

Technological challenge 5

Department that propose the challenge:

- Ministry of Culture, Education and University Planning

1. - Areas/topics that the department wishes to investigate/innovate with the aim of improving the delivery of public services through UAVs.

- Protection and surveillance of cultural heritage: Possibility of using UAVs for data collection on cultural heritage of integral assets at a territorial scale with the purpose of monitoring the same; to check the use and possible affections; to realize periodic, inspection, systematic and unsystematic, detect and analyse possible agents and deterioration effects, risk assessment.. (territorial scale)
- Conservation of cultural heritage: Data collection on the state of conservation of the property and degrading agents that can affect. Application of techniques of preventive or curative conservation ... (local scale or approximation/exterior / interior of buildings)
- Research and dissemination: Analysis of the territory for exploration of new cultural heritage sites. Graphs and analytical data collection for dissemination. Taking measurements and data collection on use and demand loads that can be treated analytically or statistically for cultural heritage study and its dissemination: visitors, use of property, land use in its environment. Conservation of cultural heritage:(local scale or of proximity/exterior/interior of real estate)

2. - Activities or resource intensive processes that can improve the department by employing UAV based solutions.

- Surveillance of cultural property in the territory.
- Assessment of use, loads and load demand.
- Detection and monitoring of degrading agents.
- Data collection: graphics, photography, video, 3D scanning, photogrammetry, thermal, environmental, etc.
- Approximation to inaccessible places or points.
- Analysis of the territory for prospecting, locating and georeferencing of visible or hidden assets below the soil, water or vegetation goods.

3. - Technical or technological challenges that should solve these solutions (this section includes the integration of solutions into existing processes or technology platforms department)

- Georeferencing or locate assets in the territory without the need to perform field work approach.
- Recognise structures built below the ground or water that is not visible to the naked eye but can be detected by 3D scanning that modelise the territory or systems using electromagnetic, sonic waves, or similar to discriminate between different materials and structures.
- Locate and document with photographs or precision video and sufficient resolution assets or structures that only their position is known on the territory. Establish monitoring systems to assess changes undergone by those goods or structures.

- Apply products or techniques accurately and remotely.
- Collect data and realise measurements, accurately and remotely, avoiding the implementation of complex and expensive aids.

4. - Management and technical team provided by the department with technological partner.

A team consisting of architects, archaeologists and restorers with sufficient experience in the protection, conservation and restoration of cultural assets. In principle this team would consist of a technician (official and/or contract personnel of the Galician regional government) for each matter.

5. - Operational improvement, process optimization, cost reduction ... that hopes to achieve with the implementation of solutions based on UAVs

- At present they are already using UAV equipment for collection of proximity data on cultural property and they are already taking photographs, videos and similar work, although at this time unsystematically and unstandardised.
- It is expected that the development of this equipment allows equipping them with analytical devices needed to perform data acquisition and measurements that now demand expensive aids such as exploring moisture using thermal cameras or precision measurements in hard to reach places .
- It would be desirable for the development of these techniques and research in technological innovation to allow detection and recognition of historic structures or of cultural value, hidden, without the need to carry out expensive on-site campaigns or excavation or clearing land.
- The approach using UAVs to cultural assets, regardless of their location in the territory would expand the functions of surveillance, monitoring and control of protected objects and therefore work towards effectiveness in safeguarding the cultural heritage, efficiency in preventive control and agility of response in a risk situation or damage verification.