Celebrating the Accomplishment, Preparing the Future

New Challenges in Human Spaceflight and Exploration

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Backdropped by Earth, the ISS is seen from Space Shuttle Discovery on 12 June 2008 during the STS-124 mission (NASA)

ESA's new Director of Human Spaceflight looks at how we have demonstrated Europe's ability to live up to our ambitions in human spaceflight, and how we are entering the next phase of the human exploration of space.

The International Space Station (ISS) is today a beautiful reality, an international accomplishment which Europe, through ESA, is proudly part of. The European-built Node-2, the ESA Columbus laboratory and Automated Transfer Vehicle (ATV) are key contributions to an endeavour that has brought humanity to live and work in space uninterruptedly for almost a decade now.

Five international partners representing 14 nations have succeeded to bring to life the largest civilian cooperative project ever conceived. Hundreds of thousands of skilled workers throughout the world have been working to build and operate the ISS, learning from each other. Citizens from all over the world have witnessed in

amazement male and female astronauts from many nations working together to assemble and utilise this first international human outpost in outer space.

Much has been said about the ISS, but it will always be a reminder of the human desire to explore and push the frontiers, a signpost for future directions in our space activities.

One cannot celebrate the ISS without thinking of those who have lost their lives in this enterprise, reminding us all that space activities, even though much safer than before, still represents a risk that requires all the possible safety measures.

The near-completion of the ISS however compels us to act rapidly in order not to waste the investment made so far and not to dissipate the human capital and knowledge gained over the last two decades.

This was the consideration that led ESA to define and propose to its Member States in 2001 the European space exploration programme Aurora. In a different context, this was also, at least partially, the underlying consideration in the US Presidential Vision for Space Exploration announced in January 2004 that eventually turned NASA in a 'space exploration agency'.

The Next Phase of Space Exploration

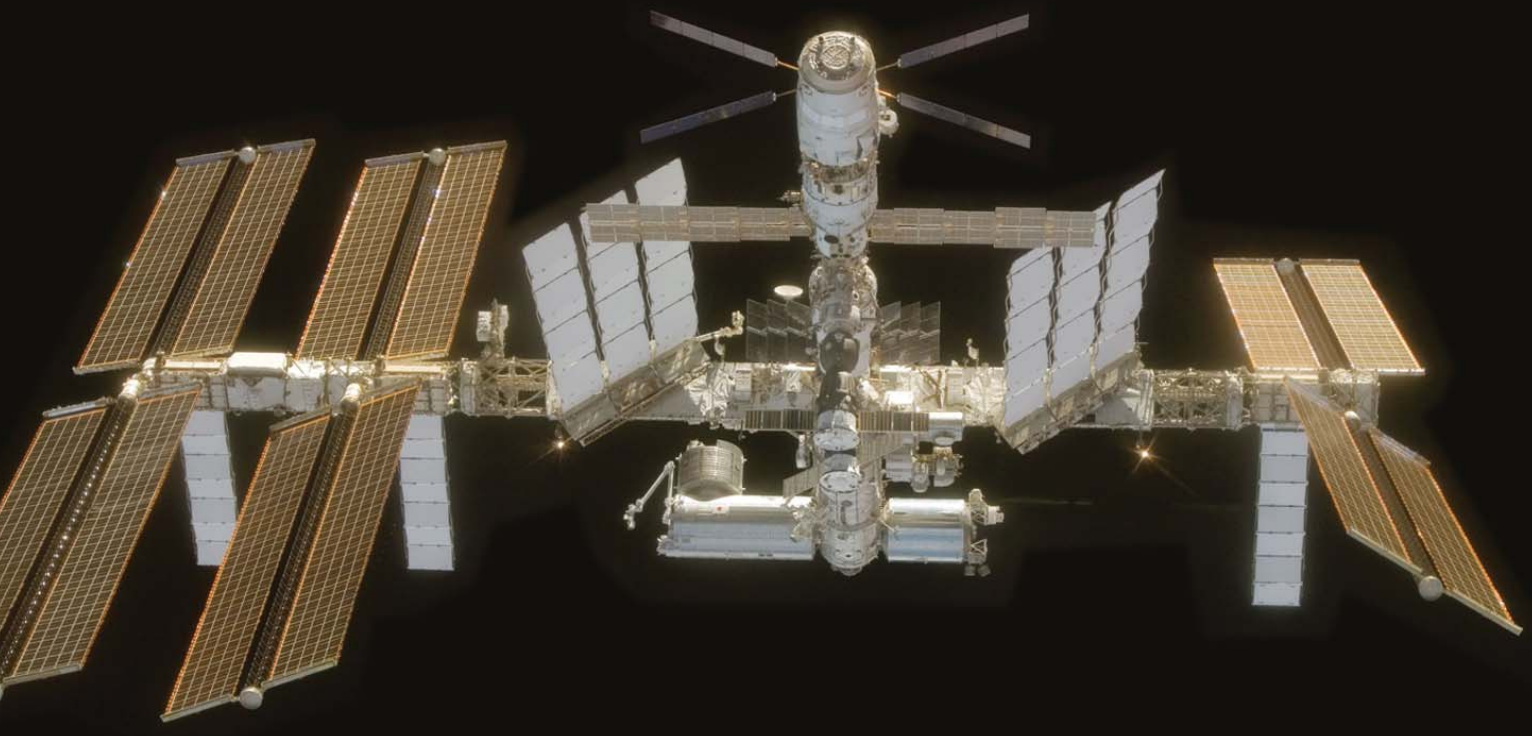
The first phase of space exploration is now over. During this phase, we learned to fly in space, to live and work there, but always remaining safely close to Earth. In parallel, our robotic proxies have reached out and conducted an initial, but no less fascinating, exploration of more distant planets, including Mars, which remains the ultimate destination for a human mission.

We are on the edge of a second phase that promises to be much more rewarding as we build on the accomplishments and the experience gained previously, in order to go farther than low Earth orbit and to do much more.

This next phase will be characterised by a number of important players with similar capabilities, a second wave of innovation linked to space exploration, an accrued attention paid to economic factors and, possibly, by the emergence of private enterprise in human spaceflight and exploration. Because this second phase aims at a sustained effort in space exploration, cooperation will be even more important and will occur probably at global level.

With this in mind, 14 space agencies worldwide have produced an important document called 'Global Exploration Strategy: a framework for coordination'.

The ISS as seen from Space Shuttle Discovery *in June 2008 after the addition of the Japanese Kibo module (lower centre near ESA's Columbus). ESA's ATV* Jules Verne *is at the top, recognised by its familiar diagonal cross of solar panels (NASA)*



With a significant contribution from Europe through ESA and four national space agencies (ASI, BNSC, CNES and DLR), this document lays down the common vision and objectives by possibly all space agencies involved or interested in space exploration.

It also provides for a mechanism of coordination and for multiplying the opportunity for cooperation. The first element of this mechanism is an International Space Exploration Coordination Group (ISECG) that is meant to implement, with the support of a Secretariat, the strategic vision contained in the document. The experience and the tradition of working together that we have gained in the ISS will come in very useful as we plan to pool our resources for a robust and sustained space exploration effort.

Europe's Role in Human Spaceflight

Europe has secured an important role in the ISS partnership and has lived up to its commitments brilliantly. We should credit the European industry in developing and manufacturing the space hardware that has been working flawlessly since the first day of installation and ever since. Columbus, ATV, Node-2 and many other elements have gained for Europe the respect and compliments from all international partners. Special credit goes to past ESA Directors of human spaceflight

activities, Jörg Feustel-Büechl, who had for such a long time skilfully managed the ESA ISS programme, and Daniel Sacotte, under whose mandate all the major European elements were launched and successfully commissioned.

Through the participation in the ISS endeavour, ESA has been able to gain an important experience in human spaceflight. The European Astronaut Corps is a valuable asset for Europe, not only for the individual European countries, but also for our international partners as the recent positive performances of our astronauts have shown.

In May and June this year, over 9000 European men and women, from all ESA Member States, enthusiastically responded to ESA's call for a new class of astronauts. They are the proof that human spaceflight is not only a highly technical and innovation-rich activity, but also can still make people dream. They represent not only the individual wish to accomplish something exceptional like becoming an astronaut, but also the desire to see Europe playing a visible role in the future space exploration.

Europe cannot afford to remain at the margin of what is bound to be one of the great undertakings of this century. Expanding human presence in the Universe, namely on the Moon and later on Mars, will positively mark humankind and our societies. This great challenge will be a source of inspiration and of mutual understanding as we cooperate to reach a goal unattainable by any nation on its own. Resolving the engineering and logistic issues of sustained surface operations, with the requirements in term of mobility, energy and life support systems, will boost research and innovation in fields that are also vital to the well being of millions of men and women on Earth.

Themes For the Future

Space exploration will also be a great diplomatic and geopolitical opportunity where the relative influence will be as important as the capabilities each player can display. Additionally it is likely that only those nations that participate and contribute to a significant level in space exploration will have a real say in a possible evolution of the current international principles regulating the use of outer space.

The main themes that ESA will be presenting to the Ministers of ESA Member States, in the ESA Ministerial Council in Den Haag in November 2008, are:

- building on the investments made in the past and the resulting industrial know-how and human capital;
- contributing to a knowledge-based economy and social growth in Europe;
- stimulating innovation and research;
- fostering European geopolitical role and inspiring our citizens, and
- providing a unifying and very visible example of a world-class European programme.

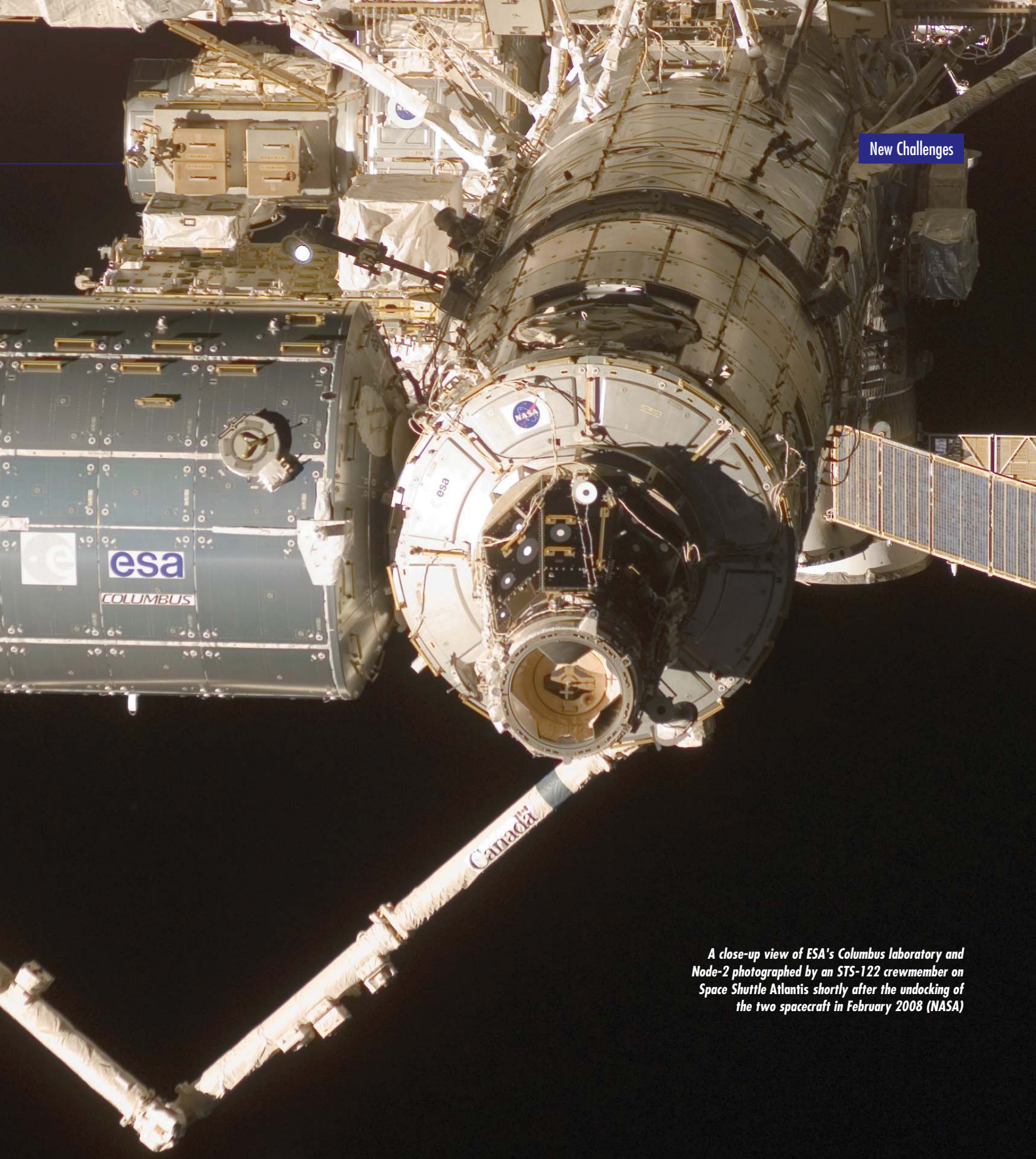
These are ambitious but affordable proposals regarding its future role in the global endeavour of space exploration.

European decision-makers demonstrated vision and inspiration when they backed the Aurora programme, first in 2001 as a preparatory programme and subsequently in 2005 as a fully fledged programme. These decisions have given Europe the required leverage, credibility and framework to be recognised, together with the recent successful missions, as a credible and important partner in space exploration.

The ExoMars mission in 2013 is not only a European flagship mission, but also a key element of the international effort to better understand and characterise Mars in preparation of future human missions. The work conducted on architectures, generic exploration technologies, life-support systems and, in particular, on a Mars Sample Return mission concept has reinforced this role for ESA and Europe.

Autonomy and Cooperation

We need to keep this direction and at the same time consider a step forward to enhance our role and increase our autonomy, both to reinforce partnerships and to better serve European interests.



A close-up view of ESA's Columbus laboratory and Node-2 photographed by an STS-122 crewmember on Space Shuttle Atlantis *shortly after the undocking of the two spacecraft in February 2008 (NASA)*

ESA astronaut Hans Schlegel seen during his spacewalk on the STS-122 mission to install Columbus. (Right) ESA's ATV Jules Verne seen in flight before docking with the ISS in April 2008 (NASA)

'Autonomy for enhanced cooperation' is how we like to refer to it. Increasing European capabilities for the reasons described will eventually result in a more robust and sustainable global space exploration effort.

Only one element will allow Europe to make this leap and reach a higher status among spacefaring nations, and this unique element is an autonomous capability in space transportation and its further evolution.

The Next Logical Evolution

The ATV's capabilities are a great help to overall ISS logistics and a pride for Europe, ESA and our industry. We have the duty to build on this accomplishment, to continue down the path of a European capability that would return cargo initially and to prepare for its next logical evolution.

Industry has already been working on similar concepts. Today it seems that there is also a convergence among key players in the institutional European space landscape. Our successes have boosted our confidence and provided us with a capital of credibility that will evaporate if we wait too long. The international context is favourable as space exploration is top on the agenda of most of the space agencies worldwide.

We need to seize this opportunity and in the next months lay down the foundations for European programmes that will determine our role and positioning in the decades to come, and that will probably define our contribution to one of the biggest enterprises that humankind will undertake this century - taking humans to the surface of a distant world.