

MISSION STATUS BULLETIN

VOYAGER

August 22, 1977



No. 3

**VOYAGER 2:
AUGUST 20, 1977
10:29:45 a.m., EDT**



STATUS SUMMARY

Voyager 2 Canopus acquisition is planned for August 23. In-flight science boom testing will be conducted on August 24. A trajectory correction maneuver is planned for August 28.

VGR77-2 will be de-encapsulated August 22 to inspect the science boom. Launch is now scheduled for September 3.

CURRENT STATUS

Two years to the day after the launch of the Viking Mission to Mars, Voyager 2, aboard a Titan IIIE/Centaur launch vehicle, lifted off launch complex 41, Air Force Eastern Test Range (AFETR), Cape Canaveral, Florida. Lift-off came at 10:29:45 a.m., EDT, less than five minutes into the launch window on the first day of the 30-day launch period. The countdown went smoothly except for a brief unscheduled hold at launch minus five minutes to determine the open/closed status of a launch vehicle valve. Minutes after launch, however, several problems were noted.

The problems included a suspected gyro failure, incomplete data transmission, and uncertainty as to the deployment of the science platform boom. The gyro is working now, the data transmission is good, and the science boom appears to be nearly deployed.

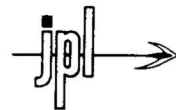
Science Boom

The boom supporting the science scan platform was to be released and deployed about 53 minutes into the flight, but initial data gave no confirmation that the boom is extended and locked. When the boom is within 0.05 degree of normal deployment, a microswitch on the folding boom opens. Confirmation of the microswitch position has not been received. A faulty switch could be the root of the problem.

Twelve hours after launch, flight controllers turned on the plasma science instrument, which is located on the scan platform, and used its measurements relative to a known axis and the direction of the solar wind (supplied by Goddard Space Flight Center) to determine the position of the science boom. Indications are that the boom is extended to at least within 2 degrees of full deployment.

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In-flight tests of the boom are scheduled for August 24. Further measurements, including temperature, will be monitored to further assess the boom position. The wide angle camera of the imaging subsystem may be activated to take a series of three star-field photographs from which analysts could more closely determine the boom and platform positions.

There are indications that the scan platform has slewed successfully, but project personnel will assess the AACS data before commanding any more movement of the platform which supports four of the science instruments.

Data Transmission

Data received at earth in the early hours of the flight were faulty and incomplete, but later transmissions began to relay more reliable data. Analysis of later data indicates that the on-board computers operated flawlessly, switching processors and enabling fail-safe routines at the first hint of trouble. Indications are that the data losses were due to an external event, still to be determined, during the launch phase, rather than to a fault in the computer systems.

Also during the Titan burn, the spacecraft switched to its second AACS processor, as part of a built-in fail-safe routine. Because of this, flight controllers will examine the contents of the AACS memory to determine if the commands for Canopus acquisition are still intact, prior to commanding the start of Canopus search. Canopus acquisition is scheduled for August 23. Once locked on both the sun and the star Canopus, the spacecraft will be stabilized on three axes in celestial lock.

The spacecraft has been stable since 3:00 p.m., EDT, August 20, except for a short pitch and yaw disturbance at 5:00 a.m., EDT, August 21. Flight controllers are investigating possible causes of the activity.

After spacecraft stabilization, ground controllers played back the launch sequence events tape recording from the on-board computer. Examination of this tape is needed to fill the gaps in the earth-received data and to determine the launch events which might have caused the data losses.

Gyros

During the Titan burn of the launch sequence, an apparent fault was detected in the Attitude and Articulation Control Subsystem (AACS) inertial reference unit gyros. The spacecraft is equipped with three gyros for orientation, each positioned about two orthogonal axes. Any combination of two gyros can control the spacecraft. During launch, gyros B

(roll and pitch) and C (yaw and roll) were active. The on-board computer switched to gyros A (pitch and yaw) and C when the fault was detected, and then to gyros A and B when the apparent fault continued. Indications were that gyro C was not functioning normally; however, since the spacecraft has stabilized, gyro C appears to be operating normally and the active pair is once again the B/C combination in use at lift-off.

Sun acquisition was achieved at 4:00:30 p.m., EDT, stabilizing the spacecraft on two axes with the third axis on roll inertial control. Sun acquisition came nearly 3-1/2 hours after initiation of the sun search command; the search was scheduled to take only five minutes.

Other Subsystems

Most of the science instruments have been turned on and are transmitting data, indicating they are in good condition. These are the magnetometer, plasma, photopolarimeter, low energy charged particle, planetary radio astronomy, and plasma wave subsystems. Several other instruments are expected to be turned on within the next few days.

The radioisotope thermoelectric generator (RTG) boom, magnetometer boom, and the two planetary radio astronomy and plasma wave antennae deployed normally.

The near-earth testing and calibration of the science instruments scheduled for the first days of the flight may be cancelled for Voyager 2 due to the other problems.

VGR77-2 (Voyager 1)

VGR77-2 will be de-encapsulated on August 22 for inspection of the science boom. This will move the second launch date to September 3.

Three spacecraft were built for the Voyager mission. One, VGR77-1, was designated the Proof Test Model (PTM) and subjected to extensive testing in simulated deep space conditions to test the spacecraft design, construction, and durability. VGR77-2 and -3 were designated flight spacecraft and subjected to less arduous testing to save them for the real deep space conditions. VGR77-3 became Voyager 2 at lift-off on August 20.

Engineers have conducted several tests on the mechanical configuration of the VGR77-1 science boom, including torque tests on the microswitch and stiffness tests of the boom to determine the scan platform settling times at various degrees of deployment.