NEWSLETTER

April 2022

Previously the "Reflections" newsletter

News in Brief

Recent Installations

Advanced Ionospheric Radar, China

Dual Frequency Meteor / ST Radar, China

6-channel Remote Receiver, China

STP Hardware upgrade, Antarctica

Pending Installs

SII Ionospheric Radar, China

EMDR Radar, China

6-channel Remote Receiver, China

HF Ionospheric Radar, USA

New Hardware

L-Band BL Wind Profiler

UHF BL Wind Profiler

HF Broadband Radar

SpaceFest Lite / SACT 22 2

ATRAD with Adelaide University will again participate in the Space Domain Awareness event to be held in April 2022.

Some Recent Related Publications

[1] *Conte, J. F., et al. (2022), JGR: Atmospheres, https://doi.org/10.1029/2021JD035982*

[2] *GuoZhu Li et al. (2022), Design of Meteor and ionospheric Irregularity Observation System and First Results, [Paper #2022JA030380] submitted to JGR - Space*

[3] *Emma Heading, et al. (2022), Analysis of RF Signatures for Space Domain Awareness using VHF radar, RadarConf2022, 2022 IEEE Radar Conference, 21-25 March 2022, New York City, USA*

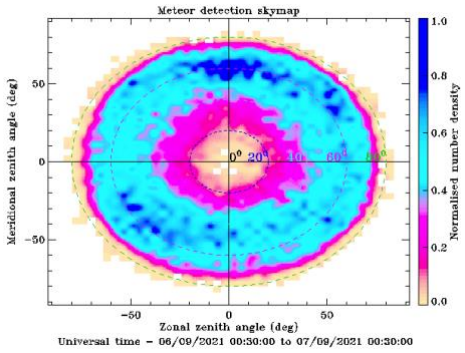
[4] *Andrew J. Spargo, et al. (2019), Atmos. Meas. Tech., https://doi.org/10.5194/amt-12-4791-2019*

[5] *Younger, J. P., et al., (2021), Atmos. Meas. Tech., https://doi.org/10.5194/amt-14-5015-2021*

Some Recent Highlights

Completion of the installation of our first dual frequency Meteor / ST radar near Langfang, China

By combining the advantages of a lower frequency for meteor work (~ 30 MHz) and a higher frequency for ST work (~50 MHz) in one radar, a significant performance improvement results for the meteor radar. This yields a radar for measuring high quality winds in the 300 to 20,000-m and 70 to 110 km height regions. Operation is alternated between the two modes. In meteor mode, counts of over *65,000 meteors per day* have been realized (see skymap below). This radar joins six other (single frequency) ATRAD Meteor / ST radars previously provided to customers in Antarctica, Australia, China, and Japan.



ATRAD has now installed more than 20 ST class radars worldwide

Completion of the installation of an advanced ionospheric radar on Hainan, China

Guozhu Li of IGG and colleagues recently submitted the first results from a new combined optical / radar observatory (MIOS) to JGR – Space (see ref [2]). ATRAD provided the radar hardware based on its *electronically steered* VHF power amplifiers and 15-receive channel transceiver. An ATRAD Enhanced Meteor Detection Radar (EMDR) is also located at the site

New HF Broadband Radar for Clemson University

ATRAD has developed a new broadband HF Doppler radar to cover the frequency range from 2 to 25 MHz. The first, specified to operate between 2.5 and 15 MHz with a power of 4 kW and with 4 of the 6 receive channels used, will be installed for Clemson University. Transmission will be on a crossed inverted "V" antenna and reception on four loop antennas arranged in a "Y".

(Above) HF Broadband System undergoing Factory Acceptance Testing

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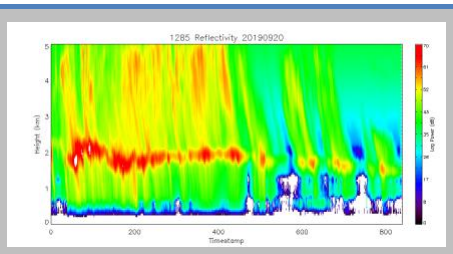
NEW HARDWARE

L-Band (1283 MHz) BL Radar

The development of an L-Band wind profiling radar to augment our VHF and UHF wind profiling radars is currently underway with a trial system running continuously in an experimental mode. Current work focusses on the development of new compact antenna types and studies of precipitation.

(Above) L-Band Fabry Perot antenna panel



(Above) Height time presentation of precipitation echoes to a height of 5 km measured with the L-Band radar using a dish antenna

UHF-Band (449 MHz) BL Radar

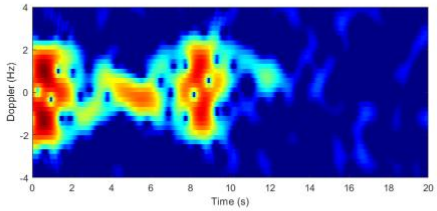
This system is designed to sample at heights beginning within the lowest 300-m portion of the atmosphere. The system design is modular and scalable, starting with low powers and small antennas for low level profiling, with the ability to add both power and antennas to sample heights up to the stratosphere. A feature of the BL design is an antenna designed to minimize low level clutter and reduce the need for clutter screens

(Above) The 36-element UHF Yagi antenna array installed at Adelaide Airport. A Fabry Perot version is under development

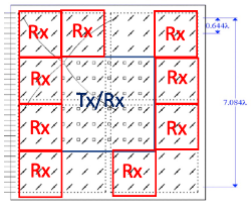
Space Situational Awareness

Buckland Park 55 MHz ST radar

Together with colleagues from the University of Adelaide and DST group, the BP ST radar is being used to demonstrate an active radar-based Space Situation Awareness capability. ATRAD and the University of Adelaide will participate in the forthcoming SpaceFest Lite / SACT 22 2 event using real-time data from the radar



(Above) Spectrogram of the Telekom-3 satellite using VHF radar data showing flashes from the solar panels (From ref [3])



(Above) The BP ST antenna arrangement for SpaceFest Lite. There are 12 receiver channels available on the radar

Product Roundup

Transceiver
3 to 15 Channel

Expandable in 18 channel blocks after 15

SII Ionospheric Radar
Electronic beam steering (~0.1°)

Remote Receiver System
3 to 15 Channel

General Description

16-bit Digital Transceiver incorporating 3 to 15 receivers and an exciter. Six-channel with GPSDO option shown. MF, HF, VHF and UHF versions available	Solid-state, modular transmitter, expandable in 24 kW increments. Six receiver channel 48 kW version shown.	Remote receiver for the MF, HF, VHF and UHF bands. Six channel VHF version shown

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