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Networks support STS-1 mission with round-the-clock service

It looked like a cargo plane with a grossly oversized belly of fuel and two amazingly large take-off assist rockets, but instead of aiming down a runway, it was pointed straight up. From underneath, a cloud of smoke erupted, engulfing the machine like a giant cotton ball. Then, slowly rising out of the smoke, balancing upon it, the Shuttle pushed off. Within nine minutes, it was 74 miles high, 920 miles down range, and had tossed off its empty fuel tank – the first aircraft to rocket into space.

From the start, from the launch at 7:03 a.m. (EST), April 12, at Cape Kennedy to wheels-down at 1:21 p.m. (EST), April 14, on the dry Rogers lake bed at Edwards Air Force Base in California, the name of the game for the first 36 orbit flight of the incredible rocket plane Space Shuttle Columbia was 'test, test, test the plane and bring it back safely.' That meant maintaining the highest quality data communications with the craft's onboard instruments and performing extremely precise tracking of the vehicle to insure its safe re-entry. Or, expressed another way, it meant 54.5 very busy flight hours for the telecommunications engineers who kept communications flowing between Earth and the Shuttle through Goddard's world-wide network of satellite tracking and data acquisition stations.

On-Center and around the globe, hundreds of Goddard and Bendix-contract network operators kept close watch as the Columbia moved rapidly in varying orbital paths above 18 dedicated antenna sites staggered among the continents below. As stations provided brief open windows for communications, computers collected masses of digital information – telemetry, audio, television, and sometimes all three at once – to keep tabs on the spacecraft's position, its health and the welfare of astronauts John Young and Bob Crippen. The collected information, relayed by land lines and telecommunications satellites, passed in real time from the Shuttle to Goddard, where it was quality controlled, and on to flight controllers in Houston. At the same time, commands to the spacecraft were transmitted from Houston through the same links.

The center of communications activity was in Building 14, Network Operations Control Center, where three 26-member,

Continued to page 2

Smiling faces and waving flags mark the success of the STS-1 mission.

Sade interviewed by reporter.

Code 100 Notes

Center Director A. Thomas Young had the following remarks on the success of the STS-1 mission

"Following the successful STS-1 mission, I heard three comments that very effectively describe the accomplishment:

"Marvelous success . . ." the world
"The United States is No. 1 . . ."
Al Lovelace
"We have our eyes to the stars . . ."
John Young

Each of you contributed to making STS-1 a success and these statements a reality. I congratulate you and thank you for a job well done."

Tom Young

A. Thomas Young
Director

Voyager I reveals new facts about Saturn

Voyager 1 scientists recently announced preliminary results of the satellite's November encounter with Saturn. The potpourri of interesting new facts about the planet and its satellites includes, among others, the following items:

Saturn

Wind speed in the atmosphere of Saturn are substantially higher than on Jupiter, and do not appear closely tied to the belt-zone boundaries. Highest winds (about 1,770 km or 1,100 mi. an hour) blow eastward at the equator and are four times stronger than on Jupiter. The velocity decreases smoothly to near zero at about 40 degrees latitude north and south.

Continued to page 5

Inside

more pictures of events during STS-1 mission . . . pages 2 & 3

Networks

Continued from page 1

Shuttle launch teams coordinated the Shuttle's two-and-a-half day flight with ground stations and watched over satellite relays. Ready to trouble-shoot, the Operations Control room teams were the largest since Apollo days, well outnumbering the usual 15-17 person teams overseeing unmanned satellite launches. Heading the crews were Networks Directors Dale Call (Prime Network Director), Larry Skiscim, and Gary Morse. Network Operations Managers on the teams included Tom Janoski (Prime Network Operations Manager), Ralph Banning, and John Walker.

Above the Network Operations Control Room, Networks Director Richard Sade oversaw activities with Network Operations Division Chief Dan Spintman, Goddard Director A. Thomas Young, Deputy Director John McElroy, and astronaut Vance Branc, veteran of Soyuz-Apollo. As they did, they hosted a continuous stream of visitors and newsmen arriving to view busy network operations and get briefings, among them NASA Associate Administrator for Space Tracking and Data Systems Ed Smylie, Congressman Wolpe of Michigan, local legislators, Department of Defense officials, academic heads, and reporters from Washington and Baltimore television stations 2, 5, 7, 11, and 13, as well as Independent Network News and Cable Network News. Radio stations WTOP, WINX, WEEL and many others called in for telephone updates, while several newspapers sent reporters.

In other parts of Buildings 14 and 3, activities insuring smooth network coverage of the Shuttle continued apace under NASCOM Mission Communications Managers Al Johnigen, Ray Goldsmith and Fred Gessner. Functioning as traffic controller for the myriads of electronic signals passing through the network, the NASCOM Digital Switching Center dedicated 70% of its computer capability to the Shuttle, under direction of Bendix's John Frostbutter and Richard Sylvester. Shuttle voice communications funneled into Goddard through NASCOM Voice Control, directed by Eddie Lawless and Bendix shift team leaders, while digital circuit configurations were monitored in the Technical Control area by Bendix's Forrest Carson and Arnold Thomas.

Still, as busy as it was throughout the network's support of the Shuttle and, concurrently, 33 other satellites also in orbit, it all could be only a taste of things to come as the vehicle becomes a routine ferry into space. As one network operations director, Ed Ambrose, summed up last week's work, "wait till we have the Shuttle launching with two or three Goddard satellites in the cargo bay at once, and we serve all of them (going into orbit) in addition to Houston."

Congratulations to Goddard's STS-1 support team

Directorate Notes

Code 200 report explains NASA's performance appraisal systems

All government agencies are required by law to have performance appraisal systems in place for all personnel by October 1, 1981. NASA has designed three systems, Senior Executive Service (SES), manager/supervisor, (grades 13-15 "Merit Pay"), and all other employees which is referred to as "non-supervisory." The SES and manager/supervisor systems are in place and operational leaving the non-supervisor yet to be implemented.

The purpose of performance appraisal is to improve productivity through improved employee/supervisor communication. The NASA nonsupervisory performance system is designed to encourage active participation of the employee in the design and assessment of their individual performance appraisal plans. From an employee standpoint, performance appraisal should increase knowledge of organizational goals, how job performance impacts these goals, and most importantly it should aid in understanding what the supervisor considers satisfactory performance. This information may then be used to identify how the employee may improve job performance by applying appropriate attention to the most important job functions or obtaining training.

Individual employees have a responsibility to themselves to make sure that all opportunities for discussion are properly utilized. Through expressive dialogue the employee can adequately understand the expectations of the supervisor. Such dialogue also helps the supervisor adequately understand and help the employee overcome the problems that impact the employee's ability to perform the required job. A typical Performance Review Cycle follows:

a. the supervisor reviews the position description (PD) of the employee along with any other documentation that clarifies the employee's job and responsibilities;

b. the supervisor identifies the duties the employee will be expected to perform for the appraisal period;

c. the supervisor determines which duties are "critical elements" (critical elements are elements that seriously impact the performance of the job if not satisfactorily completed).

d. the supervisor reviews the job elements with the employee to insure adequate understanding of the responsibilities. Unlike A, B, and C employee participation is required at this point. However it is encouraged that the employee be familiar with, and, if possible, participate in steps a through c.

e. the supervisor is then responsible for detailing and documenting performance requirements for those duties (job elements) to be performed during the appraisal period, and

f. communicating performance requirements to the employee. At this point the Performance Appraisal Plan has been constructed and is in place. Changes in work assignments that occur at any point during the appraisal period should generate a meeting between supervisor and employee to document changes in the plan.

g. the supervisor is required to meet with the employee at least once, during the performance cycle (approximately mid-way) to:

(1) review progress to date;

(2) identify and resolve problems that constitute obstacles to organizational or individual performance beyond the employee's control;

Continued to page 6

Benita A. Sidwell presents Linda L. Wetzel first place safety award of $25.00.

Joyce A. McMullen receives second place award of a reserved parking space from Benita A. Sidwell.

The Management Operations Directorate Safety Committee presented its quarterly awards April 13 for safety performance to Linda Wetzel (242) and Joyce McMullen (221). Management Operations Directorate Director Benita A. Sidwell presented Wetzel with a $25 first place award, and McMullen with the second place award of a reserved parking place for the quarter. Safety Committee members are Kent Potter (270), Darlene Ahalt (202), James Snyder (220), Tom Hamilton (260), Jack Eybel (205), Bob Bushnell (204), Jean Hartley (230), Bob Monroe (290), Homer Newton (206), Preston Pope (250), Bud Dyrland (280), and Mary Jo Sharpe (240). The purpose of the Committee is to increase safety awareness within the Directorate and encourage fellow workers to keep a careful eye out for each other's safety.

Landsat-3's Multispectral Scanner experiences mysterious recovery

Landsat-3, Goddard's Earth resources satellite whose multispectral imagery mysteriously degraded last December, just as mysteriously returned to normal service on March 19. The satellite will be made fully operational for users again as of April 13.

Engineers cannot explain the recovery, which they say looked impossible after months of tests. The engineers had traced the failure in the satellite's multispectral imagery to a particular multiplex digitizing circuit which suffered an open or shorted electronic component – a seemingly irreversible situation until the flaw suddenly disappeared last month. The engineers warn, however, that the possibility of a recurrence of the failure is high though its time is unpredictable.

The circuit failure had degraded output from the satellite's multi-spectral scanning instrument below the point of general usefulness. The instrument depicts Earth scenes below in four wavebands of the electromagnetic spectrum to detail land and water features. Its data, though the satellite is still in an experimental mode, is regularly used by natural resources planners nation and worldwide in such tasks as classifying land use and monitoring agriculture and water pollution.

The team working with Landsat-3 is headed by William D. Kenney, Mission Systems Manager for Landsats 2 and 3.

Voyager I

Continued from page 1

Voyager 1 found aurora-like emissions near the illuminated limbs of the planet, and auroras in ultraviolet light were found in a ring near 80 degrees south latitude. Scientists faced a difficult and unexpected problem in attempts to detect lightning on the dark side of Saturn, since the rings reflected too much light onto the night side. Although lightning has not been detected in images of Saturn's dark face, radio emissions typical of electric discharges have been observed. Those discharges originated in the rings.

The Rings

The F-ring, discovered by Pioneer 11 in 1979, is composed of three separate ringlets that appear to be intertwined. The inner and outer limits of the F-ring are controlled by two shepherd satellites, 1980S26 on the outside and 1980S27 on the inside. The intertwining or "braiding" phenomenon is unexplained – although it may be related to electrostatic charging of the dust-size particles comprising the ring.

Near the outer edge of the A-ring orbits the newly discovered satellite 1980S28. All three of those satellites (1980S26, 1980S27 and 1980S28) were discovered by Voyager 1.

Voyager 1 also photographed the D- and E-rings, during the passage through Saturn's shadow, and confirmed a new ring near 2.8 Saturn radii from the center of the planet. The existance of that ring had been postulated on the basis of Pioneer 11 fields and particles data.

Measurements show that the E- and F-rings have large populations of particles smaller than about 2/10,000th of an inch in diameter. Radio measurements of the C-ring indicate that it has an effective particle size of about 2 m (6 ft.), and, at the same time, suggest a wide distribution of particle sizes. Effective particle sizes for the A-ring and the Cassini Division are 10 and 8 m (33 and 26 ft.), respectively.

After it passed Saturn, Voyager 1 again took photographs of spoke-like features in the B-ring discovered on the satellite's inbound leg. The "outbound" photos showed that the spokes were brighter than surrounding material. The material in the spokes forward-scatters sunlight effectively, implying extremely small particles.

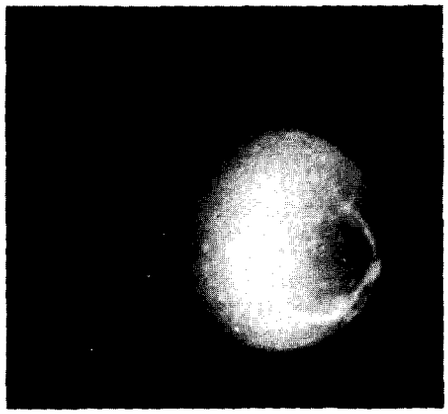
It is possible that the fine material is levitated above the rings. The electric discharges in the rings may be associated with the spokes.

Satellites

Voyager 1 observed all Saturn's known satellites except Phoebe. Mimas, Enceladus, Tethys, Dione and Rhea are approximately spherical in shape and appear to be composed mostly of water ice.

Enceladus shows no evidence, at 12 km (7 mi.) resolution, of any impact craters. Because the maximum intensity of the E-ring occurs at the orbit of Enceladus, it has been speculated that the satellite is the source of particles for that ring; it also may be that tidal stresses cause a surface renewal similar to Jupiter's satellite Europa.

Enceladus was not a prime target for Voyager 1; Voyager 2 will fly closer and return higher-resolution pictures of that satellite.



Saturn's satellite Dione as seen from Voyager 1 on November 11, 1980.

Titan

Titan was thought from Earth-based observations to be the largest satellite in the solar system. Voyager's close approach and diametric occultation show it to have a diameter of 5,140 km (3,194 mi.) – slightly smaller than Ganymede, Jupiter's largest satellite. Both are larger than the planet Mercury.

Titan's density thus appears to be about twice that of water ice, requiring Titan to be composed of nearly equal amounts of rock and ice, as is Ganymede.

The atmospheric pressure near Titan's surface is about 1.6 bars, 60 percent greater than Earth's. The atmosphere is composed mainly of nitrogen, the major constituent of Earth's atmosphere.

The surface temperature appears to be about 93 degrees Kelvin (-294 degrees F), close to the triple-point temperature of methane. Methane, therefore, probably plays the same role on Titan as water does on Earth – as rain, snow, ice and

Continued to page 6

Center Exchange

Ames:

Ames will be testing women aged 55 to 65, beginning April 1, to determine if they can withstand the physiological stress of weightlessness. Eight test subjects, selected from more than 200 volunteers, will be the oldest group of women NASA has subjected to prolonged bedrest (which closely simulates the effects of weightlessness). The study will conclude a series of six experiments designed to establish baseline medical criteria for Space Shuttle participation.

Lewis:

Lewis has begun a program on de-icing for small aircraft and helicopters. The goal of the effort is to increase the effectiveness of existing ice protection systems and, concurrently, develop advanced concepts for both anti-icing and de-icing systems that will be reliable, cost-effective, energy efficient, light in weight and easy to maintain.

Headquarters:

The Voyager Mission Team, represented by Dr. Edward G. Stone, has been selected to receive the Collier Trophy, the nation's oldest aviation award. The award, given annually for the greatest achievement in aeronautics or astronautics in America, will be presented May 19, for the "spectacular flyby of Saturn and return of basic new knowledge of the Solar System."

Wallops:

The first several Space Shuttle flights were tracked by radar from the Wallops Flight Center during launch and orbit. The Shuttle appeared on Wallops' horizon about two minutes after it lifted off from Kennedy. During this phase of the launch, safety commands, such as an order to abort if something goes wrong, could have been transmitted from Wallops.

Directorate Notes

Continued from page 4

(3) adjust priorities to accommodate new requirements;

(4) establish new objectives for the appraisal period that were not known previously or delete outdated requirements; and

(5) provide feedback and examine ways to improve performance. Other meetings, in addition to the mid-cycle review, are not required but are encouraged since increased dialogue is expected to enhance the likelihood of employees reaching their objectives.

h. supervisor and employee meet at the end of the performance period to discuss actual achievements during the performance period. This step is extremely important since it represents the final gathering of factual performance data upon which the final assessment will be written.

i. supervisor prepares a tentative assessment of the employee's performance.

j. tentative appraisal is reviewed by reviewing official (most often, the next higher level official). If not concurred it is returned to supervisor, if concurred . . .

k. supervisor discusses with the employee (if the employee disagrees with the performance appraisal he/she may request reconsideration. After reconsideration if the employee still disagrees with the appraisal, the proper procedure to follow is the administrative Grievance Procedure, NHB 3771.2A).

l. The appraisal is then sent to personnel to become a part of the employee's record and becomes a basis for personnel actions such as; promotions, training, awards, reassignments, and adverse actions.

Again, the success of the performance appraisal system rests with the dialogue between employee and supervisor. Discussion and mutual understanding will enable the employee to understand the supervisor's expectations, and enable the supervisor to understand and help the employee work to overcome any obstacles.

This first year, performance appraisal planning and preparation of written plans will be accomplished June 1981 through September 1981. All performance plans are to be written by September 30, 1981. In order for all employees to have an opportunity to better understand the performance appraisal system, orientation sessions have been scheduled for May 19 through May 22. Employees will be notified of the time, date, and place of their scheduled presentation. Managers and supervisors will be receiving additional training from late May through mid June.

Voyager I

Continued from page 5

vapor. Rivers of methane may cut through glaciers of methane under a nitrogen sky. Clouds may drop liquid-methane rain on the surface.

Titan's methane, through continuing organic chemistry, is converted to ethane, acetylene, ethylene and (when combined with nitrogen) hydrogen cyanide.

The last is an especially important molecule, since it is a building block of amino acids. However, Titan's low temperature undoubtedly inhibits more complex organic chemistry.

Titan has no intrinsic magnetic fields.

The Magnetosphere

While Saturn's magnetosphere is only about one-third the size of Jupiter's, it is still a huge structure, extending nearly a million miles from the planet towards the Sun before the flow of charged particles in the solar wind overcomes the effects of Saturn's magnetic field. As at Jupiter, charged particles in Saturn's magnetic field are dragged along by the magnetic field and circle the planet once in 10 hours, 39 minutes, 26 seconds.

At Titan's orbit, those particles pass the satellite at a relative speed of 200 km (124 mi.) per second. The size of Saturn's magnetic field fluctuates as the solar wind pressure increases and decreases. As a result, Titan is generally inside but sometimes outside the magnetosphere.

Titan was inside Saturn's magnetosphere as Voyager 1 flew past and observed the wake resulting from the flow past Titan of the electrically charged ions carried around by Saturn's rotating magnetic field. Radio emissions were also observed emanating from the wake region.

Voyager 1 is now headed out of the solar system. Its scan-platform instruments were turned off Dec. 19, 1980. Most fields and particles instruments continue to operate, monitoring the solar wind and its changes with distance and time. Although the exact location of the heliopause (the outer edge of the solar wind) is unknown, it is possible Voyager 1 will reach it sometime around 1990. Even before that time, however, Voyager may detect low-energy cosmic rays penetrating into the outer reaches of the solar system from nearby supernova remnants.

Voyager 2, meanwhile will make its closest approach to Saturn Aug. 25, 1981, and then continue on a trajectory toward Uranus.

Notice:

On May 21 there will be a fire extinguisher orientation course with a sign language interpretor present. The course, which will begin at 8:30 a.m. and last most of the morning, is available to all interested Goddard employees. It will be held in the basement of Building 3 in a room to be assigned. For more information contact: Kathy Saunders in the Health and Safety Engineering Office, ext. 6296.

NASA
GODDARD NEWS

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