The Cassini-Huygens mission includes the Cassini orbiter, which orbits Saturn and its moons for four years, and the Huygens probe, which was released from the Cassini orbiter and landed on the moon Titan to explore its surface and surroundings. The scientific instruments provide new and exciting data to help understand the mysterious Saturnian system. The Ultraviolet Imaging Spectrograph (UVIS), is one of the 12 instruments on board Cassini. Its four telescopes measure ultraviolet light from sunlight, hydrogen, and deuterium to provide information on the atmospheric composition and photochemistry of Saturn, Titan and other moons, and the nature and history of Saturn's rings. UVIS was built at the University of Colorado's Laboratory for Atmospheric and Space Physics in Boulder, Colorado.

**Mission Details**

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Cassini</th>
<th>Huygens</th>
</tr>
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<tbody>
<tr>
<td>Instruments on board Cassini</td>
<td>12, including UVIS</td>
<td>6</td>
</tr>
<tr>
<td>Cost</td>
<td>$3.3 billion</td>
<td>$12.5 million</td>
</tr>
<tr>
<td>Managed by</td>
<td>NASA's Jet Propulsion Laboratory (JPL)</td>
<td></td>
</tr>
<tr>
<td>Launched</td>
<td>October 15, 1997 by a Titan IV/B Centaur rocket</td>
<td></td>
</tr>
<tr>
<td>Launched from</td>
<td>Kennedy Space Center in Florida</td>
<td></td>
</tr>
<tr>
<td>Cruise to Saturn</td>
<td>7 years and 3.5 billion kilometers (2.175 billion miles)</td>
<td></td>
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<tr>
<td>Entered Saturn orbit</td>
<td>June 30, 2004</td>
<td></td>
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<tr>
<td>Orbital life</td>
<td>4 years (plus possible 2-6-year extension)</td>
<td></td>
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<tr>
<td>Huygens probe landed on Titan</td>
<td>January 14, 2005</td>
<td></td>
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</tbody>
</table>

**UVIS Details**

- **Dimensions**: 18.5" long x 9.2" wide x 11.8" tall and weighs 15.43 kg
- **Cost**: $12.5 million to build, funded by NASA
- **UVIS’s four Telescopes (Channels)**:
  - **A**: Extreme UV channel (EUV) measures between 55.8-118 nm wavelengths of UV
  - **B**: Far UV channel (FUV) measures between 110-190 nm wavelengths of UV
  - **C**: High Speed Photometer (HSP) measures starlight and sunlight during an occultation
  - **D**: Hydrogen-Dueterium Absorption Cell (HDAC) measures hydrogen and deuterium to learn about the origin and history of Titan's atmosphere

**Saturn Details**

- **Distance from Earth**: 1.279 billion km (795.15 million miles)
- **Average distance from Sun**: 1.4 billion km (887 million miles)
- **Average temperature**: -139.15°C (-218.47°F)
- **Diameter**: 120,536 km (74.897 miles)
- **Mass**: 95.2 times Earth's mass
- **Length of a Saturn day**: 10.7 Earth hours
- **Length of a Saturn year**: 29.46 Earth years
- **Gravity**: 107% that of Earth's at the cloudtops
- **Moons**: at least 34 and still discovering more
- **Composition**: Saturn is 75% hydrogen and 25% helium with traces of water, methane, ammonia and other elements; Rings are water ice, with some rock—particle size ranges from a grain of sand to the size of a house.
These are color-enhanced images of the rings from the UVIS observations during the Saturn orbit insertion event—when Cassini entered Saturn's orbit after a nearly seven year journey—on June 30th (MST). The turquoise represents more water ice in the rings. The red represents the most transparent (optically thinnest) area in the rings. From the inside out, the “Cassini division” in faint red at left is followed by the A ring in its entirety. The A ring begins with a “dirty” interior of red followed by a general pattern of more turquoise further away from the planet, which indicates material with more ice. The red band roughly three-fourths of the way outward in the A ring is the Encke gap.

This color-enhanced image of two density waves in Saturn's A ring was made from the stellar occultation (a star shining through from behind) observed by UVIS when the spacecraft was 6.8 million kilometers (4.2 million miles) from Saturn. Bright areas indicate the denser regions of the rings. The bright bands on the left are the “peaks” of a density wave caused by gravitational stirring of the rings by Saturn's moon, Janus. A smaller density wave on the right is produced by the moon Pandora. UVIS observed the brightness of the star Xi Ceti as the rings passed in front of it, and the flickering of the starlight was converted into the ring density depicted by the image.

Oxygen surrounds Saturn in a large donut: fluctuations show active processes in Saturn's E ring. A movie showing a series of four similar images tracking the changes in the Saturn magnetosphere's atomic oxygen emission during Saturn approach December 2003 - June 2004 can be found at http://lasp.colorado.edu/cassini on the What's New page.

Saturn and its rings block hydrogen Lyman-alpha emission. This image was taken on July 13, 2004, from a distance of 5 million km. You can see the southern auroral zone, the sunlit crescent Saturn, the dark nightside, the dim rings, Saturn's shadow on the rings, and Saturn's extensive atomic hydrogen corona.

Saturn's retrograde moon, Phoebe, in visible and ultraviolet (UV) light. On the right side, an ultraviolet image taken at a distance of 31,000 km, shows an irregular surface and bright crater region (white area). The ultraviolet spectra confirm water frost on Phoebe's surface. The image was taken by UVIS during the spacecraft's closest approach to Phoebe, on June 11, 2004. The large crater shows clearly in the image on the left.

To learn more, visit http://lasp.colorado.edu/cassini