



Venerdì, 30 ottobre 2015
alle ore 10:00

presso l'aula 2 dell'Edificio F

Area della Ricerca CNR

Via Madonna del Piano,10 - Sesto F.no

Alessandro Rossi ed Ugo Cortesi di IFAC-CNR
terranno il seguente seminario:

ReDSHIFT and AURORA projects
(Call «Space» of Horizon 2020)

HORIZON 2020





The “Revolutionary Design of Spacecraft through Holistic Integration of Future Technologies - **ReDSHIFT**”



The ReDSHIFT (Revolutionary Design of Spacecraft through Holistic Integration of Future Technologies) project has been approved by the European Community in the framework of the H2020 Protec 2015 call, focused on passive means to reduce the impact of Space Debris by prevention, mitigation and protection.

In ReDSHIFT these goals will be achieved through a holistic approach that considers, from the outset, opposing and challenging constraints for the safety of the human population when these objects re-enter the atmosphere, designed for demise, and for their survivability in the harsh space environment while on orbit.

Ensuring robustness into the future, ReDSHIFT will take advantage of disruptive opportunities offered by 3D printing to develop highly innovative, low-cost spacecraft solutions, exploiting synergies with electric propulsion, atmospheric and solar radiation pressure drag. Inherent to these solutions will be structures to enhance spacecraft protection, by fracture along intended breakup planes, and re-entry demise characteristics. These structures will be subjected to functional tests as well as specific hypervelocity impact tests and material demise wind tunnel tests to demonstrate the capabilities of the 3D printed structures.

Modern celestial mechanics and astrodynamics tools will be exploited to find “de-orbiting highways”, (i.e., fast trajectories to de-orbit) able to meet de-orbit and disposal needs, coupled with the above-mentioned technical solutions.

At the same time, novel and complex technical, economic and legal issues of adapting the technologies to different vehicles, and implementing them widely across low Earth orbit will be tackled through the development of a hierarchical, web-based tool aimed at a variety of space actors.

This will provide a complete debris mitigation analysis of a mission, using existing debris evolution models and lessons learned from theoretical and experimental work. It will output safe, scalable and cost-effective satellite and mission designs in response to operational constraints. Through its activities, ReDSHIFT will recommend new space debris mitigation guidelines taking into account novel spacecraft designs, materials, manufacturing and mission solutions.

In the talk, beyond the technical description of the proposals, a summary of the main challenges and problems encountered in the proposal preparation will be addressed.



AURORA

Advanced Ultraviolet Radiation and Ozone Retrieval for Applications

A general overview is provided of the Horizon 2020 project AURORA (Advanced Ultraviolet Radiation and Ozone Retrieval for Applications) funded by the European Union in the frame of the Call *Space, EO-2-2015: Stimulating wider research use of Copernicus Sentinel Data*. The overarching objective of AURORA is to simulate the provision of synergistic data products for the vertical profile of atmospheric ozone and to assess their quality with respect to the one expected for the operational products of the geostationary (GEO) mission Sentinel -4 and of the Low Earth Orbit (LEO) missions Sentinel-5p and Sentinel-5.

The project addresses key scientific issues relevant for synergistic exploitation of data acquired in different spectral ranges by different instruments on board the atmospheric Sentinels. A novel approach, based on the assimilation of GEO and LEO fused products by application of an innovative algorithm to S-4 and S-5 synthetic data, is adopted to assess quality of the unique ozone vertical profile obtained in a context simulating the operational environment. First priority is then attributed to the lower atmosphere with calculation of tropospheric columns and UV surface radiation from the resulting ozone vertical distribution.

In parallel, AURORA tackles the technological challenges of creating the infrastructure, exploiting virtual machines and cloud data sharing, to implement the data processing chain, including a geo-database and web-services for data access. The infrastructure represents a best practice that plays a key role in ensuring wider use of Copernicus Sentinel data for academia, public agencies and industry. It is the basis for a market analysis for pre-market applications and uptake in commercial communities. Strategic dissemination and exploitation is targeted to European level (academia, CAMS, GEOSS) and international level (potential synergies and data exchange will be investigated with the GEO missions TEMPO by NASA and GEMS by the Korea Aerospace Research Industry).