H2020 Space Work Programme.

Some EARSC views on priorities for WP2016-17.

Considering the findings from the Madrid workshop, it would appear that the EO services industry perspective was not represented and that industrial views were taken from the manufacturing viewpoint and which maybe led to the statement that "*Earth Observation activities are still seen as too much driven by industrial/political interests, with insufficient involvement of users, in particular for data processing and data exploitation.*"

The EO services industry is the user of data and engages through commercial activities with end-users. Nevertheless, around 50-60% of products and services are for public-sector customers in a very fragmented market and the representative views of these public-sector, end-users should be gathered and represented more effectively. This is one way in which EARSC can help develop priorities for future research needs.

The questionnaire published by DG-Enterprise to help define future research needs has 5 questions which seem relevant to the EO services sector. To each one, we provide some general industry reaction:

1. Which areas of research could be addressed in the WP 2016-17 to ensure the long-term evolution of the Copernicus services beyond 2020?
    - Thematic research linked to the 6 Copernicus services to broaden the range of products which can be considered as Copernicus Services and to improve the products in terms of quality, accuracy, reliability etc.
    - Develop methods to improve the procurement of services including product standardisation with a certification process to ensure that procurement bodies get quality products at best value for money.
    - Investigate new architectures for generating products and improving the efficiency of the processing chain.
    - Integration of data from different sources eg UAV, satellite, balloon, ship etc and their analysis.

2. Which are the specific innovation aspects that could be addressed in the WP 2016-17 to ensure that downstream EO applications can reach the market?
    - Enable market development requires raising awareness and developing understanding. Innovative approaches to distribute products and services into both public and private markets could be supported.
    - EARSC has shown that the large majority of companies in the sector are SME's and micro enterprises (with less than 10 employees). This highly fragmented sector has difficulty in addressing new markets and specific measures to help these small companies to find new customers and new markets especially outside of Europe could be explored.
    - For small enterprises, efficient access to data is paramount to develop new business. New methods of making data available especially where it is free and open as in the case of Copernicus should be investigated and support to meeting spatial data standards ie Inspire directive.

3. What technological difficulties could be addressed in the WP 2016-17 to access and/or use satellite data (such as Sentinel data) more efficiently?

- Deep knowledge of scenes and metadata to permit and enable automatic selection of scenes to feed into interpretation/analytic algorithms and processing chains.
- Better access mechanisms and automatic scene classification to enable diverse datasets to be accessed efficiently.
- Platforms which allow data to be combined and allow users access to algorithms, data from different sources along with base maps, imagery and various analytic and processing tools as a means of effective exploitation. The platform should be organised to favour a particular market segment with cross-thematic tools appropriate to the sector.

4. Which areas of EO related technology, notably sensors and instruments, would you consider the most appropriate to be addressed in the WP 2016-17?
    - The key here is to encourage new and private initiatives. Getting private sector investment into the sector is a key goal which is proving difficult in Europe. Means to enable R&D into new concepts should be addressed with a light award mechanism (to allow rapid approval and flexibility of approach). Scaled investments should be possible as ideas grow towards maturity.
    - Integration of different technologies required to provide effective solutions eg. EO with comms and ICT, cloud and distributed data (both sources of and databases), crowd-sourcing etc.

5. Against the background of the EC Copernicus Big Data Workshop, which specific developments would need to be addressed in WP 2016-17 so that EO can benefit from the advances being made in ICT and notably in big data, e-infrastructures, data analytics, modelling and assimilation techniques?
    - Understanding user requirements: as was stated in the opening paragraph, this is a key area and one where the language used differs between communities. Research into translation tools and the specific needs of different communities can help the uptake of EO services.
    - Automatic interpretation techniques coupled with scene understanding across different sensor and image types so as to permit data to be gathered together around a theme e.g hurricanes, flooded area etc.

Lastly, some general comments on the instruments. We are seeing a sudden leap in initiatives coming from private sector investors in the US. This is quite disappointing given the perceived lead Europe of the EO services sector and needs to be countered. We need some more rapid mechanisms which can help European SME's to bring new ideas to the market. It needs a rapid and flexible approach with phased funding steps ie a ladder of funding, similar to that which is envisaged for SME programmes under H2020 but with more possibilities. It could be interesting to try an approach which is more about "prizes" for winning ideas and less "grant" oriented.

Secondly, a great deal of the R&D actions in Europe do not lead to exploitable results. A greater involvement of industry in early research projects could help deliver more results in the form of transfer of knowledge from R&D institutions to the private sector. We should like to see greater emphasis placed on industry led proposals for later stage research and for early stage research more emphasis on industry participation so as to guide R&D to be more exploitable and to provide a ready-made exploitation path.

Finally, there is a need for more sustained research to overcome the "valley of death"; so called because of the drop away of R&D funding as a technology reaches maturity but before

it has been brought to market. A greater emphasis on development and demonstration projects could help overcome this lacune.