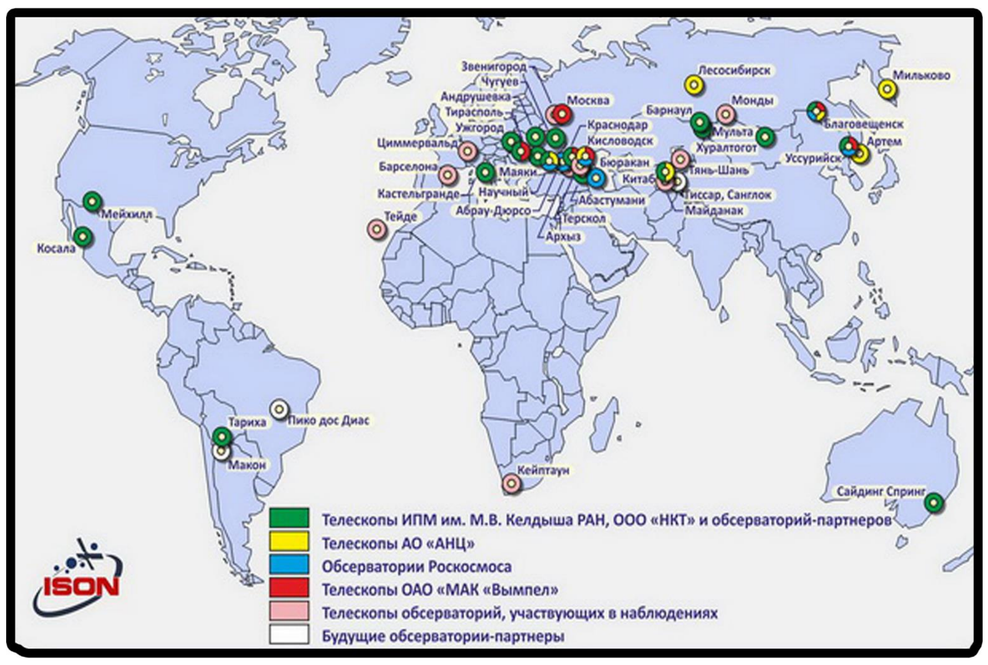
THE INTERNATIONAL CONFERENCE ON THE 120TH ANNIVERSARY
OF THE BULNAY EARTHQUAKE:
ADVANCES IN ASTRONOMY AND GEOPHYSICS

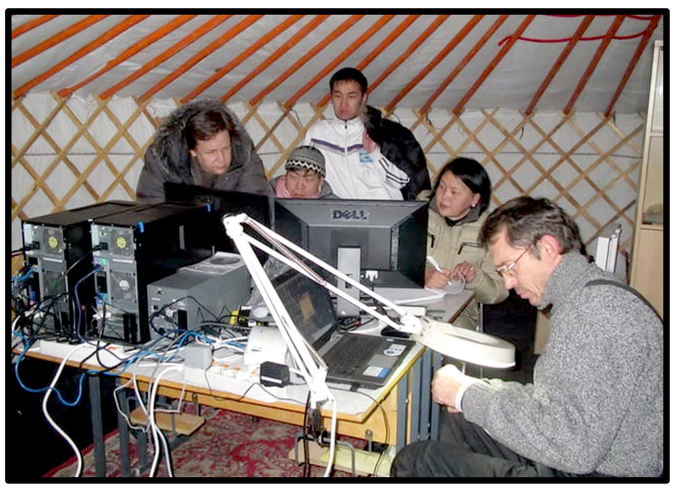
Astrometric observations in Mongolia “Khureltogoot observatory”

Irmuunzaya.B[1], Batjargal.B[2] Buyankhishig.R[3], Batbold.M[4]

Abstract: In recent years, international scientific organizations have been actively observing, registering, and indexing man-made objects in geostationary orbit using astronomical methods and telescopic equipment. As the amount of space debris generated by human space activities increases, the risk—however small—of collisions with active satellites and space equipment also rises. This has led to a growing need to establish safety standards in space and to conduct systematic research on space debris. Major countries are studying space debris by collecting data from multiple observation points distributed along the Earth's longitudes and processing this data to obtain highly accurate results. Due to its favorable geographic location, Mongolia has also joined this international monitoring network and established its own observation station to participate in space debris tracking.



Locations of optical telescopes in the network



Observational Research at Khureltogoot Observatory

At the astronomical observatory located in Khurel Togoot, fundamental research in Astronomy and Astrophysics is conducted, focusing on the continuous observation of space debris, minor planets, comets, and gamma-ray bursts. Observations of minor planets initially began in January 2014 using the ORI-40 and VT-78e telescopes. On February 5, 2014, the observatory was officially registered with the Minor Planet Center (MPC) and assigned the observatory code 075.

Observations were conducted using the VT-78e telescope, operated with the CHAOS software for telescope control and CamControl for camera control. For monitoring space debris and artificial satellites, wide-field scans are performed twice per night across the visible region of the geostationary belt. During each scan, images are captured with an exposure time of 10–15 seconds for every 3x3 degree field of view, covering the entire area throughout the night.

Summary of Observation Activities and Achievements

- A total of over 750 nights of astronomical observations have been conducted since the start of operations.
- More than 1.3 to 1.4 million image frames have been captured and processed using the observatory’s imaging systems.
- Astrometric observations for minor planet detection and position confirmation were successfully carried out on more than 30 occasions.
- Three major maintenance and servicing operations were conducted to ensure continued functionality and accuracy of the observation systems.
- Between 2014 and 2018, over 20 optical follow-up observations of gamma-ray bursts (GRBs) were performed and officially reported to the GCN Circular network.

ORI-40, VT-78 Telescopes

MAS-Institute of astronomy and geophysics, Ulaanbaatar, Mongolia email: batjargal@iag.ac.mn