

In Brief

Ariane Launches a Further Seven Satellites

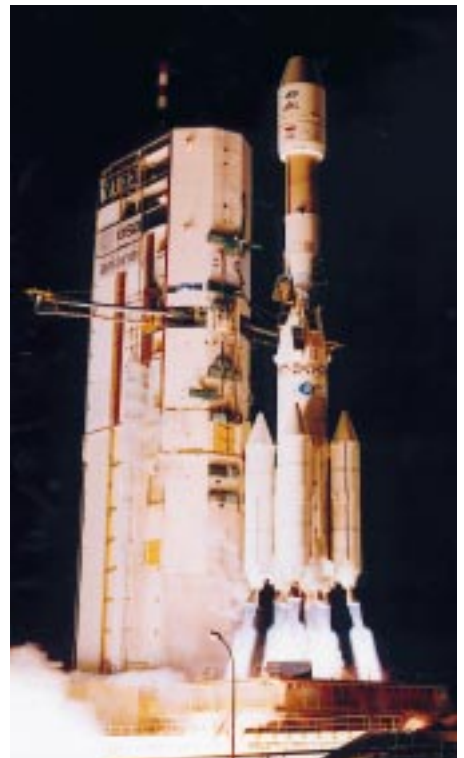
Ariane-4 launchers have successfully placed another seven satellites into geostationary transfer orbit.

Ariane V102 (44L version launcher) lifted off on 12 November 1997 (10:38 CET) carrying SIRUS-2 (Sweden) and CAKRAWARTA-1 (Indonesia).

Ariane V103 (44P version launcher) lifted off on 2 December 1997 (11:52 CET) carrying JCSAT-5 (Japan) and Equator-S (Germany).

Ariane V104 (42L version launcher) lifted off on 22 December 1997 (01:17 CET) carrying Intelsat 804.

Ariane V105 (44LP version launcher) lifted off on 4 February 1998 (00:29 CET) carrying Brasilsat B3 and Inmarsat 3F5.



International Space Station Nodes 'Made in Europe'

Mr Antonio Rodotà, ESA's Director General, and Mr Sergio de Julio, President of the Italian Space Agency (ASI) signed an Arrangement, on 12 December 1997 in Rome, concerning the management, execution and funding of the Nodes 2 and 3 for the International Space Station (ISS).

Under this Arrangement, ESA will entrust ASI with the development and manufacturing of the two Nodes, for which Alenia Aerospazio (I) is the prime contractor.

Mr Antonio Rodotà, ESA's Director General (left) and Mr Sergio de Julio, President of the Italian Space Agency (ASI) during the signing of the Arrangement concerning Nodes 2 and 3 for the International Space Station (ISS)



The Nodes constitute the interconnecting elements between various laboratory and habitation modules of the ISS. They also provide for crew and experiment support. Node 1 has already been developed and manufactured by US industry under NASA contract. Nodes 2 and 3 will be 'made in Europe' using European know-how and technology.

According to a Barter Agreement between ESA and NASA, signed on 8 October 1997 in Turin, ESA will provide the two Nodes, as well as additional high-technology laboratory equipment and services to NASA, while the US Space Shuttle will ferry the European Columbus laboratory module to the Space Station on a launch presently planned for October 2002. The launch of Node 2, the first European-built Node of the Station, is currently planned for April 2001.

The Arrangement between ESA and ASI allows Europe to take full advantage of the experience gained by Italian industry through the development of the Mini-Pressurised Logistics Module (MPLM) and the synergy between the MPLM, Nodes 2 and 3, and the European Columbus laboratory module. The MPLM, the two Nodes, and the Columbus laboratory all make use of the same structural concept.



Partners Sign International Space Station Agreements

Ministers, ambassadors and senior government officials of 11 ESA Member States* met with their counterparts from the United States, Russia, Japan and Canada in Washington D.C. on 29 January to sign agreements on the International Space Station.

A representative of each of the 15 countries participating in the Space Station signed the 1998 Intergovernmental Agreement on Space Station Cooperation which establishes the framework for cooperation among the partners for the design, development, operation and utilisation of the Space Station. It defines the rights and obligations of each of the countries and their jurisdiction and control with respect to their elements of the Space Station.

Antonio Rodotà, Director General of ESA, the European cooperating agency in the programme, together with Daniel Goldin, Administrator of NASA, the United States' cooperating agency, have also signed a Memorandum of Understanding. This accord supplements the Intergovernmental Agreement and defines the roles and responsibilities of each agency in the design, development, operation and utilisation of the Station for its planned 10-year operational lifetime.



The International Space Station will be the first international, permanently occupied outpost in space. It will serve as a versatile research institute that will orbit the Earth for at least 10 years and as an innovative centre for testing new technologies under space's unique conditions. The first element of the Space Station is currently scheduled to be launched in June of this year.

For more information on the International Space Station, you can visit:

<http://www.estec.esa.int/spaceflight>

ESA's Director General, Antonio Rodotà, addressing the participants in the Intergovernmental Agreement on Space Station Cooperation signing ceremony in Washington D.C. on 29 January 1998

*Belgium, Denmark, France, Germany, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom.



At the signing of separate bilateral Memoranda of Understanding with NASA are (left to right): Yuri Koptev, RKA; Antonio Rodotà, ESA; Daniel Goldin, NASA; William Evans, CSA; Isao Uchida, NASDA



ESA Astronaut Pedro Duque to Fly on Space Shuttle Mission

On 21 November 1997, ESA's Director General, Antonio Rodotà, and Spain's Minister of Industry and Energy, Josep Pique, announced that ESA astronaut Pedro Duque has been assigned to the Space Shuttle mission (STS-95) currently scheduled for October 1998. NASA Administrator Daniel Goldin confirmed the appointment during his recent talks with Mr Rodotà at ESA Headquarters in Paris.

Pedro Duque, 34 years of age, will be making his first spaceflight, thus becoming the first Spanish national to go into space. Duque, an aeronautical engineer, was an astronaut candidate proposed to ESA by the Spanish Ministry of Industry and Energy's Centre for the Development of Industrial Technology (CDTI) following a national selection in 1990/91. He was then recruited for the ESA astronaut corps in 1992.

In August 1993, he began training at Star City, Russia, for the joint ESA-Russian Euromir 94 mission. During that 30 day flight (October/November 1994), he coordinated the interface between fellow ESA astronaut Ulf Merbold onboard the Russian space station Mir and the scientific investigators and project management on the ground.

In May 1995, NASA selected Duque as an alternate Payload Specialist astronaut for



Announcement on 21 November in Madrid of Pedro Duque's selection for STS-95: (left to right) Pedro Duque; Antonio Rodotà, ESA's Director General; Josep Pique, Spain's Minister of Industry and Energy; and Pedro Ferraras, Vice Minister of Industry and Energy

the Space Shuttle's STS-78/ Life and Microgravity Spacelab (LMS) mission. During that flight (June-July 1996), he acted as the interface between the crew onboard the Shuttle and the researchers on the ground. He will be a Mission Specialist on STS-95.

Duque, who is based at the European Astronaut Centre in Cologne, Germany, is currently in NASA's Mission Specialist Class at the Johnson Space Center in Houston, Texas.

The 10-day mission will be dedicated to research in near-weightlessness. ESA plans to have a significant payload on board this mission: five facilities for scientific investigations. Two of those facilities, one for materials science experiments and another used to grow protein crystals, were previously on board the STS-78/LMS flight for which Duque trained. ESA's three other research facilities will be used to investigate the effects of near-weightlessness on cell cultures, the solidification process in metals, and adsorption and surface tension phenomena.



ESA/Russia Cooperation Strengthened

Further steps towards closer cooperation between ESA and Russia were taken during the visit of ESA's Director General, Mr A. Rodotà to the Russian Space Agency (RKA) on 18-19 November 1997. Discussions centred around satellite navigation and the International Space Station. Two important agreements were also formalised.

On the morning of 18 November, Mr Rodotà and Mr G.E. Mamedov, Vice-Minister for Foreign Affairs of the Russian Federation, signed an additional customs clearance agreement providing for a larger band of special exemptions.

Signature of this agreement will immediately benefit the transfer of equipment already underway in the course of cooperation on the European Robotic Arm and the DMS-R (Data Management System for Russia) computers, the flight models of which were recently delivered to RSC Energia. These computers are to become the data-processing core of the Russian segment of the International Space Station: the service module where the crew will work and sleep during the Station assembly phase. This ESA project is being handled by the Agency's Directorate for Manned Spaceflight and Microgravity, working with teams from RKA.

The agreement will also facilitate the loan of equipment for research and experimental purposes and remove some significant obstacles to cooperation.

On the same day, Mr Rodotà and his Russian counterpart, Mr Yuri Koptev signed an agreement for a Russian Proton launcher to lift ESA's Integral satellite into space in 2001. This agreement assures a place for Russian astronomers in Integral's science team supervising the instrumental and astronomical aspects of the mission, and ends five years of study and negotiation which began when scientists and engineers were first defining Integral.



Hipparcos Pinpoints an Amazing Gamma-ray Clock

The position in the sky of the "silent" neutron star Geminga is now known to within about 10 millionths of a degree (0.04 arc-second) thanks to results from ESA's Hipparcos star-fixing satellite, according to a recent paper by Patrizia Caraveo (Milan) and colleagues.

Geminga is a unique object: a highly compressed, spinning neutron star which does not emit radio beeps like the well-known pulsars. Yet it is a powerful source of pulsating gamma-rays and X-rays. Geminga is probably the prototype of millions of radio-silent neutron stars in the Milky Way Galaxy.

Geminga rotates like a lighthouse, flashing a beam of gamma-rays and X-rays towards the Earth 252 times a minute. The first detection of pulsations in Geminga's emissions came from the German-US-UK Rosat X-ray satellite in 1992. NASA's Compton gamma-ray observatory detected the same pulses in gamma-rays and observed them for several years up to 1996. Re-examination of the gamma-ray counts for Geminga from NASA's SAS-2 satellite (1972-73) and ESA's COS-B satellite (1975-82) led to the detection of the same pulses retrospectively. Astronomers then had the tantalising prospect of reconstructing, from sporadic periods of observations, every tick of Geminga's clock over a period of 24 years, 1972-1996.

Positioning Geminga accurately enough was the remaining hurdle. The gamma-ray clock seems to run fast or slow depending on the Earth's motion in orbit. Each year at the end of March, the Earth and any attendant gamma-ray satellites are travelling towards Geminga in the constellation Gemini at about 30 kilometre per second. Geminga's timekeeping speeds up by 9 seconds a day. Six months later, on the other side of the Sun, the Earth is receding at the same speed, and Geminga's pulses seem slower by the same amount. To correct for this seasonal effect required the more exact position of Geminga provided by Hipparcos data.

Motions in Earth orbit of the SAS-2, COS-B and Compton spacecraft at the times of the intermittent gamma-ray observations also had to be taken into account. The

outcome is a coherent 24.2-year reconstruction of more than 3 billion rotations of Geminga.

Created by the collapse of the core of an exploding star about 300 000 years ago, Geminga has no renewable source of energy. Nevertheless, it is more luminous in its gamma-rays and X-rays than the Sun is by visible light. Interaction between the spinning neutron star and a surrounding magnetosphere of ionized gas powers the emissions by extracting energy from the rotation and slowing the star down. The new timings suggest that Geminga is like a watch that loses less than one microsecond a year. However, the rate of slowdown is increasing faster than expected by comparison with other young pulsars.

Another puzzle concerns a slight rhythmic change in the pulse-rate of Geminga, in a cycle of 5 years, seen most clearly in the recent Compton observations. While this could be a fluke due to errors in the rather sparse data, a physical explanation could be the presence of a planet with about twice the mass of the Earth orbiting around the neutron star every 5 years, and causing it to wobble.

Michael Perryman, ESA's project scientist for the Hipparcos mission, sees the multiplicity of instruments and wavelengths used in the Geminga study as an illustration of the overarching role of Hipparcos*:

"The results from Hipparcos provide a framework for every branch of astronomy and bring new precision to all of them," Perryman comments. "Hipparcos never saw Geminga, because it is far too faint. Yet when used to calibrate other observations in visible light, the Hipparcos and Tycho Catalogues** give a position for Geminga far more accurate than could ever be expected from the X-ray and gamma-ray observations alone. Similarly Hipparcos relates the entire Universe seen by radio and infrared telescopes to the local frame of bright stars."

The story will broaden into a hunt for other silent neutron stars like Geminga, using ESA's super-sensitive X-ray astronomy satellite XMM, due to be launched in 1999. Two years later XMM will be followed into orbit by Integral, ESA's successor to COS-B as a gamma-ray astronomy satellite of vastly enhanced performance.

Giovanni Bignami, Director for Science at the Agenzia Spaziale Italiana (ASI) in Rome, named Geminga in 1976 and has hunted it, along with his colleagues in Milan, for more than 20 years. (In the Milanese argot, 'ghèminga' means 'it's not there' and referred to Geminga's invisibility at radio wavelengths.)

"Geminga is a shining example of how multinational collaboration in astronomy pays off," Bignami says. "We in Europe have done very well out of ESA in space astronomy, and also in our collaborations in ground observatories. We have world-class facilities that none of our home countries could offer us on their own. While governments ponder ESA's future role in science they should sense the surge of excitement throughout Europe, as astronomers beat all expectations in using the superb opportunities that come from ESA membership."

* More information on Hipparcos can be found on the Web at
<http://astro.estec.esa.nl/Hipparcos>

** The Hipparcos and Tycho Catalogues (ESA SP-1200) are available from:
ESA Publications Division
fax +31 (0)71 565-5433 or
e-mail: fdezwaan@estec.esa.nl



ESOC Rescues NASDA Mission

ESA and the National Space Development Agency of Japan (NASDA) have a long history of cooperation in the field of ESA ground station support to Japanese missions. ETS 7 (Engineering Test Satellite 7) is the latest Japanese mission supported by the ESA network following its launch from the Tanegashima Space Centre by an H-II rocket on 27 November 1997.

The ETS 7 mission is aimed at preparing Japan for its role in the International Space Station. It will provide experience of the supply of goods and fuel to in-orbit spacecraft, and the assembly of structures in space. It also includes rendez-vous and docking technology and space robotics, which are especially relevant to unmanned missions.

ETS 7 comprises two satellites which were attached to each other during the Launch and Early Orbit Phase (LEOP) operations and separated after the commissioning phase for rendez-vous and docking experiments.

On 29 November, ETS 7 lost attitude and the solar panels were no longer oriented towards the Sun, preventing the batteries from being recharged. This would have meant the loss of the satellite within 6 hours.

At 24:00 GMT, NASDA called ESOC requesting emergency support from ESA's ground stations at Kourou (French Guiana) and Perth (Western Australia). At 01:50, the Kourou station was ready to support the upcoming pass. Earth-spacecraft contact was reestablished and shortly after the first acquisition of the spacecraft telemetry, NASDA could send the required commands to ETS 7 to acquire the correct attitude. At 04:39 GMT, the Japanese agency confirmed that the spacecraft was restabilised.

This particularly successful operation will be followed by an agreement between ESA and NASDA for the continuation of routine phase support of ETS 7 by the same two ESA stations into Spring 1998.



Telemedicine: from Sarajevo to Tirana

The partners involved in the first European pilot project for telemedicine via satellite met on 17 November 1997 at the Celio Military Polyclinic in Rome to take stock of the first results of a joint effort which has put hospitals in Italy and Bosnia in close contact with each other thanks to space applications.

In September 1996, with ESA's help, an innovative telemedicine network was activated to provide medical care services from two Italian hospitals (San Raffaele Hospital in Milan and the Celio Military Polyclinic in Rome) to the Italian Field Hospital involved in the peacekeeping mission in Sarajevo. Further support was given to the health care structure of the University Clinical Centre of Sarajevo.

The initiative, dubbed SHARED (Satellite Health Access for Remote Environment Demonstrator), exploited dedicated ground stations and satellite links to conduct medical consultations, online surgery mentoring and medical training between the three hospitals.

After a year of successful operation, the network, which uses ground terminals and satellite capacity provided by ESA, is now being extended to include the Hospital 'IDI' in Tirana, Albania.

Session of ophthalmic surgeon-training between Milan and Sarajevo



Based on an enhanced version of the DICE multi-point video conferencing system developed by European industry for ESA, the telemedicine satellite network combines video conferencing with real-time exchange between multimedia computers and medical peripherals of images such as X-rays, scans, pathology samples, etc. An additional feature is provided by an ISDN multi-point conference unit acting as a bridge between the satellite network and other hospitals connected to the terrestrial ISDN network.

The links between the hospitals are supported by up to four digital carriers of 384 kbit/s using capacity leased by ESA on the Eutelsat II-F4 satellite.

"We are very proud of having contributed to such a humanitarian project that helps bring space within closer reach of human beings in their everyday life" said ESA's Director General, Antonio Rodotà, at the presentation.

The SHARED project stems from cooperation between ESA (provider of the communication infrastructure), the Italian Space Agency (which funded the pilot projects, through ESA's ARTES programme), the Italian Ministry of Defence (responsible for system operations) and TelBios (a consortium involving the San Raffaele Hospital and Alenia Aerospazio which proposed and coordinated the project).



ESA and NASA Exchange Views on Future Cooperation

ESA's Director General, Antonio Rodotà and NASA's Administrator, Daniel Goldin, met at ESA Headquarters in Paris on 11 November 1997 to take stock of their ongoing collaborative ventures, to exchange views on the future of their respective agencies and to discuss further cooperation.

During their discussions, Mr Rodotà and Mr Goldin confirmed their commitment to closer relations aimed at enhancing the already strong cooperation between the two agencies.

The Director General outlined the strategic evolution underway which, in partnership with all of the Agency's Member States, will reinforce the development of space applications such as telecommunications, satellite navigation, Earth observation and Earth sciences. To this end, ESA will make every effort to bring together, in a coherent

and balanced way, all the potential of its Member States in terms of knowledge, expertise and resources so that Europe can become a stronger player in the applications field and an even stronger partner in international cooperation.

Further discussions included potential international cooperation on the exploration of Mars and the need for coordination of the various missions envisaged, in order to avoid duplication of effort. ESA has introduced the Mars Express mission into its recently restructured long-term science programme. This mission consists of an orbiter carrying a scientific payload and up to four mini-lander modules. The management plan for the mission was approved in November 1997 by ESA's Science Programme Committee. The mission itself is expected to be approved in November 1998 for launch in May/June 2003. A number of ESA Member States and NASA have expressed interest in supplying the landers and other elements of the mission.

Regarding the International Space Station (ISS), for which ESA/NASA cooperation is already well established, both Directors agreed it was vital to bring all partners together to establish ground rules on Station utilisation. They evaluated the joint efforts needed to make all potential users fully aware of the availability of the unique habitat for microgravity experiments, science, Earth observation and technology development.

ESA is a key partner in the ISS programme. Its major contributions consist of the Columbus Orbital Facility (COF), a multi-purpose scientific and technological laboratory module permanently attached to the core of the Space Station, and the Automated Transfer Vehicle (ATV), a cargo vessel to be launched by Ariane-5 for resupply missions. ESA will also be present in 16 of the 47 assembly flights needed to build the station over the period 1998-2003 with equipment contributing to this international endeavour.



Industrial Briefing

'Call for Outline Mission Proposals for Earth Watch Partnership'

The high interest of European industry in the new manner of working with ESA to serve Earth Observation user markets was reflected by the more than 100 representatives of European industry attending an ESA Industrial Briefing at ESTEC on 18 December 1997. The participants covered the range from small and medium size enterprises — particularly the Earth Observation data value-adding industry — to large aerospace companies.

The major objectives of the meeting were two-fold: firstly to inform industry about ESA's Earth Observation strategy and of the planning for the future ESA E.O. programme, and secondly, to answer questions concerning the 'Call for Outline Mission Proposals for Earth Watch Partnership'. This Call, issued by ESA in early December 1997, is the first major step by the Agency towards market- and applications-oriented Earth Observation missions to be undertaken in a partnership between industry, ESA and other entities such as the European Commission. The responses by industry, invited for February 1998, will not only contribute to the



preparation of major decisions concerning the future ESA E.O. programme, but will also form the basis for concrete Earth Watch missions to be implemented in the near future.



More than 100 representatives of European industry attended the ESA Industrial Briefing at ESTEC (NL)

Mercure Satellite Helps UNEP Link the World

On behalf of ESA's Director General and six of ESA's Member States, René Collette, ESA Director of Applications, formally handed over the Mercure satellite communications network to Prof. Reuben Olembo, Deputy Executive Director of the United Nations Environment Programme (UNEP) on 5 November 1997 in Geneva.

The ceremony took place in the presence of nearly 100 participants including delegates from the six contributing ESA Member States – Austria, Belgium, Norway, Spain, Switzerland, United Kingdom – as well as many UNO representatives and ambassadors from countries all over the world.

The satellite-based telecommunications network was donated to UNEP to help the United Nations' environmental effort fulfil its leadership role by providing the specialised agency with a global communications capability for the transfer and exchange of up-to-date, easily accessible environmental databases and archives of its many partners such as the Global Resource Information Database (GRID) and the Infoterra Global Environmental Information Exchange Network.

With its headquarters in Nairobi (Kenya) and offices scattered around the world, often in remote locations, UNEP can now depend on a reliable space-based system which will particularly benefit those countries that do not have sufficient telecommunications resources. UNEPnet (Internet) can now be accessed through the global Internet via the Mercure system

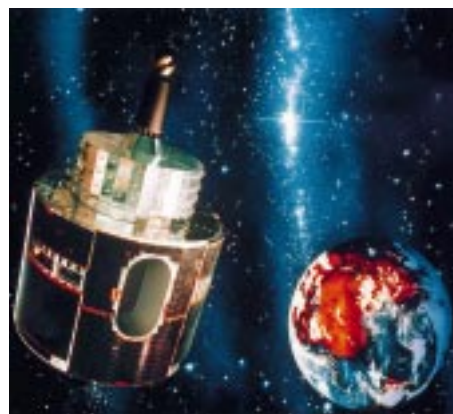
which will support a new communication culture both within UNEP and to its many external partners. The Mercure network will cut costs since it also supports the transfer of facsimile, e-mail and video transmission.

To cope with the implementation of the Mercure network, an international industrial team was set up by the six participating ESA Member States. As a follow-up to the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992, the European Space Agency was asked to manage the participating countries' contributions (11.75 MUC at 1992 economic conditions) and to coordinate efforts between UNEP, the industrial team and the network operator, the Swiss Telecom PTT.

The traffic hubs of the Mercure network are at the UNEP Headquarters and at the UNEP Regional Office for Europe in Geneva. The UNEP Regional Offices and UNEP-GRID centres in the western and eastern hemispheres will be served by Intelsat satellites located over the Atlantic Ocean and the Indian Ocean, respectively.

Mercure satellite dishes and facilities have been installed in 16 countries (Kenya, Bolivia, Cuba, Kazakhstan, Nepal, Bahrain, Mozambique, China, Thailand, Russian Federation, Costa Rica, Niger, Vietnam, Austria, Norway, Switzerland). Eleven other countries have already voiced their interest in hosting a station.

More information on the Mercure project is available at:
<http://www.estec.esa.nl/mercure>.



20 Years of Meteosat Achievement

On 24 November 1977, a gathering took place of many of the scientists, engineers and managers (right) who took Meteosat from an idea – conceived through long European debates and development phases – into operation.

With the seventh Meteosat now in orbit, they were able to look back on almost three decades of hard work and achievement:

- Meteosat-1 launched in November 1977
- Meteosat-2 in June 1981
- Meteosat 3 in June 1988
- Meteosat 4 in March 1989
- Meteosat-5 in March 1991
- Meteosat 6 in November 1993
- Meteosat 7 in September 1997

Since the launch of the first Meteosat, 20 years of imagery and derived meteorological data have helped to significantly improve weather forecasting. Direct benefits have been derived in the areas of air and marine transportation, as well as the construction, energy, retail, agriculture and leisure industries. Lives have also been saved through warning and early evacuation of populations threatened by hurricanes or other severe weather events.

ESA, which developed the Meteosat programme, and EUMETSAT, which now operates it, jointly hosted the event to commemorate more than 20 years of European achievement and cooperation. A ceremony was held at EUMETSAT Headquarters, followed by a visit to ESA's Operations Centre, ESOC in Darmstadt, Germany.



Mercure Governing Board meeting in Geneva



Many of Meteosat's scientists, engineers and managers gathered to commemorate more than 20 years of European achievement and cooperation

Departure of René Collette

René Collette, Director of Application Programmes, will be leaving the Agency at the end of March 1998, after 34 years of outstanding service.

Dr. Collette joined ESRO in November 1964 as a Principal Engineer in the former Large Astronomical Satellite Division. In June 1969 he was appointed to the post of Head of the Systems Studies Division and in 1970 to the post of Telecommunications Project Manager.

With the establishment of ESA, he became the Head of the Communications Systems Department. In this function, he was responsible for the development of the Orbital Test Satellite (OTS), Europe's first experimental telecommunications satellite; for the deployment of the European Communication Satellite series leased to EUTELSAT; and for the MARECS satellites leased to INMARSAT. He also supervised the development of the Olympus satellite.

At its December 1989 meeting, the ESA Council appointed Dr. Collette to the post of Director of Telecommunications Programmes. During this time Artemis, with its novel optical communications capabilities, was developed, including a cooperative venture with Japan, and GNSS 1 and GNSS 2 were promoted in the field of navigation.

In April 1997, Dr. Collette was entrusted with managing the new Directorate of Applications. He concentrated his most recent efforts on the consolidation of the METOP Programme.

René Collette has made a great and lasting contribution to ESA. He has always demonstrated a profound dedication to Europe and the Agency, its objectives and its Staff. His expertise and international experience have been recognised by his peers in all of the sectors for which he was responsible.



ESA 2000

The travelling 'ESA 2000' space science exhibition is coming to the end of its six months' tour of Berlin, Germany. The popular attraction has sparked public interest in the domains of science and culture.

The exhibition was first opened on 13 August 1997 at the Förster-Sternwarte by Dr F. Jansen, ESA consultant for the exhibition and astrophysicist at the Astrophysical Institute of Potsdam (D). His opening speech centred on ESA's space science satellites of the past, present and future. The exhibition was one of the main highlights during the institute's 50th anniversary celebration which peaked on 22 October with visits by Ms I. Stahmer, Berlin Senator for Schools, Youth and Sport, and well-known figures from the areas of science, culture and politics.

On 5 November the exhibition opened at the most popular astronomical institution in Germany, the Archenhold-Sternwarte. The 101 year old Sternwarte welcomed Prof J. Ortner, Chairman of the Austrian Space Agency, to give the opening speech entitled, 'The Space Science Programme of ESA'. Additionally, the brochure 'ESA 2000' (BR-118) which contains many panel photos of Huygens, SOHO, ISO, HST and Ulysses and their results, was introduced to the public.

The Berlin-based exhibition will close following the 'Lange Nacht der Museen in Berlin' (Long night of Berlin museums) on 14 February. During the event, the city of Berlin provides shuttles for visitors to travel between all of its famous museums for the entire night. The Archenhold-Sternwarte, as part of ESA 2000 will host an astronaut food shop and provide telescopes for viewing the night skies.

During its stay in Berlin, ESA 2000 will have attracted approximately 40 000 visitors of all age groups.



Top right: The Archenhold-Sternwarte in Berlin, host of the ESA 2000 exhibition since November 1997.

Centre: Celebrating the success of ESA 2000 are (left to right): Prof. J. Ortner, Chairman of the Austrian Space Agency; F. Jansen, of the Astrophysical Institute of Potsdam; Prof. D.B. Hermann, Director of the Archenhold-Sternwarte and the Zeiss-Großplanetarium

Right: Part of the ESA 2000 exhibition

(Photos courtesy of M. Arndt)



ESA Hands Over Ariane-5 Launch Complex

On 25 November 1997 in Kourou, French Guiana, Mr Fredrik Engström, ESA Director of Launchers, Mr Michel Courtois, Deputy Director-General of CNES and Mr Jean-Marie Luton, Chairman of Arianespace, signed a document formally handing over Ariane launch complex ELA-3 from ESA to Arianespace. (see photo insert)

Representing an investment of some 800 million ECU, ELA-3 is by far the largest installation built by ESA under the Ariane-5 development programme. CNES was responsible for its design, construction and operation during cryogenic main stage testing and the first two qualification flights, in its capacity as prime contractor for the development of the Ariane-5 launcher and launch facilities. Arianespace will now take over responsibility for ELA-3 operations

including launcher integration and launch operations, final payload preparation, management and maintenance of facilities, insurance, safety, and quality control, in addition to the similar responsibilities it has discharged since 1986 for the ELA-2 complex dedicated to Ariane-4.

Preparations for the hand-over of ELA-3 management responsibility to Arianespace had been under way for some years, with the progressive integration of Arianespace engineers and technicians into the CNES teams to ensure that personnel training was properly completed following execution of the first two Ariane-5 qualification flights. Particular attention has been paid to the industrial set-up in order to secure a coherent and optimised structure meeting ELA-2 and ELA-3 operations and maintenance requirements. To that end, Arianespace is contracting the same European companies which have hitherto been working under CNES

contracts. Twelve firms (from Belgium, France, Germany, Italy and Spain) provide some 250 specialists under operations and maintenance contracts for the fluids and mechanical systems, computerised checkout systems, power supply and air conditioning.

Arianespace also draws on the Guiana Space Centre's support services for Ariane-5 launch campaigns, on the same basis as for Ariane-4 launches. These support activities, managed by CNES on behalf of ESA with European contractors, include coordination of overall launch range operations, ground and inflight safety, tracking and telemetry stations, meteorology, telecommunications, operations and maintenance for payload preparation facilities and logistical facilities.

More information on the Ariane-5 ground facilities can be found at <http://www.esa.int>



Photo insert (left to right) M. Courtois, Deputy Director-General of CNES; F. Engström, ESA Director of Launchers; J-M. Luton, Chairman of Arianespace

Ultraviolet Astrophysics Beyond the IUE Final Archive

Sevilla, Spain: 11-14 November 1997

This conference, which was co-sponsored by ESA, NASA, PPARC, SEA and EAS, marked the completion of the International Ultraviolet Explorer Project (IUE) and its Archive production phase. The conference brought together, for the last time, the broad astrophysical community which has, over a period of 18 years (1978-1996), used the IUE spacecraft efficiently and productively (3435 refereed publications, based on data obtained with IUE, have appeared in the professional literature). The conference was attended by 170 participants from 16 countries, who discussed and highlighted the many ways in which the results obtained with IUE have completely revised our ideas on e.g. comets, stellar evolution, galactic haloes, the power sources possibly associated with massive black holes in the nuclei of active galaxies, and many other areas of astrophysics. Two other important aspects were also addressed extensively during the conference:

- The first was the formal presentation, by the Project, of the IUE Final Archive (IUEFA) together with the INES system developed by ESA. It combines a more advanced extraction of the 110 000 spectra of IUE, for convenient direct application of the IUE data to scientific analysis, with a completely redesigned access system. The INES system, with its modernised and distributed data retrieval, is based on the active participation of the National Hosts (currently 28) to allow world-wide access to the IUE data. It is expected to assure the long term availability of the invaluable IUE archival data in an economic way.
- The second issue, which was extensively discussed in an open forum, was the limited number of opportunities foreseen in the programmes of the major space agencies for continued capabilities of the type which had been supplied by IUE. This is not only important for the clarification of the new astrophysical problems raised by the IUE observations, since at least some of these can be expected to be addressed through new observations with the existing ultraviolet capabilities of the Hubble Space Telescope. It is



The Mayor of Sevilla, Mrs. Soledad Becerril Bustamante (centre), together with the IUE Project Scientists, Willem Wamsteker (ESA, right) and Yoji Kondo (NASA, left) during the official presentation of the Organising Committee in the City Hall

also very important to provide flexible access to the ultraviolet domain, at sufficient sensitivity that observing capabilities will be available to support, in the future, the serendipitous science which is an essential part of observational astrophysics, especially in a Universe where many dynamic phenomena show important multi-wavelength characteristics.

These concerns were addressed in the context of a World Space Observatory, since it was realised that the needs for such a facility extend well beyond the defined programmes of the major space agencies, and the scientific requirements to support such capabilities are possibly

more efficiently addressed in a broader forum than provided by the individual agencies. To assure that this important issue would be addressed in the future, a working group was formed from the participants, to analyse and present the scientific justification in more detail, with all its multi-disciplinary implications, and to identify new ways of ensuring that the UV domain will not be an area where astronomers are unable to make essential observations.

The Proceedings of the conference will be published as ESA SP-413 (February, 1998).



Director General Visits Bavaria

On 8 December 1997, ESA's Director General, Mr A. Rodotà visited the Bavarian Government as well as the top management of MAN Technologie. He also attended a reception given by Mr Edmund Stoiber, Head of the Bavarian Government, in the Kaisersaal of the Munich Residenz, where the ESA Council at Ministerial Level took place in November 1991. The following day he met with Mr Otto Wiesheu, Minister of State for Economy, Transport and Technology and with Mr Rudolf Rupprecht, Chairman of the Board of MAN to discuss space-related activities.



Mr Antonio Rodotà (left) with Mr Edmund Stoiber (right) Head of the Bavarian Government and Mr Horst Rauck (centre) of MAN Technologie

Huygens, Alive and Well

Tests carried out on 23 October 1997 by ESA's Space Operations Centre (ESOC) confirmed that ESA's Huygens probe is in excellent condition, following its launch on 15 October aboard NASA's Cassini spacecraft. The dual Cassini-Huygens mission is now en route for Saturn, by way of Venus. In 2004, Huygens will plunge into the atmosphere of Saturn's enigmatic moon Titan.

ESOC established connection with the Huygens probe at 10:09 CET using NASA's link to Cassini. Thanks to ESOC's new flight operations system, engineers and scientists responsible for the mission were quickly able to check that Huygens is alive and well in all respects.

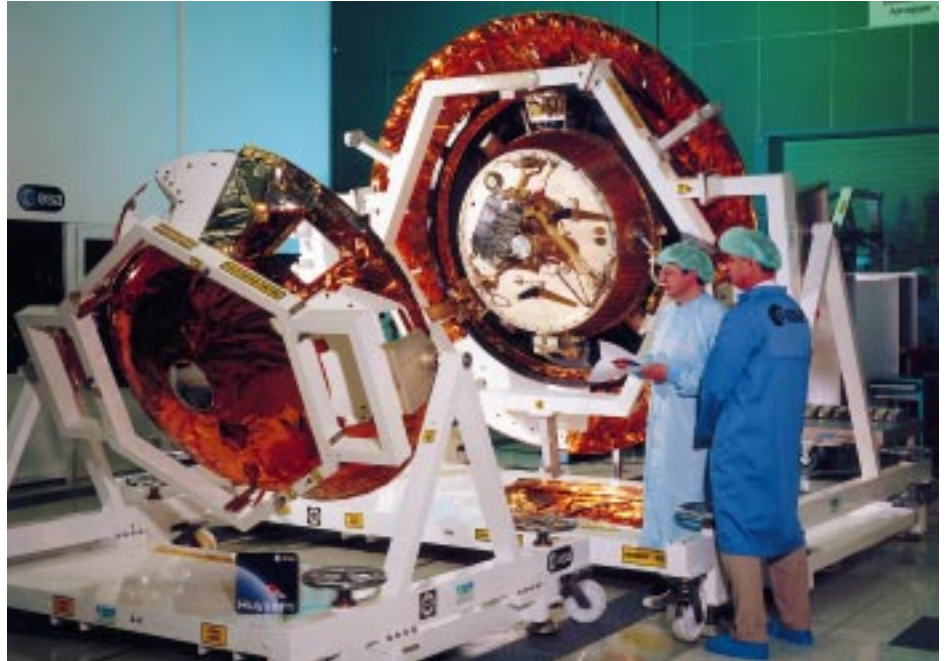
ESA's project management team and representatives of the contractors who built Huygens were able to report that the engineering system and subsystems are all performing nominally.

The Principal Investigators from Europe and the USA in charge of the six instruments on Huygens were also present for the experiment functionality test:

- HASI to analyse Titan's atmosphere and weather
- DWE to measure wind speeds during the descent
- GCMS to analyse chemical compounds on Titan
- ACP to break down aerosols for chemical analysis

- DISR to produce images and spectra of Titan
- SSP to determine the nature of Titan's surface.

"Six experiments, six green lights", reported Jean-Pierre Lebreton, ESA's Huygens Project Scientist.



29 June - 10 July 1998, Strasbourg, France

Space Techniques for Environmental Risks (STER):

Land Surface Use and Urban Issues

A European Commission DG-XII Environment and Climate Programme Advanced Study Course, organised by the International Space University.

This course is designed to educate young European scientists, engineers and graduate students from different backgrounds in the use of satellite-derived information for assessing and dealing with environmental risks, especially relating to land surface use and urban issues.

Deadline for applications: 30 April 1998

Advanced Study Course organiser:

Prof. Michael Rycroft
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