



The Ionospheric Connection Explorer

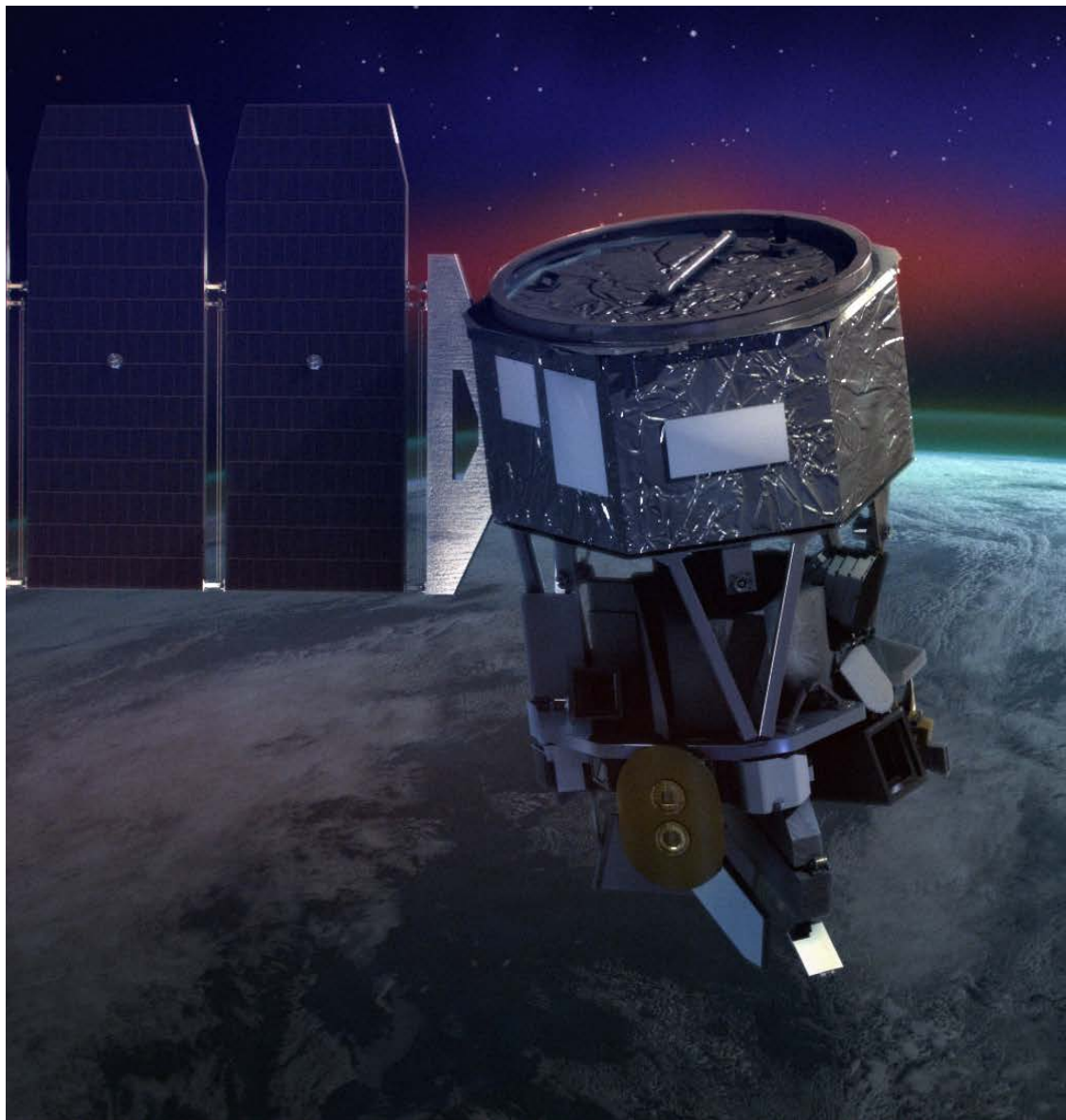
Thomas Immel

Exploring the Geospace Frontier: Quo Vadis?



Purpose

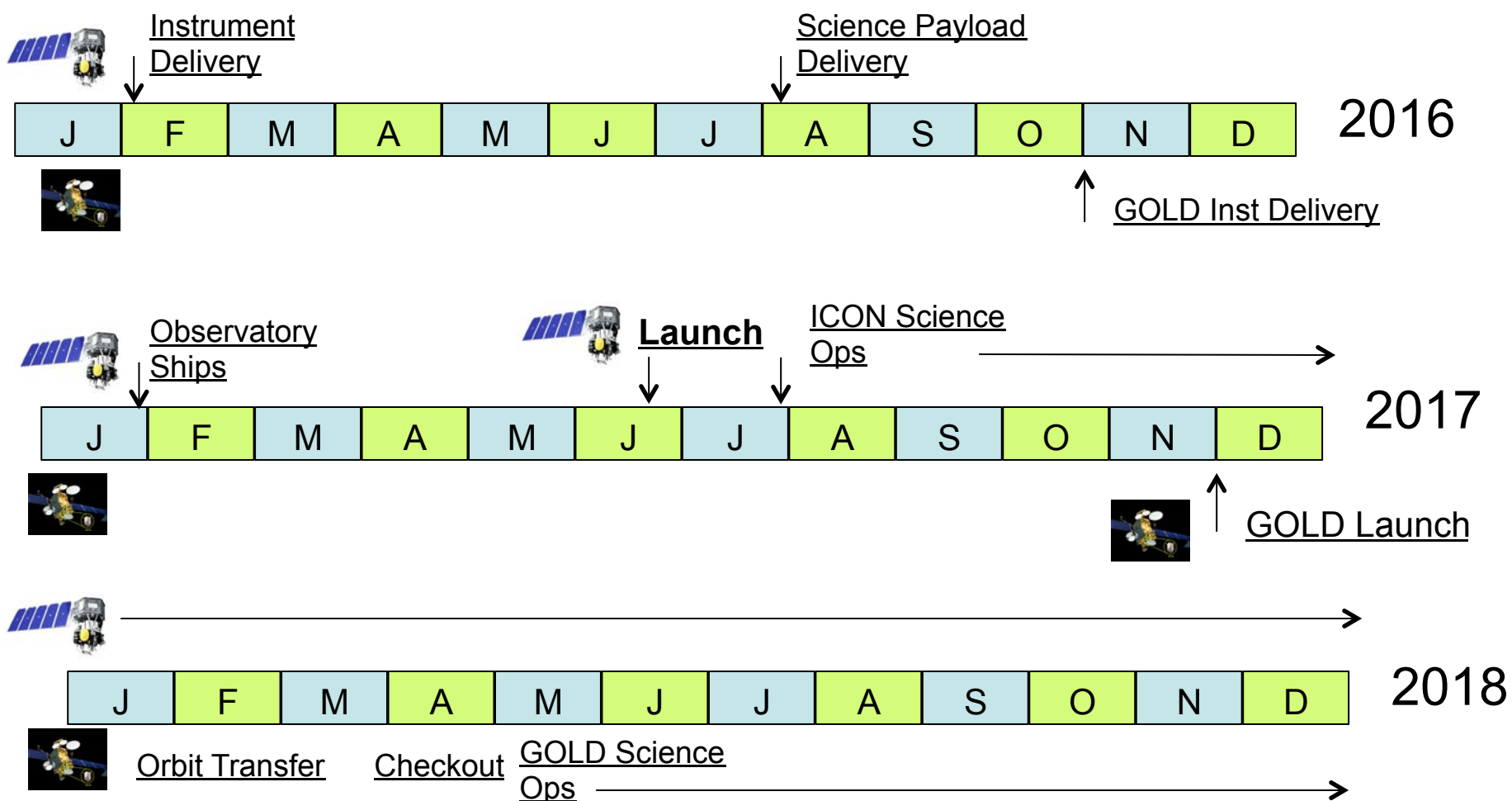
- ICON will address its own focused science objectives that address part of the Decadal Survey's Key Science Goal 2:
 - *“Determine the dynamics and coupling of Earth’s magnetosphere, ionosphere, and atmosphere and their response to solar and terrestrial inputs.”*
- The ICON, GOLD and COSMIC-2 spacecraft will all launch next year, and provide a unprecedented view of the low-mid latitude ionosphere & thermosphere. There is a remarkable synergy here.
- NSF & other agencies have an opportunity to leverage this capability and enable previously unachievable science investigations.

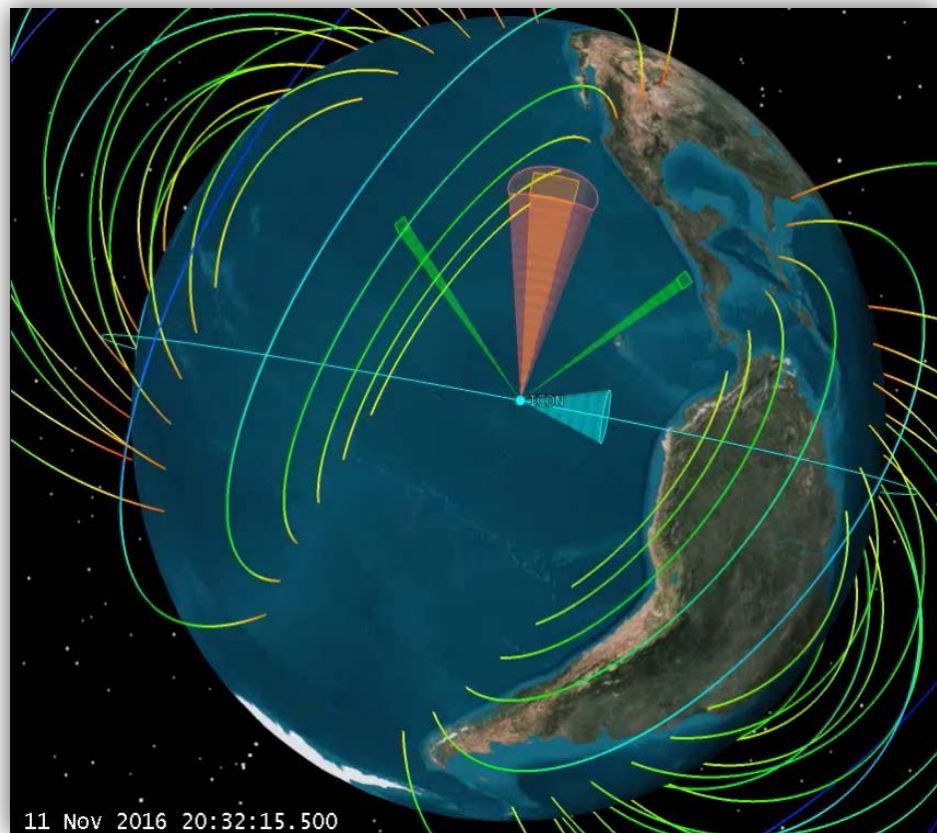


Mission Summary

Launch vehicle	Pegasus XL RTS - Kwajalein
Spacecraft	LEOStar-2, 3-axis stabilized, no consumables
Launch	June 2017
Orbit	575 km circular, 27° inclination
Science Operations	24 months Phase E Operated from UCB
Data Downlink	5 times/day, to Berkeley, Wallops, Santiago

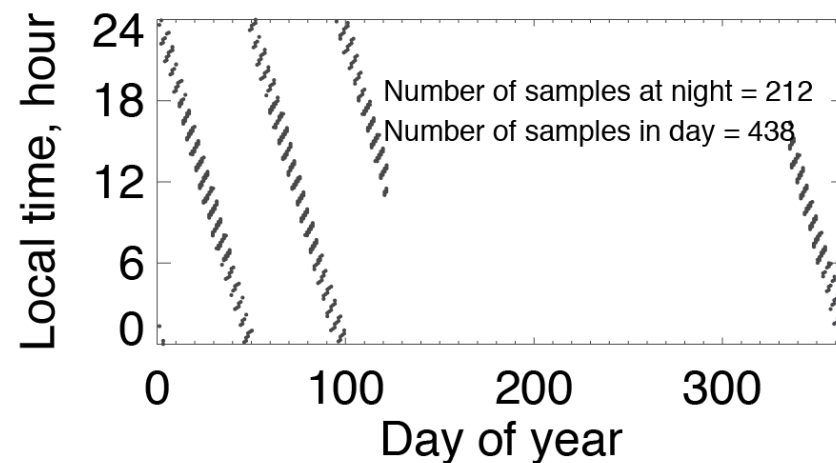
Timeline for ICON and GOLD

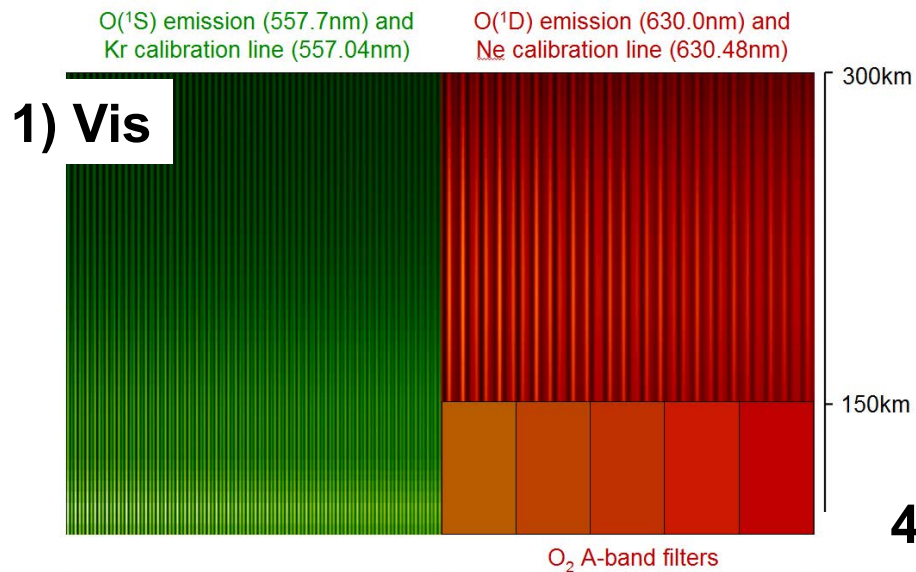




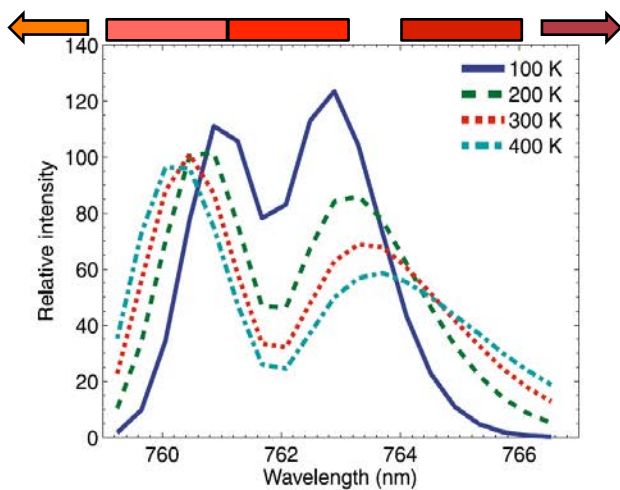
Right: example of ICON sampling at location of Jicamarca over 4 months

- Single orbit track of ICON in nominal observation mode
- Continuous wind, T_n , O^+ profiles, V_i , T_i , daytime O/N_2
- Nighttime UV imaging along magnetic field lines
- Periods of complete conjugate measurements 2x per orbit

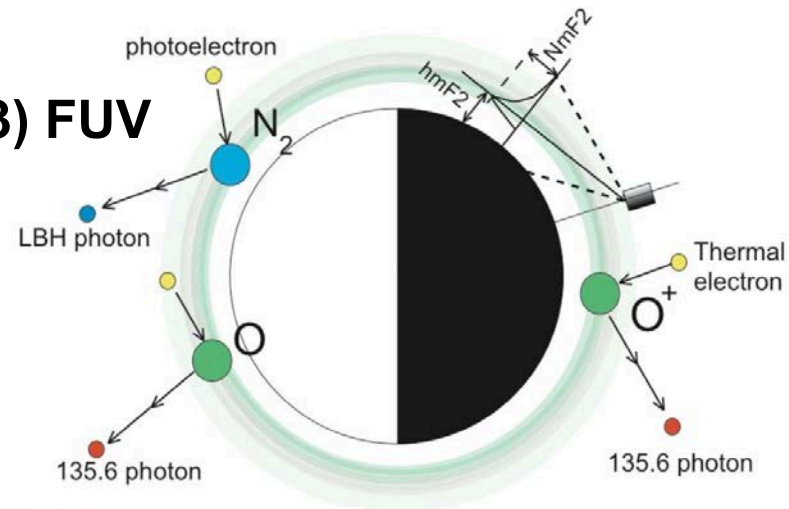




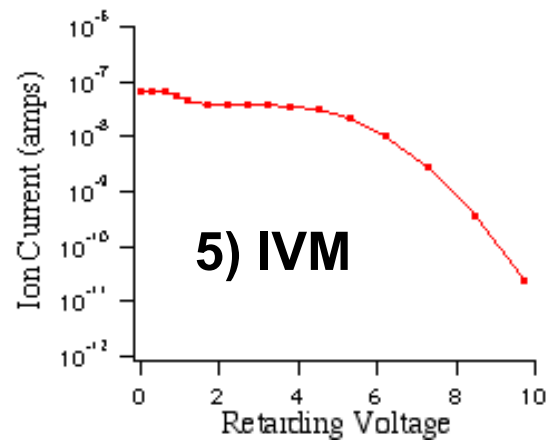
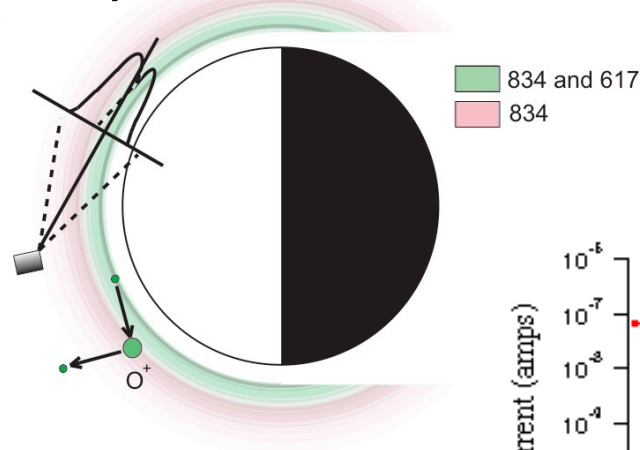
2) IR

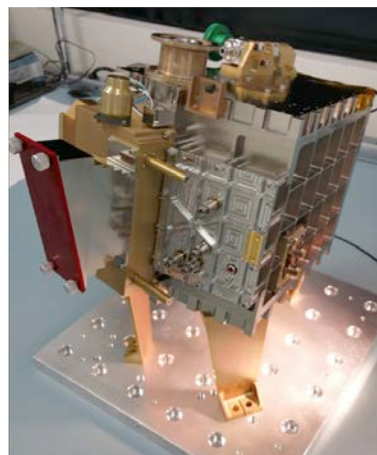
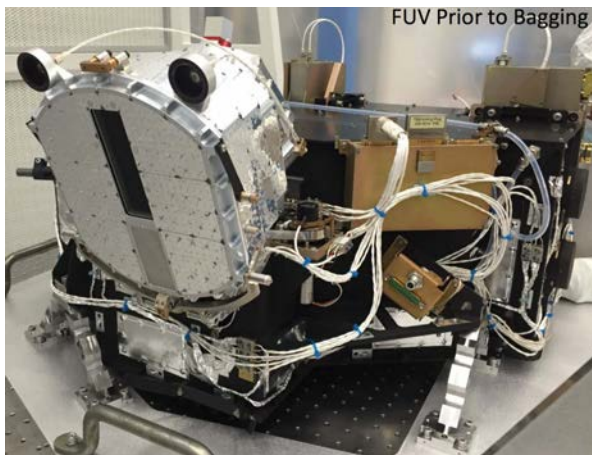
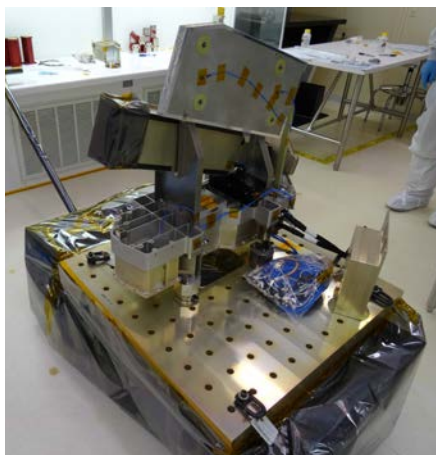


3) FUV



4) EUV



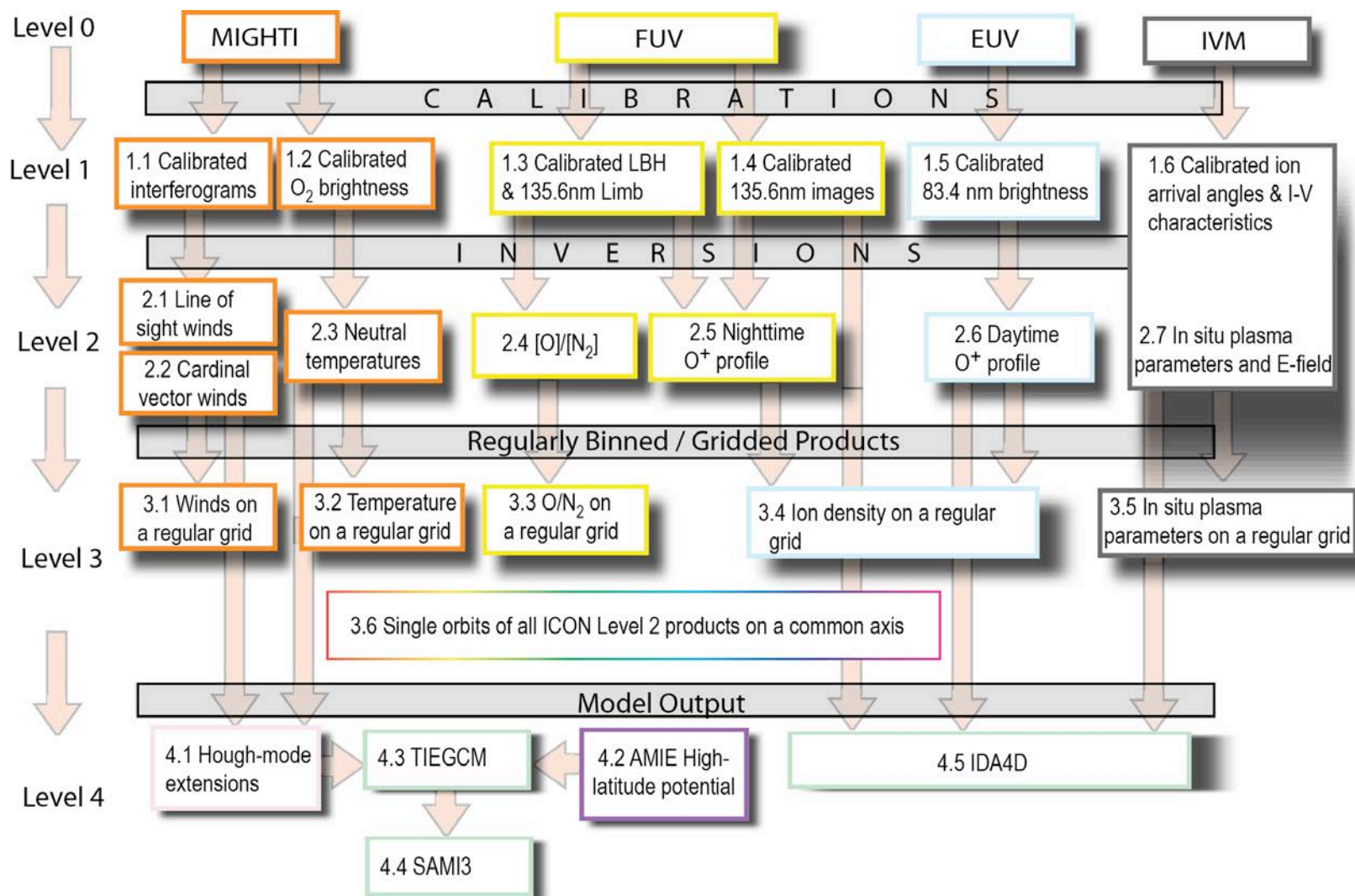


Parameter	$V_n U_n$	T_n	O/N_2	O^+	O^+	$V_i T_i O^+$
Cadence	Day 30s / Night 60s		12s	12s	12s	4s
Alt. Range	Day: 90-300 km Night: 90-105, 200-300 km	90-105 km Day&Night	Column	Sub-limb to 500 km		<i>In situ</i> 575km
Day/Night			Day	Night	Day	Day & Night
Precision	8.7 ms^{-1}	12.2 K	8.7 %	10 % $\pm 10 \text{ km}$	10 % $\pm 20 \text{ km}$	6 ms^{-1}

- High-latitude potential (AMIE)
- MLT tides (HME)

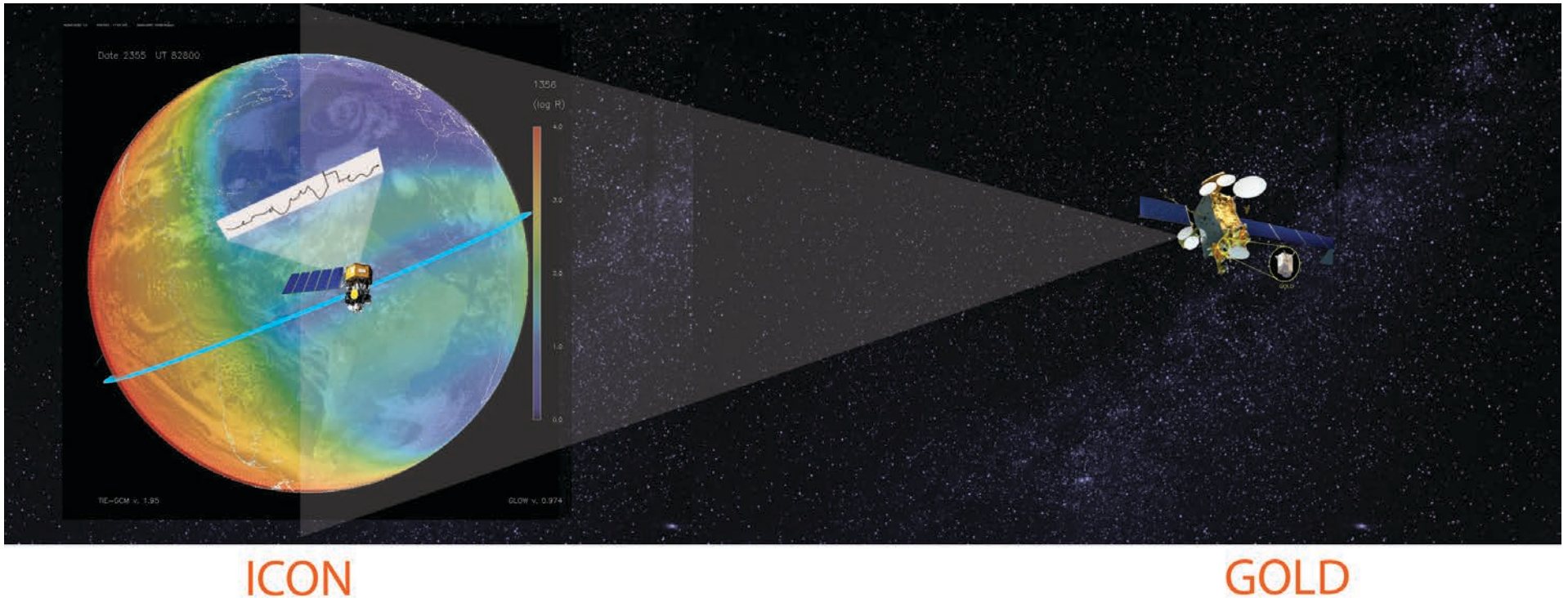
- Data-driven models (TIEGCM, SAMI3)
- Ionospheric Assimilation (IDA4D)

❑ Mission Level Science Requirements are held against Level 2 Data Products



Data – where, when & how

- All ICON & GOLD data products are using netCDF.
- The missions are coordinating and attempting to standardize data files where possible. We are working on a common IDL reader.
- Initial release of calibrated products is no later than 6 months into the science phase (~Fall AGU 2017). All released as soon as calibrated – there is no proprietary period.
- NASA SPDF is your one-stop-shop for all the ICON & GOLD data. In addition, both missions have their own Science Data Centers.



Geostationary view of GOLD compliments the *in situ* / limb view of ICON.

Observations Common to ICON & GOLD:

- Thermospheric temperatures
- Exospheric temperatures
- O/N₂
- Ion density

- icon.ssl.berkeley.edu
- www.nasa.gov/icon
- *Observation and Analysis Opportunities Collaborating with the ICON and GOLD Missions*, September 27-28, 2016, <http://www2.hao.ucar.edu/geogoldicon>
- Fall 2016 AGU Session - *Advances in low-latitude aeronomy from space- and ground-based observations*

