THE GLOBAL COMMUNICATIONS INFRASTRUCTURE

HIGHLIGHTS IN 2018

High GCI availability maintained through migration to new infrastructure

An average of 36 gigabytes of data and products transmitted per day

Third generation of the GCI for 2018-2028 is operational

GCI III installation on the roof of the Vienna International Centre (Austria).

The Global Communications Infrastructure uses a combination of communications technologies including satellite, cellular, Internet and terrestrial communication links to enable the exchange of data between IMS facilities and States around the world and the Commission. The GCI first transports raw data from the IMS facilities in near real time to the IDC in Vienna for processing and analysis. It then distributes the analysed data to States Signatories along with reports relevant to verification of compliance with the Treaty. Increasingly, the GCI is also being used as a means for the Commission and station operators to monitor and control IMS stations remotely.

The current, third generation of the GCI began operation in 2018 under a new contractor. Its various communication links are required to operate with 99.5% availability and its terrestrial communication links with 99.95% availability. The GCI is required to send data from transmitter to receiver within seconds. It uses digital signatures and keys to ensure that the transmitted data are authentic and have not been tampered with.

Technology

IMS facilities, the IDC and States Signatories can exchange data, via their local earth stations fitted with a very small aperture terminal (VSAT), through one of several commercial geostationary satellites. These satellites cover all parts of the world, other than the North and South Poles. The satellites route the transmissions to hubs on the ground, and the data are then sent to the IDC via terrestrial links. Complementing this network, independent subnetworks employ a variety of communications technologies to carry data from IMS facilities to their respective national communications nodes connected to the GCI, from where data are routed to the IDC.

In situations where VSATs are not in use or are not operational, other technologies such as broadband global area networks (BGANs), 3G/4G or virtual private networks (VPNs) can provide alternative means of communication. A VPN uses existing telecommunications networks to transmit data privately. Most of the VPNs for the GCI use the basic public infrastructure of the Internet together with a variety of specialized protocols to support secure encrypted communications. VPNs are also used at some sites to provide a backup communication link in case of failure of a VSAT or terrestrial link. For National Data Centres (NDCs) with a viable Internet infrastructure, a VPN is the recommended medium for receiving data and products from the IDC.

At the end of 2018, the GCI network included 266 redundant links. Of these, 206 are primary VSAT links backed up by 3G (110 links), BGAN (76 links), VPN (14 links) or VSAT (6 links). There are also 43 VPN links with VPN or 3G backup, 10 links with 3G primary and BGAN backup and 7 terrestrial multiprotocol label switching links. In addition, 71 independent subnetwork links and 6 Antarctic communication links were operated by 10 States Signatories to carry IMS data to a GCI connection point. In total, the combined networks have over 600 different communication links to transport data to and from the IDC.

Operations

The Commission measures the compliance of the GCI contractor against the operational target of 99.5% availability in one year using a rolling 12 month adjusted availability figure. In 2017, this was 99.68%. Full statistics for the calendar year 2018 are not available owing to the migration process from GCI II to GCI III. The adjusted availability for GCI III in the first six months of the operational phase (July-December 2018) was 99.58%. No sites went offline on the 30 June migration deadline. To avoid interruptions in service, the GCI III contractor, at its own expense, re-contracted some of the GCI II VSAT links temporarily to allow the primary links of the remaining stations to be migrated without loss of data communications.

Over the year, data transported over the GCI from IMS facilities to the IDC and from the IDC to NDCs averaged 36 gigabytes per day. Data sent to NDCs that are directly connected to the IDC averaged 11.9 gigabytes per day. These figures are similar to those of 2017.

Satellite Coverage of Global Communications Infrastructure III