For Network Personnel Only

TECHNICAL INFORMATION BULLETIN

THE MANNED SPACE FLIGHT NETWORK

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Merritt Island Plays Critical Role In Mission Operations

Merritt Island plays the same vital role in supporting orbiting spacecraft as other MSFN Apollo stations, but, in addition, plays a unique and critical part in prelaunch testing of the spacecraft and protection of the astronauts.

MIL has been set up to function basically as a MSFN remoted station using the Downrange Uplink (DRUL) system for UHF command through CNV, GBI, and ANT. In providing orbital mission support, MIL is configured basically as other USB stations.

In addition prelaunch support for KSC and MSC required that other equipments be installed at the stations.

To support prelaunch operations, MIL has an additional PCM decommutator, telemetry "fine monitor" display, a set of flight control consoles, an acquisition system which interfaces with ETR instrumentation, enlargement of the 1218 system for command history, an abort advisory system, an enlargement of the air/ground voice system, and a telemetry data system for interfacing with the space vehicle.

Also, additional communications include 24 voice circuits to KSC, 5 to ETR, 11 to MSC, and 4 to GSFC; 8 wideband

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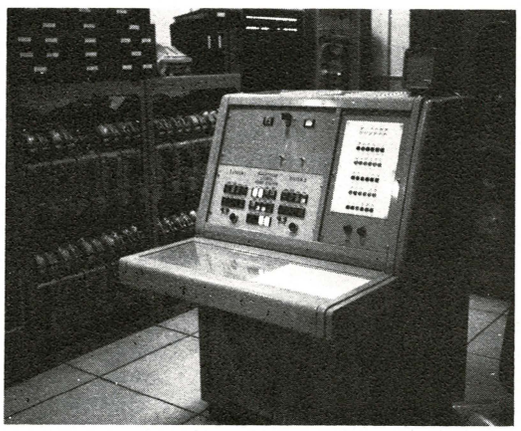
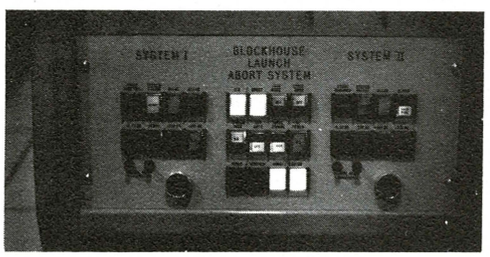
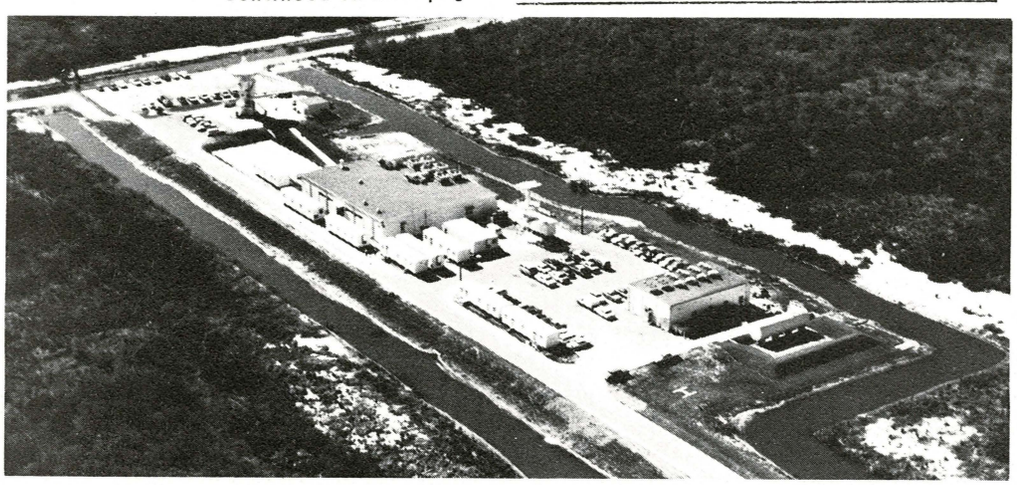


The Launch Operations Manager's Console is continuously monitored to detect any indication of an emergency situation. The photo below is a blowup of the console panel.





The Merritt Island USB station plays a vital role in prelaunch, launch, and orbital operation for Manned Space Flight Missions.

3 Ships Support

Three Apollo ships and five aircraft are scheduled to support the AS-502 mission which is set for launch March 28.

The Redstone will support as the insertion ship and the Watertown will serve as the reentry ship. In addition, the Mercury will provide passive support to the mission while undergoing engineering operations evaluation.

Ship and aircraft forecast and status is as follows:

USNS Vanguard--Now being fitted with ComSat equipment at the Quincy, Mass. shipyard. The revised estimated completion date is mid-May, 1968.

USNS Redstone--Scheduled to depart Miami, Fla. on T-12 day for a Test Support Position of 30 degrees North longitude and 50 degrees West latitude.

USNS Mercury--Now at Port Canaveral, Fla. She will undergo engineering operation evaluation while providing passive support for the AS-502 mission. The Test Support Position is 24 degrees North longitude and 80 degrees West latitude.

USNS Watertown--Now at Port Hueneme, Cal. She is scheduled to support the AS-502 mission as reentry ship at a Test Support Position of 27 degrees North latitude and 156 degrees East longitude.

USNS Huntsville--Now at Jacksonville, Fla. for C-band radar installation. The revised ETO is mid-March, 1968.

Five aircraft are scheduled to support the AS-502 mission. Two will be deployed at Bermuda; two at Patrick Air Force Base; and two at Hawaii.

AS 502 Mission Status

The earliest possible date for the launch of AS-502 has been reset for March 28.

The operations plan for AS-502 mission is an almost exact duplicate of the highly successful AS-501 mission last November. Objectives of this mission will further prove out systems which acheived a high degree of success during the first launch of Apollo-Saturn V.

The complete Manned Space Flight Network has been configured to support the AS-502 mission, including the 85-foot antenna wing sites at Goldstone, Honeysuckle, and Madrid. These three sites, using the JPL 85-foot antennas, will support the mission on a non-interference basis in order to evaluate equipment interface with the MSFN main sites nearby. In addition, as was the case for AS-501 mission, The Deep Space Network Ascension Island station, DS-72, will support the AS-502 Mission and will use the MSFN Ascen-

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Merritt Island

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circuits to and from KSC; three 2.0 kbps data modem circuits to ETR and one 40.8 kbps data modem circuit from ETR; two 3-kHz circuits to ETR; three event circuits for KSC and MCC-H and two event circuits from ETR.

During prelaunch operations MIL provides support to KSC for certain data needed to certify that the launch vehicle and spacecraft are ready for flight; provides support to MSC in the integration of the space vehicle with the flight control systems of MCC-H; and provides support to the KSC to assure software and hardware compatibility between the flight systems of the space vehicle and the ground systems of the MSFN and MCC-H.

MIL systems designed to protect the lives of the astronauts in the event of a hazardous booster condition during launch are perhaps the most critical equipment.

The escape system, which will lift the command module clear of the booster, can be controller from Mission Control Center, Houston, and by the appropriate blockhouse at Cape Kennedy. The launch display and control point at Cape Kennedy is the Launch Operations Manager (LOM) console which provides continuous monitoring by the Abort Advisory System (AAS) of all launch events to detect the first indication of an emergency situation. If an abort of the launch is warranted, the Launch Director will initiate an abort "request" (manned flights) or an abort "command" (unmanned flights).

The abort "command" will immediately activate the spacecraft escape tower. The abort "request" signal will illuminate lights in the spacecraft and the astronauts will manually initiate the escape system. Two commands are required for the request or command and are designated "Abort A" and "Abort B."

These extremely critical signals must be transmitted reliably from the Launch Director's Console in the blockhouse to (MILA) command system for transmission to the spacecraft.

The commands are sent over six transmission lines as dc levels of 48 μsec minimum duration. The resulting signals are received at the USB station by the Abort Interface Unit (AIU).

The AIU senses and decodes the six command channels, verifies valid commands, and generates the proper interrupt to the MIL 642B command computer which will uplink the command. After the spacecraft receives the command, the 642B command computer will, by two special codes, inform the AIU of an Abort A or Abort B successful transmission. The AIU, in turn, will illuminate lights on the blockhouse LOM console with single channel dc switching. Additional events transmitted by the AIU are activation of the escape system and status of the UHF and USB command

Because of the critical nature of the system, particularly the command portion, special measures were taken in the design to ensure reliable transmission of commands and at the same time protect against erroneous commands being generated by equipment due to failure or noise on the transmission lines. The transmission system utilizes protected and dedicated circuits and voting logic. Voltages on two of the three command lines are required to generate the command, providing that the other set of three lines are not active at the time. A single open line will still permit successful operation. Likewise, noise or signal voltage on a single line or all lines simultaneously will not result in a valid command, nor will failure of any component of the system.

Station	USB System	Station Designator	TTY Routing Des.	Location Latitude	Location E. Longitude
Antiqua	30'	ANG	GANG	17° 01'14"	298° 15'02"
Ascension	30' dual	ACN	GACN	-07 57 18	345 40 20
Bermuda	30'	BDA	GBDA	32 21 04	295 20 30
Canary Islands	30' single	CYI	LCYI	27 44 24	344 23 49
Carnarvon	30' dual	CRO	ACRO	-24 54 27	113 43 27
Corpus Christi	30' single	TEX	GTEX	27 39 13	262 37 17
Goldstone, Cal.	85' dual	GDS	GGDS	35 20 30	243 07 36
Goldstone (Wing)	-	GDSX	JPIR		
Grand Bahama Island	30' single	GBM	GGBM	26 39 17	281 50 51
Guam	30' dual	GWM	PGWM	13 18 33	144 44 03
Guaymas, Mexico	30' single	GYM	GGYM	27 57 47	249 16 44
Kauai, Hawaii	30' dual	HAW	PHAW	22 07 29	200 20 06
Honeysuckle Creek	85' dual	HSK	AHSK	-35 35 05	148 58 35
Honesuckle Creek (Wing)	-	HSKX	ABMW		
Madrid, Spain	85' dual	MAD	LMAD	40 27 19	355 49 57
Madrid (Wing)	-	MADX	LRID		
Merritt Island, Fla.	30' dual	MILA	GMIL	28 30 29	279 18 23

Ops Doc Status

Operations documentation that has been distributed recently includes:

Network Operations Plan for OV1 13/14 Mission (launch scheduled 1st quarter 1968)--Distributed March 8. (MSFN supporting stations: CRO, HAW.)

Network Operations Plan for Solar Explorer B Mission (launch scheduled) February 29)--Teletype NOP distributed February 23. (MSFN supporting station: BDA.)

Network Operations Plan for NIMBUS B Mission (launch scheduled 1st quarter 1968)--MSFN updated input to NASA-GSFC Operations plan distributed February 20. (MSFN supporting stations: TAN, HAW.)

Network Operations Plan - MSFN input to NASA-GSFC operations plan for OGO-E Mission--Distributed January 26. (Supporting stations: BDA, CRO.)

Network Controller's Report for GOSS-Apollo navigation qualification (tracking period of January 29-30)--Distributed February 29.

Premission Briefing Report for AS-502 Mission (launch scheduled March 25)--Distributed March 4.

Scheduled for distribution are:

AS-503 Mission Supplements to the NOD

AS-502 Mission

sion Island station as interface with the network. The JPL station will provide support during the waiting orbit stage. This will allow USB tracking of both the command module and the instrumentation unit after they separate. ACN will track the command module and SEN will track the instrumentation unit. If, by any circumstance, ACN fails to track the CSM, then SEN will track the command module.

USB support will also be provided by Bermuda, Honeysuckle, Carnarvon, Canary Island, Grand Bahama, Goldstone, Guam, Guaymas, Hawaii, Madrid, Merritt Island, Texas and the ships Redstone and Watertown.

Antigua will also provide USB support within station capability on an engineering evaluation basis.

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