



The CICERO Project

Community Initiative for Continuous Earth Remote Observation

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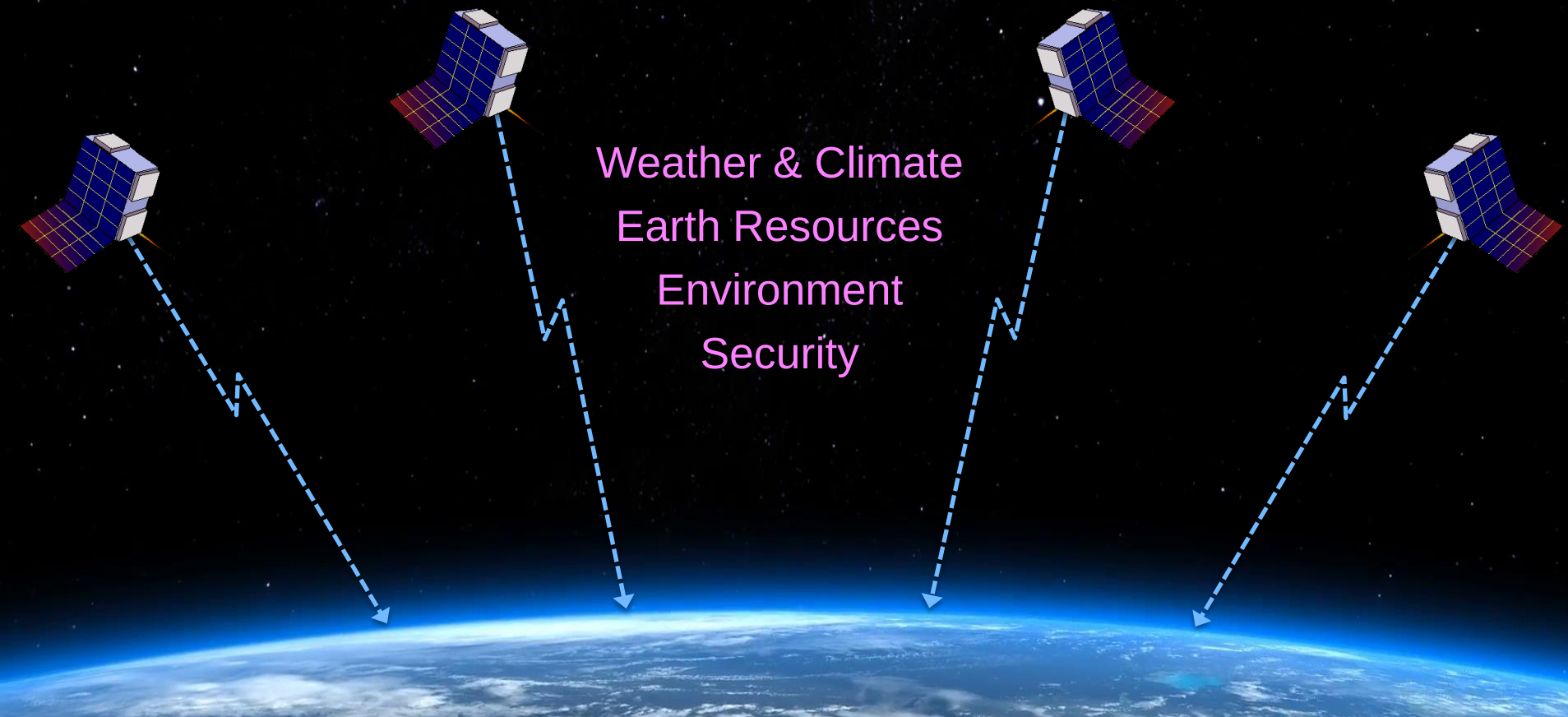


April 4, 2019



Planned CICERO Smallsat Constellation

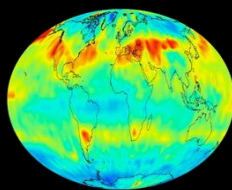
To Collect Diverse Types of Remote Sensing Data



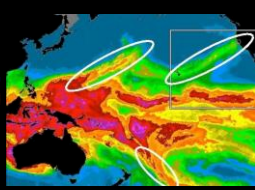
Weather & Climate
Earth Resources
Environment
Security



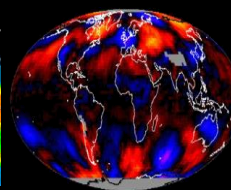
Ocean Circ.



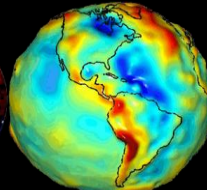
Carbon



Atm. Moisture



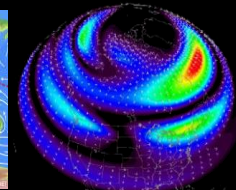
Temperature



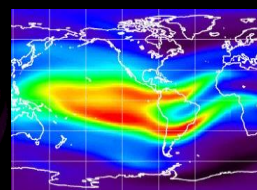
Gravity



Winds



Magnetics

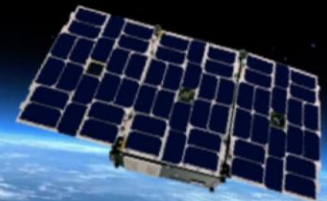
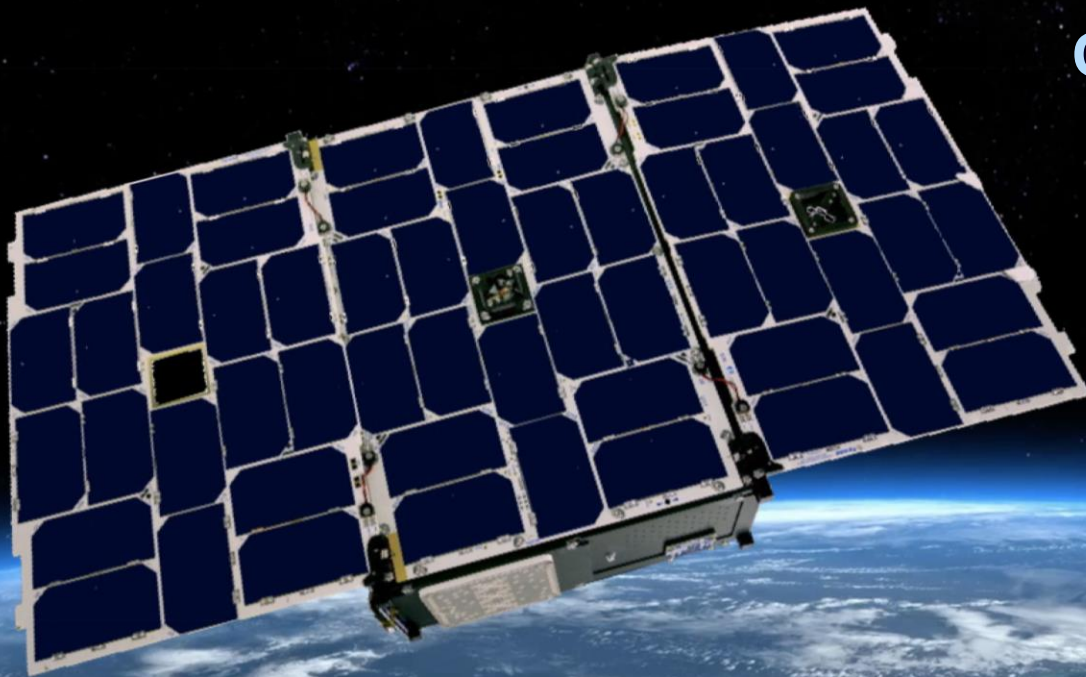


Ionosphere



The CICERO Constellation Today

**GPS / Glonass / Galileo
Radio Occultation**



GNSS Radio Occultation

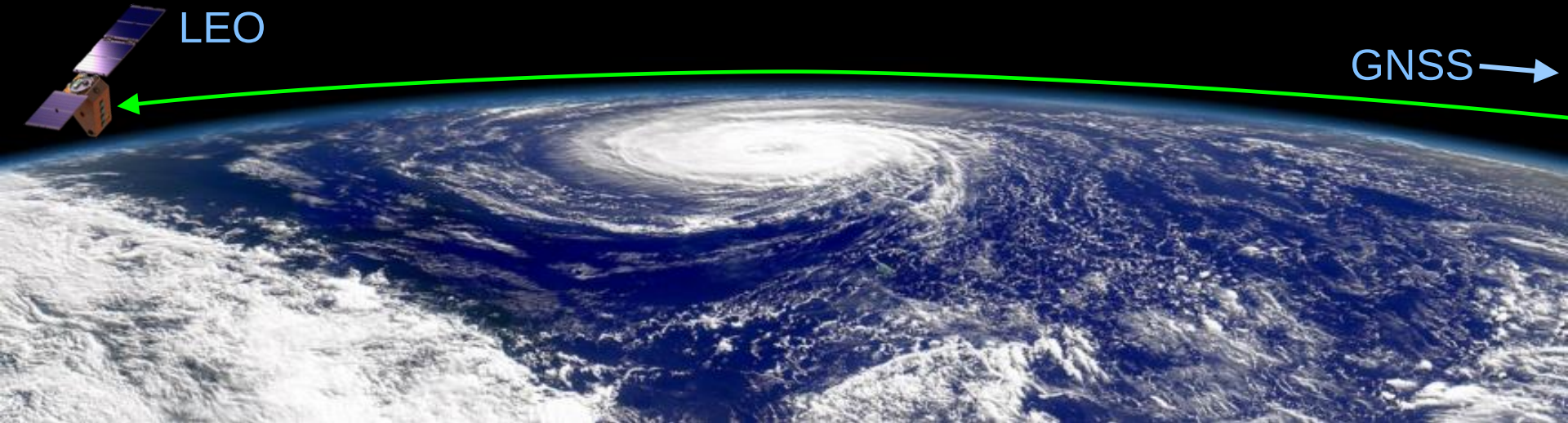


- High resolution profiles of:
 - Bending angle
 - Refractivity
 - Density
 - Pressure
 - Temperature / Moisture
- Geopotential heights
- 3D geostrophic winds
- Global ionospheric imaging

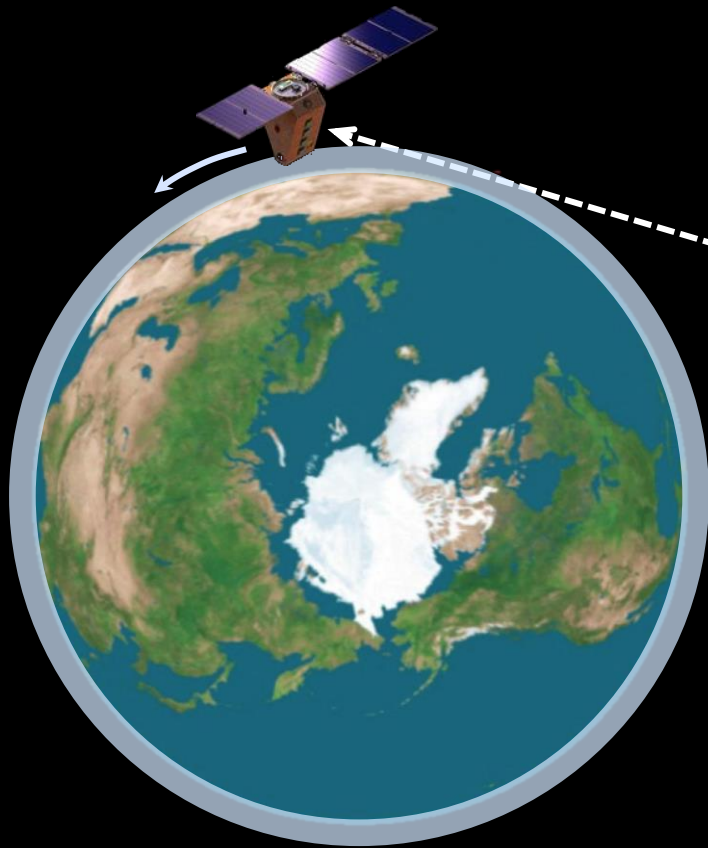
>10x the accuracy & vertical resolution of any other atmospheric remote sensing method



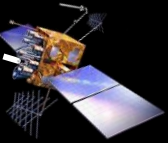
GNSS →



GNSS Radio Occultation



GNSS



Key Mission & Instruments

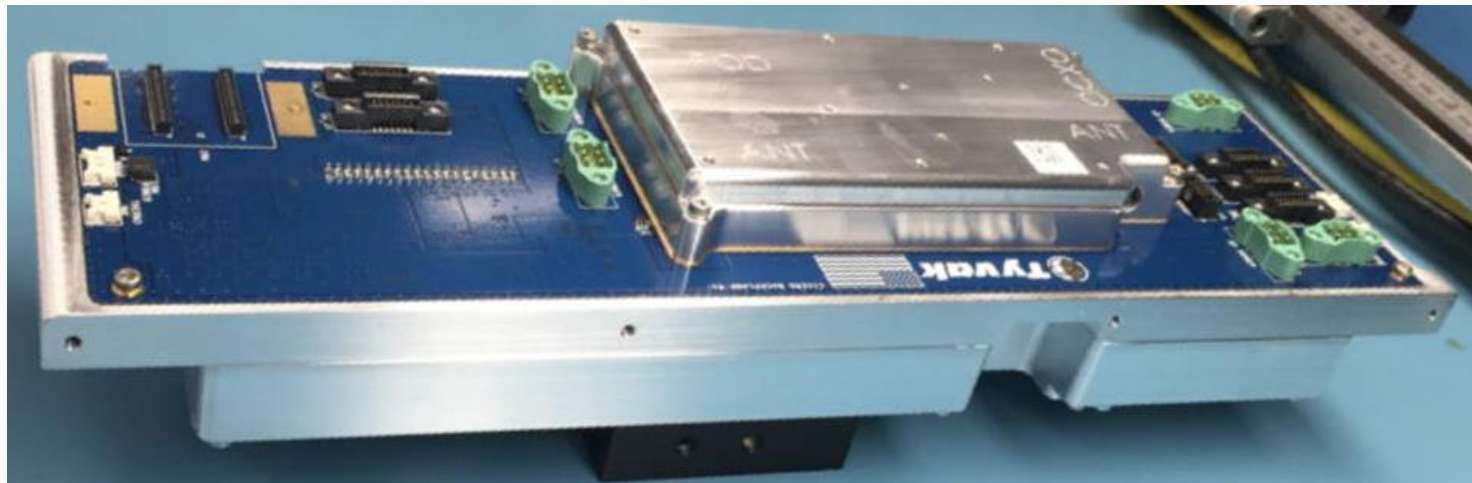
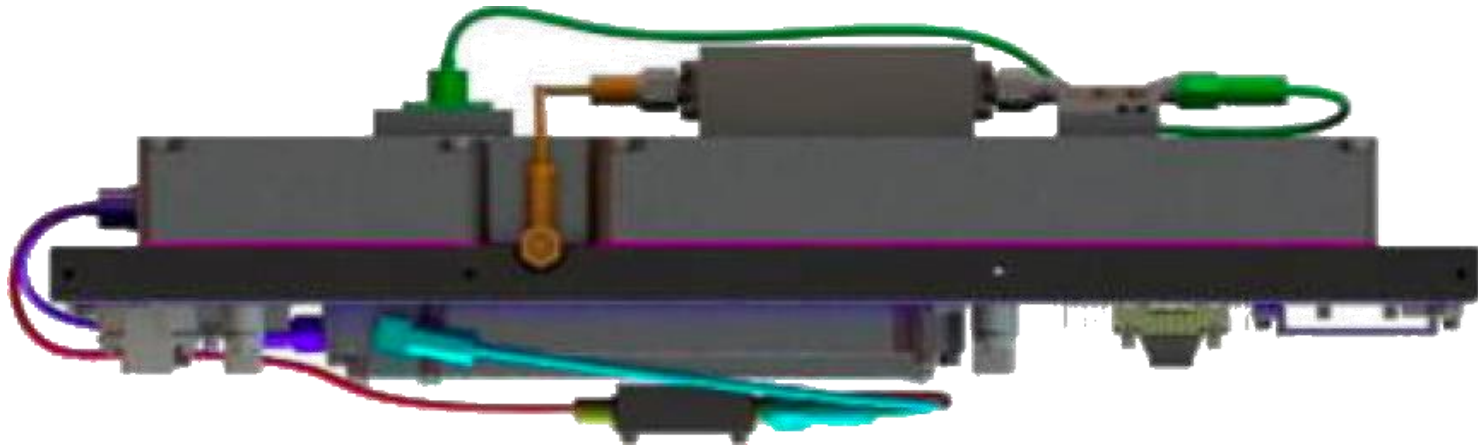
- GGI Proposal (1988)
- GPS-MET (1995) TRSR
- CHAMP, SAC-C (2000) BlackJack
- COSMIC-1 (2006) BlackJack'
- COSMIC-2 (2019) TriG
- CICERO (2017) Cion



The Compact Cion GNSS-RO Instrument



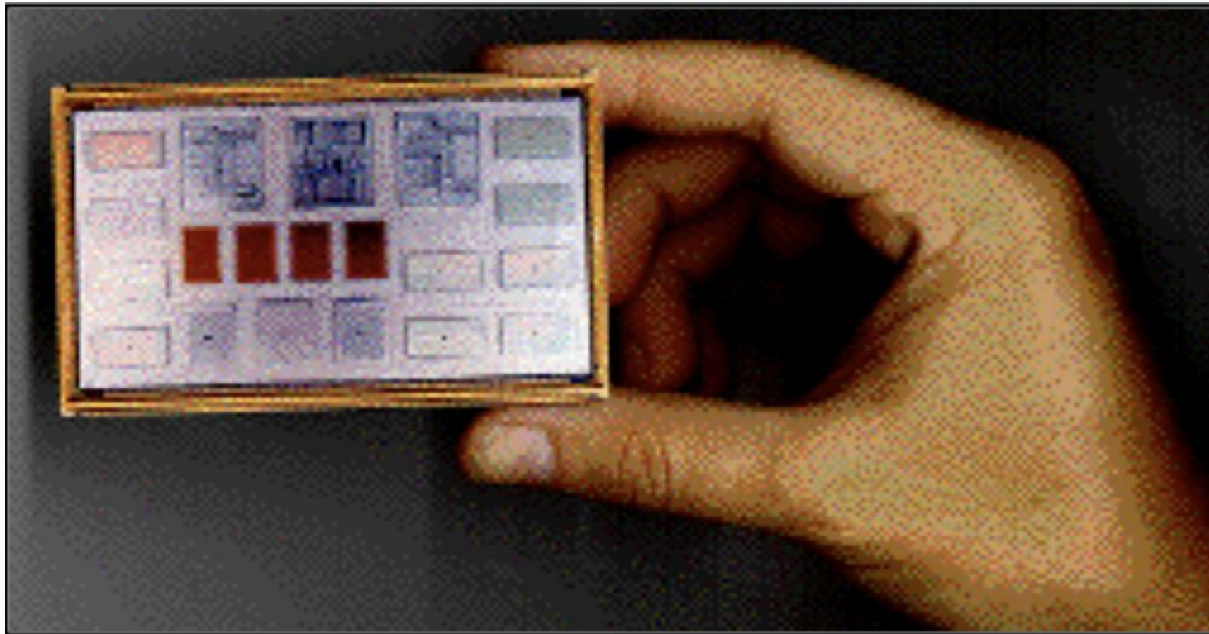
Miniaturized TriG: GPS, Glonass, Galileo



~1U and 6.5W



1998 Vision

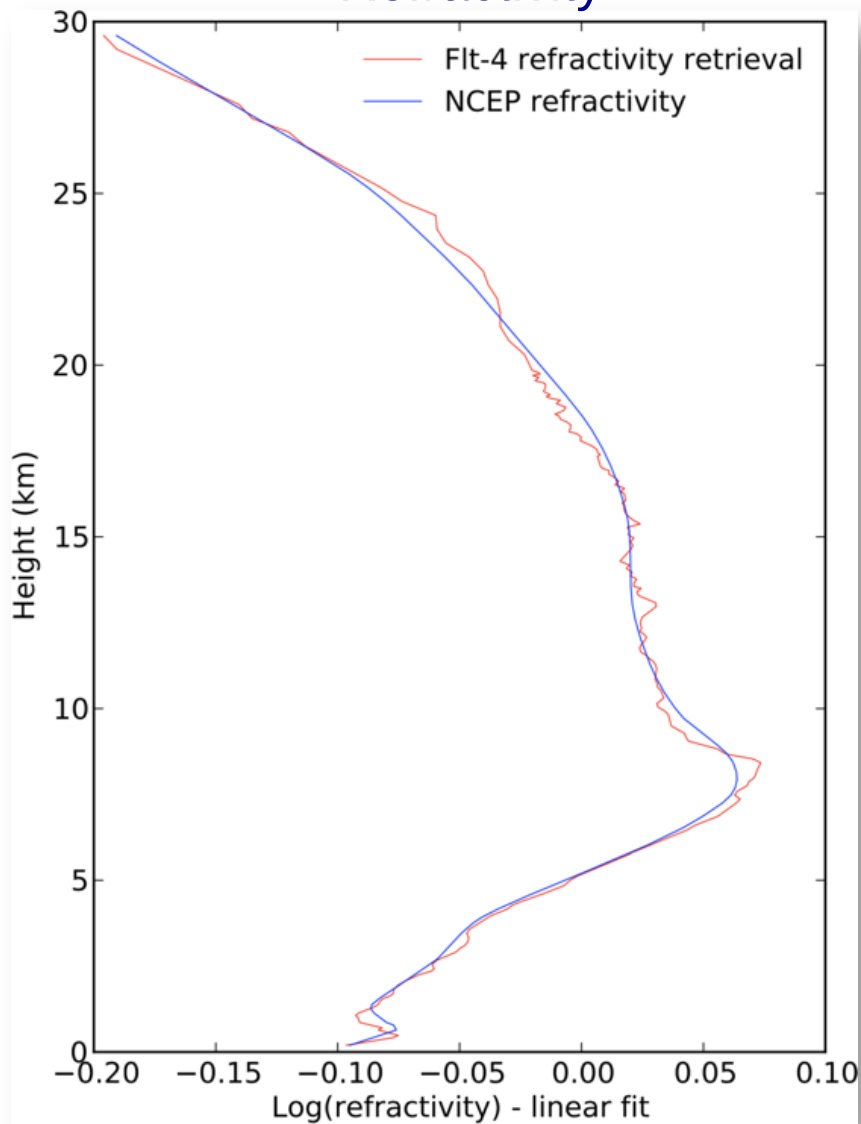




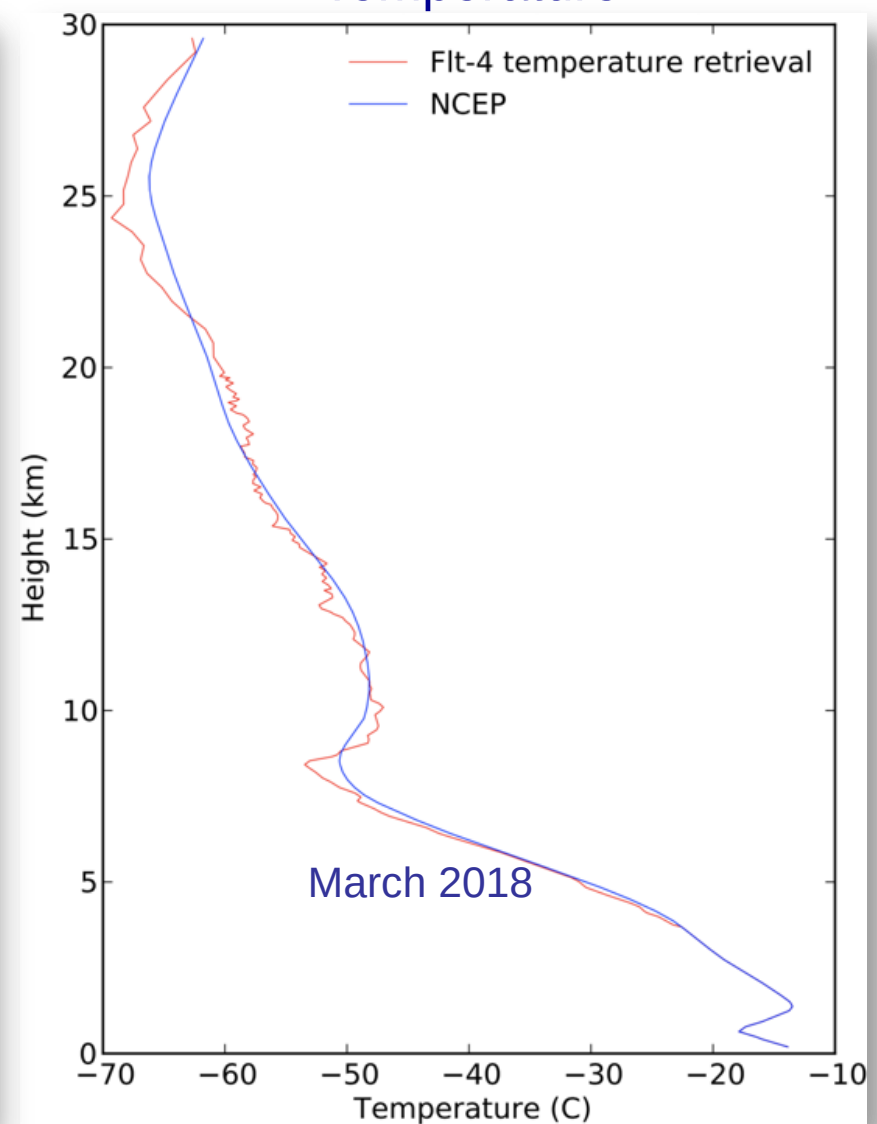
Sample CICERO Profiles



Refractivity

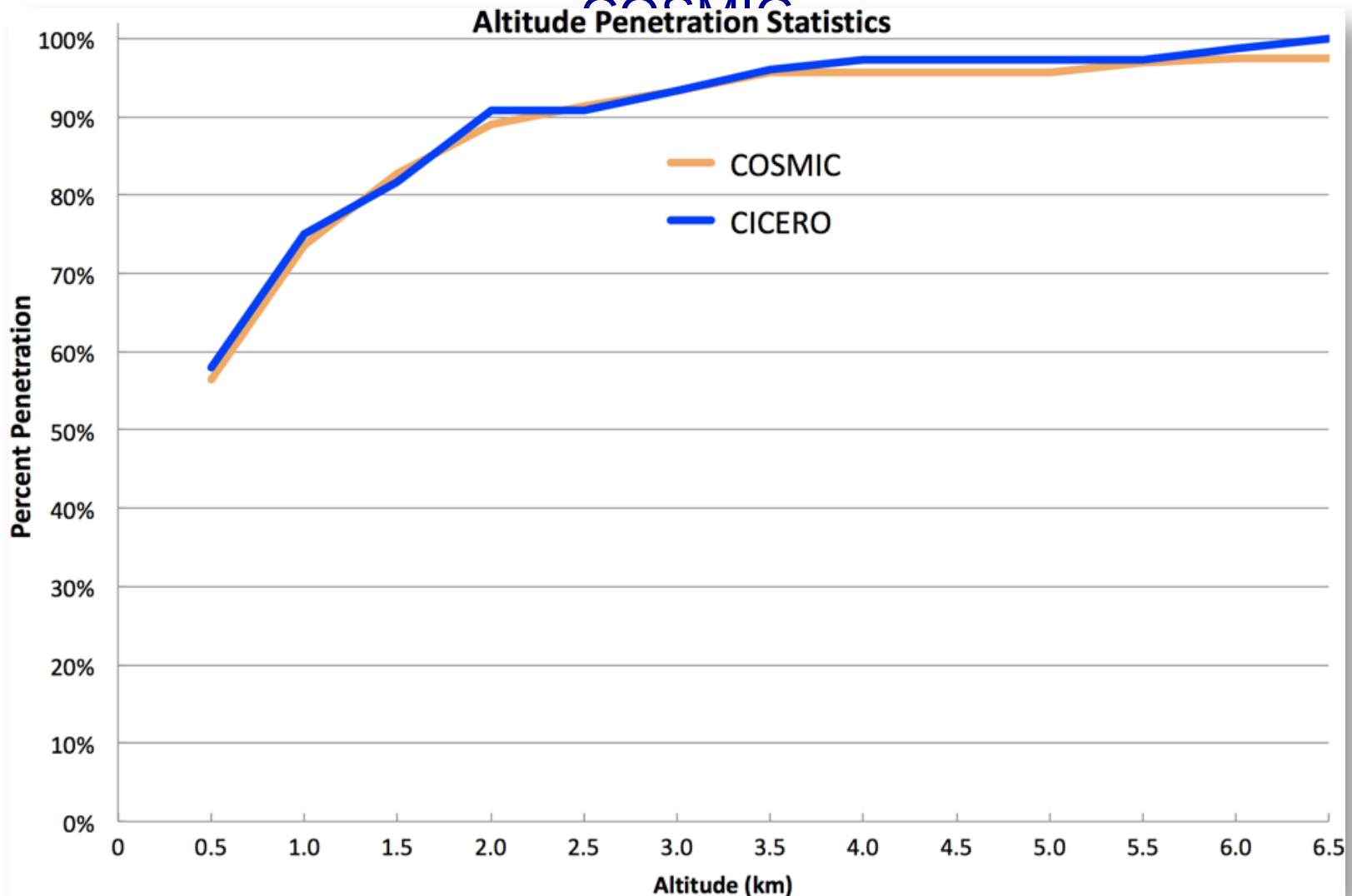


Temperature





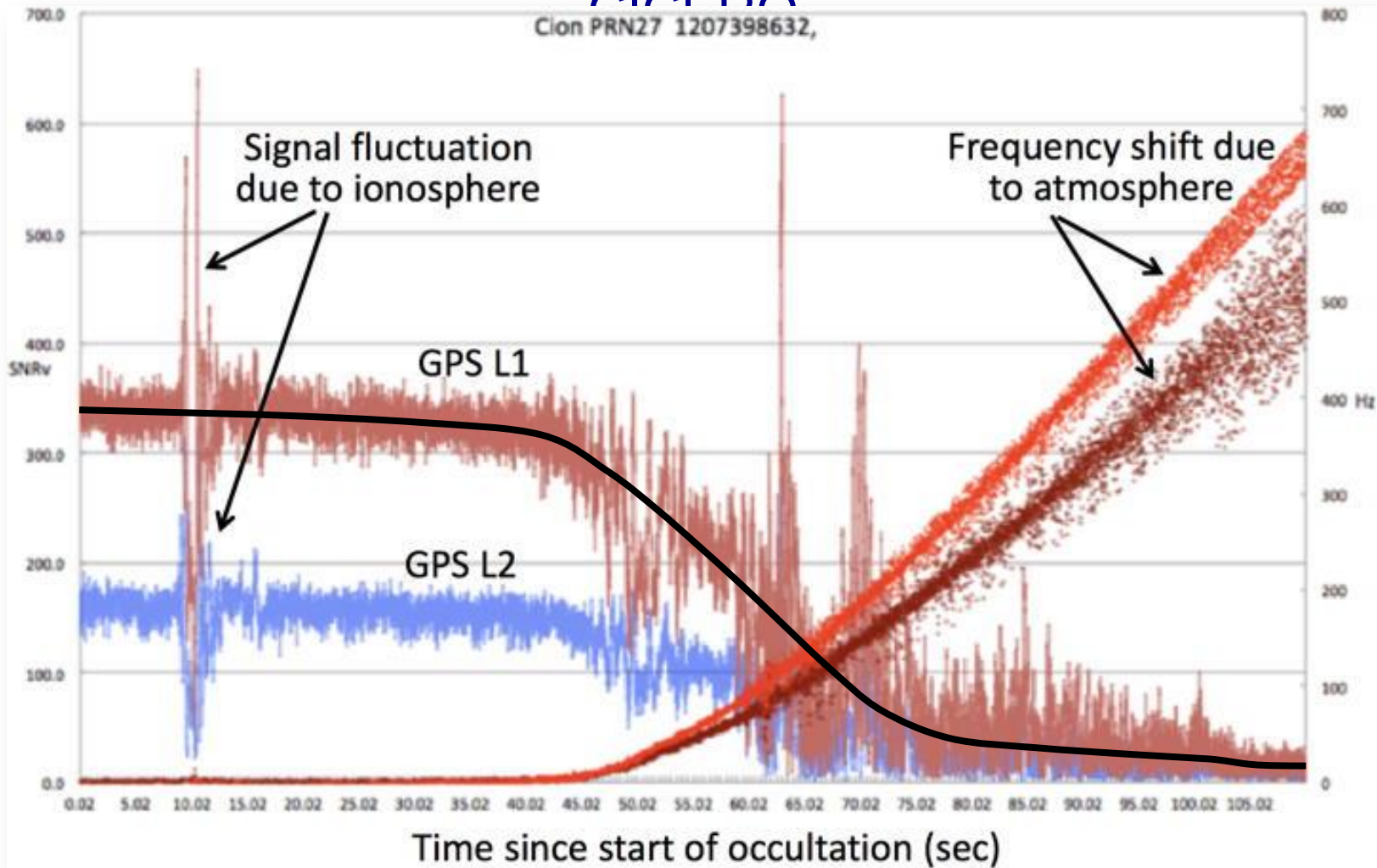
Depth of Penetration: CICERO v





Ionospheric Scintillation Event from

CICERO





Ionospheric Structure

