

*** VERSION 3.0 ***

Ground Support System Operational Concept Description (OCD)

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SQUADRON
OPERATIONAL CONCEPT DESCRIPTION (OCD)

for the

GROUND SUPPORT SYSTEM (GSS)

VERSION 3.0

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Ground Support System Operational Concept Description (OCD)

CHANGE RECORD

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Ground Support System Operational Concept Description

1. Scope

1.1 Identification

The Ground Support System (GSS), is intended to support the squadron mission and aircraft subsystems during deployment preparations, mission planning, and post-deployment data analysis. The Squadron Ground Support System is hereafter referred to in this document as the GSS.

1.2 System overview

The GSS configuration is characterized by support for multiple users simultaneously interfacing through a variety of secure networked terminals, operator consoles, and application workstations/computers. A commercial RDBMS is utilized for overall data base management, and the server has sufficient hard disk storage to support all data and database requirements. Interfaces to external peripherals, systems and subsystems is accomplished through Ethernet connectivity, a VME expansion chassis, secure communications connections, and removable digital media. The GSS's open modular architecture is capable of extending its mission support, to the forward deployable Portable GSS configuration, as well as to the aircraft's configuration.

1.3 Document Overview

This Operational Concept Description describes the Ground Support System in terms of aircraft subsystem support, pre/post mission support and the theory of operation. The OCD will continue to evolve as the squadron's mission and aircraft's configuration changes. The specific intent of this document is to provide the fleet user a means for relating their operational mission procedures and requirements to the program project managers, and system engineers, and institute central guidance through PMA-290E3 for the ground support of the aircraft subsystems, and the squadron mission.

2. Referenced Documents

3126AS100 Story Teller System Specification (V)1.5, 1 March 1995, NAWC ADI

3524AS100 Operational Concept Description (OCD) for the Story Teller Version Two (Story Teller) (Rev. 1.4), 12 May 1997.

3. Current System or Situation

3.1 Description of current system or situation

Currently, the ground support for the aircraft subsystems and other mission related tasks are segregated and limited. The subsystems' support consists primarily of standalone units tailored to specific tasks surrounding various aspects of the respective subsystem's functionality. In many cases the tasks performed by these units is an extension of the onboard subsystem's capability, and not designed to support basic tasks such as disk maintenance, or database updates. This method of ground support

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increases training requirements, functional redundancy, and when deployed, exceeds the aircraft's stringent space/weight limitations.

Mission planning tasks are not integrated, and the subsystem support resources are not networked. Mission planning is accomplished using the standalone systems, and the target folders are compiled primarily in hardcopy format. Data is stored on a variety of digital media types, with minimal database update capability. For the most part, subsystem disk building and disk maintenance tasks exceed both, the support system's capabilities, and the operator's expertise. Mission data correlation, and report generation tasks are performed manually, and database access and manipulation is limited.

4. Justification for and Nature of Changes

4.1 Justification for change

As the squadrons' airborne subsystems evolve into a digital networked environment their capabilities, and correspondingly their value to the squadron's mission, increases dramatically. However the aircraft subsystems' dependency on disk maintenance, and database support have added a new dimension to the squadron's ground support role. Each subsystem requires both disk and data support. Although the aircraft LAN's open architecture provides the ability to seamlessly integrate a mixture operating systems, and hardware configurations, it also increases the squadron's support requirements incrementally.

Many of the aircraft subsystems are reliant upon database support. The accuracy, consistency, and timeliness of the data and databases utilized by these subsystems, has a direct impact on their mission readiness, and how well these systems will perform. In order for the squadron to support the required databases the GSS must provide the ability to store, access, parse and format the resultant information.

Another integral part of the squadron aircraft mission support centers on mission planning and target analysis. The tasks and capabilities required to support the aircraft's subsystems' databases, are common with the fundamental requirements associated with the squadron's mission planning and target tracking requirements. The integration of these capabilities, and standardization of the intelligence information, will ensure that all data utilized in direct support of the squadron's mission, is accurate and remains consistent between the subsystems, and mission planners.

4.2 Required Changes

The GSS will provide the necessary integrated software tools and hardware peripherals required to satisfy all tasks surrounding the pre- and post-deployment mission ground support. The GSS will contain as much hardware, software and interface commonality with the aircraft subsystems as possible, for ease of data transfer between the systems. The GSS will have reserve capacity to support new functionality as the aircraft subsystems evolve as well as capacity to support other candidate aircraft and mission support functions. In addition to the squadron based GSS, one portable configuration per aircraft is required to support the aircraft and mission while forward deployed.

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The Ground Support System is intended to provide the squadron with integrated aircraft ground-based support. These functions include, but are not limited to the following:

- Aircraft Subsystem Disk Building and Disk Maintenance,
- Database Access and Maintenance,
- Mission Planning,
- Pre-Deployment Data Correlation,
- Mission Data Base and File Generation,
- Post-Mission Data Archiving and Analysis,
- Mission Replay
- Report Generation,
- Tactical Displays,
- Secure Communications,
- Mission Training.

Mission Data will be transferred between the GSS and the aircraft via hand-carried removable digital storage media compatible with the respective systems' hardware and software.

5. Concept for a New or Modified System.

5.1 Background, Objectives and Scope

The GSS will take full advantage of all available Non Developmental Items (COTS/GOTS hardware and software, (such as the Cryptologic Unified Build [CUB] and the Portable Flight Planning System [PFPS]). The GSS will also conform to current Department of Defense and Navy directives concerning commonality and interoperability. It will be necessary for the GSS to provide support to legacy systems, upgraded systems, and any future systems. The GSS will also be capable of future expansion via use of available chassis slots, use of reserve system memory and throughput, and upgrades via component replacement.

5.1.1 Subsystem Disk Build and Maintenance

Operators will utilize the GSS to perform subsystem disk configuration and disk copy functions for each aircraft subsystem. These functions include, but are not limited to the following:

- loading the respective subsystem's operating system,
- loading the respective subsystem's operational software,
- loading tailored subsystem configuration and database files,
- performing all required disk maintenance functions,
- disk copying,

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- and disk/data validation and verification.

5.1.2 Database Management

5.1.2.1 Squadron Databases

Operators will use the GSS to maintain locally generated databases, consisting of the mission data archived from previous missions, and correlated target information compiled from various sources, and tailored to the area of operation. The mission data will be extracted from the aircraft subsystems and the post mission reports and transferred to the GSS after each deployment.

5.1.2.2 Database Maintenance

The operators will use the GSS to maintain master databases that are distributed and updated on a regular basis from national database sources and transferred to the GSS via digital media and/or data transfer from the various secure communication networks. The operators will then access the databases using a variety of search, correlation and display software techniques, and create the data sets in support of the mission and aircraft subsystems. The tailored data sets will then be converted to the required formats and transferred to the aircraft disks. The databases include, but are not limited to the following:

- Emitter Parameter List
- Modernized Integration Database (MIDB)
- Digital Aeronautical Flight Information File (DAFIF)
- Digital Maps and Overlays
- Digital Elevation and Terrain Data (DETD)
- Hultec
- Sitetec
- Specific Emitter Identification Database (SEI)
- Radar Parameter Data Set (RAPADS)
- Technical ESM Collection Guidance Manual (TECGM)
- Telemetry and Beaconry Analysis Guide (TEBAG)
- Proforma Signal Index
- Sigint Operational Collection Manual (SOCM)
- Radio Signal Notation Manual (RASIN Manual)
- Naval Intelligence Database (NID)
- Blue/Gray Force Data

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- Common Cryptologic Database (CCDB)
- Image Database
- Oceanographic Database
- Receiver Scan Strategies
- Squadron Mission Archives
- JANES Databases

5.1.3 Pre-Mission Planning

Operators will utilize the GSS functionality combined with a wide variety of COTS/GOTS software applications, tactical data access, secure intelligence network access, national databases, and the mission data archives to perform mission planning tasks. Based on mission tasking and area of operation the information will be researched, correlated and tailored to produce mission data sets for the various aircraft subsystem databases, data filters, target folders, and tactical maps/overlays.

5.1.4 Post-Mission Analysis

Operators will use the GSS to archive and catalog mission data collected after each mission series. The GSS will have the capability and tools necessary to assist the squadron personnel in analyzing post-mission data collected during deployments, through post-mission reconstruction, replay and review of saved mission data. This information will be utilized for mission planning purposes as well as in report generation.

5.1.5 Message Generation

Operators will use the GSS to generate messages based on the post-mission analysis. Messages can be displayed, printed, or sent out on secure communication networks. GOTS message generation applications will be utilized in conjunction with COTS word processing capabilities.

5.1.6 Secure Communication

Operators will have access to secure receive only, (near-real-time) tactical information broadcasts (TRAP, TADIXS-B and TIBS) for mission planning purposes. Connectivity to the various secure intelligence data networks will also be available to the GSS operators.

5.1.7 Portable Ground Support System

The Portable GSS will provide the necessary software tools and hardware peripherals to perform all tasks surrounding the pre-mission and post-mission ground support with the exception of the secure communications functionality. The squadron aircrew and ground support personnel will access the GSS functionality via the Portable GSS configuration, or onboard the aircraft, while forward deployed. The onboard GSS functionality may run simultaneously with other onboard sub-systems, or in a standalone mode.

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6. Theory of Operation

This section outlines the basic methodology the squadron would employ utilizing the GSS to accomplish deployment preparation, subsystem support, and mission planning. These tasks and procedures will evolve based on subsystem requirements, the GSS configuration, and squadron mission tasking/requirements. The tasks include, but are not limited to, those described in paragraphs 6.1 through 6.7.

6.1 Pre-Deployment Mission Planning

During pre-deployment mission planning the GSS, operator will research the area of interest by accessing the tactical situation broadcasts, intelligence networks, and all applicable databases including the mission archives and message traffic. The compiled data will then be correlated and tailored to the mission operational area and target/signal environment. The data is then used to plan tactics, and collection strategies, for the scheduled missions. Once the mission planning is completed the information will be used to brief the aircrews, and archived by squadron intelligence personnel for support of the deployed crews.

6.1.1 Subsystem data preparation

Operators will utilize the GSS to prepare subsystem data files, databases which are required for normal subsystem operation. The information gathered during the Mission Planning phase can now be parsed and Data preparation will consist of but is not limited to;

- tailoring data filters and queries.
- modifying tailored operator configuration files.

6.2 Subsystem Disk Writing/Copy

The GSS operators will then create tailored mission loads for all associated mission aircraft subsystems. The mission loads are then formatted, validated and transferred to the appropriate digital media. The GSS provides all necessary data loading, validation and verification capabilities not available through the core operating system or utilities. The operator is able to download all applicable software programs and data to the appropriate subsystem disk drives, including:

- Operating System/Network Software
- Subsystem Operational Flight Programs
- Databases
- Commercial Software Applications
- Software Utilities and Tools

After downloading the software and data, the GSS verifies and validates the integrity of all data written to the disk drives. Additionally, a backup set of mission disk loads are prepared, to allow rapid disk creation of replacement disks while deployed.

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6.3 Database Maintenance

The squadron personnel will utilize the GSS, the associated secure network connectivity, and the applicable removable digital media to load and maintain all required databases (as listed in paragraph - [6.3 Database Maintenance](#)). Associated query, parsing, and format tools will be incorporated. Where possible the archived data sets and maintenance processes will be automated.

6.4 Digital Map Maintenance

There are multiple tactical map applications utilized by the aircraft subsystems and the GSS. The squadron personnel will utilize the GSS, to load and maintain associated worldwide NIMA map, imagery and overlay products. These products will be utilized to create specific sets of map, imagery, and overlay data tailored to the squadrons' operational areas of interest. Worldwide coverage of selected map data will be maintained for general navigational purposes. A locally generated, Points of Interest database created from target folder data and imagery will be maintained for map overlay purposes. Where possible the archived data sets and maintenance processes will be automated.

6.5 Target Folder Maintenance

Squadron personnel will utilize the GSS and the associated secure network connectivity to access all available data sources for the purposes of gathering detailed information concerning targets of interest. Archived target data files will be continuously updated and utilized during mission planning, subsystem data updates, aircrew briefing, and training.

6.6 Deployed Operation

The mission hard drives created on the GSS are loaded into the aircraft's chassis during pre-flight operations, and exchanged if necessary with the backup disks. During the mission the Mission Commander reviews the mission data reporting on pertinent information and preparing selected mission data for the post mission report generation. Based on specific criteria the collected mission data will be archived onto the removable digital media for post-mission review and eventual inclusion into the GSS mission archives. Upon completion of the mission, the collected data and initial reports, which were generated during the mission, are then downloaded to a removable digital media. The subsystem hard drives are removed from the aircraft chassis and hand carried to a secure facility. The digital media containing the saved mission files is loaded into the Portable GSS and the data is reviewed and the final reports are generated. New intelligence information, and pertinent data gathered during the mission, and not entered into the subsystem data files at that time, is then appended to the files/databases on the appropriate subsystem disk drives during post-mission processing.

6.7 Ground Processing/Post Mission Analysis

After completion of the deployment the digital media containing the mission series data is loaded into squadron based GSS. The mission data is reviewed and analyzed by squadron personnel, and appended to all appropriate target folders. The mission data is then archived for replay during mission planning sessions, and in training evolutions.

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7. Summary of Impacts

7.1 Operational impacts

7.1.1 GSS Weight and Size Constraints

Due to the space limitations within the squadron's secure facility, the squadron based GSS design should strive to the overall system footprint. The portable GSS must be as compact and lightweight as possible to comply with the stringent space and weight limitations onboard the aircraft during transport, as well as the space limitations at the forward deployed secure facilities.

7.1.2 Automated Data Processing (ADP) Security

The squadron deployment preparations require correlation of information, ranging in classification, from unclassified through the GENSER and the SCI levels. Where feasible the GSS should facilitate compliance with directives governing classified data storage, access, exchange, handling, and auditing by incorporating design features, which would preclude unauthorized or inadvertent disclosure of classified information. Squadron security procedures and program classification guidelines may need to be reviewed and modified to comply with the varied classification levels of the information available within the GSS connectivity, data files, and digital media.

7.2 Organizational impacts

7.2.1 Squadron Manning

The anticipated users of the GSS will be Navy personnel of various enlisted rates and ranks, as well as Navy officers varying in rank. The degree of experience and training among these personnel varies widely. The GSS tasks will be assigned to personnel based on their rank, enlisted rate, job and mission qualifications.

EXAMPLE: During the Mission Planning phase each of the below listed personnel may have mutually exclusive tasks to perform on the GSS, which will support the overall deployment preparations.

- Mission Commanders,
- Sensor Coordinators,
- Pilots,
- Navigators,
- Intelligence Specialists,
- Aircrew Subsystem Operators,
- Computer Resources Support Personnel.

Additionally, these requirements should be considered during the GSS hardware and software design phases, as well as for the GSS training development.

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7.2.2 Training

Due to the wide range of GSS functions required to complete the mission related tasks, and the system's varied architecture the training must be task-oriented and directed toward the appropriate personnel at various skill levels. Prior training and/or qualification on an aircraft subsystem, or computer related skills may be required to complete assigned tasks. Potential training methodologies include but are not limited to:

- Onsite Technical Training/Support.
- Online Program Documentation and Users Manuals.
- Online Help and Tutorials.
- Commercial and/or Navy Training Courses.

7.3 Impacts during development

Squadron personnel need to be involved in all levels of design meetings/technical discussions concerning the GSS.

8. Analysis of the Proposed System

8.1 Summary of advantages.

The installation of the aircraft network, and upgrades to the aircraft's subsystems has simultaneously increased the squadron's overall mission capabilities, and the quantity and sophistication of computer resources onboard the squadron aircraft. Correspondingly, the subsystem maintenance requirements, and mission dependency on accurate and consistent data also has been increased. The GSS's subsystem support, mission planning, and the pre/post mission capabilities will have a direct impact on the squadron's ability to execute its mission successfully, on how well the airborne subsystems perform, and how accurate the mission data being reported will be.

8.1.1 Connectivity

The GSS capabilities outlined in this document will allow the squadrons to keep pace with the mission critical data access and information exchange available within the C⁴I architecture. The connectivity and software applications provided by the GSS and ancillary subsystems will add a new dimension to all phases of the squadron's deployment preparations.

8.1.2 Integration

The GSS will integrate deployment/mission preparations and subsystem support tasks into a single synergistic network. This will assist the squadron personnel in rapidly completing all associated tasks within the, often, short-fused environment of squadron operations. The consolidated design will reduce redundant capabilities and tasks associated with the subsystem support. The task integration will also reduce the mission planning and pre/post-deployment/mission workload for squadron personnel.

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8.2 Summary of disadvantages/limitations.

Since GSS is ground-based, there are no anticipated disadvantages or limitations imposed by the use of this system.

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Appendix A - Notes

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Glossary of Terms

ADP	Automated Data Processing
C ⁴ I	Command, Control, Communications, Computers and Intelligence
COTS	Commercial Off The Shelf
CUB	Cryptologic Unified Build
ESM	Electronic Support Measures
GENSER	General Service
GOTS	Government Off The Shelf
GSS	Ground Support System
MIDB	Modernized Integration Data Base
NIMA	National Imagery and Mapping Agency
OCD	Operational Concept Description
OFP	Operational Flight Program
PFPS	Portable Flight Planning System
RAPADS	Radar Parameter Data Set
SCI	Sensitive Compartmented Information
SEI	Specific Emitter Identification
TADIXS-B	Tactical Data Information Exchange System B
TAMPS	Tactical Aircraft Mission Planning System
TIBS	Tactical Information Broadcast Service
TRAP	Tactical Receive Equipment (TRE) Related Applications