



EUROPEAN TECHNOLOGY & INNOVATION  
PLATFORM ON WIND ENERGY

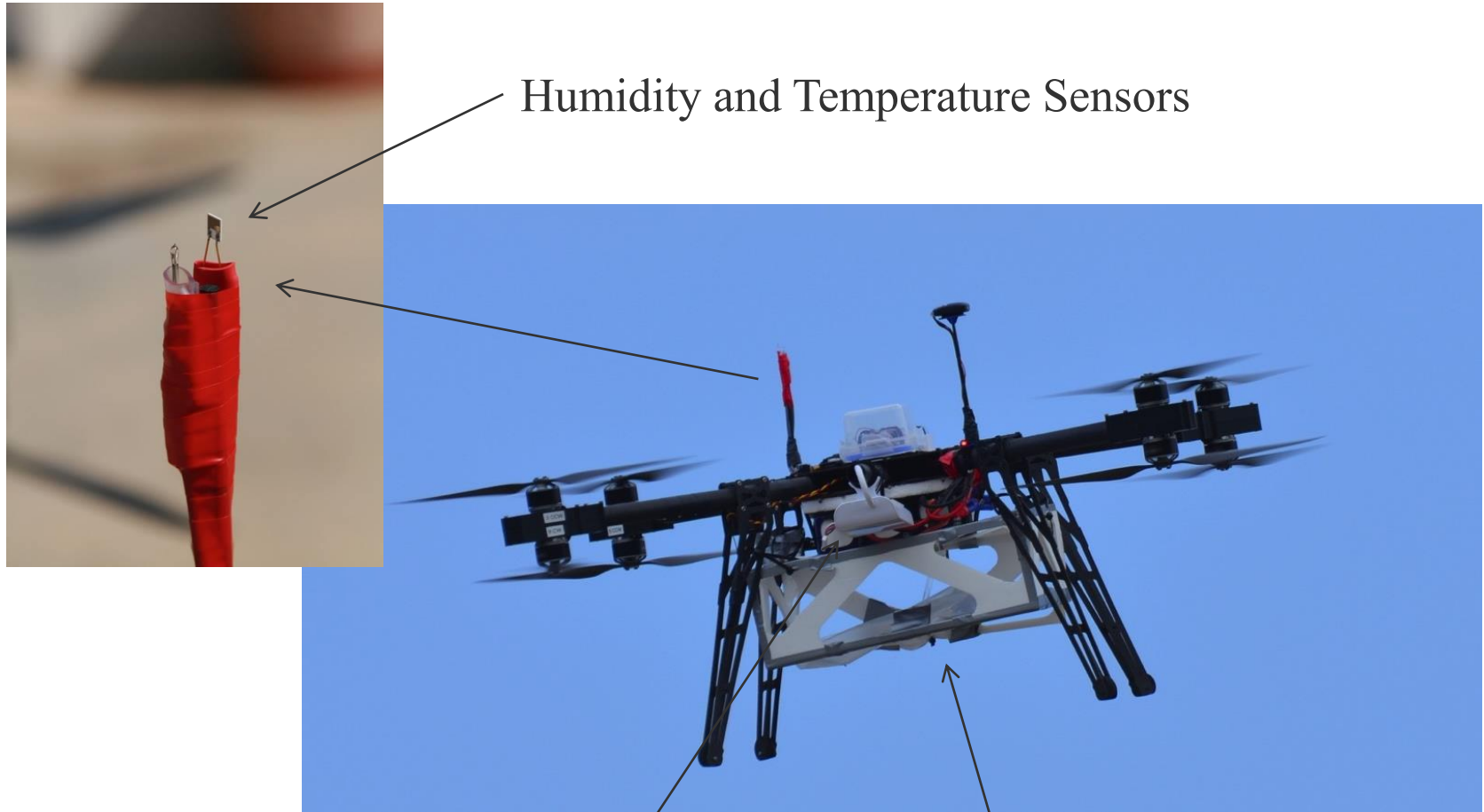
# Autonomous drones & perspectives from the aerospace industry



# Ascension Island Campaigns 2014-2015



# Ascension Island Drone



Humidity and Temperature Sensors

Communications

Sample Collection Box



# Digitizing and Tracking Turbine Defects Using Drones

- How?
  1. Requirement driven image capture through optimized flight
  2. Real-time and Post-processing to find and classify faults
  3. Track location and growth for effective maintenance



‘Up close and personal!’



‘NDT & Interaction with the Environment’

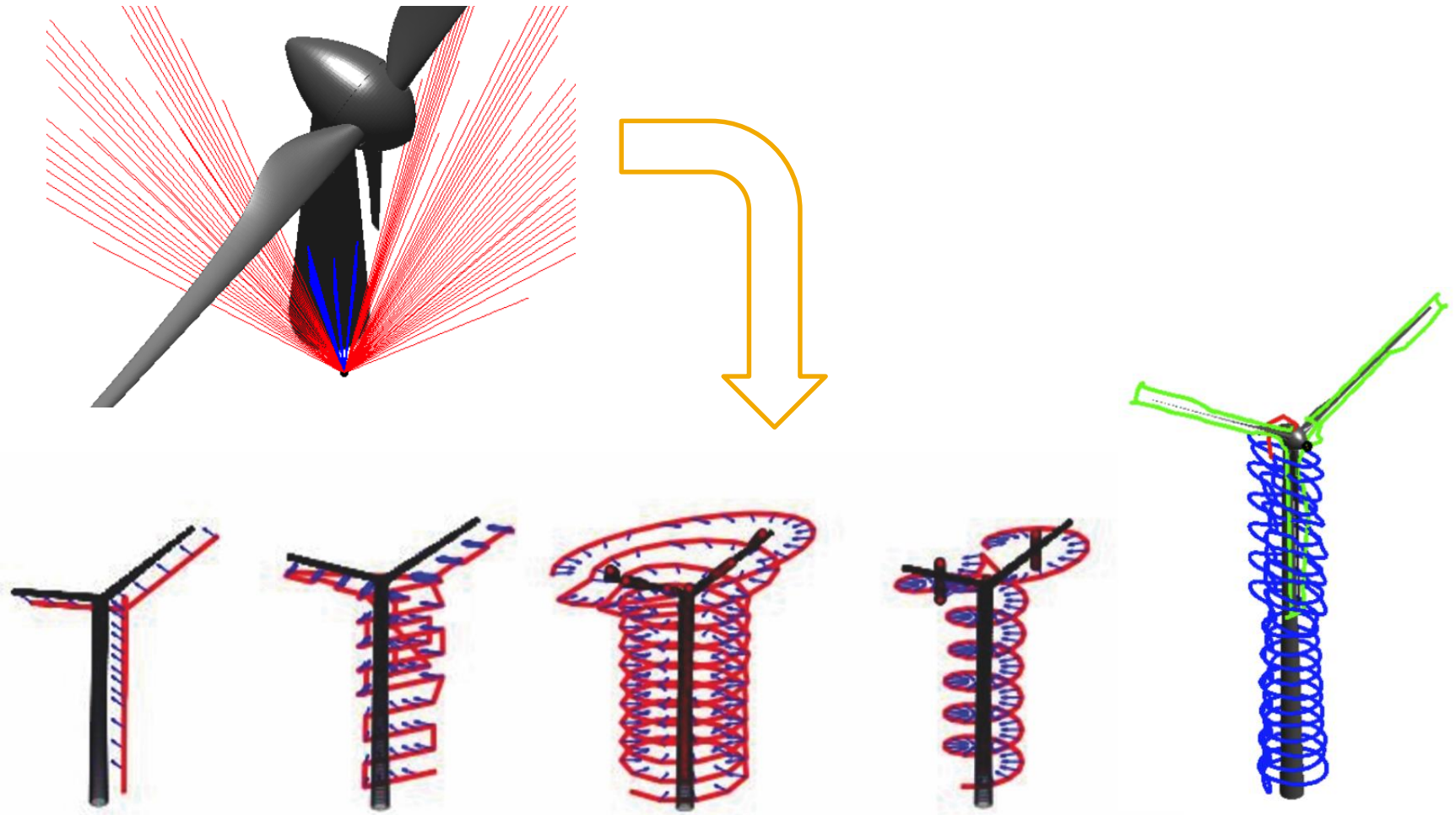
# Wind Turbines – Smart automation for Drones

- The goal
  - Automated inspection and and repair of exterior faults
- Why wind turbines?
  - Restricted airspace – reduced uncertainty
  - Large, known geometries
  - Expanding market
  - Piloted drones- uninteresting!
  - This is just the first step...
- Why automation?
  - Can be used as tool by existing inspection teams
  - Consistent data acquisition - create a uniform database
- Faster, optimized & safer than remotely piloted.
  - How can we be smart about this?

# State-of-the-art Automated Inspection

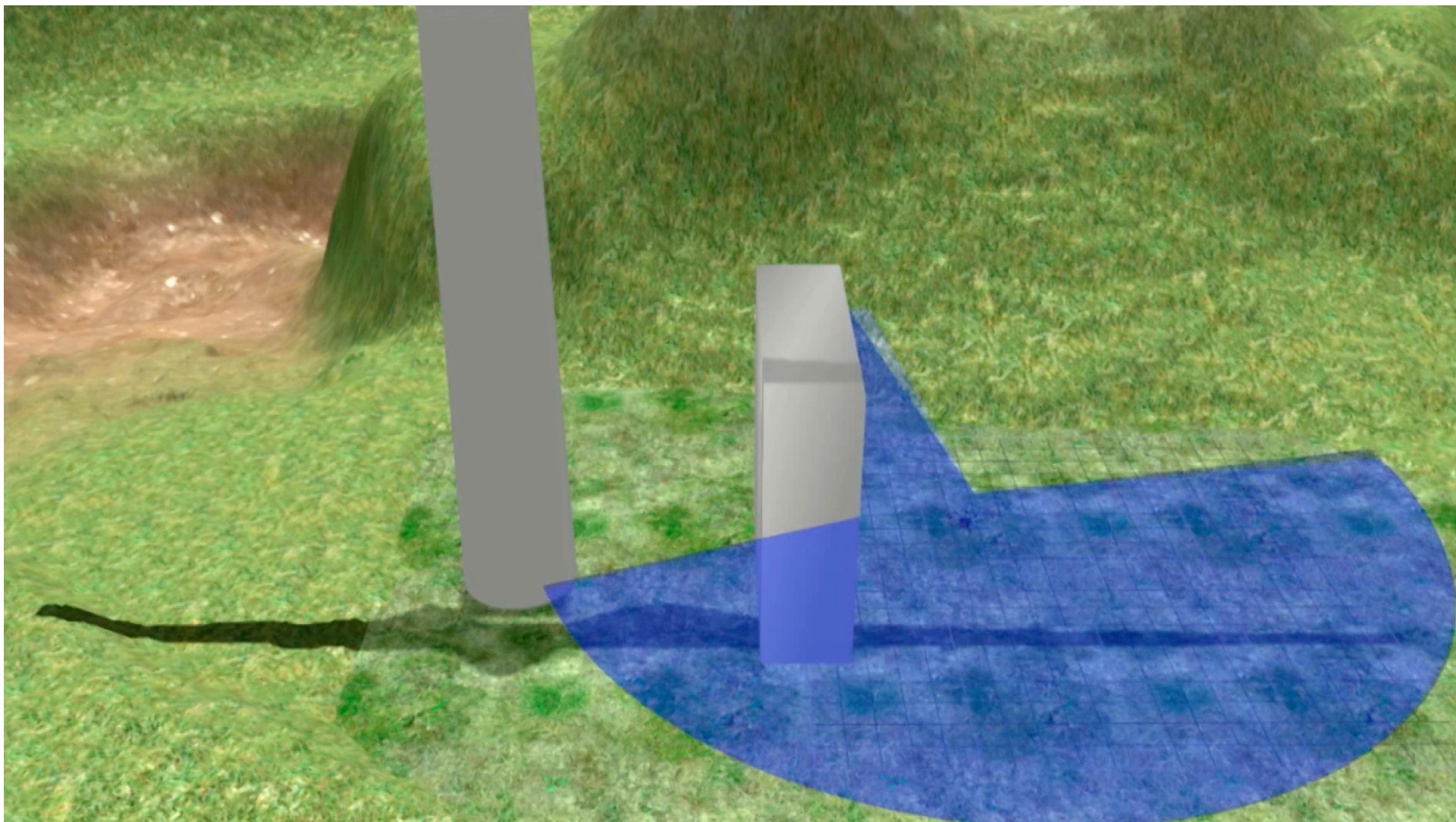


# Path-planning options - Ray-tracing



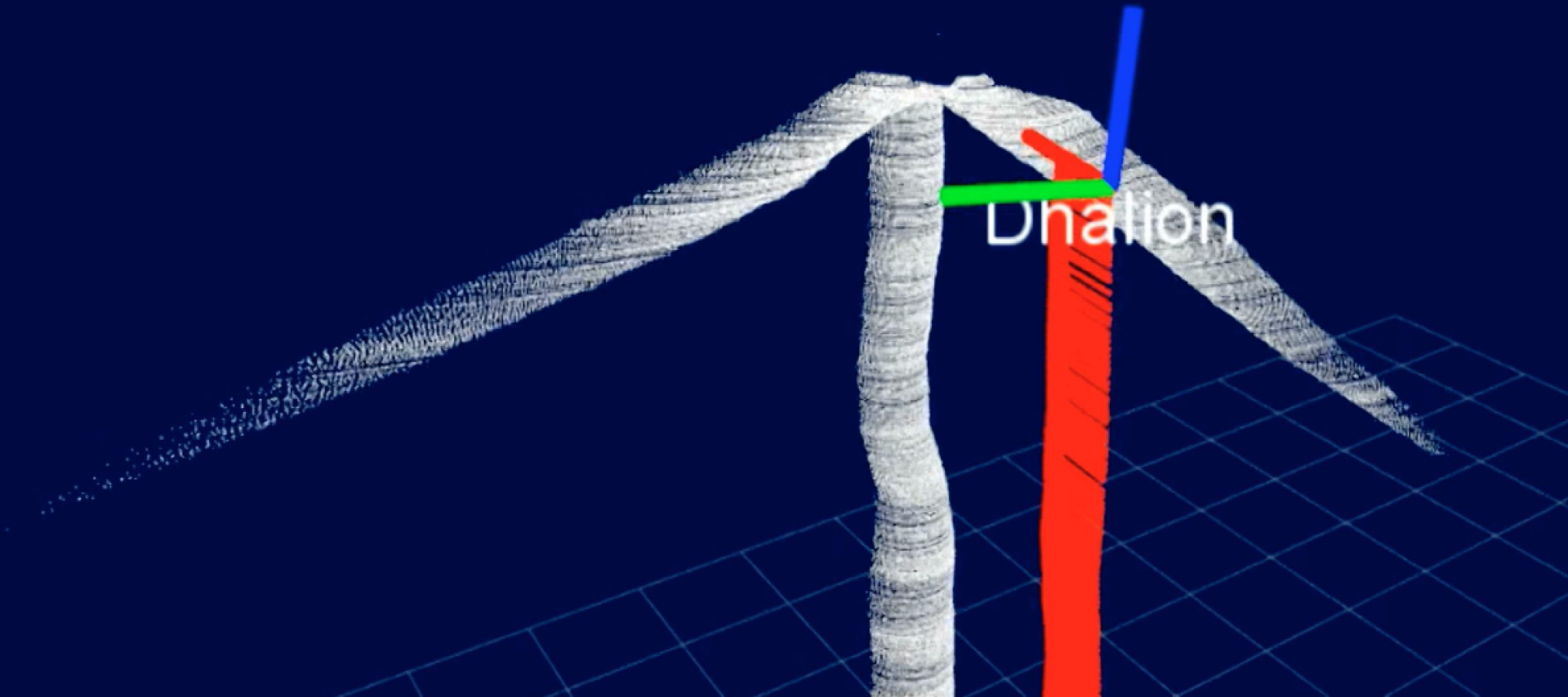


# Safe Operation

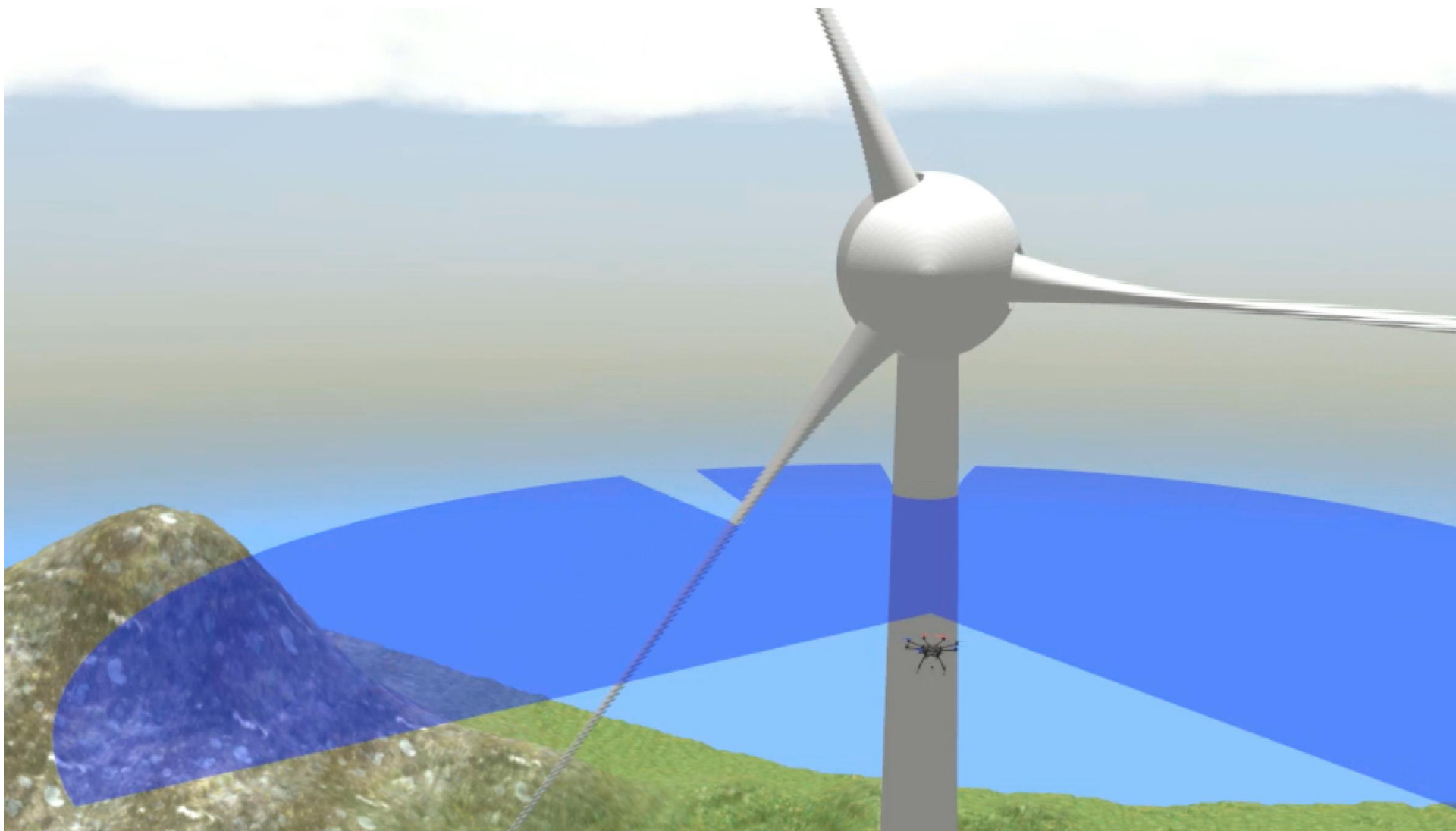




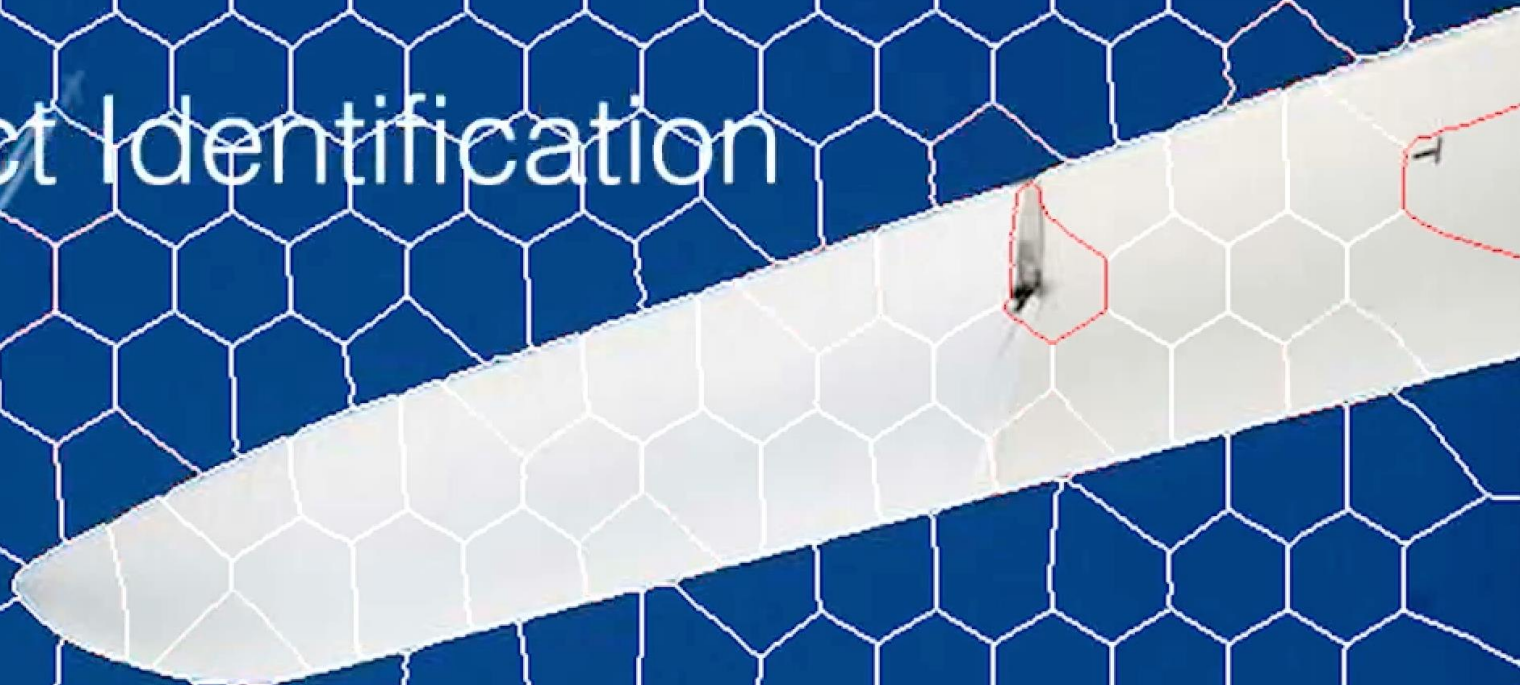
# Safe Operation



# Estimators



## Defect Identification





# Wind Turbines – Smart Inspection Using Drones

- Primarily a systems development problem.
- Multifaceted challenges – e.g. power, route optimization, sensors, control, estimators, classification, safety, interaction with the environment.
- Can it be done & will it be done?
  - Yes & today!
- Key areas to be addressed?
  - Smart algorithms
  - Batteries (alternative power sources)
  - Flight envelope
  - Processing power
  - Long term maintenance & physical interaction



Join the conversation

#ETIPWind

[etipwind.eu](http://etipwind.eu)

# Thanks for your attention

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