For Network Personnel Only

TECHNICAL INFORMATION BULLETIN

THE MANNED SPACE FLIGHT NETWORK



Volume 8, Number 5 Goddard Space Flight Center March 15, 1971

# NEW NST ROOM IS OPERATIONAL

New NST room below OPSCON center.

Old NST room.

Goddard Space Flight Center has greatly increased its capability to support Apollo and scientific launches with the completion of a redesigned NST area.

Operational since December, 1970 the new room has become more sophisticated than the old room, with an increase in its monitoring display capabilities. Operating with a very low budget, the engineering team and MSFNOC M&O personnel scoured through the entire MSFN and GSFC borrowing stored and defunct bits and pieces such as unused console shells, wiring, recorders and similar leftovers. New console display modules as well as TV monitors were purchased.

The NST area has the capability to monitor all data coming in from MSFN stations, and acts as a backup to Houston should it become necessary.

All the new consoles have closed circuit TV monitors capable of viewing dynamic and static displays as presented through the MSFNOC and GRTS. The new center includes console positions for: RSDP software and RSDP operations; telemetry; USB; radar; RF command; data services/logistics; procedures; the team chief, with the capability of handling specific data streams from the radar, USB, and command consoles and of controlling the fast access files, wall-mounted TV's, lights, etc; engineering; ARIA/ships; and an M&O systems console used to monitor MSFNOC equipment.

Above the consoles are two closed circuit TV cameras; facing the consoles

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# NTTF Expands ERTS & CCTV

NTTF is undergoing a construction project to provide an Earth Resources Technology Satellite (ERTS) on-center tracking facility. The project involves final completion of the basement with a concrete floor, the construction of six office spaces, a new logistics area, and a 400-sq. ft. test equipment and calibration lab. The project was started in December, 1970, and is scheduled to be completed during April, 1971.

Further requirements are the construction of an antenna pad and a hydro-mechanical equipment building for the 30-ft. ERTS antenna system. The Duct Bank System in Building 25 will be extended to Building 23, the ERTS Data Interpretation Laboratory.

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# Apollo 15 Will Take LRV To The Moon

The first flight model Lunar Rover Vehicle (LRV) has begun six weeks of extensive acceptance tests leading to its scheduled April 1 delivery to NASA. Final assembly and modification were recently completed by the Boeing Co. Boeing is also building three more flight model LRV's for the last three Apollo lunar exploration missions. The first flight model will transport two astronauts on three extravehicular traverses during Apollo 15 in late July of 1971.

Apollo 15 is scheduled to land between Hadley Rille, a half-mile-wide valley 600 feet deep and 60 miles long, and the Apennine Mountains which rise to 8,000 feet above the moon's surface.

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# SERT 2 ACHIEVES SECONDARY GOALS

Based on the primary objective of operating an electric ion thruster system in space for six months, NASA has officially called the Space Electric Rocket Test 2 (SERT 2) mission unsuccessful.

Despite falling short of the endurance goal by less than a month, the SERT 2 flight is considered a significant advancement in this type of propulsion system with its attractive advantages of high specific impulse and repeated restart capability. These highly efficient rocket engines may be used in the future to position earth-orbiting spacecraft or to propel spacecraft to distant planets.

However, virtually all the secondary experiments of SERT 2 achieved their objectives and a wealth of scientific

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# GSFC NST ROOM

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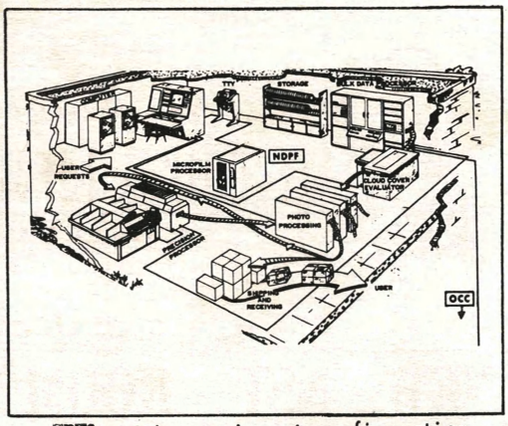
are a site status display, two 6' X 6' fast access file screens, timing displays, and two color TV's; forthcoming capabilities will consist of the operational activation of the 642B computers located in the MSFNOC equipment area behind the display wall and a redesigned site status display. Associated with the computers are EMU's, tape units, and an HSP.

Approximately 64 NASA and Bendix personnel man the NST during Apollo mission activity.




ERTS station equipment configuration.

# SERT 2 ACHIEVES SECONDARY GOALS

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information was gathered from instruments on the spacecraft.

SERT 2 was launched into orbit from the Western Test Range on Feb. 3, 1970. The endurance test of one of the two ion engines aboard SERT 2 began Feb. 14 when it was advanced to full thrust with evaluation planned for six months. However, an electrical short in the thruster caused an early shutdown of the ion engine after having operated successfully for 3,785 hours, a little more than five months. Seven unsuccessful attempts to restart the thruster led to the decision to start the second ion engine on July 24. On Oct. 17, the second ion engine failed after operating for 2,011 hours, or nearly three months.

Analysis indicates that failure of each thruster was caused by an electrical short in its high-voltage power supply system. A tiny piece of metal apparently eroded and broke off from the accelerator grid at the back of the engine. In the weightless environment, the electric field between the screen and accelerator grids attached this splinter to the small space which separates the grids. Lodged between the grids, the metal short-circuited the system.

However, current ground tests have indicated that failure due to erosion can be easily averted on ion engines used in the future by relocating the neutralizer. The neutralizer beam primarily contains electrons which neutralize the ion exhaust of the thruster, but it also emits some ions which can gradually erode the accelerator grid.

A secondary surface contamination experiment, consisting of test patches of solar cells located near each ion rocket, revealed severe contamination from molybdenum which sputtered from the grid during the first few days of ion rocket operation. Electric propulsion-type spacecraft of the future must then be designed so that solar arrays are located out of view of the accelerator grid. Officials noted that only the nearby test cells were affected. The thruster's outflow had no measurable long-term effects on the spacecraft's huge main solar array.

Probe measurements of the net electrical charge of the spacecraft and the surrounding environment to determine the potential, or voltage difference, between the two showed no electrical incompatibility.

A miniature electrostatic accelerometer (MESA), an extremely sensitive device, measured the thrust of the ion engine to within one per cent of the 006-pound thrust level.

A reflector erosion experiment (REX) continues to operate on the spacecraft. Consisting of two small stainless steel discs thinly coated with aluminum, the REX is instrumented to measure temperature changes of the surfaces during a prolonged period in space. As micrometeoroids impact on the discs, the reflective surfaces degrade and rapidly rise in temperature. The 6,000 hours of data received so far indicate that micrometeoroid flux is less than 1/100 of what was predicted previously by acoustic sensors. Therefore, the problem of micrometeoroid damage to optical elements, mirror, and thermal control surfaces in space appears to be much less serious than was once believed.

A radio frequency interference experiment to determine if electric rocket operation would interfere with radio communication between the spacecraft and earth was only partly successful. Although data is still being analyzed, it appears that the part of the experiment covering low frequencies did not operate properly. High frequency signals were masked by noise radiated from the Earth, providing only information that the ion rocket did not cause interference in excess of earth background noise.

Correction: The Feb. 26 TIB should have read Volume 8, Number 4

# NTTF Expands

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CCTV System Now Operational

A closed circuit television (CCTV) system has been installed at NTTF to enhance the learning situation for NTTF students and MSFN tracking station personnel.

The CCTV system's design, configuration, and installation were acquired from TV Central Control, GSFC, and they were joint efforts of the training and facilities staffs of NTTF.

Video tape productions will encompass the performance of various laboratory exercises, SST's, ST's, and IST's (which are outlined in the courses of study), as well as class discussions, programmed instructions, and newly installed equipment in operation.

TV productions of fire prevention and safety lectures are being considered. Once completed, these productions will be distributed to all MSFN stations for personnel cross training and technical staff self improvement.

A recent organizational change at NTTF resulted in authorization for a full time Training Coordinator. Through this position, the NTTF plans a more active interface on training matters between the school and the network.

The production of various TV programs and the operation and maintenance of the CCTV system will be the responsibility of the NTTF multi-media productions group.

Now serving as Station Director is Richard Augenstein; Assistant Station Directors, Robert Eves and George Karras; Station Manager (M&O), John Gale; and Assistant Station Manager, George Burawa.

# LRV To The Moon

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During the next six weeks, the first flight LRV will be subjected to tests that will check its ability to withstand the vibrations, shocks, vacuum, and temperature extremes that it will encounter during the launch, lunar landing, and traverse operations.

Special deployment tests will check the vehicle's ability to be folded into a small quadrant of the LM's descent stage during flight, and its ability to be deployed quickly and easily by one astronaut.

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