

DPS-4D System Specifications:

Quad Receiver	
Frequency Range	0.5 – 30 MHz (all modes of operation)
Bandwidth	34 kHz @ 3 dB (for 5 km range resolution)
Input Impedance	50 Ω
Noise Figure	11 dB (at receiver antenna preamplifier)
Receiver Sensitivity	-130 dBm (+/-6 dB) into main chassis; better at preamplifier (amount depending on preamp gain setting)
Dynamic Range	>90 dB instantaneous >140 dB total operating range including gain control
Recovery Time	40 μ s
Output	16-bit quadrature samples
RF Output	
Frequency Scan	0.5 - 30 MHz, start, stop and step size selectable to 1 kHz
Restriction of Transmission	Programmable list of frequencies
Ionogram Scan Time	Standard VIS ionogram 10 - 200 sec (varies with programmable settings)
Frequency Synthesis	Fully digital (frequency switching time < 1 μ s)
Pulse Repetition Rate	100 and 200 pps
Pulse Width	533 μ s (16 chips of 33 μ s) waveform with 30 kHz signal bandwidth
Peak Pulse Power	2 channels @ 150 W each
Output Impedance	50 Ω
Transmitter Type	Dual RF MOSFET Amplifiers for polarized transmission using turnstile transmit antenna
Lightning Protection	In-line spark gap discharge devices
User Interface	
Unattended operation	Controlled by 255 measurement programs, 255 schedules, automatic schedule switch rules and preprogrammed campaign events
Remote access & control	Network or Serial Port interface for Input/Output access to schedules, measurement data, diagnostic data, and operating software. (Internet, LAN, or Modem)
Time Setting	Integrated GPS receiver keeps time to +/-25 μ s
Built-in-Test (BIT)	Full diagnostics to isolate failures to line replaceable units runs automatically, remotely accessible
Self Calibration	Built-in internal cal automatically updates phase/ amplitude adjustment tables. Remotely accessible results.
Signal Processing	
Processors	Two Embedded Intel Dual Core processor SBCs (Control and Data platforms)
# of Range Bins	Selectable: 256 or 512
Height Range	0-1200 km (0 km used for self-calibration)

Height Resolution	2.5 km sample spacing 500 m using differential phase technique
RF Interference Mitigation	RFIM reduces coherent interference up to 35 dB
Waveform Processing	Pulse compression of 16-chip phase code provides 15 dB signal processing gain
Doppler Processing	4 to 128 integrations can provide up to 21 dB signal processing gain
Doppler Range	+/-3 Hz to +/-50 Hz
Doppler Resolution	.0125 to 12.5 Hz
Amplitude Resolution	< 0.01 dB
Wave Polarization	Alternating transmission with O and X, synchronized receive antenna polarizations (doubles reliability of O/X identification by ARTIST). Linear polarization on request.
Standard Operating Modes	Linear Frequency Scan for Ionogram Multiplexed Frequency scan (finer Doppler resolution) Multi Fixed-Frequency (for TID and absorption studies) Plasma Drift & Ionospheric Tilt (direction and velocities) Synthesized multi-beam reception (detects off-vertical echoes) Precision Group Height (0.5 km h' accuracy) HF surveillance mode
Software (included with system)	
System Software	Windows XP Embedded and RTEMS
WEB Server for Real-time Data Monitoring	Apache, with access to real-time displays of ionogram, directogram, skymap, drift velocity data and BIT
Operating Software	DESC (Control platform). DCART, Dispatcher, ARTIST with NHPC, DDA (Data platform).
Online Ionogram Scaling	Automatic Real Time Ionogram Scaling with True Height Analysis (ARTIST) vs 5.0.2
Online Drift Data Processing	DDA (Drift Data Analysis) software, skymap generation, drift velocity analysis, and calculation of ionospheric tilt
Online Data Delivery	FTP to multiple destinations
4 Receiver Antennas	
Antenna Type	Active Crossed loops – Turnstile antennas (1.5m diameter)
Antenna Array	4 antennas in 60 m triangle with central antenna
Construction	Schedule 80 PVC, with wire braid loop elements
Electronics	Preamplifier (powered via RF cable) with electronically switched polarization.
Pre-Amplifier Sensitivity	-123 dBm (in 34k Hz bandwidth, not including signal processing)
Specifications for Transmitter Antenna	
Antenna Type	Turnstile Delta or Rhombic (2 orthogonal radiating elements)
Tower	30 m or larger recommended

Data Post-Analysis Workstation	
Computer Hardware	Intel Dual Core processor, 19" LCD monitor, DVD R/W, Color Printer
Computer Software	Windows XP
Ionogram Editing and Profile Inversion	SAO Explorer 3.4 with NHPC electron density profile inversion tool, International Reference Ionosphere model, and access to the UML DIDBase data repository
Drift Data Analysis	Drift Explorer 1.2 with access to UML Drift-DB data repository