AOV Meeting Program
12 Nov 2015

Thu 19 Nov

8.30 – 9.00 Early morning tea/coffe – on site registration/payment. Room 232.

Session 1 : Chair: Jim Lovell

9.00 – 9.15 Welcome (John Dickey, UTas)
9.15 – 9.40 *New Zealand Radio Astronomical Observatory* – Sergei Gulyaev (AUT)
9.40 – 10.05 *GSI's Vision for the AOV* - Ryoji Kawabata (GSI)
10.05 – 10.30 *Current activity of NICT/Kashima as Technical Development Center* - Kazuhiro Takefuji (NICT)

10.30 – 11.00 Coffee

Session 2: Chair: Jungho Cho

11.00 – 11.25 *The present status and future view of VERA Geodesy* - Takaaki Jike (NAOJ)
11.25 – 11.50 *R&D activities and plans of Space Geodesy Group at KASI* - Jungho Cho (KASI)
11.50 – 12.15 *Geodetic VLBI development at SHAO and its connection with AOV future* - Fengchun Shu (SHAO)

12.15 – 13.45 Lunch

Session 3: Chair: Stas Shabala

13.45 – 14.10 Progress with the Seshan VGOS Station – Guangli Wang (SHAO)
14.10 – 14.35 *Status of the Long Baseline Array* – Phil Edwards (CASS/CSIRO)
14.35 – 15.00 *The AuScope VLBI Array* – Jim Lovell (UTas)

15.00 – 15.30 Coffee

15.30 Bus departs University for Mt Pleasant Observatory
18.00 Bus departs observatory for Hobart
19.00 Dinner at Mures

Fri 20 Nov

8.30 – 9.00 Early morning tea/coffe. Room 232.

Session 4: Chair: Guangli Wang

9.00 – 9.10 Announcements
9.10 – 9.35 *VLBI research activities in Hobart: an offer for collaboration* – Lucia Plank (UTas)
9.35 – 10.00 *Radio Astronomy in Thailand: Present and Future* - Prudth Jaroenjittichai (NARIT)
10.00 – 10.25 *The status of Shanghai Station* - Bo Xia (SHAO)

10.25 – 10.55 Coffee

Session 5. Chair: Sergei Gulyaev

10.55 – 11.20 *Using quasar physics to improve the VLBI celestial and terrestrial reference frames* – Stas Shabala (UTas)
11.20 – 11.45 *Application of the AOV Network for radio source structure production* – Oleg Titov (GA)
11.45 – 12.10 *Resolving the emission region of pulsars with scintillometry* - Franz Kirsten (Curtin University)

12.10 – 13.30 Lunch

13.30 – 14.00 AOV Business (chair: Jim Lovell)
- 2016 Observing Program
- Expanded membership
- AOV meetings in 2016

14.30 – 15.00 *Open discussion: Science and Technology* (chair: Jim Lovell, Fengchun Shu)
- New uses for legacy systems
- VGOS-Legacy Tie: How can legacy stations connect to VGOS stations (or ITRF)
- other items arising

15.00 – 15.30 Coffee

15.30 – 16.30 *Open discussion: Collaboration* (chair: Ryoji Kawabata, Lucia Plank)
- Collaboration in the VGOS era
    + Operation of VGOS: VGOS operation center in this region?
- Collaboration with UN-GGIM(-AP)

16.30 – 17.30 Close & drinks

Talks and Abstracts

No	Speaker	Title	Abstract	Topic
1	Sergei Gulyaev (AUT)	New Zealand Radio Astronomical Observatory		Status/Vision
2	Ryoji Kawabata (GSI)	GSI's Vision for the AOV		Vision
3	Jungho Cho (KASI)	R&D activities and plans of Space Geodesy Group at KASI	Korea Astronomy and Space Science Institute (KASI) is the national Astronomy and Space Science research institute established in 1974. Since Positional Astronomy with GPS in 1989 Space Geodesy Group (SGG) has been mainly focusing on Global Geodesy detecting the tiny variations of Earth's shape and its rotation based on primary space geodetic techniques such as GNSS, VLBI, and SLR. The topics to be covered in the first part of this talk are infra facilities and recent R&D activities of the SGG. The second part deals with possible issues on future collaboration with AOV member institutes	Status/Vision
4	Bo XB Xia (SHAO)	The status of Shanghai Station	It will show the status of the shanghai station, and also show the AOV session that was observed in the Sheshan 25m and Tianma 65m.	Status/results
5	Kazuhiro Takefuji (NICT)	Current activity of NICT/Kashima as Technical Development Center	Currenty we have developing a broad-band system. A main purpose of the development is for Time & Frequency transfer by VLBI technology. Now two compact antennas installed to Japanese time keeping institutes, NICT/Koganei and AIST/Tsukuba. Due to thier compactness, a better SNR is needed especially broad-band system. In this workshop, we will report more detail of experiments results and the progress.	Status/Vision/Results
6	Fengchun Shu (SHAO)	Geodetic VLBI development at SHAO and its connection with AOV future		Status/Vision
7	Takaaki Jike (NAOJ)	The present status and future view of VERA Geodesy	VERA is the Japanese VLBI project dedicated to phase-referencing VLBI astrometry and aimed at determining annual parallaxes and proper motions of Galactic maser sources with 10 micro-arc-seconds to reveal the 3-D structure and dynamics of our Galaxy. In order to guarantee the accuracy of VERA astrometry, knowledge of geometric form of VERA-network with 10^-9 accuracy is indispensable. Monitoring of VERA-network form with a few or several millimeter accuracy is the most important required in the VERA project. After the 2011 earthquake off the Pacific coast of Tohoku, co-seismic crustal movement and post seismic creeping moved VERA-Mizusawa position 4 meters by the end of 2014. By the high speed crustal movement, the improvement in stability and tracing ability became important at the determination of VERA-antenna positions. In order to aim at improvement in the performance of geodetic results, we are going to adopt the new broadband recording system to AOV and the VERA internal geodetic VLBI observations.	Status
8	Stas Shabala (UTas)	Using quasar physics to improve the	Radio-loud quasars making up the International Celestial Reference Frame (ICRF) are dynamic objects with significant structure that changes on timescales of months and years. This is a problem for the stability of both terrestrial and celestial reference frames, as realised	Results/science

		VLBI celestial and terrestrial reference frames	through the geodetic and astrometric Very Long Baseline Interferometry (VLBI) technique, which has so far largely treated quasars as point sources in analysis. I will describe the source structure simulator recently implemented in the Vienna VLBI Software (VieVS) package, and quantify the effects of various levels of source structure on the celestial and terrestrial reference frames, and Earth Orientation Parameters linking these two frames. We find that even relatively modest levels of quasar structure can produce systematic effects that affect derived quasar positions significantly in excess of the noise floor of the present ICRF realisation, ICRF2. I will also discuss the observed relationship between astrophysical properties of quasars, their structure and geodetic stability. By simulating quasar structure and evolution in VieVS, we have devised various quasar mitigation strategies. These include: (1) astrophysically-based quasar selection techniques; (2) scheduling sources by taking into account quasar structure; and (3) analyzing geodetic and astrometric VLBI observations using knowledge of quasar structure. I will describe our simulation results, and outline promising quasar structure mitigation strategies.	
9	Oleg Titov (GA)	Application of the AOV Network for radio source structure production	So called structure delay induced by extended variable structure of reference radio sources is one of major contributors to the total geodetic VLBI error budget. The traditional way to solve the problem is to accommodate the source images obtained with independent astrophysical VLBI observations. However, due to technical and logistic reasons this approach was not used so far. Nonetheless, there is an alternative approach to facilitate the radio source structure without additional observations. A detailed analysis of post-fit residuals coming from geodetic VLBI reveals a strong systematic signal consistent to the radio source structure effect. Intensive two-week campaigns (CONT14 and AUST14) were found to be very effective in a search of the systematic signals. We developed a simple model for radio source 0014+813 observed at CONT14 campaign and demonstrated its effect for reduction of the geodetic VLBI data. Since the Asia-Oceania VLBI Network makes a lot of baselines, it is feasible to use the facilities for production of structure models of equatorial extended radio sources. More details are given in the presentation.	Results/vision
10	Prudth Jaroenjittichai (NARIT)	Radio Astronomy in Thailand: Present and Future	There has been rapid development in astronomy in Thailand, simply due to the establishment of the National Astronomical Research Institute of Thailand (NARIT) and the Thai National Observatory in 2008. As one of the key goals in the roadmap year 2016-2021, NARIT has a plan to establish the Thai-national Radio Astronomical Observatory (TRAO) to promote radio astronomy in Thailand and South East Asia region. TRAO will allow Thailand to participate in VLBI networks in the region, which also has applications for surveys and geodesy. Past and current activities of the radio group will be reported.	Status/vision
11	Jim Lovell (UTas)	The AuScope VLBI Array		Status/vision
12	Phil Edwards (CASS/CSIRO)	Status of the Long Baseline Array	The current status of the Long Baseline Array, combining telescopes from the CSIRO's Australia Telescope National Facility, the University of Tasmania, the Canberra Deep Space Communications Complex, and other partners, will be presented, with particular consideration to the potential collaboration in the Asia-Oceania VLBI Group for Geodesy and Astrometry.	Status/vision
13	Guangli Wang	SHAO VGOS		

		(TBD)		
14	Franz Kirsten (Curtin)	Resolving the emission region of pulsars with scintillometry	The interstellar medium scatters the pulsed, spatially coherent emission from pulsars giving rise to -- typically unwanted -- scintillation. Here we exploit the characteristic pulsar scintillation pattern as observed with VLBI to, eventually, spatially resolve the pulsar emission region and solve the long standing puzzle of the pulsar emission mechanism. The phase information contained in VLBI observations is key in mapping out the scattering screen, typically only a few milliarcseconds in size. Thus, we measure the physical distance between individual speckles acting as stations in our interstellar interferometer. In order to obtain the full 2D-information of the scattering screen, long sensitive E-W and N-S baselines are required. The latter, however, are sparse with existing VLBI arrays at which point the AOV has great potential to fill in the gaps.	Science
15	Lucia Plank	VLBI research activities in Hobart: an offer for collaboration	We give an overview about our VLBI research activities at UTAS. Topics discussed are the AUSTRAL experiments as a prototype for VGOS, observations with a sibling telescope, the benefit of the high-cadence AuScope VLBI data for the combination with local ties and GNSS, quasar structure, VLBI observations to satellites of the GNSS, and more.	Science