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**Automated Support for Processing
Special Assignment Airlift Missions
(SAAMs)—A Concept Paper**

Angela Sexton
Ho-Ling Hwang

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ENERGY DIVISION

AUTOMATED SUPPORT FOR PROCESSING
SPECIAL ASSIGNMENT AIRLIFT MISSIONS
(SAAMs)--A CONCEPT PAPER

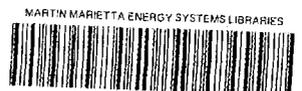
Angela Sexton
Ho-Ling Hwang

30 October 1989

NOTICE: This document contains information of a preliminary nature. It is subject to revision or correction and therefore does not represent a final report.

Prepared for the
HEADQUARTERS MILITARY AIRLIFT COMMAND
SCOTT AIR FORCE BASE, ILLINOIS

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ABSTRACT

The Airlift Deployment Analysis System (ADANS) is a research and development effort sponsored by the Headquarters, Military Airlift Command (HQ MAC) and conducted by researchers at Oak Ridge National Laboratory (ORNL). The purpose of this effort is to upgrade HQ MAC's automated capabilities for scheduling peacetime/wartime missions, deliberate and execution planning, and analysis of the airlift system. HQ MAC is also integrating its airlift scheduling processes to provide an easier transition from peacetime to wartime duties. The goal of this research and development effort is to provide an integrated system that allows HQ MAC to better maintain its forces in a constant state of readiness. The development for ADANS is scheduled in three increments and is to be completed in September 1992.

The Special Assignment Airlift Missions (SAAMs) at HQ MAC are to be supported at the end of Increment II of ADANS development. Increment II development began in October 1988 and will be completed in June 1991. To develop a useful decision support system for the HQ MAC staff to process SAAMs, it is essential that both HQ MAC and ORNL understand and agree, in advance, what should be done in ADANS for SAAMs and how it should be accomplished. This report intends to provide a baseline for future discussions and communications on this subject.

This paper documents the procedures for processing SAAMs at HQ MAC as of May 1989 and presents functions that will be provided by ADANS to support SAAMs. In general, ADANS will provide HQ MAC Current Operations, Airlift Management Division, Special Airlift Branch (HQ MAC/DOOMS) and Air Transportation, Director of Cargo and Requirements, Special Assignment Airlift Division (HQ MAC/TRKS) with the ability to automate SAAM information management/data processing tasks, along with systematic error and consistency checking. Reports will be generated automatically by the system for analysis of SAAM requirements and airlift allocation. Consequently, better data integrity among various forms and reports can be expected.

1. BACKGROUND

The Military Airlift Command (MAC) is a major command of the U.S. Air Force, encompassing strategic and tactical airlift, special operations, and rescue/recovery missions. Headquarters, Military Airlift Command (HQ MAC), is responsible for providing airlift support during peacetime and maintaining a constant state of readiness during wartime.

The Airlift Deployment Analysis System (ADANS) is a research and development effort, sponsored by HQ MAC and conducted by researchers at Oak Ridge National Laboratory (ORNL), to integrate existing airlift planning/scheduling systems and manual tasks of HQ MAC into one system. It will operate on a series of workstations connected by a Local Area Network (LAN). Workstations will be located at Scott Air Force Base, Illinois, and at the 21st and 22nd Air Forces. ADANS will provide planning, analysis, and scheduling tools for HQ MAC staff in peacetime as well as during contingency airlift operations. These operations include Channel Missions, Joint Chiefs of Staff (JCS) exercises, Special Assignment Airlift Missions (SAAMs), and Deliberate and Execution Planning.

ADANS is being developed in three increments and is to be completed in September 1992. SAAMs will be supported at HQ MAC and at the Numbered Air Forces (NAFs) at the end of Increment II of ADANS development. Increment II development began in October 1988 and will be completed in June 1991.

SAAMs are unique peacetime/wartime missions requested by users who require airlift for cargo and/or passengers. SAAM users include all areas of the U.S. Department of Defense (DoD), U.S. government, and non-U.S. government agencies/groups. During 1988, Special Assignment Airlift Missions included support for the White House, Persian Gulf operations, National Science Foundation in Antarctica, and the Bob Hope USO Christmas Tour. As stated in the Military Standard Transportation And Movement

Procedures (MILSTAMP: DoD 4500.32-R, Vol. I), SAAMs cover four categories of operation:

1. traffic originating for airlift at other than an Aerial Port of Embarkation (APOE) and terminating at any location,
2. traffic originating for airlift at an APOE and terminating at other than an APOE,
3. traffic originating at an APOE and terminating at an APOE but requiring singular or unusual consideration not available if moved as normal channel traffic, and
4. traffic originating at an APOE and terminating at a destination in the proximity of a channel route (channel extension of flag stop).

On the average, over 300 SAAM requests may be flown within a month. During high-activity months, the number increases to between 350 and 450 SAAMs. Usually, only 3% to 5% of SAAMs are repetitive. Approximately 75% of SAAMs are single origin and destination missions with an empty return. The remaining 25% of SAAMs are multiple origin and destination missions (ADANS Functional Description 1988). However, because of the difficulty of viewing overall aircraft movements, coalescing passengers or cargo on SAAMs is a rare occurrence. Unlike the dedicated Channel moves, changes in SAAMs are frequently made by the users. These changes can occur at any time, ranging from four months to one day before the mission is scheduled to take place.

2. THE PROCESSING OF SAAMs

2.1 REQUIREMENTS PROCESSING

SAAM users are responsible for submitting DD1249 forms (see Appendix B) to their U.S. Department of Defense (DoD) Service Appointed Validators and to HQ MAC/TRKS to initiate SAAMs. SAAM requests are manually prepared by the users and submitted to the validators and HQ MAC/TRKS via mail, telephone, or Automated Digital Network (AUTODIN). The AUTODIN communications center is used to transmit standard formatted messages between U.S. military installations when computer internetting is not available. The validators determine whether a SAAM is legitimate and whether sufficient funding is available. When the DD1249 data are approved, a unique SAAM number and a priority code are assigned to the SAAM by the validator. The DD1249 request is processed by HQ MAC/TRKS when a validation notification from the validator is received via AUTODIN, telephone, or hard copy message. SAAM requests can be received by HQ MAC/TRKS from several months to only hours ahead of the scheduled mission time.

The DD1249 forms are first sorted according to the requested month and SAAM number by HQ MAC/TRKS. Limited error-checking procedures are performed manually to ensure the compatibility and accuracy of the requirement data. The hardcopy Airfield Suitability Report (ASR) data, supplied by Flight Standards and Aircraft Performance Division (HQ MAC/DOVF), is used as a reference to check the compatibility of requested aircraft with the departure and arrival stations. To determine the compatibility of the load with its associated aircraft, a loadmaster in HQ MAC/TRKS is consulted. When the compatibility of hazardous cargo with other cargo is in question, HQ MAC/TRKS can make its own judgment or use the advice of the loadmaster. Additional manual inspections are made on the DD1249 data. HQ MAC/TRKS must check for incomplete data and verify that the requested flight time for a given SAAM is reasonable. When problems are encountered (e.g., insufficient or incomplete requirements), HQ MAC/TRKS staff coordinates with the validator to resolve them over

the phone. After necessary editing is completed, a DD1249 memo (see Appendix F), which contains applicable data from the DD1249, is typed and submitted to HQ MAC/DOOMS.

The user can submit amended DD1249 forms via mail, phone, or AUTODIN to request changes anytime before a SAAM is executed. These requests can include changes in the requirements, the arrival and departure times, or the Aerial Port of Embarkation (APOE) and Aerial Port of Debarkation (APOD). Upon receiving the change requests, HQ MAC/TRKS staff perform necessary edits and notifies HQ MAC/DOOMS of the changes.

HQ MAC/TRKS staff are also responsible for determining the mission cost. Tariff tables and a hardcopy listing of executed missions produced by Military Air Integrated Reporting System (MAIRS) are used to manually calculate the SAAM cost. The connection between the onload and offload stations for a mission is defined as a "leg." The charge for each leg of the SAAM mission is summed to calculate the final bill and is recorded on a cost memo. Copies of the cost memo are sent to HQ MAC/DOOMS for records and to the HQ MAC Comptroller (HQ MAC/AC) for the actual billing of the user. Because it is cheaper to fly an empty aircraft, a discount of 10% is given to users on one-way missions. An additional 5% discount is given to those missions which are validated 30 days prior to the mission and have no significant changes.

2.2 MISSION OPERATING DIRECTIVE (MOD) PREPARATION

When HQ MAC/DOOMS staff receive DD1249 memos (Fig. 1), they manually sort them into two groups. Those not taking place within the next three months are stored as an inactive group and are rechecked periodically until activated. The memos in the active group, those that will take place within three months, are manually reformatted into the Mission Operating Directive (MOD) (see Appendix C). Additional verifications and compatibility checks, similar to those performed by HQ MAC/TRKS, are repeated for MOD data.

Current SAAM Communication

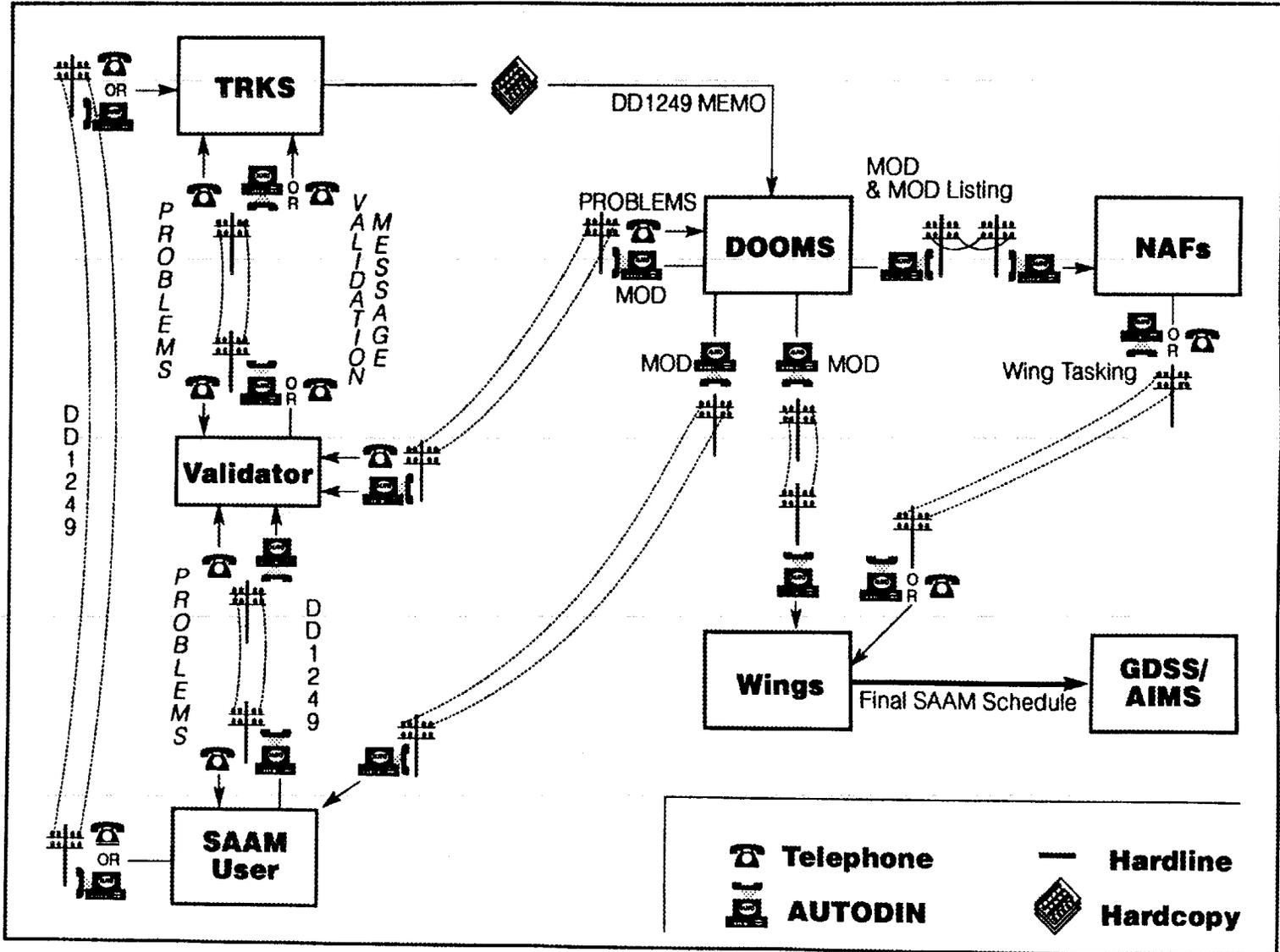


Fig. 1. Current SAAM Communications

2.3 AIRLIFT ALLOCATION

The primary responsibility of HQ MAC/DOOMS is to allocate aircraft efficiently from the 21st or 22nd AFs to SAAMs. When allocating aircraft for SAAMs, HQ MAC/DOOMS staff refers to an Aircraft Commitment Spreadsheet (see Appendix E). This Aircraft Commitment Spreadsheet provides information on the number of available aircraft for each mission (SAAMs, Channels, etc.) by day of the month, by aircraft type (C-5, C-130, C-141), by NAF, and for each of the Military Airlift Wings (MAWs). For example, the data on the spreadsheet may show that five C-141s under the control of the 60 MAW, 21st AF are available on 3 December for SAAMs.

The selection of a NAF is based on mission location, availability of aircraft, and the historical precedent of the NAF in handling a particular mission type. The NAF, once chosen by HQ MAC/DOOMS, is then responsible for tasking a wing to fly the mission (see Fig. 1). Following the selection of a NAF and the determination of aircraft availability for a specific request, a unique SAAM number is manually recorded on an allocation sheet or "snake chart" (see Appendix D). For each NAF, the snake chart is divided into days of the month and aircraft type. Any changes that may later occur to the MODs are also made to the associated snake charts.

If the requested aircraft is not available for a certain SAAM request when allocating aircraft, HQ MAC/DOOMS staff coordinates with the validator to make necessary changes to accomplish the requested mission. The HQ MAC/DOOMS Airlift Director has a number of alternatives that can be pursued in the attempt to match an appropriate aircraft to a SAAM:

- o requesting an extension in airlift allocation from HQ MAC Airlift Operations Branch (HQ MAC/DOOMA) or HQ MAC Tactical Airlift Branch (HQ MAC/DOOMT) barrelmaster,
- o changing the requested mission to another day,
- o requesting a commercial carrier,
- o selecting another aircraft type that is feasible, or

- o rescheduling or canceling a lower priority mission with the coordination of the validator.

The selected NAF and aircraft for the SAAM are added to the MOD. When a MOD is complete, it is distributed, via AUTODIN, to the NAFs, wings, validators, users, and the affected stations. In addition, a daily MOD listing is sent to the NAFs via AUTODIN to notify them of the MODs they should have received.

2.4 PROBLEMS WITH THE CURRENT SAAM PROCEDURES

Due to the frequent changes that occur during the processing of SAAMs, manually updating the DD1249s, MODs, and snake charts is time-consuming. HQ MAC/TRKS and HQ MAC/DOOMS need a system that will support their data-processing needs, as well as provide analysis and scheduling capabilities. The Global Decision Support System (GDSS) was designed to automate the Command and Control (C2) functions at HQ MAC. SAAMs was initially to be supported by GDSS; however, the GDSS SAAM program is not currently operational, and there are no plans as of MAY 1989 to continue SAAM development within GDSS. Therefore, manual editing of DD1249s, MODs, and snake charts still exists.

Another problem that affects the HQ MAC/DOOMS Airlift Directors is the role they play in scheduling missions during exercises or contingency operations. The Airlift Directors are responsible for the development of MODs. They allocate aircraft and select the NAF for the SAAM. Once a NAF receives a MOD, it is the NAF's responsibility to task a wing to fly the SAAM. The wing is then responsible for performing the actual scheduling of the mission, including the assignment of aircraft.

During contingency operations, however, more responsibilities are given to the HQ MAC/DOOMS Airlift Director. The Airlift Director is expected to participate as a member in the Requirements and Flow Planning Cell, which actually does scheduling. In the Flow Planning Cell, contingency schedules are developed in the Integrated Military Airlift Planning System (IMAPS) at HQ MAC.

3. ADANS PLANS FOR SAAMs

In Increment II of the ADANS project, a user-friendly, menu-driven decision support system will be developed for HQ MAC/DOOMS and HQ MAC/TRKS to process SAAM requirements (Fig. 2). Through a workstation windowing environment, users will be given menus with options from which they can select desired functions. By selecting an option, certain functions may be activated or executed. Multiple levels of menus will be used when necessary. Simple prompts will be used to collect additional information from the user. Fill-in-the-blank-type screens will be provided when appropriate.

All essential information, including DD1249, DD1249 memo, MOD, aircraft commitment, and airfield data, will be available in the ADANS database. The system will allow users who have permission to review, edit, and analyze desired data. Automatic error checking and data validation will be performed within ADANS. Cross-referencing between DD1249/MOD and master airfield data will be provided. The ability to use the load-planning module to assist the HQ MAC/DOOMS Airlift Director in selecting appropriate aircraft will also be furnished.

The HQ MAC/DOOMS Airlift Director will have a viewing capability of the ADANS aircraft commitment spreadsheet. Staff at HQ MAC/DOOMA and HQ MAC/DOOMT are responsible for maintaining the spreadsheet data. NAFs, however, perform actual interactive data updating. The Airlift Director will be able to use the information contained in the spreadsheet to determine the availability of appropriate aircraft, needed for a SAAM.

ADANS will provide both HQ MAC/DOOMS and HQ MAC/TRKS staff with the following automated tools:

1. Checking Airfield Suitability

Using APOE and APOD airfield data from a given DD1249 or MOD, the aircraft requested for the mission will be cross-referenced with the master airfield file (which will include ASR data). If the suitability of an aircraft for an airfield is in question, a warning message will appear on the terminal screen, and alternative aircraft types

ADANS / SAAM Communication

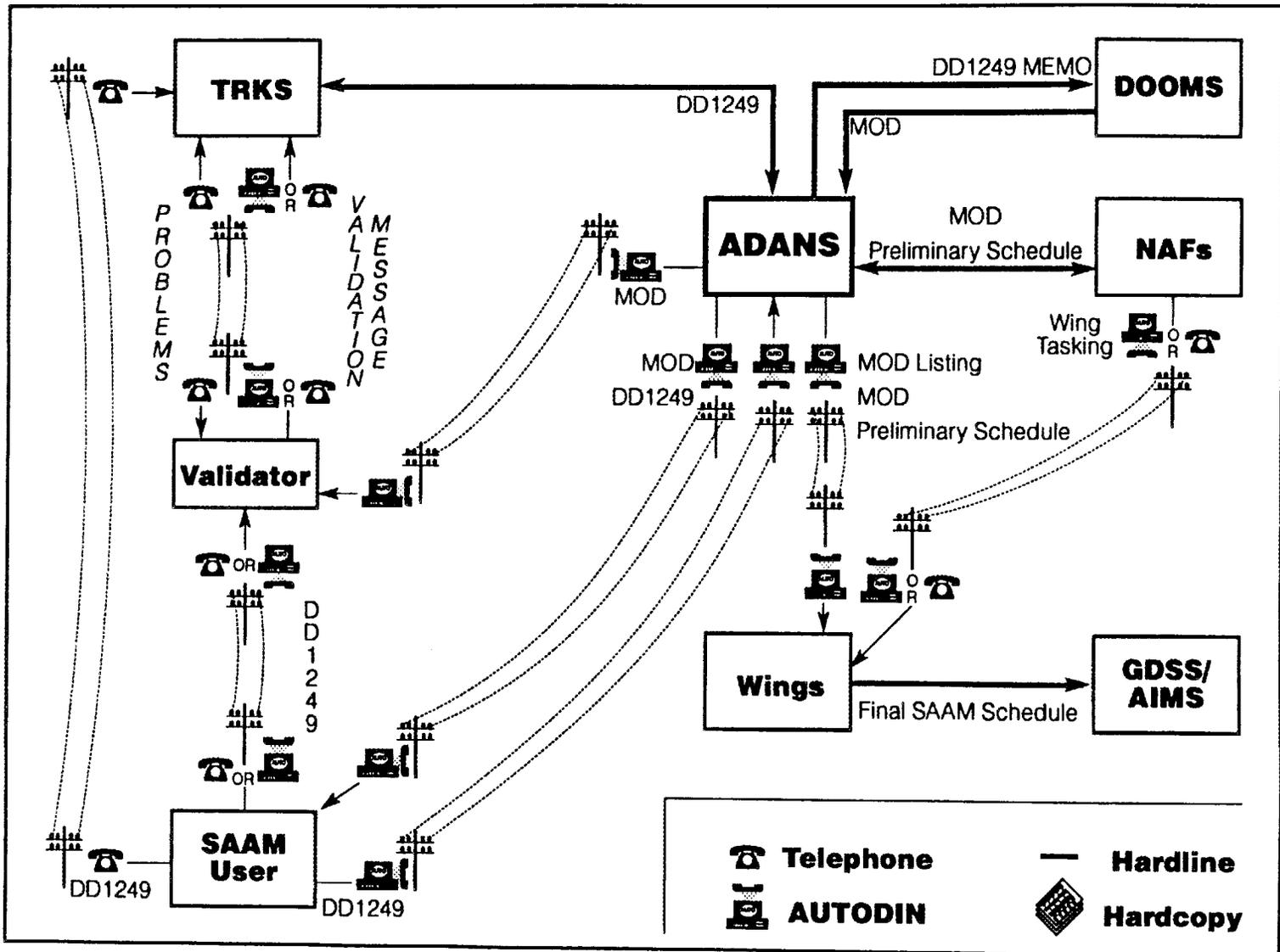


Fig. 2. ADANS/SAAM Communication

for the particular airfield will be suggested. A more detailed explanation can be provided, if applicable.

2. Checking Cargo Compatibility

DD1249 and MOD Cargo data will be checked and verified for compatibility. Any unacceptable mixture of cargo (e.g. passengers with hazardous materials) will be flagged. Proper warning messages will be displayed.

3. Checking Flight Time for Feasibility

Using the Latest Arrival Date (LAD) and Available to Load Date (ALD) from the DD1249 or MOD, a reasonable flight time will be calculated by using leg distances from the Leg Table in the ADANS database (onload station to offload station). Once the distance is determined, the aircraft type and its associated requirements to be moved will be used to evaluate the flight time. Error or warning messages will be displayed if the user has underestimated the flight time.

4. Supporting and Executing the Load-Planning Module

A load-planning tool is being developed for supporting the deliberate and execution planning processes. This load-planning module will also support SAAMs. The user will be able to activate (execute) the load-planning module at any given time. The system will prompt the user for information that was not supplied on the existing DD1249s or MODs. Once all required data are provided, the execution of the load-planning module can take place. Suggestions, such as number of aircraft needed for a given mission, type(s) of aircraft that should be used for the mission, as well as possible alternatives, will be presented to the user.

5. Editing DD1249/MODs

The SAAM DD1249s and MODs will be stored in ADANS DBMS. ADANS will provide capabilities for the user to retrieve and edit DD1249s/MODs before airlift allocation and scheduling. When the SAAM requirements are scheduled but results are not satisfactory, the Airlift Director can modify the MOD and then reallocate the airlift and/or reschedule the requirements. Any edits performed on the MOD will also update its associated snake chart, and vice versa.

6. SAAM Querying and Reporting

The HQ MAC/TRKS and HQ MAC/DOOMS staff will have the capability to perform ad hoc querying and reporting on SAAM data, including DD1249s and MODs, and ADANS data, including airfields and missions (if appropriate privileges are given). The querying and reporting capability will allow the Airlift Director to foresee potential coalescing of cargo. The SAAM user will be able to query the system for information such as the number of a certain type of mission occurring on a particular day (or within a specified time frame) with the same APOE and APOD.

ADANS will provide HQ MAC/DOOMS with the following additional tools:

1. Viewing Spreadsheet Information

A viewing capability will be provided to allow the Airlift Director to review the Aircraft Commitment Spreadsheet prepared by HQ MAC/DOOMA and HQ MAC/DOOMT staff. Data in the spreadsheet can be used by the Airlift Director to determine the availability of aircraft for the SAAM and to enter SAAM numbers into the snake chart.

2. Preparing Snake Charts

ADANS will allow the HQ MAC/DOOMS Airlift Director to view, edit, and print snake charts. Initial allocation totals will be automatically entered into the snake chart on the basis of information available in the Aircraft Commitment Spreadsheet (see 6 above). As the Airlift Director assigns a SAAM number to a specific type of aircraft in the MOD (also for a particular NAF and day of the month), the allocation total in the snake chart can also be simultaneously updated.

3. Creating a MOD Listing

A list of MODs that have been processed for a specified day will be generated by the system when requested. The list will be available for viewing or printing by the user at any time.

4. Scheduling

Increment II of ADANS will provide the HQ MAC/DOOMS user with a scheduling capability. Scheduling algorithms, developed for Field Training Exercises (FTXs), will be used to schedule SAAMs. After the HQ MAC Airlift Director develops the MOD, the data will be reformatted into ADANS requirements for input into scheduling. During scheduling, ADANS will select a wing to fly the mission based on the NAF selected by the HQ MAC/DOOMS Airlift Director. ADANS will also assign departure and arrival times considering operating hours, MAC mission support, and user time-frame requests. The schedule and requirements data will be stored in the ADANS database for report generation and querying by authorized users. The MOD and the produced schedule, or itinerary, for the SAAM will be available to HQ MAC/DOOMS, and the NAFs via ADANS workstations. The NAFs will be able to change the wing selected by ADANS, if necessary. Wings, users, ALDs, and associated stations will receive the MOD and schedule via AUTODIN. The selected wing will enter the final schedule into the Airlift Implementation and Monitoring System (AIMS), Command and Control Information Processing System (C2IPS) in future, which will update GDSS.

In Increment II of ADANS, the NAFs will also be supported for SAAMs processing. Analysis is currently being done to define the functions that might be used to support the NAFs.

HQ MAC has requested that ORNL consider the possibility of supporting SAAMs in ADANS prior to the completion of Increment II development (e.g., Revised Increment I). Two major problems exist, however. First, ADANS algorithms for scheduling SAAMs will not be completed until the end of Increment II; therefore, the only capabilities that ADANS could provide before then would be editing and cross-referencing. Second, the ADANS HQ MAC/DOOMA and HQ MAC/DOOMT Aircraft Commitment Spreadsheet will not be available until the completion of Increment II, limiting the ability of HQ MAC/DOOMS to performing aircraft allocation; therefore, the ORNL ADANS development team has determined that Increment I will not be feasible.

4. SUMMARY

At the end of ADANS Increment II, a menu-driven, user-friendly, decision support system will be available to the HQ MAC/DOOMS and HQ MAC/TRKS staff.

Whenever an option from a given menu is selected, a certain function (or a series of functions) will be invoked. Error or warning messages, if applicable, will be displayed. Suggestions or alternatives will be provided to aid in the user's decision-making process. No programming knowledge will be required to operate the system.

Editing, analysis, and scheduling functions will be provided by ADANS to support SAAMs. In general, ADANS will provide HQ MAC/DOOMS and HQ MAC/TRKS with the ability to automate SAAM information management/data processing tasks, along with systematic error and consistency checking, which will reduce errors in SAAM requirements. ADANS will also assist the Airlift Directors by providing an overview of all MAC missions to be flown, in a specific time window, for more efficient airlift allocation. MODs and snake charts can be generated automatically by the system for analysis of SAAM requirements. Consequently, better data integrity among various forms/reports and reduction of paperwork can be expected.

Analysis is continuing for the determination of SAAM requirements. A prototyping effort will be used to allow HQ MAC/DOOMS and HQ MAC/TRKS to verify that their requirements have been met. The functions presented in this paper will be used as a starting point for this effort.

REFERENCES

- ADANS. 1988. Airlift Deployment Analysis System (ADANS)--Data Requirements Document, ORNL Draft Report, April.
- Barsellone, Major Steve, personal conversation at HQ MAC/DOOMS, Scott Air Force Base, 10 May 1988.
- Brewer, Major Ted, personal conversation at HQ MAC/DOOMS, Scott Air Force Base, 22 April 1987.
- Bruce, Major Chris, personal conversation at HQ MAC/DOOMS, Scott Air Force Base, 21 April 1987.
- Buehler, Mary, personal conversation at HQ MAC/TRKS, Scott Air Force Base, 20 April 1987 and 10 May 1988.
- Concept Description for The Airlift Deployment Analysis System (ADANS), Department of the Air Force, HQ MAC, Scott Air Force Base, April 1988.
- Global Decision Support System (GDSS)--Design Book, Draft Report Release 2, California Institute of Technology, Jet Propulsion Laboratory, April 1987.
- Global Decision Support System (GDSS) User Guide--Current Operations (DOO), Draft Report Release 3, September 1987.
- Global Decision Support System (GDSS) User Guide--Special Assignment Airlift Mission (SAAM), Draft Report Release 3, September 1987.
- Harrison, Glen, and Kraemer, Ron, "The Airlift Deployment Analysis System, an Automated Scheduling System for the Military Airlift Command", Defense Transportation Journal, (accepted for publication Spring 1989).
- Harrison, Glen; Southworth, F.; Russell, David L.; Sexton, Angela; Hilliard, Michael; Holcomb, Mary; Wood, Thomas; Brenner, Heidi; Jacobi, Judith; and Kraemer, Ron, Airlift Deployment Analysis System: ADANS Functional Description, prepared for the Military Airlift Command, Scott Air Force Base, Illinois, Oak Ridge National Laboratory, April 1988.
- Highlights, Lloyd A. Price, HQ MAC/ACIB, Scott AFB ILL 62225, U.S. Government Printing Office: 1988-556-522.
- Joint Staff Officer's Guide--1984, AFSC Publication 1, July 1984.
- Program Specifications for IMAPS Modify Mission--FLOGEN III, MACR 171-189.1, Vol. 7 (H), August 1984.

Special Assignment Airlift Mission (SAAM)--Point Paper, Department of the Air Force, HQ MAC, Scott Air Force Base, September 1986.

User's Manual for IMAPS Modify Missions--FLOGEN III, MACR 171-189.1, Vol. 2 (H), November 1985.

Appendix A
ABBREVIATIONS AND ACRONYMS

ADANS	Airlift Deployment Analysis System
AIMS	Airlift Implementation and Monitoring System
ALD	Airlift Division
APOD	Aerial Port of Debarkation
APOE	Aerial Port of Embarkation
ASR	Airfield Suitability Report
AUTODIN	Automatic Digital Network
C2	Command and Control
C2IPS	Command and Control Information Processing System
CD	Concept Description
CINC	Commander in Chief
DBMS	Database Management System
DFCS	Deployment Flow Computer System
DoD	U.S. Department of Defense
DRD	Data Requirement Document
FD	Functional Description
FLOGEN	Flow Generator
FTX	Field Training Exercise
GDSS	Global Decision Support System
HQ MAC	Headquarters, Military Airlift Command
HQ MAC/AC	Deputy Chief of Staff, Comptroller
HQ MAC/DO	Deputy Chief of Staff, Operations
DOOM	Airlift Management Division
DOOMA	Airlift Operations Branch
DOOMS	Special Airlift Branch
DOOMT	Tactical Airlift Branch
DOV	Director of Air Crew Standards Evaluation
DOVF	Flight Standards and Aircraft Performance Division
HQ MAC/TR	Deputy Chief of Staff, Air Transportation
TRK	Director of Cargo and Requirements
TRKS	Special Assignment Airlift Division
IMAPS	Integrated Military Airlift Planning System
JCS	Joint Chief of Staff
JDS	Joint Deployment System
LAD	Latest Arrival Date
LAN	Local Area Network
MAIRS	Military Air Integrated Reporting System
MAW	Military Airlift Wing
MHE	Material Handling Equipment
MOD	Mission Operating Directive
NAF	Numbered Air Force
ORNL	Oak Ridge National Laboratory
SAAM	Special Assignment Airlift Mission

Appendix B
SAAM OR JCS EXERCISE-AIRLIFT REQUEST,
DD1249 FORM

SAAM OR JCS EXERCISE—AIRLIFT REQUEST

AUTHORITY: 10 U.S.C. 8012

PRINCIPAL PURPOSE(S): Your home phone number is required in order that contact can be made during off-duty hours.

ROUTINE USES: Your home phone number will be used to obtain information regarding the mission or to advise you of unexpected changes to previous arrangements.

DISCLOSURE IS VOLUNTARY: The requirement for your home phone number is voluntary. **IMPACT IF NOT FURNISHED:** The airlift mission could be delayed and additional cost incurred.

OVERALL SECURITY CLASSIFICATION	DATE (YYMMDD)	NAME OF VALIDATOR (Last, First, MI)	OFFICE SYMBOL
---------------------------------	---------------	-------------------------------------	---------------

SAAM NUMBER	PRIORITY	UNIT PROJECT NAME OR NICKNAME
-------------	----------	-------------------------------

EXERCISE NAME	PRIORITY	UNIT
---------------	----------	------

ONLOAD TO OFFLOAD									
R	LINE	NUMBER	POE	POD	PAX	BAG	CGO-ST	CUBE	

TIMING						
R	LINE	NUMBER	AVAILABILITY	PICKUP	EAD	LAD

AIRCRAFT MISSION REQUIREMENTS					
R	LINE	NUMBER	NO TYPE ACFT	CONFIGURATION	MISSION SUPPORT REQUIREMENTS

COMMODITY DESCRIPTION—ONE									
R	LINE	NUMBER	DESCRIPTION	QTY	WEIGHT	CUBE	DIMENSIONS	NEW	RS

COMMODITY HAZARDOUS—TWO				
R	LINE	NUMBER	HAZARDOUS PARA	HAZARDOUS SHIPPING NAME

CONTACTS					
R	TYPE	LOCATION	NAME	DUTY PHONE	HOME PHONE

BILLING INSTRUCTIONS

REMARKS

Appendix C
MISSION OPERATING DIRECTIVE (MOD)

PAGE 01
MILITARY AIRLIFT COMMAND
OPR: DO (05) TR (03)

CMP739

01/0355Z
UNIT TOTAL: 008)

INFO: FILE COPY (01)

----- 01/0359Z A1 SWIN (TOTAL COPIES: 009)

RCTUZYUW RHDJEAAL350 0320323-UUUU--RHCUAAA.

ZNR UUUUU

R 312000Z JAN 89

FM 113TFW ANDREWS AFB MD//LGX//

TO RHCUAAA/HQ MAC SCOTT AFB IL//DOOMS/DOOX/TRRR//

INFO RUEOLIA/21AF MCGUIRE AFB NJ//DCO//

RUWMEFA/22AF TRAVIS AFB CA//DCO//

ZEN ANGSC ANDREWS AFB MD//DOX/LGT//

BT

UNCLAS

QQQQ

AIRLIFT REQUEST/ONLOAD TO OFFLOAD

R/LINE/NR	/POE	/POE	/PAX	/BAG/CGO-ST/CUBE
U/001 /N/A	/ANDREWS AFB MD	/PUERTO RICO	/120	/3.7/41 /5661
U/002 /N/A	/PUERTO RICO	/ANDREWS AFB MD	/120	/3.7/41 /5661

AIRLIFT REQUEST/TIMING

R/LINE/NR	/AVAIL	/DES PICKUP	/EAD	/LAD
U/001A/N/A	/12 FEB 89	/121230ZFEB89	/N/A	/12FEB89
U/001B/N/A	/12 FEB 89	/121630ZFEB89	/N/A	/12FEB89
U/002 /N/A	/21 FEB 89	/211330ZFEB89	/N/A	/21FEB89

AIRLIFT REQUEST/AIRCRAFT MISSION REQUIREMENTS

R/LINE/NR	/NBR TYPE ACFT/CONF	/MISSION SUPPORT REQUIREMENTS
U/001 /N/A /2 - C141	/C2MOD	/OPERABLE WINCH REQ AT ALL LOADING

AIRLIFT REQUEST/COMMODITY DESCRIPTION-ONE

R/LINE/NR	/DESCRIPTION	/QTY/WGT	/CUBE/DIMENSIONS/NEWS
U/001A/N/A	/PALLET 463L	/9 /4300	/369 /88X108X86 /N/A/U
U/001A/N/A	/GEN ASM32-60	/2 /3750	/327 /124X68X58 /N/A/U
U/001A/N/A	/TANK DOLLY	/2 /500	/195 /129X52X50 /N/A/U
U/001A/N/A	/TOW BAR	/2 /600	/228 /133X55X38 /N/A/U
U/001A/N/A	/3000 TRL/ENGINE/1	/5682 /840	/224X60X84 /N/A/U

AIRLIFT REQUEST/COMMODITY HAZARDOUS-TWO

R/LINE/NR	/HAZARDOUS PARA	/HAZARDOUS SHIPPING NAME
U/001A/N/A	/5-33A (1) A	/CHAFF
U/001A/N/A	/5-27	/GEN ASM32-60
U/001A/N/A	/5-19A	/ELEC SQUIB
U/001A/N/A	/5-28	/ENGINE

AIRLIFT REQUEST/CONTACTS

R/TYPE	/LOCATION	/NAME	/DUTY PHONE/HOME PHONE
U/ONLOAD	/ANDREWS	/SMSGT GRAY	/AV858-3864/AC301-322-7674
U/DEST	/PUERTO RICO	/ON BOARD	
U/OVERALL	/ANDREWS	/2LT DENMAN	/AV858-3864/AC301-740-1202

AIRLIFT REQ/BILLING INSTRUCTION - BILL SHOULD BE SENT TO ANGSC/LGTT

AIRLIFT REQUEST/REMARKS - RETURN LOAD SAME AS INITIAL

BT

*1350

NNNN

Appendix D
ALLOCATION SHEET
"SNAKE CHART"

Appendix E
AIRCRAFT COMMITMENT SPREADSHEET

COMMITMENT APRIL 1987 21AF C-141																															
: 21AF C-141 :	1	2	3	4S	5S	6	7	8	9	10	11S	12S	13	14	15	16	17	18S	19S	20	21	22	23	24	25S	26S	27	28	29	30:	TOTAL:
: CHANNEL :	22	22	24	17	16	19	20	20	22	17	16	19	20	20	22	17	16	19	20	20	22	17	16	19	20	20	22	17	18	21:	580:
: SAAM :	10	10	10	8	8	8	8	8	8	10	10	10	10	10	8	10	8	8	10	10	10	10	10	10	10	10	8	10	10	10:	280:
: ANAUS TARA :	0	0	1	6	7	8	7	7	9	6	6	5	3	4	3	2	2	1	0	1	0	0	1	2	1	0	0	0	0:	82:	
: BLAZING TRAIL :	0	0	4	4	4	0	0	0	0	0	0	0	0	0	0	0	4	4	4	0	0	0	0	0	0	0	0	0	0:	24:	
: ECHO RIDGE :	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	6	6	2	0	0	0	0	0	0	0	0	0	0	0:	32:	
: FLINYLCK :	0	0	0	1	1	2	2	1	2	2	4	4	4	4	4	5	4	4	1	1	4	3	3	0	0	2	2	3	2:	67:	
: SOLID SHIELD :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	2	2	0	0	1	0	3	4	4	3	4:	28:	
: TEAM SPIRIT :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	3	3	3	3	3	3	3	0	0	0	0	0:	26:	
: COLD WINTER :	2	1	1	0	1	1	2	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0:	13:	
: TOTAL EXERCISE :	5	2	7	12	14	12	12	10	14	10	12	10	8	9	11	16	19	17	10	7	7	6	8	5	4	6	6	6	6:	272:	
: JAAT :	3	7	5	1	0	1	1	3	2	1	1	0	1	0	1	2	0	2	0	2	11	14	9	9	14	20	10	10:	147:		
: TRAINING :	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10:	300:	
: MNT/OTN/ALK :	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11:	330:	
: FCST ACFT USE :	59	62	68	65	66	69	69	69	76	65	66	65	63	64	66	68	66	68	61	61	71	68	65	66	70	75	69	64	64:	1991:	
: ACFT ASSIGNED :	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95:	2850:	
: % COMMITTED :	62%	65%	72%	68%	69%	73%	73%	73%	80%	58%	69%	68%	66%	67%	69%	72%	69%	72%	64%	64%	75%	72%	68%	69%	74%	79%	73%	67%	67%	76%:	

ES

COMMITMENT APRIL 1987 22AF C-141																															
: 22AF C-141 :	1	2	3	4S	5S	6	7	8	9	10	11S	12S	13	14	15	16	17	18S	19S	20	21	22	23	24	25S	26S	27	28	29	30:	TOTAL:
: CHANNEL :	26	28	29	30	31	31	29	28	28	29	30	31	31	29	28	29	30	31	31	29	26	28	29	30	31	31	29	26	28:	870:	
: SAAM :	10	10	10	10	10	10	10	10	10	8	6	6	6	8	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10:	284:	
: ANAUS TARA :	0	0	2	5	7	6	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0:	26:	
: ECHO RIDGE :	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0:	4:	
: FLINYLCK :	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1	1	1	0	1	1	1	1	0:	12:	
: TEAM SPIRIT :	0	0	0	0	0	3	6	10	15	21	25	27	21	20	16	13	8	4	4	3	3	0	0	0	0	0	0	0	0:	199:	
: SOLID SHIELD :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	3	3	4:	16:	
: TOTAL EXER :	0	0	2	5	7	9	9	11	15	21	25	27	22	21	18	16	9	5	4	4	4	2	1	1	3	1	4	4	4:	257:	
: JAAT :	0	1	1	2	1	1	1	8	1	1	1	2	1	2	1	3	6	6	6	8	3	2	5	5	2	4	3	8	12:	107:	
: TRAINING :	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12:	360:	
: MNT/OTN/ALK :	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12:	360:	
: FCST ACFT USE :	55	58	63	71	75	76	71	75	73	78	81	85	75	75	74	76	73	70	70	72	65	59	63	65	65	65	67	70	70:	2114:	
: ACFT ASSIGNED :	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105:	3150:	

Appendix F
DD1249 MEMO

ADD THE FOLLOWING MISSION FOR APRIL 1987:

1. Unclassified
 2. #1465
 3. Priority 1B(1)
 4. FB-111 Rapid Recovery
- Onload: 6 pax, .35 ton bags, 4.6 ton cgo, 1914 cube
5. Plattsburgh AFB NY (KPBG)
Ellsworth AFB SD (KRCA) Offload: Above
 6. Avail, P/U 081100Z Apr 87, LAD 081600Z Apr 87
 7. 1 C-141 or C-130
 8. Request operable winches at both locations
 9. Unclas
 10. TF30 Eng w/Tr1, 1, 9304 lbs, 1164 cube, 249x60x90
4000 Eng Chg Tr1 and 3000 Transfer Tr1, 3372 lbs, 430 cube, 154x72x74, IAW para 6-28a(1), Mtr Int Combustion
Rollout Kit, 1, 100 lbs, 6 cube, 36x21x12
Tool Box, 1, 50 lbs, 2 cube, 24x12x12
Tool Box, 1, 170 lbs, 15 cube, 50x36x20
 11. Contacts: Onload, Plattsburgh, Sgt Blay, AV 689-5447, HPAC 518-562-1467
Offload, Ellsworth, Job Control, AV 747-2816
Overall, HQ SAC/LGT, Capt Coffman, AV 271-4338, HPAC 402-399-8742
 12. CIC 44767 985 525700

REMARKS: Validated by Colonel Connolly, DCR, Plattsburgh. SNJ: Just received notice plane went down.

INFO ADDEE: HQ SAC OFFUTT AFB NE/LGT; 15AF MARCH AFB CA/LGT; BAF BARKSDALE AFB LA/LGT

CHARGE: TO BE FURNISHED

Telecon Capt Coffman/Bev/7 Apr 87

SAC 082005Z Apr 87

B. Hart/0750L/8 Apr 87

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