Technology Harmonisation and Strategy

The timely mastery of technology is crucial for the future of the European Space Programme, in order to limit project development risks, to find solutions for complex challenges, to improve the competitiveness of Industry in commercial markets, to limit European dependence, and to attract young talent. Technology is also a major Industrial Policy instrument, particularly in terms of the restructuring of European Industry. ESA's efforts with the technology harmonisation process have also demonstrated their usefulness for better organising Europe's space activities, but given the growing challenges coming from the USA and Japan and new competitors such as India and China a lot still remains to be done.

The ESA Technology End-to-End Process

A significant achievement in 2005 was the introduction of a single new End-to-End Space Technology R&D Management Process for all ESA technology programmes. Being user driven and aimed at meeting both the institutional and commercial needs of Europe, it is based on the following key elements:

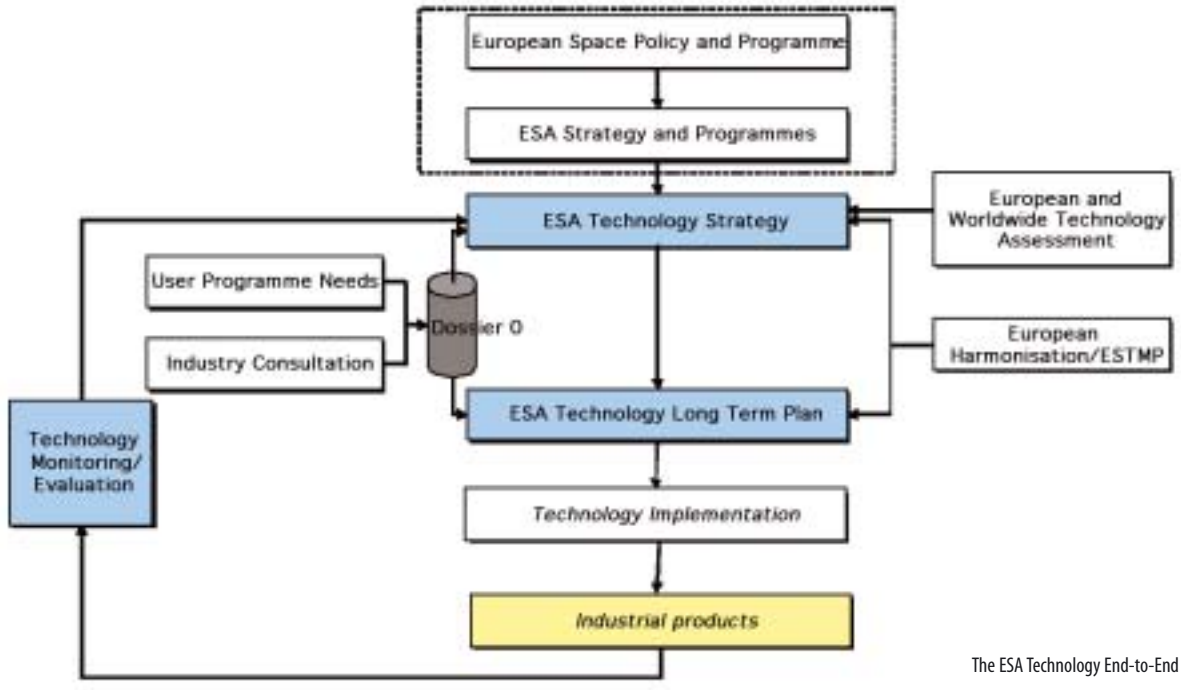
- The ESA Technology Long-Term Plan.
- The ESA Three-Year and Annual Space Technology Research Plan.
- Technology Monitoring and Evaluation.

To support this new ESA Technology End-to-End Process, two groups have been established:

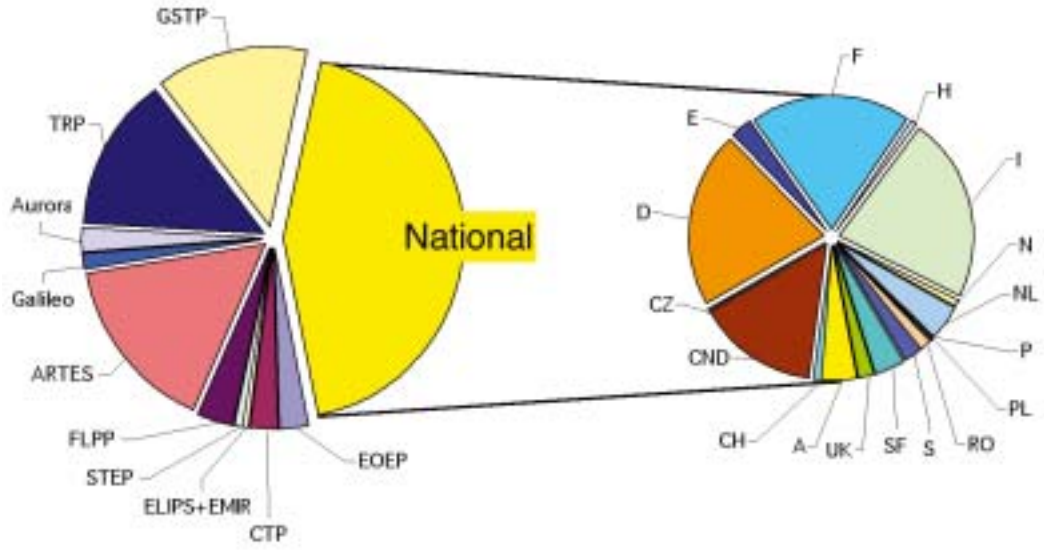
- The Technology Steering Group (TSG), made up of senior ESA managers and Directors, to oversee the complete process and to interact with ESA's Director General.
- TECNET, made up of ESA managers and senior technical experts, to ensure the efficient implementation of the complete process.

Although the complete process was only put in place in 2005, positive benefits can already be identified. The ESA Technology Strategy and Long-Term Plan were finalised as essential inputs to the Ministerial Council in December. A complete analysis was carried out identifying areas of space technology in which Europe may risk being dependent on other countries, to the detriment of its institutional and commercial aspirations. It led to the creation of a new Technology line known as 'NewPro'.

The European Space Technology Requirements Document (Dossier 0) is one of the key elements of the End-to-End Space Technology R&D Management Process. It provides the European space community with as complete an overview as possible at European level of all the envisaged missions, their associated top-level technology



The ESA Technology End-to-End Process



Budget for European space technology R&D in 2005 (~ 380 million Euros)

requirements (user pull), and the technology requirements related to 'technology push'. The updating of the document in 2005 resulted in a printed version of the Dossier 0 introductory document and an updated Dossier 0 electronic database, accessible via the Internet (http://dossier0.esa.int). A major review of the requirements was carried out to consolidate and prioritise the content of the database, which now contains 101 missions and 712 technology requirements, more than half of which were generated in the context of this latest update.

European Space Technology Harmonisation

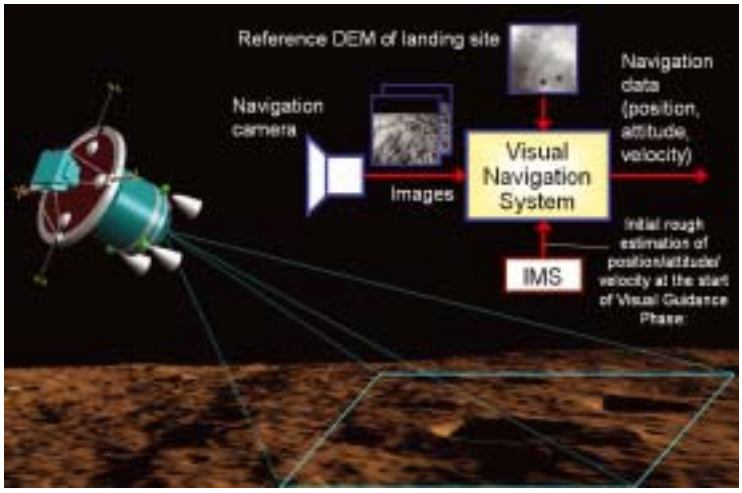
The European Space Technology Harmonisation effort, mandated by the 2001 ESA Ministerial Council in Edinburgh, is designed to achieve better coordinated space technology R&D activities among all European actors, with the 'filling of strategic gaps' and the 'minimising of unnecessary duplications' as major objectives. The harmonisation process takes into account the various European developments, capabilities and budgets in order to enhance the complementary roles of the various stakeholders in meeting common objectives, and covers the different situations in terms of technology maturity, industrial competitiveness, funding needs and political interests. Based on voluntary participation and two review cycles per year, the process is strongly supported by all stakeholders and recognised by the European Commission White Paper as a leading instrument for space technology in Europe. Since its pilot launch in 2000, approximately 40 technologies have been harmonised, with the participation of all ESA Member States, the European Commission, Industry, and more than 700 professionals from 170 European space companies and research organisations.

Proposals to adapt the Technology Harmonisation Process, approved by ESA's Industrial Policy Committee (IPC) in May, are now being implemented, which will ensure that recommendations stemming from the harmonisation process are applied in ESA programmes, promoted and duly considered by Member States and their industries in national and commercial programmes. A significant step forward in this context was the creation of a Technology Harmonisation Advisory Group (THAG), reporting to the IPC.

European Space Technology Master Plan (ESTMP)

The ESTMP is a key element of the overall European Space Technology Coordination and Harmonisation Process. After four releases, the first of which was in 2002, the ESTMP has now achieved a high degree of maturity and strategic relevance in Europe, being distributed to over 400 stakeholders (ESA Member States, European Commission, Industry, etc.).

The 2005 edition of the ESTMP provides stakeholders with the most comprehensive single source of information on space technology in Europe, reporting on the latest developments and defining roadmaps for future action, and reflecting the new ESA Technology End-to-End Process and the plans submitted to the Ministers meeting in Berlin on 5/6 December. European Union initiatives that have an impact on space technology (such as GMES, Galileo and security issues) are described in more detail, more closely linking technology-development plans with applications responding to end-user needs. Particular attention is also given to ESA-EC cooperation on space technology and to the European Space Technology Platform (ESTP).

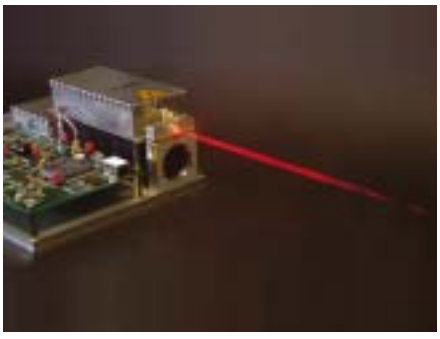


A visual navigation system – an example of ITI technology

Cooperation with the European Commission on Space Technology

Following the work in 2003 by the Working Group on Technology of the EC/ESA Joint Task Force (JTF), the EC White Paper on Space recommended greater investment in space technology using the ESTMP as a basis, including investment in technologies for non-dependence, upstream research on multiple-use/spin-in technologies from non-space sectors and technologies for civil security, through EC technology programmes – in particular Framework Programme 7.

To respond to the needs of an enlarged Europe, a European Space Technology Platform (ESTP) has been proposed in the context of the European Space Policy, to complement the ESTMP/Harmonisation process on technological issues with a European strategic dimension. The ESTP is basically a Europe-wide umbrella bringing EU actors and programmes together for a long-term coherent vision on space-technology development. It will provide interfaces with other related technology platforms on upstream issues of common interest, it will promote research on multiple-use technology, and it will formulate the rationale for the necessary EC financial commitment to space technology through the identification of harmonised stakeholder needs.



A micro-laser ranging system – an example of ITI technology

The Innovation Triangle Initiative

The aim of the Innovation Triangle Initiative is to explore applications technologies or services that are not currently being used or exploited in the context of space. Since the ITI's launch, 235 unsolicited proposals have been received, resulting in 48 approved activities covering a wide range of technologies. The number of high-quality proposals submitted demonstrates both European Space Industry's interest in the Initiative and the validity of the approach. 12 ITI contracts have already been concluded and the results were presented at an ITI Final Presentations Day in ESTEC on 21 November. One example of an ITI-supported development is a novel micro-laser ranging system to guide a landing vehicle; it allows the vehicle to find the exact landing position to an accuracy of 3 cm from an altitude of 7 km. Another example is a visual navigation system that continuously acquires images of a planet's surface, and calculates the difference from one image to the next in real time to determine the exact location, orientation and speed of the lander with only a 1% error.