

GLONASS –Satellite System (IGS and ILRS Tracking Status in 2002)

Between January 1 and May 31, 2002, there have been 7-8 healthy, operational GLONASS satellites. They are all in planes 1 and 3 of the constellation. The first new GLONASS-M satellite, GLONASS No. 711 in Plane 1/Slot 5, has not yet been designated as operational. It is not clear what if any problems may have been encountered after launch.

Microwave Technique / Tracking Status

The number of "permanent" IGLOS microwave tracking stations has grown slightly since December 2001. There are now 50 stations in the network, continuously tracking the GLONASS satellites and transmitting their data to the IGS Data Centers. Forty-five or more of these stations have been sending data to the data centers each week. Most of the receivers are Ashtech Z18 or JPS Legacy models. New stations that came on-line during the last three months include Frankfurt, Germany (FFMJ), Kourou, French Guyana (KOU1), and Zimmerwald, Switzerland (ZIMZ).

Satellite Laser Ranging / Tracking Status

The ILRS has agreed to continue to track three GLONASS satellites as part of their standard tracking protocol. In February 2002, the IGLOS Project Committee requested the ILRS to track two of the satellites in orbit plane 1 and one satellite in plane 3: Plane 1/Slot 1, Plane 1/Slot 3, Plane 3/Slot 24. A few weeks later Slot 1 has been set unhealthy, so this satellite was replaced by Plane 1/Slot 6.

Orbit Determination

BKG, ESA and the Russian Mission Control Center (MCC) continue to compute and make available GLONASS orbits on a routine basis. The MCC orbits are based on SLR data. A combination orbit is produced by Robert Weber, the IGS Analysis Center Coordinator, from the orbits of these three centers. Figure 1 below demonstrates the daily coordinate rms. of the center submissions with respect to the combined orbit (1998.8-2002.2). The consistency among all contributed orbit submissions is at the 20cm level, regardless of the basic observable. MCC orbit rms. numbers are of course somewhat noisier, caused by the low number of satellites tracked by ILRS. The visible bump in figure1 in summer 2001 is related to a mis-modelling of radiation pressure for satellite slot 8 by ESA. Just after fixing that problem the rms. numbers went down below the 20cm level.

Outlook

In May 2002 the IGS-CB integrated all combined GPS/GLONASS tracking sites within their official data site pool, which was a long lasting request of the IGLOS-Pilot Project. This step should encourage all IGS Analysis Centers to make increased use of the GLONASS data in their processing schemes and come up with a number of new or improved products. In the first place precise GLONASS orbits with an increased orbit accuracy of 1-3 cm in the radial direction should be sufficient to study in detail the reason of the remaining bias of a few centimetres between microwave and laser tracking observations. Moreover, in case of a new GLONASS launch to plane II (elevation of sun above the orbital plane up to 88 degree) we are looking forward to learn more about

reliable radiation pressure models for the GLONASS satellites Thus, the ILRS is kindly asked to continue the tracking of GLONASS satellites and to provide laser based precise orbits.

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Figure 1