

HyperTrack™ Telemetry Antennas



Digital Dexterity

Quasonix antennas offer a new generation of performance, usability, and versatility. The bedrock of our systems is the HyperTrack™ Antenna Controller (HTAC), where real-time processing is done in FPGA hardware, yielding faster response and extremely smooth, accurate tracking. With reflectors ranging from 3 to 24 feet (1 to 7.3 meters) in diameter, systems covering the full telemetry frequency range, and modular designs conceived with long service life, minimal maintenance, and expandability in mind, we have an antenna to fit your needs – and exceed your expectations. Quasonix is... Reinventing Telemetry™.

Decades of Innovation — The Quasonix antenna team comprises design, manufacturing, and test experience dating back to the 1980s, with several hundred systems delivered—many still in use 20 years or more after commissioning.

Complete Tracking Antenna Systems — Quasonix offers the entire system: pedestals, reflectors, feeds, motors, servos, slip rings, and the industry's most full-featured antenna control unit—all backed by our legendary technical support.

HyperTrack is a Complete System Approach — HyperTrack incorporates dynamic tracking loop adjustments, interference-mitigation techniques, and advanced system monitoring and feedback. All tracking calculations are done in FPGA hardware, with very low and very consistent latency. The improvement in tracking accuracy provided by HyperTrack renders conventional AM/AGC control schemes obsolete.

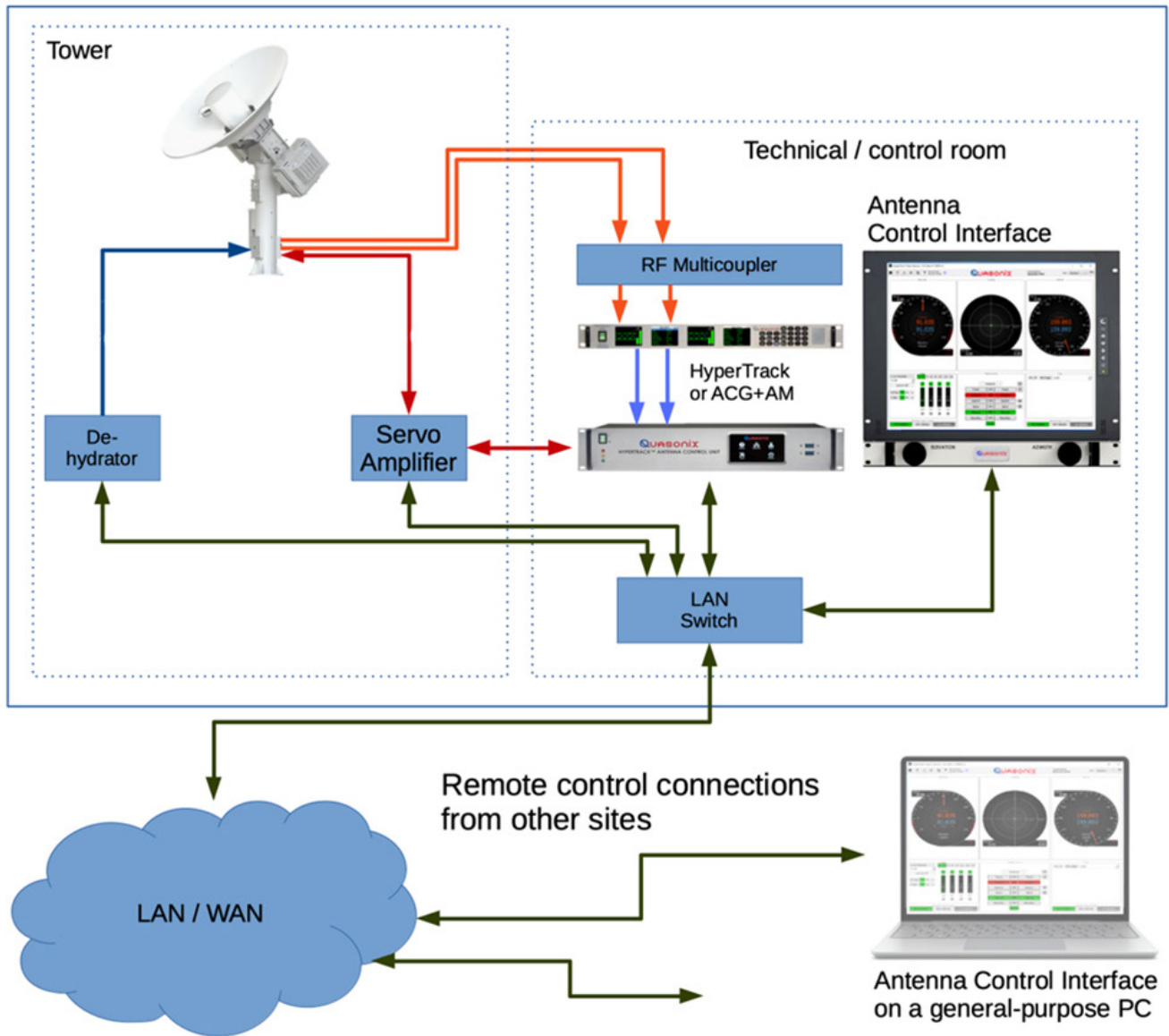
Revolutionary HyperTrack Digital Control Protocol — In addition to the normal AM and AGC interfaces, the HyperTrack antenna control unit (HTAC) also supports the advanced HyperTrack digital control interface, included in every Third-Generation Quasonix RDMS™ receiver shipped since late 2017.

Modular System Design — Robust tracking systems are available to support reflectors from 3 feet to 24 feet in diameter; Quasonix has right-sized antennas for fixed, mobile, or portable applications.

Plano-Centric Drive Systems — Advanced design delivers positioning accuracy and repeatability to 0.01 degrees. Sealed gearbox housings require no adjustments and have provided flawless operation for 20 years—and still counting.

Lifetime Updates and Support — All HyperTrack systems include free lifetime software updates, a three-year hardware warranty, and lifetime customer support from the team that designs and builds your antenna.

HyperTrack System Diagram



HyperTrack Pedestals

HyperTrack pedestals are the nucleus of every Quasonix antenna system. This mechanical foundation must position the antenna quickly and accurately, and do so for many years with minimal maintenance. That's why every element of the pedestal is designed with very high performance margins:

Motors — The total package of drive motors, servos, and gearing are selected to guarantee delivery of the full range of velocity and accelerations after accounting for worst-case wind loading. Your antenna will always deliver its specified performance.

Bearings — All pedestals use sealed, maintenance-free bearings, designed to carry at least double the weight of the moving parts (reflector, feed, camera, etc.). Your antenna will track smoothly, for years.

Plano-Centric Gearboxes — Plano-centric gearboxes are derived from the robotic assembly industry where they run 100% duty cycle for months at a time. These are the most robust gearboxes ever applied to tracking antenna systems, providing years of maintenance-free service with backlash of less than 0.016 degrees. Your antenna will be pointed exactly where you intended.

Servo Amplifiers — State-of-the-art servo amplifiers are fully compensated and have comprehensive protection and HTAC monitoring. This conservative design philosophy leads to years of trouble-free operation, even under heavy usage.

Sealed Enclosures — All pedestals and feeds are sealed with O-rings (not gaskets) and pressurized to eliminate any possibility of moisture ingress. Thermostatically controlled heaters provide an added measure of environmental immunity.

Dehydrators — Pressurizing dehydrators remove moisture from the air before pumping it into the sealed enclosures. Your pedestal will have a desert climate on the inside, even when installed in the tropics.

Connectors — All pedestals utilize MIL-DTL-38999 aerospace grade sealed connectors for outdoor connections. Your antenna will give years of consistent, dependable operation. No more "flaky" intermittent behavior.

Slip Rings and Rotary Joints — All pedestals come standard with multi-conductor slip rings and a 2-channel rotary joint for continuous 360 degree azimuth rotation. Naturally, these are also sealed against environmental contaminants.



PD450 Monopod HyperTrack



PD750 Monopod Cassegrain

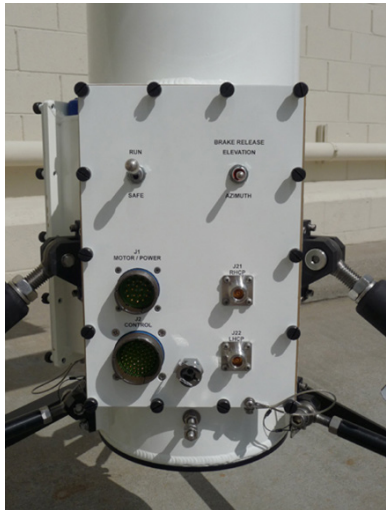


PD450 6-Foot HyperTrack (Front),
PD750 16-foot HyperTrack (Rear)

Plano-Centric Gearboxes

All pedestals systems are provided with plano-centric drives (supplied in sealed gearbox housings). Commonly used in robotics, such as pick-and-place machines, plano-centric drives have excellent performance features, superior to those of conventional gear transmissions.

- Excellent positioning accuracy
- High torque capacity
- Zero (less than 1 arc-min) backlash
- High single-stage reduction ratio
- High efficiency
- Minimal wear, long life
- High torsional stiffness
- Long life expectancy
- Maintenance free
- Zero adjustments



Environmental Protection

Every HyperTrack system includes air dehydrators and thermo-electric temperature control with each system to prevent the ingress of moisture into the pedestal, the antenna feed, and the servo amplifier sub system.

- All environmental alarm indicators (temperature, pressure, humidity) displayed remotely on the HTAC control interface
- Compressor overrun and low pressure condition protection and alarms
- Dry air regulation to 0.4 psig
- Pressurization of moisture sensitive electronic enclosures and positioner interior spaces
- Thermostatically controlled heaters for environmental control located within the HyperTrack positioners and feeds

Dehydrator

Connected

System Status

Alarm

High Flow Alarm

High Outlet Pressure Alarm

Low Outlet Pressure Alarm

High Humidity Alarm

High Temperature Alarm

High Last Runtime Alarm

Maintenance Required

Compressor

Fan

Heater

Tank Pressure:

34.5

PSI

Outlet Pressure:

0.4

PSI

Flow Rate:

120.0

SCFD

Temperature:

75.8

°F

Humidity:

0.0

%

HyperTrack Antenna Controller (HTAC) Features

Supports HyperTrack Digital Control Interface – Bypassing the analog AM and AGC interfaces entirely, the revolutionary HyperTrack Digital Control Interface from Quasonix brings you faster, more accurate tracking than you've ever seen before

Ethernet Control Connections – The HTAC communicates with the system via EtherCAT (Ethernet for Control Automation Technology) real-time, machine communication protocol for a more time accurate, deterministic connection

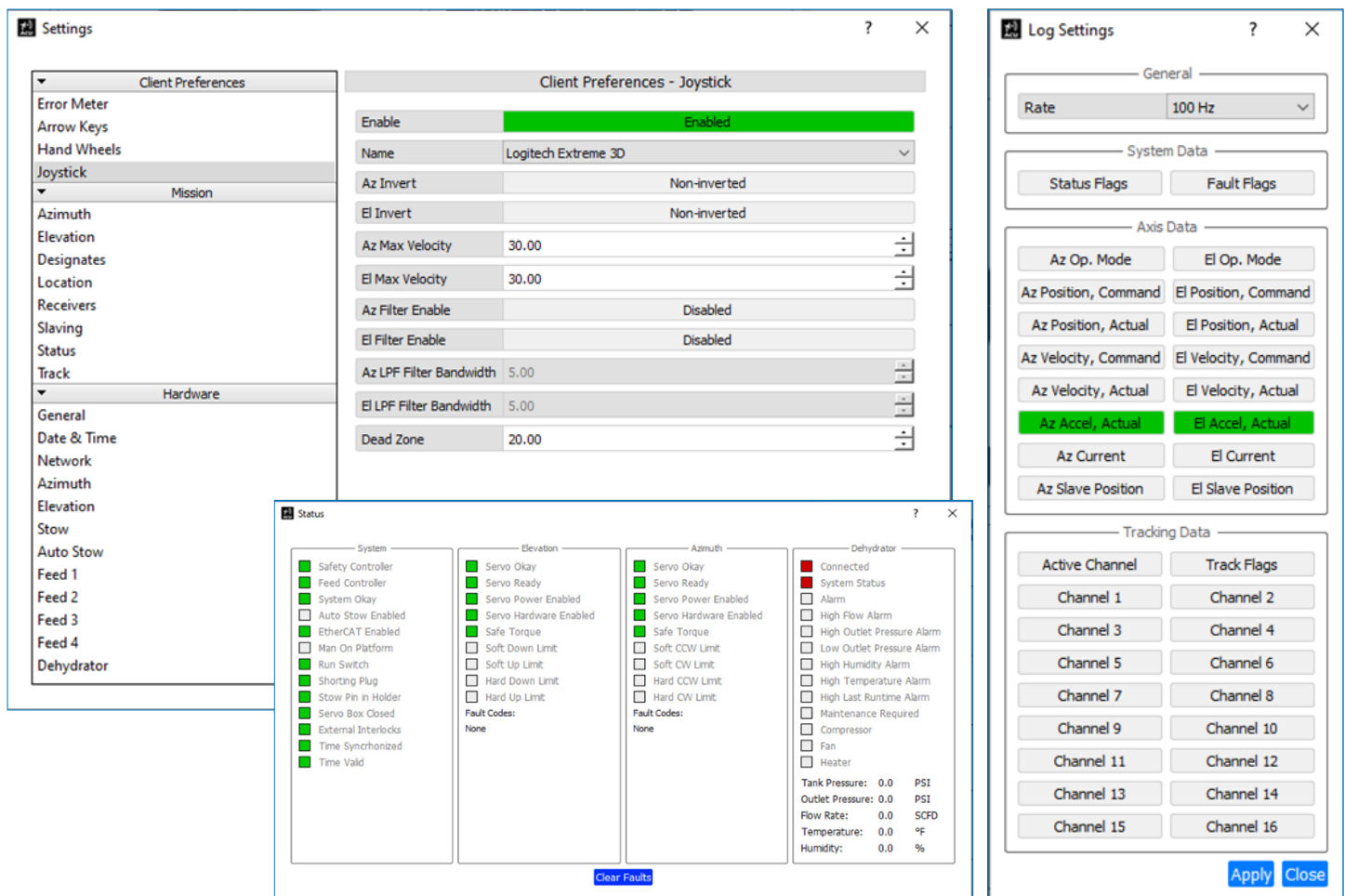
Powerful, Intuitive User Interface – Less clutter on the main screen for easier operation; setup and advanced status reporting are on sub-menus and sub-windows

Multiple Tracking Modes – Accepts pointing data from remote customer slave sources; server-based local HTAC allows for slaving of one HyperTrack to another and enables tracking from user-provided files of predicted or projected data

Smaller 2U Form Factor – “Headless” design minimizes required rack space; 4.3 inch touchscreen for set up and network configuration

More Detailed System Status Feedback – Safety controller, dehydrator status, power health, position, velocity, motor current, track error, RSSI, dynamic bandwidth, and many others

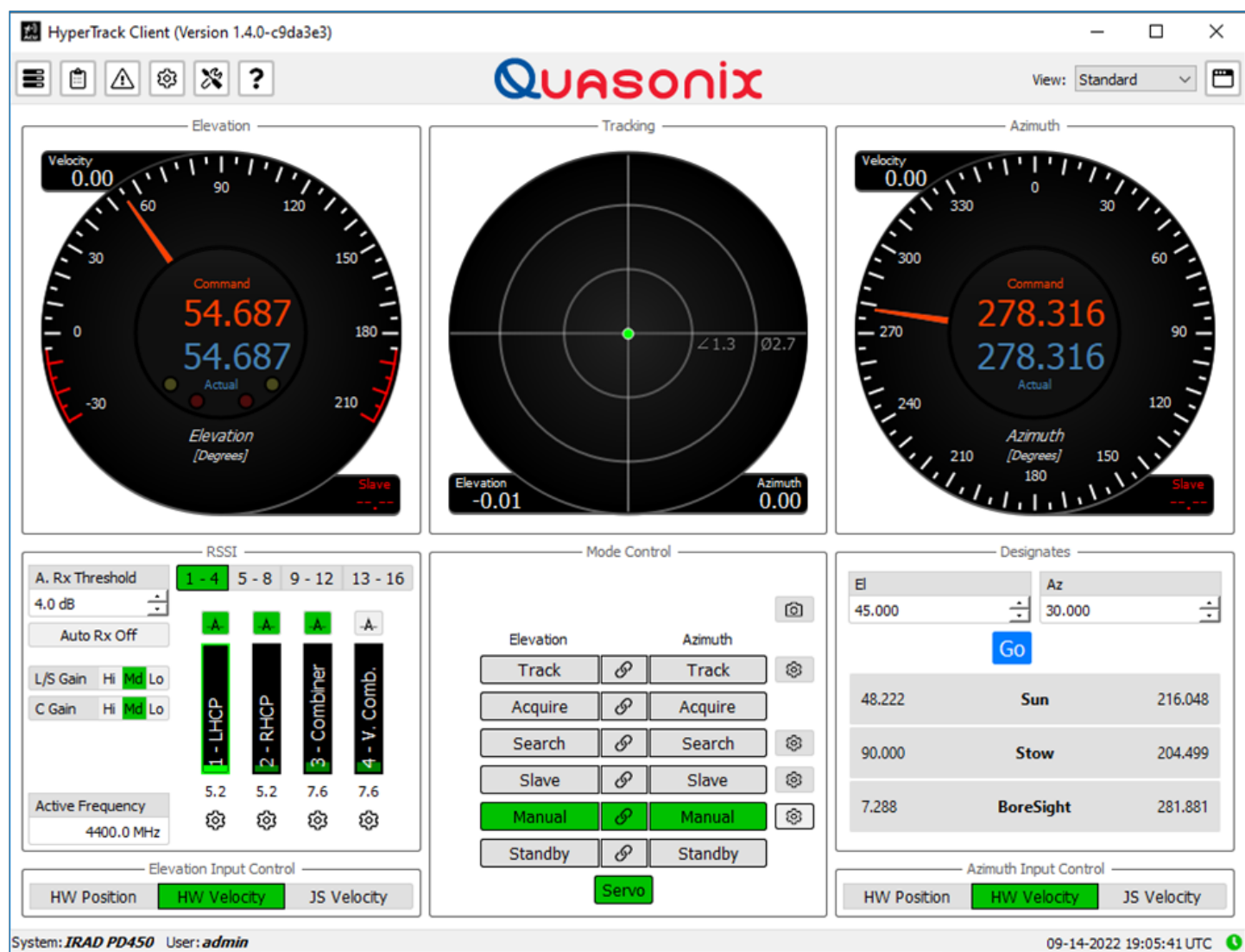
Comprehensive Diagnostics – Comprehensive status and diagnostic information; real-time scroll plots for Position, Velocity, and Current for each Axis; real-time scroll plots for Tracking Error, AGC, and Tracking Loop Performance; network-accessible oscilloscope view of antenna AM, AGC, and DQM; Scope Snapshot Recorder for post-mission analysis; user-configurable system status logger for post-mission analysis



HyperTrack Antenna Controller (HTAC) Interface

Quasonix combines a state-of-the-art FPGA based, real-time antenna controller with a straightforward, touchscreen configuration interface for setup. This enables the user to work from a remote display for configuring, monitoring, and controlling all missions. All status related to the pedestal and HTAC operations can be continuously broadcasted via a multicast port, allowing any computer on the network to gather all system information in one data-log, time-stamped ASCII file.

- Touchscreen user interface
- Back-panel USB, ethernet, serial, and test ports
- Solid-state storage memory
- Ethernet-based remote operation
- Comprehensive calibration tools
- Connections for up to 8 receiver channels



Control the auto-tracking antenna with the remote user interface

Antenna Feeds

Environmentally Protected Feeds — All Quasonix feeds are maintenance-free, using heating and dry-air pressurization to reduce moisture ingress for maximum life expectancy and ensuring consistent performance in any weather.

Dual Polarizations for Both Receive and Transmit — E-scan and Conscan feeds offer simultaneous left-hand and right-hand circular polarizations.

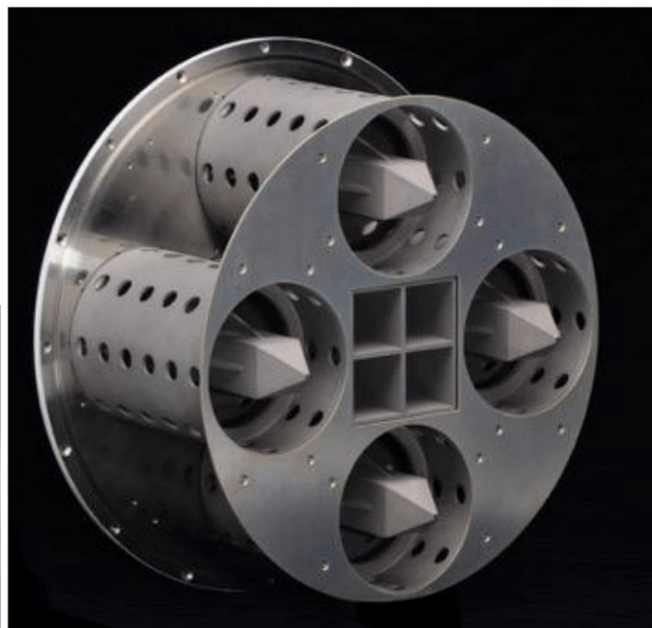
Electronically Scanned Feeds

Electronic Scanning for Highly Dynamic Targets — Quasonix E-scan feeds sweep the beam by electronic means, allowing scan rates up to 2.0 kHz. These high scan rates can greatly mitigate the challenges inherent in tracking targets that impose high degrees of amplitude modulation on the transmitted signal (rotorcraft or spinning missiles, for example).

3D-printed Waveguides — Assure best possible low VSWR and low axial ratio across the band.

Multiple Frequency Bands in a Single Feed — E-scan feeds are available in multi-band configurations covering Lower L, Upper L, S, and C bands in a single feed; low-loss, high-selectivity cavity tuned filters for interference rejection.

No spars required — The SCM feed can support its subreflector without spars.



Antenna Feeds (Continued)

Conical Scanning Feeds

Highest Possible G/T for a Single L/S or C-Band Feed — Quasonix Conscan feeds integrate brushless, hollow-shaft DC motors with the most innovative waveguides in the industry to cast the smallest shadow on the reflector. In conjunction with the direct routing of the waveguides to the RF output connectors, this ensures that the complete system is delivering the highest-quality signal.

High Reliability Conical Scanning — Utilizing brushless, hollow-shaft DC motors with permanently sealed bearings, high-precision balancing, and pressurized enclosures, Quasonix Conscan feeds provide decades of trouble-free operation.

Multiple Frequency Bands — Conscan feeds are available in multi-band configurations covering Lower L, Upper L, S, and C bands in a dual feed; low-loss, high-selectivity cavity tuned filters for interference rejection.



Telemetry Antenna Systems

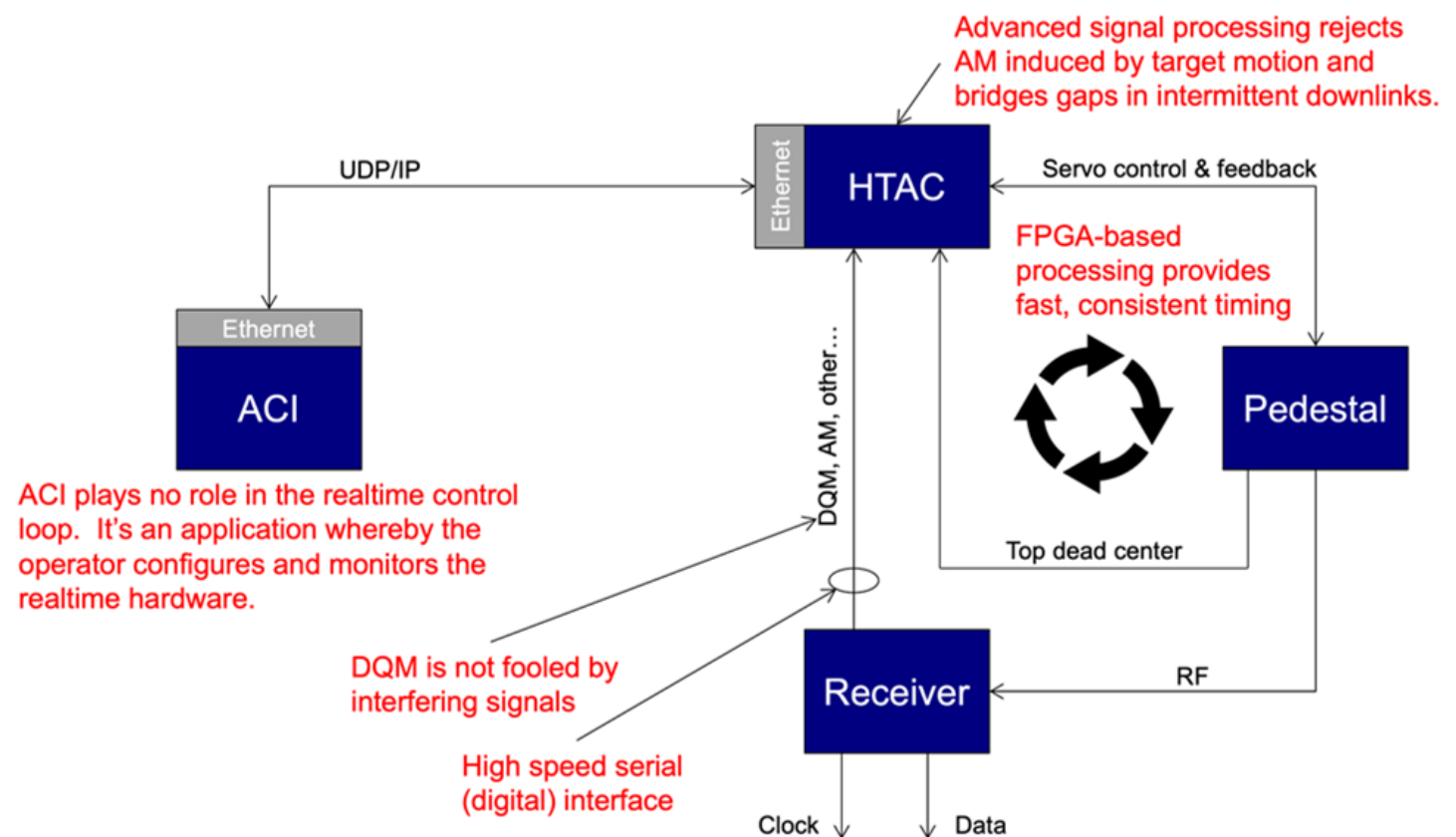
Target Simulator – Each Quasonix antenna system includes the Target Simulator, whereby the motion of a virtual target is defined and controlled. This becomes an amazingly powerful tool when used in conjunction with the Ground Station Analyzer.

Ground Station Analyzer – Integral to HyperTrack, the breakthrough Ground Station Analyzer (GSA) generates an RF signal with the correct amplitude modulation (depth and phase) to match the motion of the virtual target. This RF signal is radiated from the subreflector to the feed. Unlike “test signal injection” schemes, where the AM signal is inserted somewhere downstream of the feed, the GSA exercises every single component in the RF path. No defect or failure can be overlooked.

Engineered and Manufactured Entirely in the USA – Quasonix has two facilities, both in the USA. Our transmitters and receivers are designed, built, tested, and supported from our headquarters in West Chester, Ohio. Our antenna division is anchored in Moorpark, California, but our Ohio facility provides both engineering and manufacturing support to our California team.

Complete Telemetry System Integration – Quasonix has already delivered thousands of transmitters, hundreds of receivers, and dozens of Receiver Analyzers (RF signal simulators) to the telemetry market, and our technical leadership is widely recognized.

The telemetry antenna systems are a seamless extension of this technical edge, and you can be assured that if one vendor – Quasonix – provides every RF component in the link, the overall system will operate smoothly and effectively.



HyperTrack Functional Flow

Better, Stronger, Faster

HyperTrack is going places, through innovative engineering that allows for greater size, mobility, and utility, while maintaining extended durability and jitter-free precision tracking.

System architecture is linear and scalable across the entire series of antenna models. The scalable architecture minimizes spare costs and training costs while maximizing flexibility and commonality.

Below are some ongoing HyperTrack product-line extensions driven by requests for solutions from the marketplace.

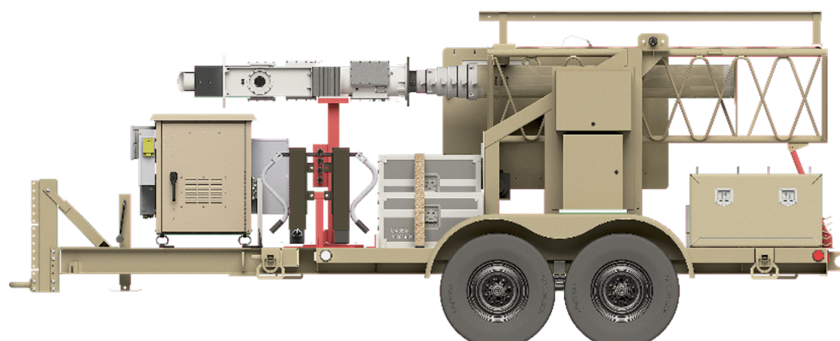
PD500 8-foot (2.4-meter) Reflector on a Trailer



Digital Antenna – RF arrives, IP packets delivered

PD300 4-foot (1.2-meter) System – Land or Mobile

The PD300 is a scaled-down version of our standard HyperTrack Model PD450. It supports customer requirement for smaller multifunction mobile or transportable 4-foot (1.2-meter) reflector assemblies. It shares the same architecture, precision, and quality as the entire family of Quasonix HyperTrack Antenna systems. The Mobile PD300 depicted here includes a 30-foot mast. This allows target tracking over obstructions for clean data collection.



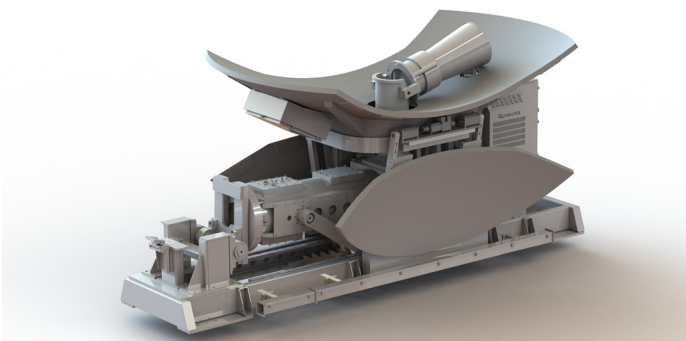
Better, Stronger, Faster (Continued)

ADAPT™ PD750 12-foot (3.7-meter) System with Automated Deployment

The Quasonix ADAPT PD750 auto-deployable antenna gives you our best-in-class HyperTrack data acquisition in a portable, large reflector size with fast and easy setup.



The ultimate in mission readiness anywhere in the world



Stored configuration

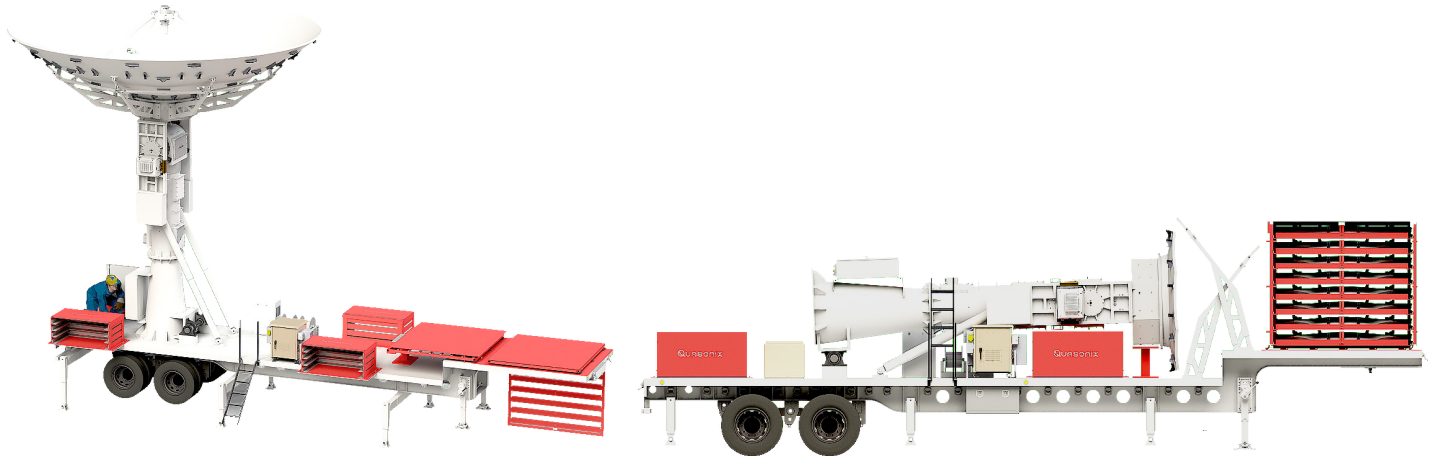


Fully deployed

Better, Stronger, Faster (Continued)

PD900 24-foot (7.3-meter) System – Land or Mobile

The PD900 is modular antenna assembly that supports prime focus, Cassegrain and prime/Cassegrain configurations. Standard feed types include Single Channel Monopulse (SCM), CONSCAN, or a combinations of types. As with the entire series of our positioners, the PD900 is built from known proven technology utilized in the robotics industry - applications requiring 24 hours, 7 days a week precision positioning with a 98% uptime requirement - far more demanding than duty cycles in our market.



The PD900 Mobile has been designed to be compliant with US road standards and US military air transport without modification. All Quasonix-supplied equipment is stored on the trailer system and not on the tow vehicle. The mobile configuration allows the user the most flexibility in multipurpose use of the asset.



PD900 fixed system with a 24-foot composite radome

Modular design results in reduced costs via common spare parts, a common user interface, and common operator and maintenance training



Better, Stronger, Faster (Continued)

PD900 24-foot (7.3-meter) System – Land or Mobile (Continued)



You can see the future from here.

Warranty

Our commitment to our HyperTrack™ customers goes beyond providing the best possible hardware and software; we also include lifetime support. All HyperTrack™ systems come with the following:

A Lifetime Software Warranty — Quasonix provides free updates to our software. Our upgrades are backward compatible and allow all calibration data to be kept. As more features and capabilities become available, we provide them to our customers free of charge.

A Three-Year Hardware Warranty — All Quasonix HyperTrack™ antenna systems come with a comprehensive three-year warranty. Provided that our customers certify that visual inspections and servicing have been maintained per our written instructions, any hardware issues are covered free of charge.

Lifetime User Support — All Quasonix HyperTrack™ antenna systems come with phone support for technical assistance. Our legendary customer service is provided via our technical support staff in Ohio and California and through our extensive representative network. In addition to being available by phone, we can be contacted via our support portal at support@quasonix.com.

Side-by-Side Comparison of HyperTrack Pedestals

	PD300		PD450		PD500		PD750		PD900	
Antenna Capability	Up to 4 feet (1.2M)		Up to 6 feet (1.8M)		Up to 10 feet* (2.44M)		Up to 16 feet (5M)		Up to 24 feet (7.3M)	
Typical Conscan Performance	4' (1.2 Meter) G/T - Beamwidth		6' (1.8 Meter) G/T - Beamwidth		8' (2.44 Meter) G/T - Beamwidth		16' (5 Meter) G/T - Beamwidth		23' (7.3 Meter) G/T - Beamwidth	
1500 MHz	-0.5	11.2°	3.5	7.5°	6.3	5.5°	12.7	2.7°	14.5	2.2°
2300 MHz	3.0	7.3°	7.0	4.9°	9.8	3.6°	16.2	1.7°	18.0	1.4°
4400 MHz	5.5	4.0°	9.0	2.5°	11.0	1.9°	17.0	0.9°	21.5	0.65°
Compliance (radians/ft lb.)	1.75 x 10 ⁻⁵		2.3 x 10 ⁻⁵		2.0 x 10 ⁻⁵		4.0 x 10 ⁻⁷		2.0 x 10 ⁻⁷	
Pedestal Wgt	175 lbs		400 lbs		800 lbs		2400 lbs		3950 lbs	
Wind Operating Gusting Survival	50 MPH 65 MPH 120 MPH		50 MPH 65 MPH 120 MPH		45 MPH –10 feet* 50 MPH – 8 feet 65 MPH 120 MPH		50 MPH 65 MPH 120 MPH		50 MPH 65 MPH 120 MPH	
Power Requirements	1.5 KW 115/230 VAC 50-60 Hz, 1Ø		2.5 KW 115/230 VAC 50-60 Hz, 1Ø		3.0 KW 115/230 VAC 50-60 Hz, 1Ø		4.0 KW 208/400 VAC 50-60 Hz, 3Ø		5.0 KW 208/400 VAC 50-60 Hz, 3Ø	
Torque	Cont-125 ft-lbs Peak-250 ft-lbs		Cont-235 ft-lbs Peak-400 ft-lbs		Cont-900 ft-lbs Peak-1800 ft-lbs		Cont-3600 ft-lbs Peak-7200 ft-lbs		Cont-5800 ft-lbs Peak-12000 ft-lbs	
Velocity	30°/sec		30°/sec		30°/sec		20°/sec		15°/sec	
Acceleration	40°/sec ²		40°/sec ²		40°/sec ²		20°/sec ²		20°/sec ²	
Backlash	0.016 degrees typical									
VSWR	2:0:1 maximum									
Axial Ratio	<2.0 dB maximum									
Polarization	Simultaneous dual or single, all variants of Circular or Linear polarization									
Travel	Azimuth: Continuous, Optional up to + 420° with pre-limits Elevation: -8° to +188° (Software), -10° to +190° (Electrical), -12° to +192° (Mechanical)									
Environmental										
Operating Temperature	-30°C to +52°C									
Storage Temperature	-54°C to +71°C									
Relative Humidity	Up to 100%, including condensation									
Rain	Up to 4 inches per hour									
Ice	1/2 inch, Radial									

HyperTrack Configuration

Primary Configuration			
Pedestal Size	300 450 500 750 900	Reflector Format	P: Conscan sectional S: Conscan solid C: Spar-mount Cassegrain M: Monopod Cassegrain
Reflector Size	03: 3 ft (1.0 m) 04: 4 ft (1.2 m) 06: 6 ft (1.8 m) 08: 8 ft (2.4 m) 10: 10 ft (3.0 m) 12: 12 ft (3.7m) 14: 14 ft (4.3 m) 16: 16 ft (5.0 m) 20: 20 ft (6.1 m) 24: 24 ft (7.3 m)	Slip Ring/Cable Wrap	CW: Cable wrap S2: Slip ring / 2-channel rotary joint
		Feed Type	C: Conscan auto-tracking E: Escan auto-tracking N: Non-tracking

Frequency Range				
Band Code ID*	Lower L 1435.0 MHz to 1535.0 MHz	S 2200.0 MHz to 2290.0 MHz; 2365.0 MHz to 2395.0 MHz	US C 4400.0 MHz to 5150.0 MHz	Euro C 4400.0 MHz to 5250.0 MHz
C			✓	
F		✓		✓
L	✓			
M	✓	✓		
Q	✓	✓	✓	
S		✓		
V	✓			✓

* Additional frequency ranges and combinations available. Contact Quasonix for more information.

Options

- AS: Auto Stow

CA: Ethernet-based HD Camera, 1080p 30 fps, h.264.
Hardware h.264 to HDMI decoder and display included

FC: Fiber Optic Control Connections

FR: Fiber Optic RF

GP: Differential GPS; Position and Heading

GY: MEMS IMU; Position, Heading and Motion Compensation
- PS: Pedestal Spacer

RB: Reinforced Backup Structure

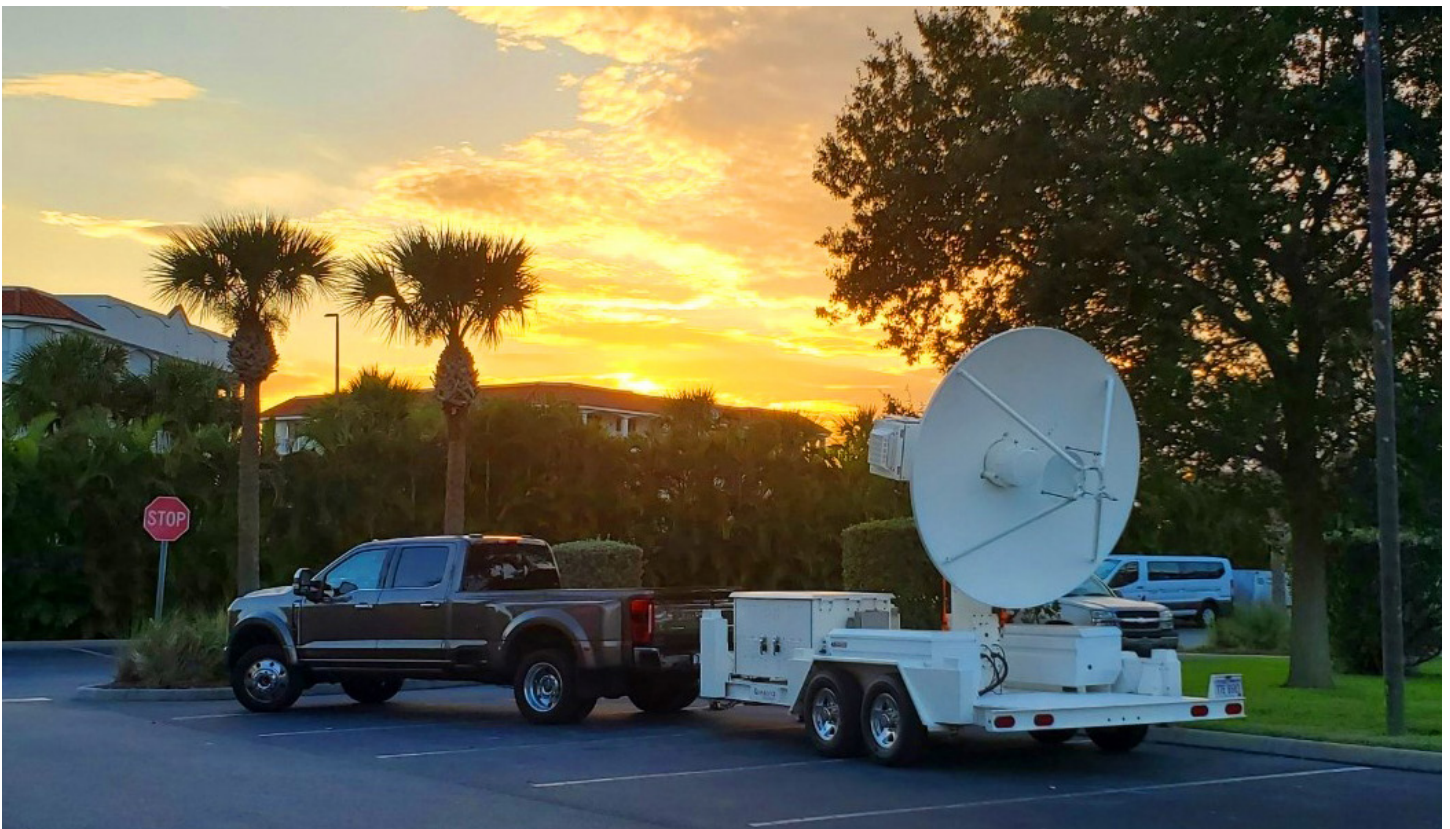
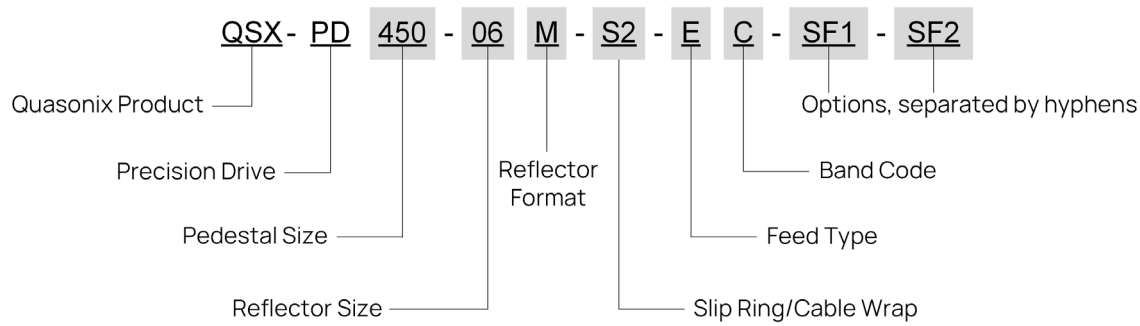
SF1: Site-Specific Feed Filtering

SF2: Site-Specific Feed Filtering

TR: Tripod

TX: Uplink Transmit Capable

HyperTrack Antenna Part Numbering Example



Proof that you CAN take it with you

Quasonix

All Quasonix products are under U.S. Dept. of Commerce jurisdiction. Antenna products are categorized as 5A991.
ISO 9001:2015 Certified | Specifications subject to change without notice.

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