Aerial Robots

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Applications

Civil Applications

- Wildfire Mapping Needs
- Agricultural Monitoring
- Disaster Management
- Highway Speed Control
- Telecommunications
- Weather Monitoring
- Aerial Imaging/Mapping
- Thermal Infrared power line surveys
- Environment Monitoring….

Monitoring of Flood Barriers and Bridges : Facts

- Surveying every 3, 6, 9 years
- Potentially dangerous for the inspectors, very specialized team
- Expensive, (>15k€ for 7 days of monitoring of a 60m long bridge)
- Traffic shutdown

AMBITION

- Improve operational efficiency
- Increase the frequency of operations
- Improve staff safety
- Easy way of testing in normal use or emergency
- Sustainability of testing (no traffic shutdown)
- Cost-Effectiveness

Proposed Solution :Monitoring By Aerial Hovering Robots

- Unmanned Aerial Vehicles: used with success in the military area
- Increased use in Civil area
- Missions more efficient and less expensive than with manned aircraft
- Alternative to manned visual inspection

- Multidisciplinary research :
  - Information and Communications Technologies
  - Civil Engineering
  - Aeronautical Engineering
  - Energy
  - Integration in the National Airspace
  - Societal Acceptance..

TECHNICAL RESEARCH IN ICT

- Aerial Robot in a windy environment
  - Autopilot
  - Flight Management System
  - Mission Planning
- Vision Device dedicated to Flood barriers and Bridges: gyro-stabilized turret
  - Limiting vibrations by passive filtration
  - Active control of the optical sensor
- chain of treatments to follow the evolution of defects, the data processing and presentation defects
  - real-time visualization of the bridge for the overall tracking disorders and navigation control vector optimizing the real-time positioning
  - processing for an image metrologically exploitable
  - reconstruction of defects on multiple photos
  - identification of the disorder compared with a database
  - location of disorder on the structure
  - Development of the disorders….

IMPACT (2020+, B€)

- In France
  - Flood barriers (> 10.000Km)
  - Bridges 22000 (>60m), 80000 (<60m), 100000 (<20m)…
- In Europe (civil engineering structures)
  - Belgium: > 5000 bridges
  - Finland : > 15000
  - Germany : >35000
  - Norway : > 17000
  - Spain : > 15000
  - Netherland: > 5000Km