Annual Report 2006

European Space Agency
Agence spatiale européenne

This Report is published in accordance with the terms of the Convention for the establishment of the European Space Agency, Article XII 1(b), which requireS the Director General to make an Annual Report to the Council.

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Foreword

It was another remarkably successful year for ESA and its partners in space, in many different ways.

For the Science Programme, the year was notable for the successful Venus Express orbit insertion on 11 April, the spectacular end to the SMART-1 mission on 3 September with its controlled lunar impact, the launch of two collaborative missions Akari (Astro-F) and Hinode (Solar-B) on 21 February and 22 September, respectively, plus the launch of the French mission COROT conducted in partnership with ESA and various Member States to search for exoplanets from space, marking another 'first' for Europe.

A further significant event was the successful launch from Baikonur on 19 October of MetOp-1, Europe's first polar-orbiting weather satellite, enhancing Europe's contribution to global weather and climate monitoring.

We also saw substantial progress being made on the International Space Station (ISS) programme, with the return-to-flight of the Space Shuttle and the resumption of ISS assembly after more than three years of great difficulties for the project. Thomas Reiter became the first European astronaut to undertake a long-duration mission on board the ISS. We are now looking forward to the inaugural flight of the Automated Transfer Vehicle (ATV) and to the launch of the Columbus labo-

ratory to be attached to the Station at the end of 2007. After a long development period and much uncertainty, Europe will finally be able to reap the benefits of its investment in this international partnership project.

In the launchers area, Arianespace carried out five Ariane-5 launches and put into orbit a total of 12 satellites plus one technology experiment. It also signed 12 new launch contracts during the year.

Turning to Galileo, after the successful deployment of GIOVE-A in January, the launch of the second test satellite GIOVE-B had unfortunately to be delayed because of an onboard computer failure during testing. Action is being taken to ensure that this problem does not have an impact on the completion of the Galileo In-Orbit Validation phase.

While acknowledging the difficulties we face in some areas, we should also be proud of our accomplishments. It is not possible here to pay full tribute to each and every one of the many individuals and groups whose dedication, hard work and professionalism contributed to achieving these successes. But I would still like to thank all those who made 2006 such a successful year and who are helping to implement ESA's vision for the future.

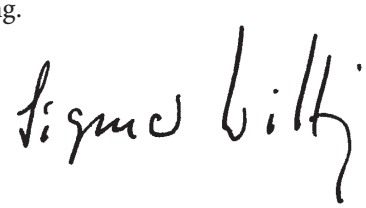
In addition, it was a busy year for the ESA Council. One of the main items on its agenda was the debate about the elaboration of the European Space Policy (ESP), which the Agency is developing together with the European Union. A Resolution on a common European space policy providing a framework for future action will be submitted to Ministers for adoption at the next ESA/EU Space Council in May 2007. Another important topic of discussion was the evolution of the Agency in terms of the expected increase in its number of Member States. Much work remains to be done on these very important subjects, which are crucial for ESA's future.

I am very happy to report that Council in June renewed the mandate of Jean-Jacques Dordain as Director General for a further four-year term through to July 2011. In October, he presented his Agenda 2011 document plotting the way forward for the Agency's future activities and evolution. He also presented the ESA Long-Term Plan 2007-2016, which serves as an important tool for dialogue between the Council and the Programme Boards in preparing for the future programme decision-taking at the next Council at Ministerial Level, planned for late 2008.

In February, the European space community was deeply saddened to hear of the death of former ESA Director General Antonio Rodotà. Many of us who had the pleasure of working with him remember him well for his warmth and charm as he led the Agency into the 21st Century. Another European space pioneer, Michel Bignier, died in October. He played a key role in the birth and development of the French space programme, and later at ESA as Director of the Spacelab Programme and Director of Space Transportation Systems from 1976 to 1986.

Jörg Feustel-Büechl left the Agency at the end of the year after more than twenty years of service. In December, the Council appointed Ludwig Kronthaler (D) as Director of Resources Management and he will join the Agency on 1 April 2007. He succeeds Hans Kappler, who retires at the end of May 2007 after having served as Director for Industrial Matters and Technology Programmes since June 1997 and Director of Resources Management since April 2004. On behalf of the Council, I wish to thank Mr Feustel-Büechl and Mr Kappler for all their work and for their contribution to ESA.

It is now time to look ahead to the challenges and opportunities of 2007. While much has been achieved since the beginning of the space age – and during this year we will be celebrating the 50th anniversary of the launch of Sputnik 1 – space exploration remains exciting and full of promise. We can look to the future with optimism, building on the successes of the past and on the exemplary talent and commitment of those in whose footsteps we are following.



Sigmar Wittig
Chairman of Council

Year in Review

2006 turned out to be an incredible year for ESA, with many highlights across all of the Programmes, and the Agency heavily involved in a wide range of missions and activities spanning the realms of space exploration, Earth observation and climate change, and satellite navigation.

It was also an excellent year for launchers, with five successful flights of Ariane-5 ECA, and the signature of 12 new launch contracts with Arianespace by commercial customers. Human spaceflight too logged some major milestones, with ESA astronaut Thomas Reiter completing the Agency's first long-duration mission on the International Space Station (ISS) and his colleague Christer Fuglesang completing a gruelling series of spacewalks to help extend and complete the ISS.

The first highlight of the year came early, when the GIOVE-A satellite started transmitting the first Galileo signals in space on 12 January, thereby securing the frequencies allocated to the Galileo system. This pilot satellite constitutes the first step towards Europe's own global satellite navigation system, a ground-breaking partnership project involving ESA and the European Commission that will provide a highly accurate and guaranteed positioning service under civilian control.

Less than two weeks later, MSG-2, the second member of Europe's new generation of weather satellites, transmitted its first image. Developed by ESA and operated by Eumetsat, it has replaced the aging Meteosat-8 as the prime satellite for monitoring the Earth's atmosphere and climate. With two more satellites already ordered, the MSG series will provide coverage until at least 2018. The data that the Meteosats are providing constitute a unique record of the evolution of our planet's climate over nearly three decades, serving as a continuous source of data for the fight against global climate change.

In February, as a further endorsement of ESA's commitment to addressing climate problems, the Member States gave the green light to build and launch CryoSat-2, to replace the original satellite lost through a launch failure in 2005. By monitoring the thickness of land and sea ice, it will help to explain the connection between the melting of polar ice and rises in sea level, and how this is contributing to climate change.

In science too, the quest continued to unravel the unknowns of our Universe, not least with XMM-Newton, ESA's scientific X-ray observatory mission. After just five years of operations, the mission saw the publication in January of the 1000th scientific paper based on XMM-Newton data. In April, Venus Express

successfully entered orbit around its target planet, with its VIRTIS instrument already providing spectacular views of the south pole's cloud structure. After a complex series of successful manoeuvres to reach its final operating orbit, the mission's routine science operations began just two months later, in June. That same month, Mars Express celebrated three years in space and continues to send back spectacular images of the Martian surface and crucial data about how the atmosphere of our planetary neighbour functions.

May saw the delivery of the Columbus laboratory, complete with its suite of payload rack facilities, to Kennedy Space Center, in preparation for its planned launch to the ISS in December 2007. Three days earlier, on 27 May, it had been the Ariane launcher's turn to be

in the limelight, when Ariane-5 ECA set a new record for the vehicle by delivering a payload of close to 8500 kg, consisting of the Satmex-6 and Thaicom-5 satellites, into geostationary transfer orbit. There was also success for the new Vega small launcher's development programme, with the problem-free first test firing of its Zefiro-23 second-stage engine in Sardinia (I) on 26 June.

The highlight in August was down to Thomas Reiter, who became the first ESA astronaut to perform an EVA from the International Space Station.

On 3 September, observers around the world saw a small flash illuminate the surface of the Moon, when SMART-1 made its controlled impact on the lunar surface in the Lake of Excellence. The impact concluded a spectacularly successful mission that, in addition to testing innovative space technologies for future missions, had been exploring the Moon for 16 months, gathering a wealth of data on the structure and mineral composition of its surface. Also in September, ESA announced its new strategy for the future direction of its Living Planet Programme, addressing the continuing need to further our understanding of the Earth System and the impact that human activity is having on it.

In October, MetOp-A, developed jointly by ESA and Eumetsat, became Europe's first polar-orbiting weather satellite, also carrying instruments provided by CNES (F) and NOAA (USA). MetOp will provide a closer view of our planet's atmosphere from low Earth orbit, delivering data that will improve global weather prediction and enhance our understanding of climate change.

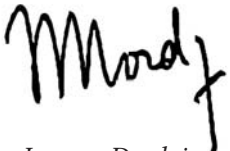
On 11 October I presented the Executive's 'Agenda 2011' document to Council, which sets out the Agency's main priorities and objectives for the next five years. It proposes an important evolution in the Agency and its activities. Behind this vision lies the desire to turn ESA into a global space agency by 2011, supporting the policies of its Member States and of the European Union (EU), developing a competitive economy, and contributing to the development of global policies and to the advancement of human knowledge. In effect, this vision will add an EU dimension to Europe's space policy and, by the same token, a space dimension to the political actions of the Union. The shape of ESA's future is also being determined by the imminent growth in the number of ESA Member States.

The two highlights that spring to mind for November are the fact that the Venus Express scientific mission celebrated its first anniversary in orbit, and there was the successful first test firing of Vega's first-stage motor in Kourou, French Guiana.

The year ended with another flurry of accomplishments, starting with the successful eighth flight of Ariane-5 ECA on 8 December. It was followed by ESA astronaut Christer Fugelsang's launch on 10 December aboard Shuttle flight STS-116 to the ISS. His 13 days of intense activity on the Station included three highly demanding spacewalks (EVAs). Another world first was achieved by ESA early in the month when its Artemis spacecraft established the first optical laser links with an aircraft, flying at altitudes of 6 and 10 kilometres. Earth-observation satellites will benefit particularly from this new technique for transmitting large volumes of data around our planet. On 22 December, Space Shuttle 'Discovery' landed safely at Cape Canaveral, bringing back Thomas Reiter and Christer Fugelsang, after completing one of the most complex assembly missions to date to the International Space Station.

With all of the above achievements and milestones, 2006 was certainly a highly successful year for the Agency, and one that contributed substantially to strengthening ESA's image and reputation as a European organisation synonymous with success. 2007 will be the 50th anniversary of the launch of Sputnik, marking the start of the space age as well as the 50th anniversary of the Treaty of Rome. With space and Europe constituting the two key dimensions of ESA, 2007 too promises to be an exciting year for the Agency. Concrete results from the investment that Europe has made over the last 20 years in the ISS will finally begin to be realised, with the launch of the first Automated Transfer Vehicle (ATV) and the deliveries of the Columbus laboratory and the Italian-built Node-2 to the Station. Other scheduled launches include those of Proba-2 and GIOVE-B and of a Russian Foton-M3 capsule carrying 17 ESA experiments. We should also have three ESA astronauts in orbit during the year.

Thanks to the continuous support of its Member States and to the expertise and dedication of its staff, ESA is putting the European flag at the leading edge of scientific progress, serving Europe's citizens, and boosting its industrial competitiveness.



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