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# The Green-Wake Project

An overview

Funded by the European Commission's  
Framework Programme 7 under Grant Agreement 213254

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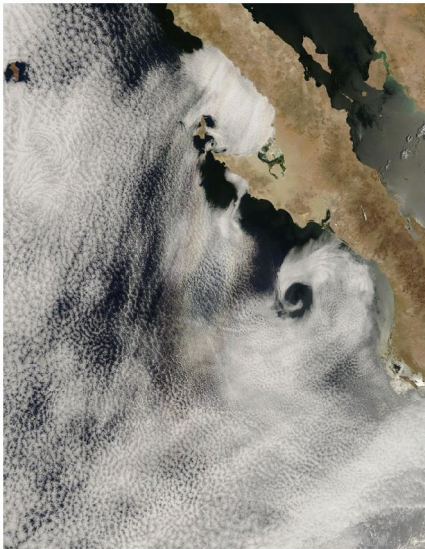


October 2009

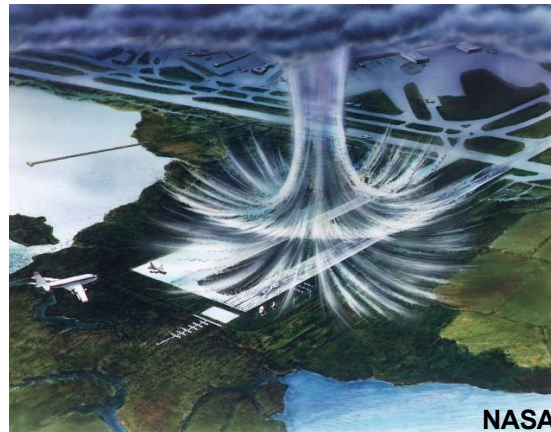
# Atmospheric threats

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Clear air turbulence (CAT)



Wind shear



Wake vortices



# Risk

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## Probability



- Wake vortex : 12 accidents in 40 yrs\*
- Wind shear : 72 accidents in 62 yrs\*

## Impact



- Unexpected aircraft movements
- Potential causes of accidents and injuries to passengers and crews
  
- Currently few options for protection
  - Reactive, procedural solutions



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\* ASN Safety Database

# Green-Wake objectives

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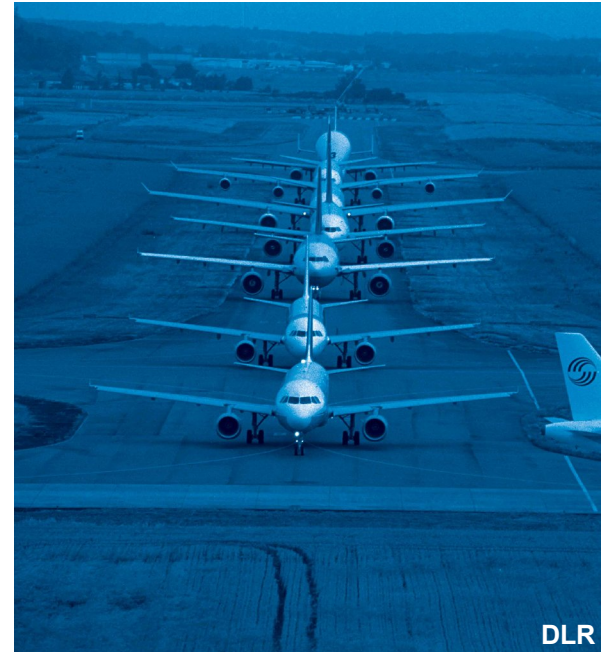
- Detect wake vortices and wind shear in a timely manner
- Anticipate and mitigate effect of wake vortices and wind shear on the aircraft and occupants
- Investigate mitigation via flight controls
- Develop and validate innovative technologies: LIDAR based
- Provide air traffic system wide benefits



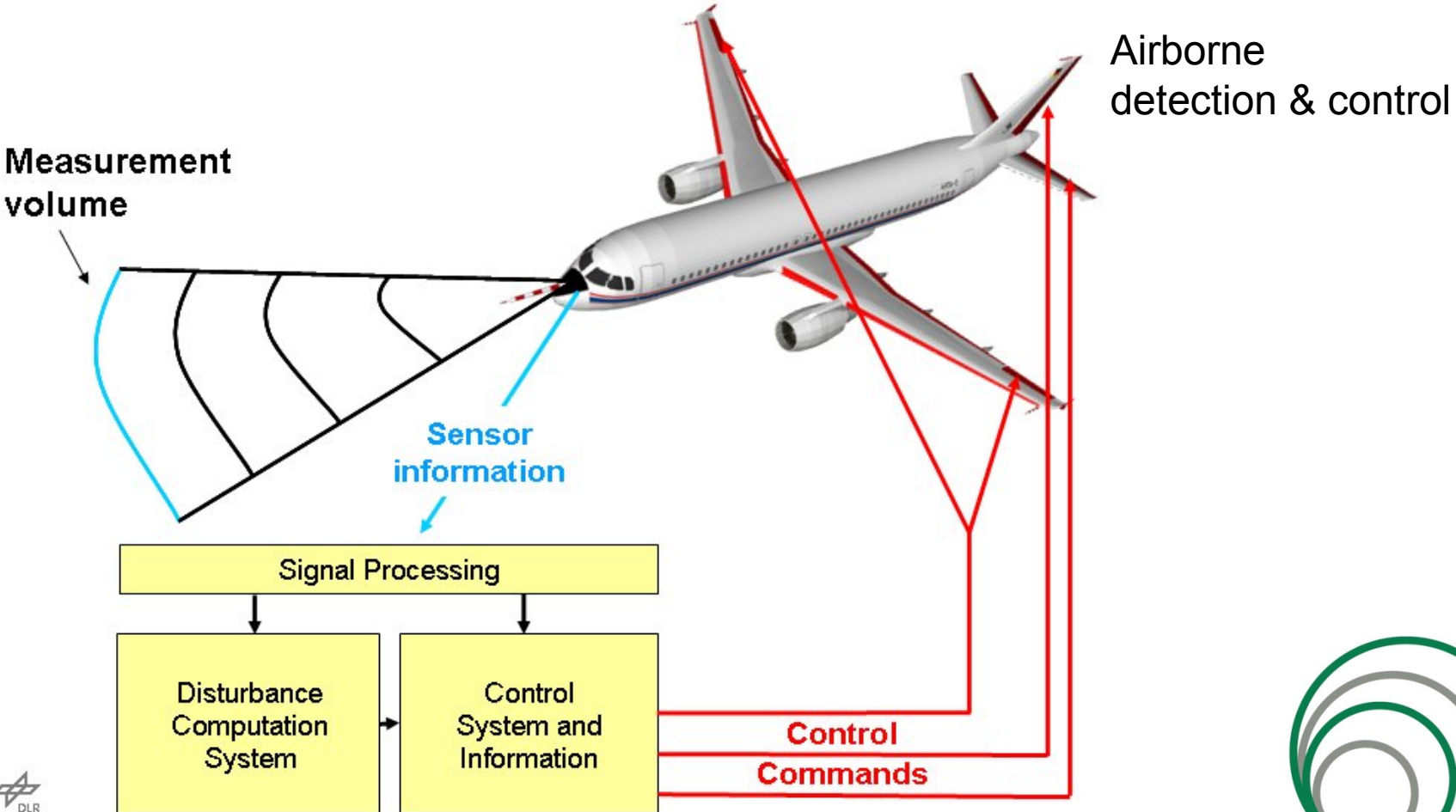
# Targeted benefits

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- Increased crew and passenger and safety
- Higher airport capacity via reduced air traffic separation
- increased in-flight safety in dense airspace



# The Green-Wake consortium concept



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# Wake vortices and wind shear R&D

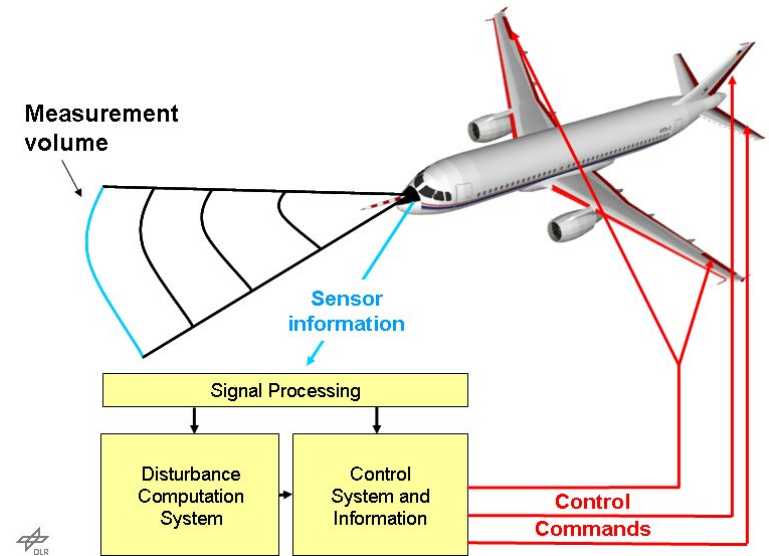
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- Detection and handling is focus of research programmes
- Funded within Europe and the US
- LIDAR (Light Detection And Ranging) has already been shown to offer enabling technology



# Green-Wake solution

- Imaging Doppler LIDAR,
- Measuring wake vortices and wind shear in front of an aircraft
- Integration into commercial aircraft
- Data provided in an appropriate format
  - to the flight control system (under study)
  - to the flight crew





# Green-Wake innovations

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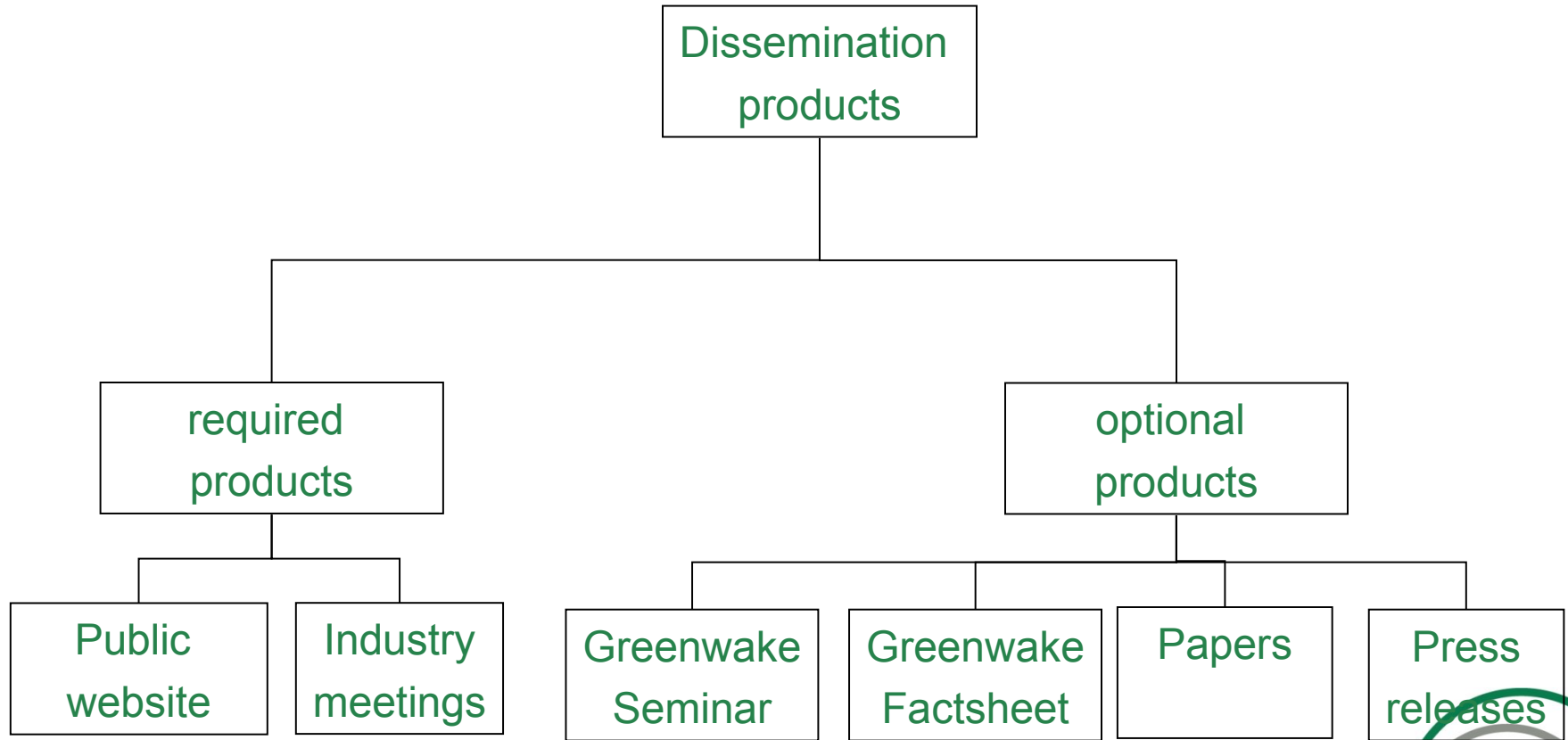
- Modeling and simulation of wake vortex and wind shear detection by imaging LIDAR instruments
- Development of an imaging Doppler LIDAR and fast scanning system
- Detector and data processing
- Test and demonstration of the performance of the system
- Hazard map

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# Dissemination Plan

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# Workpackages

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- WP1: management
- WP2: user requirements
- WP3: imaging system simulation
- WP4: 3D UV imaging Doppler LIDAR system
- WP5: validation
- WP6: dissemination & exploitation



# Participants

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- Lidar Technologies Ltd (coordinator), UK
- EADS Deutschland GmbH, Germany
- Université Catholique Louvain, Belgium
- Technical University Sofia, Bulgaria
- German Aerospace Center DLR, Germany
- Aeronautical Research and Test Institute VZLU, Czech Republic
- Active Space Technologies, Portugal
- ADSE, Netherlands
- Photonic Science Ltd, France
- SensL Ltd, Ireland
- Sula Systems Ltd, United Kingdom
- SimSoftware Ltd, Bulgaria

