Titolo Assegno: *"Conservation of Aircraft Heritage: an assessment of innovative protective coatings through accelerated ageing tests"*

The research activity is whithin the frameworkof the EU Project JPI PROCRAFT (**PRO**tection and Conservation of Heritage Air**CRAFT**), whose main object is the definition of Conservation guidelines for historical aircrafts and the work will be carried out through different steps:
1. Evaluation of **effective protection** of the innovative protective coatings on original substrates through accelerated ageing tests;
2. Identification of **advantages and limits** of innovative protection;
3. **Comparison** between innovative and traditional protective coatings.

1- Application of protective coatings on selected substrates and pre-exposure characterization

Application of the best performing protective coatings from WP4, by conservators on the original substrates, according to CR best practices, with careful monitoring, so as to assess the conformity of treated surfaces to CH requirements.

Characterization of protected samples before exposure, in order to define their main chemical and morphological properties, by a combination of microscopic/spectroscopic/profilometric techniques (SEM/EDS/μ-Raman, FIB/FEG-SEM, XRD, XPS, TOF-SIMS, surface tension and colour measurements).

2- Exposure of coated samples to accelerated ageing in outdoor and semi-confined conditions

Assessment of the protectiveness of the coatings in conditions simulating outdoor and semi-confined exposure.

Ageing of samples (without and with protective coatings) in climatic chambers (with variable temperature, humidity, UV radiation) and artificial rain testing devices. These devices simulate the different action of rain exposure: (i) dropping test, simulating rain runoff in unsheltered areas, (ii) alternate immersion (wet&dry) test simulating stagnant rain.

Selection of testing conditions on the basis of environmental data.

Monitoring of dissolved metal ions (from the collected ageing solution) and Al surface evolution during ageing, to investigate the corrosion process as a whole.

3- Characterization of aged surfaces (post-exposure)

Assessment of the influence of the coatings on surface features by surface and cross-section investigations, considering the results of pre-exposure characterization as a reference.

Visual, morphological and structural characterization by microscopical and micro-spectroscopical techniques.

Identification of the best protective coating, including adhesion properties, will be based both on the achievement of the highest protective efficiency (estimated on the basis of metal ion release data) and on aged surface analyses performed in this task.