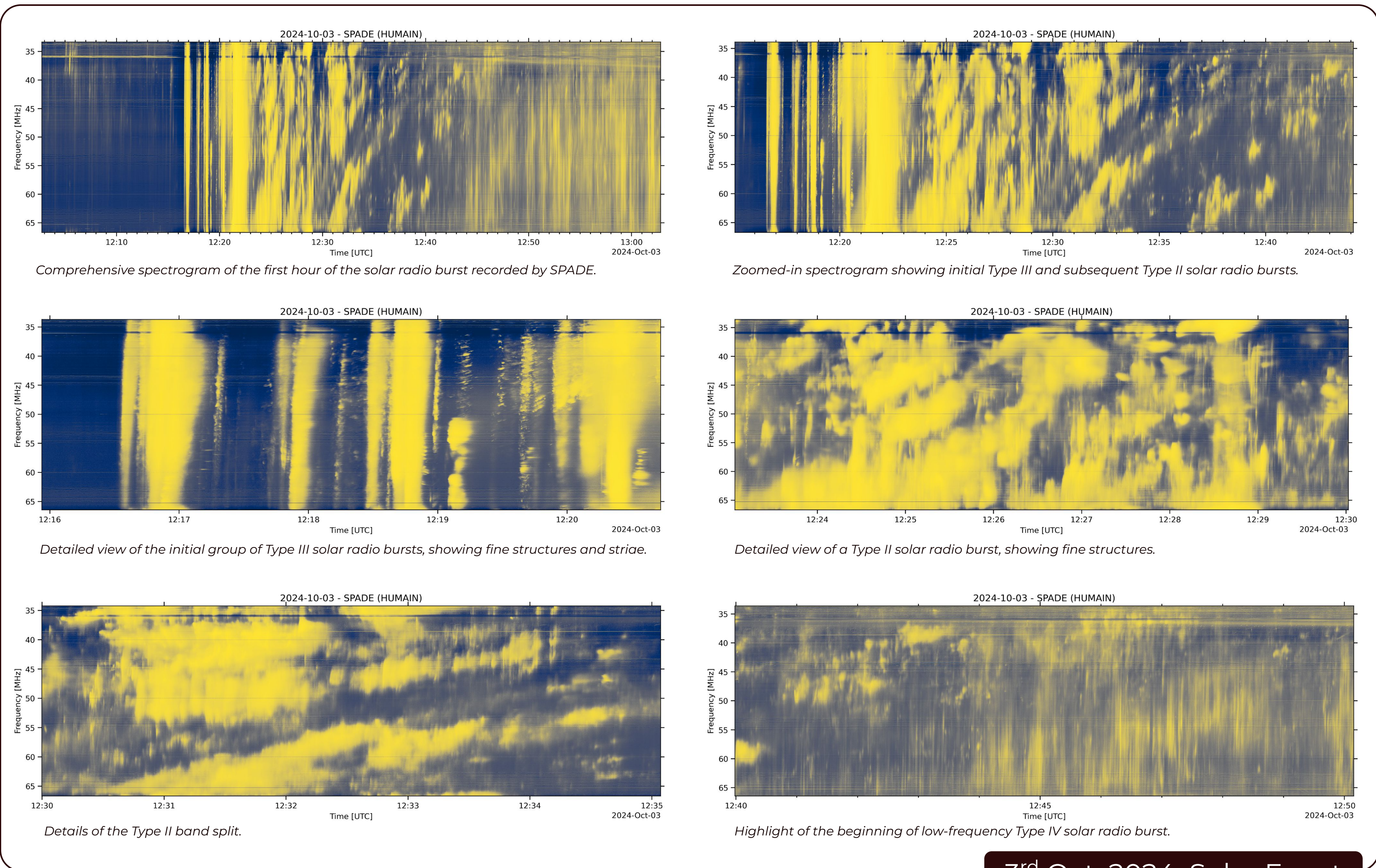
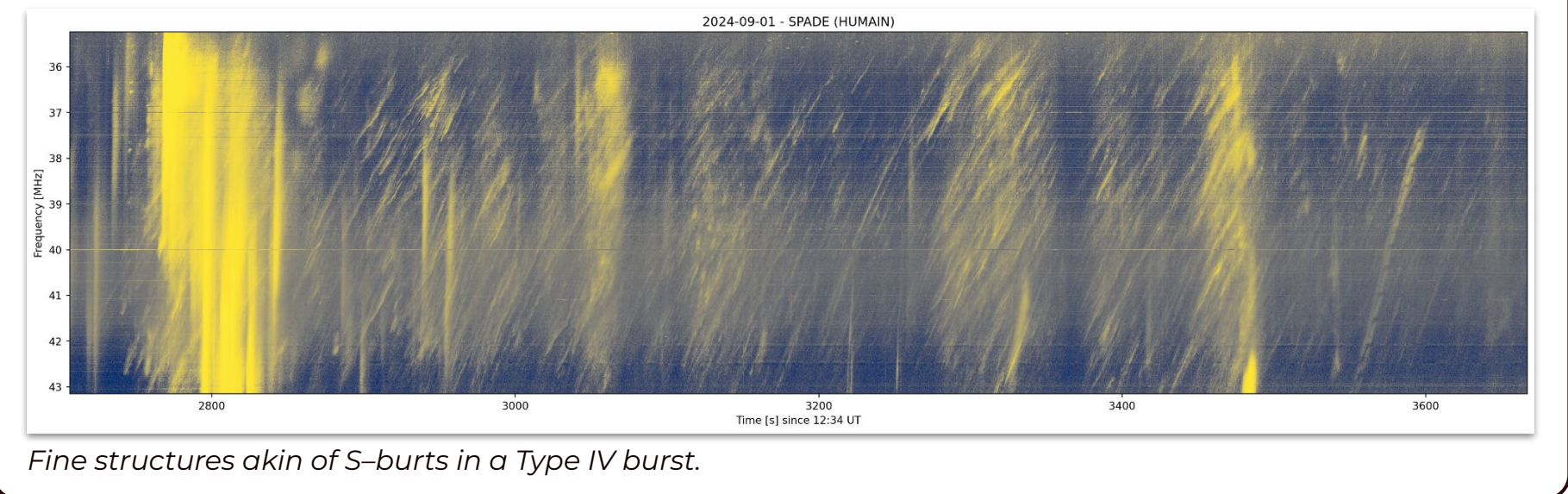


First Radio Solar Observations with SPADE



First Light!

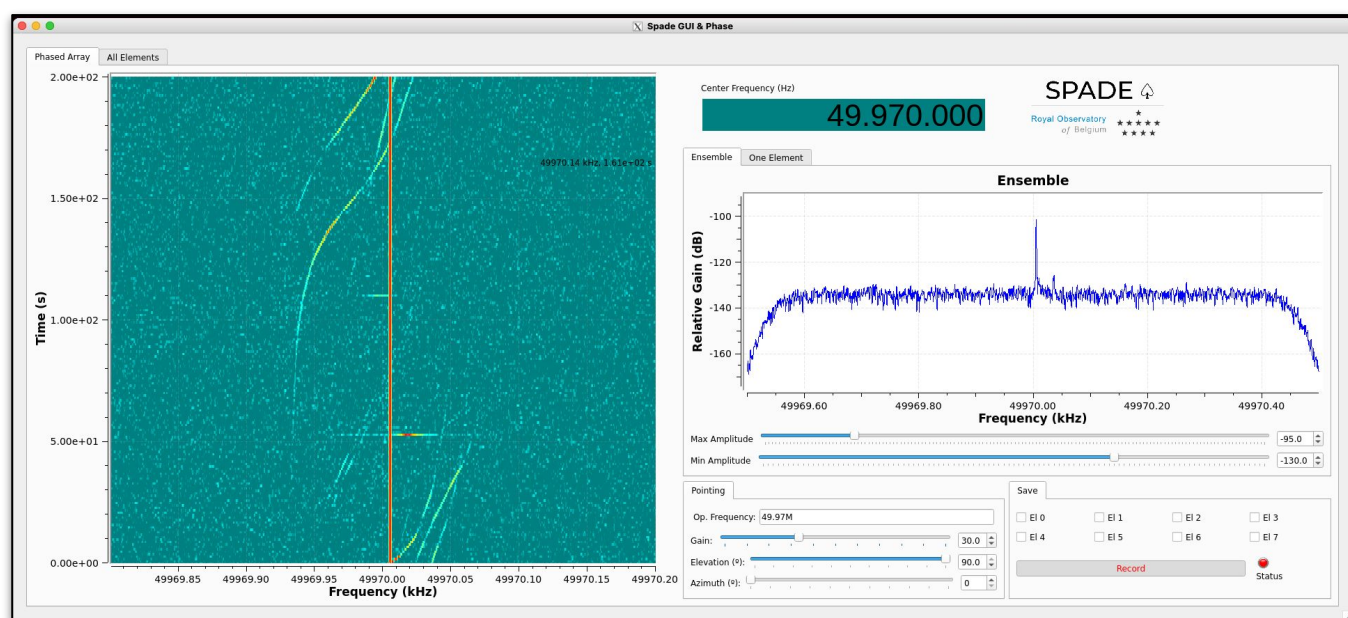
1st Sep. 2024 Solar Event



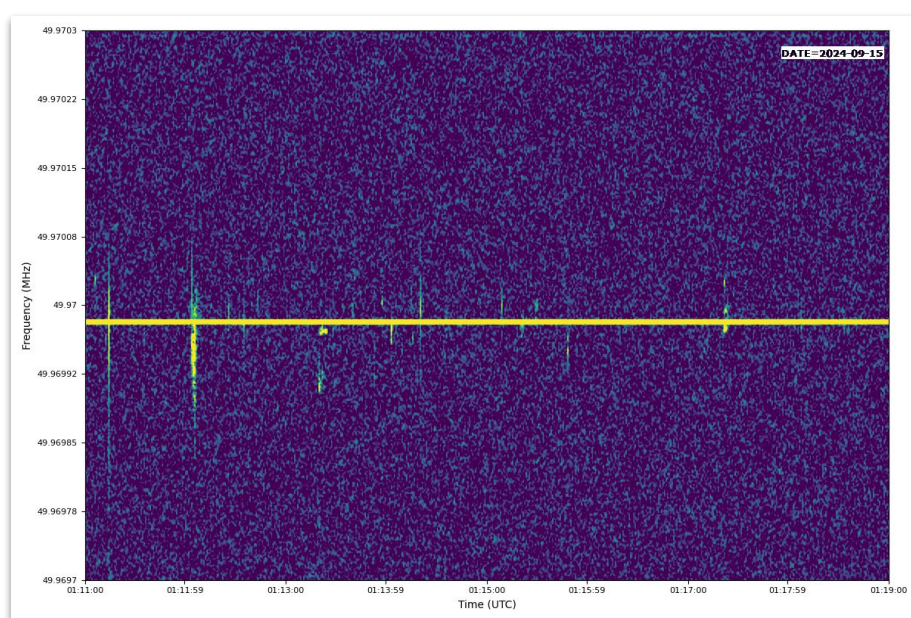
3rd Oct. 2024 Solar Event

Testing

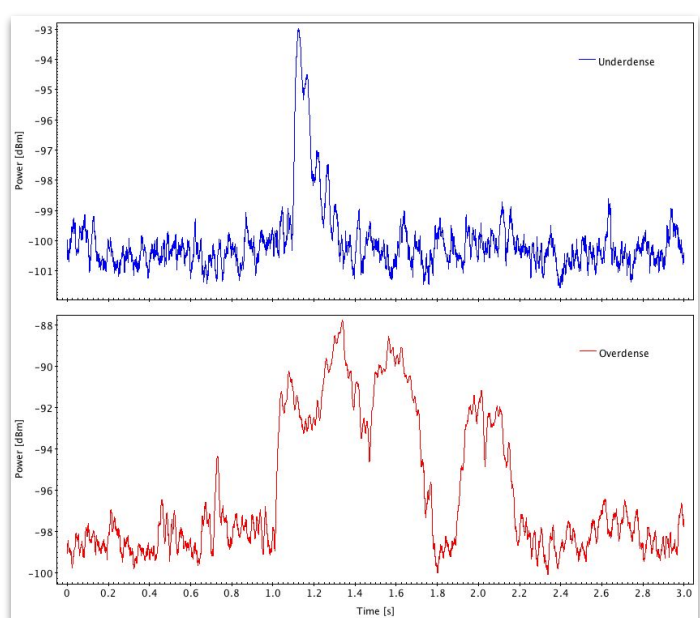
- Meteor echoes observation as a proof of concept.
- Main beam pointing.
- Data quality and performance check.



SPADE meteor-echo observation control Graphical User Interface.



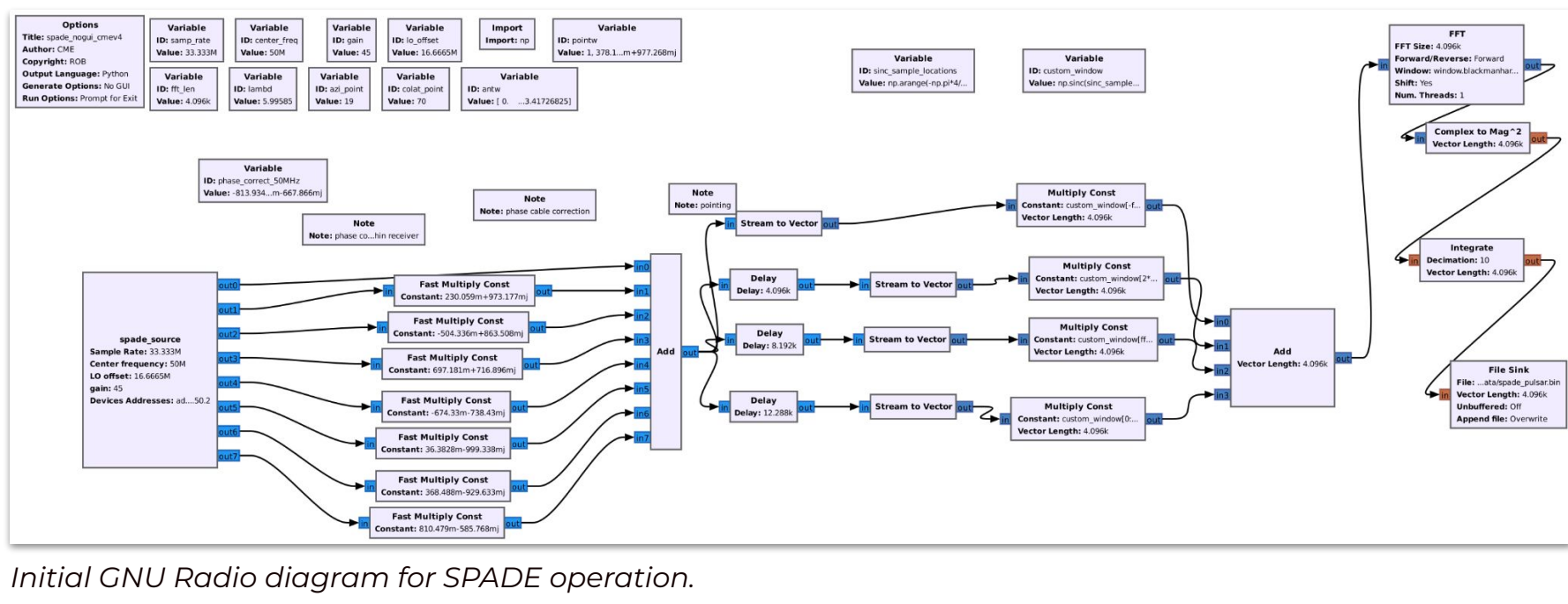
Meteor echoes registered by SPADE.



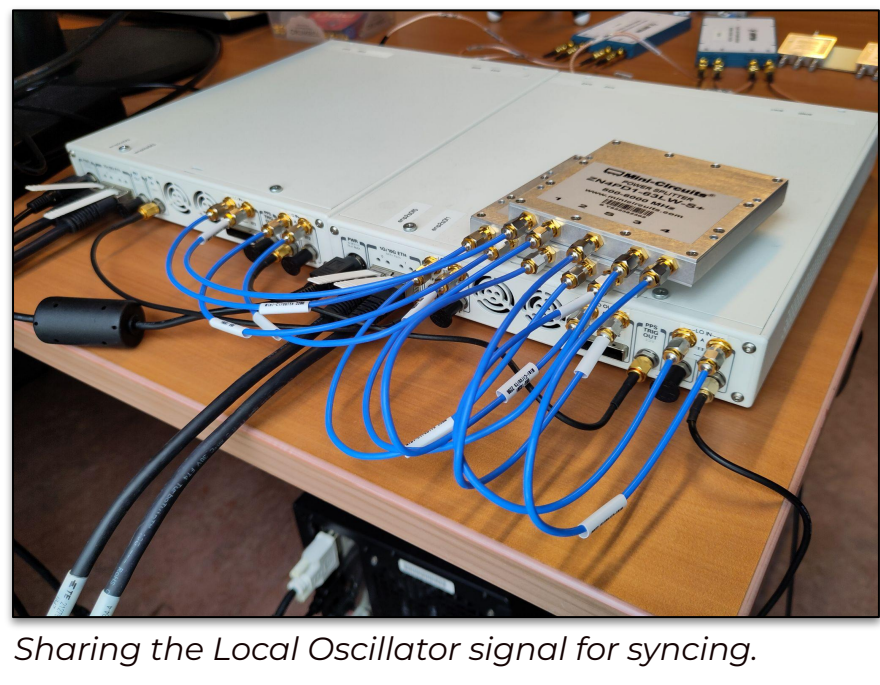
Meteor echo power profiles.

SDR Configuration

- Cable electric length correction.
- Sampling synchronization.
- Phase alignment.
- GNU-Radio for SDR implementation.
- Beam pointing via real-time phase delay.



Initial GNU Radio diagram for SPADE operation.



Sharing the Local Oscillator signal for syncing.

Array Field Building

- 20x20 m reflective ground plane.
- Over 500 t of soil moved for leveling.
- Total surface area of 400 m².
- Over 600 m of cabling.



Underground cabling.



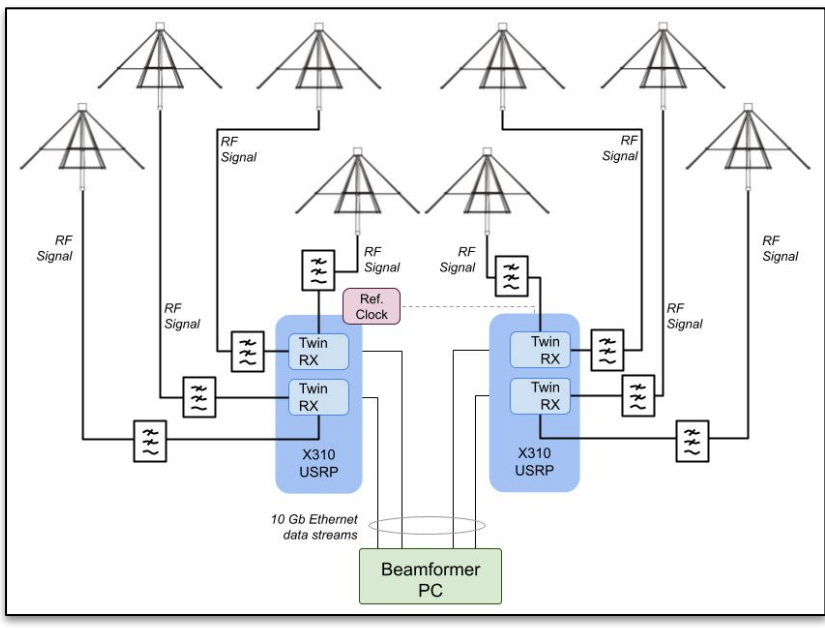
Soil movement for array field leveling.



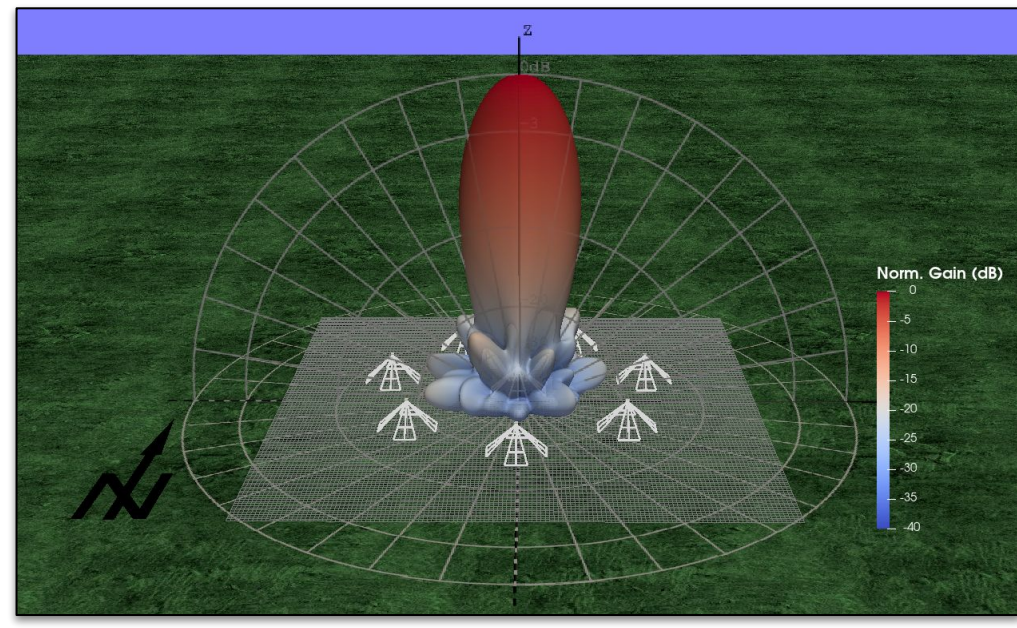
Array field terrain works.

SPADE Inception

- EM simulation-oriented design.
- 8x fat inverted-vee active antennas.
- Circular layout with central element.
- 2x commercial receivers.



General signal path schematics.

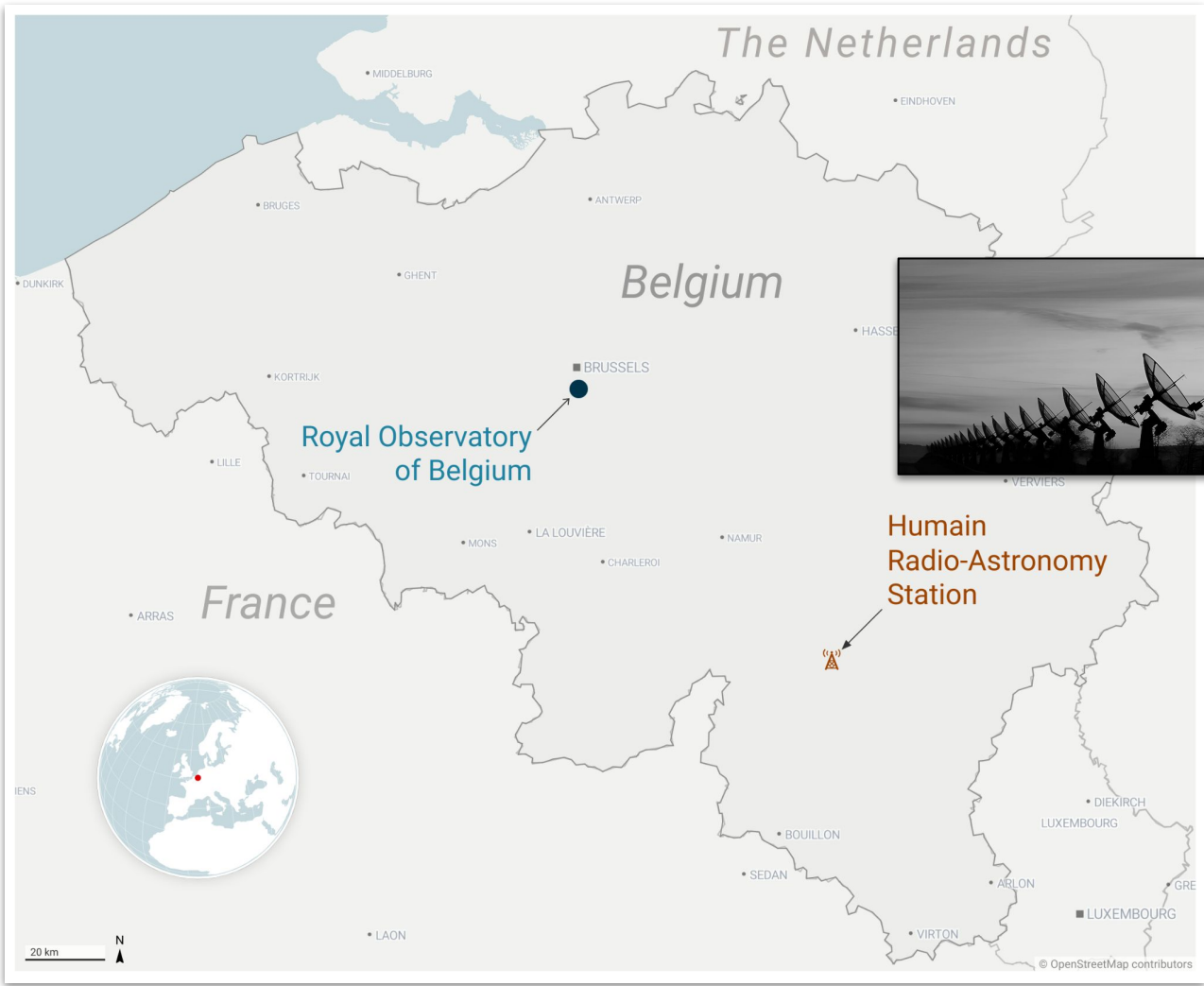


SPADE array antenna pattern visualization.



Antenna element testing.

Humain Radio-Astronomy Station



Spectrographs Features

	Frequency Resolution (kHz)	Time Resolution (ms)	Data Production (MB/day)
HSRS	98	50	1660
ARCAS	98	250	1550
CALLISTO	63	84	35
SPADE	04	50	26385

