility Adaptation Update Level

Box 29 - Facility Patch Update Level

AF - AT - Check the service of the PTR originator

HDR No. - Box 1 & 2 - Contain month
Box 3 & 4 - Contain day of month
Box 5 - Contains last digit of year
Box 7, 8 & 9 - Each site shall number their HDR's sequentially starting at 001 at the beginning of each calendar year. If more than 999 numbers are required, Box 7 will contain an alphabetical character.
Box 10 & 11 - Identifies the originating facility.

PRI - Enter one of the following:

E - Emergency is a problem that prevents a site from continuing automation activities on this system.

H - High priority is a problem that can be procedurally handled but has an adverse affect on the system.

L - All others.

HARDWARE SUBSYSTEM - Subsystem utilizing the hardware for which the HDR is written.

REFERENCES - Indicate the document(s) and paragraph that define(s) how the hardware should respond.

HARDWARE TYPE - Identification of hardware type experiencing this discrepancy.

ATTACHMENTS - Indicate what type and number of attachments.

HARDWARE MODEL - Identification of hardware model experiencing this discrepancy.

DESCRIPTION OF PROBLEM - State:

SYSTEM TAPE ID - That the HDR was initially identified on:

Box 23 - A - ARTS

C - CCC

D - CDC

E - DCC

Box 24 - A - Operational Programs

D - Diagnostic Programs

M - Maintenance Programs

N - Support Programs

Box 25, 26 & 27 - Sequential No. (3d digit may optionally be used as a descriptor)

(a) The problem in detail.

(b) The expected results.

(c) The actual results.

(d) The system configuration, if pertinent.

(e) The adaptation, if unique to the problem.

(f) Patches that may be a factor.

(g) Is problem transit or duplicatable?

(h) Any other facts considered to be pertinent.

(i) The suggested fix, if one is available.

ACTION TAKEN - The action taken to resolve the problem or close the HDR.