The Global Communications Infrastructure (GCI) is designed to transmit raw data from the 337 facilities of the International Monitoring System (IMS) in near real time to the International Data Centre (IDC) in Vienna for processing and analysis. The GCI is also designed to distribute to States Parties analysed data and reports relevant to verification of compliance with the Treaty. Digital signatures and keys are used to ensure that the transmitted data are authentic and have not been tampered with.

Using a combination of satellite and terrestrial communication links, this global network will enable the exchange of data by IMS facilities and States in all areas of the world with the CTBTO. The GCI is required to operate with 99.5% availability and to provide data within seconds from origin to final destination. It began provisional operations in mid-1999.
HIGHLIGHTS IN 2008

COMPLETION of migration to the new GCI technology platform and launching of GCI II

ADDITION of 12 very small aperture terminals (VSATs) and four new virtual private network (VPN) links established as backups to VSAT links

INCREASE in volume of data traffic carried by the GCI and by special links to the IDC, and from the IDC to remote sites.

GCI TECHNOLOGY

The GCI is the first global satellite communications network based on very small aperture terminals (VSATs). IMS facilities and States Signatories in all but near-polar areas of the world can exchange data via their local VSAT earth stations through one of six geosynchronous satellites. The satellites route the transmissions to hubs on the ground and the data are then sent to the IDC by terrestrial links.

A virtual private network (VPN) utilizes existing telecommunications networks to conduct private data transmissions. Most of the VPNs for GCI II use the basic public infrastructure of the Internet together with a variety of specialized protocols to support private communications. In situations where VSATs are still not in use or not operational, VPNs, though generally slower, provide an alternative means of communication.

EXPANDING GLOBAL COMMUNICATIONS

GCI coverage continued to expand throughout 2008, with 12 new VSATs installed as well as four new VPN links used as backups to VSAT links.

At the end of the year, the GCI included 214 VSATs in operation and 25 VPNs. Five multiprotocol label switching (MPLS) circuits replaced the frame relay link of the previous GCI technology. The number of planned VSATs has been reduced owing to the conversion of some sites to reliance on independent subnetworks (ISNs) or because some were provided with a VPN connection instead.
The volume of data traffic carried by the GCI and by special links to the IDC increased during the year, as did the flow of data in the other direction from the IDC to remote sites.

**MIGRATION TO GCI II**

The migration of the GCI to a new technology platform was completed by July 2008 without major disruptions to the data flow.

The PTS global VSAT network comprises more than 200 sites in nearly 100 countries. The migration was performed as part of a 10 year contract with UltiSat, Inc., which designed, implemented and commissioned a secure hybrid satellite–terrestrial network to accomplish the objectives.

With support from the PTS, the new contractor completed regulatory filings, obtained host country agreements and secured operating licences for all terminals in most countries in less than 12 months. Using leased capacity on six different satellites and an MPLS terrestrial network infrastructure, UltiSat operates and maintains this closed and secure global network in some of the world’s most remote and harsh environments.

GCI II is capable of managing the performance of each link from each site, which was not possible with the previous technology. It also makes use of off the shelf rather than proprietary products for network management applications and has higher security standards than the original GCI.
Currently, GCI II includes 214 VSAT stations, 25 stand-alone VPN links, four backup VPN links, four ISNs on terrestrial links, one terrestrial link for US stations located in Antarctica, four satellite hubs (one in Norway, two in the USA and one in Japan), six satellites, one network operations centre (Maryland, USA), one service management desk (Vienna) and a core terrestrial network operated by a major service provider. The satellites cover the Pacific Ocean region, Japan, North America, the Atlantic Ocean, Europe and the Middle East, and the Indian Ocean region.