In Brief

ESA Signs Materials Science Laboratory Contract

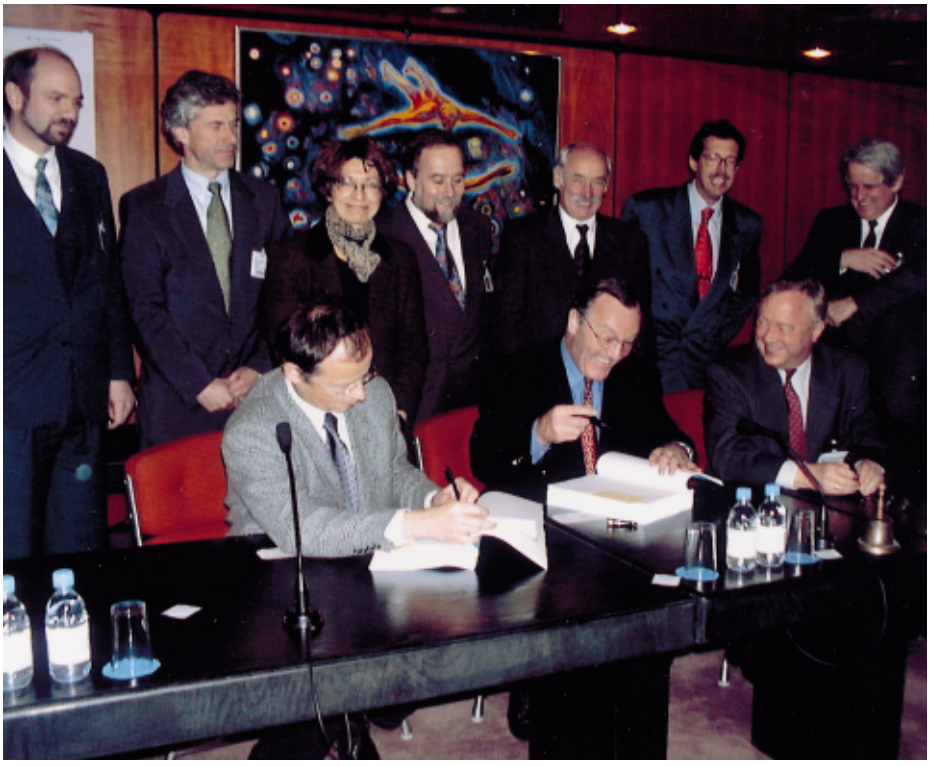
The contract for the development and delivery of ESA's Materials Science Laboratory (MSL) for the International Space Station was signed on 24 November 1998 at ESA Headquarters by Mr J. Feustel-Büechl, ESA Director of Manned Space Flight and Microgravity, and Drs S. Graul and E. Wolff for the MSL prime contractor Dornier GmbH.

MSL is a multi-user facility being developed under ESA's Microgravity Facilities for Columbus (MFC) Programme. MSL is mainly intended to support high temperature research in the fields of metallurgy, crystal growth, and thermophysical properties measurement. The high degree of modularity and flexibility of MSL, as well as the wide range of advanced diagnostics including the measurement of Seebeck voltages and sample resistance as an adaptation from the highly successful French Mephisto programme, have led to a cooperative agreement between NASA and ESA for the utilisation of MSL.

As part of the NASA-ESA cooperation, MSL will be integrated into the first Materials Science Research Rack (MSRR-1) provided by NASA and will be accommodated in the US laboratory of the Space Station. Both Europe and NASA will each be allocated 50% of experiment resources for the utilisation of MSL. The cooperation agreement, initially limited to two years, is expected to be extended for an on-orbit period of five years.

One novel feature of MSL is the possibility to exchange 'Furnace Inserts' in orbit. A Furnace Insert is an arrangement of heating and cooling zones specifically adapted to certain groups of experiments. The flexibility offered by this capability is further enhanced by the possibility to mount experiment-dedicated electronics in MSL. At present, ESA intends to include two Furnace Inserts in the MSL development, namely the Low Gradient Furnace (LGF) and the Solidification and Quenching Furnace (SQF). NASA will also develop two Furnace Inserts called the Quench Module Insert (QMI) and the Diffusion Module Insert (DMI). Additional Furnace Inserts are under consideration by NASA as well as by European agencies, such as the Floating Zone Furnace with Rotating Magnetic Field (FMF) currently planned by the German Space Agency.

The industrial consortium led by Dornier GmbH includes fourteen subcontractors: SEP (F) with support by Soterem (F), Ratier-Figeac (F) and Mechanex (CH); Threde (D) with support by ETEL (CH), EREMS (F) and Kayser Italia (I); DASA-DSS (D), Verhaert (B), Ferrari (I), HTS (CH), the University of Freiberg (D), and ARDE (US) as a specialised supplier. esa



MSL contract signing at ESA HQ on 24 November 1998. Seated from left to right: Dr S. Gaul, Dornier GmbH; Mr J. Feustel-Büechl, ESA Director of Manned Spaceflight and Microgravity; Dr E. Wolff, Dornier GmbH

‘Unity’ Joins ‘Zarya’

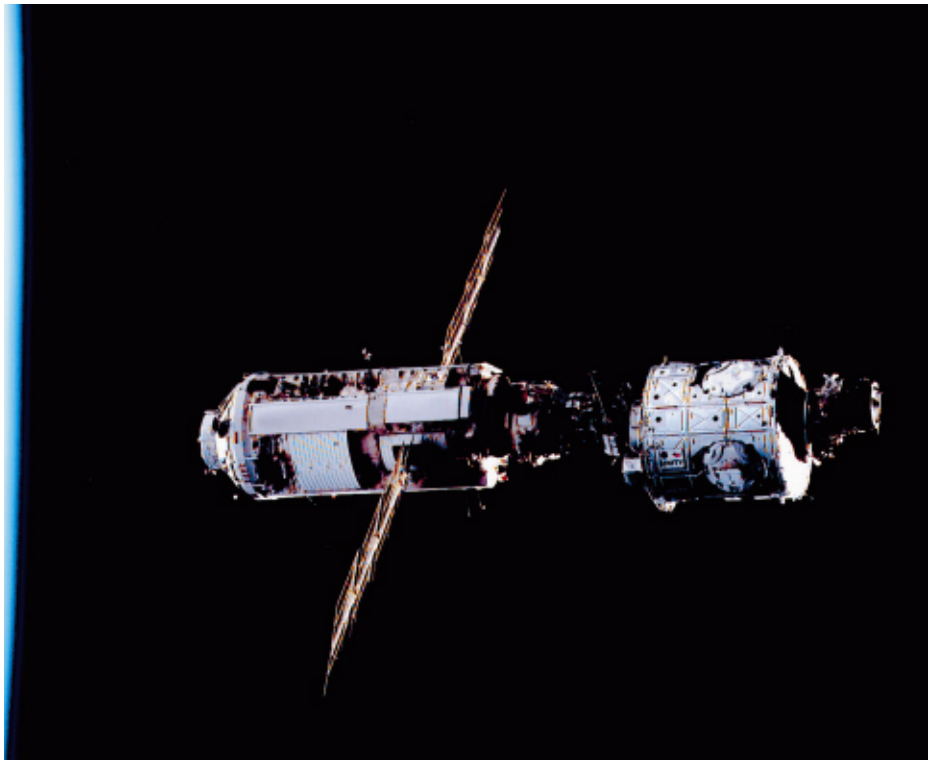
Unity, the second element of the new International Space Station (ISS), was launched on Friday 4 December aboard the Space Shuttle Endeavour from the Kennedy Space Center in Florida, less than two weeks after the first element, Zarya, was placed in orbit by a Russian Proton launcher from the Baikonur Cosmodrome in Kazakhstan (on 20 November 1998).

In a historic moment, Mission Commander Robert Cabana and Russian Cosmonaut/Mission Specialist Sergei Krikalev swung open the hatch between Endeavour and the first element of the ISS on 10 December 1998. The STS-88 astronauts completed the first steps in the orbital construction of the ISS by connecting Zarya and Unity during three space walks totalling 21 hours and 22 minutes. The US-made connecting module, Unity, has six docking ports and will serve as the basic building block to which all future US modules will be attached. Krikalev will return to the Space Station in early 2000 when the first of three crews moves into the new station.

In all, more than 100 elements totalling 460 tonnes of structures, modules, equipment and supplies will be assembled during 45 missions by the year 2004. Europe, as one of the five Partners (together with the United States, Russia, Japan and Canada), will take part in 19 of the 45 planned assembly flights. In addition to supplying technical and scientific equipment, ESA is contributing two major elements: the multi-purpose Columbus laboratory and the Automated Transfer Vehicle – a vehicle to be launched by Ariane-5 to transport supplies to the ISS.

For further information, visit:
http:/www.estec.esa.nl/spaceflight esa

Astronaut James Newman on the Shuttle’s Remote Manipulator System arm whilst deploying an antenna on Zarya (courtesy NASA)



The mated Zarya (left) and Unity (right) modules backdropped against the blackness of space over Earth’s horizon (left edge of photo) shortly after undocking from Endeavour’s cargo bay (courtesy NASA)

Announcement of Opportunity for Technology

As a trial case for testing new ways of ESA-industry partnerships in technology, an 'Announcement of Opportunity for Technology' was issued and evaluated during the 3rd quarter of 1998. The objective set for this AO was to solicit European companies to propose technological developments of near-to-market space products of their own choice, in order to gain a better positioning with respect to worldwide competition. Focusing on small- and medium-sized enterprises (SMEs) and equipment suppliers, companies usually associated with a role as European prime-contractor were excluded from this Announcement of Opportunity.

The overall budget amounted to 2.5 million ECU, of which 20% was reserved for SMEs. ESA's contribution was limited to 150 000 ECU per proposal, to be complemented by company co-funding at least equal to the ESA contribution. In response to this AO, 55 companies submitted 75 proposals, from which 21 proposals were selected for contract award. A second AO is currently planned for 1999.

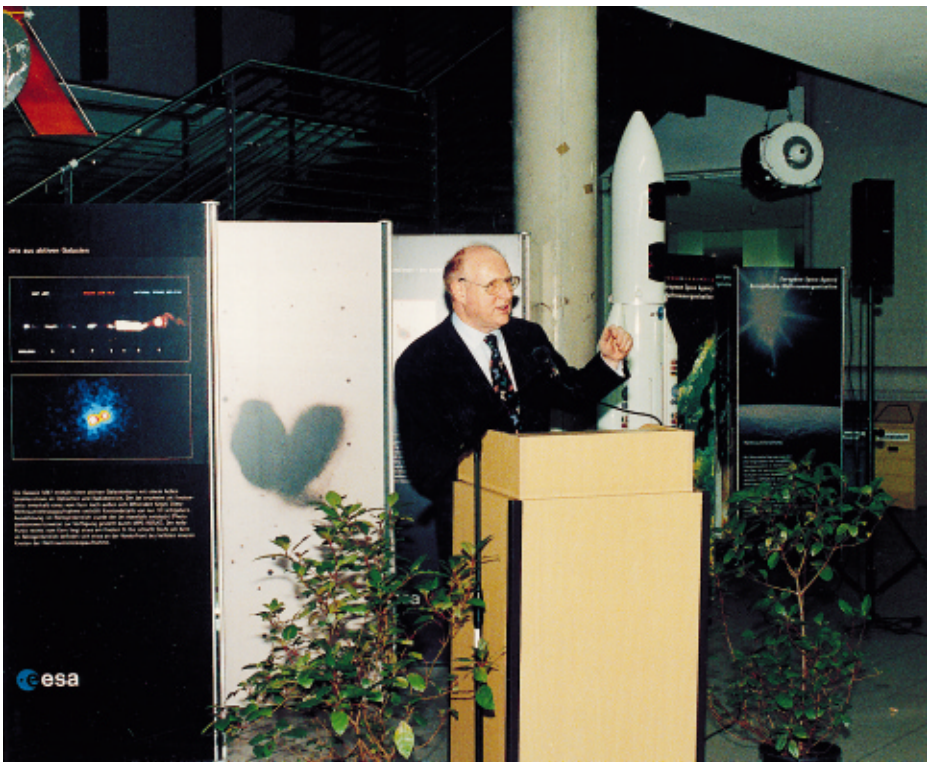
Kick-off of the first contract awarded under the 'Announcement of Opportunity for Technology' at ESTEC. Seated from left to right: M. Stanghini, Operating Marketing Manager for FIAR Space; H. Kappler, ESA's Director of Industrial Matters and Technology Programmes; N.E. Jensen, Head of ESA Technology & Systems Studies Department. Standing from left to right: P. de Boer, ESA Contracts Department ; F. Ronchi and L. Nebuloni, FIAR Space; and S. Benetti, ESA Contracts Department

ESA 2000 Exhibition Opens in Jena

On 4 November 1998, Dr. Martin Huber, Head of ESA's Space Science Department and Prof. Georg Machnik, Rector of the University of Jena, opened the 'ESA 2000' space science exhibition in the foyer of the Friedrich-Schiller University Jena in Thuringia, Germany. Following the opening ceremony, Dr. Frank Jansen, from the Astrophysical Institute of Potsdam, Germany and ESA's consultant for the exhibition, invited the visitors to a tour of the numerous stands and models depicting Europe's past, present and future space endeavours.

ESA 2000 was opened in Jena during the celebration week '450 Jahre Hohe Schule Jena, 1548-1998'. In his opening address, Dr. Bernard Vogel, Prime Minister of the Federal State of Thuringia, recounted Jena's colourful intellectual and political history during the last 450 years.

ESA 2000 will be on display at the following locations during 1999: Planetarium Bochum, Deutsche Roentgen Museum Remscheid, Wissenschafts-zentrum Bonn, and Zeiss-Grossplanetarium Berlin.



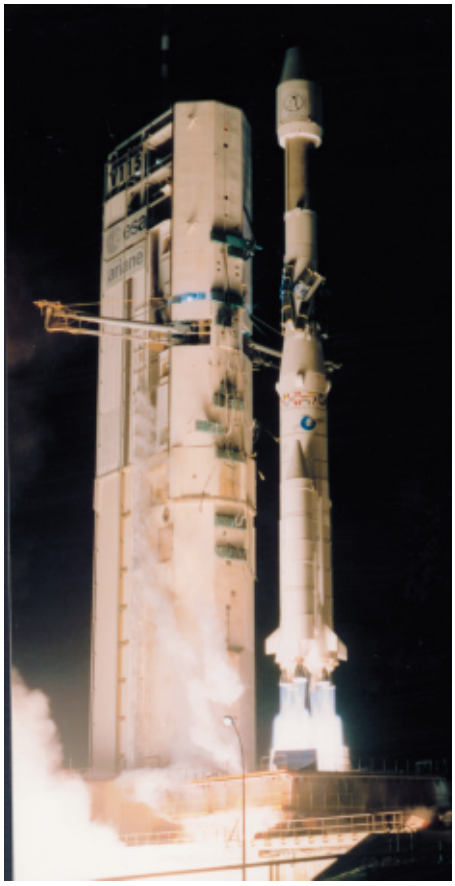
Martin Huber, Head of ESA's Space Science Department, during the opening ceremony for 'ESA 2000' in Jena (photo: P. Scheere)

Ariane Launches V114 & V115

The 114th Ariane launch (V114) took place successfully on Saturday 5 December 1998. An Ariane 42L launcher (equipped with 2 liquid strap-on boosters) lifting-off from the Guiana Space Centre – the European spaceport in Kourou, French Guiana – placed into orbit the Mexican telecommunications satellite SATMEX 5. The satellite will provide telecommunications services from Canada to Tierra del Fuego, Argentina.

The 115th Ariane launch (V115) followed on Monday 21 December. The same type launcher placed the direct-to-home television services satellite PAS 6B into geostationary transfer orbit. The spacecraft separated from the launch vehicle 21 minutes into the flight. Satellite controllers in Sydney, Australia, received the first signals 67 minutes after launch, confirming normal operation. With 32 active Ku-band transponders, PAS-6B is planned to provide direct-to-home television services for 15 years for South America from its orbital slot of 43 deg W longitude. It is one of the most powerful satellites in PanAmSat's fleet with 10 kW total power. Three more PAS launches are scheduled in 1999. esa

The PAS-6B satellite being readied for launch in Kourou



Flight V115: an Ariane 42L launcher takes to the skies on 21 December at 22:08 from Europe's spaceport in Kourou carrying the PanAmSat PAS 6B satellite.

Scientific Research Opportunities with Meteosat Second Generation

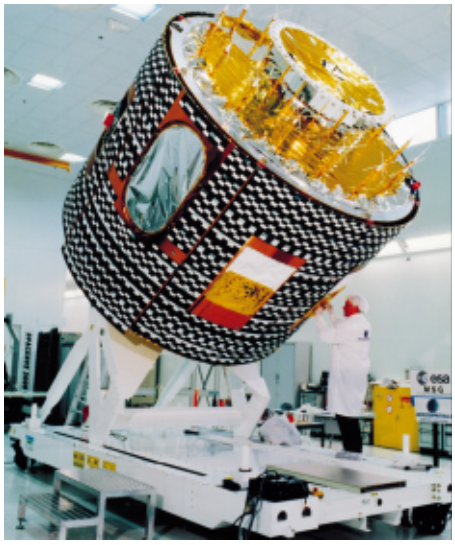
At the beginning of February this year, ESA and the European Organisation for the Exploitation of Meteorological Satellites (Eumetsat) jointly opened a Research Announcement of Opportunity (RAO) for the scientific use of data from the Meteosat Second Generation (MSG) satellite system.

MSG is a meteorological geostationary satellite system developed by ESA and Eumetsat, the latter representing the European operational meteorological user community. The programme foresees a series of three satellites providing observations over a period of at least 12 years following the launch of the first satellite, MSG-1, planned for October 2000 on an Ariane launcher.

The main instrument of MSG, the SEVIRI imager, will provide about ten times more information than current Meteosat satellites. It will offer new and, in some cases, unique capabilities to characterise clouds, surfaces and the stability of the lower atmosphere, with improved thermal infra-red calibration and radiometric performances. MSG will also carry a Geostationary Earth Radiation Budget (GERB) instrument that will observe the radiative fluxes reflected and emitted by the Earth.

The objective of the joint RAO is to demonstrate the capability of the MSG system to foster innovative research in areas such as hydrology and land surface processes, atmospheric, oceanographic and climate research. This Announcement will also trigger the demonstration of innovative MSG products beyond traditional imagery and weather forecasts, by European and African users, and will contribute to improved calibration and validation.

The selected investigators will be invited to present their results in workshops or conferences jointly organised by Eumetsat and ESA. The first workshop will take place in mid 2000, i.e. before the launch of the first satellite, in order to present the research plans and coordinate the work.



The Research Announcement of Opportunity is coordinated entirely through electronic means. Proposals for research will be collected via an Internet server operated by ESA under the web address <http://msg.esa-ao.org>. esa

Le septième cours d'été de 1'ECSL: Brest 1998

Partie intégrante de la mission de développement de la connaissance du droit de l'espace que l'ECSL s'est fixé voici déjà neuf ans, le cours d'été de l'ECSL* s'est tenu cette année à Brest, dans l'enceinte de l'Université de Bretagne Occidentale.

Pour sa septième édition, le cours d'été de l'ECSL a, une fois encore, réuni dans un même forum une quarantaine d'étudiants en provenance dix neuf universités réparties sur les territoires de huit Etats membres, ainsi qu'une vingtaine d'enseignants issus des milieux académiques, de l'industrie et d'organisations internationales, parmi lesquelles figure bien sûr l'Agence.

Au fil de deux semaines de cours intensifs, les étudiants ont été initiés aux multiples domaines du droit de l'espace et des activités spatiales.

Comme chaque année, afin de garantir une cohérence de l'enseignement dispensé, les cours ont été répartis en cinq modules dont le contenu se définit comme suit:

- Tout d'abord, une introduction se concentrant sur les Traités et Principes des Nations Unies relatifs à l'espace extra-atmosphérique. Les autres sources du droit de l'espace, telles les législations nationales, font aussi partie de ce module.
- Les télécommunications font, quant à elles, l'objet d'une double analyse:

Premièrement, une analyse institutionnelle comprenant une étude du rôle de l'ITU, ainsi que celle du phénomène de privatisation des organisations internationales de télécommunications comme Inmarsat ou Intelsat.

Deuxièmement, une étude des problèmes juridiques découlant de la mise en oeuvre des dernières évolutions en matière de distributions de programmes télévisés.

- L'ESA se voit également consacré un module. Son histoire, sa politique industrielle, sa structure et son mode de fonctionnement, ses activités de lancement, les pratiques et procédures d'approvisionnement, ainsi que ses relations avec la Communauté Européenne font l'objet d'autant de cours donnés par des membres du personnel de l'Agence.
- Le troisième module aborde les questions liées à la coopération internationale dans le domaine des activités spatiales, notamment au niveau de la station spatiale internationale.
- Enfin, un dernier groupe de cours s'intéresse aux conséquences de la commercialisation des activités spatiales ainsi qu'aux nouvelles initiatives dans le domaine. Ce module couvre des domaines aussi variés que les assurances, la télédétection, la navigation par satellite ou encore le règlement des litiges.

Outre cet ensemble de cours, les étudiants se sont également vus soumettre un cas pratique relatif à une appropriation indirecte d'une orbite moyenne via la mise en oeuvre du droit des brevets. Répartis en groupes de travail chargés de défendre chacun un intérêt particulier, les étudiants ont été amenés à faire valoir leurs points de vue à l'occasion d'une simulation de conférence internationale qui clôtura le programme académique.

Les loisirs n'ont pas été oubliés. Les organisateurs ont émaillé le séjour d'intermèdes tant culturels que ludiques. Ainsi, les étudiants se sont vus proposés, entre autres, une visite du musée des télécommunications de Plomeur-Boudou, une randonnée à cheval et une croisière au son du bignou... De quoi satisfaire les goûts les plus éclectiques.

T. Herman
ECSL Executive Secretary
esa

*H. Tuinder, "Europe's First Space Law and Policy Summer Course", ESA Bulletin 73, 1993, pp. 77-79
V. Kayser & R. Roelandt, "The ECSL Summer Course on Space Law and Policy - An Example of ESA's Role in Space Law Teaching", ESA Bulletin 81, 1995, pp. 59-62

The Earth Explorer Missions – Further Evolutions

Introduction
For the post 2000 era, two general classes of mission are being proposed by the Agency:

- Earth Explorer Missions: research/demonstration missions with the emphasis on advancing understanding of the different Earth system processes. The demonstration of specific new observing techniques would also fall under this category.
- Earth Watch Missions: pre-operational missions addressing the requirements of specific Earth observation application areas. The responsibility for this type of mission would eventually be transferred to operational (European) entities and the private sector.

Within this overall context two complementary types of Earth Explorer Missions are envisaged, namely:

- Earth Explorer Core Missions: larger research/demonstration missions led by ESA
- Earth Explorer Opportunity Missions: smaller research/demonstration missions not necessarily ESA led.

This article is concerned with both types of *Earth Explorer Missions* and specifically with developments since the Granada User Consultation Meeting in May 1996 after which four candidate *Earth Explorer Core Missions* were selected for Phase-A study.

More information on the nature of these missions and the scientific context of the Earth Explorer element of the Agency's *Living Planet Programme* can be found in ESA SP-1227 ("*Earth Explorers: The Science and Research Element of ESA's Living Planet Programme*") published in October 1998.

The Earth Explorer Core Missions
The four candidate *Earth Explorer Core Missions* selected for Phase-A study after the Granada User Consultation Meeting were as follows (not in any order of priority):

(a) *A Land-Surface Processes and Interactions Mission* – intended to observe surface characteristics associated with land-surface processes and land/atmosphere interactions at local scales; to advance the understanding of these interactions on a global scale by extrapolating through space and time using process models; to enhance the capability to model and hence to advance the capability to manage our environment and its resources.

(b) *A Gravity Field and Steady-State Ocean Circulation Mission* – intended to advance work in the areas of steady-state ocean circulation, physics of the Earth's interior and levelling systems (based on GPS); to provide the unique data set required to formulate global and regional models of the Earth's gravity field and the geoid (its reference equipotential surface) to high spatial resolution and accuracy.

(c) *An Atmospheric Dynamics Mission* – intended to contribute to the correction of a major deficiency in the current (meteorological) operational observing network as well as the study of the Earth's global energy balance (i.e. global circulation and related features such as the El Niño and the Southern Oscillation); to provide global observations of three-dimensional wind fields.

(d) *An Earth Radiation Mission* – intended to advance the understanding of radiative processes in maintaining the present climate and in governing the amplitude and evolution of large-scale climate anomalies; to provide global observations of cloud and aerosol fields (including both characteristics and distribution in the vertical) coupled with observations of radiative fields in synergy with other data.

Phase-A studies in support of each of these candidate *Earth Explorer Core Missions* have been initiated and Mission Advisory Groups have been set up to produce Reports for Mission Selection.

The four Phase-A studies are scheduled to be completed later this year and the four Reports for Mission Selection should be available in August 1999. These Reports will not only summarise the results of the Phase-A studies but will also contain updated (relative to the Reports for Assessment: ESA SP-1196/Vols. 1-9) scientific arguments in support of the four missions. The latter will include the results of various scientific studies initiated in support of the four missions as well as other relevant scientific developments.

The Reports will be presented to the scientific community during a Consultative Workshop which will be held in Granada, Spain, on 12 to 14 October 1999. This Workshop is open to the whole research community and will largely follow the format of 'Granada I'. Each of the four missions will be presented in turn and, in addition to seeking clarifications, participants will be invited to comment on the strengths and weaknesses of the four candidate missions. More information on arrangements for this meeting (including registration) can be found on the Agency's Earth Explorer web site

<http://www.estec.esa.nl/explorer/>.

Following this meeting, the evaluation of the four missions will be initiated under the auspices of the Earth Sciences Advisory Committee (ESAC). It will be this Committee's responsibility to decide on behalf of the scientific community which two of the four missions to recommend for full implementation to the Programme Board for Earth Observation.

The Earth Explorer Opportunity Missions

On Monday 13 July 1998, the first Call for Proposals for *Earth Explorer Opportunity Missions* was issued for small missions intended to conduct research in the field of Earth Observation and/or to demonstrate the potential of new innovative Earth Observation observational techniques/ technologies of relevance to both the scientific and the applications communities. The deadline for submissions was 1 December 1998.

In response, some 27 Full Proposals were received. These are currently being evaluated scientifically and technically under the auspices of the Earth Sciences Advisory Committee (ESAC). The Committee is scheduled to complete its deliberations and submit its findings, coupled with specific recommendations on which proposals to implement, early in April 1999.

As far as research is concerned, proposals may contribute to any of the objectives underlying the Earth Explorer element of the Agency's *Living Planet Programme* (ESA SP-1227). These are organised under four themes, namely:

- Theme 1 - Earth Interior
- Theme 2 - Physical Climate
- Theme 3 - Geosphere/Biosphere
- Theme 4 - Atmosphere and Marine Environment: Anthropogenic Impact

Furthermore, for the purposes of this Call, proposals could be for small missions fully funded and led by ESA, for co-operative ESA-led missions with other space entities, or for instrument or other provisions to the programme of another space entity. All were acceptable and all could include the demonstration of techniques/ technologies as well as research. More information may be found in ESA SP-1226, *The Living Planet Programme: Earth Explorers: Call for Earth Explorer Opportunity Missions,* or on the Agency's Earth Explorer web site

<http://www.estec.esa.nl/explorer/>.

All of the ESA SP's referenced above can be purchased from ESA Publications Division: see order form inside back cover or visit the Publication's Bookshop website *<http://esapub.esa.int>*

Alpbach Summer School 1998

The Alpbach Summer School 1998, co-organised by the Austrian Federal Ministry for Science and Transport, the Austrian Space Agency, ESA and the national space authorities of its Member States, was successfully held from 21-30 July 1998.

51 students from Austria, the Czech Republic, France, Germany, Ireland, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom and Australia converged on Alpbach (A) to learn more about Planet Earth and further develop their space-related studies. The aim of the Summer School is to offer advanced training and working experience to European students, on a subject which is not usually part of the academic curricula, in an atmosphere conducive to informal discussions between lecturers, tutors and students.

The topic for 1998 'Our Solid and Liquid Planet' was concerned with the application of satellites for an improved understanding of the Earth/atmosphere system and for monitoring the global environment. For careful management of the Earth's biological, fossil and mineral resources, and in order to preserve the long-term habitability of our planet, it is necessary to understand the complex processes of the Earth system. Earth observation from space is an important way to provide key data for these tasks.

20 lecturers from among the ESA Member States provided an overview of the wide range of satellite applications. Two specific application areas were covered in detail:

- The global energy and water cycle
- The dynamics of the solid Earth.

The Alpbach Summer School students were challenged to design future satellite missions for these two applications, which they brilliantly accomplished, presenting the following mission studies at the end of the session:

- SPLASH (Satellite System for Processes in Land Surface Hydrology)
- DEMETER (Deep Earth Measurement Through Extreme Resolution Gravity Gradiometry)
- GRANDMA (Gravity and Magnetometry).

The study results demonstrate the serious enthusiasm of the students in the field of aerospace sciences and will most likely prove to be the backbone of many future space science missions.

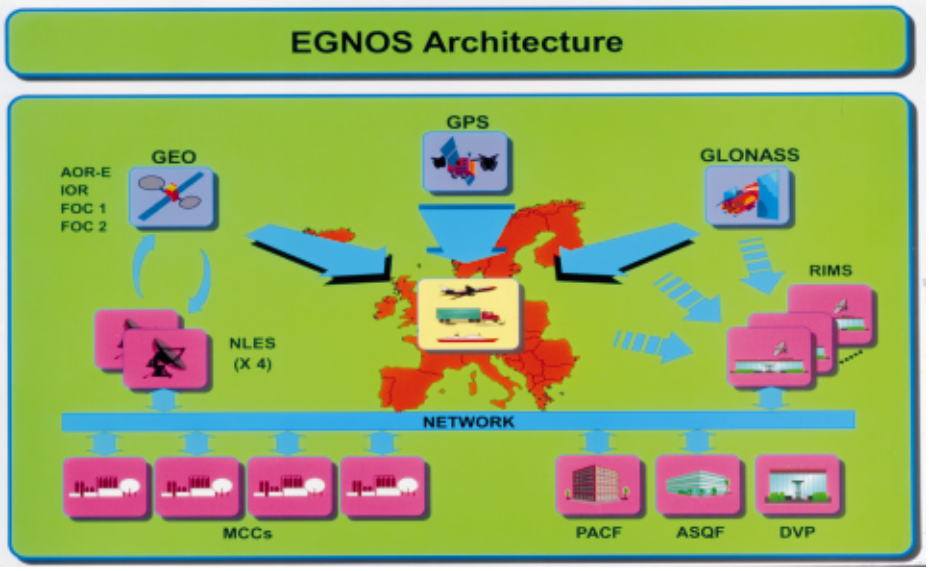
Klaus Pseiner
Managing Director, Austrian Space Agency

EGNOS Bilateral Agreements Signed

On Thursday 21 January 1999, ESA's Director General, Antonio Rodotà, signed eight Bilateral Agreements with Air Traffic Service Providers, Air Traffic Management Service Providers and other Agencies: AENA (ES), ANA & EP (P), CNES & DNA (Fr), DFS (D), ENAV (I), NATS (UK), NMA (N) and Swisscontrol (CH). These Agreements establish the terms of cooperation between the parties in support of the European Geostationary Navigation Overlay Service (EGNOS), a system intended to provide GPS/GLONASS (GPS-Global Positioning System, GLONASS-Global Navigation Satellite System) satellite-based augmentation services to aviation, maritime and land users, thereby significantly enhancing safety-critical applications.

EGNOS is being designed to serve the needs of all modes of transport in the European region. Its built-in expansion capabilities will also allow the propagation of the EGNOS technology and expertise to the other regions of the world (Africa, South America, Pacific region, etc).

EGNOS is being implemented by ESA, in cooperation with the European Commission (EC) and Eurocontrol in the context of a more global European effort in the field of satellite navigation, and will be interoperable with similar systems under development in the US (WAAS: Wide Area Augmentation System) and in Japan (MSAS: Multi-Transport Satellite Augmentation System).



ESA has taken a leading role in preparing the future European contribution to a Global Navigation Satellite System (GNSS 1 & 2), capable of meeting the strategic, industrial and technical objectives laid down by European states. The direct involvement and contributions of other agencies in this programme introduces an important operational/commercial thrust and opens new avenues and opportunities for ESA's Application Programmes.

EGNOS, planned to be operational in early 2002, will have installations of varying degrees of complexity in the eight countries involved in the Bilateral Agreements, as well as outside Europe. The implementation is entrusted to an industrial team led by Alcatel.

STS-95 Crew on Tour

ESA astronaut Pedro Duque accompanied his fellow crew members of the Space Shuttle Discovery STS-95 mission on a whirlwind tour of his home country, Spain, and ESA establishments (EAC, ESRIN, ESAHQ and ESTEC) from 11-21 January before continuing on to Japan. The well-received crew sparked European public and media interest and appreciation for on-going space endeavours, especially related to the International Space Station and manned spaceflight in general.

ESA staff members were also appreciative for the opportunity to see and talk to the crew. At ESTEC, NASA astronauts Curt Brown (Commander), Steve Lindsay (Pilot), Steve Robinson (Mission Specialist) and the popular, 77 year-old, John Glenn (Payload Specialist), as well as our own Pedro Duque gave an entertaining yet informative presentation of their 9-day mission of last October, followed by questions from the audience.

A total of 31 experiments were carried out during STS-95, including European experiments from Belgium, UK, France, Germany, Italy, Spain, Sweden and Switzerland. The mission was also a final test for some of the ESA science facilities and experiments designed to explore the effects of weightlessness on various materials and substances which may be flown in Europe's Columbus laboratory of the ISS.

Top
Mr D. Dale, ESA Director of Technical and Operational Support, receives a souvenir of the mission from Shuttle Commander Curt Brown during the STS-95 presentation at ESTEC

Centre
Each of the STS-95 astronauts was presented with a gift to commemorate their visit to The Netherlands. Pictured here (from left to right) are: Pedro Duque, ESA Astronaut; Kathy Laurini, NASA Resident at ESTEC, Jörg Feustel-Büechl, ESA Director of Manned Spaceflight and Microgravity; and John Glenn, STS-95 Payload Specialist

Bottom
The STS-95 crew at ESTEC (from left to right): Pedro Duque, Steve Robinson, Steve Lindsay, Curt Brown and John Glenn

ESA Astronaut Umberto Guidoni, First European on the ISS

ESA astronaut Umberto Guidoni will become the first European to travel to the International Space Station (ISS). The announcement was made by ESA Director General Antonio Rodotà, together with NASA Administrator Daniel S. Goldin and Italian Space Agency (ASI) President Sergio De Julio, on 9 February in Rome, Italy.

Guidoni, an astrophysicist of Italian nationality, will fly on Shuttle mission STS-102, currently scheduled for April 2000. For the first time, the Shuttle will transport material in a specially-designed Multipurpose Logistics Module (MPLM) mounted in its cargo bay. The module, Leonardo, is the first of three such carriers scheduled for launch to the ISS. The modules are being built by ASI under an ASI-NASA agreement which includes a flight opportunity for an Italian astronaut.

STS-102's cargo – laboratory racks filled with equipment, experiments and supplies – will be used to outfit the US laboratory module, which will have been attached to the ISS one month earlier. Once docked, the crew will use the Shuttle's robotic arm to lift Leonardo from the cargo bay and attach it to another of the Space Station's ports. The astronauts will then unload its contents. Leonardo will then be placed back in the Shuttle's cargo bay and returned to Earth.

For additional information, see the following web pages:
- Umberto Guidoni: <http://www.estec.esa.int/spaceflight/astronaut/eacpr/bios/cv-ug.htm>
- ESA astronauts: <http://www.estec.esa.int/spaceflight/astronaut>
- International Space Station: <http://www.estec.esa.int/spaceflight>
- Multipurpose Logistics Module (MPLM): <http://www.alespazio.it/mplm.htm>

esa

Umberto Guidoni will be making his second spaceflight. His first was as a payload specialist on the Shuttle's 16-day Tethered Satellite System (STS-75/TSS-1R) mission in February-March 1996. Originally recruited by ASI as an astronaut in 1989, he joined ESA's single European Astronaut Corps (EAC) in August 1998. He is currently based at NASA's Johnson Space Center in Houston, Texas, where he is working in the Robotics Branch on graphical user interface displays for the Space Station's Remote Manipulator System, a new-generation robotic arm being built by Canada

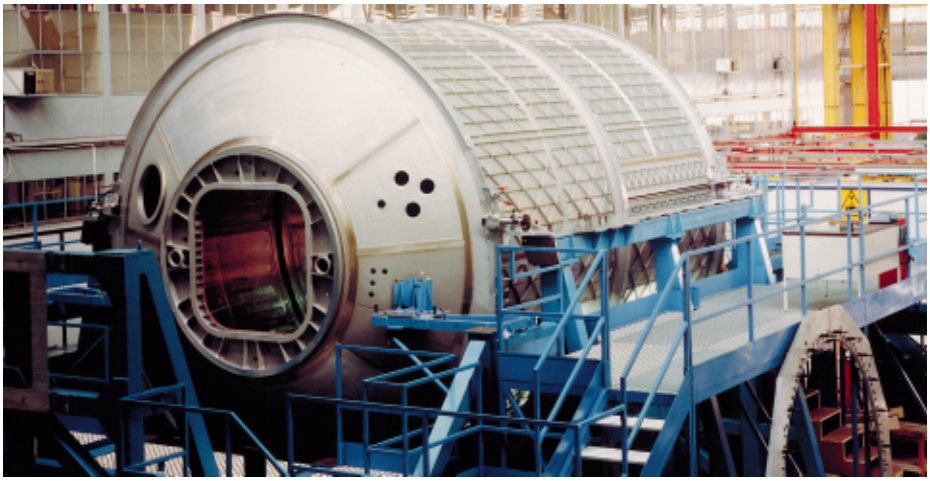
Cupola Contract for the International Space Station Signed

Following successful completion of negotiations, the Cupola contract for the International Space Station (ISS) was signed on 8 February in Turin, Italy, by ESA and Alenia Aerospazio (I). The Cupola programme results from a bilateral agreement between NASA and ESA under which ESA is to provide two Cupolas for the ISS in exchange for Shuttle transportation of European equipment and experiments.

The Cupola is a kind of Space Station control tower – an observation module – in the form of a windowed dome, that will allow two crew members to manoeuvre the robotic arm (Space Station Remote Manipulator System - SSRMS), thereby facilitating the assembly and attachment of the various Station elements. The Cupola will accommodate command/control workstations and other hardware to observe the Earth and Orbiter/ISS activities. The Cupola will also offer unquestionable psychological benefits by providing a pressurised observation area for the crew to have a clear view of the Station, the stars and Mother Earth.

The two Cupola units stipulated in the contract will be launched on the Shuttle and positioned on the Nodes – the interconnecting elements of the Station – by the SSRMS. The first unit is currently planned to be attached to Node 1 (Unity) in early 2003 and the second to Node 3 later that same year.

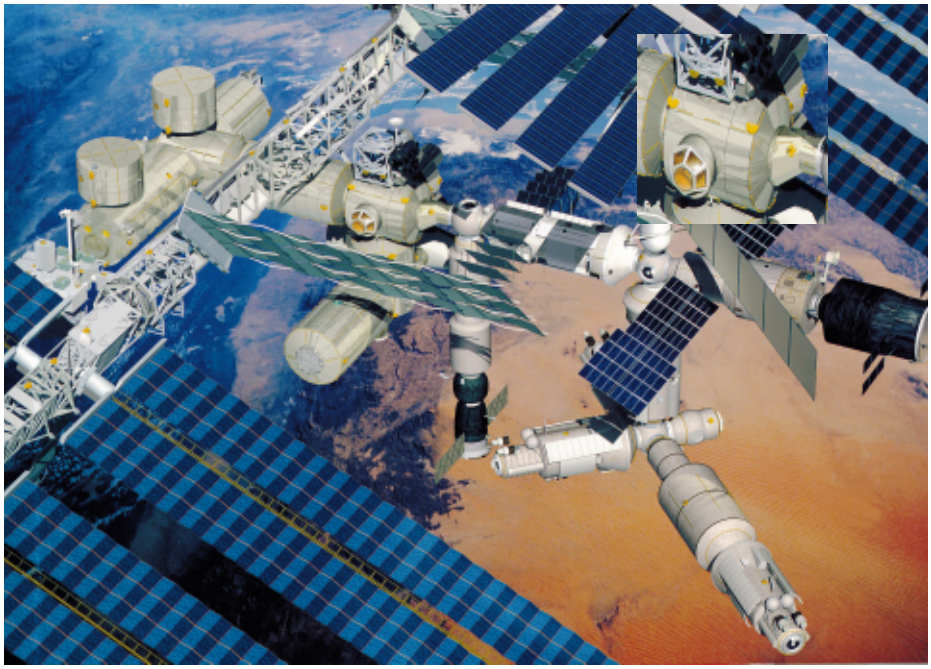
ESA has assigned the programme to Alenia Aerospazio. As prime contractor, Alenia Aerospazio will coordinate an industrial team of six other European companies: CASA (E), APCO (CH), Saab Ericsson and Lindholmen (S), Verhaert (B) and Daimler Chrysler Aerospace/DASA (D).



The MPLM modules as well as Europe's Columbus laboratory (to be added to the Space Station in 2003) have been derived from the European-designed laboratory Spacelab, which flew on 22 Shuttle flights over a period of 15 years (1983 to 1998)

At the signing, Giuseppe Viriglio, Head of Alenia Aerospazio Space Division, declared *"The acquisition of the Cupola programme further strengthens Alenia Aerospazio's leadership in orbiting infrastructures. What is more, it places the company in the unique position of being the second industry after prime contractor Boeing for the design and construction of systems for the International Space Station".*

Jörg Feustel-Büechl, Director of ESA's Manned Spaceflight and Microgravity Directorate, stated *"The signing of the Cupola contract reinforces the already strong position of Italy and Alenia in the International Space Station. It is a logical additional task which takes advantage of their competence, built up since the beginning of our ESA manned space ventures, which started in 1973 with the Spacelab project. The Cupolas are another two elements of the International Space Station which will be built in Europe, thereby enriching its role in this vast international programme. This contract will hopefully encourage, and help to ensure, the anticipated significant participation of Italy in ESA's future operational Exploitation Programme phase of the International Space Station".* esa



The Cupola is an aluminium structure about 2 m in diameter and 1.5 m high. It has one skylight and six lateral windows protected by special shutters that can be opened and closed

At the signing of the new ESA/CNES Frame Contract are, seated from left to right: Mr G. Brachet, CNES' Director General, Mr A. Rodotà, ESA's Director General; standing behind, from left to right: Mr H. Weber, ESA Contracts Department, Mr K-E. Reuter, ESA's Head of Cabinet

ESA and CNES Sign Frame Contract for the Mutual Supply of Network Services

Under this Frame Contract, signed on 29 January 1999, ESA and CNES will provide reciprocal TT&C services for spacecraft through the interconnection of their ground operation networks. ESA and CNES will take advantage of each other's TT&C networks with the aim of reducing costs and improving the quality of the respective services. The contract itself is non-exclusive and each individual support service will be the subject of a short standardised service programme contract. All main terms and conditions, including the values of the several standard services needed for support, are defined in the Frame Contract, thus enabling the Parties to request support at short notice and without complex negotiations.

The signature of this Frame Contract has to be seen in a wider context in which three Agencies, i.e. ESA, CNES and DLR, will interconnect their ground operations networks. esa