

### News in Brief

#### New ATRAD Offices

ATRAD has a new office and manufacturing facility. The address is 154 Ashley Street, Underdale, SA, 5032, AUSTRALIA

Our email and phone contact details remain the same.

#### Recent Installations

- 6-channel Remote Receiver, China
- EMDR Radar, China
- EMDR upgrade, China

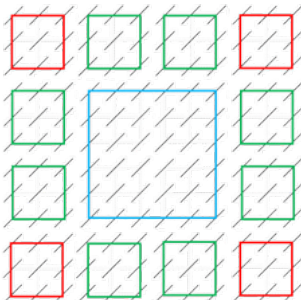
#### Pending Installations

- MF radar renewal, Antarctica
- High power (200 kW) transmitter, South America
- GPSDO upgrade (x2), Norway
- DSU changeovers, Australia
- Radar Computer renewal (x2), UK

#### Space Domain Awareness

ATRAD has continued to participate in SACT events most recently in SACT 23 2 providing satellite observational data from the Buckland Park Stratospheric Tropospheric (ST) / Meteor radar operating in Space Domain Awareness (SDA) Mode.

For SACT 23 2, the radar operated as an eight channel receive only interferometer with an active Doppler Beam Steering (DBS) radar with four off-zenith and one vertical beam direction. The antenna arrangement is shown in plan view below with the receive only groups in green and the DBS sub-array shown in blue. The red sub-arrays are not used for these observations.



### Recent Highlights

#### Darwin Meteor Radar

As anticipated in the previous Newsletter, the Darwin Meteor radar has been brought online again as part of a cooperation between ATRAD, the Institute of Atmospheric Physics (IAP) in Germany (<https://www.iap-kborn.de/en/home/>), and the University of Adelaide (UoA) as part of their LOLA project. Originally installed in 2005 by the UoA, and decommissioned in 2015, we have partially refurbished the radar.

#### AAP BLP on EUMETNET

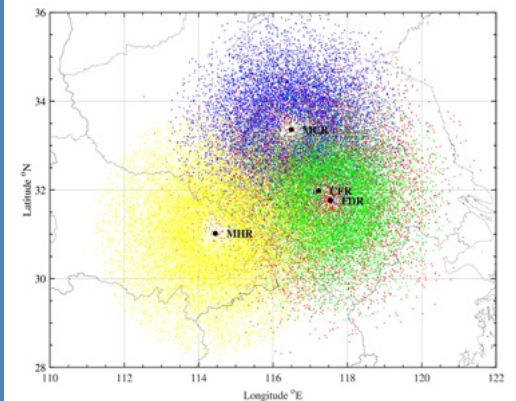
The Adelaide Airport (AAP) Boundary Layer Tropospheric (BLP) 55 MHz Wind Profiler operated by ATRAD, and the University of Adelaide, and locally supported by the Australian Bureau of Meteorology (BoM) is now sending BUFR encoded results to the European Meteorological Network for assimilation into various global forecast models.



Results are at [https://e-profile.eu/#/wp\\_profile](https://e-profile.eu/#/wp_profile). This profiler joins nine others of the same build, and four Stratospheric Tropospheric (ST) Wind profiling radars operated by the BoM in Australia in sending BUFR encoded data to EUMETNET (<https://www.eumetnet.eu>). Data from the Davis Station ST radar operated by the Australian Antarctic Division in Antarctica (<https://www.antarctica.gov.au/about-antarctica/ice-and-atmosphere/atmosphere/studying-the-atmosphere/the-davis-vhf-radar/>) are also provided to EUMETNET. Realtime results from some of these radars are also available at <http://www.atrad.com.au/results/>.

#### New multistatic meteor system in China

Yi Wen and colleagues from the University of Science and Technology, China (USTC) have installed a new meteor radar as part of a meteor radar network in China. A new meteor radar at Feidong joins the meteor radar located near Mengcheng and the remote receiving system located at a site near Changfeng, about 167 km distant. The remote system receives both the Feidong and Mengcheng radars. Meteor detections from the three sites are shown below.



#### Ionospheric Plasma Waves

A paper by Jordan Jonker entitled "Investigation of Doppler Perturbations in Satellite Observations used for Space Domain Awareness" will be presented at the upcoming IEEE RadarConf2023, 2023 IEEE Radar Conference, to be held in Sydney, Australia, in November 2023.

Jordan's work is on detecting ionospheric plasma waves using satellite observations using the Buckland Park ST / meteor radar. This appears to be the first time that radar has been used to observe such waves and shows that, under certain conditions, radar may provide a more sensitive measure of the plasma waves than the magnetometers normally used to detect them. A manuscript has been prepared for journal submission.

### IMCP 2023 Workshop and School, Beijing

Prof Iain Reid (Invited Speaker and Lecturer) and Richard Mayo (guest) attended the International Meridian Circle Project (IMCP) 2023 International Workshop / Yanqi Youth Forum and IMCP Space Weather School held in Beijing, September 14-23, 2023 (<http://imcp.ac.cn/en/events/2023IMCP/intr/>)

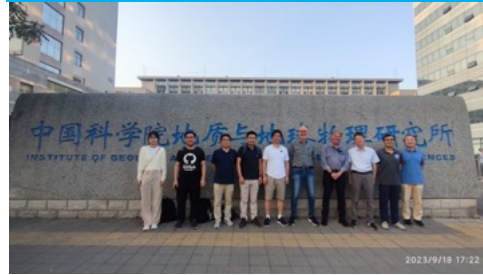
### SOUSY Svalbard Radar visit

Chris Adami visited the UiT SOUSY Svalbard Radar (SSR) on Svalbard to help assess the radar array and discuss potential improvements. The radar system operates with ATRAD hardware (currently a single receive channel and with a peak power of 8 kW) (see <http://radars.uit.no/sousy/>)

### MIOS Radar visit

Chris Adami and Richard Mayo (separately) visited the IGGCAS Meteor and Ionospheric Irregularity Observation System (MIOS) (see <https://doi.org/10.1029/2022JA030380>) on Hainan Island for the first inspection by ATRAD personnel since the radar was installed with remote ATRAD support during COVID.

### 25 Years of Collaboration with IGGCAS



2023 marks 25 years of cooperation between ATRAD and the Institute for Geology and Geophysics of the Chinese Academy of Science (IGGCAS). This started with a visit to the group of Ning Baiqi at the Wuhan Institute of Physics and Mathematics by Iain Reid in 1998. This group ultimately moved to the IGGCAS in Beijing. The photograph below shows Prof Ning Baiqi (right) and Prof Iain Reid (left) at a dinner to celebrate this, and other milestones achieved, held in Beijing in September 2023.



### Recent Publications (with ATRAD coauthors)

1. Li, G., Wu, Z., Li, Y., Hu, L., Sun, W., Xie, H., Zhao, X., Reid, I.M., Ning, B. and Liu, L., 2023. The Spectrum and Orbit of a Fireball Producing Mesospheric Irregularity and Implications for Meteor Mass Deposition. *The Astrophysical Journal*, 946(1), <https://doi.org/10.3847/1538-4357/acba98>
2. Wang, J., Yi, W., Wu, J., Chen, T., Xue, X., Zeng, J., et al. (2022). Coordinated observations of migrating tides by multiple meteor radars in the equatorial mesosphere and lower thermosphere. *Journal of Geophysical Research: Space Physics*, 127, e2022JA030678. <https://doi.org/10.1029/2022JA030678>
3. Robert Vincent, Sujata Kovalam, Iain Reid, Damian Murphy and Andrew Klekociuk, (2022), Southern Hemisphere Stratospheric Warmings and Coupling to the Mesosphere-Lower Thermosphere, *JGR-Atmospheres*, <https://doi.org/10.1029/2022JD036558>

### Langfang Dual Frequency ST / Meteor Radar visit

Iain Reid accompanied Xu Qingchen and He Maosheng on a visit the NSSC Langfang dual frequency ST / Meteor radar during September 2023. This radar was also installed with remote ATRAD support during COVID. A manuscript on the first results has been prepared for journal submission.

## Other Items of Interest

### 30 Years Ago



30 years ago (August 1993) the 6<sup>th</sup> Workshop on the Scientific and Technical Aspects of MST radar was held at the National Central University in Taiwan. The photo above was taken at the meeting during a visit to the Chung Li VHF ST radar. [The next meeting in the series \(MST15/iMST2\) is planned to be held at the IAP in Germany in September 2024. There will be a radar school associated with the meeting.](#)

Previously the "Reflections" newsletter  
Newsletter October 2023  
15-61006-104

### Aberystwyth MST Radar to close

The Aberystwyth MST radar will close at the end of March 2024. The radar was constructed during 1989/1990. Professor Lance Thomas, the original PI on the project is amongst the faces in the photo to the left (rear row 3<sup>rd</sup> from right). Some highlights of Professor Thomas' career can be found at <https://angeo.copernicus.org/articles/18/1372/2000/angeo-18-1372-2000.pdf>

ATRAD installed an upgraded beam steering system for the radar in 2010. Details of the radar and the upgrade are available at <https://www.atrad.com.au/special-projects/renovation-of-the-aberystwyth-mst-radar/>.

Another significant ATRAD upgrade to the radar has been awaiting installation, but this will not now proceed.



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