



JRO Radar Operation Now and Beyond

Karim Kuyeng

60th Anniversary Jicamarca Radio Observatory
workshop

July 25 – 27, 2022
Lima, Peru



PERÚ

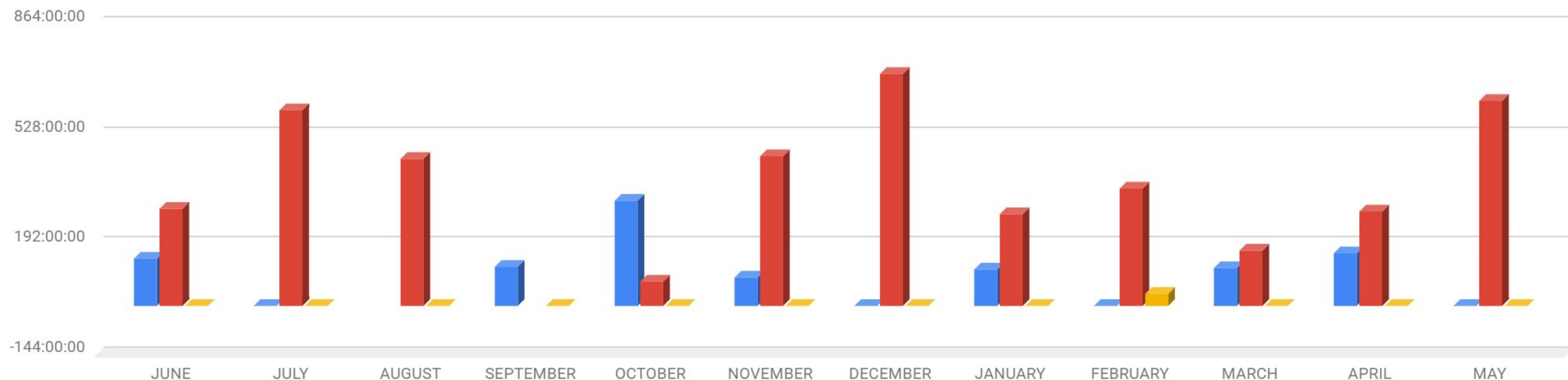
Ministerio
del Ambiente



JRO Operations

OPERATION HOURS 2021 - 2022

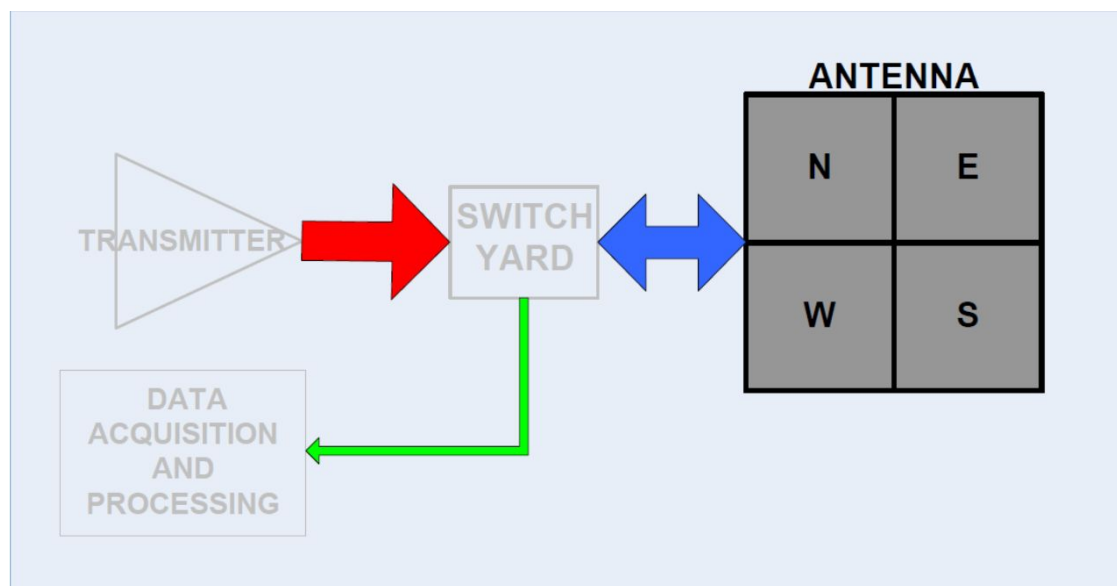
ISR JULIA OTHERS



ISR: 1143 hours
JULIA 4710 hours



Antenna improvements

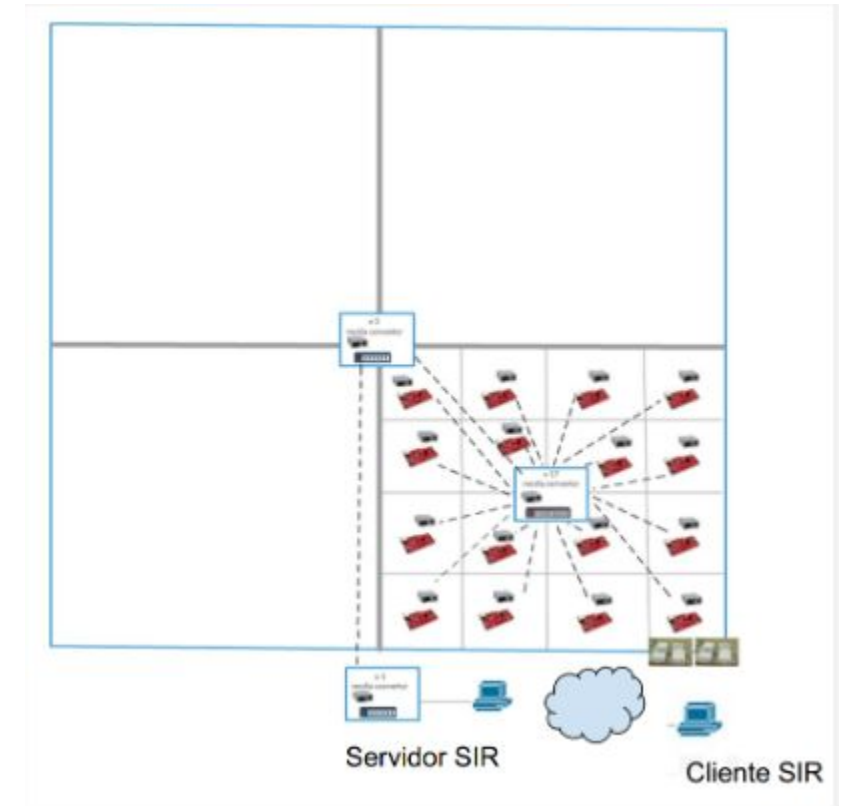




Automatic Beam Switching (ABS)



Manual change



Automatic change



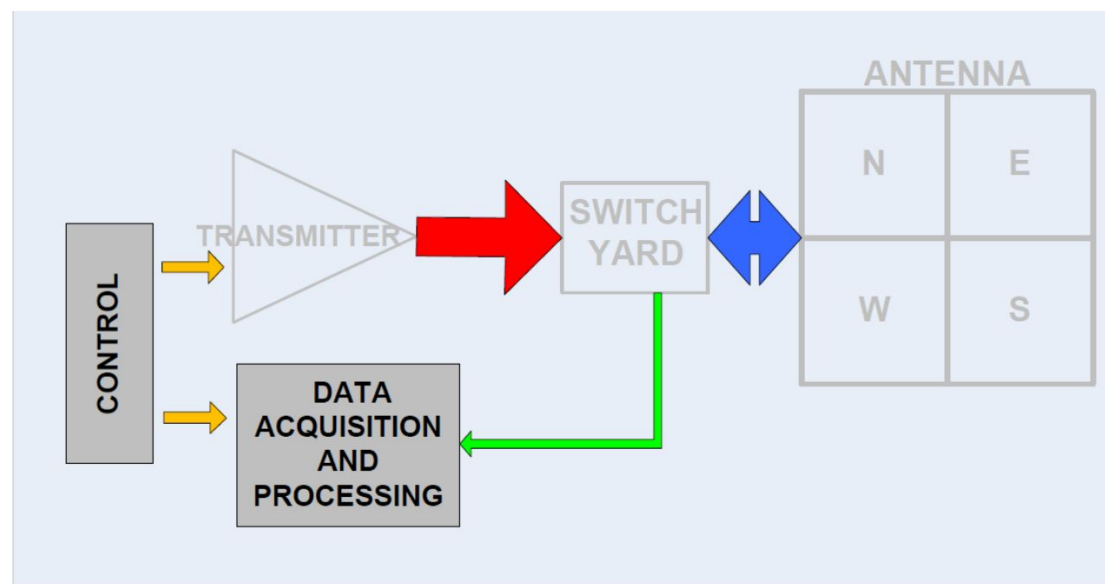


Antenna ground plane





Acquisition systems

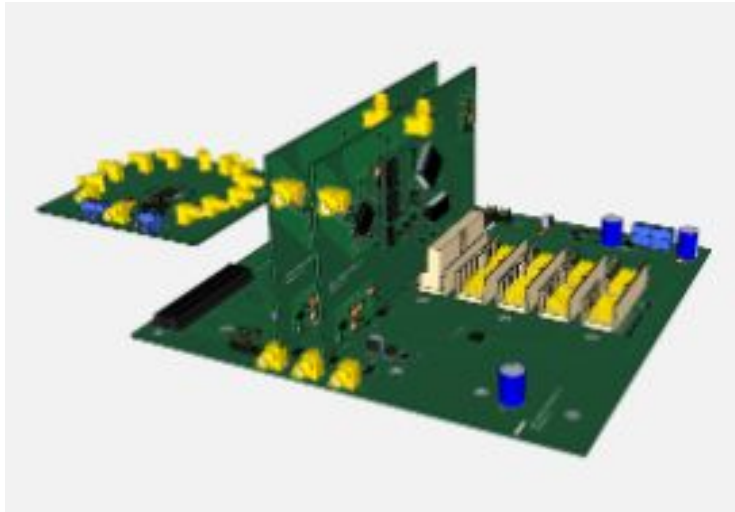




Jicamarca Acquisition Radar systems (JARS)



JARS 1.2



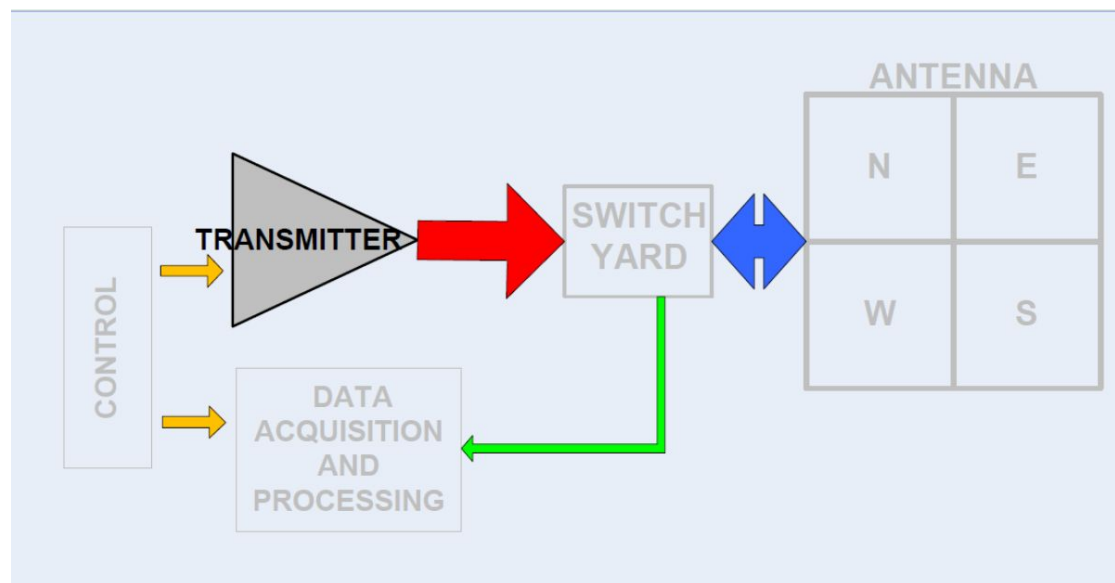
JARS 2.0



JARS 2.X

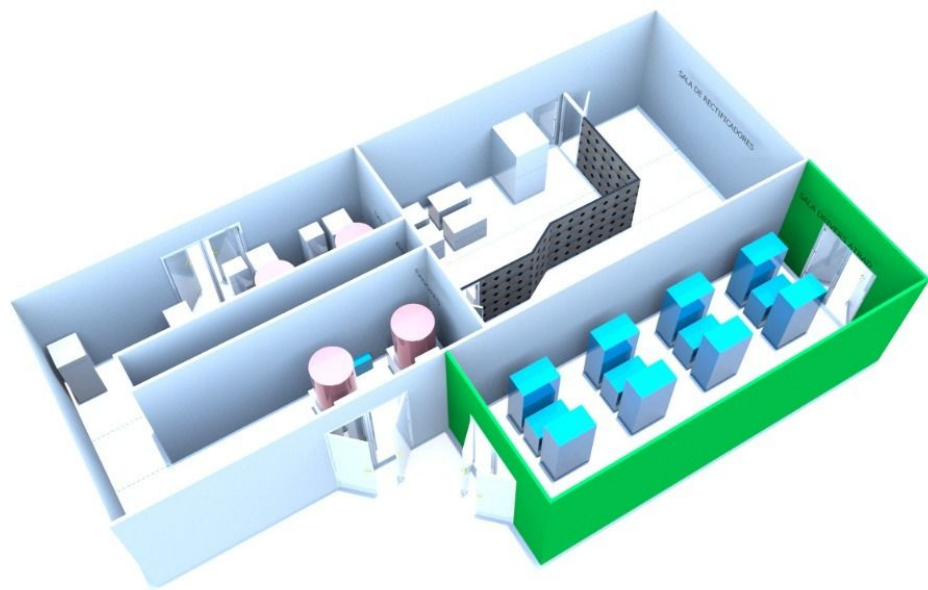


Transmitters





New 96 kW transmitters





96 kW transmitters – Medium Power JULIA mode



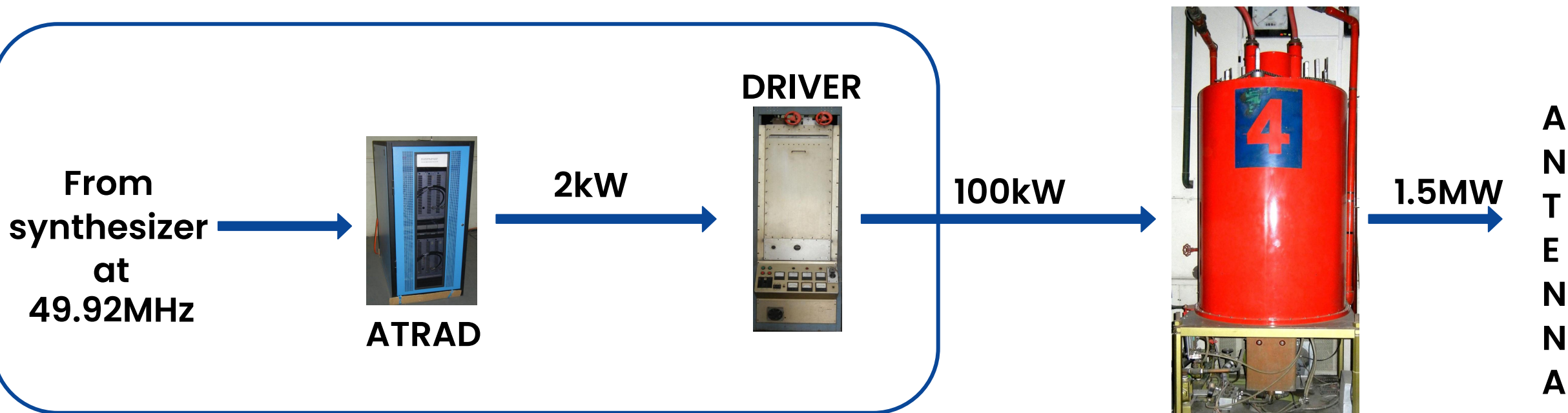
96kW
→

A
N
T
E
N
N
A

96 kW transmitter



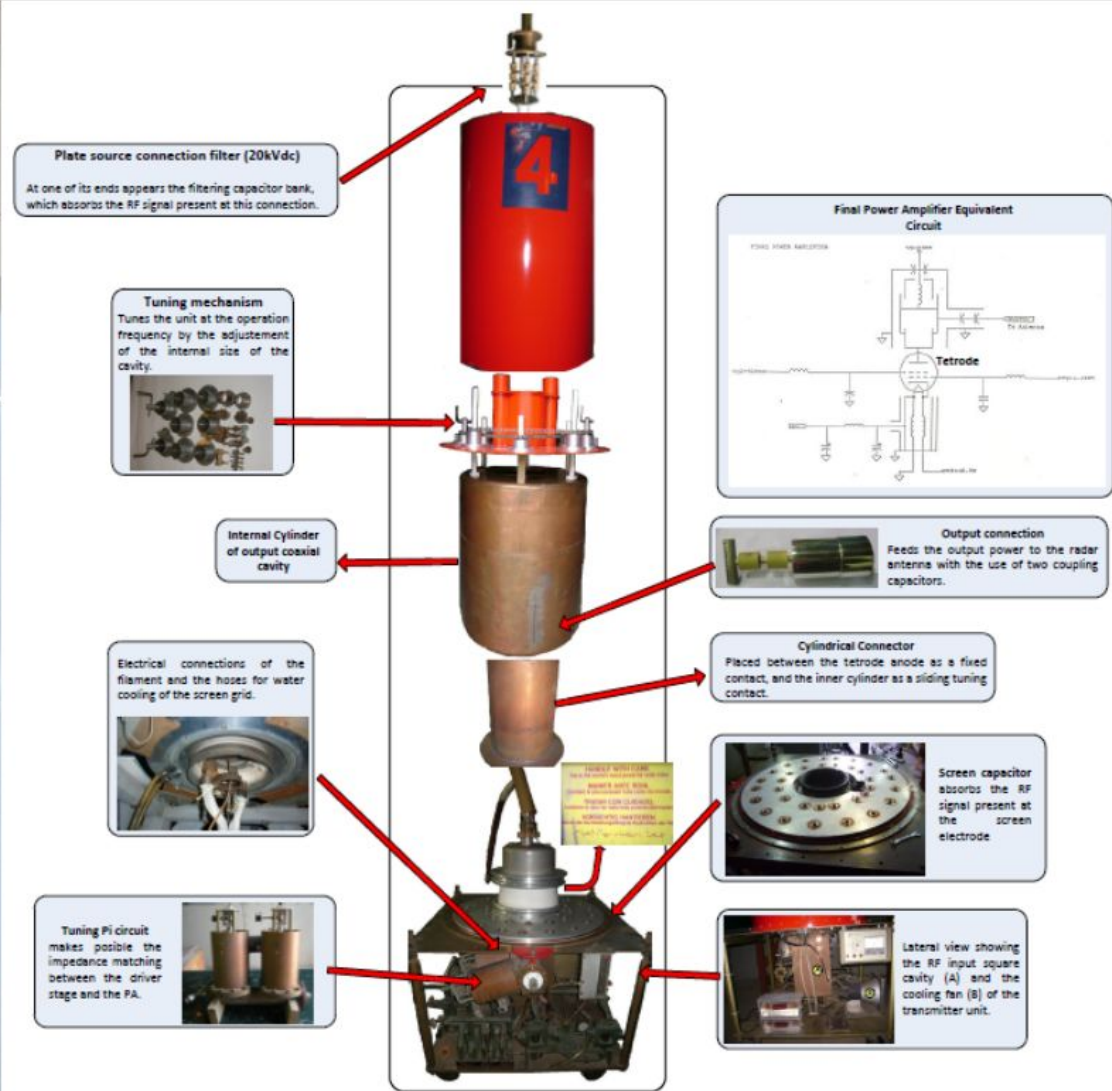
96 kW transmitters – ISR mode



To be replaced with 96 kW transmitter



4th High Power Amplifier

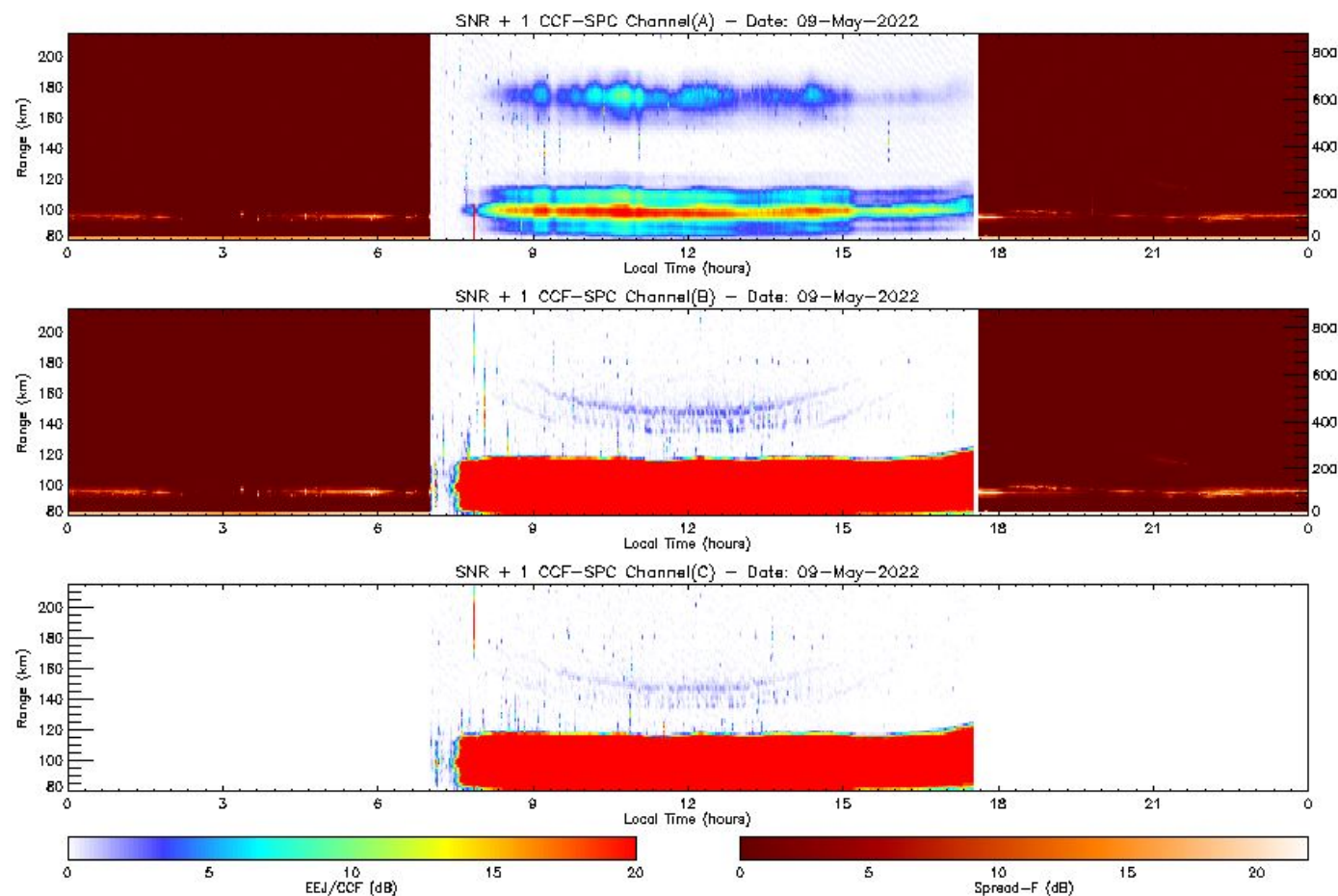




New experiments



NOW: JULIA mode (20 kW transmitters)



DAY TIME

- 150km echoes drifts
- Oblique EEJ

NIGHT TIME

- ESF
- Imaging ESF

Operational hours:
~4000 hours a year

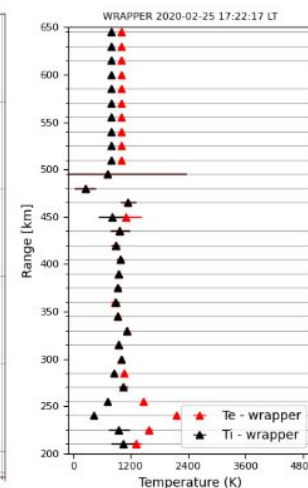
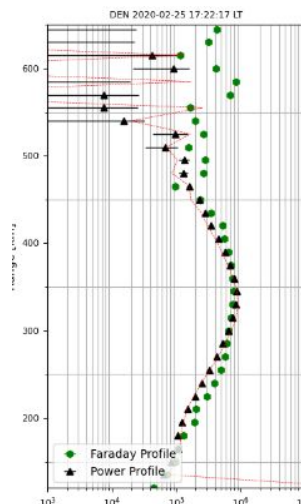
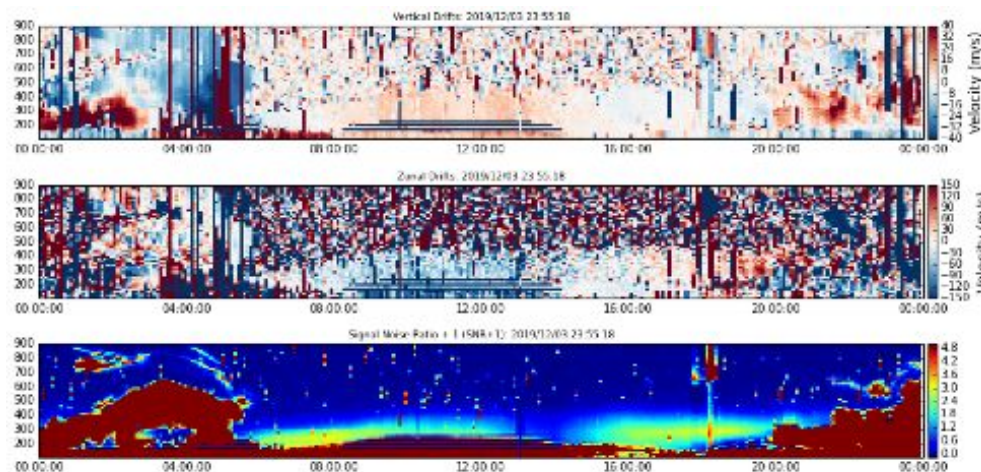


NOW: ISR mode (1.5 MW transmitters)

Scheduled CAMPAIGNS for:

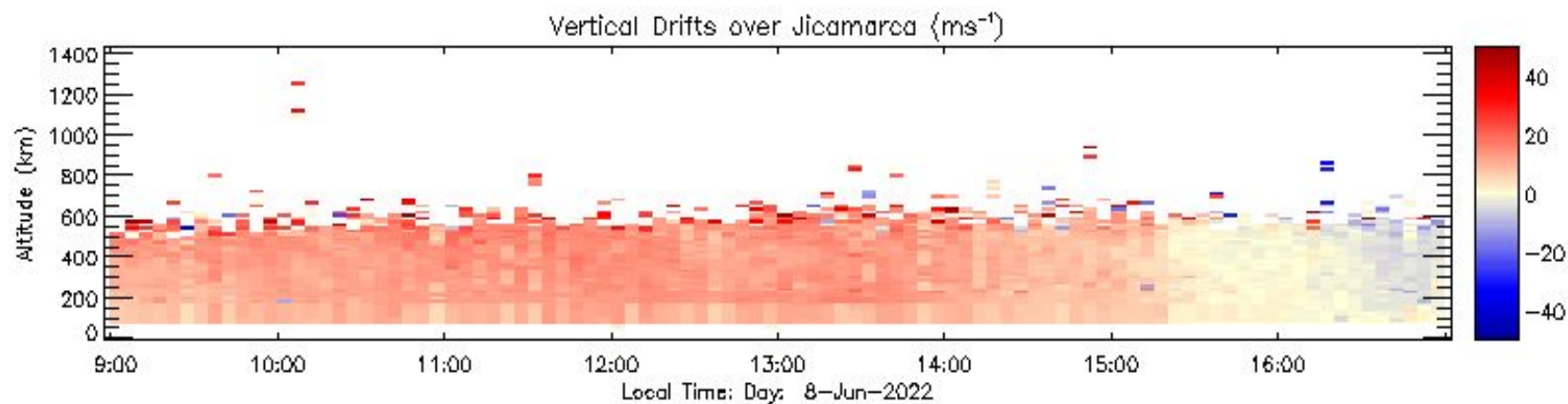
- *EW Drifts*
- *Faraday mode (Densities, composition, etc)*

*Operational hours:
~1000 hours a year*





FUTURE: New Medium Power JULIA mode (96 kW transmitters)

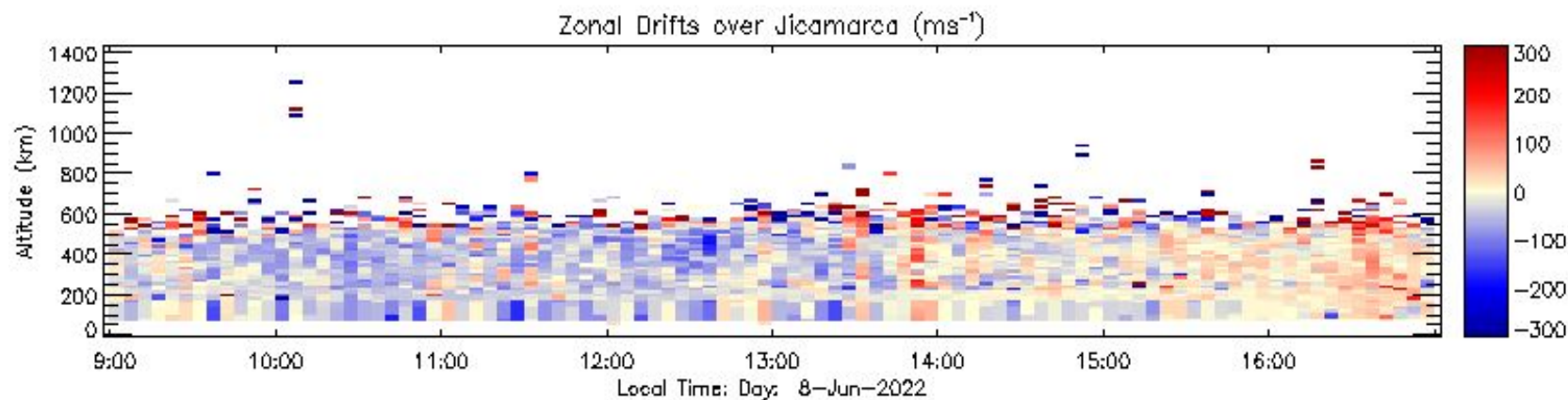


DAY TIME

- 150km echoes drifts
- Oblique EEJ

NIGHT TIME

- ESF
- Imaging ESF



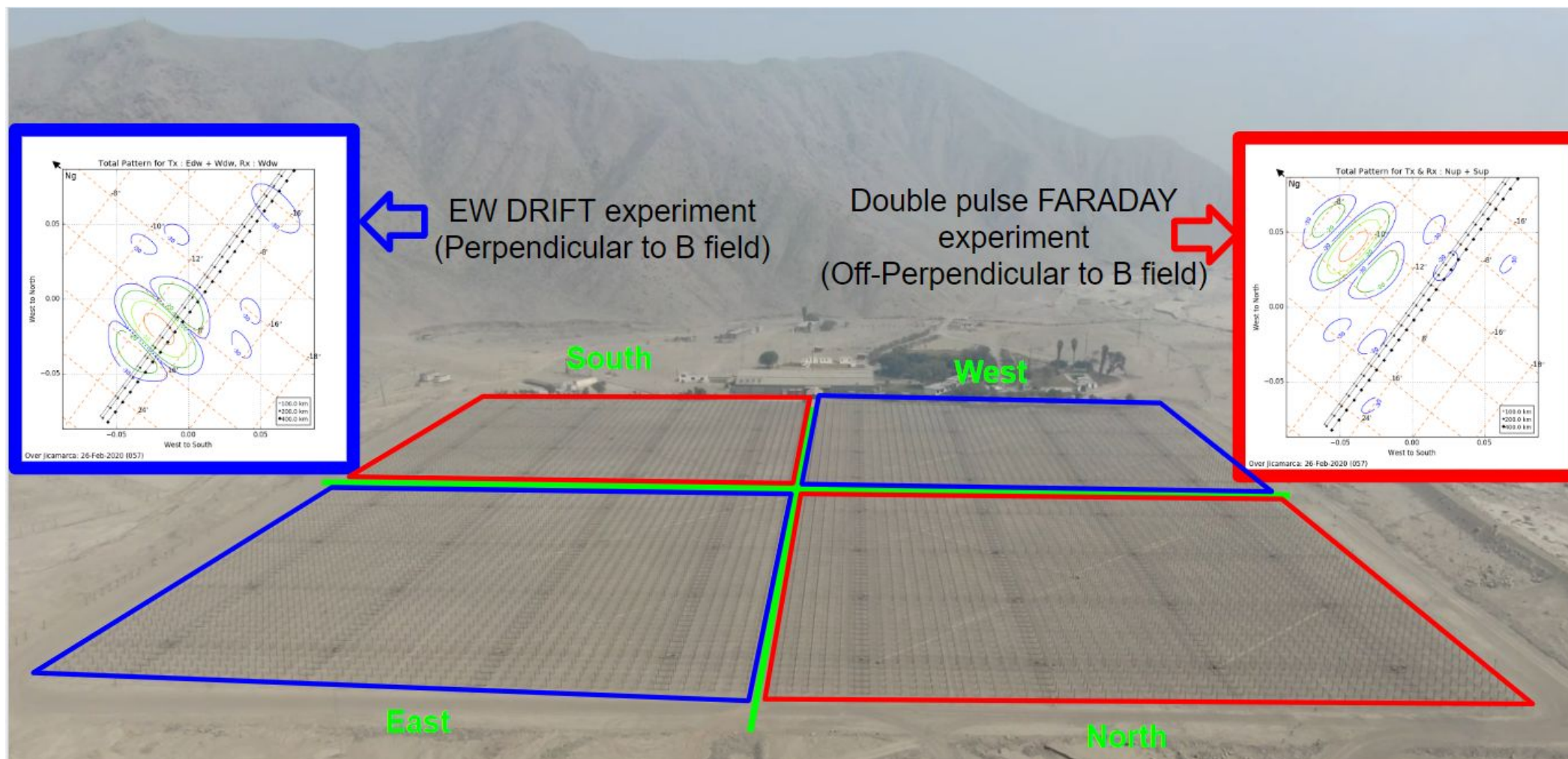
ALL DAY -EW Drifts

**Operational hours:
~4000 hours a year**

****Faraday mode: to be tested***

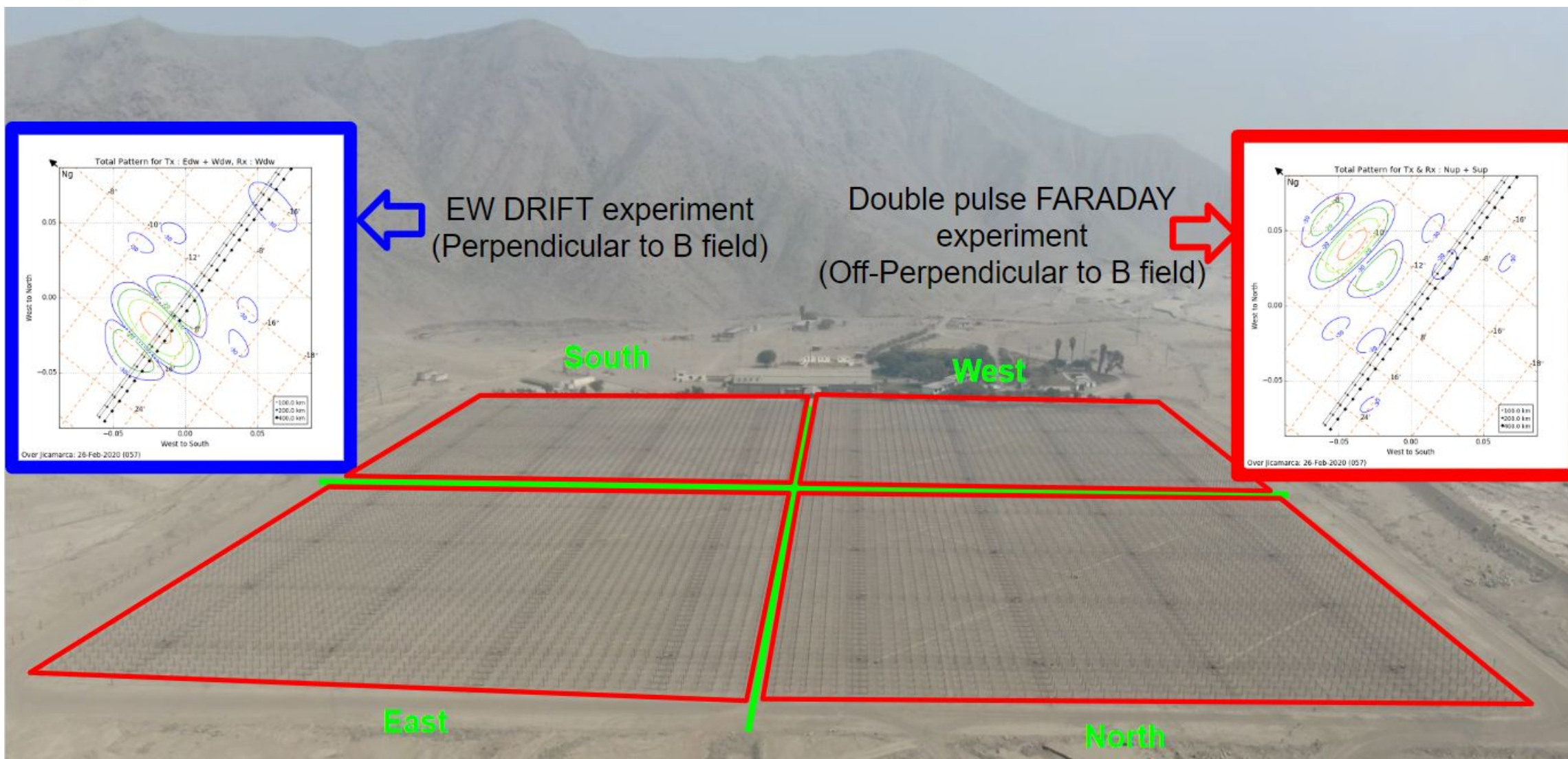


NOW: Dividing antenna for multiple pointing directions





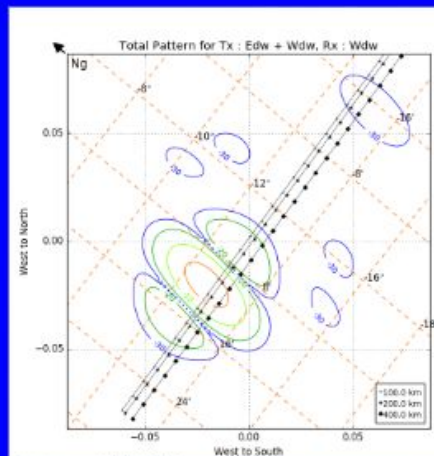
FUTURE: Multiple pointing directions with ABS





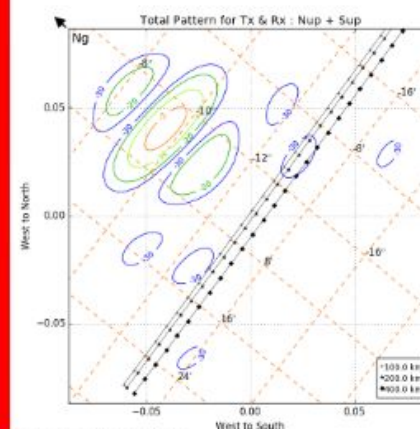
FUTURE: Multiple pointing directions with ABS

Useful for SOLAR experiment



EW DRIFT experiment
(Perpendicular to B field)

Double pulse FARADAY
experiment
(Off-Perpendicular to B field)



South

West

East

North



Summary

Antenna improvements

- *ABS : multiple pointing directions for multiple experiments*
- *Electrical system : handle ABS load*
- *Ground plane: improve antenna gain*



Summary

Antenna improvements

- *ABS : multiple pointing directions for multiple experiments*
- *Electrical system : handle ABS load*
- *Ground plane: improve antenna gain*

Acquisition systems:

- *New JARS: independent of National Instrument PCI board and will run on Linux*



Summary

Antenna improvements

- *ABS : multiple pointing directions for multiple experiments*
- *Electrical system : handle ABS load*
- *Ground plane: improve antenna gain*

Acquisition systems:

- *New JARS: independent of National Instrument PCI board and will run on Linux*

Transmitters:

- *New 96kW: New Medium Power JULIA mode → **~4000 hours of EW Drifts***
- *4th HPA: more power to reach higher altitudes*



*Ciencia para **protegernos***
*Ciencia para **avanzar***