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# ATLAS: Deployment, Control Platform and First RSO Measurements

# Hello!

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# ATLAS key features



## Carrier frequency at 5.56 GHz

Atmospheric effects are negligible.



## Peak power of 5 kW

Solid state power amplifiers based on GaN transistors.



## Fully Coherent

All the clocks, pulses, gates and frequencies are synchronous with highly stable master oscillator.



## Arbitrary Waveform

Waveform synthesis and configuration is dynamic and in the digital domain.



## 50 MHz of bandwidth

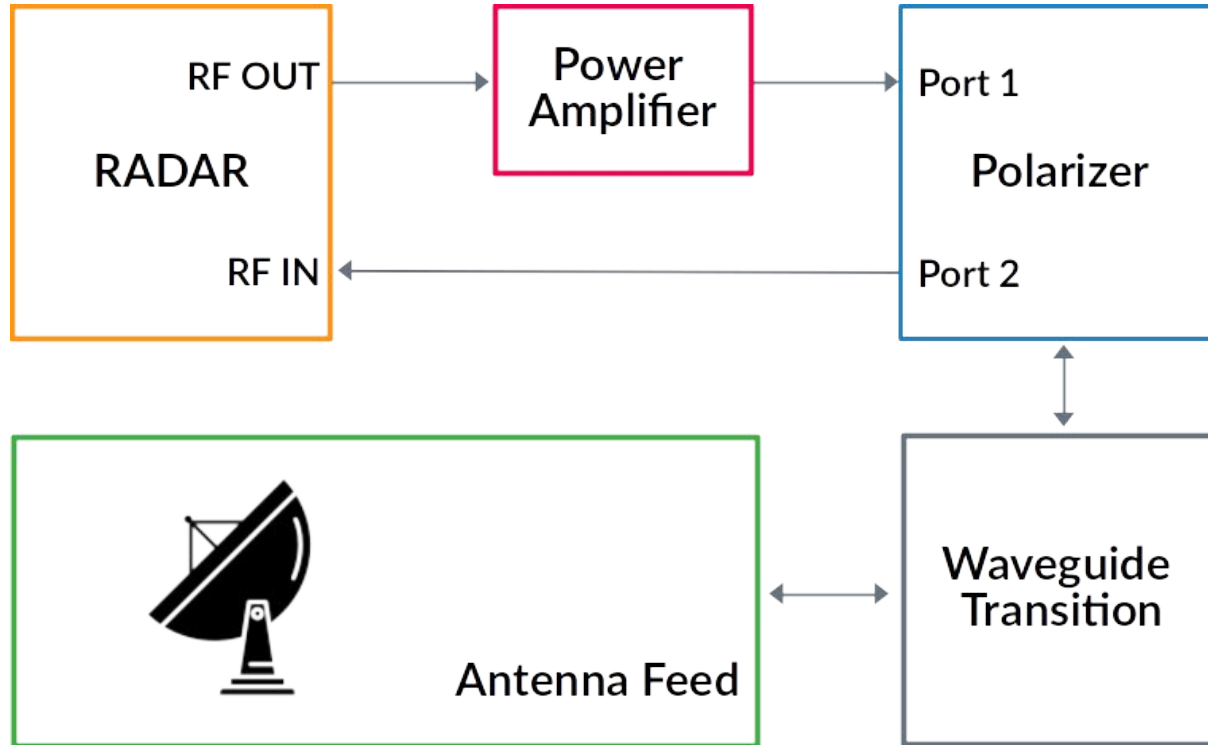
New and innovative waveforms with better detection capabilities.  
Improve object characterization with signal processing.



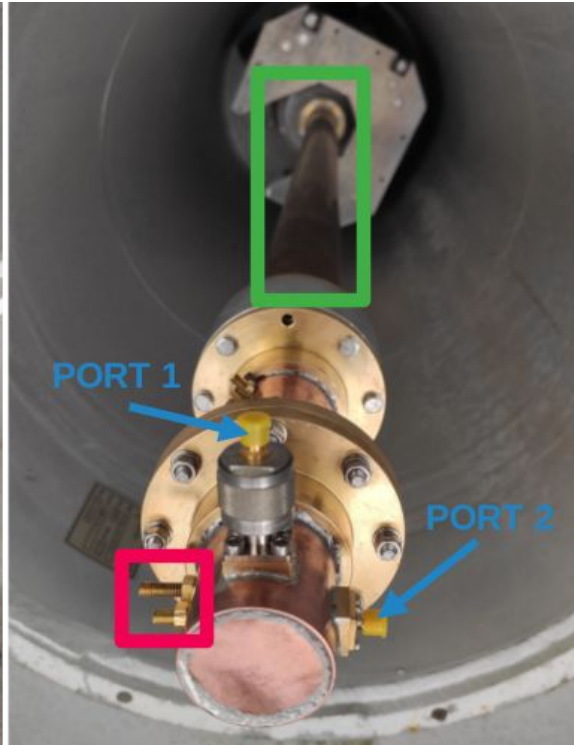
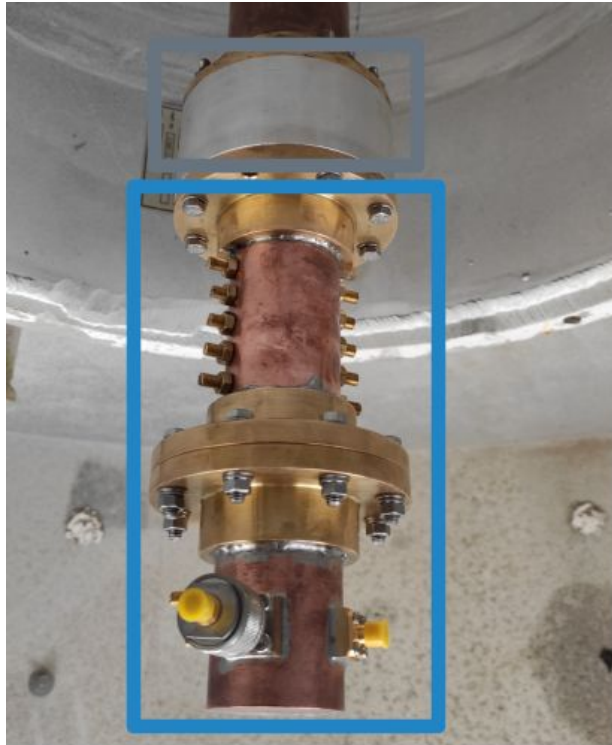
## All digital

Radar configuration, waveform synthesis and signal processing completely in the digital domain.

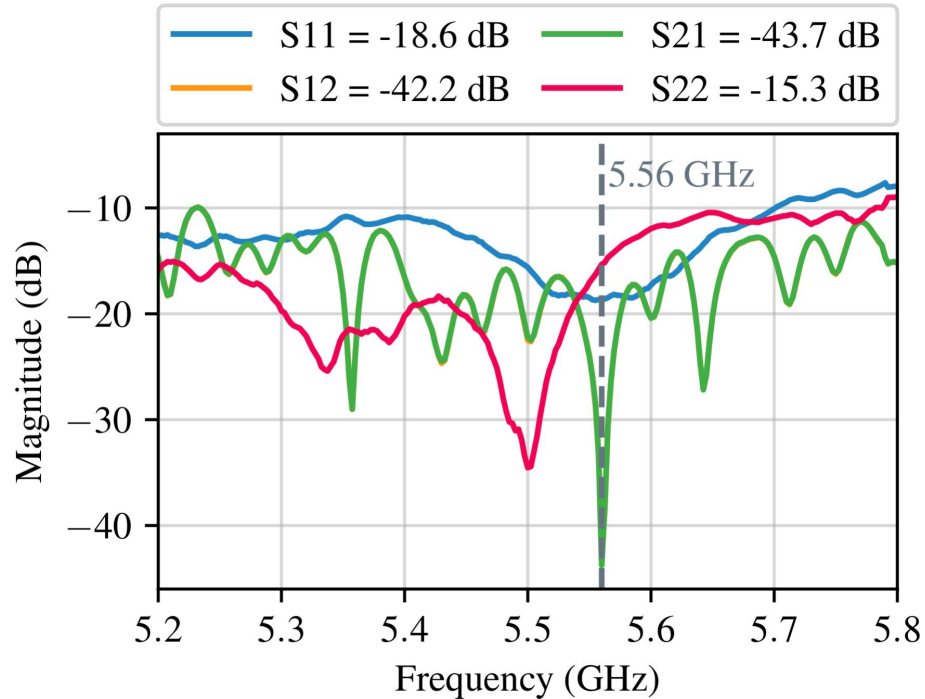
# ATLAS Deployment



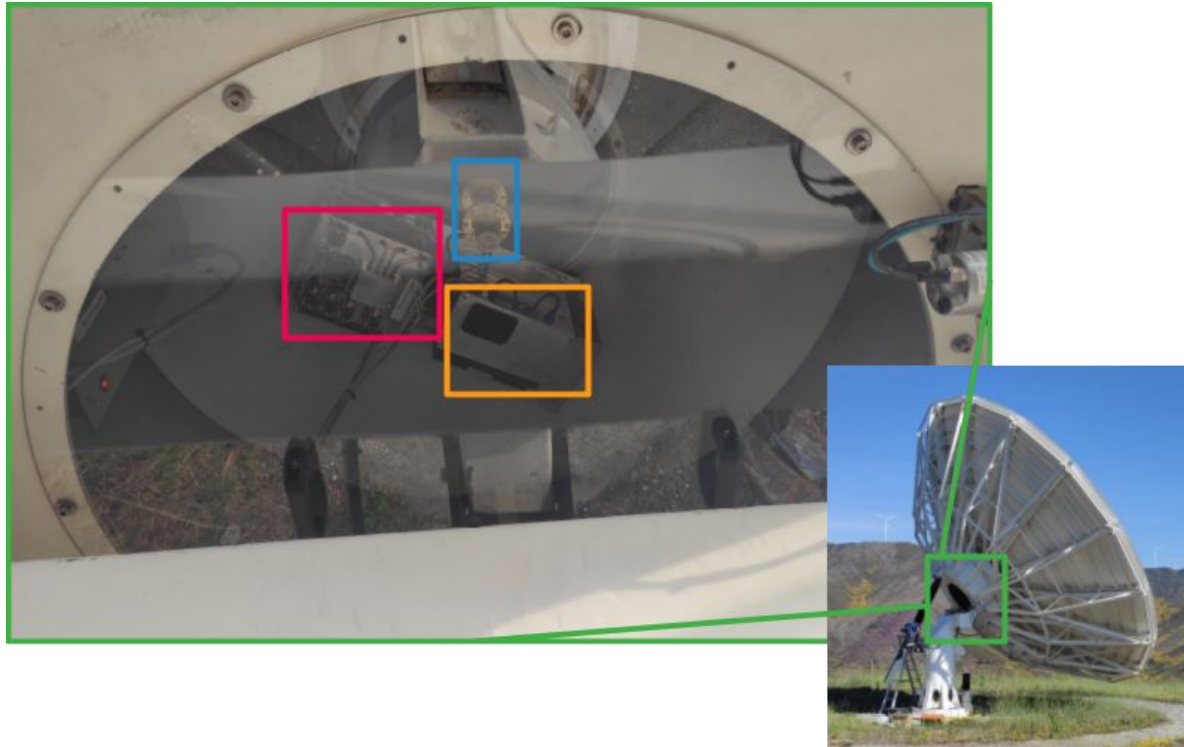
# Mounting the polarizer to the feed



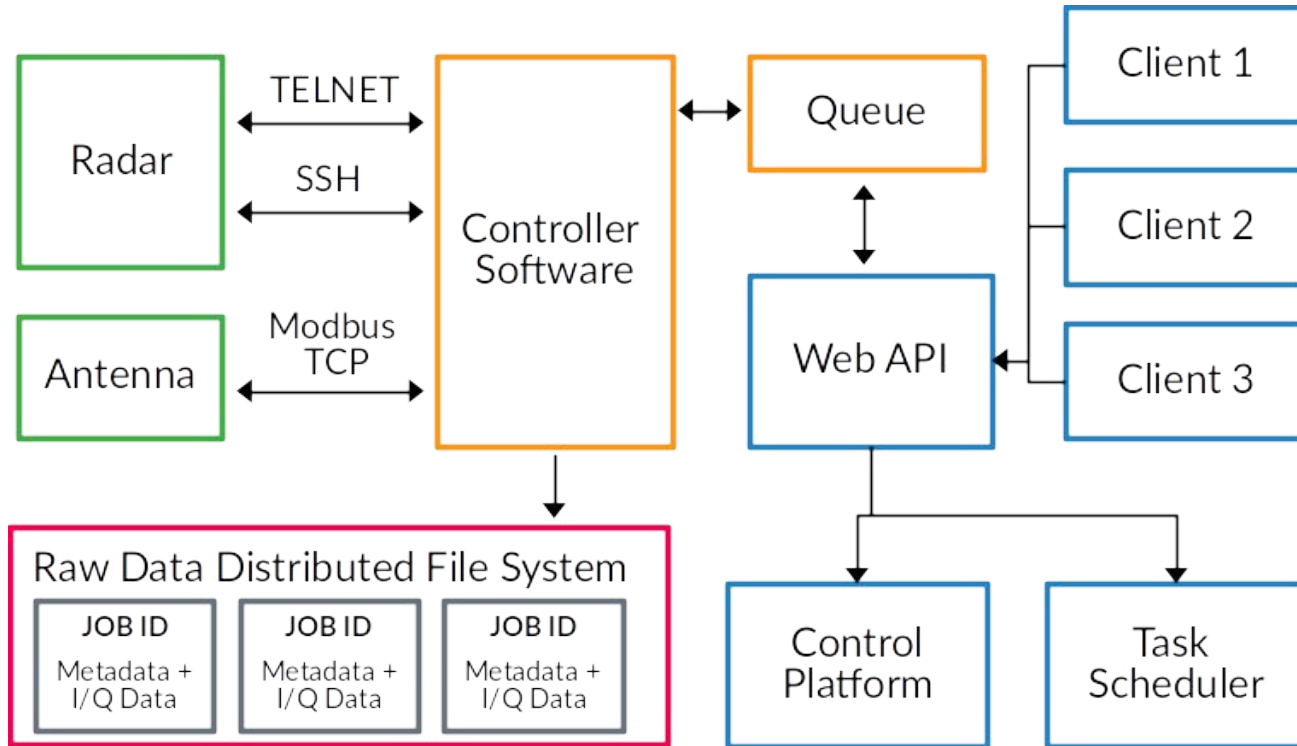
# Matching the Polarizer



# The Hardware is complete!



# Software Infrastructure






# Control Platform

← pampilhosa Hi, admin

### Camera

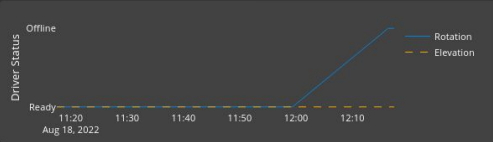
08-22-2022 Mon 10:12:12



### Controllers

1-WEEK 1-DAY 1-HOUR

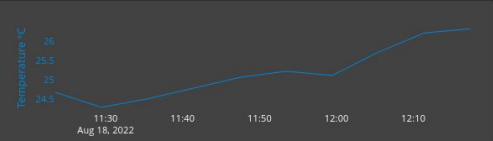
Rotation	Offline	Elevation	Ready
Movement	STOPPED		
Speed	0 rpm		
Position			



### Radar

1-WEEK 1-DAY 1-HOUR

AQS_DELAY_MICROS	4512.65	IF_MODE	Zero
LNC_TEMP_CELSIUS	21.38	NUMBER_OF_PULSES	40
PRI_MICROSECS	24000	RX_DVGA_dB	-10
RX_TEMP_CELSIUS	35.12	SHAPE_FILENAME	endtest.wav
TDELAY_MICROSECS	10	TRIGGER_STATE	ENABLED
TX_PROG_ATT_dB	-30	TX_TEMP_CELSIUS	40.62



### Jobs

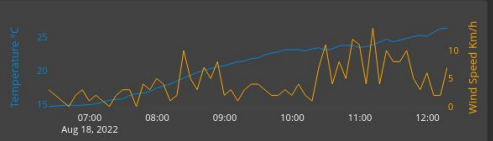
FILTERS CREATE

<input type="checkbox"/>	Created At	Author	Type	Status (Error)
<input type="checkbox"/>	Fri, 12 Aug 2022 10:28:30 GMT	admin	target	SUCCESS >
<input type="checkbox"/>	Fri, 12 Aug 2022 10:27:36 GMT	admin	home	SUCCESS >
<input type="checkbox"/>	Fri, 12 Aug 2022 09:50:03 GMT	admin	target	SUCCESS >

### Weather

1-DAY 6-HOUR 1-HOUR

Out Temp	26.33 C
Wind Speed	7 km/h S
Out Humidity	24 %
Rain Rate	0

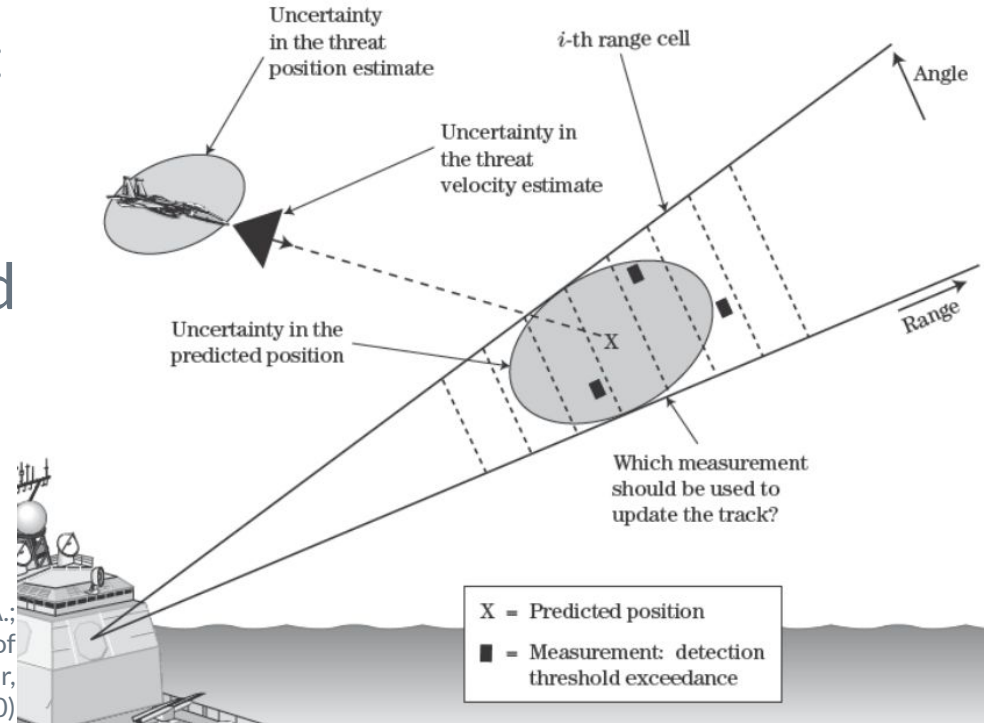


# Calibration and Observation Strategies

- ▷ Narrow Beamwidth, Targets with High velocity and orbit prediction errors -> hard to track!
- ▷ Calibration process:
  - Georeferencing
  - Calibration with celestial sources -> sun and moon
  - Calibration with selected objects: ISS, CRYOSAT-2, Jason-3 etc...
  - Use radar calibration satellites to tune RCS measurements (STELLA, STARLETTE)

# Calibration and Observation Strategies

- ▶ Semi-surveillance:
  - Park before it passes
  - Fire before and after it passes



Richards, Mark A.; Scheer, James A.;  
Holm, William A. (ed.): 'Principles of  
Modern Radar: Basic principles' (Radar,  
Sonar & Navigation, 2010)

# Conclusions and Future Work

- ▷ ATLAS is deployed in the antenna at PASO.
- ▷ Control Platform is used to monitor and trigger the radar by operators.
- ▷ Tracking objects in LEO demands careful calibration and observation plan.
- ▷ Currently we are implementing the calibration and observation plan.
- ▷ In the near future we will present measurements and performance assessment.

# Thanks!

## Any questions?

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