

Exploring topside sounder concept



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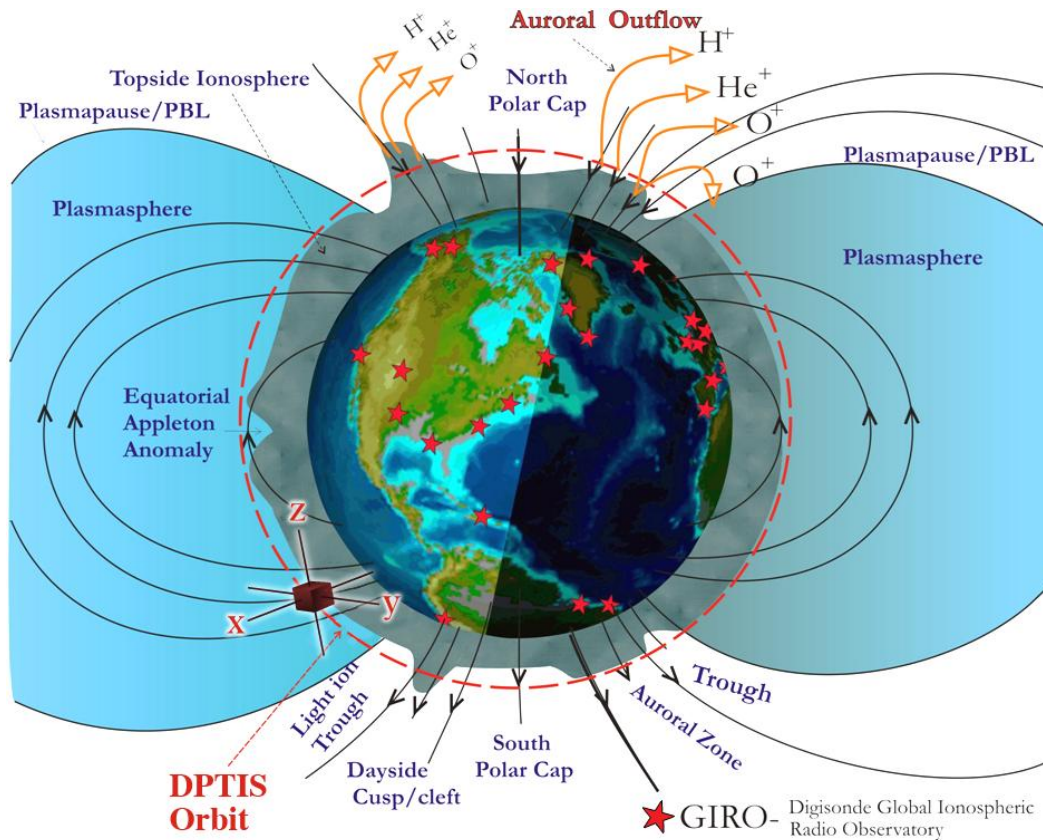
Lowell Digisonde International, LLC
& University of Massachusetts Lowell, CAR

IGF 2014

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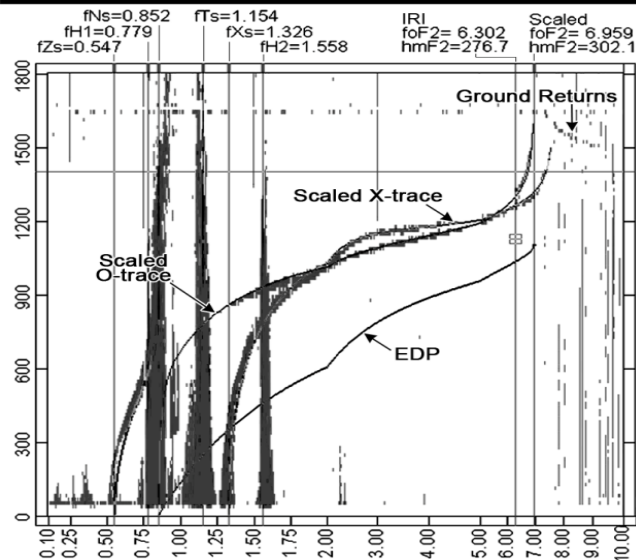
Proposed DPTIS polar orbit.

Stars indicate ground-based GIRO Digisonde locations



ISIS-2 Topside Ionograms and TOPIST Autoscaling

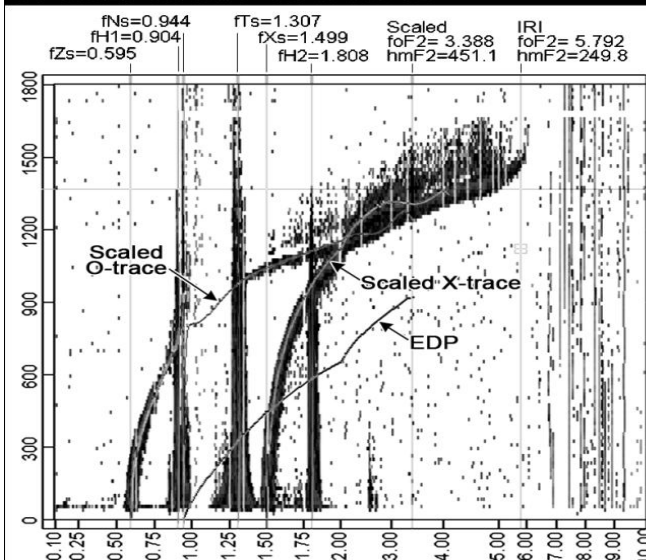
SATELLITE: ISIS-2
POSITION: 1405.595 (km) 36.334 / -63.718 (Deg)
UT TIME: 21:25:11 1973 / 06 / 19



Accurate TOPIST scaling for quiet ISIS-2 ionogram

ISIS ionograms have no polarization tagging. The apparent “kink” in the profile plot at 2 MHz is caused by the change from linear frequency steps below 2 MHz to quasi-log steps above 2 MHz [Huang et al., 2002].

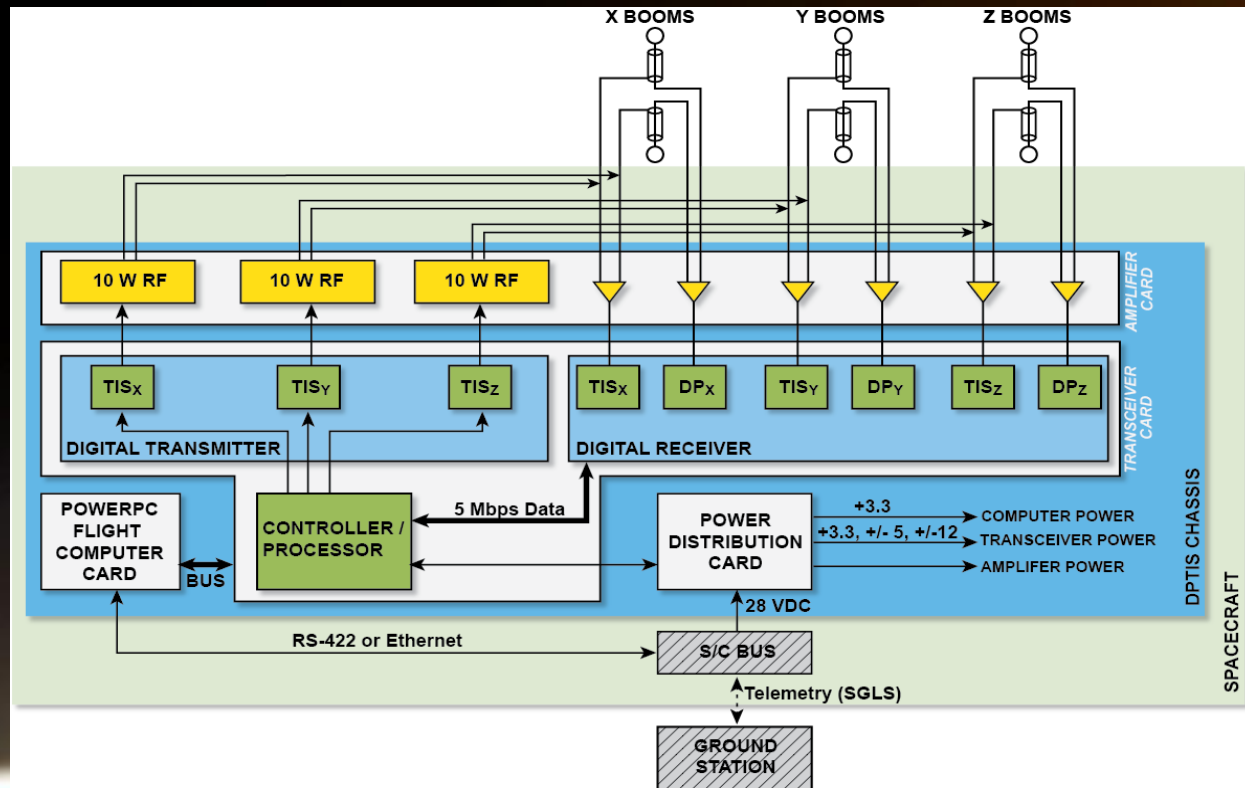
SATELLITE: ISIS-2
POSITION: 1371.713 (km) 49.402 / -86.202 (Deg)
UT TIME: 15:49:44 1978 / 06 / 12



Inaccurate TOPIST scaling for disturbed ISIS-2 ionogram.

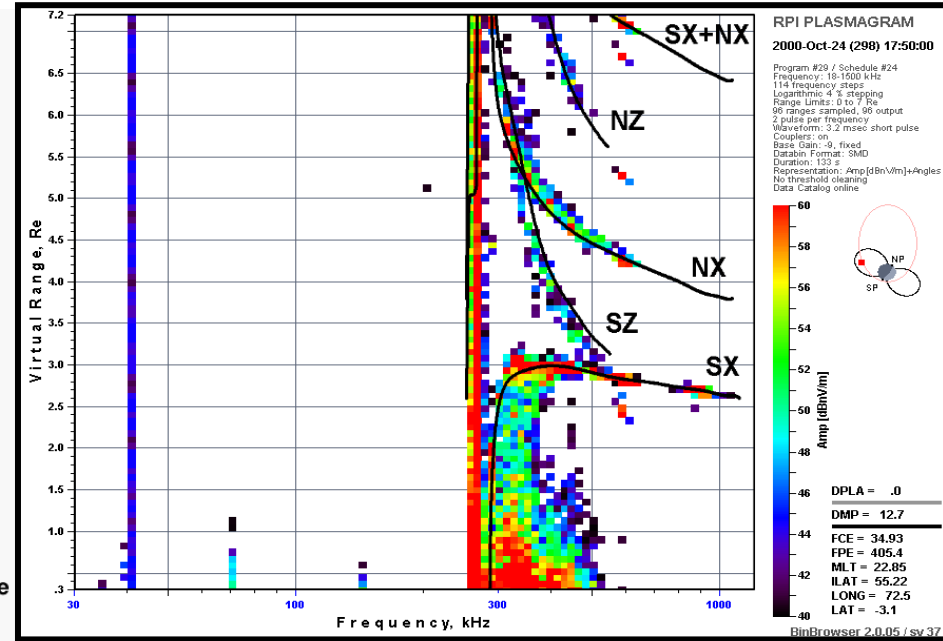
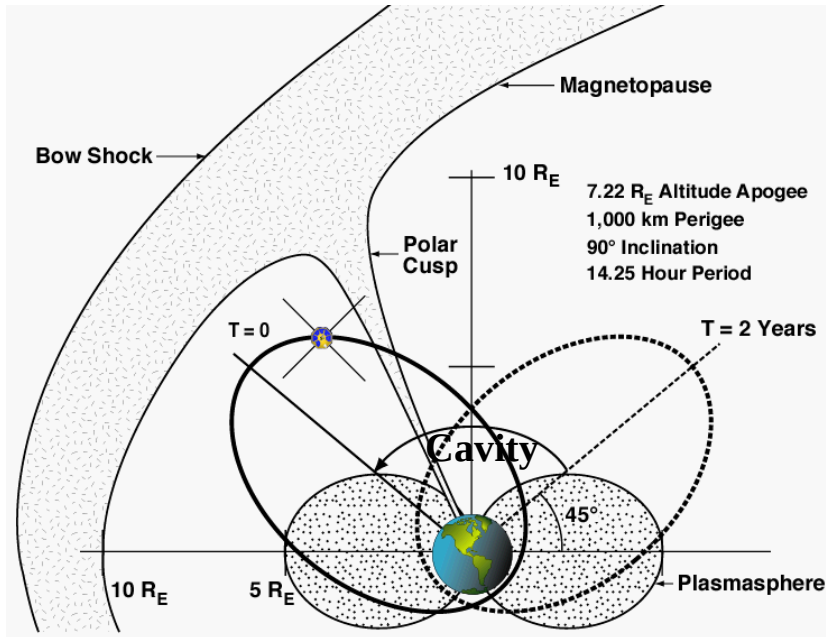
Lack of polarization tagging makes it impossible to find foF2. In situ cutoff and resonance frequencies are identified correctly.

Double-Probe & Topside-Ionosphere-Sounder DPTIS

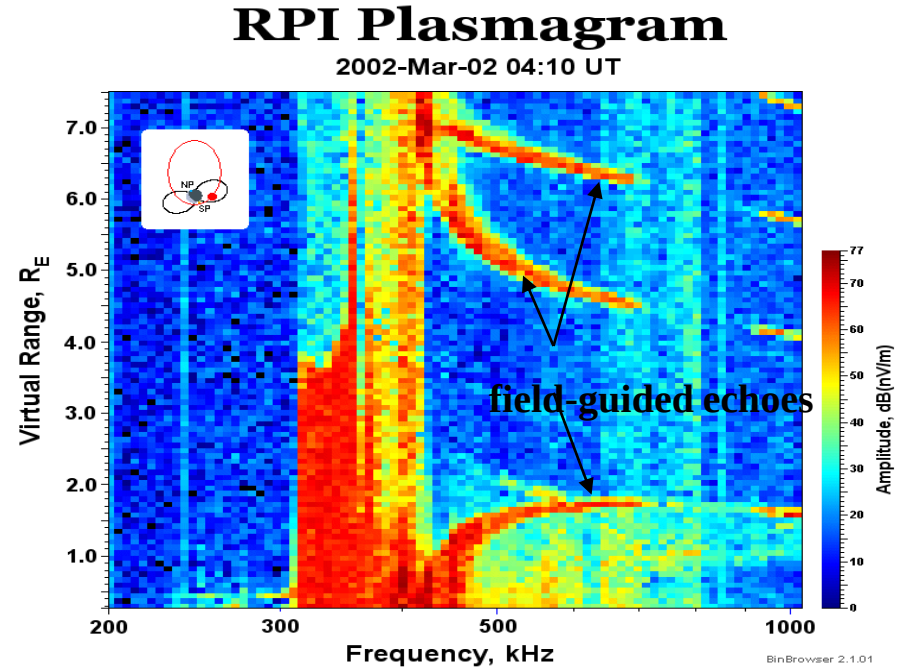
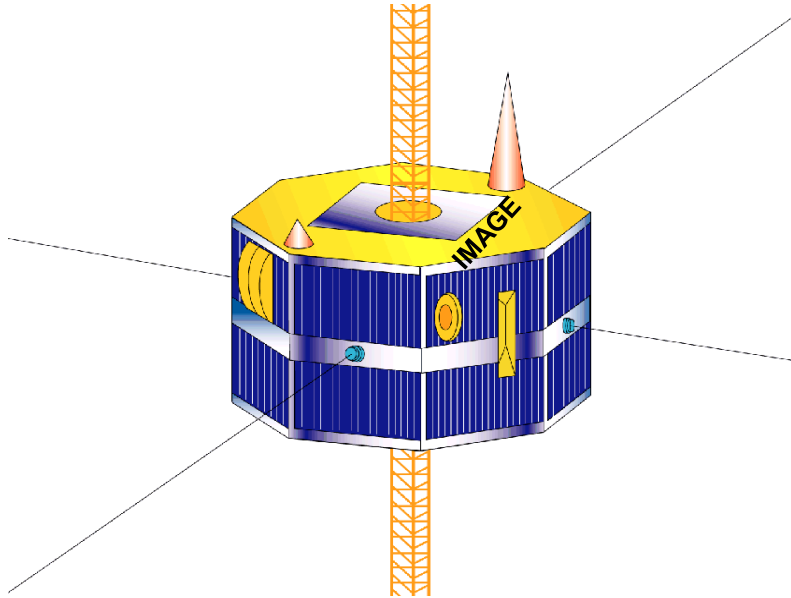


Heritage: IMAGE / RPI

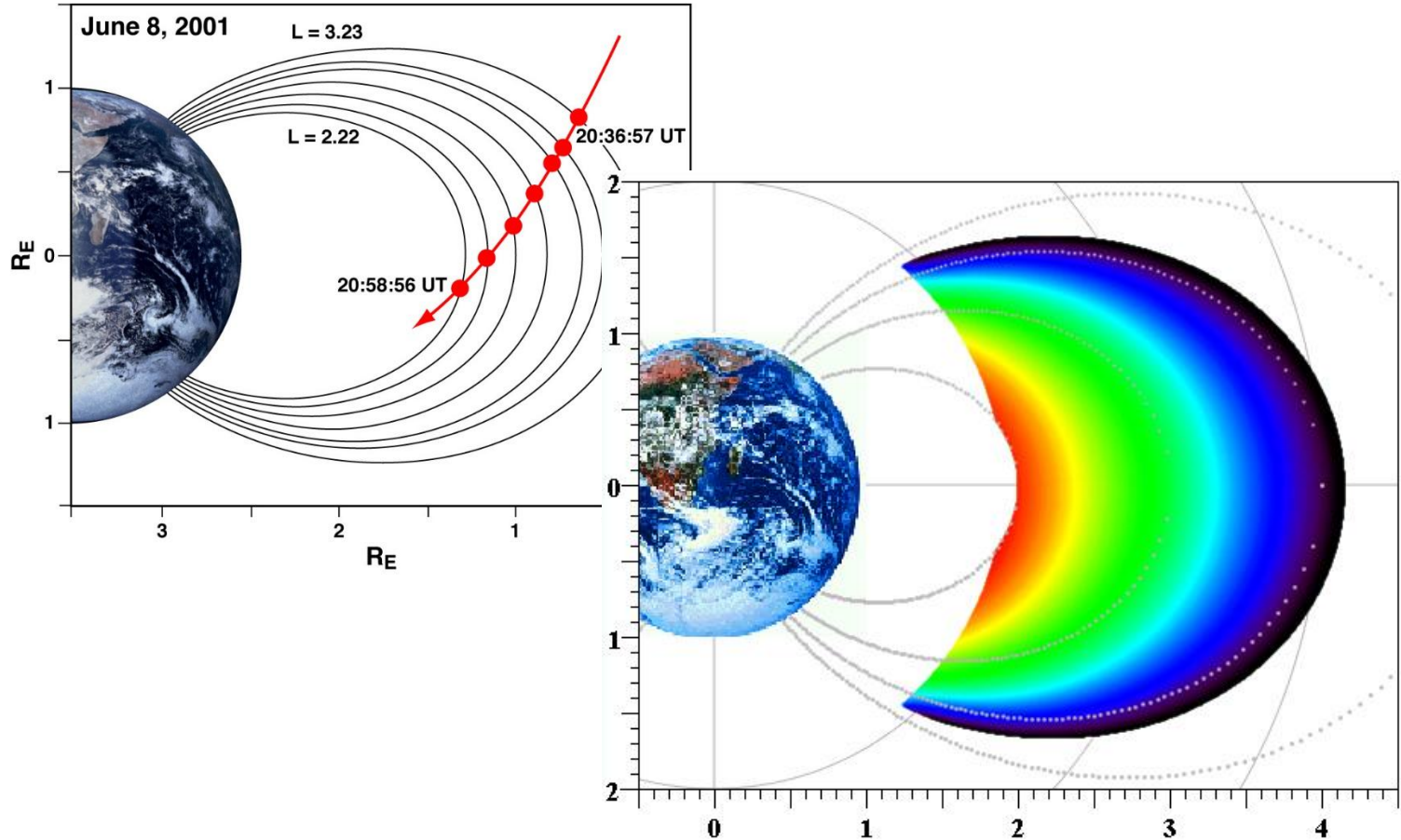
2000 - 2005



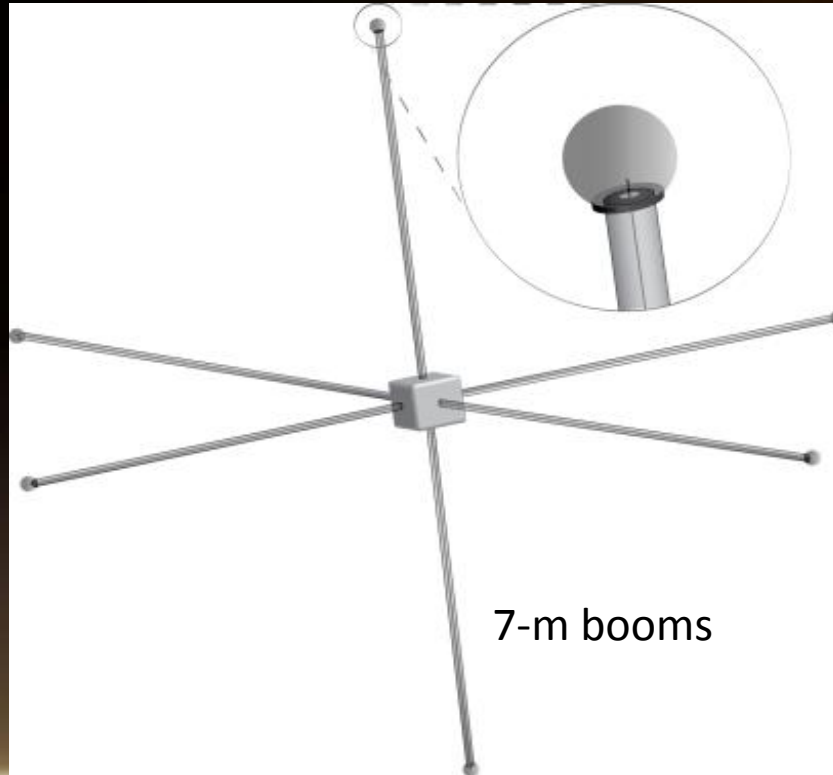
IMAGR / RPI



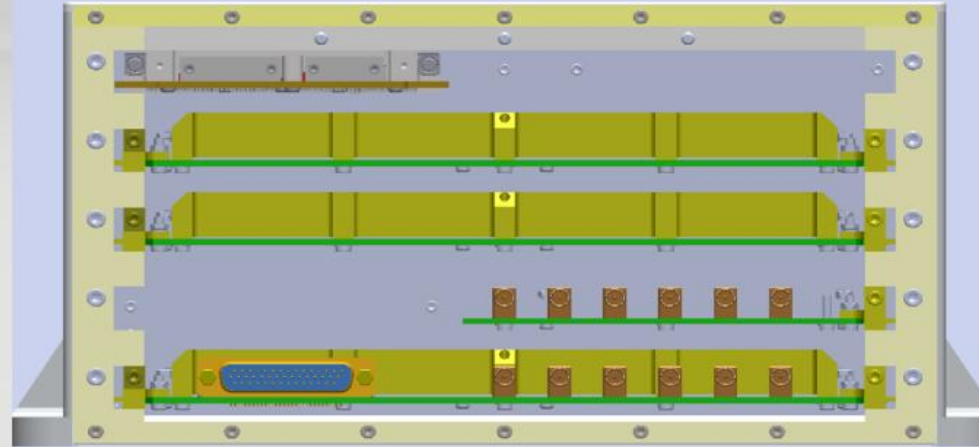
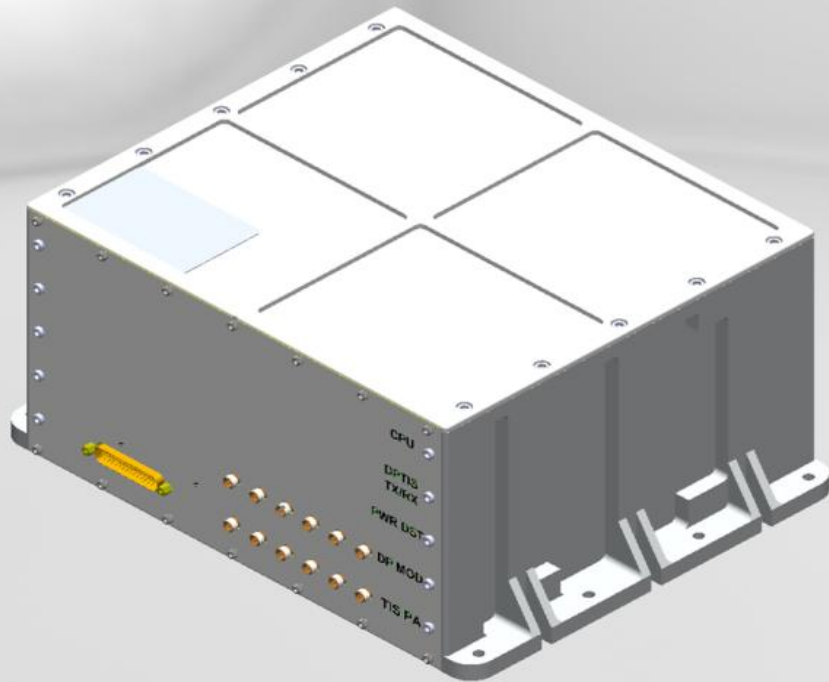
Almost-instantaneous measurement of 2D Ne distribution



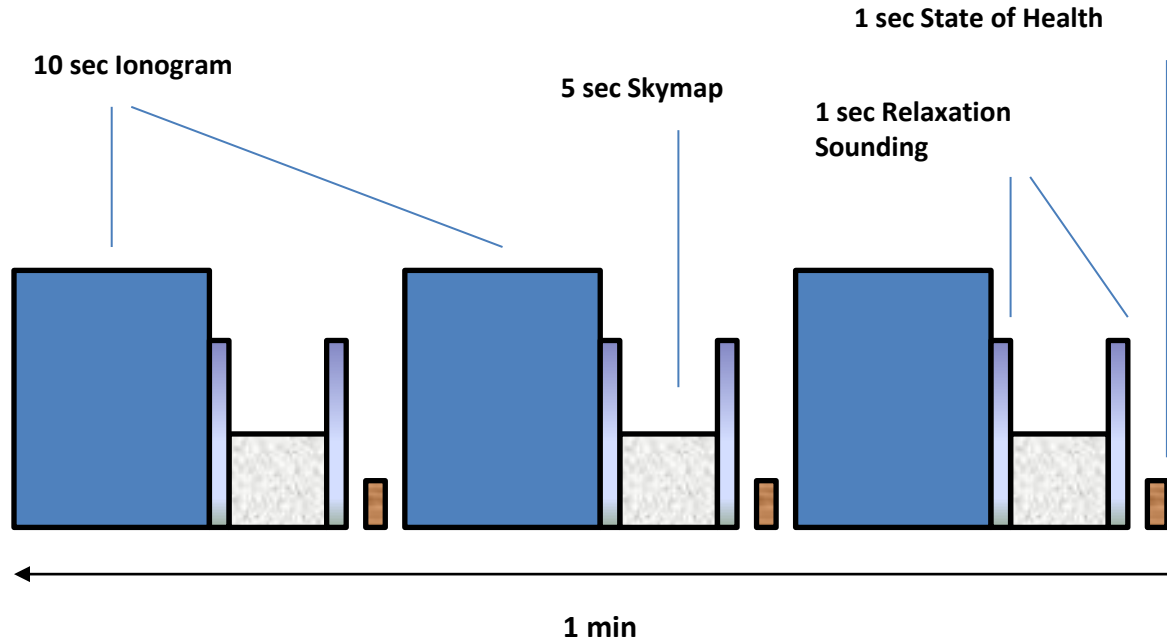
Proposed Antenna Boom Configuration for DPTIS



DIPTIS Packaging



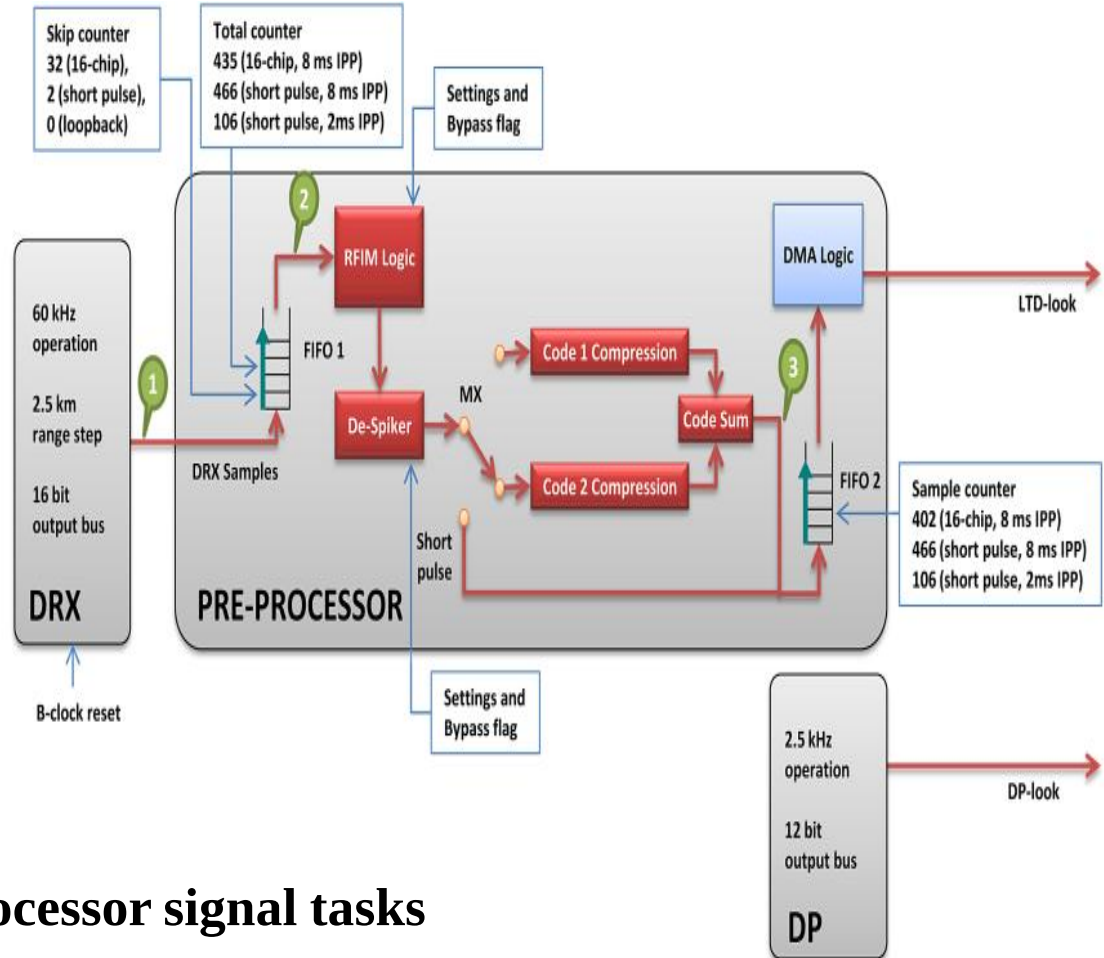
Example of DPTIS 1-minute Operating Schedule



DPTIS Telemetry Science Data

Category	Telem . ID	Contents / OpMode	Length	Test Pattern	Frequency
SCIENCE	0x81	Ionogram	variable	Yes	Per TIS schedule definition
	0x82	Skymap	variable	Yes	Per TIS schedule definition
	0x84	DP Electric Field	TBD	No	Continuous
	0x88	DP Spacecraft Potential	TBD	No	Continuous

Point	Description	Burst Bandwidth	Data volume	# per orbit (full schedule)
1	Raw DRX Samples	5.88 Mbps	-	
2	DRX Samples per IPP (LTD-look)	16-chip/8ms: 5.22 Mbps	5-sec ionogram: 3.3 MB	960 (3.2 GB)
		Short-pulse/8ms: 5.59 Mbps	2.5-sec ionogram: 1.8 MB	1920 (3.4 GB)
		Short-pulse/2ms: 5.09 Mbps	0.25 sec sweep: 160 kB	19200 (3.1 GB)
3	LTD-look after Pulse-Comp	16-chip only: 2.41 Mbps	5-sec ionogram: 1.5 MB	960 (1.4 GB)



Pre-Processor signal tasks

Dalu

감사합니다

Gracias

Danke

Ευχαριστίες

THANK YOU

Obrigado

Köszönöm

Спасибо

Dank

Tack

Grazie

谢谢

Merci

ありがとう

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