

The background features a dark blue gradient with a starry field. Overlaid on this are several white circular elements: a large scale on the left with markings from 150 to 260, and several smaller circles with dashed lines and arrows, suggesting orbital paths or data cycles.

# CASSINI IMAGING

MATTHEW MCLEAN, GEOG 457 ADVANCED REMOTE SENSING

PLANETARY REMOTE SENSING

# CASSINI

- Launched: October 1997
- Reached Saturn: 2004
- Mission ended 2008
- Extended Mission: Cassini Solstice 2017

# SATURN

- Mass:  $5.68^{26}$ kg (9.6x Earth)
- Diameter: 120,536km (9.4x Earth)
- Atmosphere: Approx. 75% H, 25% He
- Rings: 13 (Studied by fly through!)
- Moons: 62 (Some of which have atmosphere, especially Titan which is often Hazy)

## Remote Sensing Capabilities

### Optical

Composite Infrared Spectrometer (CIRS)

Imaging Science Subsystem (ISS)

Ultraviolet Imaging Spectrograph (UVIS)

Visible and Infrared Mapping Spectrometer (VIMS)

### Microwave

Radar

Radio Science (RSS)

### Fields, Particles and Waves

Cassini Plasma Spectrometer (CAPS)

Cosmic Dust Analyzer (CDA)

Ion and Neutral Mass Spectrometer (INMS)

Magnetometer (MAG)

Magnetospheric Imaging Instrument (MIMI)

Radio and Plasma Wave Science (RPWS)

# IMAGING SCIENCE SUBSYSTEM (ISS)

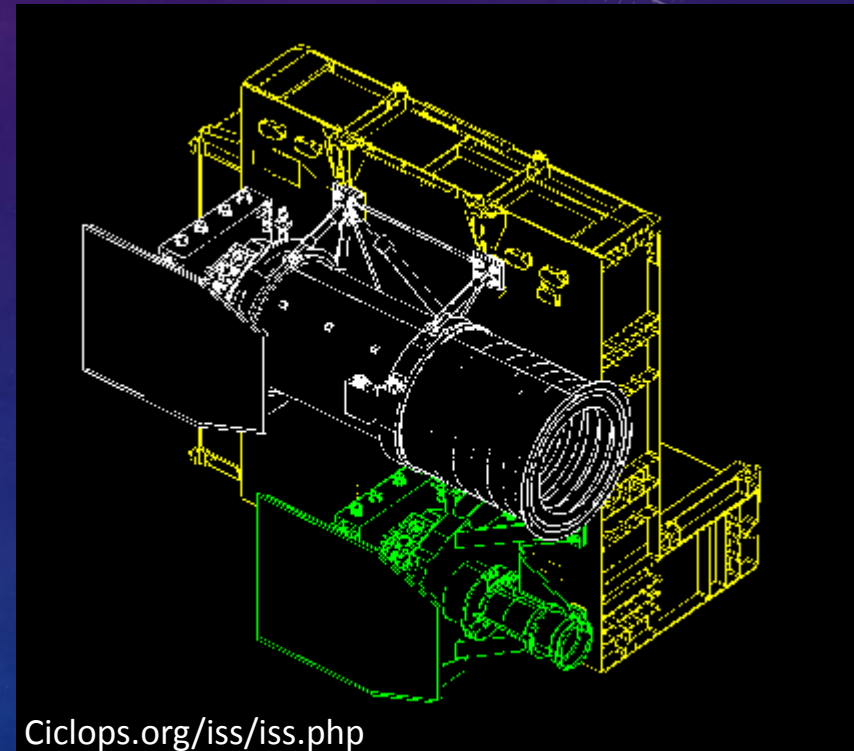
The Imaging Science Subsystem is made of two components

## Narrow Angle Camera (NAC)

- Field of view 0.35 degrees
- Resolution 1024px X 1024px
- 24 Spectral filters
- Change 3 positions / second
- Sensitivity 200 nm – 1100 nm

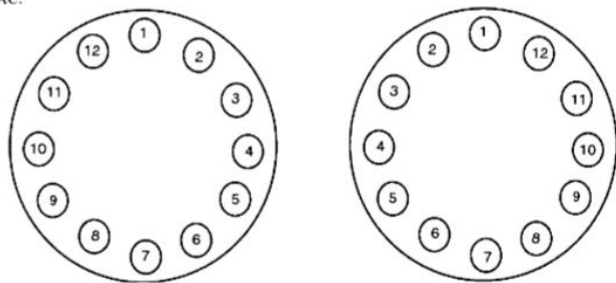
## Wide Angle Camera (WAC)

- Field of view 3.5 degrees
- Resolution 1024px X 1024px
- 18 Spectral filters
- Change 2 positions / second
- Sensitivity 420 nm – 1100 nm



Filters are like Landsat bands, but only 1 can be used at a time.

A. NAC:

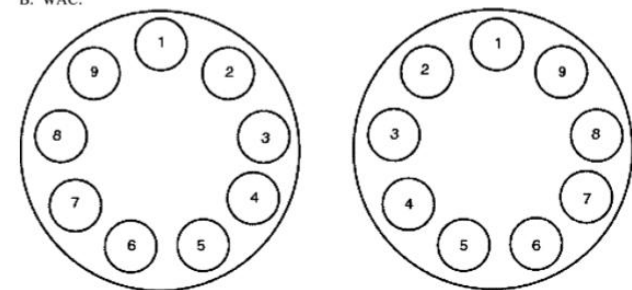


NAC Filters

(Wavelengths, in nm, are central wavelengths computed using the full system transmission function.)

Filter Wheel #1	Filter Wheel #2
1) CL1 (611W)	1) CL2 (611W)
2) Red (650W)	2) GRN (568W)
3) BL1 (451W)	3) UV3 (338W)
4) UV2 (298W)	4) BL2 (440M)
5) UV1 (258W)	5) MT2 (727N)
6) IRP0 (746W)	6) CB2 (750N)
7) P120 (617W)	7) MT3 (889N)
8) P60 (617W)	8) CB3 (938N)
9) P0 (617W)	9) MT1 (619N)
10) HAL (656N)	10) CB1 (619N)
11) IR4 (1002LP)	11) IR3 (930W)
12) IR2 (862W)	12) IR1 (752W)

B. WAC:



WAC Filters

(Wavelengths, in nm, are central wavelengths computed using the full system transmission function.)

Filter Wheel #1	Filter Wheel #2
1) CL1 (635W)	1) CL2 (635W)
2) IR3 (918W)	2) RED (648W)
3) IR4 (1001LP)	3) GRN (567W)
4) IR5 (1028LP)	4) BL1 (460W)
5) CB3 (939N)	5) VIO (420SP)
6) MT3 (890N)	6) HAL (656N)
7) CB2 (752N)	7) IRP90 (705W)
8) MT2 (728N)	8) IRP0 (705W)
9) IR2 (853W)	9) IR1 (742W)

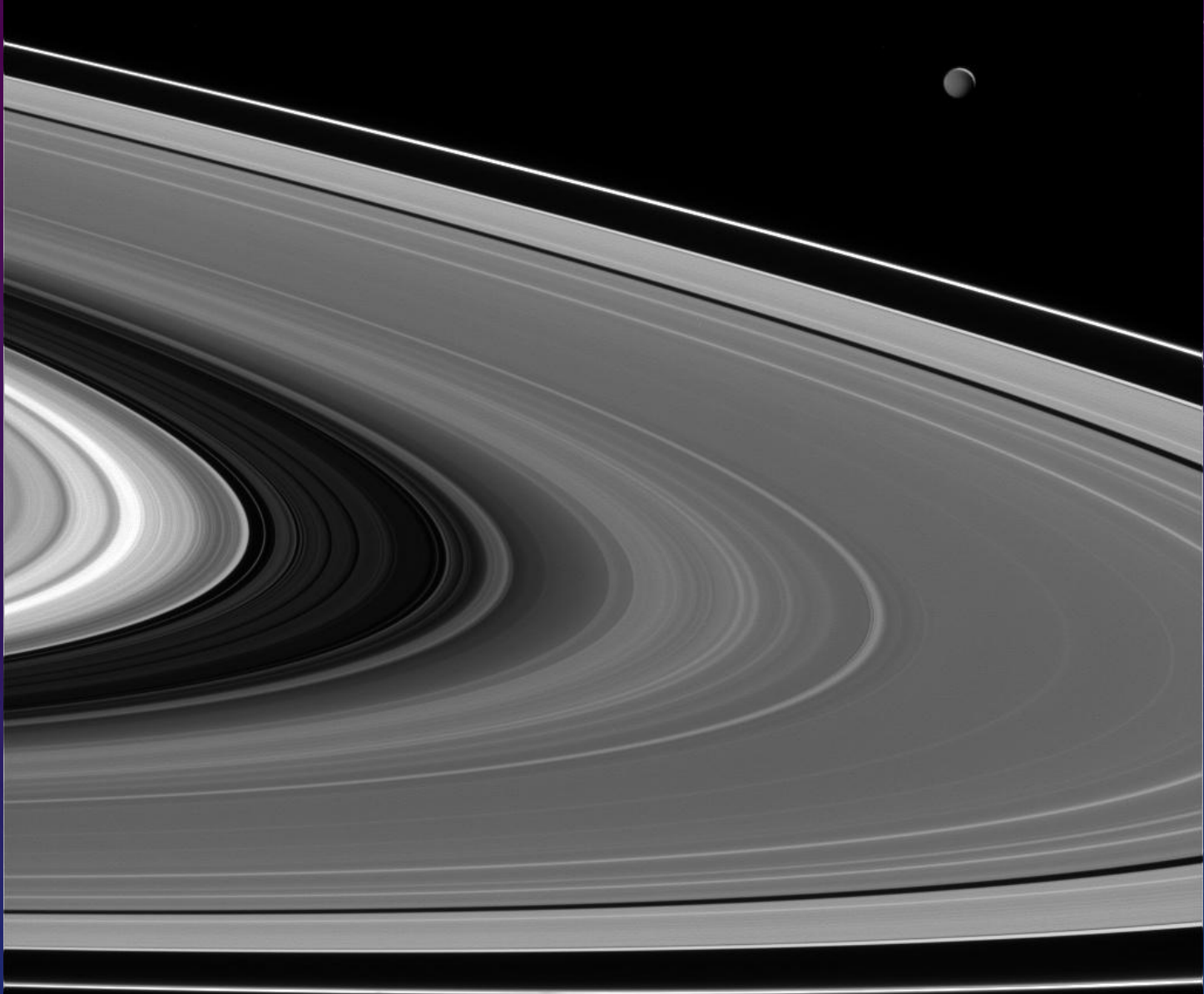
TABLE VIII  
ISS filter characteristics.

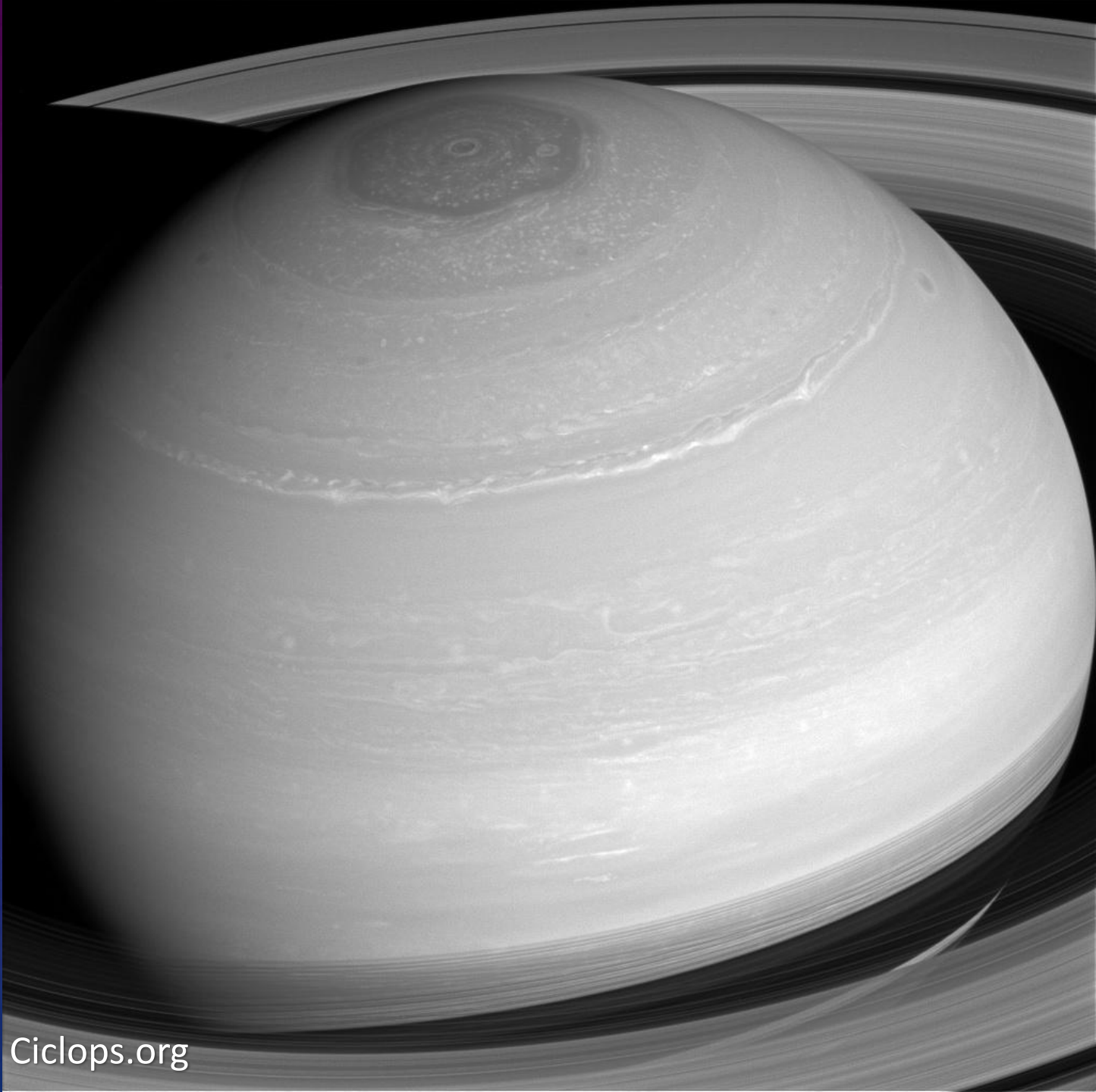
Filter	$\lambda_{cen,NAC}$	$\lambda_{eff,NAC}$	$\lambda_{cen,WAC}$	$\lambda_{eff,WAC}$	Science justification
UV1	258W	264	–	–	Aerosols
UV2	298W	306	–	–	Aerosols, broad-band color
UV3	338W	343	–	–	Aerosols, broad-band color, polarization
VIO	–	–	420SP	420	Broad-band color
BL2	440M	441	–	–	Medium-band color, polarization
BL1	451W	455	460W	463	Broad-band color
GRN	568W	569	567W	568	Broad-band color
MT1	619N	619	–	–	Methane band, vertical sounding
CB1	619N	619	–	–	Two-lobed continuum for MT1
CB1a	635	635	–	–	
CB1b	603	603	–	–	
RED	650W	649	648W	647	Broad-band color
HAL	656N	656	656N	656	H-alpha/lightning
MT2	727N	727	728N	728	Methane band, vertical sounding
CB2	750N	750	752N	752	Continuum for MT2
IR1	752W	750	742W	740	Broad-band color
IR2	862W	861	853W	852	Broad-band color; ring absorption band
MT3	889N	889	890N	890	Methane band, vertical sounding
CB3	938N	938	939N	939	Continuum for MT3; see thru Titan haze
IR3	930W	928	918W	917	Broad-band color
IR4	1002LP	1001	1001LP	1000	Broad-band color
IR5	–	–	1028LP	1027	Broad-band color
CL1	611	651	635	634	Wide open, combine with wheel 2 filters
CL2	611	651	635	634	Wide open, combine with wheel 1 filters
P0	617	633	–	–	Visible polarization, 0°
P60	617	633	–	–	Visible polarization, 60°
P120	617	633	–	–	Visible polarization, 120°
IRP0	746	738	705	705	IR polarization; see through Titan haze
IRP90	–	–	705	705	IR polarization; see through Titan haze



# Mimas, not a Death Star







# MORE INFORMATION

## Websites

- Cassini <http://saturn.jpl.nasa.gov/>
- Cassini Imaging Central Laboratory for Operations (CICLOPS) <http://www.ciclops.org/index.php>

## Research

- Cassini-Huygens Mission Overview and Recent Science Results <http://proxy.library.unbc.ca:2068/10.1109/AERO.2008.4526259>
- Cassini Solstice Mission overview and science results <http://proxy.library.unbc.ca:2141/xpl/articleDetails.jsp?arnumber=6496923&queryText=Cassini&pageNumber=1&newsearch=true>
- Papers related to ISS <http://www.ciclops.org/sci/reports.php>  
<http://www.ciclops.org/sci/papers.php>