

Wind generation remote inspection

Project partners:

University of Dubrovnik

University of Zagreb FER (LARICS, AMOR)

Diagnostiqua



LARICS

larics.rasip.fer.hr

Problem addressed and proposed solution

The wind turbine must be out of service and stopped while inspected, leading to unavailability and causing significant loss of electricity production and income.



Motivation:

- ❑ to cut the cost and improve safety of the inspection by:
 - executing inspection while wind turbine *is in operation*
 - *fully autonomous operation* – remote inspection





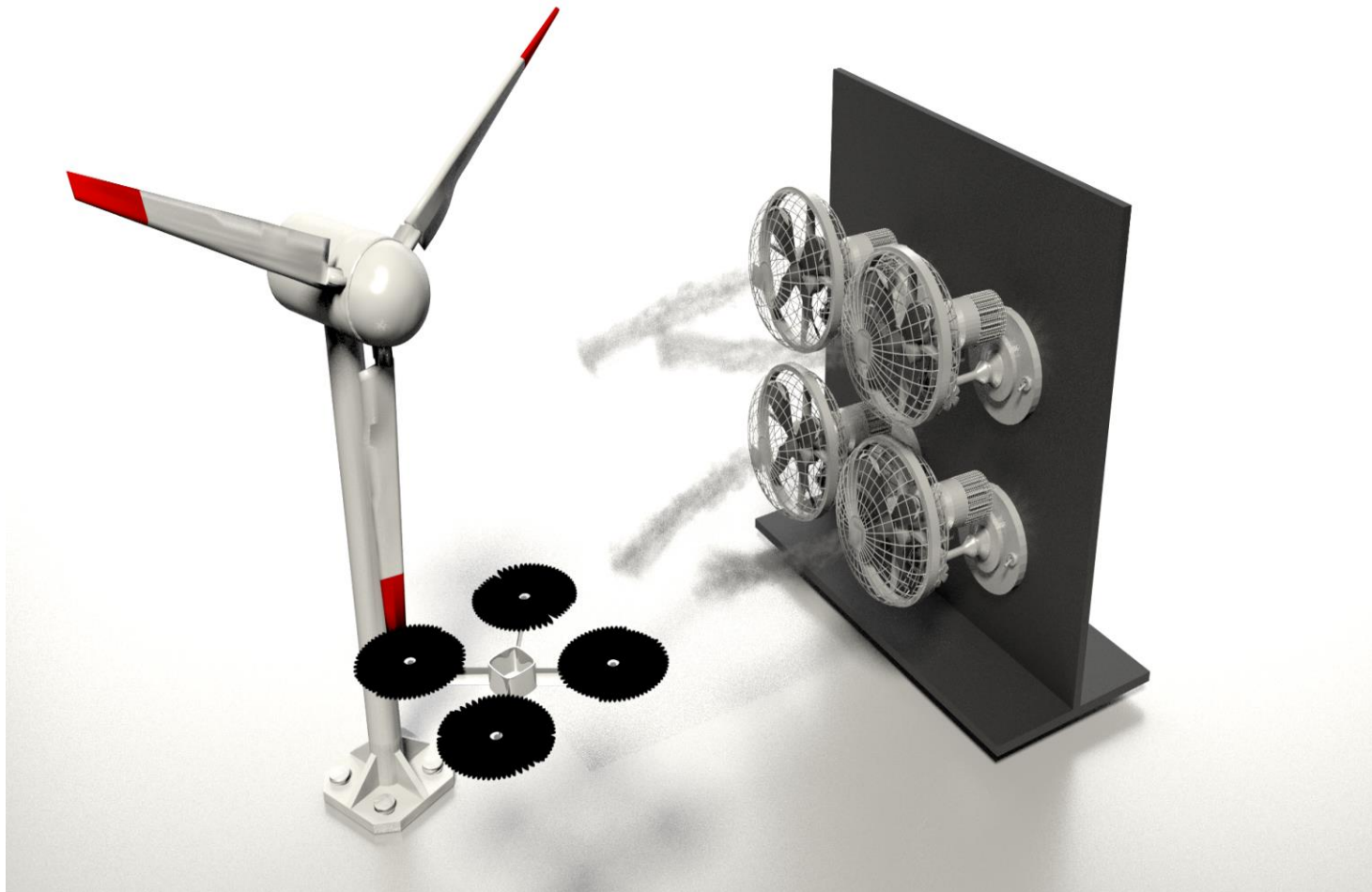
Objectives of the EOLO project:

- i) detect damage at an early stage, before they become critical,
- ii) reduce wind turbine programmed outages,
- iii) increase the speed and efficiency of inspections,

Challenges:

- Guidance, navigation and control systems, with obstacle avoidance capabilities and robustness with respect to wind turbulences,
- Simultaneous Localization and Mapping (SLAM) for wind turbine blades,
- The fusion of existing information (e.g. CAD drawings) with information acquired by sensing system in order to build a 3D information model of a wind turbine for autonomous operation,
- Implementation of high-speed-high-precision digital camera on-board of an aerial vehicle and development of supporting image processing software,

Task 2. Showcase round – mockup system



The Blade Capture System:

- ❖ a platform comprised of a gimbal => the full control of the camera attitude
- ❖ high-speed camera => high speed image acquisition (at least 150 fps), low exposition time (from 10 μ s) and global shutter to capture blur-free images of the rotating blades
- ❖ lens => the requirements on pixel density, given by DQA
- ❖ control software => generating feasible MAV trajectories, with the goal to inspect the complete surface of all three blades
- ❖ autonomous operation => MAV rises strictly vertically and captures images of the leading edge of rotating blades. After it reaches the top of the tower, the MAV changes its relative position to the turbine to capture images of the trailing edge during descent.

Thank you.

