



10783 - Rapid Response: Jupiter's White Oval Turns Red

Cycle: 14, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets</i>	<i>Configurations</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) JUPITER-RED-OVAL	ACS/HRC	1	21-Mar-2006 00:50:24.0	yes

1 Total Orbits Used

ABSTRACT

In the late 1930s, bright white clouds expanded and encircled Jupiter's southern hemisphere in a band near 33 degrees south planetographic latitude. As it cleared, the clouds collapsed into three large anticyclonic storms later named the White Ovals. These three storms were second in size only to the Great Red Spot, but unlike their larger counterpart, were covered with white clouds. In the mid to late 1990s these storms suddenly approached each other very closely, resulting in the 1998 merger of two of the storms. In 2000, the third oval also merged, leaving one remaining large White Oval. Early in 2006, amateur observers noted that the oval appeared to be changing in appearance and turning red. While small red spots do appear on Jupiter from time to time, they usually form as a colored spot, cloud over, and become white, rather than the opposite. We wish to observe this unexpected, and unprecedented, color change with ACS to compare to similar ACS observations that serendipitously observed the oval in January

Proposal 10783 - Overview

2005 and to recent and upcoming ground-based observations. The ACS HRC observations would be the highest spatial resolution possible, while also offering a unique range of filters from the near UV to the near IR. Using the two ACS datasets, we will compare the vertical structure of the storm to determine how the mass loading of the clouds may have changed. This is useful in determining local energetics and dynamics, which play a strong role in the overall energy balance of the planet. Understanding these mechanisms on the giant planets will also help us to better model the atmospheres of unresolved extrasolar giant planets.

OBSERVING DESCRIPTION

Target the new "red oval" using the ACS HRC. The oval's position is 290 deg W System III longitude on March 18. It is drifting eastward at ~ 0.24 deg/day (towards smaller System III W. longitude). Targeting time tolerance is approximately ± 1 hour of central meridian crossing. The oval resides at 33 deg S. planetographic latitude, so the HRC FOV should be offset to ensure coverage of the southern hemisphere of the planet, if the entire disk does not fit in the FOV.

Proposal 10783 - Visit 01 - Rapid Response: Jupiter's White Oval Turns Red

Tue Mar 21 05:50:35 GMT 2006

Visit	Proposal 10783, Visit 01									
	Diagnostic Status: No Diagnostics Scientific Instruments: ACS/HRC Special Requirements: BETWEEN 20-MAR-2006:00:00:00 AND 10-APR-2006:00:00:00 Comments: See comments under Target. We would like to schedule this orbit for as soon as possible, given the time-variable nature of Jupiter's atmosphere.									
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window				
	(1)	JUPITER-RED-OVAL	STD=JUPITER	TYPE=PGRAPHIC, LONG=290.0, LAT=-33.0, R_LONG=-0.24, EPOCH=18-MAR-2006:00:00:00		CML OF JUPITER FROM EARTH BETWEEN 260.0 320.0				
Comments: Target to ensure the southern hemisphere is visible, if the entire planet does not fit in the ACS HRC field-of-view. All longitudes are given in System III W. longitude, latitude is planetographic. The preferred central meridian longitude is given in the Level 2 Target requirement (based on March 18 location and with associated drift rate). The tolerance is +/- 30 deg. of that longitude, as indicated in the observing window BETWEEN window (based on March 18). The field of view can be offset slightly in the direction of the desired longitude, to better center it, but that is not strictly required.										
Exposures	#	Label	Target	Config, Mode, Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	220W	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F220W	CR-SPLIT=NO			220.0 Secs [==>]	[1]
	2	250W	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F250W	CR-SPLIT=NO			20.0 Secs [==>]	[1]
	3	330W	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F330W	CR-SPLIT=NO; GAIN=4			15.0 Secs [==>]	[1]
	4	435W	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F435W	CR-SPLIT=NO; GAIN=4			3.0 Secs [==>]	[1]
	5	656N/637	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	FR656N 6370.0 A	CR-SPLIT=NO; GAIN=4			10.0 Secs [==>]	[1]
	6	656N/643	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	FR656N 6430.0 A	CR-SPLIT=NO; GAIN=4			10.0 Secs [==>]	[1]
	7	656N/649	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	FR656N 6490.0 A	CR-SPLIT=NO; GAIN=4			10.0 Secs [==>]	[1]
	8	550M	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F550M	CR-SPLIT=NO; GAIN=4			3.0 Secs [==>]	[1]
	9	658N	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F658N	CR-SPLIT=NO; GAIN=4			10.0 Secs [==>]	[1]
	10	F892N	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F892N	CR-SPLIT=NO; GAIN=4			12.0 Secs [==>]	[1]
	11	550M	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F550M	CR-SPLIT=NO; GAIN=4			3.0 Secs [==>]	[1]
	12	435W	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F435W	CR-SPLIT=NO; GAIN=4			3.0 Secs [==>]	[1]

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	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
Exposures (continued)	13	658N	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F658N	CR-SPLIT=NO; GAIN=4			10.0 Secs [==>]	[1]
	14	F220W	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F220W	CR-SPLIT=NO			220.0 Secs [==>]	[1]
	15	250W	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F250W	CR-SPLIT=NO			20.0 Secs [==>]	[1]
	16	330W	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F330W	CR-SPLIT=NO; GAIN=4			3.0 Secs [==>]	[1]
	17	435W	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F435W	CR-SPLIT=NO; GAIN=4			3.0 Secs [==>]	[1]
	18	656N/637	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	FR656N 6370.0 A	CR-SPLIT=NO; GAIN=4			10.0 Secs [==>]	[1]
	19	656N/643	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	FR656N 6430.0 A	CR-SPLIT=NO; GAIN=4			10.0 Secs [==>]	[1]
	20	656N/649	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	FR656N 6490.0 A	CR-SPLIT=NO; GAIN=4			10.0 Secs [==>]	[1]
	21	550M	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F550M	CR-SPLIT=NO; GAIN=4			3.0 Secs [==>]	[1]
	22	658N	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F658N	CR-SPLIT=NO; GAIN=4			10.0 Secs [==>]	[1]
	23	892N	(1) JUPITER-RED-OVAL	ACS/HRC, ACCUM, HRC-FIX	F892N	CR-SPLIT=NO; GAIN=4			12.0 Secs [==>]	[1]

