Recent Progress and Future Perspectives of the International VLBI Service for Geodesy and Astrometry (IVS)

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1. Overview of IVS and VLBI2010
2. VGOS progress in the world
3. VGOS project in Japan
4. Toward GGOS
5. Summary
International VLBI Service for Geodesy and Astrometry

- Established in 1999 under IAG and IAU
- 83 Permanent Components, representing 43 institutions in 21 countries
VLBI2010

- VLBI2010 Committee: considered the concrete system for VLBI2010.

- System for VLBI2010 contains:
  ① 12-m diameter dish & 12°/s fast moving
  ② 2〜14GHz broad-band receivers
  ③ High speed sampler, Digital Backend

VGOS

VLBI Global Observing System
based on available information September 2013 by H. Hase, V2PEG

Degree of progress of VGOS

- operational (broad-band)
- under construction or just before operation
- funded
- proposal submitted
- planning phase
- operational (legacy S/X ) to be upgraded
New VGOS telescopes

Ny-Ålesund (Svalbard, Norway)
Courtesy L. Langkaas

Ishioka (Japan)

Zelenchukskaya (Russia)
Courtesy A. Ipatov

Hobart (Australia)
Courtesy D. Behrend

GGAO (US)
Courtesy A. Niell
RAEGE, Spain

Açores Islands
Canary Islands
Yebes

Gómez-González et al. (2013)

Santa Maria (Eastern Azores) (August 2013)
Yebes (August 2013)

Courtesy: J.A. Lopez

February 27, 2013
Twin Telescope Wettzell, Germany

Inauguration in April 2013

Courtesy A. Nothnagel
Onsala Tvilling Teleskop, Sweden

Map showing the location of Onsala in Sweden. The map includes a zoom-in view of the area around Onsala, with satellite dishes labeled as OTT1 and OTT2. The dishes are shown in 20 m and 25 m sizes. The image also notes that the content is courtesy of R. Haas.
VGOS Station in Japan

- FY2011～FY2013
  - 13.2-m telescope
  - Broadband front-end (feeds, receivers)
  - Hydrogen masers
  - Up-down convertor
  - Data acquisition system (Sampler, storage, ...)
  - 10Gbps network
Ishioka Geodetic Observing Station

Ibaraki pref. Livestock Research Center

Ibaraki Golf Course

Kasumiura City

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Ishioka Geodetic Observing Station

Total site area: 13,000m²

Laser Ranging facilities?
DORIS stations co-located with other IERS techniques (VLBI, SLR or GNSS)

Courtesy J. Saunier (IGN, France)
Synergy of VLBI and SLR for GGOS

Badary (Russia)

Courtesy A. Ipatov & Y. Bondarenko
RFI at GGOS station

• Intra-site RFI transmitted by DORIS beacon and SLR radar for aircraft avoidance
  – DORIS: 401.25 MHz, 2.036 GHz
  – SLR radar: 9.4 GHz ?
  – VLBI receives 2-14 GHz 😞
Summary

• IVS is enthusiastic about VGOS.
  – Australia, Germany, Spain, Russia, ...
• Ishioka VGOS telescope in Japan
  – under construction
  – complete by March 2014
• More co-located sites of multi-technique are necessary for GGOS.
• However, intra-site RFI in the broad-band VLBI telescope should be considered.
Thank you for your attention.

VGOS: The New VLBI Network