

General Studies

Looking back on 2003, the first question to ask is whether we delivered on the goals that were set in the preceding years, namely:

- Focussing on ways to speed up the interactions between the Agency and its partners (Annual Report 2001)
- Greater interaction with academia (Annual Report 2002).

The answer is clearly yes.

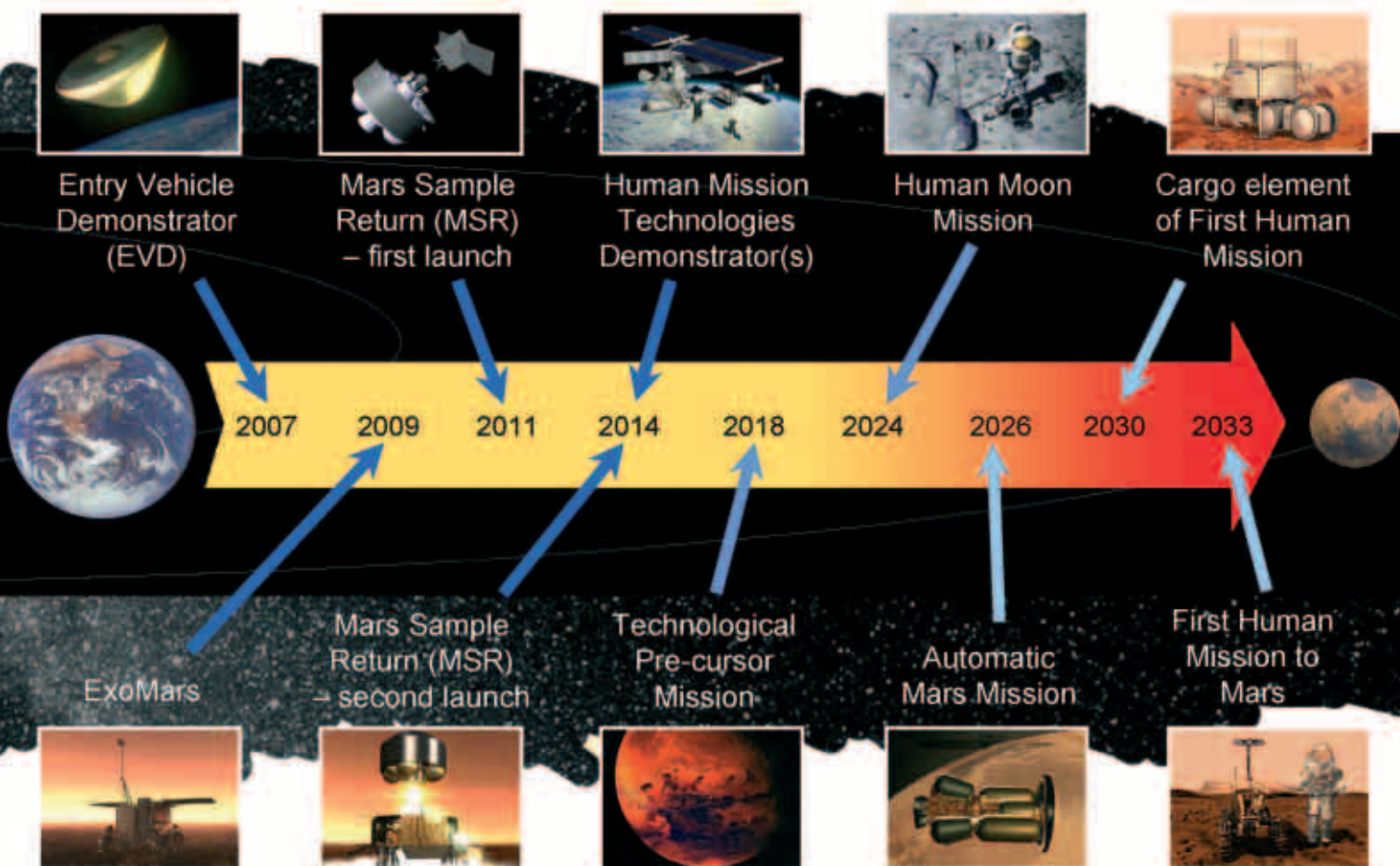
By the end of the first quarter of 2004, over 95% of the 2003-2004 activities approved by Member States will have been committed. This called for an effort exploiting both the technical and administrative resources of the Agency in order to make sure that activities deemed urgent for preparing for Europe's future in space got underway promptly and effectively.

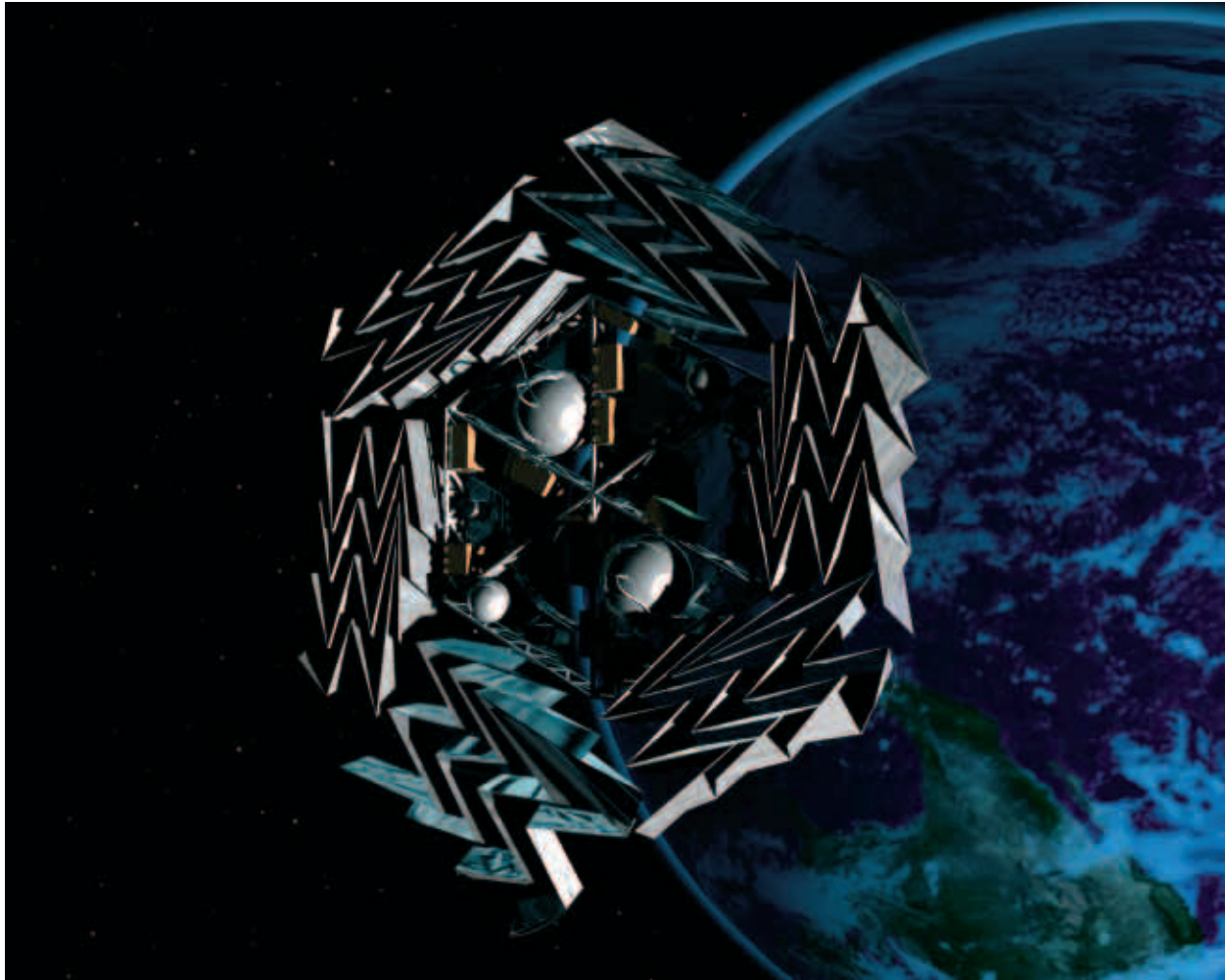
The Ariadna procedure, developed by the Advanced Concepts Team (ACT) and the

Contracts Department, constitutes the first contractual instrument specifically tailored for fast interaction with university research teams. It was successfully launched in 2003 with a first call that now involves over 20 university research groups. The ACT, made up of PhD Research Fellows, constitutes an ideal interpreter of the Agency's needs towards the academic world.

Beyond this, 2003 saw the coming together of a number of actions started by the Advanced Concepts and Studies Office to provide Member States with the best possible value from their investments in the General Studies Programme (GSP). In mid-year, the Aurora programme issued its preliminary roadmap for the future of human and robotic exploration. This long-term plan was based on early results from internal studies conducted in the Concurrent Design Facility (CDF), often with support from National Agencies and Industry, and industrial studies.

The Aurora mission roadmap





A future solar-sailing concept

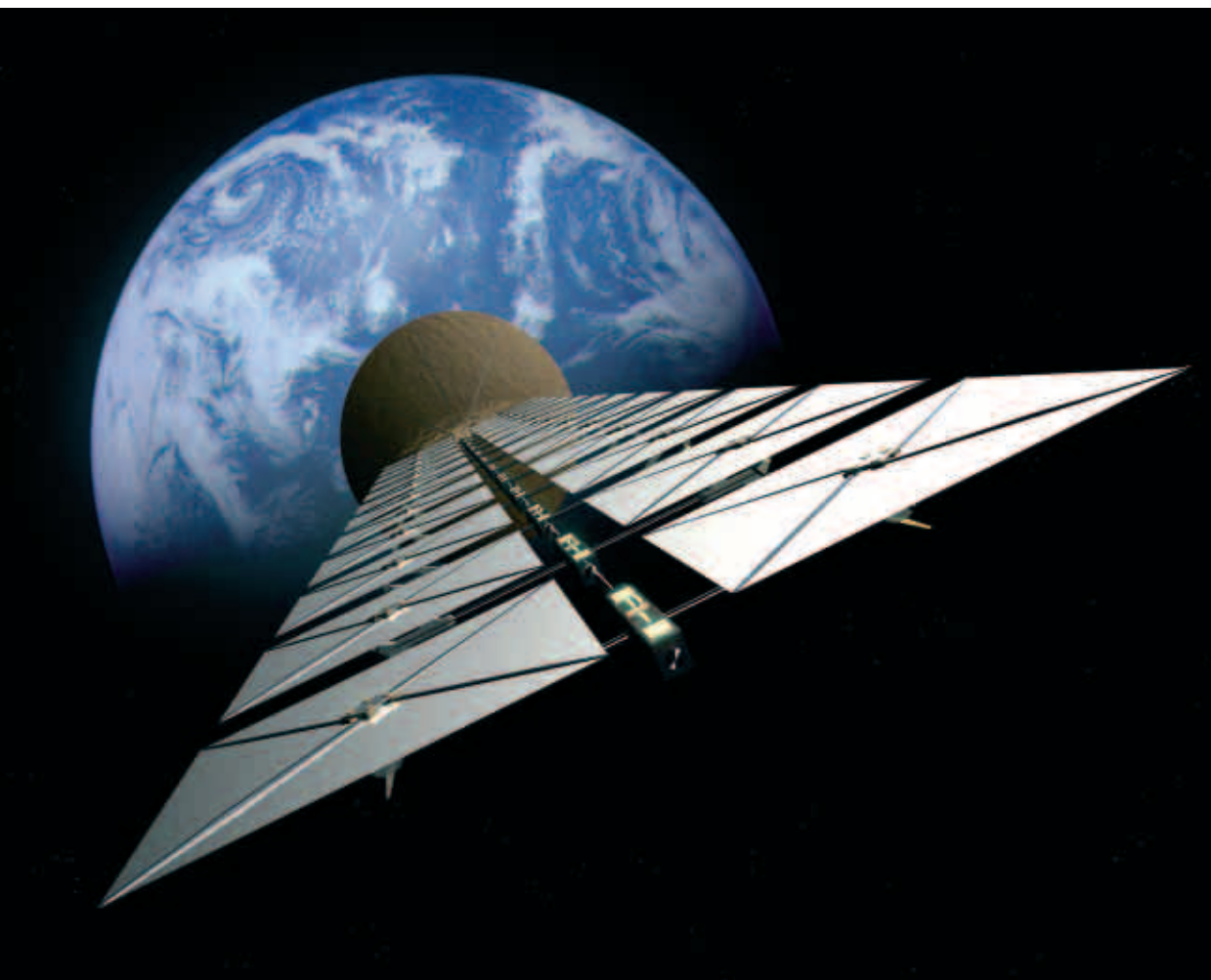
When, in January 2004, the US President unveiled the United States' vision for exploration, it was with some satisfaction that we saw most of our work confirmed by the analysis of the largest and most highly resourced space agency in the World. This was not, of course, the only benefit. In the process, the GSP has prepared the European public, scientific community and industry for this new opportunity, enhanced the capabilities of the CDF to analyse manned and unmanned vehicles and launchers, and demonstrated that the internal pre-Phase-A/industrial Phase-A cycle could be reduced to little more than a year while also improving the quality of the results.

Looking forward to a more complex landscape of space systems, actors, applications and needs, the Office of Advanced Concepts and Studies will have to make full use of these resources to analyse and propose the most efficient architecture for Europe's future space assets. In this frame, the GSP continues to be the

sponsor of all new missions analyses, both internal and industrial, in science, Earth sciences, applications and launchers.

"The best and most sustainable innovation occurs where creativity and customer needs intersect. Good ideas don't just leap out of laboratories – they are called out by the clear voice of the customer and need to be reinforced with the right resources" (W. James McNerney, Jr. Chairman & CEO of 3M)

With the ACT competence in house, extended by its academic network, and the support from technology experts in the Agency, the GSP has also looked at where technological innovation can benefit space systems and, vice versa, where the space-research constraints can stimulate innovative solutions beneficial on the ground. Among many examples, two of the main challenges facing society concern energy and water:



Artist's impression of a Solar Power Satellite beaming energy back from Earth orbit

- Hydrogen storage: the much-heralded 'hydrogen economy' finds its building blocks among the spin-offs of space exploration: hydrogen-handling technologies and fuel cells. The next big challenge, both on Earth and in space, is hydrogen storage and efficient fuel cells. Various GSP activities have put ESA on the map among the entities working in this field, opening the way to further cooperation and synergy.
- For the first time, the long-standing idea of placing Solar Power Satellites in Earth orbit to beam down energy has been critically assessed under the leadership of non-space companies specialising in energy options. The preliminary results clearly identify the constraints on a space solution and the conditions for its consideration.
- Water and waste recycling are not only enabling technologies for future human space

missions, but are also the key to more efficient aircraft, trains and habitats on Earth. The GSP has enabled the industrial link between the energy- and mass-efficient space technology and the larger Earth-based market.

Concentrating on the future does not mean we can forget the present. Besides having facilitated and sped up the interaction with our external partners, we have also started the electronic archiving of all past GSP reports with the support of the Technical Information and Documentation Centre (TIDC), and restyled our web site (www.esa.int/gsp). In its new configuration it will carry monthly information on the latest GSP results and activities, and links to other resources such as the new Advanced Concept Team website, the Space Weather, the Near-Earth Objects, and the Aurora sites. As these initiatives move on to their next stage, new ones will emerge, ensuring that Europe stays at the forefront of global space activities.