REPORT ON EURO-CARES INTERNATIONAL WORKSHOP

PRELIMINARY REQUIREMENTS

Aurore Hutzler, Natural History Museum, Vienna, and the EURO-CARES team

List of invited experts

- Louise Alexander, University of London
- Brian Crook, HSL
- Alexander Halliday, University of Oxford
- Ranah Irshad, RAL
- Markus Keller, Fraunhofer Institute for Manufacturing Engineering and Automation IPA
- Tatsuaki Okada, JAXA
- Christian Schröder, University of Stirling
- Alexandre Simionovici, ISTerre
- Eileen Stansbery, NASA
- Ryan Zeigler, NASA

Introduction

EURO-CARES is an EC funded project to roadmap a European facility for the curation of materials that may be returned from space missions in the future. The EURO-CARES project started in January 2015. The first objective (Work Package 1) was to exhaustively study literature on the different aspects of the work to be performed. Each WP summarized their findings in reports. An International Meeting, held in month 8, aimed at revised these literature reports, and go further, by encouraging discussion between experts in different fields, the scientific community, and the EURO-CARES team members.

International Meeting

The meeting was divided into two parts: first, an open meeting (24-25 of August 2015), for all interested scientists and students to attend. The second part was on invitation only, for international experts and EURO-CARES members (26-27 of August 2015).

The meeting had several aims. First, it was the first team-building event since the Kick-Off meeting in January. Then, it was a good way to start advertising the EURO-CARES project to the scientific community. Finally, by inviting experts we were aiming at gaining new knowledge, and making useful people want to work with us in the future. All aims were attained; attending people were very enthusiastic about the project, and initiated a lot of animated discussion throughout the four days. Some experts are now in a closer collaboration with several WPs.

Each researcher attending the "Expert Workshop" were asked to state a few important points related to the project. Table below shows these reflections and concerns.

Definition and contrains on the project	**Notes**	**Nber iterations (on 63)**
Number of facilities	A facility for each type of samples / Remote storage	2
Focus on Mars samples		1
Various part of the facility	Curation on site or in another laboratory?	2
Flexibility	Adapt to various samples, technical developments…	5

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Practical and simple facility	No over engineering	2
Role of PP	PP seen as an obstacle to science	2
Non-Science aspects		
Political aspect	How to make all agencies/stakeholders agree? Unclear future, independent of science	7
Communication	Between scientists, engineers, politics. With public, to avoid people fearing science.	8
Funding	Initial and running costs	3
Inter-disciplinarity	More fields of expertise in EURO-CARES team: astrobiologists, lawyers…	1
Time management	Facility to be done 1-2 years before any sample return. Maintenance & evolution over the facility life span	5
Employee management	Dedicated and well-trained team	2
Scientific overview commitee	Division and allocation of samples, analysis and experiments	5
Technical developments		
Animal testing	Alternatives, or in the evolution of the facility	1
Data integration and management	Clear tracking of all samples, access to scientists and public	3
Contamination control	Definition of contamination	2
Shipping and transport of biohazardous materials		1
Sample analysis protocols	Clear and ordered procedures of analysis and experiments to be performed	3
Technical requirements		
Thin section laboratory		1
Cleaning lab for tools		1
See through windows		1
Actions to follow		
European Network	Exchange of experience and best practice	3
Understanding of Mars in detail first		1
Sample definition	Focus on a certain set of samples only ?	1

Location requirements

Location requirements can be separated into two categories: first, the physical and geographical requirements, then the requirements based on sociology and politics. The latter are usually subjective, and no entirely dependent on our team.

Geographical requirements:

- Central Location in Europe
- Stable political situation
- Natural disasters to avoid:
    - Earthquakes: the structure should not be disturbed (apart from minor fracture and dislocations) by a disturbance of TBD magnitude (Richter scale),
    - High-velocity winds or hurricanes: internal pressure should not be disturbed for more than a few tens of seconds by winds of TBD km/h.

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    - Floods after local rainfall.
- Low contamination levels of the environment: Cleanliness of air, water…
- Good transportation (airport, train station…) for samples and people to access the facility.

Other requirements

- In an existing facility: may reduce the costs of security, and help with recruitment of qualified employees BUT need of a facility with extra-space, and some facilities may have their own risks (nuclear power plan, vibrations…)
- Place nice enough to bring best people to work in the facility: entirely subjective.
- Funding available (ESA, EC, local agencies): depending on the agency, funding programs have various aims (local agencies in their own country, EC Cohesion policy to redistribute wealth and talents all over Europe).
- Somewhere where local officials are ready to be involved, especially for communicating with the population about a potentially dangerous facility.

Summary

Within Europe there is sufficient expertise to build a state of the art extraterrestrial sample facility. There are many lessons to be learnt from the experience of NASA in the USA and JAXA in Japan who have already developed such facilities. The risks associated with such a facility include the currently unclear funding mechanism for such a facility and the scope for such a facility to be seen as dangerous by the local (and broader) population. We will require input from a broad range of disciplines (such as astrobiology and law) to make the facility tenable.

Further expert workshops will clarify the issues over the lifetime of EURO-CARES.

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