

Series 1453 Performance Characteristics

		Typical Reflector Sizes			
		10 Meter (33 foot)	11 Meter (36 foot)	12 Meter (39 foot)	13 Meter (43 foot)
RF Performance	Frequency Range (MHz)	X-Band 8025 - 8400 & S-Band 2200 - 2400			
	G/T ¹	@ 8200 MHz 35.9 dBK @ 2300 MHz 23.8 dBK	@ 8200 MHz 36.7 dBK @ 2300 MHz 24.6 dBK	@ 8200 MHz 37.5 dBK @ 2300 MHz 25.4 dBK	@ 8200 MHz 38.2 dBK @ 2300 MHz 26.1 dBK
	Beamwidth	@ 8200 MHz 0.22° @ 2300 MHz 0.88°	@ 8200 MHz 0.20° @ 2300 MHz 0.84°	@ 8200 MHz 0.18° @ 2300 MHz 0.77°	@ 8200 MHz 0.17° @ 2300 MHz 0.68°
	Sidelobes (dB peak)	-16	-16	-16	-16
Performance Characteristics	System Weight (nom.)	30,595 kg (67,462 lbs.)	30,979 kg (68,308 lbs.)	31,368 kg (69,154 lbs.)	31,746 kg (70,000 lbs.)
	Wind - Operational	42 m/sec. (95 mph)	38 m/sec. (80 mph)	34 m/sec. (70 mph)	30 m/sec. (67 mph)
	Wind - Survival (stowed)	56 m/sec. (125 mph)	56 m/sec. (125 mph)	56 m/sec. (125 mph)	56 m/sec. (125 mph)
	All Models				
	Velocity	Ei = 10°/sec., Az = 15°/sec			
	Acceleration ²	Ei/Az = 10°/sec ²			
	Output Torque (max intermittent)	149,100 N • m (110,000 ft. lbs.)			
	Rated Gear Strength	176,200 N • m (130,000 ft. lbs.)			
	Brake Rating	170,800 N • m (126,000 ft. lbs.)			
	Elevation Travel	-7° to +187°			
Azimuth Travel	±410°				
Power Requirements (max)	120/208 3Ø, 60 Hz or 220/380 3Ø, 50 Hz (75.0 KVA)				
Environmental	Temperature - Indoor Equip.	0°C to +50°C			
	Temperature - Outdoor Equip.	-40°C to +57°C			
	Temperature - Storage	-40°C to +70°C			
	Humidity - Indoor Equip.	0 to 100%			
	Humidity - Outdoor Equip.	0 to 100% R. H.			
	Rain	Up to 13 cm (5.0 in.) per hour			
	Ice (survival)	Up to 13 mm (0.5 in.) radial			

NOTES: 1. Per EIA-411-A, 10° Ei, 17°C, shaped optics with cassegrain X-Band and prime focus S-Band SCM feed with coax dipoles, measurements for data channels each frequency band. Contact factory for alternate configurations and associated performance details.
2. Active acceleration limiting for improved control.

Available System Options

- X-Band Up/Downlink W/Autotracking
 - X-Band Program Track Feed
 - S-Band Up/Downlink W/Autotracking
 - S-Band Program Track Feed
 - Dual Data Channel
(selectable or simultaneous)
- Extended Frequency Bands
 - Automatic Data Switching
 - Automated BER Testing
 - Automated RF/IF Switching
 - Fiber Optic Control Interface
 - Transportable Configurations
- Video Monitoring Systems
 - Reflector De-Icing
 - Radome
 - Installation
 - Training

200 West Los Angeles Avenue
Simi Valley, CA 93065-1650
805.584.1717
Fax: 805.526.3690

www.L-3Com.com/datron



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Antenna Systems

Series 1453 S/X-Band Autotracking Antenna System

The Series 1453 S/X-Band Autotracking Antenna System combines over 35 years of field proven RSS/TT&C success with state-of-the-art technology to deliver a highly flexible system with improved life cycle costs. Significant cost saving is realized through high COTS content and reduced use of proprietary control hardware.



The Series 1453 S/X-Band Autotracking Antenna System is a highly flexible, low maintenance, open architecture design providing our world-wide users years of reliable, high performance service.

Downlink connectivity for both Low Earth Orbit (LEO) satellites and other sources in the 8 to 8.4 GHz and 2.2 to 2.4 GHz bands are provided with standard feeds. Support for other frequencies and/or multi-band operations are available with our proven line of RF assemblies. With standard reflector sizes ranging from 10 to 13-meters in diameter, the Series 1453 can easily be configured to meet your specific RF requirements.

Greater system utilization and value is realized with the Series 1453 open control scheme. Control and monitoring of the Series 1453 Antenna Control Assembly (ACA) is accessible via Ethernet connection, eliminating costly proprietary control hardware. The ACA provides control and status via any network accessible JAVA enabled browser or readily accepts command strings from CFE control systems.

- Long life
- Easily maintained
- High performance
- Modular design
- Designed for harsh environments
- COTS drive packages & electronics
- Low life cycle costs



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Designed to Last!

Advanced X-Band Autotrack Feed –

L-3 Datron's advanced TE₂₁ mode coupler technology provides superior tracking performance and high efficiencies in both the data and tracking channels. The symmetry of the mode coupler design, along with phase compensation across the frequency band, results in high accuracy autotracking, regardless of the axial ratio of the satellite downlink. The mode coupler feed is mounted in a Cassegrain configuration and provides superior wideband performance compared to multi-element designs. The X-Band autotrack feed assembly can be configured to meet either simultaneous or selectable Right and Left Hand Circular Polarization (RHCP/LHCP) requirements.

S-Band Options –

Optional simultaneous S and X-Band operations is provided by locating a prime focus S-Band tracking feed behind a low loss dichroic Frequency Selective Surface (FSS) subreflector. The S-Band feed supports

simultaneous or selectable reception RHCP/LHCP operation and is available configured as: transmit only, transmit/receive, receive only and autotracking.

Alternative Operations –

The Series 1453 may be configured for specialized missions in extended frequencies such as C, Ku and Ka-Bands. Through use of advanced RF optics, we have successfully combined several feeds on a single antenna to achieve optimal performance across desired frequencies.



High Performance Reflectors –

Our reflector design is optimized for multi-band operations. The main reflector is a shaped precision surface quasi-paraboloid constructed of aluminum panels, radial trusses and

intercostal supports for simultaneous X-Band and S-Band operations. Our system is optimized for high X-Band performance while maintaining high S-Band efficiency. Quadrapod struts attached to the main reflector support the subreflector and optional S-Band feed assembly.

Dichroic Subreflector –

The system utilizes a high performance dichroic subreflector for dual-band operation. This allows for simultaneous operation of both X-Band and S-Band reception.

Frequency Conversion –

The single-step frequency conversion architecture used in the L-3 Datron RSS system provides flexibility, economy and enhanced performance. The X-Band spectrum of interest is down converted at the antenna to a 720 MHz IF using a low phase noise synthesizer as the Local Oscillator (LO). The LO frequency tuning is controlled through the embedded Graphical User Interface (GUI) or command strings.

Model 8453 Antenna Positioner –

The Series 1453 features our fully positional, three axis Model 8453 positioner. The 7° tilt of the third axis assembly allows full hemispherical tracking of satellites with altitudes as low as 370 Km with no data loss. Our third axis increases satellite pass capabilities and service life while reducing the demands on



mechanical, servo and primary power systems. The single piece, truncated cone riser base features an environmentally controlled equipment space for antenna control and limited CFE equipment rack. The positioner was designed to operate in harsh environmental conditions ranging from the Artic Circle to the Equatorial Tropics and Desert regions. The design utilizes identical high-torque electric drives in anti-backlash configuration in all axes for ease of assembly, maintenance and reduced operation costs. Each axis drive package consists of: a high precision gearbox with a brushless servo motor, failsafe brake and resolver assembly for position feed back.

Servo Control Enclosure –

The Servo Control Enclosure (SCE) is an environmentally protected enclosure housing the following COTS components: PWM servo power amplifiers, power supplies, relays, breakers, power contactor, Ethernet hub and ACA. The PWM (sinusoidal commutation) power amplifiers are multi-channel brushless

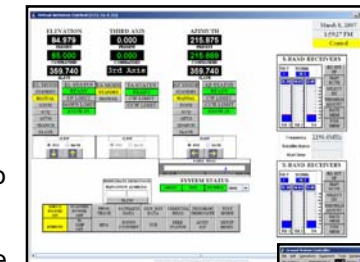
drive systems for precise motor control. In the standard configuration the SCE is collocated within the positioner. As an option, the SCE can be remotely located.

Antenna Control –

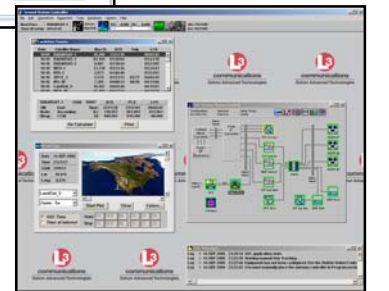
Our control system features the L-3 Datron Antenna Control Assembly (ACA), an industrial PC housed in the SCE located within the Model 8453 positioner. The QNX operating system is a

true "Real-Time" operating system that provides precision axis control, system status and time critical functions that are to be performed and monitored. Local or remote interface to the ACA is available via a standard Ethernet connection provided at the SCE. Embedded into the ACA is our Virtual Antenna Controller (VAC) graphical user interface (GUI). The VAC provides system status, control, Built In Test (B.I.T.) for automated test and health monitoring, pass management, satellite acquisition,

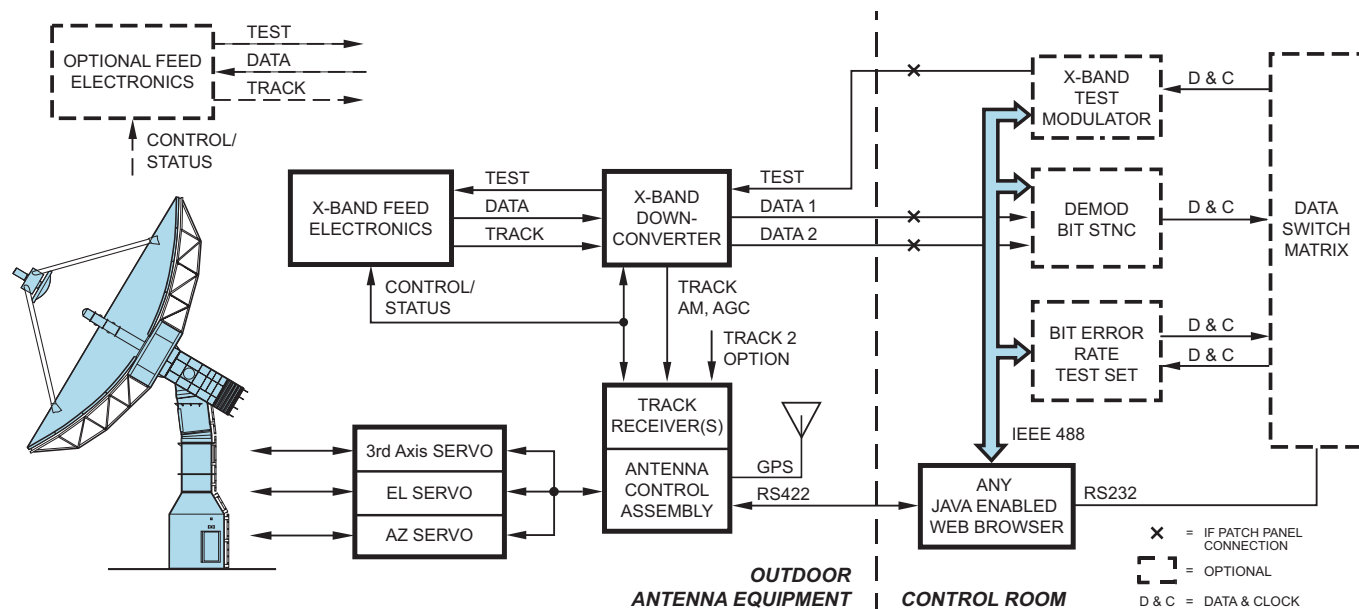
and tracking. Platform independent, the VAC can be accessed by direct ethernet connection with any JAVA enabled browser or multiple work stations when connected to a Local Area Network (LAN). The optional Ground Station Control (GSC) software advances station automation. The GSC configures equipment on a pre-pass basis, monitors equipment in real-time and archives operational data for post pass analysis.



Left - Our embedded GUI, Virtual Antenna Controller (VAC).



Below - Optional Ground Station Control (GSC) Software.



The L-3 Datron Series 1453 Antenna System have been the system of choice for over 20 years.

L-3 Datron's open architecture provides the greatest flexibility in station control. Antenna status and control can be achieved through the imbedded VAC GUI or obtained via simple command strings on the CFE network. Our optional Windows™ based GSC application controls the antenna and supported backend equipment for automated station operations.

