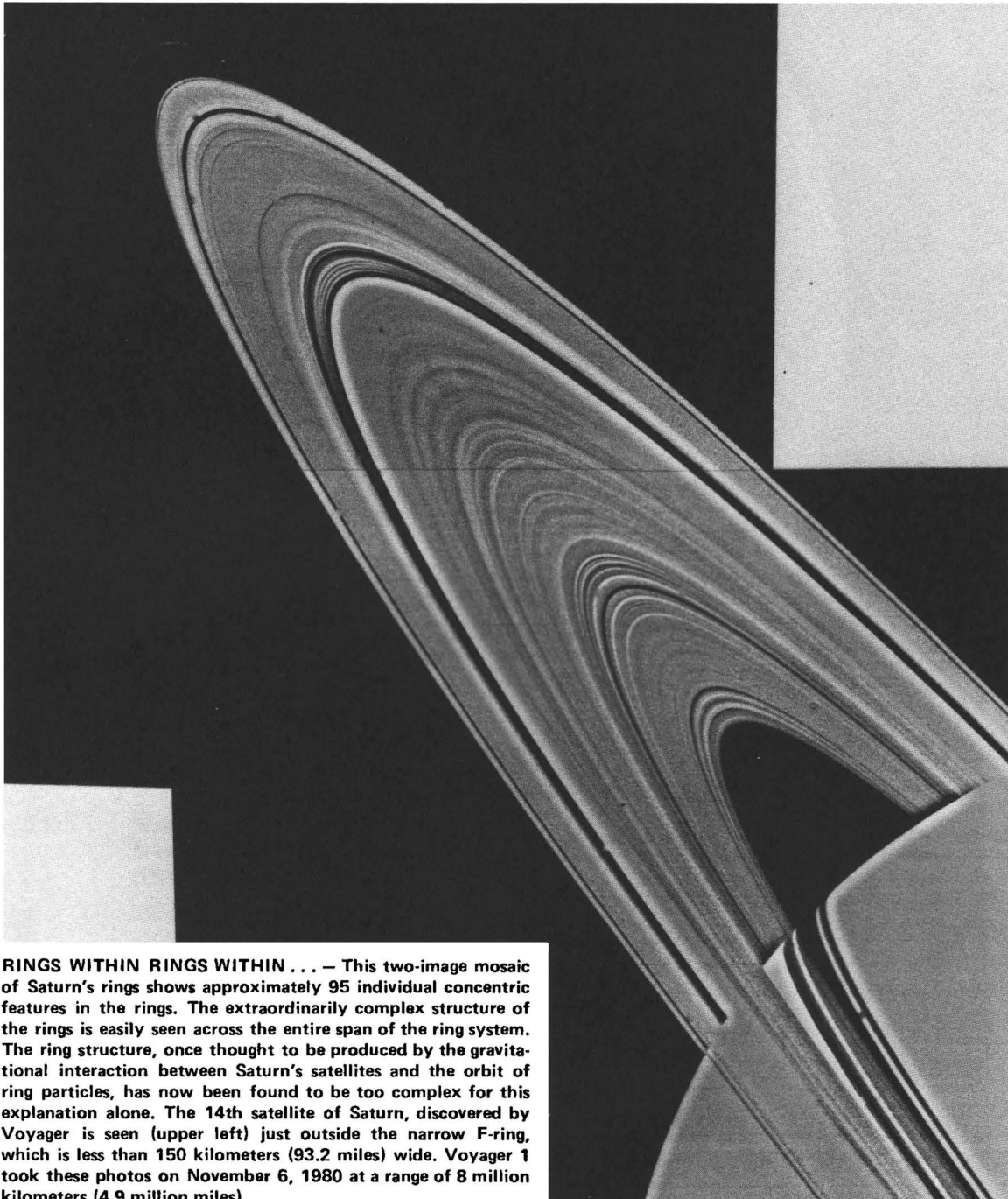


# Voyager Bulletin

MISSION STATUS REPORT NO. 57 NOVEMBER 7, 1980



**RINGS WITHIN RINGS WITHIN . . .** — This two-image mosaic of Saturn's rings shows approximately 95 individual concentric features in the rings. The extraordinarily complex structure of the rings is easily seen across the entire span of the ring system. The ring structure, once thought to be produced by the gravitational interaction between Saturn's satellites and the orbit of ring particles, has now been found to be too complex for this explanation alone. The 14th satellite of Saturn, discovered by Voyager is seen (upper left) just outside the narrow F-ring, which is less than 150 kilometers (93.2 miles) wide. Voyager 1 took these photos on November 6, 1980 at a range of 8 million kilometers (4.9 million miles).

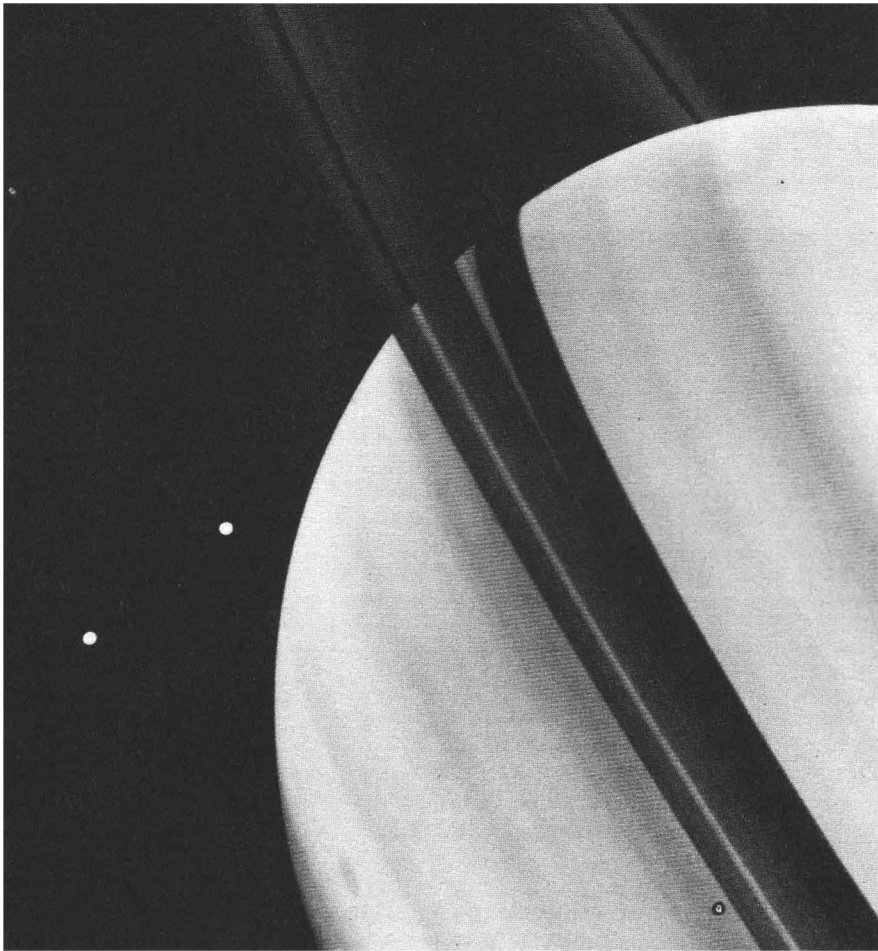
**NASA**

National Aeronautics and  
Space Administration

Jet Propulsion Laboratory  
California Institute of Technology  
Pasadena, California

**Voyager 1: Saturn Minus 5 Days**  
**Voyager 2: Saturn Minus 291 Days**

Recorded Mission Status (213) 354-7237  
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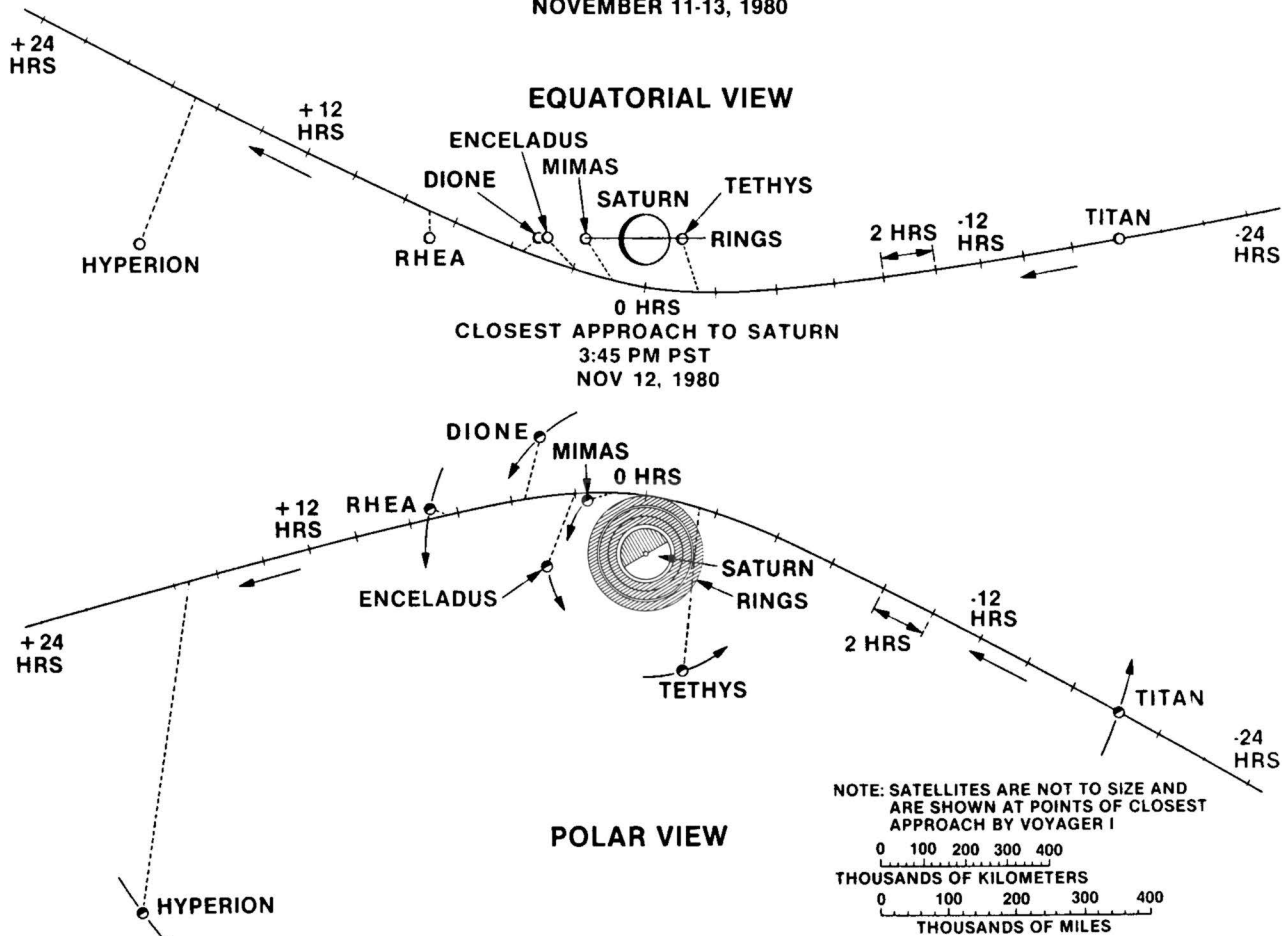
**CLOSING IN** — Saturn, its rings, and two of its moons, Tethys (above) and Dione, were photographed by Voyager 1 on November 3, 1980, from 13 million kilometers (8 million miles). The shadows of Saturn's three bright rings and Tethys are cast onto the cloud tops. The limb of the planet can be seen easily through the 3500-kilometer-wide (2170 miles) Cassini Division, which separates Ring A from Ring B. The view through the much narrower Encke Division, near the outer edge of Ring A, is less clear. Beyond the Encke Division (at left) is the outer edge of the A-ring.



**SATURN'S CLOUDS** — Saturn's northern hemisphere as seen by Voyager 1 on November 5, 1980 at a range of 9 million kilometers (5.5 million miles) shows a variety of features in the planet's clouds: Small-scale convective cloud features are visible in the dark belt (center); an isolated convective cloud with a dark ring is seen in the lighter zone; and a longitudinal wave is visible in the brighter zone (right of center belt). The smallest features visible in this photograph are 175 kilometers (108.7 miles) across.

## TWO VIEWS OF VOYAGER I FLYBY OF SATURN

NOVEMBER 11-13, 1980



### Encounter Highlights

*All times are Pacific Standard Earth-received time of event. All distances are from surfaces of satellites except where noted.*

#### November 11

9:52 – 10:36 a.m.      Spacecraft maneuver to sample fields and particles near Saturn; reference star is Miaplacidus

11:05 p.m.            Titan closest approach (4000 kilometers)

11:11 – 11:22 p.m.   Titan/Sun occultation

11:12 – 11:24 p.m.   Titan/Earth occultation

11:22 p.m.            Inbound ring plane crossing

#### November 12

3:41 p.m.             Tethys closest approach (415,320 kilometers)

5:10 p.m.             Saturn closest approach (124,200 kilometers above clouds)

7:07 p.m.             Mimas closest approach (88,820 kilometers)

7:15 p.m.             Enceladus closest approach (202,251 kilometers)

6:09 – 6:33 p.m.

Spacecraft maneuver to sample fields and particles

7:08 – 8:35 p.m.

Saturn/Earth occultation

7:22 – 8:02 p.m.

Saturn/Sun occultation

9:03 p.m.

Dione closest approach (161,131 kilometers)

8:44 – 9:00 p.m.

Ring/Earth occultation

9:45 p.m.

Outbound ring plane crossing

11:46 p.m.

Rhea closest approach (72,000 kilometers)

11:09 – 11:26 p.m.

Spacecraft maneuver to sample fields and particles; reference star is Alhena

11:38 p.m. –  
12:41 a.m.

Rhea image motion compensation maneuver; reference star is Vega

#### November 13

10:09 a.m.

Hyperion closest approach (879,127 kilometers)

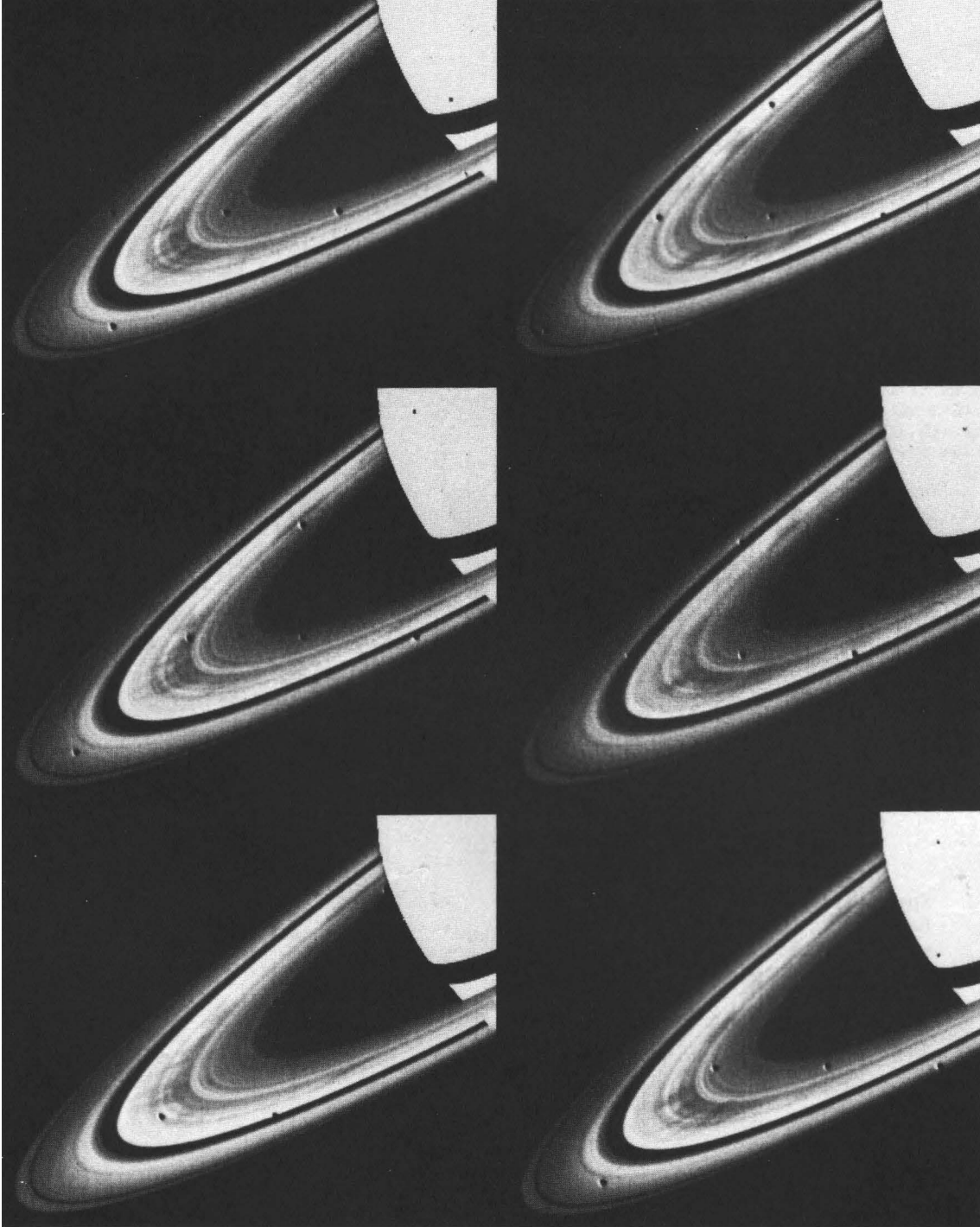
2:42 – 4:43 p.m.

Spacecraft maneuver; return to Vega

#### November 14

12:50 a.m.

Iapetus closest approach (2,474,000 kilometers)



**FEATURES IN SATURN'S RINGS** — Dark spokelike features in Saturn's B-ring are seen revolving around the planet with the rings' orbital motion in these six photographs taken by Voyager 1 on October 15, 1980. The images were taken in sequence (from upper left to lower right) approximately every 15 minutes at a distance of about 24 million kilometers (14.9 million miles) from the planet. The rotation of the spokelike features, visible in the brightest part of the rings, is recorded in each frame. Because the outer parts of the rings revolve more slowly than the inner rings, the differential motion is thought to cause the features to dissipate. However, the radial features are apparently ubiquitous and are regenerated by some unexplained mechanism. Dark round spots on the rings and planet are resseau marks engraved on the camera and are not features of Saturn.