Telecommunications

Artist's impression of the AlphaBus platform

Together with its Member States, the Agency's objective is to build and run as efficient a Telecommunications Programme as possible to support European Industry's competitiveness on the World market in the best possible way. The year saw, inter alia, the signature of the AlphaBus Phase-C/D contract, the start of several Applications Initiatives, expressions of satisfaction from the Artemis user community, and the success of the AmerHis switchboard in space.

Based on an analysis of trends in the telecommunications market, on the observed evolution of the satellite operators, and on the perceived needs of Industry, the Telecommunications Department has prepared a Telecommunications Long-Term Plan (TLTP), which maps out ESA's course of action for the period 2006-2010. It includes preparatory/strategic, systems/equipment/technology, applications, and mission related activities and goals.

The successful outcome of the ESA Ministerial Council in Berlin in December allows the Agency to proceed with new programmes such as AlphaSat and the Small Satellite initiative whilst also pursuing the necessary technology development and focused competitiveness enhancements.

Major Contracts Signed

AlphaBus

ARTES Element 8 is ESA's Large Platform Mission programme to develop, in co-operation with CNES, the next generation of large platforms for geostationary telecommunications satellites. The AlphaBus main development phase (Phase-C/D) contract was signed in Le Bourget on 16 June, with the formal contract kick-off taking place a week later. Attention focussed in 2005 on consolidation of the system design and the negotiation of subcontracts with equipment suppliers.

The new AlphaBus platform will be able to accommodate up to 200 radio-frequency transponders, which will allow Europe to compete effectively on the World market for high-power telecommunications satellites. AlphaBus will facilitate a wide range of commercial missions ranging from TV broadcasting to multimedia applications, and including Internet access, mobile or fixed services in the widest sense, and hybrid C+Ku+Ka / Ku+Ka multi-spot access / S-band multi-spot missions.

The AlphaBus concept relies on a combination of cutting-edge equipment supplied by leading European companies working together under the joint prime contractors, EADS Astrium and Alcatel Space. The first AlphaBus protoflight satellite model is included in the current Phase-C/D development contract.

New Initiatives in 2005

Technology

Several technology-development contracts were placed with industry during the year, for items ranging from telecom satellite equipment to network-control software, and including significant efforts on next-generation telecom satellite payloads, with the emphasis on flexible and cost-effective designs.

AlphaSat

The Large Platform Mission (AlphaSat programme) is a key element in the successful introduction of the new AlphaBus product line into the global commercial

marketplace. It will provide operators, investors and insurers with the confidence that commercial bids based on the AlphaBus platform are founded on a sound policy of risk mitigation through in-orbit demonstration.

An Announcement of Opportunity (AO) was issued in July and attracted 19 expressions of interest. The Executive subsequently invited the respondents to the first AlphaSat Selection Contest, in order to select the best proposals for Phase-A studies at the beginning of 2006.

Applications

The Applications line of the ESA Telecommunications Department was particularly active in 2005, with the launch of twelve new activities in the areas of: telemedicine and medical education (REACH, IGEA-SAT and V4DL projects), broadband connectivity on transport systems (Wired Ocean, SAET and Satellite Internet Access for High-Speed Trains projects), interactive broadcasting applications (IMSATTV, 2EDIBS and LyngBox projects), triple-player solution for nomadic users based on SATMODE (CampNet project), multimedia services for e-government (ADMiNiSTRA project), and DVB-RCS with local wireless for Internet access and advanced multimedia services (INSPIRE project).

ESA has established a joint working team with the French Directorate of Civil Defence and Security in order to prepare a common position paper on the rationale for a European initiative for the development of satcom-based civil-protection services.

In addition, broadband access on trains has become an important issue, with huge potential. To address this need, the Agency launched an initiative in 2005 to provide a real broadband-access service solution for all European railways.

ESA, Alcatel Space and EADS Space Services have joined forces in the Mobile Satellite for Automotive Applications [MSAA] initiative, which seeks to understand the motivations and expectations of the car industry and vehicle users concerning communications and navigation satellite systems as well as multimedia possibilities.

The International Atomic Energy Agency (IAEA) and ESA have decided to join forces to assess the relevance of a satcom infrastructure for meeting the IAEA's future safeguards and security needs.

Potential civil-protection applications

INSPIRE

The INSPIRE project addresses the provision of broadband-access services to consumers in rural areas. By combining the use of two-way satellite dishes with wireless LAN equipment, the cost of service provision can be reduced, paving the way for a service proposition at a price level comparable with that of similar consumer offerings such as DSL.

Artist's impression of the OICETS–Artemis optical link

INSPIRE will offer, in a pre-operational pilot, the standard services that form part of the commercial broadband internet packages, but will also include the provision of innovative applications (including voice over IP, videoconferencing and datacasting) and promote technological innovation in the field of interoperability and enhanced transmission schemes. The design of the system was completed during the year, and its development and validation is now entering the final phase.

Ongoing Activities

Artemis

Artemis has now been operating for almost three years since its arrival in geostationary orbit. The services to the main data-relay, land-mobile and navigation services have been consolidated and preparations for new users are now underway.

Envisat has relied heavily on Artemis for the acquisition of both real-time and recorded data since June 2004, and two-thirds of the mission's science data is now downloaded via Artemis. In 2005, Envisat accumulated more than 10 000 links with Artemis, totalling 5000 hours. Spot-4 is still making relatively modest use of Artemis, at the rate of two optical data links per day; in 2005 it made 1200 links, totalling 230 hours. The Artemis navigation payload is now being used continuously by EGNOS for its Initial Operations Service.

The highlight of 2005 was the success of the OICETS optical-link experiment with Artemis. This was the culmination of several years of cooperation between ESA and JAXA in the area of data relay and free-space optical communication. Following the launch of Japan's OICETS spacecraft in August and its subsequent commissioning, the first optical links were established at the end of December. All links up to now have been successful, with very short acquisition times and excellent tracking performance. OICETS is the second optical user for Artemis, and the first demonstration of optical inter-operability between agencies.

AmerHis

AmerHis

Launched aboard Hispasat's Amazonas satellite on 5 August 2004 and now located in a geostationary orbit at 61ºW, the AmerHis payload heralds a new era in satellite communications. As the first European telecommunications satellite with onboard processing, thanks to AmerHis, Hispasat will provide high-performance interactive multimedia services to North and South America and Europe. Ground-segment tests for the

AmerHis 'switchboard in space' were successfully completed at several locations in Spain on 4 February. After the initial qualification tests, the AmerHis system was subjected to comprehensive tests and demonstrations with the establishment of networks directly interconnecting terminals in the different coverage areas, made possible by the novel onboard regenerative DVB S/DVB RCS switch.

BGAN

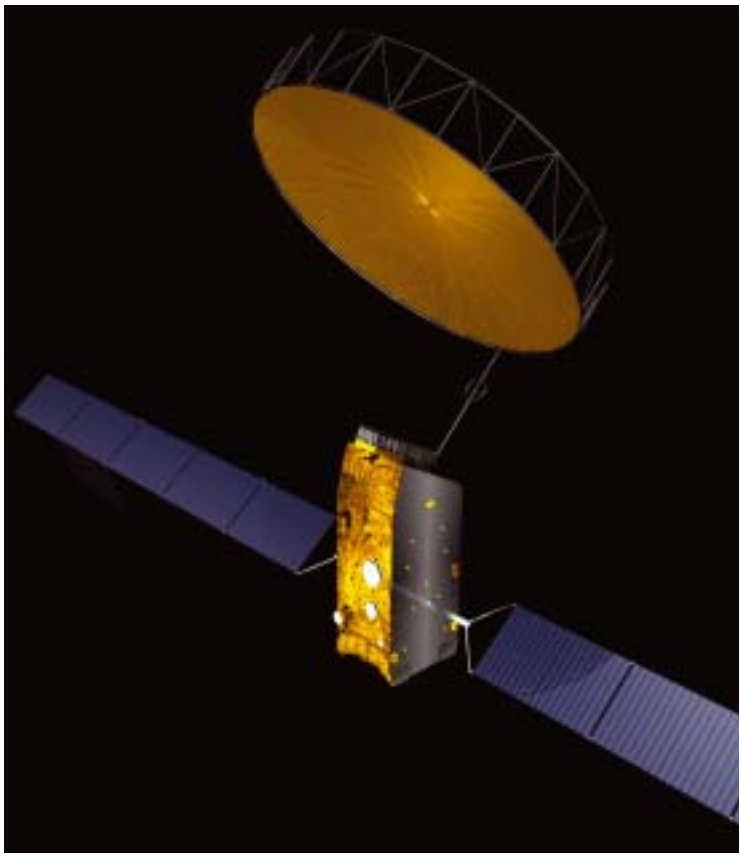
The BGAN payload was launched aboard the first Inmarsat-4 (I-4) satellite on 11 March. It will cover Europe, Africa, the Middle East, the Indian subcontinent, most of the Asia Pacific region, and Western Australia. The Inmarsat Broadband Global Area Network (BGAN) system has been designed to support point-to-point telecommunications services on portable and semi-fixed land-mobile platforms with low to medium gain, nontracking antennas providing bit rates of 216 to 432 kbps in downlink, and 72 to 432 kbps in uplink, depending on the type of terminal. The BGAN air interface is optimised for a land-portable environment with directional antennas.

SATMODE

SATMODE is a joint programme to develop a low-cost, two-way communication channel for satellite TV users. Newtec Cy of Belgium and Sinosat of China signed a Memorandum of Understanding in June covering the development of Digital iTV via satellite based on the ESA Telecom supported project SATMODE. This represents the first large-scale commercial field trial of the SATMODE system outside Europe. The SATMODE modem layer specification is currently in the process of being approved as a Cenelec Standard (prEN 16768).

SatLabs Group

The SatLabs Group is an ESA-supported, international association whose members are committed to encouraging large-scale deployment of the DVB-RCS Standard. The latter is an open standard, targeted mainly towards broadband communications and Internet access via satellite. The majority of the current 33 members of the Group are service providers, satellite operators, satellite and system manufacturers, or equipment and technology vendors, representing the key DVB-RCS players worldwide.



Artist's impression of the Inmarsat-4 spacecraft

In 2005, the SatLabs Qualification Programme, which undertakes DVB-RCS interoperability testing and certification, was launched and three DVB-RCS vendors have already received certification for their products. Interoperability is key for the benefits of an open standard to be fully exploited, and the SatLabs Qualification Programme is recognised as an essential tool for its verification.

Start-up Initiative – Round 5

The 'Satellite Communication System Elements and Technologies – Opportunities for Start-up Projects – Round 5' Invitation to Tender was issued on 29 March, with the activities split into three areas: Applications and Services (AAS), Enabling Technologies (ET) and Location-Based Communications Services (LBCS). Fifty-eight outline proposals were received from 12 countries, and eight were subsequently assigned to co-funded ESA ARTES-3 and ARTES-4 programmes.