

Client: Philippe Couturier & David Molitor | **Director:** Tom Wilke | **Executive Director:** Julie Steinbrenner
Special Thanks: Tim Everett, Adam Clare, Prof. Dennis Akos, Thom Skrtich, Ian Rumsey, Prof. Penina Axelrad

Background

- Knowing blade deflection → better blades → more power output
- Current methods don't give full deflection data
- Turbine blade tips move at 200+ mph and deflect 10 m

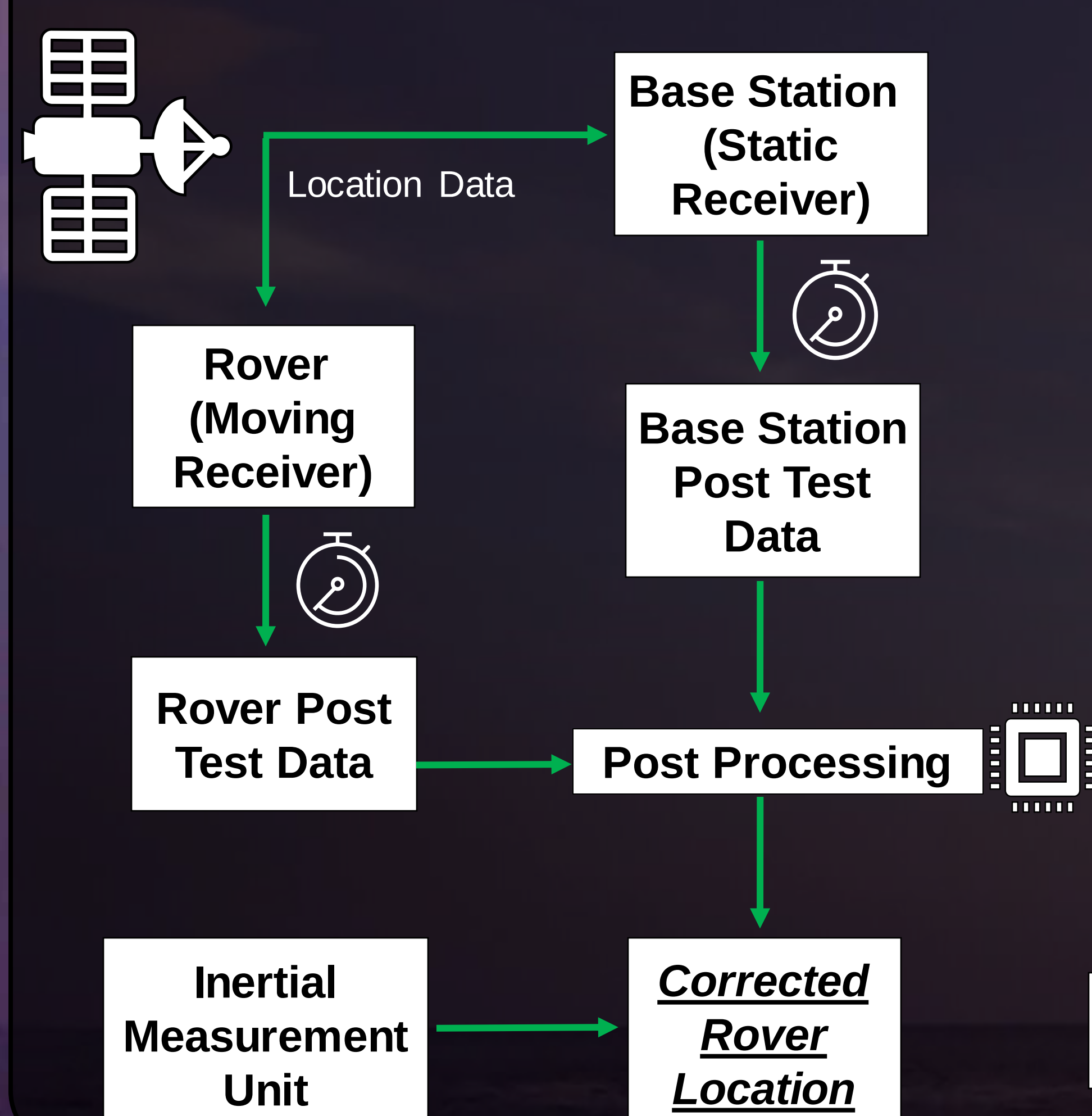
Objective

Build a blade tip tracking device capable of 3 cm global position tolerance and 1° orientational tolerance using Global Navigation Satellite Systems (GPS, GLONASS, Galileo)

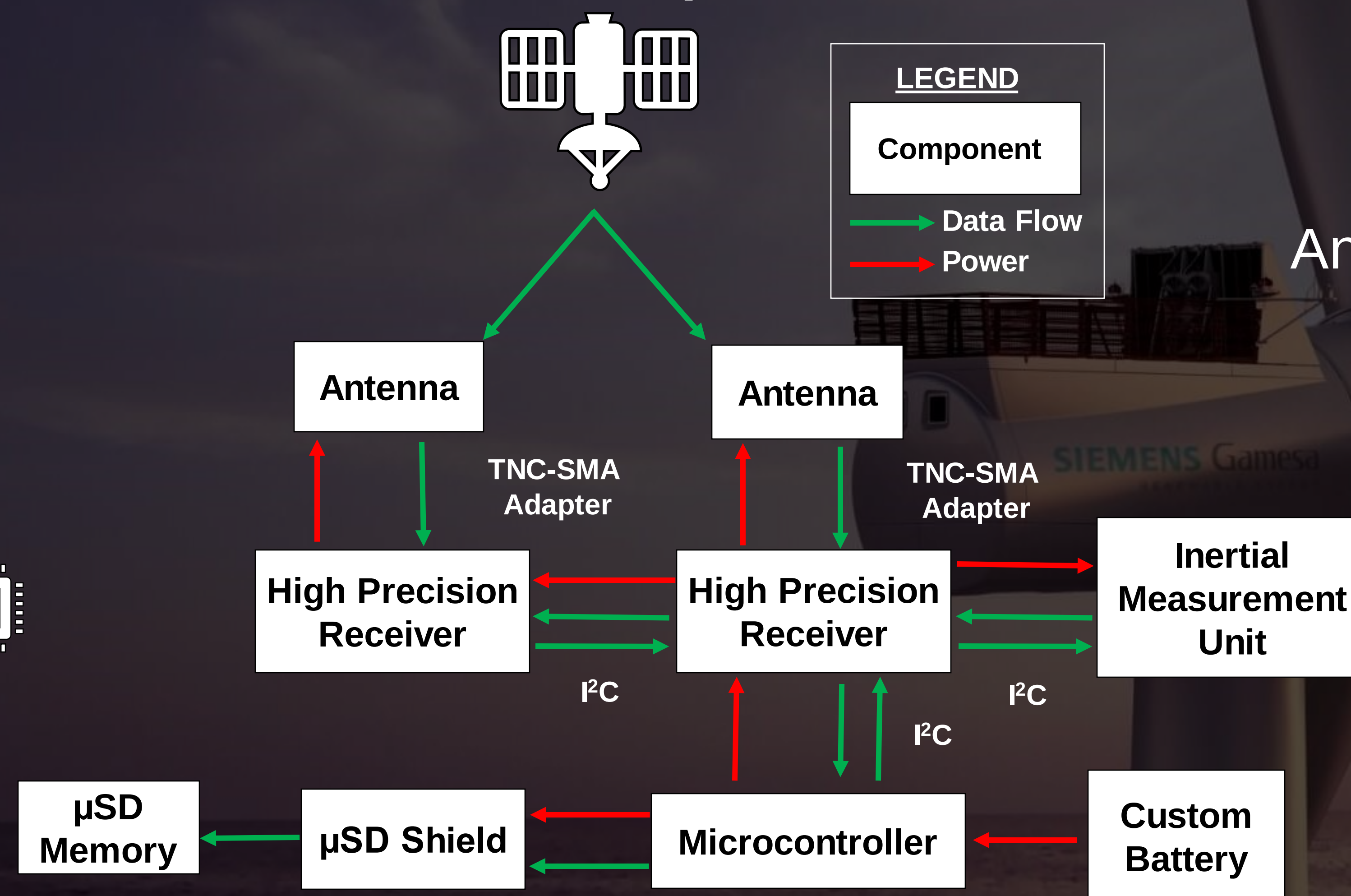
Requirements

- 4 Hz sampling rate
- Weatherproof
- Record 1 day of data
- Easy to assemble
- Withstand aerodynamic and inertial forces
- \$2000 Budget

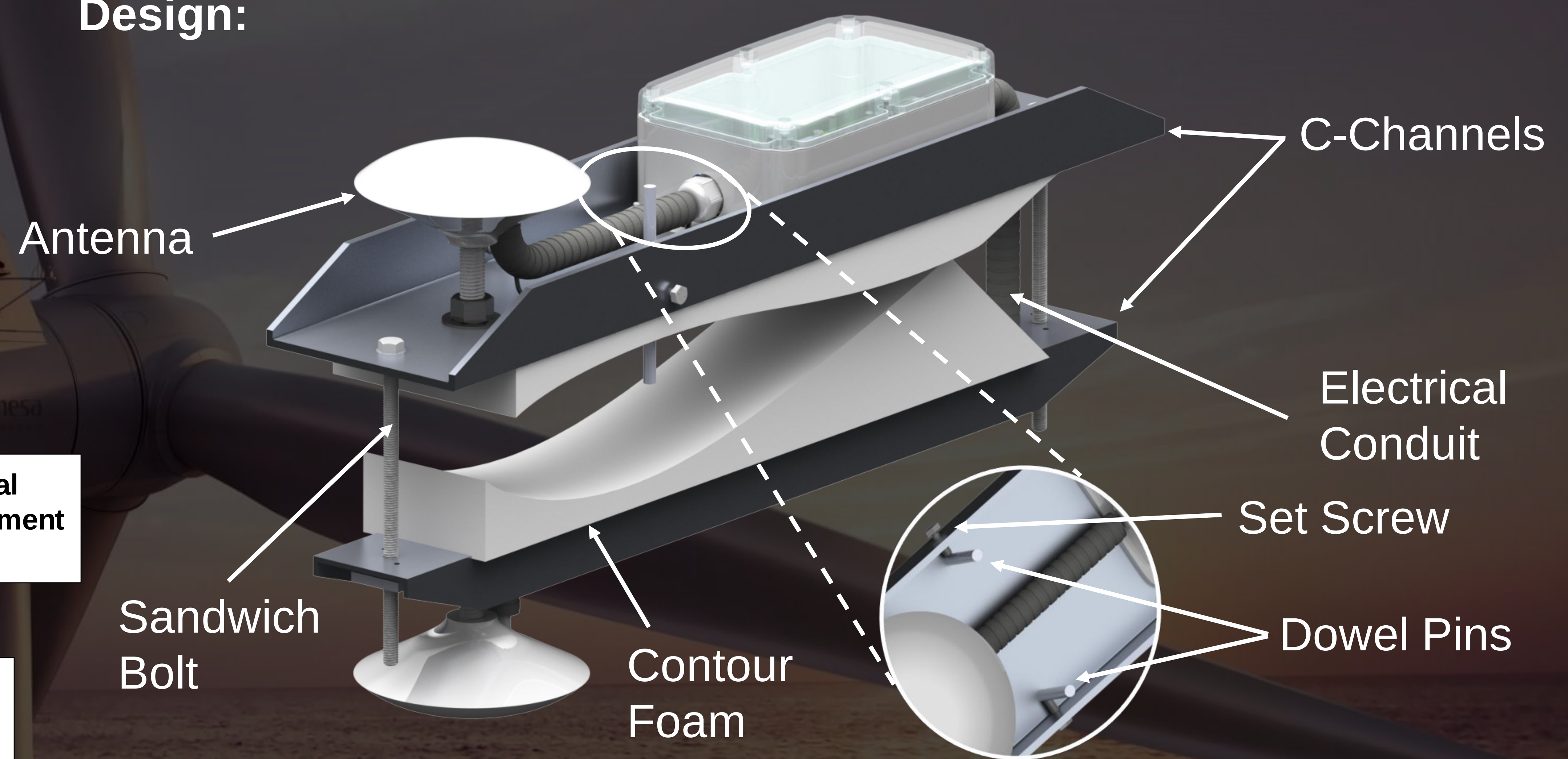
Data Flow:



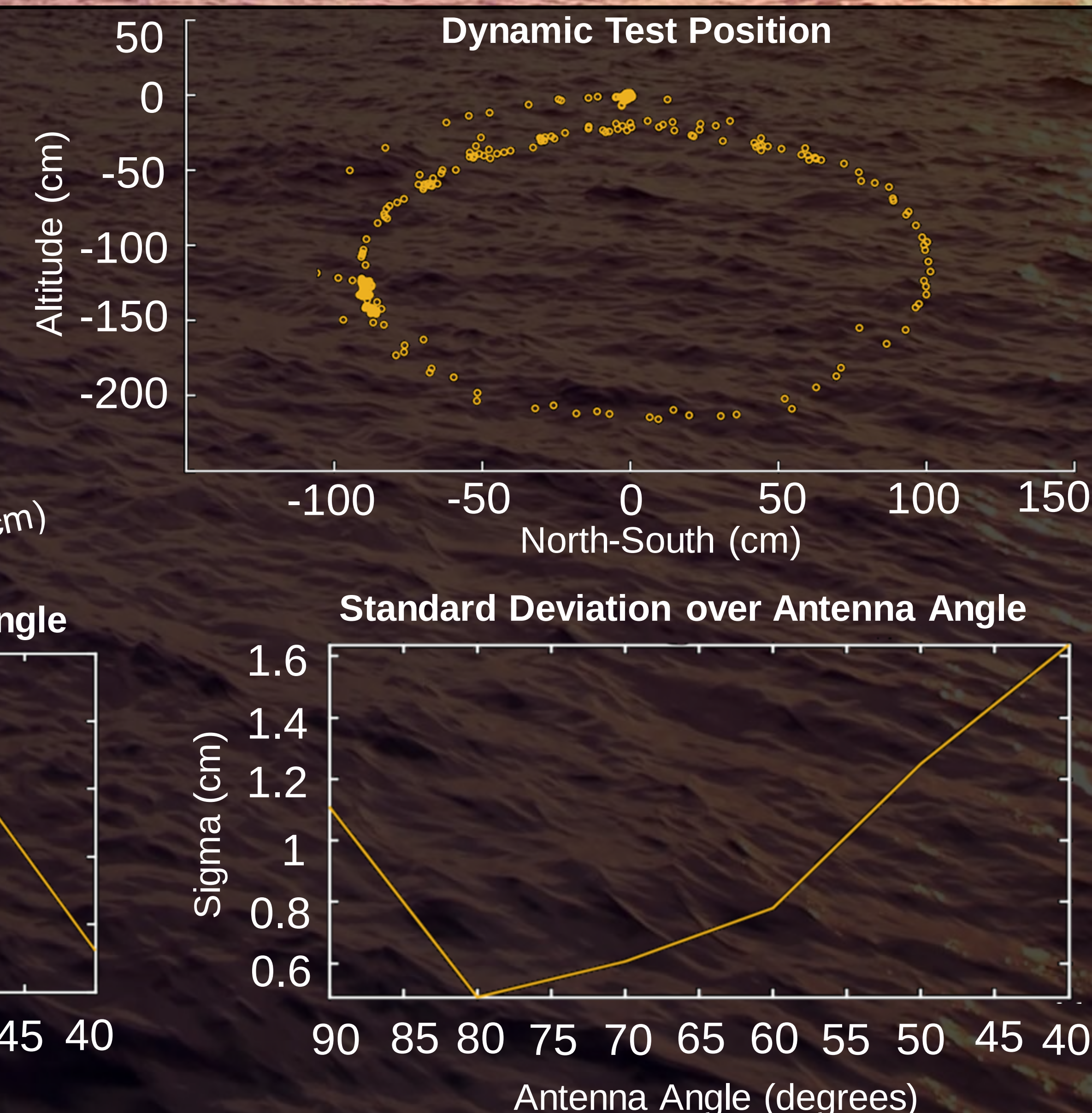
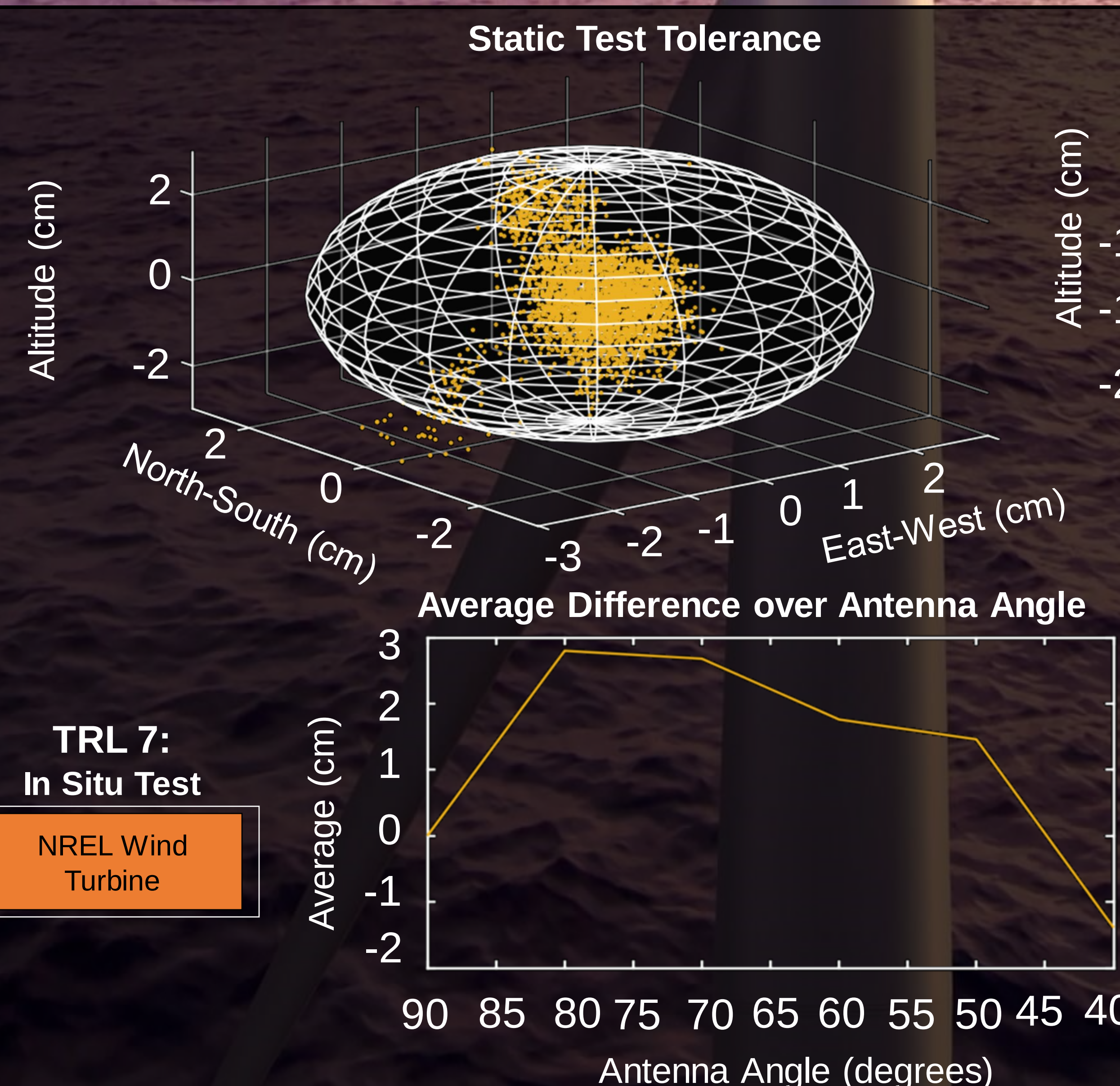
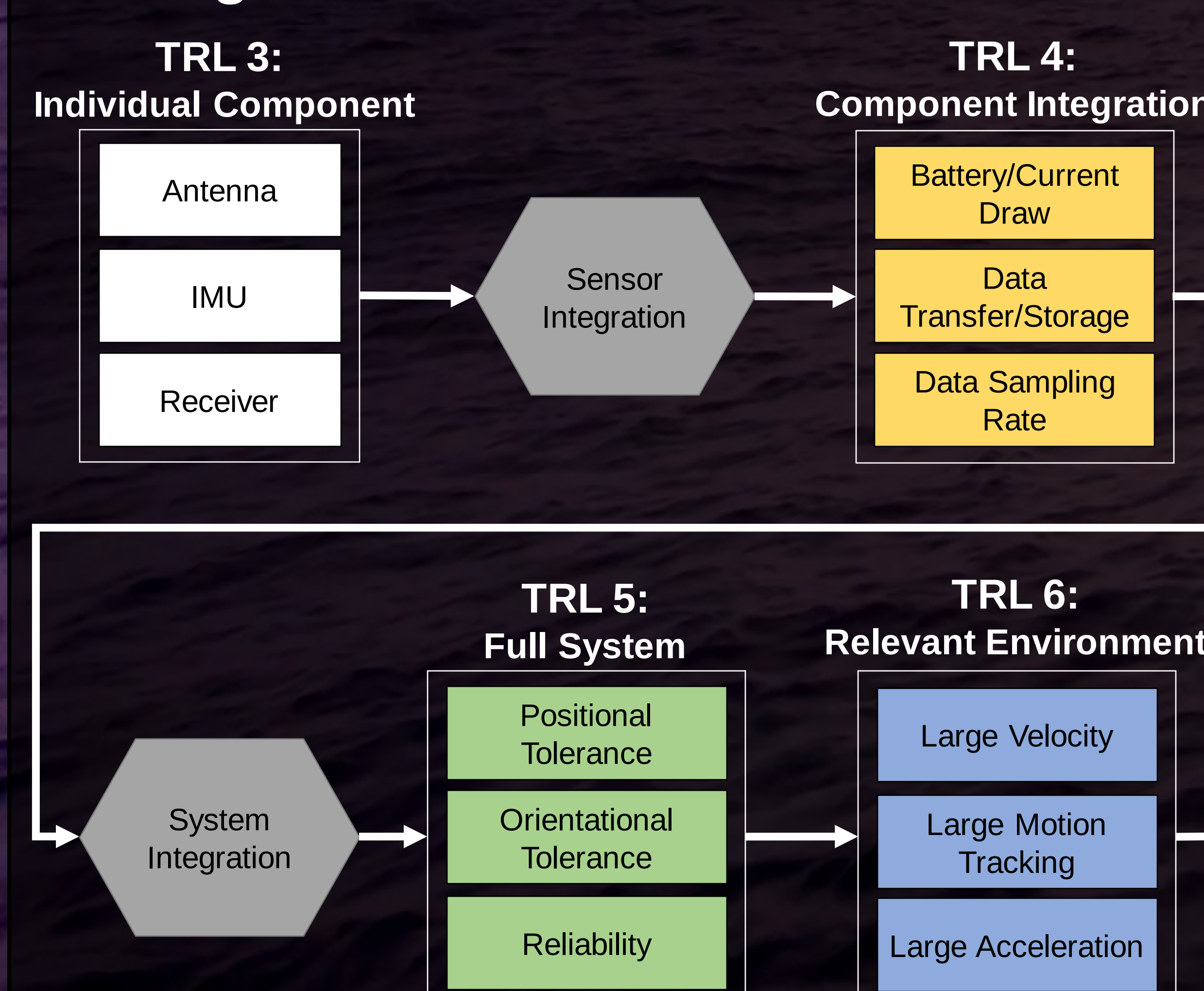
Rover Electronic Components:



Design:



Testing:



Next Steps:

- Simulation blade tip testing
- System combination
- Toolbox forming
- Final test on turbine

Future Work:

- Deliver system to SGRE
- SGRE modifies TRL 7 system to fit larger blades
- SGRE uses tip tracker alongside current methods to validate new blades