



## Preliminary results of new Jicamarca's ISR mode

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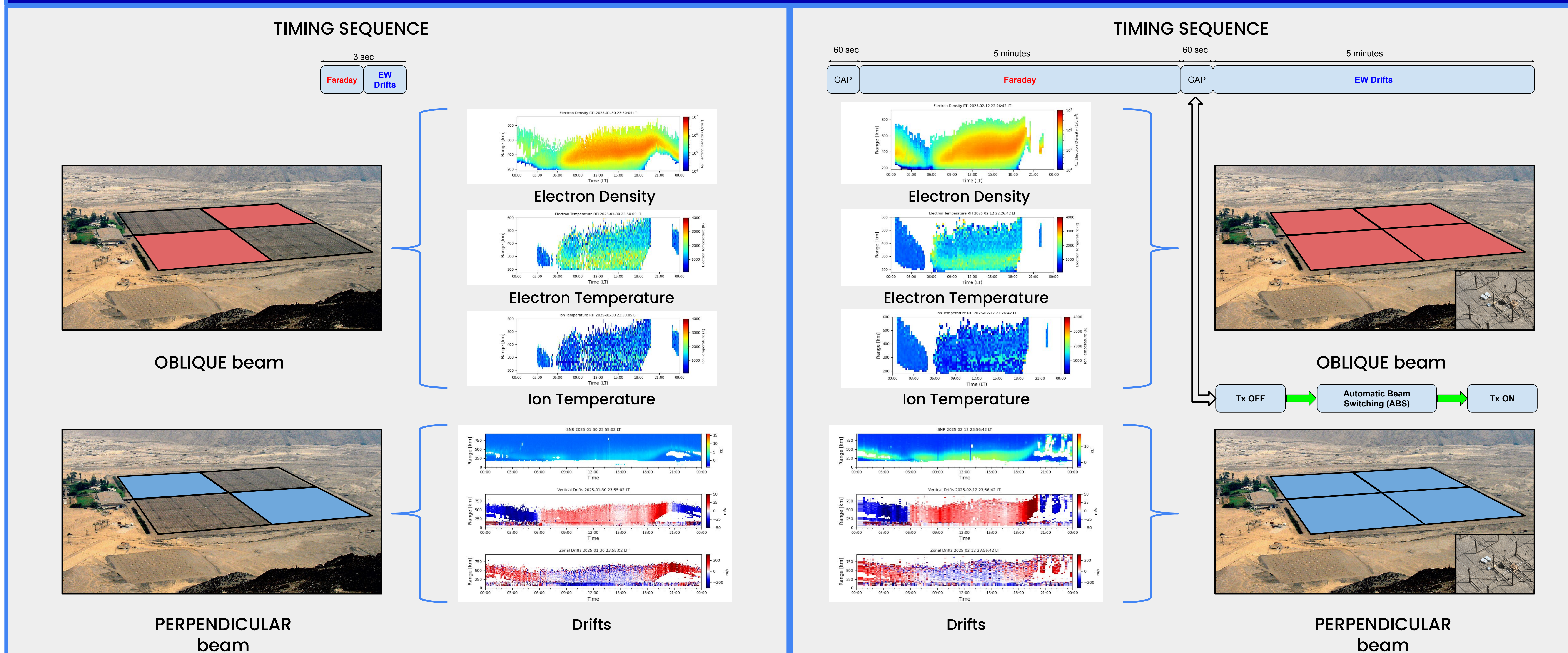
### Abstract

For several years, at the Jicamarca Radio Observatory (IGP-ROJ) we had to choose which operational mode to use depending on the ionospheric parameter (Drifts or Electron Densities) needed to be measured since each experiment requires a different antenna pointing direction. It was around 2012 when our default ISR mode became a combination of both experiments by using half the antenna for obtaining Drifts, pointing perpendicular to the magnetic field and the other half of the antenna for obtaining Electron Densities pointing off-perpendicular to the magnetic field, but that come to the costs of Signal to Noise ratio. At the end of 2024 the installation of the Automatic Beam Switching (ABS) for the whole antenna (64 modules) was completed and with this new capability now we can not only change the pointing direction faster than doing it manually, but also we are able to switch the pointing direction of the antenna between experiments.

ABS opens many possibilities like this new proposed ISR mode, where we use the whole antenna to obtain Drifts (zonal and vertical Drifts) and Electron densities + composition "almost" simultaneously (interleaving between each experiment).

This work will present preliminary results obtained on February 2025 tests by interleaving the Drifts and Electron Densities experiments with durations of 5 minutes each experiment and the comparison with the default ISR measurements.

### Comparison between default ISR mode and new ISR mode



### Limitations of the new ISR mode

- The pulse sequence must incorporate a GAP to turn OFF/ON the transmitter for the beam switching procedure otherwise it will damage the relays of the ABS system
- For now the pulse configuration can only last up to 12 minutes because of memory limitations on the pulse generator equipment.

### Conclusions

- Using the whole antenna for transmission and reception increases the signal to noise ratio and allow us to get signals at higher altitudes.
- This new configuration will be the standard operational mode ISR campaigns

### Future Work

- Incorporate the Long Pulse configuration to this pulse sequence to get electron densities at higher altitudes.
- Sample each of the antenna quarters and polarizations separately to be able to process the data in different ways.

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