

Auroral Morphologies of Jupiter and Saturn

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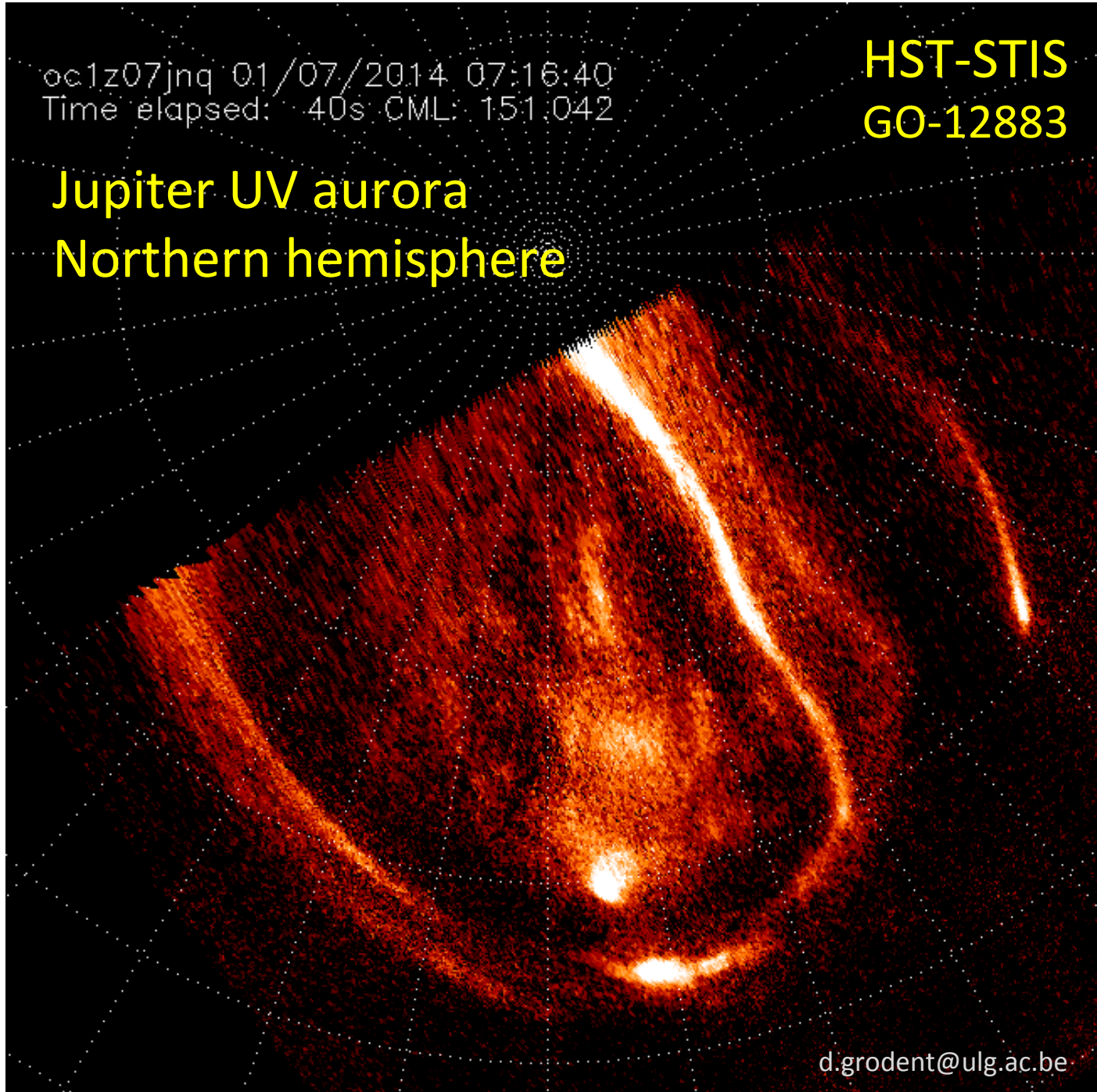
d.grodent@ulg.ac.be



oc1z07jng 01/07/2014 07:16:40
Time elapsed: 40s CML: 151.042

HST-STIS
GO-12883

Jupiter UV aurora
Northern hemisphere



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Saturn UV aurora
Southern hemisphere

Cassini -UVIS

DOY 2013-079

alt.:

13.2_12.7 RS

ssc lat:

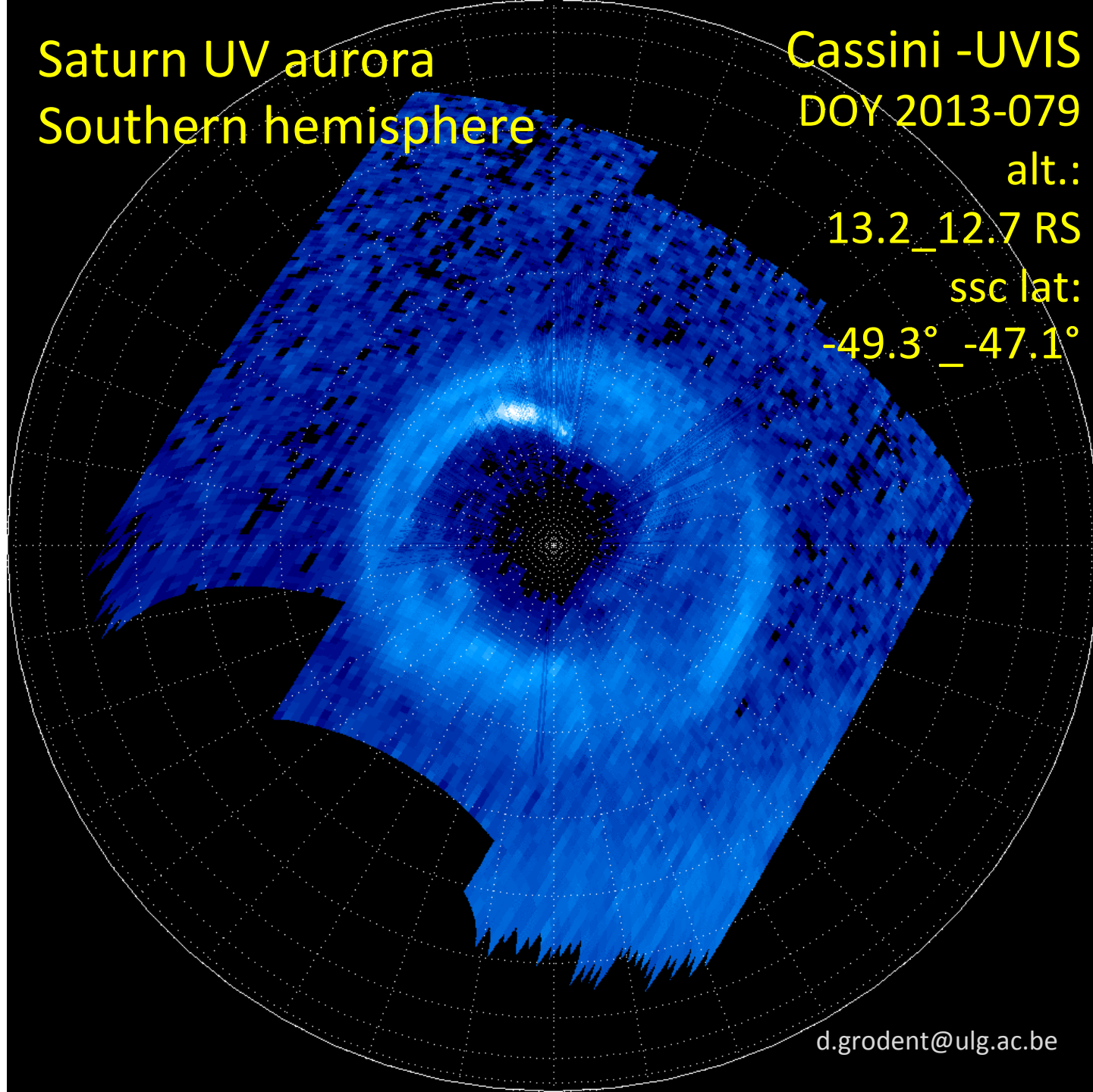
-49.3°_-47.1°

3 frames:

15:19

16:32

17:44

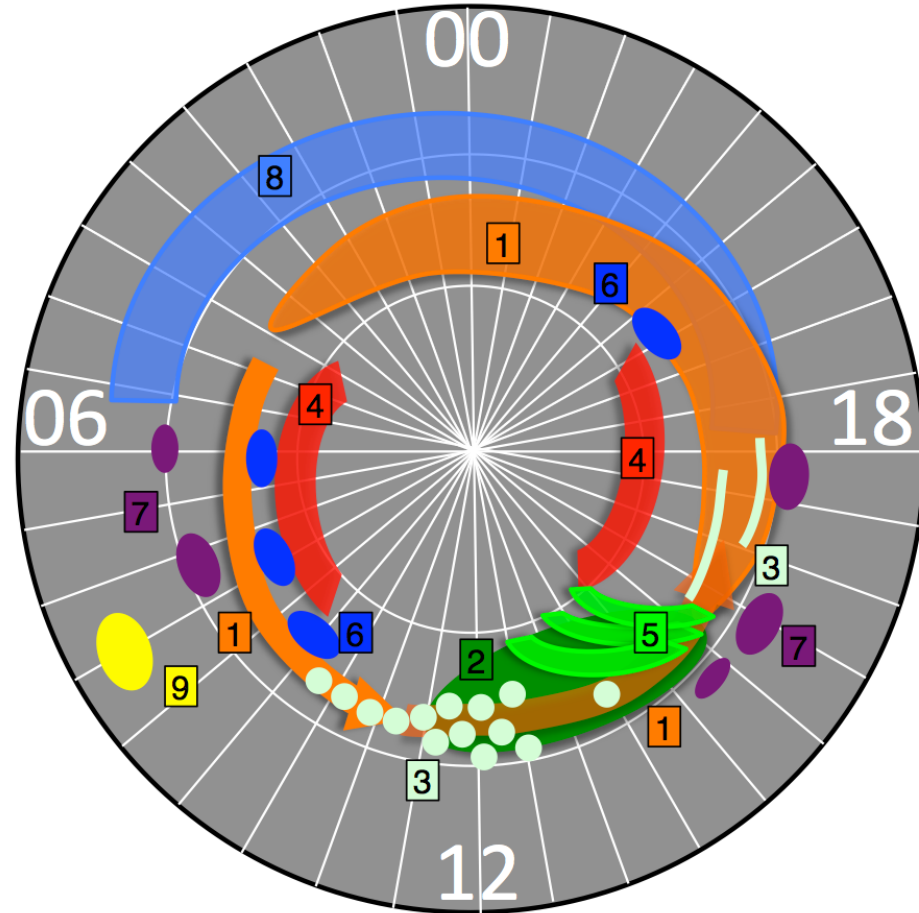
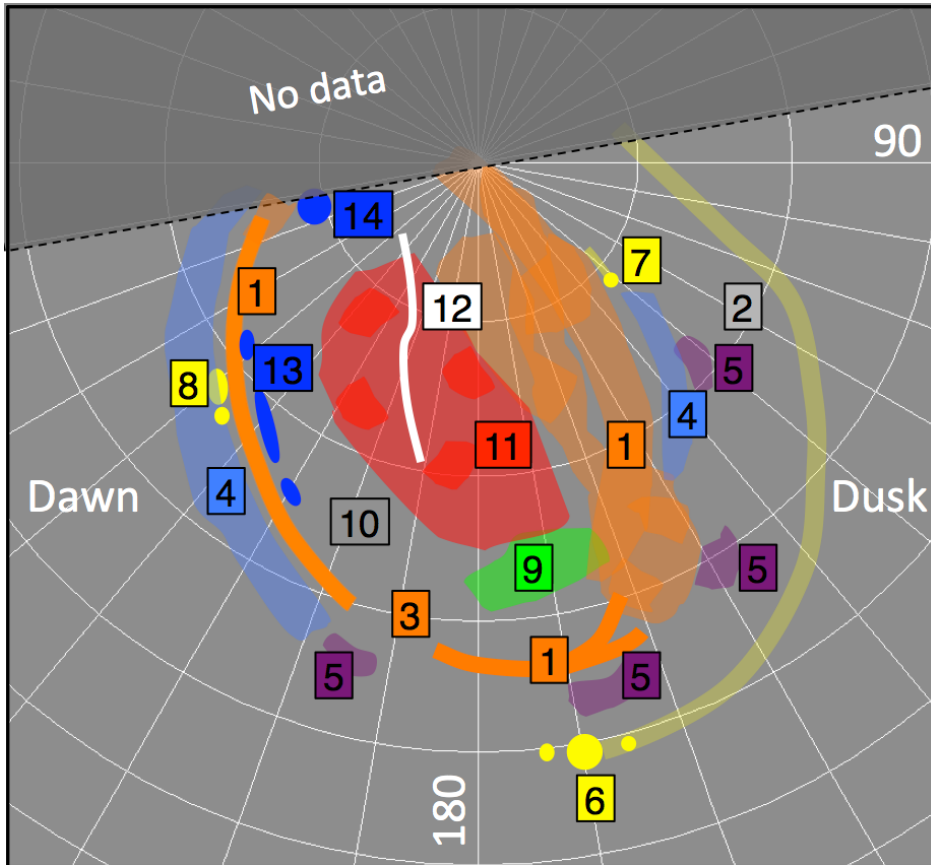




Sketches with comparable "ingredients"

Jupiter (North)

Saturn (both)



S3 frame (equiv. to LT if CML=180°)

LT frame

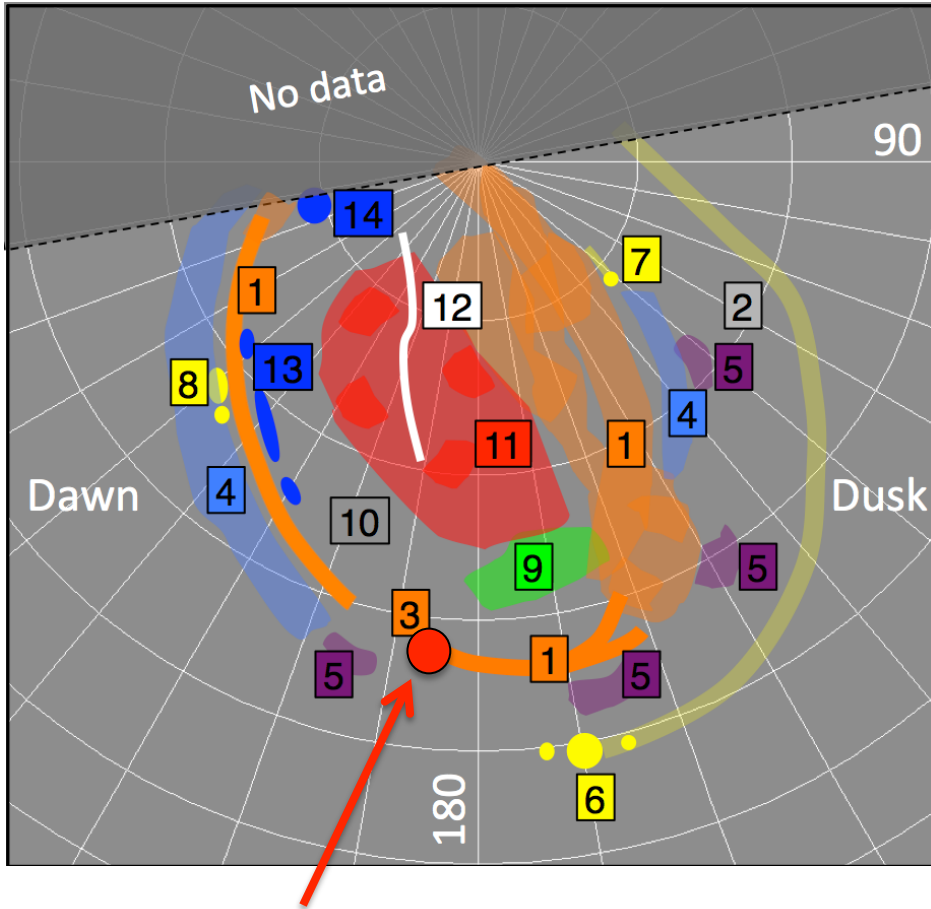
Grodent (SSR, 2014-2015)

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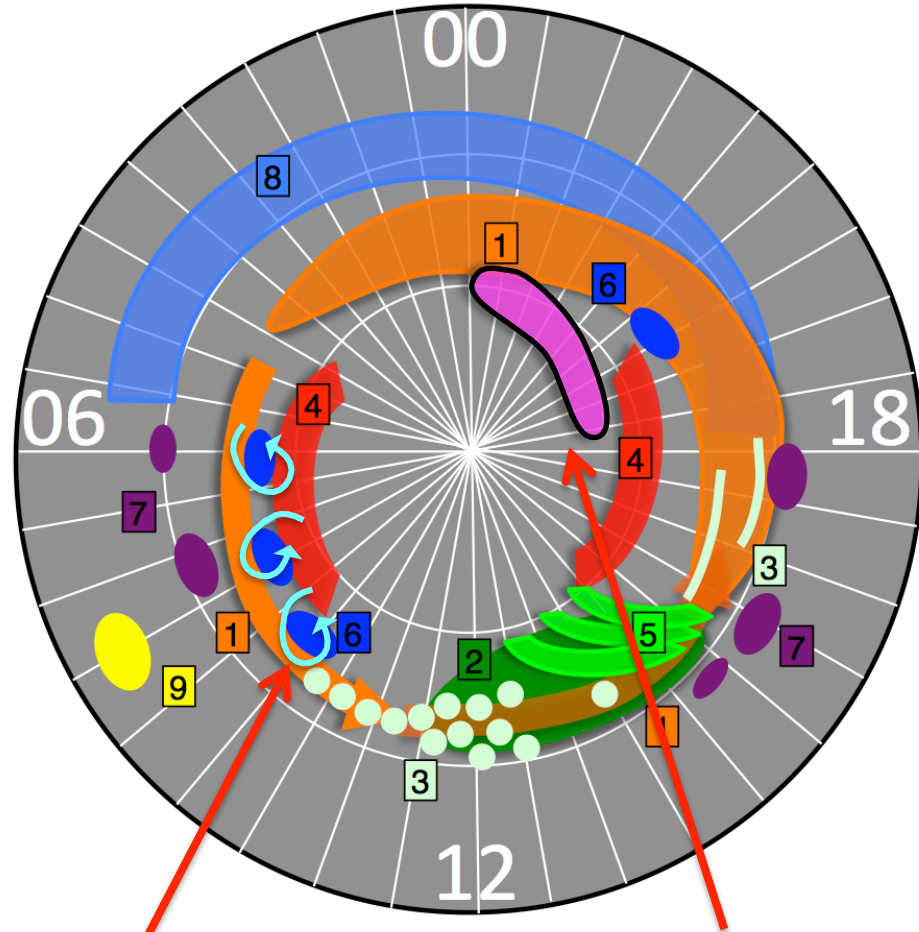
Jupiter

Update

Saturn

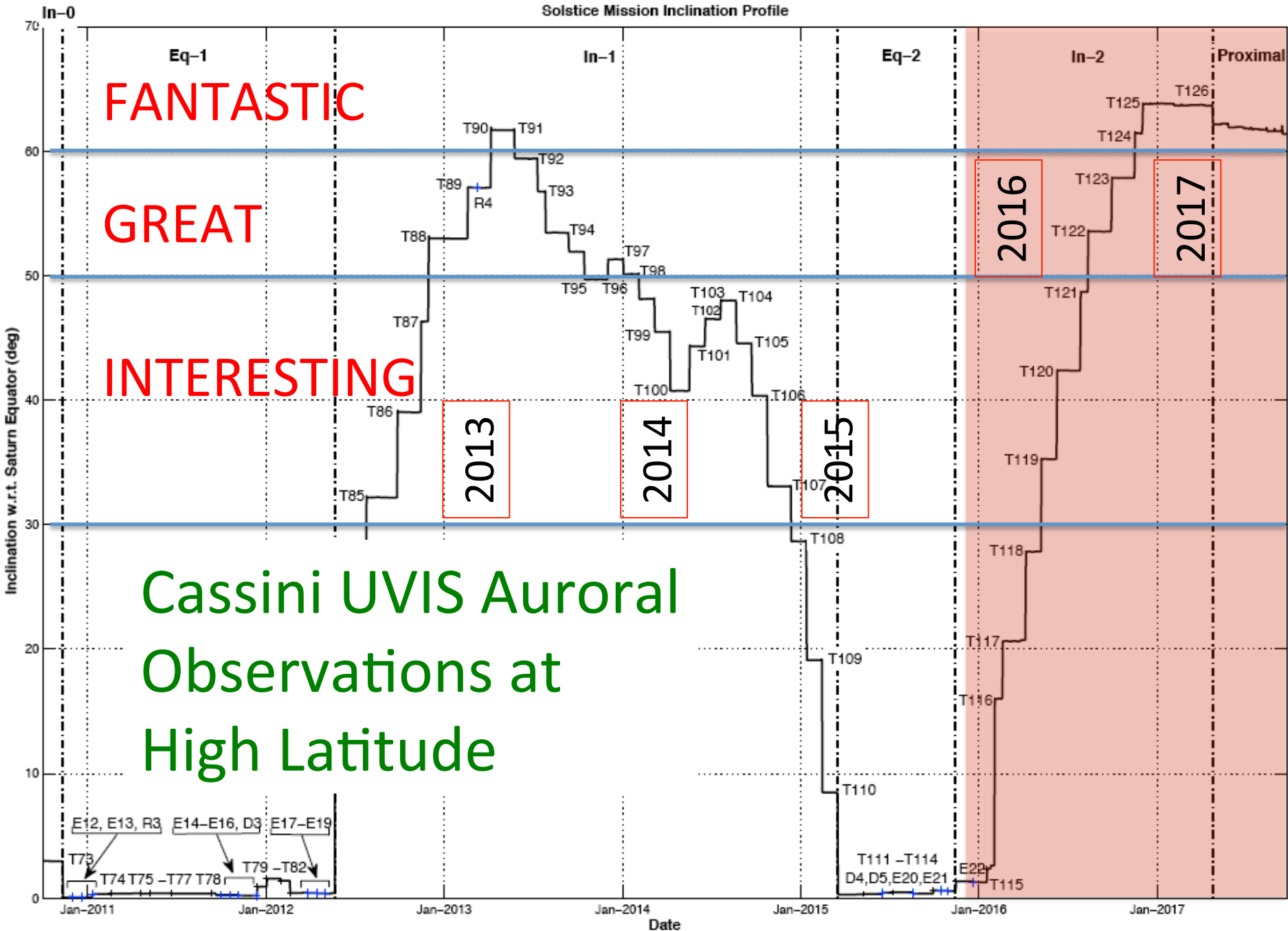


Palmaerts et al. (2014): Transient localized auroral enhancement (few 10s min). Inward plasma flow near noon (Galileo obs. + MHD sim., SW trig.). Strong ∇B_z



Radioti et al. (2014): Rare polar arc, Dungey recon. (flux closure), ~~Vasyliunas recon., dayside recon.~~

Radioti et al. (subm.): large scale vortices. Field line deformation from msph to ionsph?



Exercise by UVIS Team A. Jouchoux, W. Pryor

⇒ NOTHING IMPLEMENTED YET!

Tested 4 realistic auroral cases:

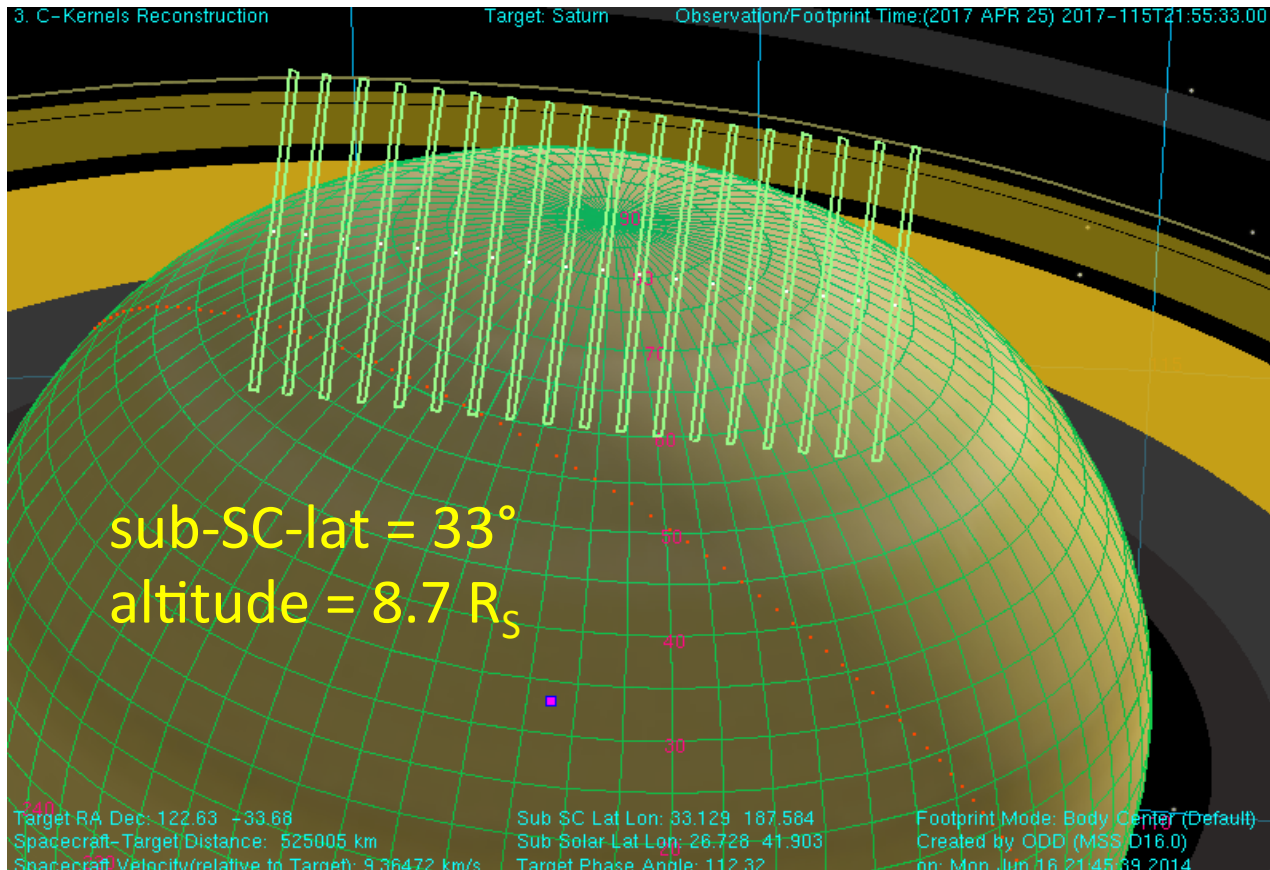
- assumed that aurora covers 65-90 deg of latitude.
- use all 64 spatial pixels (instead of 32).
- use a scan rate of 0.12 mrd/sec (instead of 0.06 mrd/sec).

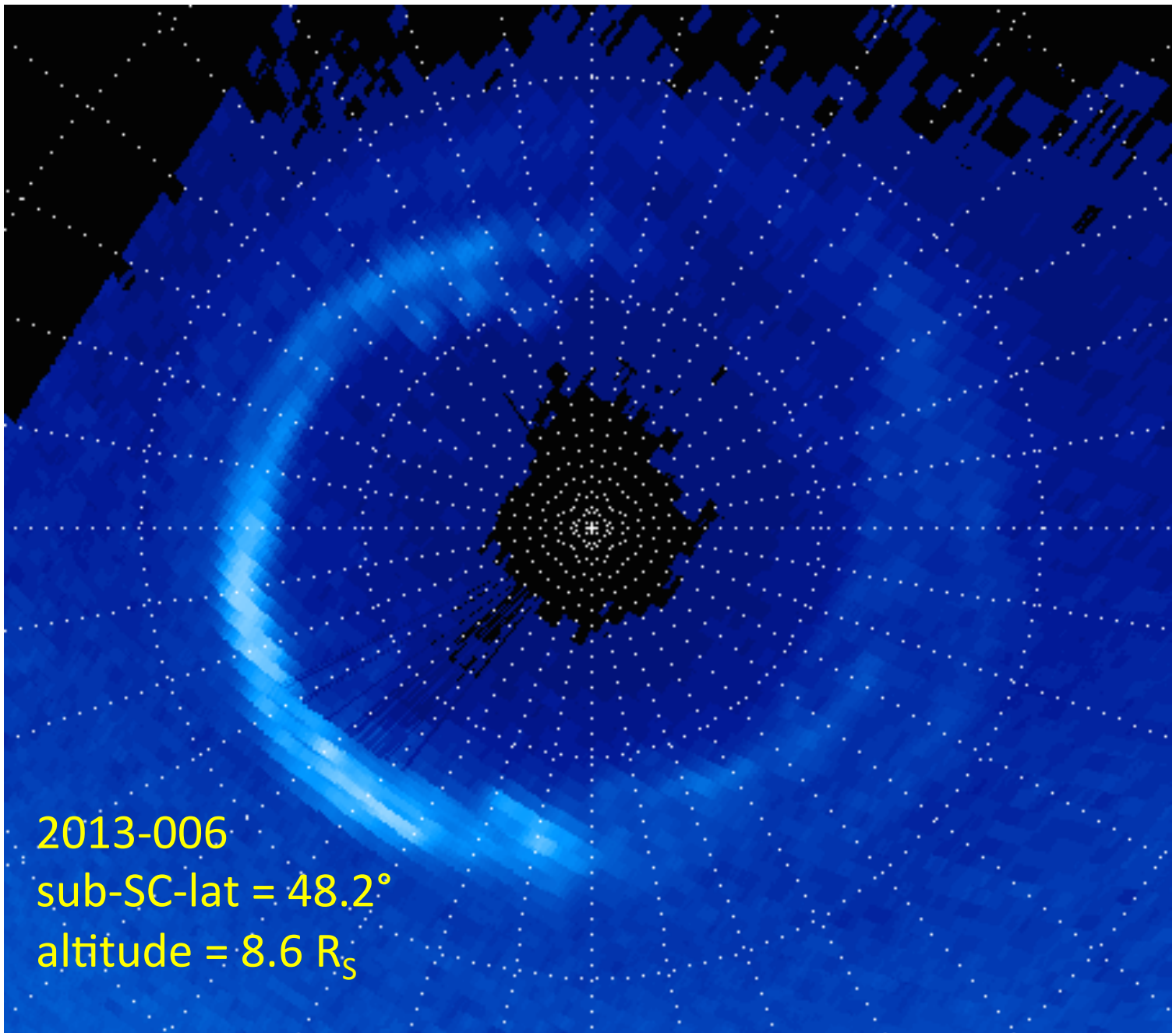
-Y Sun avoidance issues
(Southern hemisphere)

		start date
1.	271_NAURSLEW	25 Apr 2017
2.	271_SAURSTARE	26 Apr 2017
3.	275_NAURSLEW	21 May 2017
4.	275_SAURSTARE	22 May 2017

UVIS_271_NAURSLEW001_PRIME

First of the five 1*1 scans



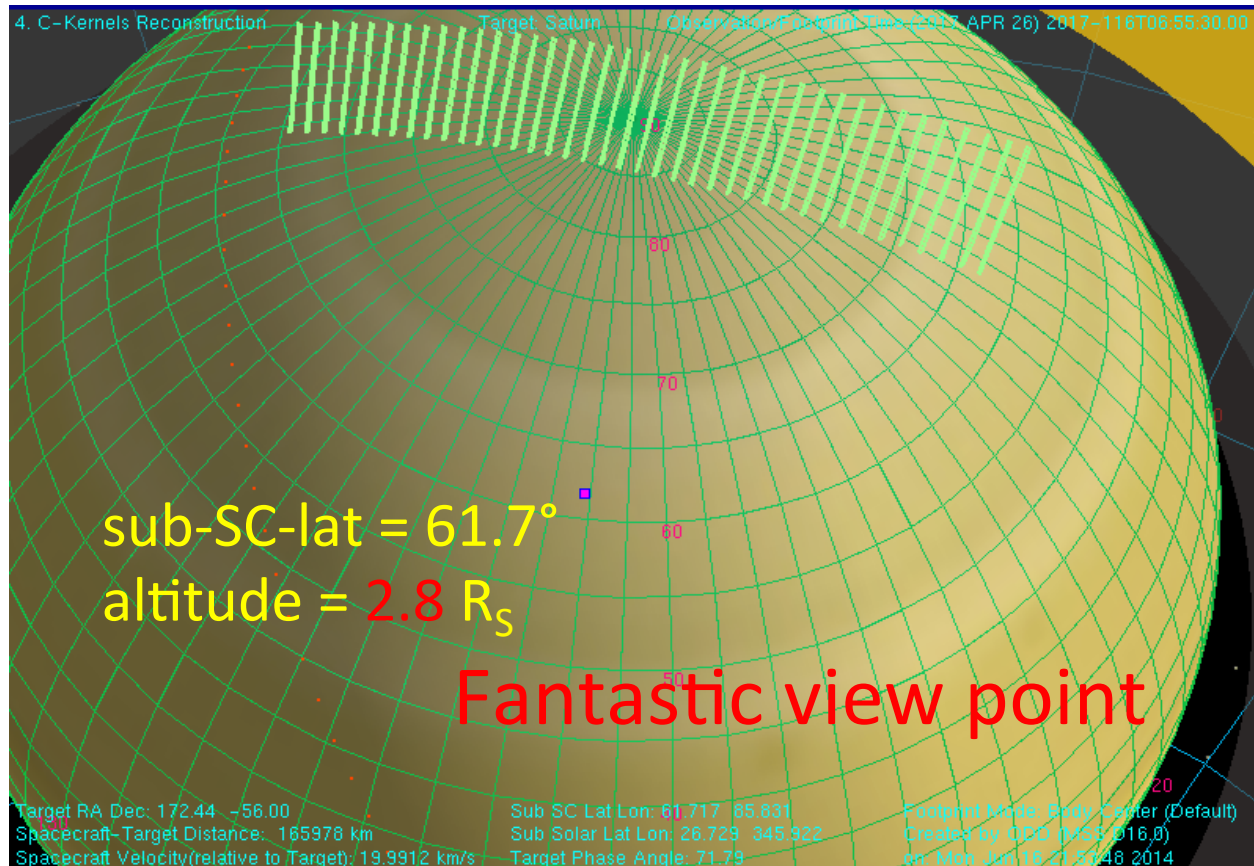


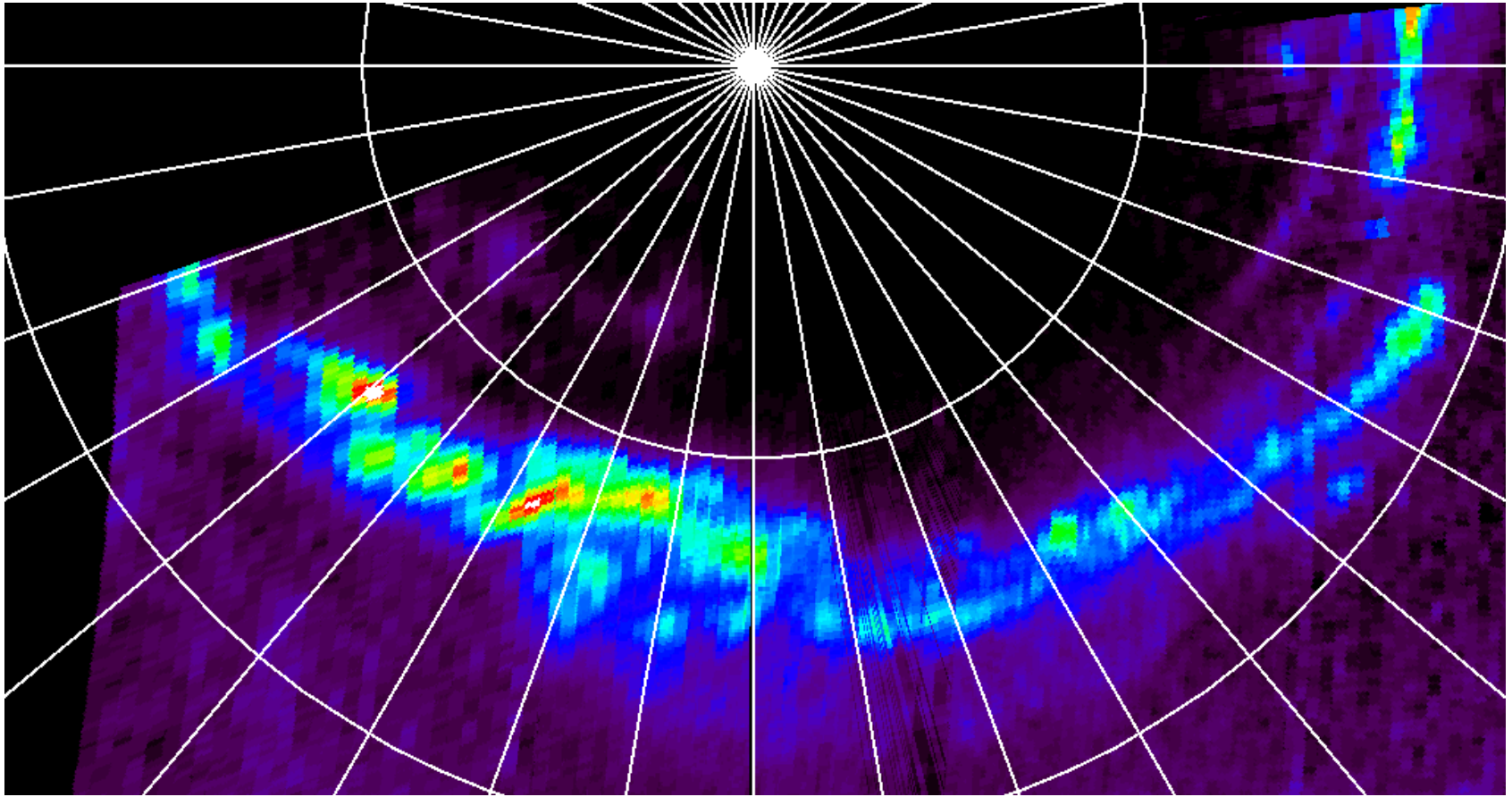
2013-006
sub-SC-lat = 48.2°
altitude = 8.6 R_S

UVIS_271SA_NAURSLEW001_PRIME

9 hours later

The last 1* 1 scan



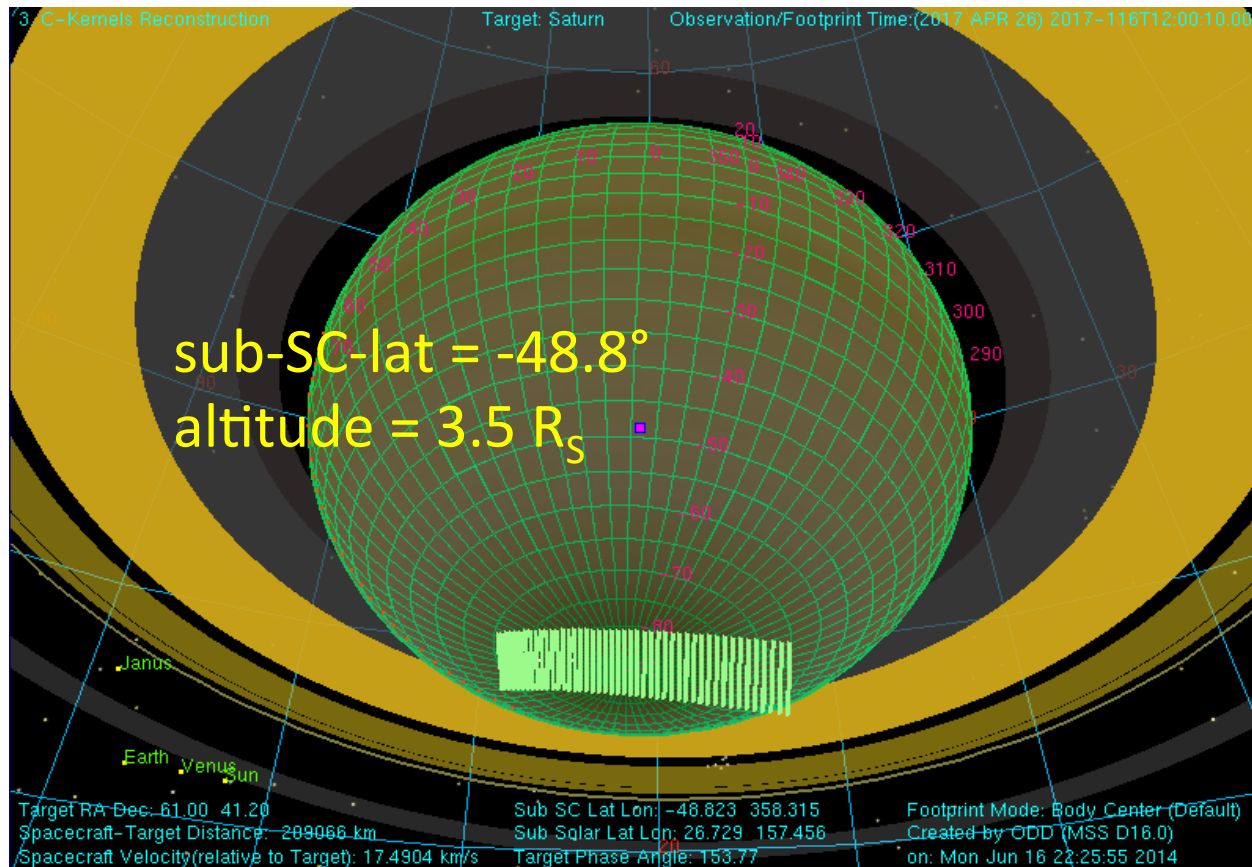


DOY 239 of 2008, North (3*26min)
sub-SC lat.= 62 to 55° SC-alt.= 5 to 4.5 R_S
Spatial resolution ~ 200 km (\sim Jupiter with HST)

At 2.8 R_S , spatial res. ~ 120 km !

UVIS_271SA_SAUURSTARE001_PRIME

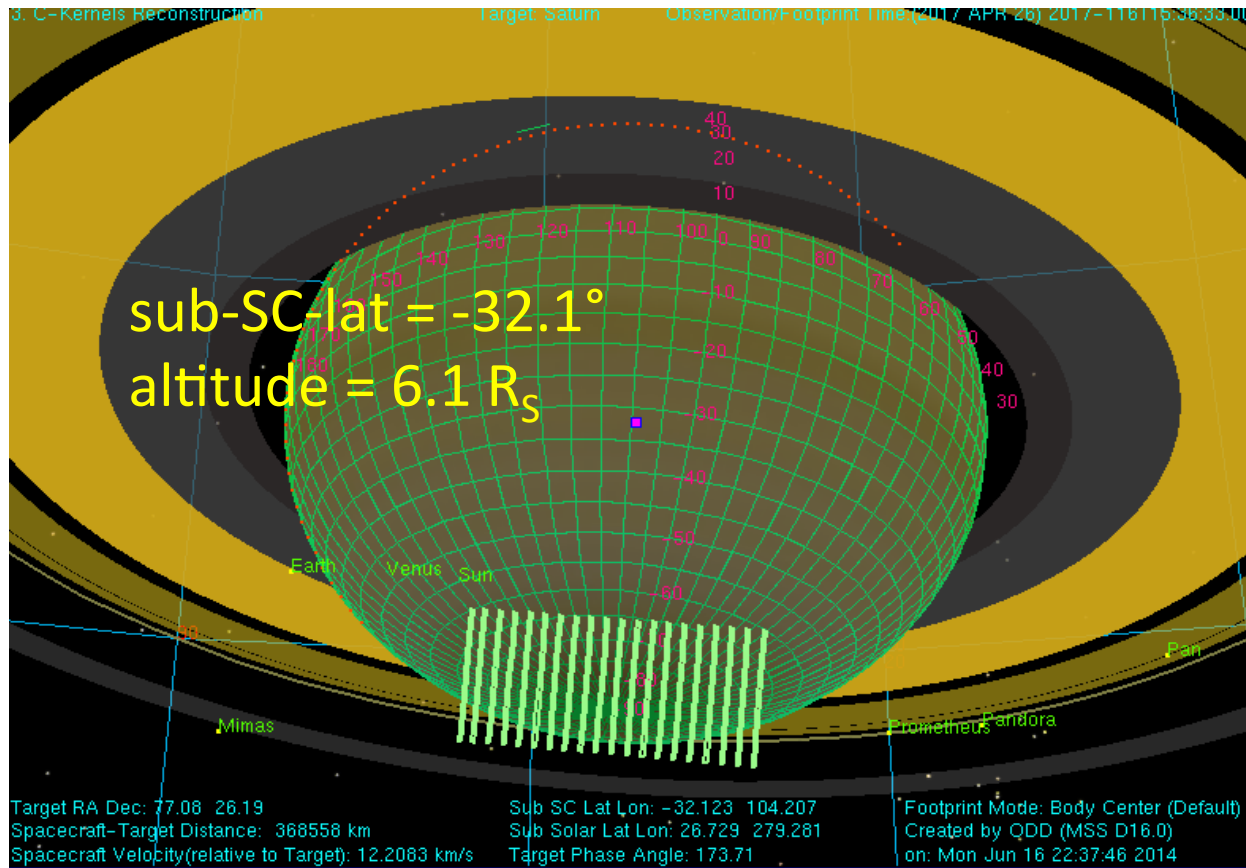
First 1*1 scan

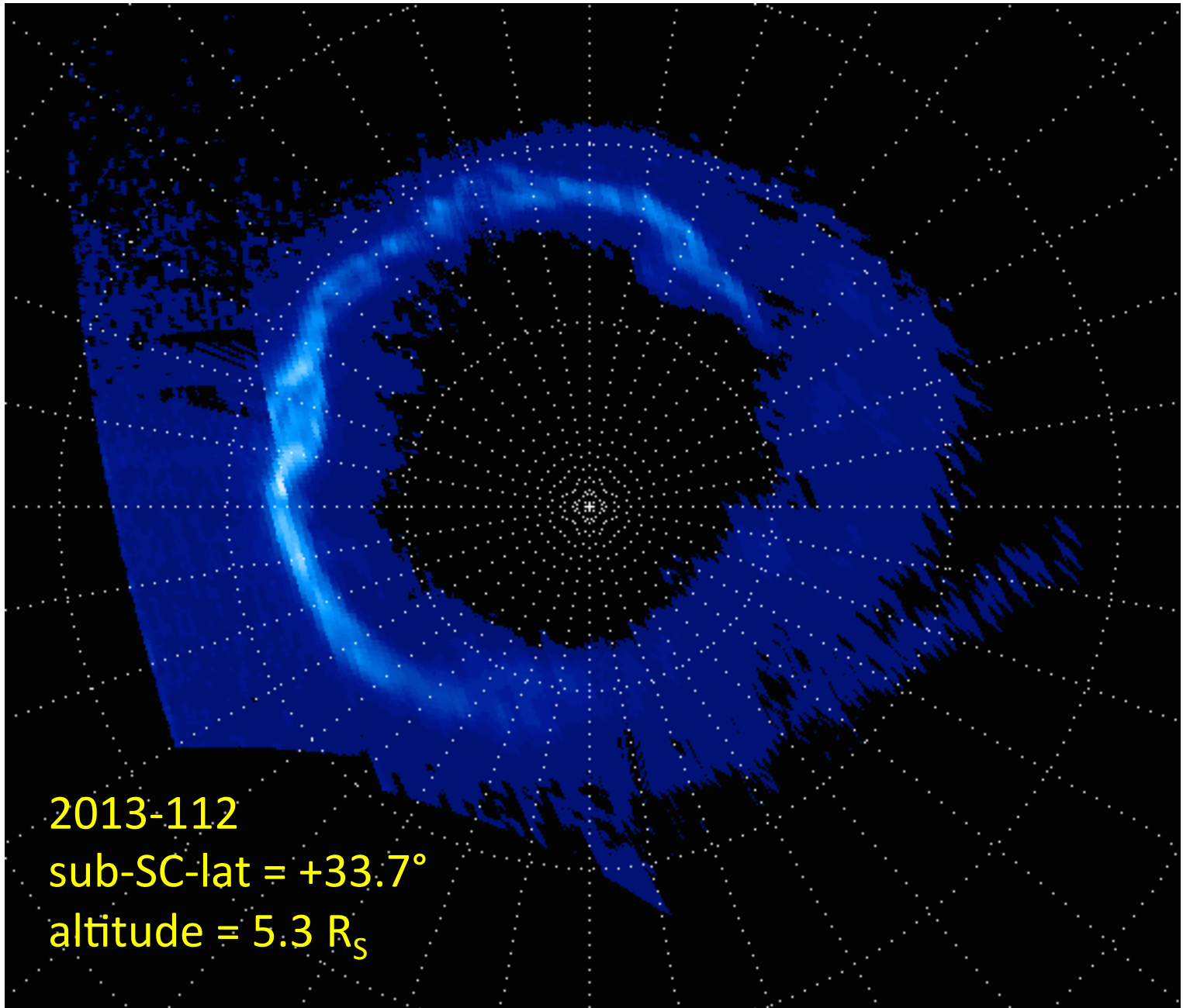


UVIS_271SA_SAUURSTARE001_PRIME

First of the last 4 1*1 scan

3.5 hours later





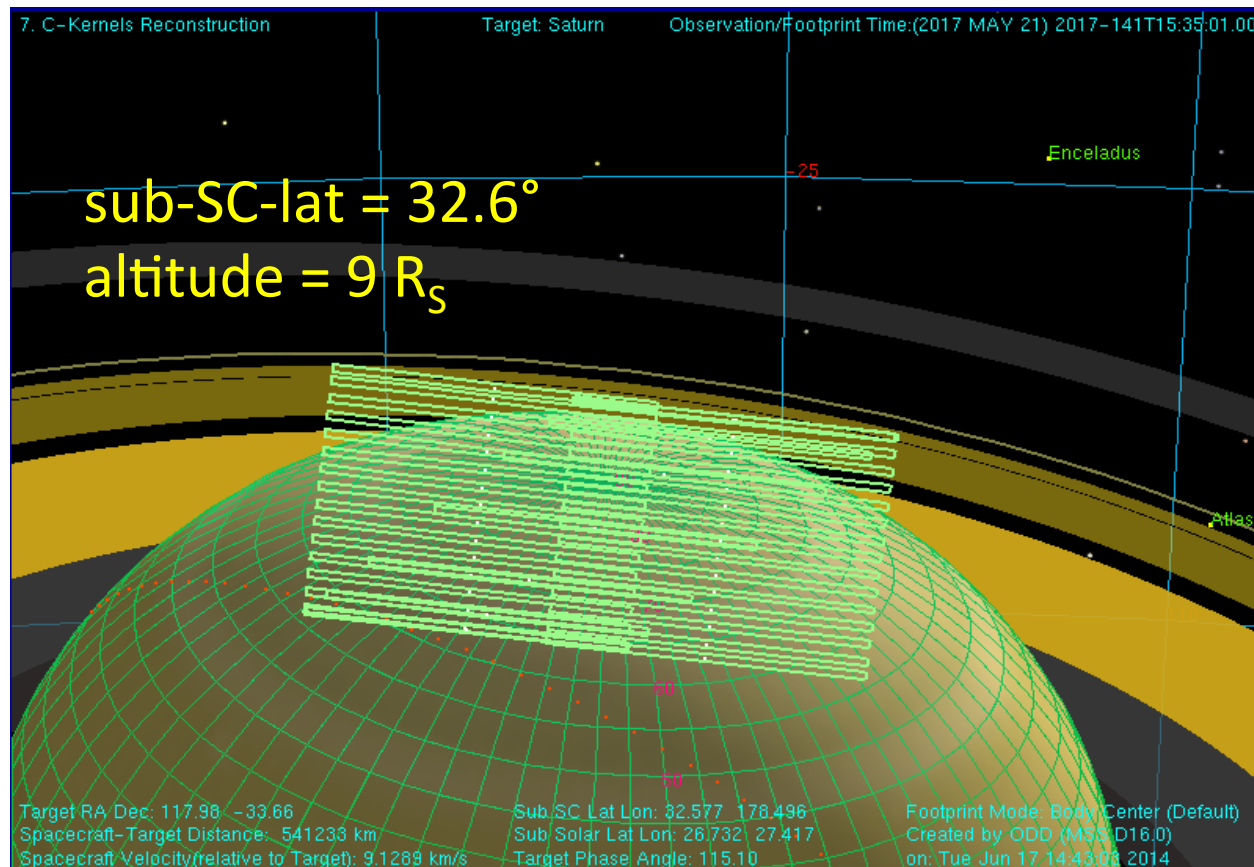
2013-112

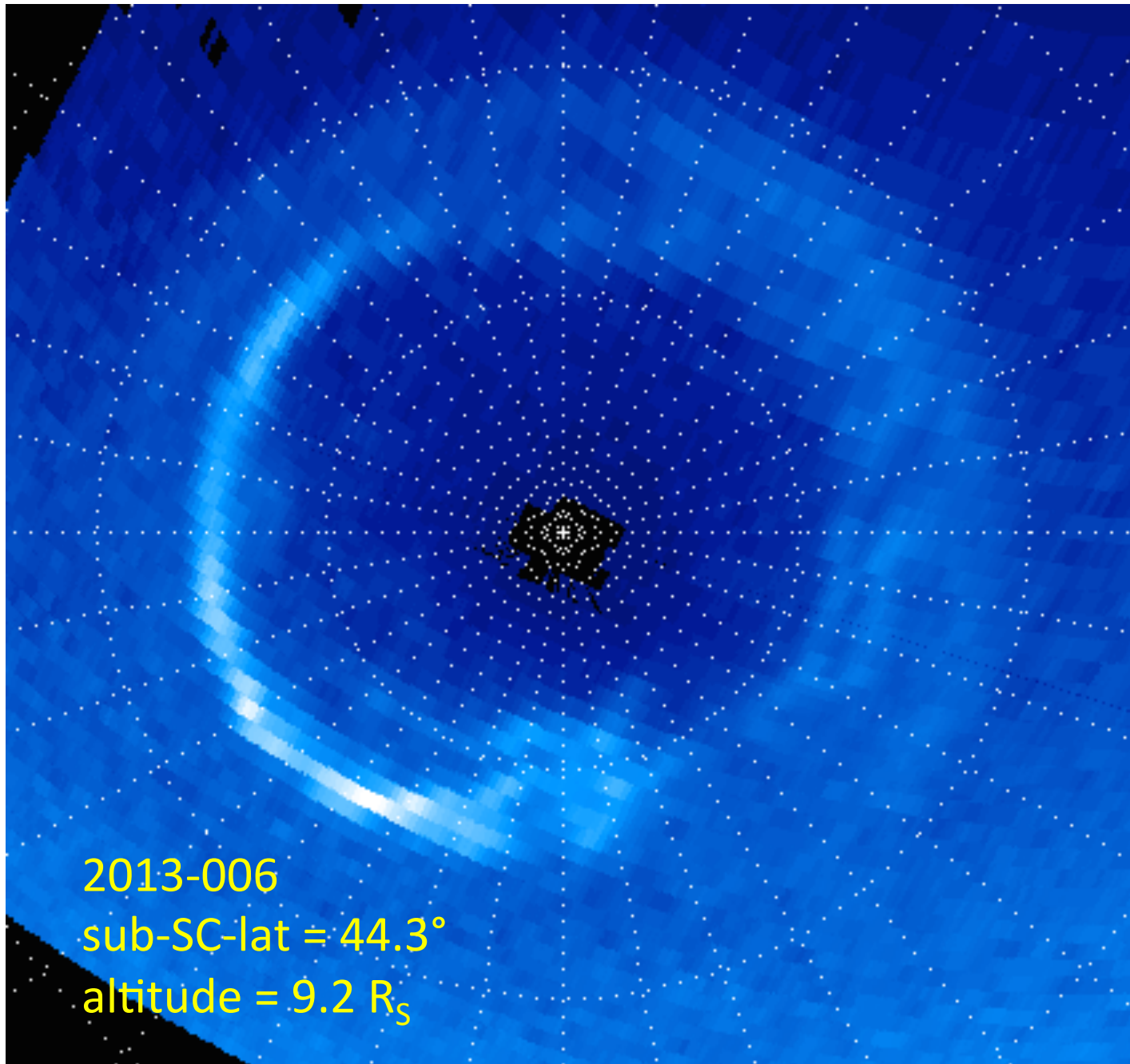
sub-SC-lat = +33.7°

altitude = 5.3 R_s

UVIS_275SA_NAURSLEW001_PRIME

First 1*2 scan



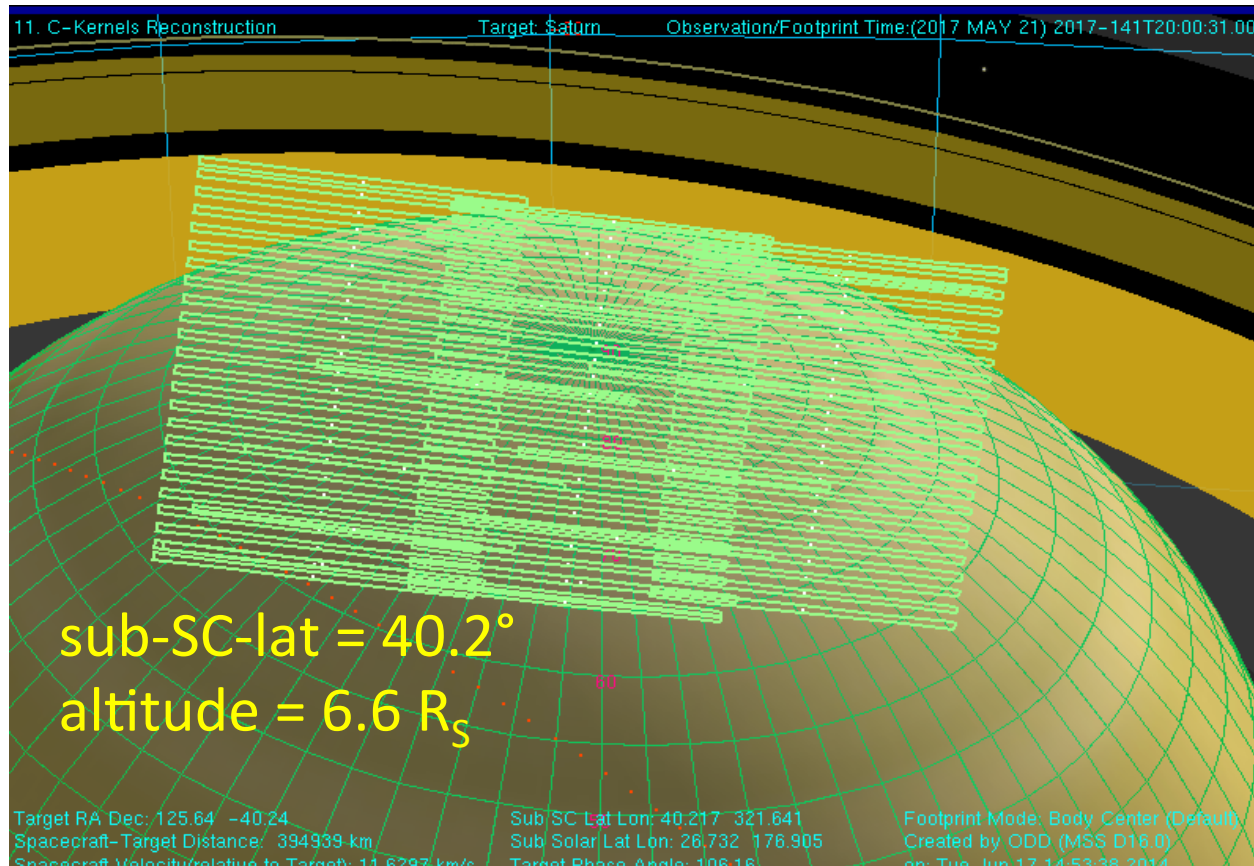


2013-006
sub-SC-lat = 44.3°
altitude = $9.2 R_s$

UVIS_275SA_NAURSLEW001_PRIME

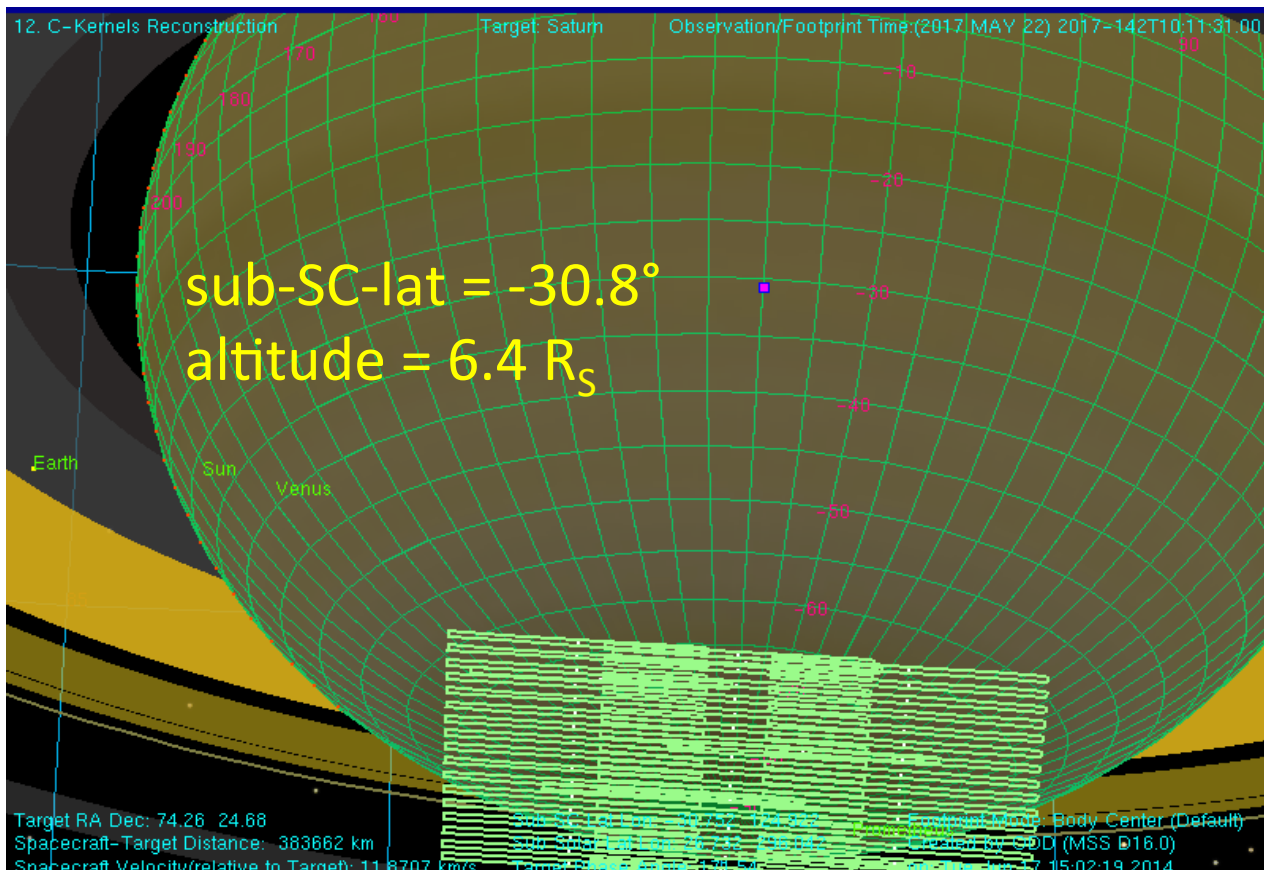
The last 1*3 scan

4.5 hours later

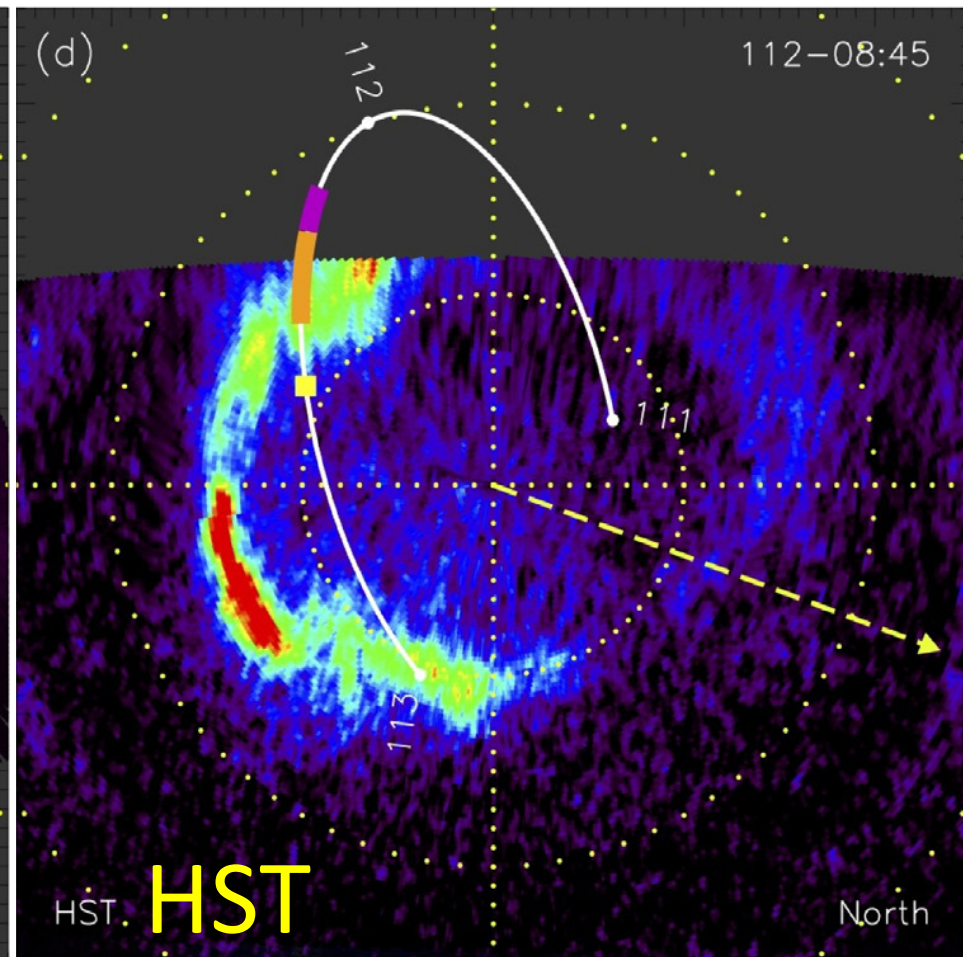
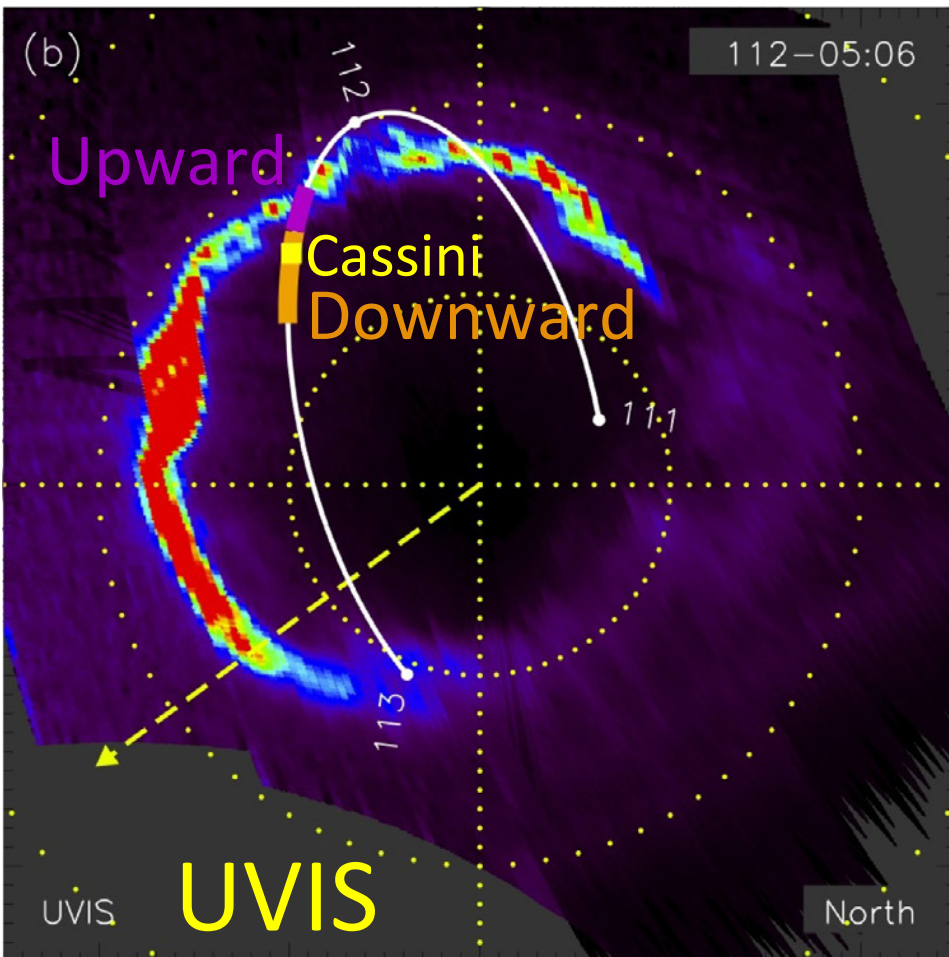


UVIS_275SA_SAURSTARE001_PRIME

The 1*3 scan



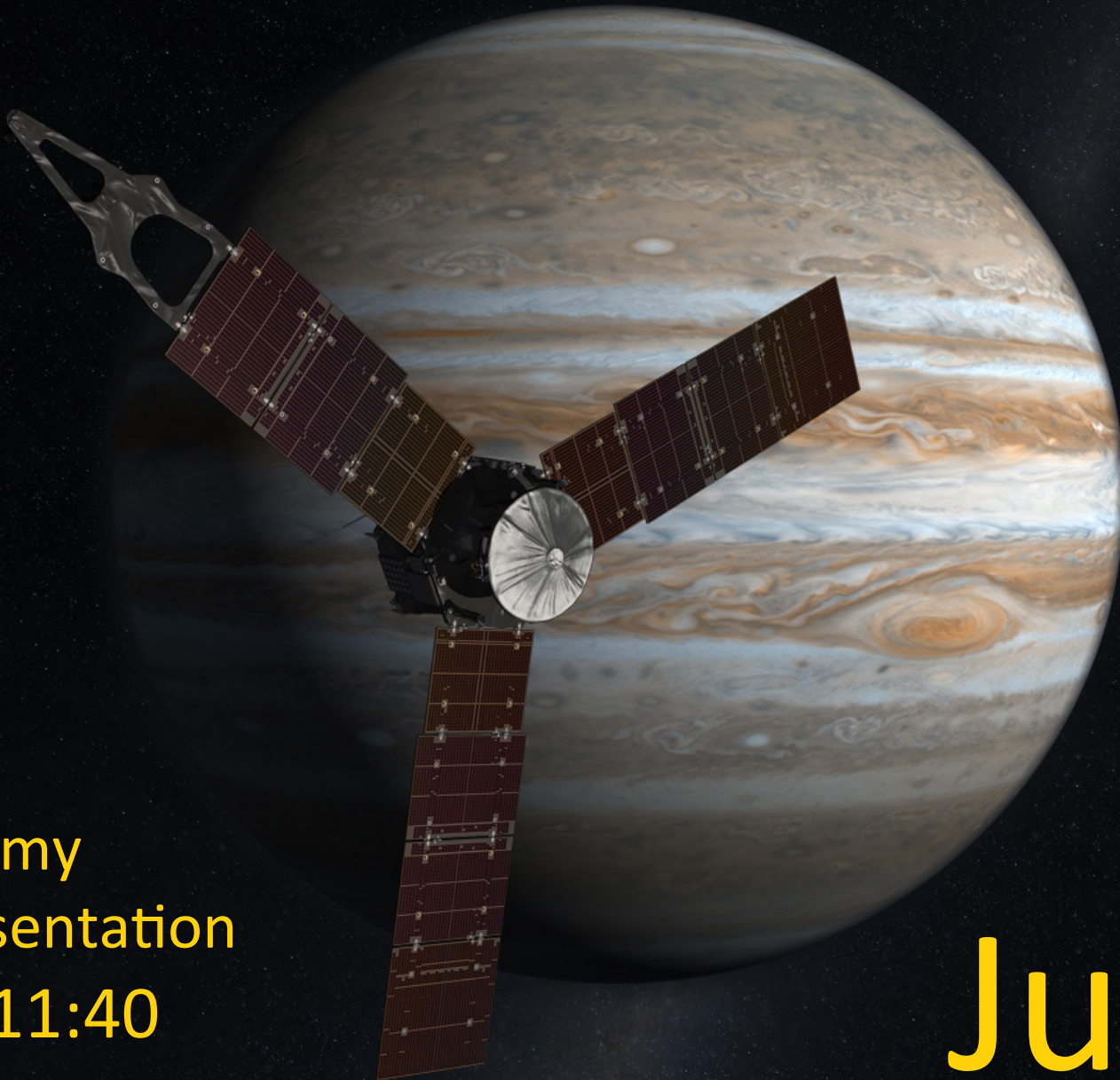
Remote + in situ observations



2013 HST – Cassini **Coordinated** observations

Badman et al., 2014 (in press)

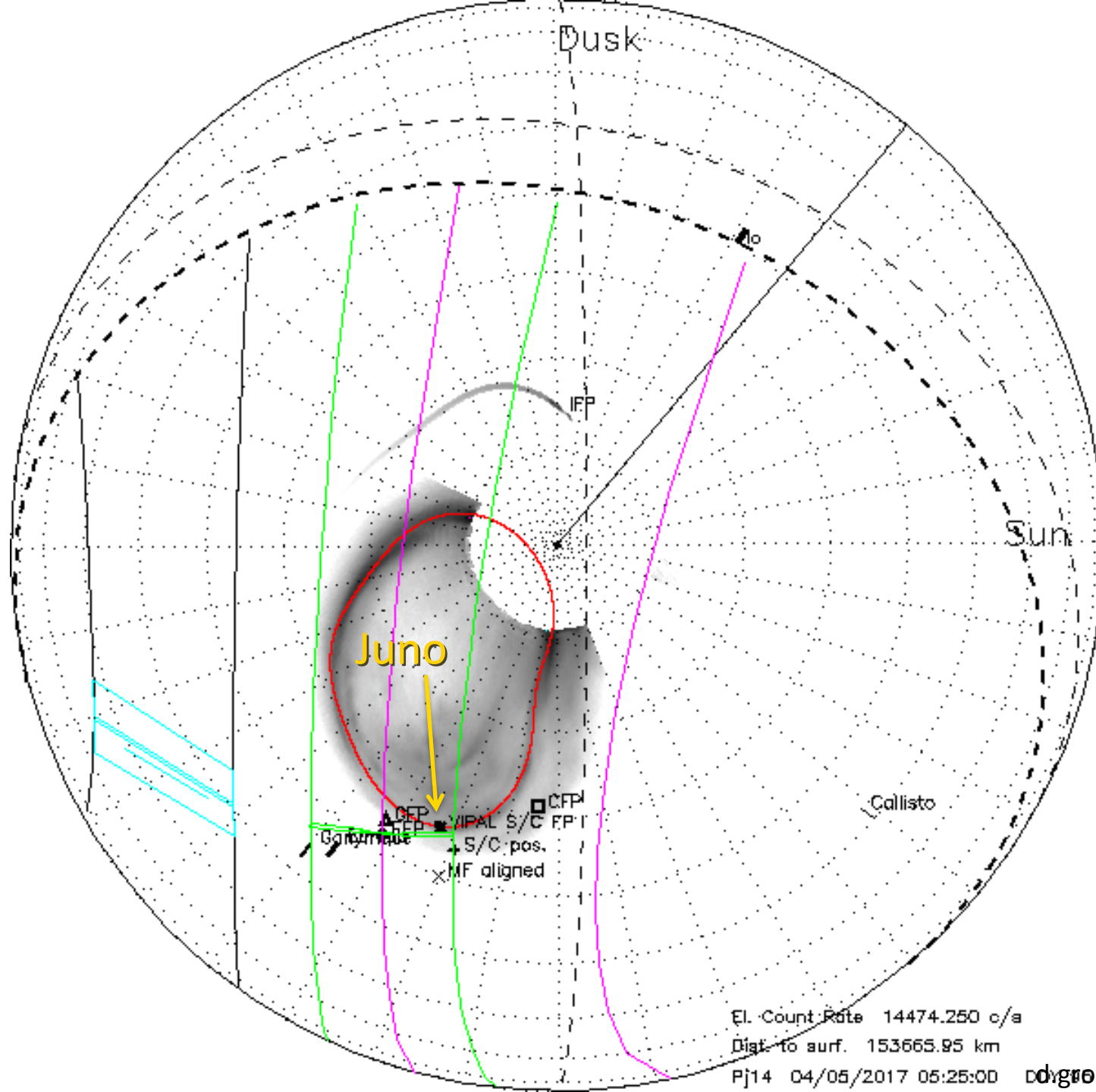
d.grodent@ulg.ac.be



see my
presentation
Tu 11:40

Juno

d.grodent@ulg.ac.be



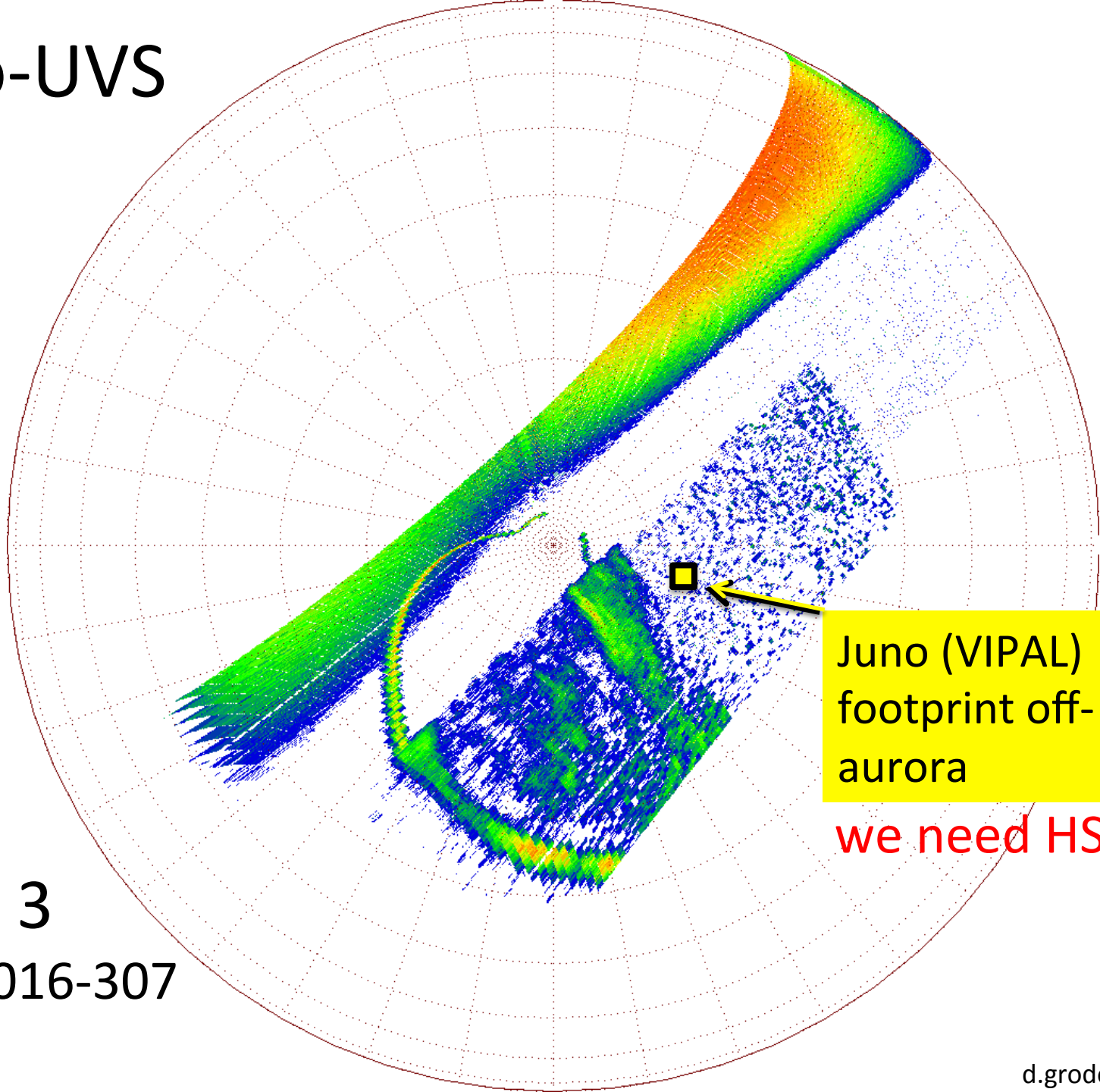
El. Count Rate 14474.250 c/a

Dist. to surf. 153665.95 km

Pj14 04/05/2017 05:25:00

dyg@student@ulg.ac.be

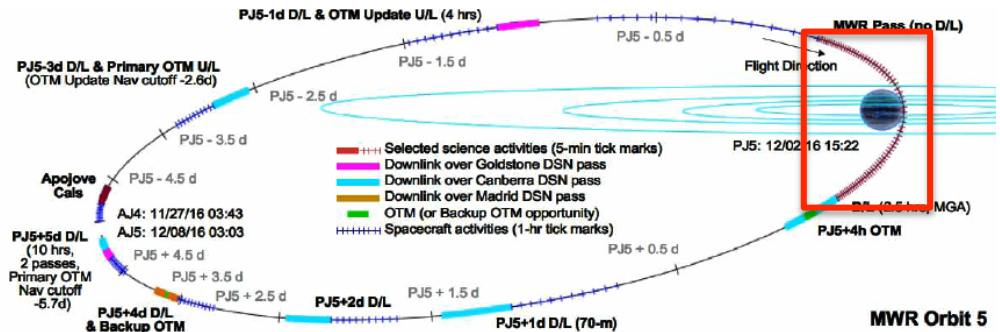
Juno-UVS obs.



Juno (VIPAL)
footprint off-
aurora

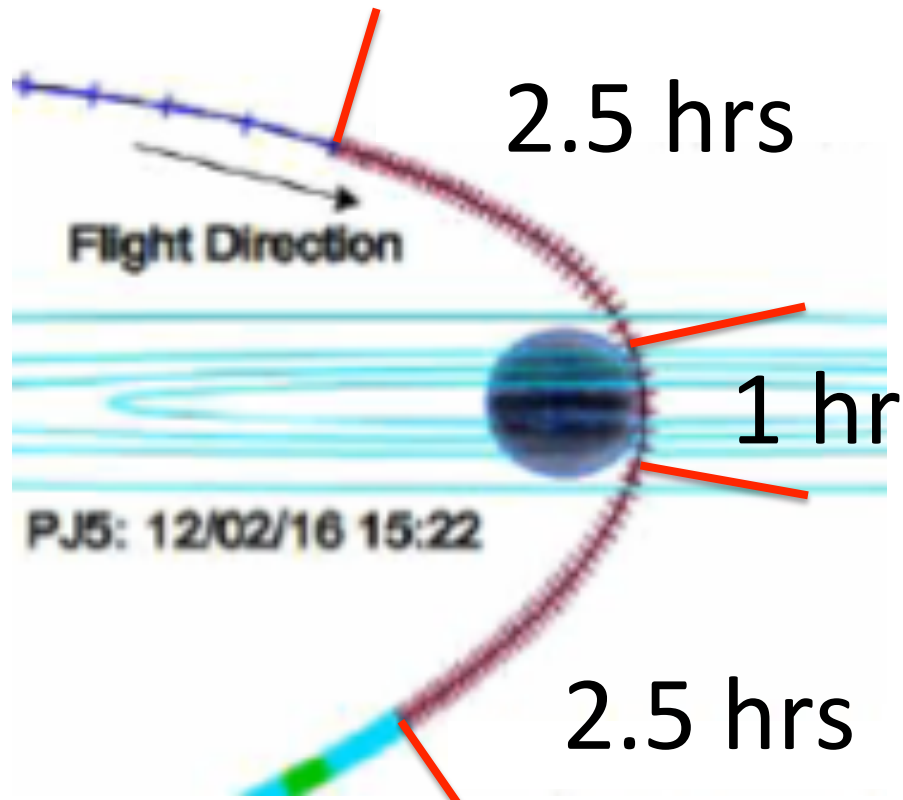
we need HST

Orbit 3
DOY 2016-307
16:23



33 14-Day orbits

UVS segment = ~6 hours



UVS observes < 2% of orbit

we need HST for the rest (> 98%) of the time

Grodent et al., 2015
HST White Paper (ArXiv)

Large HST proposal during cycles 24 and 25 in support of Juno

The crucial role of HST during the NASA Juno mission:
a “Juno initiative”

*Paper submitted to the Space Telescope Science Institute in response to the call for HST White
Papers for Hubble’s 2020 Vision*

March 4, 2015

Grodent, D.¹, B. Bonfond¹, J.-C. Gérard¹, G. R. Gladstone², J. D. Nichols³, J. T. Clarke⁴,
F. Bagenal⁵, A. Adriani⁶

"it is important that an appropriately large number of HST
orbits are put aside to support these missions without
jeopardizing other solar system proposals"

EuroPlanet HST-Juno workshop?

