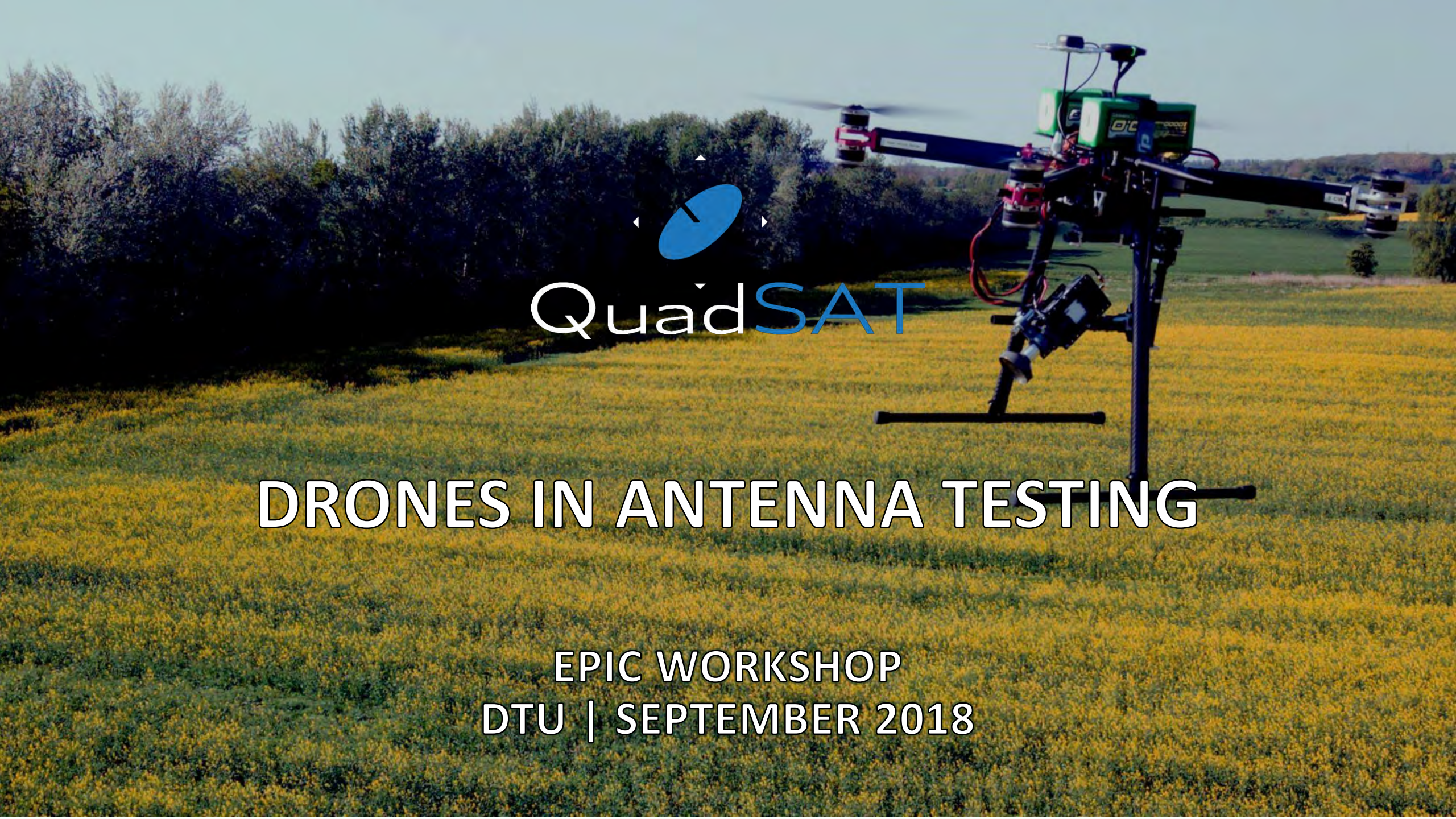


DRONES IN ANTENNA TESTING

EPIC WORKSHOP
DTU | SEPTEMBER 2018

Joakim Espeland

- Certified VSAT technician
- 8 years working experience in telecom industries
- Working consultant for EMC+GEE
- Background in electronics and automation
- B.Eng Mechanical Engineering

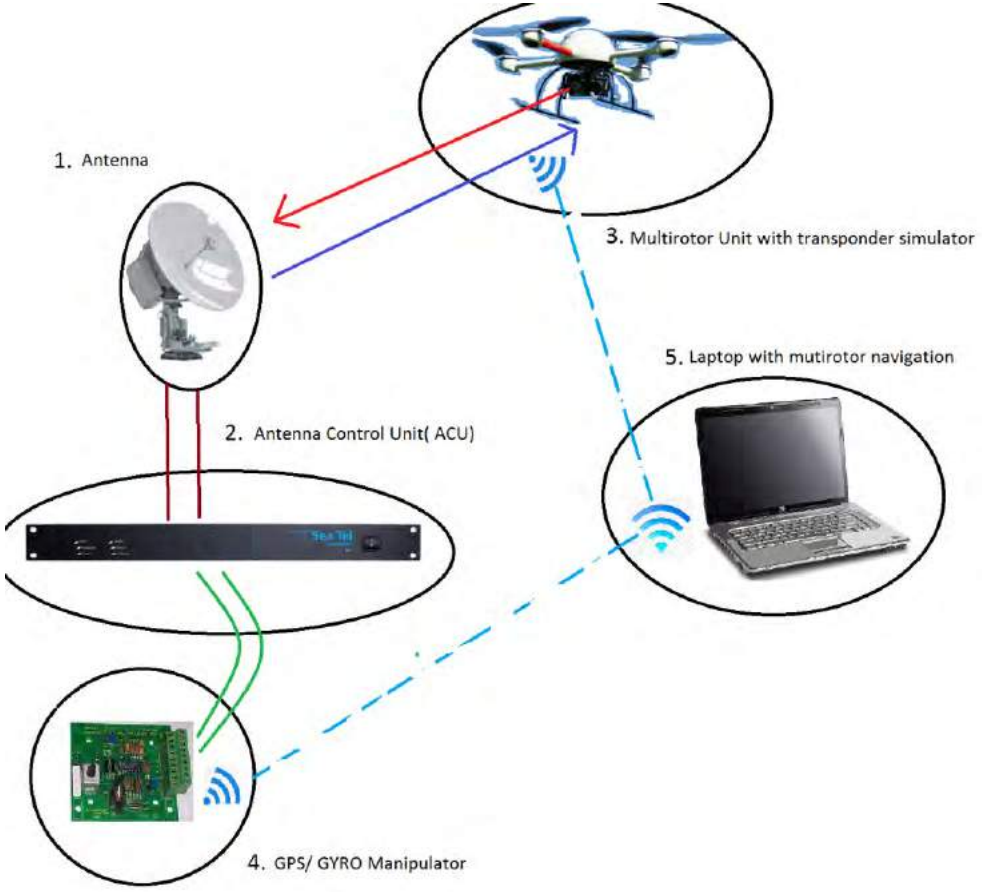
Andrian Buchi

- Mechanical Engineering student with specialization in Product Development
- Student worker at Davinci development – Industrial 3D- printing
- AIESEC - Experience within management board and recruitment
- Trainings and practical visits at EMC + GEE

Presentation from Henrik Sheel…

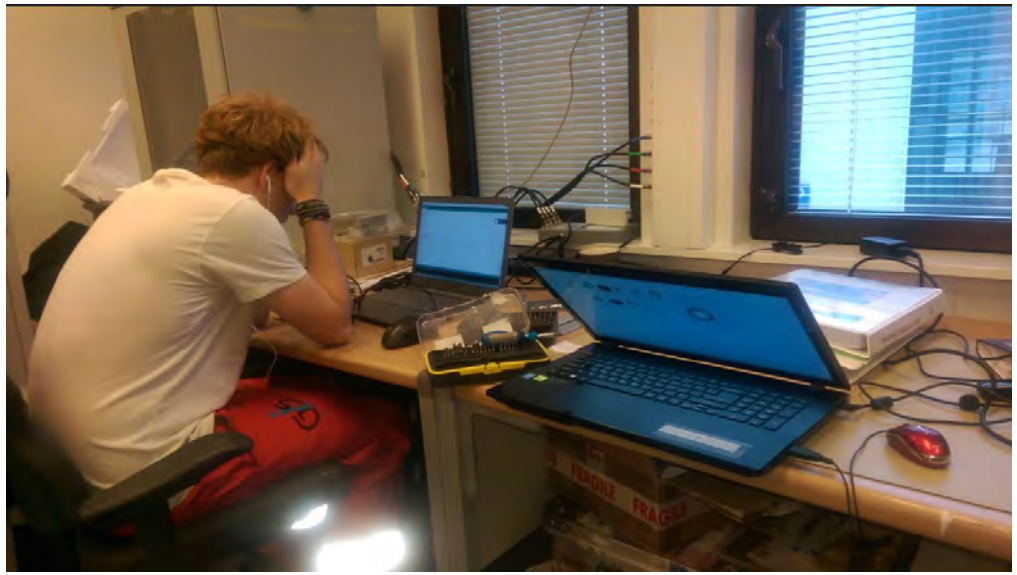
Brainstorming … Two projects

A. Drone for antena testing



B. Electronics recycling

Research and learning phase



External resources in DK

VIA University College

Bring ideas to life
VIA Student Incubator

VITUS BERING INNOVATION PARK

BUSINESS HORSENS
SAMMEN PRÆSTERER VI BEDRE

Innovationsfonden

VÆKSTHUS Midtjylland

Moving from Horsens to Odense

ODENSE | ROBOTICS
STARTUP HUB

UAS DENMARK
INTERNATIONAL TEST CENTER & CLUSTER

MANAGEMENT & TEAM

JOAKIM ESPELAND
CEO
SATELLITE COMMUNICATIONS EXPERT
QUADSAT FOUNDER

ANDRIAN BUCHI
CTO
DRONE EXPERT

QUADSAT FOUNDER

HELGE MUNK
ANGEL INVESTOR OF THE YEAR DENMARK 2018
TECH FOUNDER

IT PROGRAMMER
MECHANICAL DESINGER

RF DATA ANALYST
AEROSPACE EXPERT

ABOUT THE COMPANY

- *Founded March 2017.*
- *Located in Odense, Denmark*
- *Raised €300k.*
- *Patent pending on critical IP.*
- *First movers*
- *Traction with the major satellite operators.*

TOTAL ADDRESSABLE MARKET

- ANTENNA MANUFACTURERS
- VSAT SERVICE PROVIDER
- SATELLITE OPERATORS

- **4 000 000+ VSAT DEPLOYED GLOBAL**
- **30 000+ FIELD ENGINEERS**

€1BN+

PRODUCT DEVELOPMENT

Q2 2019

MILESTONE 1

UAS FOR **ANTENNA MANUFACTURERS**

Q4 2019

MILESTONE 2

UNIVERSAL PAYLOAD FOR **SERVICE COMPANIES**

Q3 2020

MILESTONE 3

INTELLIGENT CLOUD FOR **SATELLITE OPERATORS**

- *TYPE APPROVAL*
- *ANTENNA INSTALLATION*
- *ANTENNA ANNUAL MAINTENANCE*

QUADSAT SOLUTION

UAS TEST CENTER DENMARK
UAS
VERIFICATION
FACILITY
TNERS
Danish Ministry of the Environment
Danish Geodata Agency

QuadSAT

Mission Flight Planner

QuadSAT

Drone Control

Options

Pattern
Fixed 360

Flight Speed
2.02 m/s

Battery
56.78%
5678/10.000

Altitude
20.231m

GPS Coordinates
Latitude
55.47110055
Longtitude
10.3257886

Info Feed
065: Wind 2.6m/s
065: Wp.9 Reached
060: Data Measured
058: Wp.8 Reached
053: Data Measured
051: Wp.7 Reached
050: Wind 3m/s
046: Data Measured
044: Wp.6 Reached
039: Data Measured
037: Wp.5 Reached
032: Data Measured
030: Wp.4 Reached
030: Wind 4.2m/s
025: Data Measured
023: WP.3 Reahed
018: Data Measured
016: WP.2 Reached
015: Wind 2.7m/s
011: Data Measured
009: WP.1 Reached
006: Altitude Gained
001: Rising
001: Health Good
000: Start
PRE-Flight
Type: Fixed VSAT 1.2M
Test: Antena

Movement

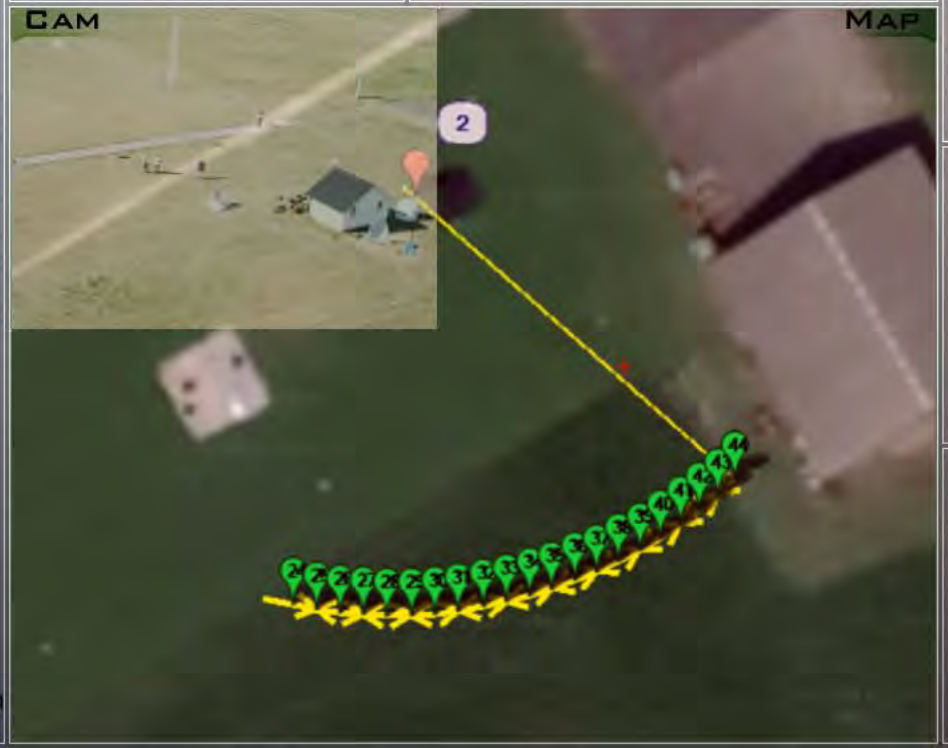
Roll
-2.67
deg

Yaw
-16.08
deg

Angle
+1.05 deg

Cam

Map



Spectrum Analyzer

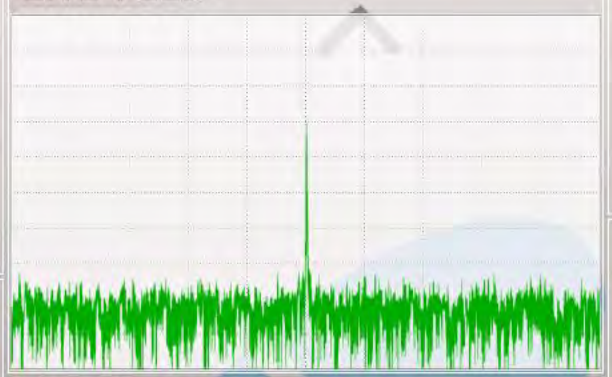
Flight Time
67sec

Drone Status
Good

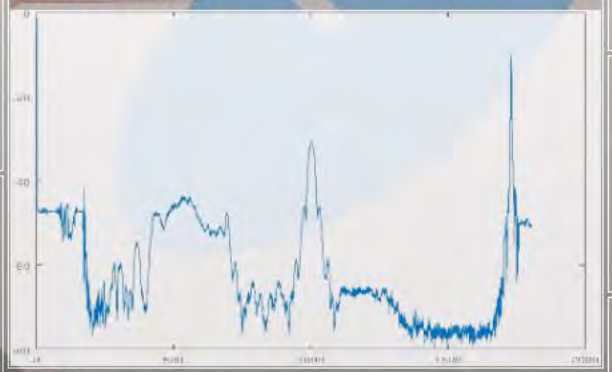
Feed Status
OK

Antena Health
Good

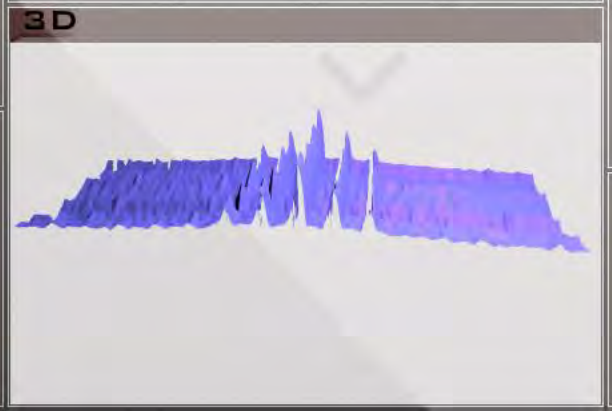
Live Feed



Time Zero



3D



Settings

Spectrum Control Panel

Frequency

Frequency Center

Marker Control Panel

RWO CSW Settings

FUTURE EXPANSION

5G NETWORKS

CELLULAR TOWER COVERAGE MAPPING

INTERFERENCE HUNTING

INTER-ORBIT ANTENNA TEST

RADAR SYSTEMS

MISSILE GUIDANCE SYSTEM

Summary of the challenges

- Mixing technology mindsted with business mindset
- ”Pivoting” for the best outcome
- Danish language and culture
- Risk management & diving into unknown

- Transition of being independent
- Too many opportunities...what are the right ones?
- Out of the realm of what is thought possible