

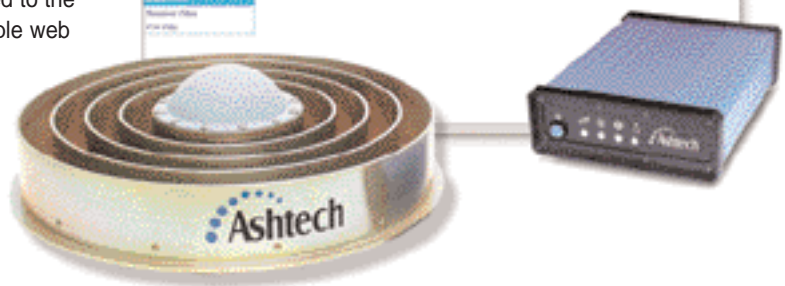
INTERNET-ENABLED GEODETIC REFERENCE SYSTEM

iCGRS System

The Ashtech® Internet-Enabled Continuous Geodetic Reference Station (iCGRS™) from Thales Navigation Professional Products provides you with direct Internet connectivity for the world's most powerful GPS Reference Station technology. The iCGRS is an enhanced version of the Ashtech MicroZ-CGRS (μZ-CGRS™) with an embedded PC running Linux. Designed for high-accuracy applications, the iCGRS system is ideal as a permanent GPS base station that is directly connected to the Internet. You can communicate with the receiver through a simple web page interface.

The iCGRS system has been designed to meet the stringent requirements of continuous unattended operation for the collection of high-quality, dual-frequency GPS data. Data files can be downloaded from the iCGRS while the receiver continues tracking and logging data, and you can stream data in real time. External frequency input is standard. Now there is no need to use an expensive, power hungry external PC to connect your reference station to the Internet.

Networks such as the U.S. and Canadian Coast Guards' Differential GPS network, Southern California Integrated GPS Network, National Geodetic Survey's CORS network, the Bay Area Regional Deformation network, the China Seismological Bureau, and the Shanghai Multi-Function Reference Network rely on Ashtech reference stations.



INTERNET CONNECTION

The iCGRS from Thales Navigation connects directly to a network using Ethernet. We provide a cable with an RJ-45 connector for direct network connection. Once connected you can control, monitor, and download data using a web browser. You can also set up automatic FTP downloading of data, or stream data in real time.

The screenshot shows the iCGRS web interface. On the left is a navigation menu with options like 'Receiver / EPC View', 'Receiver Status', 'EPC Status', 'Channel / SV Status', 'Position Status', 'Receiver / EPC Setup', 'Receiver Setup', 'EPC Setup', 'Data Files', and 'Receiver Files'. The main content area is titled 'Ashtech Channel Status' and contains two tables. The first table, 'Channel Status', shows data for 12 channels. The second table, 'SV Status', shows satellite status for 12 satellites. Below the tables is a circular 'SV Status' plot showing satellite positions in the sky.

Channel	1	2	3	4	5	6	7	8	9	10	11	12
Satellite PRN	31	14	13	21	3	0	25	20	7	16	6	10
L1 CA S/N	48	54	52	51	44	SPC	52	39	SPC	SPC	SPC	46
L1 P S/N	47	53	50	50	43	SPC	50	39	SPC	SPC	SPC	43
L2 P S/N	43	45	45	45	38	SPC	45	32	SPC	SPC	SPC	39
L1 CA Cnt	999	999	999	999	999		999	999				999
L1 P Cnt	999	999	999	999	999		999					999
L2 P Cnt	999	999	999	999	999		999	999				999
Elevation	21	62	36	37	9		42	0				5
Azimuth	244	35	307	80	207		158	269				93
IRA	1	0	0	0	0		2	0				1
Health	0	0	0	0	0		0	0				0

This screenshot shows the 'Session Programming' section of the iCGRS web interface. It includes fields for 'Enable', 'Reference Day', 'Offset Per Day', 'Auto Configure', 'Interval', 'Elevation', 'Min. SVs', and 'Data Type'. There are also 'Auto Set' and 'Manual Set' buttons. Below these fields is a table for session configuration.

Session Number	Session ID	Use	Start Time	End Time	Interval	Elevation	Min. SVs	Data Type
1	A	Yes	00:00:00	00:14:59	030.0	15	3	70f
2	B	Yes	00:15:00	00:29:59	030.0	15	3	70f
3	C	Yes	00:30:00	00:44:59	030.0	15	3	70f
4	D	Yes	00:45:00	00:59:59	030.0	15	3	70f
5	E	Yes	01:00:00	01:14:59	030.0	15	3	70f
6	F	Yes	01:15:00	01:29:59	030.0	15	3	70f
7	G	Yes	01:30:00	01:44:59	030.0	15	3	70f
8	H	Yes	01:45:00	01:59:59	030.0	15	3	70f
9	I	Yes	02:00:00	02:14:59	030.0	15	3	70f
10	J	Yes	02:15:00	02:29:59	030.0	15	3	70f
11	K	Yes	02:30:00	02:44:59	030.0	15	3	70f
12	L	Yes	02:45:00	02:59:59	030.0	15	3	70f

You can easily program recording sessions through a browser window.



iCGRS back panel

The status of each tracking channel and the location of each satellite in view are displayed in a single window.

COMMUNICATION PROTOCOL OPTIONS

The iCGRS provides a choice of Internet communication protocols for different applications, including TCP/IP or UDP for data streaming, FTP for file transfer, and HTTPS for web page access. ZMODEM protocol is supported on the serial ports.

REAL-TIME DATA STREAMING

One of the main advantages of the iCGRS is its ability to stream raw data and RTCM corrections in real time. The iCGRS provides addressing for up to five independent Ethernet ports. Available streaming protocols are TCP/IP and UDP, and the receiver can either act as a server or client for these ports. Available raw data types include Ashtech proprietary MBN, PBN, DBN, and SNV, as well as BINEX data. RTCM V 2.3 corrections are also available for streaming.

AUTOMATIC E-MAIL REPORTING

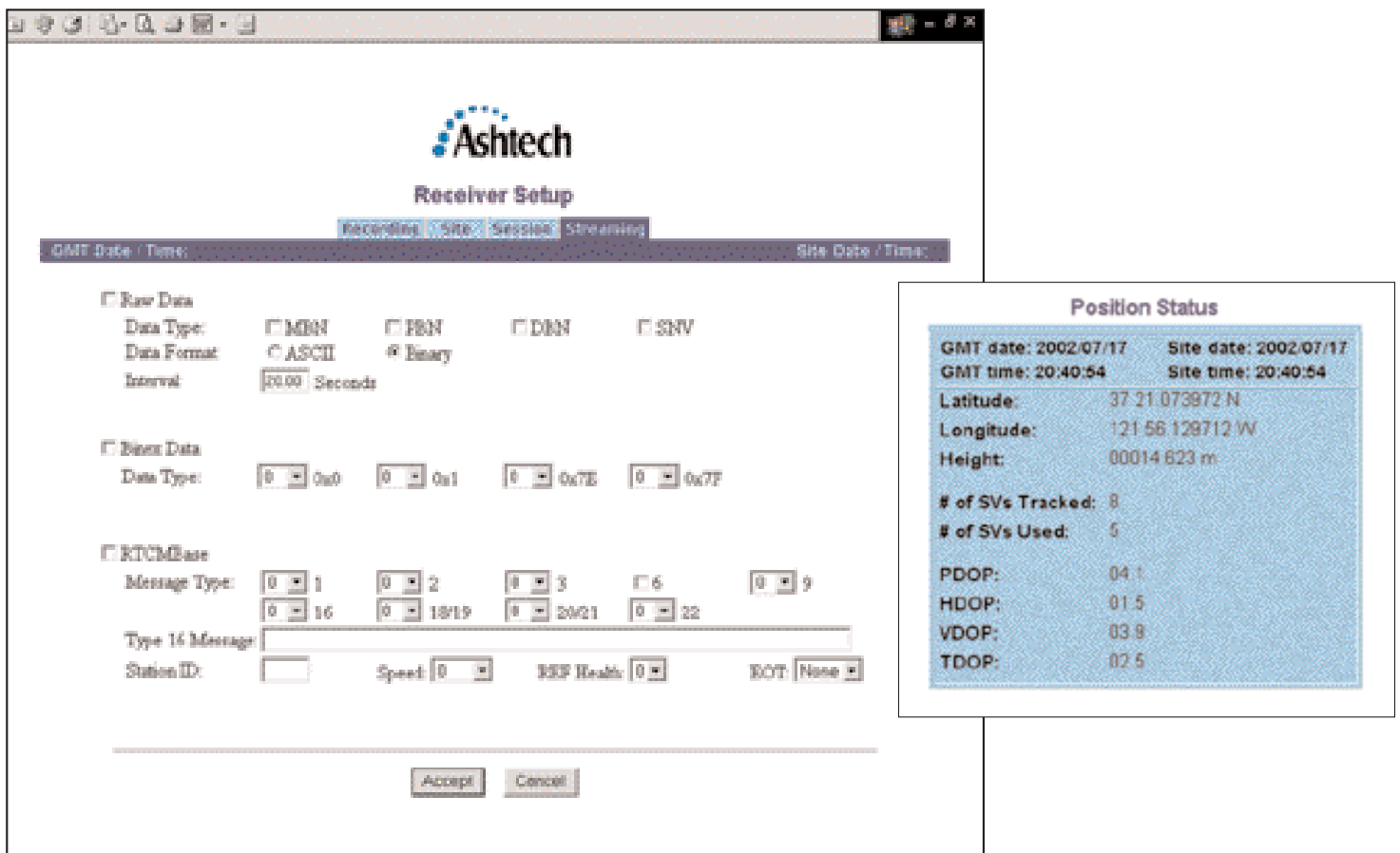
In the event of an error condition, the iCGRS can send an e-mail notification automatically to the system administrator. Other levels of e-mail reporting are possible, including a complete EPC process status report.

ADVANCED SESSION PROGRAMMING

The iCGRS can be programmed to automatically create sessions as short as 15 minutes. The web GUI includes a simple tool to configure session parameters, including time span, recording interval, satellite elevation, and data recording mode. Once the parameters are defined for one session, the GUI will generate the parameters for all sessions based on the session duration.

POWERFUL Z-TRACKING TECHNOLOGY

The iCGRS system is built upon field-tested and patented Ashtech Z Technology™ for high Signal to Noise ratios on L2. This means uninterrupted operation during Anti-Spoofing (AS) and large ionospheric activity. Standard features of the iCGRS receiver include all-in-view 12-channel operation, multi-bit signal processing for RF jamming immunity, and SAW filtering techniques.



The status of each tracking channel and the location of each satellite in view are displayed in a single window.

FULL MET/TILT SENSOR INTEGRATION

The iCGRS is easily integrated with a meteorological sensor and/or a tilt meter. The user can connect to both sensor types simultaneously. Met and Tilt data are logged and can be downloaded together with the GPS data, or streamed in real time.

CHOKE RING ANTENNA FOR HIGH PRECISION

The iCGRS System is available with the high-precision Ashtech L1/L2 Choke Ring antenna. This antenna is the accepted design for the International GPS Service (IGS) tracking network, the Southern California Integrated GPS Network (SCIGN), and numerous other networks around the world.

OPTIONAL GEODETIC IV ANTENNA

The Ashtech Geodetic IV™ antenna with removable ground plane is available as an option. This is the standard antenna offered with Ashtech RTK systems and provides a lower cost alternative to the choke ring antenna.

MICRO-MANAGER CONTROL SOFTWARE

Micro-Manager™, a Windows control software package, is bundled with every iCGRS system. Micro-Manager provides complete control

over the receiver allowing the user to easily set receiver parameters, program recording sessions, download data, and upload new firmware through a direct serial connection. Micro-Manager Pro, which allows modem control and FTP of downloaded data as well as other capabilities, is available separately. Micro-Manager Pro, which allows modem control, FTP of data downloaded to a PC, as well as other capabilities, is available separately.

OPTIONAL RTCM SC-104 V 2.3 BROADCAST

Even while the iCGRS is logging precise GPS data, it can broadcast RTCM-104 v 2.3 corrections to users for DGPS and RTK. This option allows you to easily use the same receiver for multiple tasks, providing you more value for your investment.

A COMPLETE MULTI-FUNCTION REFERENCE STATION SOLUTION

Ashtech reference stations have set the industry standards for high precision continuous operation. With the introduction of the iCGRS system, powerful easy-to-use reference station technology can be easily accessed directly through the Internet.

Measurement Precision¹

C/A (>10° elevation)

- Pseudo-range: 25 cm/ 3.6 cm (raw/ smooth)²
- Carrier phase: 0.9 mm

P-Code AS Off (>10° elevation)

- L1 Pseudo-range: 15 cm/ 0.9 cm (raw/smooth)²
- L1 Carrier phase: 0.9 mm
- L2 Pseudo-range: 21 cm/ 1.3 cm (raw/smooth)²
- L2 Carrier phase: 0.9 mm

P-Code AS On (Z-Tracking)

- L1/ L2 Pseudo-range (raw/ smooth)²
- 10 – 30° Elevation: 120 cm/ 20 cm
- 30 – 50° Elevation: 25 cm/ 6 cm
- > 50° Elevation: 10 cm/ 3 cm

L1/L2 Carrier phase

- >10° Elevation: 1.4 mm

Systematic Errors (Between Satellites)

- Pseudo-range (all bands): < 1.00 cm
- Carrier phase (all bands): < 0.01 cm

System Components

ICGRS Receiver

- 12-channel all-in-view operation
- Patented Z-Tracking technology
- Full tracking of L1 C/A Code, L1/L2 P Code, and L1/L2 full-cycle carrier
- 32 MB memory
- 4-LEDs; power/SV; raw observable data logging; MET/TILT data logging/Ethernet activity
- 4 independent programmable serial ports
- 1 Ethernet port to five IP addresses
- Ethernet cable with RJ-45 jack plug
- Remote monitoring capability

- External frequency input (5, 10, 20 MHz)
- Real-time data outputs
- Z-Modem protocol
- NMEA 0183 message outputs
- Session programming
- Micro-Manager Control Software
- Rugged construction
- 5 Hz data output
- Receiver reference manual
- 1-year warranty
- Free technical support

Choke Ring Antenna

- 100% IGS compatible choke ring design
- Dome & Margolin C146 dipole antenna element
- Proprietary Ashtech low-noise amplifier (LNA)

Cables

- 30 m antenna cable
- 60 m antenna cable
- Car battery cable
- Power cable
- Power Y-cable
- Single RS-232 data cable
- Dual RS-232 data cable
- 1 PPS timing signal (5V TTL) plus serial cable
- Dual Met/Serial I/O cable

Powers

- 110/ 220 VAC 50/ 60 Hz UL, CE Power Supply
- Softcase Battery
- Battery Charger

Communications

- 4 bi-directional RS-232 serial ports (115,200 baud rate)
- Ethernet connector for direct Internet connectivity

Environmental and Physical Specifications

Dimensions

- Inches: 2.5 H x 7.01 W x 9.6 D
- cm: 6.3 H x 17.8 W x 24.3 D

Weight

- Receiver: 3.60 lbs. (1.7 kg)
- Antenna: 9.41 lbs. (4.3 kg)

Power

- 10-28 VDC, 8.0W

Temperature Ranges Receiver

- Operating: -40°C to +55°C (-38°F to 131°F)
- Storage: -40°C to +85°C (-38°F to 185°F)

Antenna

Temperature Ranges

- Operating: -40°C to +65°C (-38°F to +149°F)
- Storage: -55°C to +75°C (-65°F to +167°F)

Environmental

- Meets MIL STD 810E for wind-driven rain and dust.

Optional Accessories and Features

- 128 MB memory upgrade
- Fast data output (10 Hz)
- Real-time Kinematic (RTK) broadcast capability for centimeter-level accuracy
- RTCM message outputs (1, 2, 3, 6, 9, 16, 18/ 19, 20/ 21, 22)
- Geodetic IV antenna with removable ground plane
- Antenna line amplifier
- Geodetic Base Station Software
- Micro-Manager Pro Remote Operation Software
- Ashtech Solutions™ Post-processing Software
- Meteorological package
- Tilt sensor

Ordering Information

Receiver Part Number

iCGRS Receiver 800940-XX

(1) Precision specifications are rms values for the lowest possible signal strengths as specified in ICD-GPS-200B.

(2) The μ Z receiver provides both raw pseudo-range and a smoothing correction. Applying the smoothing correction to the raw pseudo-ranges yields the high accuracy pseudoranges.

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Thales Navigation follows a policy of continuous product improvement; specifications and descriptions are thus subject to change without notice. Please contact Thales Navigation for the latest product information.

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