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EURO-CARES: EUROPEAN ROADMAP FOR A SAMPLE RETURN CURATION FACILITY AND PLANETARY PROTECTION IMPLICATIONS.

John Robert Brucato, jbrucato@arcetri.astro.it
INAF - Osservatorio Astrofisico di Arcetri, Firenze, Italy
EURO-CARES WG2
A. Meneghin (1), S. S. Russell (2), C. L. Smith (2), P. Rettberg (3), J. C. Bridges (4), J. Holt (4), A. Bennett (5), T. Pottage (5), R. Moeller (3), S. Leuko (3)

1) INAF - Astrophysical Observatory of Arcetri, Firenze, Italy; 2) Department of Earth Sciences, The Natural History Museum, London, UK; 3) DLR – Institute of Aerospace Medicine, Cologne, Germany; 4) Space Research Centre, Dept. of Physics and Astronomy, University of Leicester, UK; 5) Biosafety, Air and Water Microbiology Group, Public Health England, Porton Down, UK.

A mature European planetary exploration program and evolving sample return mission plans gathers the interest of a wider scientific community. The interest is generated from studying extraterrestrial samples in the laborato-ry providing new opportunities to address fundamental issues on the origin and evolution of the Solar System, on the primordial cosmochemistry, and on the nature of the building blocks of terrestrial planets and on the origin of life. Major space agencies are currently planning for missions that will collect samples from a variety of Solar Sys-tem environments, from primitive (carbonaceous) small bodies, from the Moon, Mars and its moons and, final-ly, from icy moons of the outer planets. A dedicated sample return curation facility is seen as an essential re-quirement for the receiving, assessment, characterization and secure preservation of the collected extraterrestrial samples and potentially their safe distribution to the scientific community.

EURO-CARES is a European Commission study funded under the Horizon-2020 program. The strategic objec-tive of EURO-CARES is to create a roadmap for the implementation of a European Extraterrestrial Sample Cu-ration Facility. The facility has to provide safe storage and handling of extraterrestrial samples and has to enable the preliminary characterization in order to achieve the required effectiveness and collaborative outcomes for the whole international scientific community. For example, samples returned from Mars could pose a threat on the Earth's biosphere if any living extraterrestrial organism are present in the samples. Thus planetary protection is an essential aspect of all Mars sample return missions that will affect the retrival and transport from the point of return, sample handling, infrastructure methodology and management of a future curation facility.

Analysis of the state of the art of Planetary Protection technology shows there are considerable

possibilities to define and develop technical and scientific features in a sample return mission and the infrastructural, procedur-al and legal issues that consequently rely on a curation facility. This specialist facility will be designed with con-sideration drawn from highcontainment laboratories and cleanroom facilities to protect the Earth from contami-nation with potential Martian organisms and the samples from Earth contaminations. This kind of integrated facility does not currently exist and this emphasises the need for an innovative design approach with an integrat-ed and multidisciplinary design to enable the ultimate science goals of such exploration.

The issues of how the Planetary Protection considerations impact on the system technologies and scientific meaurements, with a final aim to prioritize outstanding technology needs is presented in the framework of sam-ple return study missions and the Horizon-2020 EURO-CARES project.