GNSS ACTIVITIES IN MONGOLIA

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UN/FIJI Workshop on the Applications of GNSS, June 24-28, 2019
Suva, Fiji,
BACKGROUND

FACTS

- 1,564,000 sq.km
- 3,250,000 people
- Language: Mongolian
- Main religions: Buddhist (53%), Shamanist (3%), Muslims (3%), Christian (2%)
- GDP ~4,000$
- HDI 0.741
- Parliament democracy
- Government: 13 Ministries, 21 Agencies

Source: NSO
Photos: Alina Reyzelman
SPACE TECHNOLOGY IN MONGOLIA

- 1965: Space technology and application is started under INTERCOSMOS program
- 1970: First Telecommunications satellite data receiving station “ORBIT”
- 1970: World meteorological satellite data receiving ground station is established /NRSC/
- 1981: J. Gurragchaa, the first cosmonaut of Mongolia the 2nd Asian in the space.
- 2017: Mazaalai /CubeSAT/, the first satellite in the space
SPACE TECHNOLOGY RELATED ORGANIZATIONS

**Prime Minister**
- Information Technology, Post, Telecommunication Authority
  - Radio Frequency Management
  - Satellite Technology Development
- National Space Council

**Ministry of Environment and Green Development**
- Environmental Information Center
  /National Remote Sensing Center/
  - Carry out research studies on environment monitoring using RS, develop operational applications and environmental databases
- Mongolian Academy of Sciences
- State and Private owned Universities and Institutes

**Ministry of Road, Transport, Construction and Urban Development**
- Geodesy, Cartography and Land Affairs Agency
  - GNSS networking, application development
- Non Government Organizations
- Private Companies
In the past, the Mongolian triangulation, gravity and leveling networks were based on Soviet Union, meaning the old Pulkovo-42 reference system, Krassovsky reference ellipsoid and height system was Baltic sea.

2009, Government Resolution No.25:
- Coordinate system – WGS 84 (ITRF 2000 epoch 1997.8 /MonRef 97/)
- Height system – Baltic Sea
- Projection - UTM

2014, ALAGAC Resolution No. A/112 and A/261
- ITRF2008 epoch 2005.0
- Mongolian Geoid Model (MONGEOID 2012/2014)

Source: Jivall and Saandar, 2019
GNSS NETWORKS IN MONGOLIA (2)

Triangulation Network

Gravity Network

Height Network

Source: Jivall and Saandar, 2019

- LEGEND:
  - Laplacian points
  - Baselines
  - 1st class triangulation

- LEGEND:
  - Gravimetric datum
  - 1st order Gravimetric network points
  - 1st order Gravimetric network satellite points

- LEGEND:
  - Capital city of Mongolia
  - 2nd class levelling lines
  - 2nd class levelling lines for 1st order
  - Gravity network points heighting

- LEGEND:
  - Length of 2nd class levelling lines
  - Length of 3rd class levelling lines
GNSS NETWORKS IN MONGOLIA (3) : MONREF 97

Source: Jivall and Saandar, 2019
GNSS NETWORKS IN MONGOLIA (4): CORS

Source: ALAGAC
GNSS NETWORKS IN MONGOLIA (5) : APREF

Source: ALAGAC
STRUCTURE OF THE ASSOCIATION

BOARD
9 MEMBERS

EXECUTE /2/
CEO
Secretary

Internal audit
3 members

MEMBERS

TECHNICAL COMMISSIONS
Photogrammetry and RS
GIS
Surveyor and GNSS

Principal Advisory*
MEMBERS / COMMUNITIES

TYPE OF MEMBERS

• Student
• Regular
• Institution
• Honorary members*
• Advisory

*Advisory
ACTIVITIES

- Geo-meeting
  - Monthly

- Geo-workshops
  - Quarterly

- GIS day
  - Annual

- Geo-forum
  - Annual

1500 Workshops

10 Workshops
GEO-MEETING

Knowledge sharing and Networking event

Since 2014
8 times/ per year
Totally 40

2 presentation about geo-spatial technology and applications
This publication is a peer-reviewed journal for Mongolian geo-spatial, which publishes presentations, reports, news, information and geo-activities of the association.

General requirements: One day the GIS DAY will be printed and distributed.
- The final date of the story: August 31, every year;
- The number of page sheets is not less than 6 at least 6;
- 20 mm from each side of the frame;
- Page size: B5;

Editor-in-chief: B.Bayarkthalag, Ph.D: 95113264

Contact: info@geomedeeelel.mn, bayartungalag@geomedeeelel.mn
Every year since 2014

On average, over 200 specialists, students, and users attend a meeting.

Speakers introduce new technologies, their research, new approaches in the geospatial technology.

The afternoon event was organized jointly by Mongolian University of Science and Technology, with the support of MonMap LLC. The training was organized by the Geo-Seminar: ArcGIS Pro Software Introduction and Application. / 2018 /
GEO-TRAINING/GEO-SEMINAR

- Remote sensing: SENTINEL data processing
- GIS: ArcGIS Pro
- GNSS: GAMIT/GLOBK training
In collaboration with Institute of Astronomy and Geophysics of the Mongolian Academy of Sciences, "Geo-Forum: Applications of the GNSS" was successfully organized on April 17, 2019.
RESEARCH/PROJECTS


➢ “SDI Cookbook Published In Mongolian Language”, Global SDI Association’s Small Grant, 2017;


➢ Asia-Pacific Space Cooperation Organization (APSCO) International GNSS Monitoring and Assessment” (iGMA) project, Since 2018.
INTERNATIONAL GNSS MONITORING AND ASSESSMENT (IGMA) PROJECT

➢ September 2011, ICG-6. China proposed GNSS service performance should be monitored by some international third party organization. IGMA task group co-chaired by China, IGS and Japan was setup with its objective and tasks to promote international GNSS monitoring and assessment activities.

➢ Mongolia Government, member of APSCO, is granted to our association for the local institution of APSCO-iGMA project implementation.

➢ APSCO International GNSS Monitoring and Assessment” (IGMA) project in Mongolia is implemented with our members, New Mongol Institution of Technology and Chandmani Survey, LLC, Since 2018.
INTERNATIONAL GNSS MONITORING AND ASSESSMENT (IGMA) PROJECT (2)

Mongolia (ulbt)  Skyplot

BDS  GPS

GLONASS  Galileo

Test Date: Sep.13, 2018

Source: APSCO
INTERNATIONAL GNSS MONITORING AND ASSESSMENT (IGMA) PROJECT (3)

Mongolia (ulbt)

Number of Visible Satellites and PDOP

Test Date: Sep.13, 2018

Source: APSCO
Mongolia (ulbt) Positioning Error

BDS

GPS

GLONASS

Galileo

Source: APSCO
SUMMARIES/CHALLENGES

➢ Human resources
➢ Technology
➢ Financial issues

NEXT STEPS/ACTIVITIES

• GNSS Trainings
  • National (geo-workshops, geo-training, geo-seminars etc)
  • International (Summer school etc)

• UN/MONGOLIA Workshop on the Applications of the GNSS, April/May, 2020 ????
CONTACT

www.geomedeelmn

SOCIAL MEDIA

• https://www.facebook.com/MonGeospatialAssoc/

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ACKNOWLEDGEMENT

➢ United Nations Office for Outer Space Affairs

➢ International Committee on Global Navigation Satellite System

➢ University of the South Pacific
QUESTIONS?