

ESPI Executive Brief

A Crowdsourced Science Satellite?

How space sector can make use of civil society involvement to the benefit of innovation and outreach

Society is becoming ever more efficient and ever more demanding in terms of innovation. Crowdsourcing is one of the tools that can be used to optimise societal results in this field and is therefore becoming increasingly widespread. Typically, crowdsourcing is concerned with finding quality solutions and hence involves the outsourcing of creative, non-standard tasks to a distributed group of people. As crowdsourcing is mostly supported by an online web structure; built on the premise of open participation and customisable, the concept offers interesting opportunities for the space sector.

Thus, crowdsourcing is being done by NASA in its hunt for innovative concepts to cut costs while improving performance as it revamps the Mars Exploration Program. However, there is no reason to be complacent. Much more can be achieved by crowdsourcing in the space field. Examples from the non-space field, like the US Defence Department programme for an entirely crowdsourced armoured vehicle show that revolutionary approaches to the design, manufacturing and verification of complex defence systems and vehicles can be addressed by these approaches as well.¹ In addition, the space sector has – just like the military sector – a considerable network of followers, the technical expertise of which has been underutilised in terms of crowdsourcing so far.

The European space community might want to consider entering in a big way the crowdsourcing field by letting the crowd design a science satellite, and by letting the crowd substantially guide the production and ultimate exploitation of the spacecraft.

The crowd would not necessarily have to be given complete freedom, and the effectiveness of the approach would depend heavily on finding the right balance between the crowd involvement and institutional management and supervision.

To illustrate this, imagine the case where only a broad scientific objective is defined by the institution. Clearly, this scenario leaves immense freedom to the crowd in terms of specification, and although this approach entails some practical challenges – like for instance the decision-making mechanism and structure – more people would get involved, simply because the ‘needs’ have to be formulated before the conceptual design and requirements definition are elaborated. This way, the initial involvement could engage a wide range of people with different backgrounds and there would be plenty of room for non-specialists. As the procurement advances, further technology development in implementation of specifications would then be taken over by volunteers with the required knowledge in the respective fields of engineering or science. On the other hand, if the initial project description is already quite detailed, the creativity of the crowd will be constrained. As a result, the opportunities for participation and serendipitous innovation would decrease. Any institution guiding such a crowdsourcing project should be aware of this trade-off and find an optimal balance between both.

¹[1] Boyle, Rebecca. “How The First Crowdsourced Military Vehicle Can Remake the Future of Defense Manufacturing” 30 Jun. 2010 POPSCI 30 Jul. 2012 <<http://www.popsi.com/cars/article/2011-06/how-first-crowdsourced-military-car-can-remake-future-defense-manufacturing>>.

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In either case, it is essential that the supervising institution keeps a firm grip on the project and communicates to the crowd the present or newly risen needs, budget constraints, possible conflicts related to the interaction and needs of different subsystems etc. It would also be the responsibility of the supervising body to provide sufficient means to get and to keep such a project going, for instance the availability of discussion forums, decision-making frameworks and the (open source) software required for the engineering tasks. Once in operation, the data provided by the satellite should again be distributed, so that all related services and information remain in the public domain, hence facilitating more citizen science.

Since such an initiative would stimulate involvement from people with different backgrounds, there is a good chance of cross-disciplinary innovation to be bred. Evidently, few of the expected innovations will be ready for direct market-implementation, but they might be further incubated or applied in other (non-space) fields, as is often the case with embryonic inventions.

For society, the benefits are innovation optimisation and better outreach and an increased public exposure to the concepts and vocabulary of space, which allows meaningful participation and discussion with scientists and politicians. If managed well, such a project could even become a small – for and by the people – flagship project. As a result, it could raise political legitimacy and the interest in science and technology among students and other citizens. For Europe, it might be a chance to match words with deeds as part of the aim to establish a genuine innovation union. After all, innovation is not something that can easily be commanded, it is an attitude!

If you are interested in more information on the practices of crowdsourcing and citizen science and their relationship with space sector and innovation, please read the ESPI Report 43 on “*Space and the Processes of Innovation*” and Executive Brief 1, Networked Space, which can be consulted on our website.



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Short title: A Crowdsourced Science Satellite
Published in August 2012

Editor and publisher:
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