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INTRODUCTION

The European effort to develop communications satellites started rather late in comparison with the Soviet Union and the United States, which had already launched satellites in 1958 and 1959. It was only in the mid-60's that the European countries, aware of the growing importance of application satellites,[1] particularly communication satellites, decided to take the necessary steps to join the concert of the great space powers. At that time, however, the European space effort was fragmented in three organizations:

1. The European Conference on Satellite Telecommunications (CETS), which convened in 1963 to help Europe prepare a unified position at the International Telecommunications Satellite (INTELSAT) negotiations. CET's mission was fulfilled with the completion of the final negotiations in 1971.
2. The European Space Research Organization (ESRO).[2] Founded in 1964, ESRO's main purpose was to do technical space research.
3. The European Launcher Development Organization (ELDO), which was founded in 1962 to develop European satellite launch capability.[3]

European space officials soon realized that the existence of three European space organizations would lead to overlap of work and inefficient use of available funds and space manpower. Consequently, in 1966 the European Space Conference (ESC) was established to serve as a coordinating and policy-making body for European space activities.[4]

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The establishment of the ESC gave Europe the necessary impetus to start applications programs. In 1968, the third ESC ministerial meeting at Bad Godesberg, Federal Republic of Germany, unequivocably assigned space applications to ESRO, created the Committee of Senior Officials as an advisory board, and allocated a small budget for studies on application satellites. The Committee of Senior Officials set up a working group specifically to study possible European involvement in communication satellite programs. This working group consisted not only of representatives of the ESC and the space organizations ELDO and ESRO but also of the potential users of the space communication system: the European Broadcasting Union (EBU) and the European Conference on Post and Telecommunications (CEPT). The working group reported in 1970 to the ESC, which decided in July of the same year that ESRO should undertake a communication satellite program leading to the launch of a telecommunication satellite by the end of the decade that would satisfy the requirements of the CEPT and the EBU. At the same time, ESRO was involved in preliminary studies on an aeronautical satellite system that would be developed jointly by the United States, Canada and ESRO. ESRO was also studying the feasibility of a European meteorological satellite program. This article will discuss the legal framework only of communication satellites and will touch on other applications programs only when necessary for clarification.

LEGAL FRAMEWORK OF COMMUNICATIONS PROGRAMS IN ESRO

The Convention

The convention establishing ESRO stated its purpose as follows: "The purpose of the Organization shall be to provide for, and to promote, collaboration among European States in space research and technology, exclusively for peaceful purposes."[5] Article V of the ESRO Convention described the program and the activities of the organization:

> In order to fulfill its purpose the organization shall carry out a program of scientific research and related technological activities. It may in particular:
>
> a) design and construct sounding rocket payloads, satellites and space probes, carrying instruments provided by Member States or by the Organization itself;
>
> b) procure launching vehicles and arrange for their launching;
>
> c) provide means for the reception, collection, reduction and analysis of data;

d) support research and development as required for its program;

e) promote and provide for contacts between scientists and engineers, their interchange and advanced training;

f) disseminate information among Member States;

g) cooperate with research institutions in the Member States and assist in the coordination of their efforts;

h) make contractual arrangements for the use of launching ranges for rockets and satellites and other facilities available in Member States.

Article XII dealt with the financial contributions to the organization:

1. Each Member State shall contribute both to the capital expenditure and to the current operating expenses of the Organization

b) . . . in accordance with a scale which shall be decided every three years by the Council by a two-third majority of all Member States and shall be based on the average net national income at factor cost of each Member State for the three preceding years for which statistics are available. . . .

The Institutional Problem

As noted earlier, the political will of the European partners to embark on an applications program was evident since 1966 and culminated in Resolution No. 1 of the ESC in July 1970, which stated that ESRO should undertake a communications satellite program that would meet the requirements of EBU and CEPT. This resolution created an institutional problem for ESRO, the organization having clearly been established to conduct scientific research and not applications programs. Several legal solutions were envisaged. One consisted in inviting the member states of the CETS to sign a multilateral agreement with ESRO and ELDO for the development and launching of an experimental telecommunications satellite, the management of which would be given to ESRO. Another solution proposed was simply to incorporate the project in ESRO's regular program ignoring the contradiction with the organization's purely scientific aims.

In the end, the Council decided on December 20, 1971, to adopt a resolution to reform the organization itself, giving ESRO competence to execute applications programs. This reorientation required, however, a revision of the ESRO Convention in accordance with the Resolution of December 20, 1971. In the meantime, it was agreed that the execution of optional programs would be based on Article VIII of the ESRO Convention which read:

If, outside the agreed program but within the scope of the Organization, one

> or more Member States engage in a project in connection with which the Council decides, by a two-third majority of all Member States, to make available the assistance of the Organization or the use of its facilities, the resulting cost to the Organization shall be refunded to the Organization by the State or States concerned.

The legal framework consisted of an arrangement concluded by the member states of ESRO and ESRO itself for the execution of programs adopted by the ESRO Council. The supervision of the program was entrusted to a program board composed of representatives of participating states (art. 4).

As for the financial support of these optional programs, the ESRO Council at its December, 1971, meeting agreed on the principle of "a la carte" financing. According to this principle, all ESRO Member States would be responsible for supporting the basic ESRO program but could elect whether to participate in any given "Special Project," such as the applications program. Contributions to special projects would be made according to the same scale which applied to member contributions in support of ESRO's compulsory basic program.

The December, 1971, Resolution on the Reform of the Organization launched three programs:

1. A joint aeronautical satellite program to be undertaken with the United States and Canada by Belgium, France, Germany, Italy, Sweden, Switzerland, and the United Kingdom with a budget not to exceed 100 million accounting units (MAU);
2. A meteorological satellite program to be undertaken by Belgium, France, Germany, Italy, Sweden, Switzerland, and the United Kingdom with a budget not to exceed 115 MAU; and
3. An experimental communications satellite program complying with the requirements of the CEPT and EBU conducted by Belgium, France, Germany, Italy, Sweden, Switzerland, and the United Kingdom with a budget not to exceed 100 MAU.

In 1973 the ESRO Council adopted a fourth major application program, MAROTS, a satellite for maritime communications, involving Belgium, France, Germany, Spain, Sweden, and the United Kingdom. At that time, ESRO also implemented the concept of allowing financial participation in special projects to the degree of a member state's interest, rather than requiring participation according to the fixed scale ESRO had established for support of its mandatory program. This financing scheme facilitated participation by member states in the various programs. Thus, the Nether-

lands and Sweden joined the TELECOM program in 1973, and, in 1974, they joined the MAROTS program, as did Norway, a non-ESRO member.

The Communications Satellite Program

In 1973 an arrangement between certain member states of ESRO and the organization itself concerning the execution of a communication satellite program (referred to as the TELECOM-Arrangement) entered into force.[6] The Arrangement contained, in addition to the basic text, an Annex A describing the objectives and the technical content of the program and an Annex B, which outlined the cost of the program and the scale of contributions.

Article 1 stated that the participants shall undertake a program whose objectives shall be to design, develop, construct and set up the experimental and pre-operational space segment of a space communications system matching the objectives of the users, and to make reliable operational satellites available to the users on completion of the program. This program was broken down into two phases (art. 2):

a) A technological and experimental phase, during which the communication techniques and spacecraft technologies required for the program would be developed on the ground and tested aboard experimental and pre-operational satellites. This phase was called "Phase 2" because it was preceded by a preparatory program definitional phase, "Phase 1," which was undertaken at the request of CETS and ESC. For the purpose of Phase 2 the Orbital Telecommunications Satellite (OTS) was developed and launched successfully in November, 1978.
b) A "Phase 3" devoted to the development of two operational flight units together, if necessary, with the launching and evaluation in orbit of a prototype model. On its completion, these operational flight units, one of them in orbit and the other on the ground, would be made available to potential users on terms to be agreed between the participants and the users.

The decision to proceed to Phase 3 had to be made by the Program Board by a two-thirds majority, provided this majority represented at least two-thirds of the financial contributions to the program.

The financial budget for the execution of the program was fixed in article 6 of the Arrangement, and article 7 laid down the procedure known as the 120 percent rule. The 120 percent rule stated that no participant would be entitled to withdraw from the program if the cumulative overruns of estimated costs to completion did not exceed 20 percent of the

amount of the financial budget of the phase in progress. The Program Board would decide on the additional expenditure by a two-thirds majority. If the cumulative overruns of estimated costs exceeded 20 percent of the amounts of the budget in question, the participants who so wished could withdraw from the program. Those participants that wished to continue the program would consult among themselves and determine the arrangements for such continuation and report to the Council, which would make any necessary decisions.

It should also be noted that article 12 of the Arrangement foresaw an arbitration procedure in case of disputes arising between two or more of the participants, or between any one of them and the organization itself, concerning the interpretation or the application of the agreement. Another important point was that both Annex A, describing the technical content of the program and Annex B, setting out the financial provisions, required a unanimous decision to modify.

The Aerosat Arrangement

A similar arrangement to that of TELECOM was entered into by ESRO and certain member states of ESRO for the execution of an aeronautical satellite program. Together with this arrangement, ESRO signed in 1974 a memorandum of understanding with the United States Aviation Administration and its Canadian counterpart on behalf of nine member states participating in the program (Switzerland was not participating).[7] This program was intended to provide a pre-operational system of air traffic control by satellite. Unfortunately, in the spring of 1977 all funds for Aerosat were deleted from the Federal Aviation Administration FY '78 budget with orders that the program be reevaluated and less expensive alternative communications systems be considered. The main reason for this decision was opposition from international airlines; the program was, therefore, virtually abandoned.

The MAROTS Arrangement

In 1973, ESRO undertook a fourth major applications program, MAROTS, a satellite designed for maritime communications and navigation and modelled after the third applications program METEOSAT. The decision to undertake the MAROTS program was made easier by the fact that it was to utilize the modular platform developed for the OTS satellite. The arrangement dealing with this program was signed by the United Kingdom, the prime sponsor for the project, Belgium, France, Germany, Italy, Spain, and Sweden.[8] The maritime arrangement has the same legal characteristics as the TELECOM Arrangement.

THE LEGAL FRAMEWORK OF COMMUNICATIONS PROGRAMS IN THE EUROPEAN SPACE AGENCY

Creation of ESA

As mentioned earlier, the introduction of applications programs in ESRO necessitated a major change in the ESRO Convention. Since 1972, however, the need for a unified space organization became increasingly evident. Moreover, the ESC devoted its efforts to reconciling the attitudes of those European countries that advocated relying on the United States to launch their satellites and those that perceived the need for Europe's own launcher. At the fifth ESC ministerial conference held on December 20, 1972, the European ministers agreed in principle that a new organization was to be formed out of ESRO and ELDO, obviating the need for material changes in the ESRO Convention. Finally, on May 30, 1975, the Convention establishing the European Space Agency was signed by representatives of the member states of ESRO and of Ireland, which was not a member of ESRO.[9] ESA began to function *de facto* on May 31, 1975, even though the Convention itself came into force only on October 30, 1980, after ratification by the parliaments of all the member states. It was decided in 1975 that until ratification of the ESA Convention, the ESRO Convention would be the legal basis for ESA's activities and programs, but, as far as possible, the provisions of the ESA Convention would be taken into account.

The ESA Convention

Article II of the ESA Convention stated that:

> The purpose of the agency shall be to provide for and to promote, for exclusively peaceful purposes, cooperation among European states in space research and technology and their space applications, with a view to their being used for scientific purposes and for operational space applications systems:
>
> a) by elaborating and implementing a long-term European space policy, by recommending space objectives to the Member States and by concerting the policies of the Member States with respect to other national and international organizations and institutions;
>
> b) by elaborating and implementing activities and programs in the space field;
>
> c) by coordinating the European space program and national programs, and by integrating the latter progressively and as completely as possible into the European space program, in particular as regards the development of applications satellites;

d) by elaborating and implementing the industrial policy appropriate to its program and by recommending a coherent industrial policy to the Member States.

Article V of the ESA Convention stated that, besides the mandatory activities in which all member states participated, the activities of the Agency should also include the optional activities, in which all member states participate, excluding only those that formally declare themselves not interested. According to article V(a), the Agency should with respect to the mandatory activities:

(i) ensure the execution of basic activities such as education, documentation, studies of future projects and technological research work;
(ii) ensure the elaboration and execution of a scientific program including satellites and other space systems;
(iii) collect relevent information and disseminate it to Member States, draw attention to gaps and duplication of international and national programs;
(iv) maintain regular contact with the users of space technologies and keep itself informed of their requirements.

With respect to the optional activities, article V(1)(b) states that the Agency shall ensure, in accordance with the provisions of Annex III of the Convention, the execution of programs which may, in particular, include:

(i) the design, development, construction, launching, placing in orbit, and control of satellites and other space systems;
(ii) the design, development, construction and operation of launch facilities and space transport systems.

As far as the financial contributions to these programs are concerned, the ESA Convention adopted, for the mandatory activities and the common costs of the Agency, the same principle as the ESRO Convention: *i.e.*, the scale of contributions would be based on the average national income of each member state for the three latest years for which statistics were available. For the optional programs, however, article XIII(2) provided that each member state would contribute to the costs of each optional program unless it had formally declared itself not interested in participating. The scale of contributions to a given program would be based, as with the mandatory activities, on the average national income of each participating state for the three last years for which statistics are available. The same article provides, however, that another scale of contributions could be

adopted if all participating states decided to do so. This article, therefore, carried forward the principle of "a la carte" participation and financing which had been the norm during the ESRO era.

The Implementation of Optional Programs

Annex III of the ESA Convention laid down the detailed procedure for the implementation of optional programs as they were defined in article V(1)(b) of the Convention. The procedure is as follows: A proposal for the execution of an optional program is submitted by a member state or by the Director General to the Chairman of the Council, who communicates it to all member states for examination. After examination, a detailed proposal defining the technical and the financial content is submitted to the Council, which adopts a resolution that the proposed optional program be executed within the framework of the Agency. Member states that do not intend to take part in the program must formally declare their lack of interest within three months from the adoption of the resolution.

The member states that wish to participate shall draw up, within the same three-month limit, a declaration which sets out their duties with respect to:

1) the phases of the program;
2) the conditions under which it is to be carried out, including the timing; the financial budget (envelope) and sub-budgets (sub-envelopes) relating to phases of the program, and any other provisions for its management and execution;
3) the scale of contributions determined in accordance with article XIII(2) of the Convention; and
4) the duration and amount of the first binding, financial commitment.

This declaration is transmitted to the Council for information together with draft implementing rules, which have to be approved by the Council. These implementing rules form the third official document of the new optional program after the resolution and the declaration, and spell out the agreed procedure for carrying out the program, particularly with regard to decision-making (*e.g.*, designation of the competent body at the national delegate level, voting rules) and the application of the Agency's rules on contractual, financial and other matters. These rules also specify the terms on which non-member states may be allowed to join the program.

It should be pointed out that the enabling resolution requires only a simple majority by the Council, *i.e.*, by all the member states, whereas the declaration, which is drafted and subscribed to by all of the participants,

is submitted to the Council only for information. As for the implementing rules, which are also drawn up by the unanimous consent of the participants, these must be submitted to the Council for approval by a simple majority.

Evidently, the most important document for the execution of the program is the declaration, which is analogous to the arrangements signed by member states under the ESRO Convention. Because, however, the declaration is formally based on the ESA Convention and the program is executed in accordance with its provisions and with the rules and procedures in force in the Agency, a number of provisions, necessarily detailed in the ESRO Arrangements (such as entry into force, arbitration, etc.) are not described in the declaration itself. Each declaration contains a number of articles which define the duties of the participants and is supplemented by two annexes, a technical one giving a more or less detailed account of the program, its objectives, timetable, phases, etc., and a financial one, which determines a budget for implementing the whole program and lays down the scale of contributions. As far as the budget is concerned, the contributions required from the participants are considered binding estimates.

The declaration, once completed, will be opened for acceptance during a time period established in the declaration itself. If a participating state is unable to accept the provisions set out in the declaration or the implementing rules within this time limit, its participation shall cease. Other member states of the Agency or non-member states may subsequently become participating states by accepting the provisions of the declaration under the conditions determined by the participating states in the implementing rules.

Operational Activities in ESA

Before giving some examples of optional programs executed within ESA, it is important to draw attention to the operational activities provided for in article V of the ESA Convention. ESRO was created as a research organization, without any competence in operational activities. Although the same philosophy applies generally to ESA, in drafting the article European space officials recognized that in some cases ESA should be allowed to undertake operational activities, especially when potential users of space systems were not yet organized to operate such systems.

Article V(2) of the ESA Convention provides therefore that, in the area of space applications, the Agency may carry out operational activities under conditions to be defined by the Council by a majority of all member states. When so doing the Agency shall:

1) place at the disposal of the operating agencies concerned such of its own facilities as may be useful to them;
2) ensure as required, on behalf of the operating agencies concerned, the launching, placing in orbit and control of operational, applications satellites;
3) carry out any other activity requested by users and approved by the Council.

The cost of such operational activities shall be borne by the users concerned.

At the ESA Council meeting of ministers held on February 14 and 15, 1977, a resolution on operational systems was adopted, which defined more clearly the role of the Agency in this area. The ministerial meeting recognized that, in addition to its task of developing space technology, ESA also had the mission, under its convention, of giving support for the development and management of European operational space systems. Two principles were therefore adopted:

1) As regards the pre-operational systems which the Member States entrust to it for execution, the Agency will have full responsibility for design, development and exploitation. It will exercise this responsibility in consultation with potential users, particularly in cases where the development of prototypes is considered to be the best way of advancing the associated technology and facilitating the transition to the operational phase.
2) As regards operational systems:
   a) In the fields where organized users do not exist, the Agency will encourage the potential users of operational space systems to take over the management of these systems and to organize their exploitation. In accordance with the Council's instructions, it will furnish them with all the technical and institutional assistance they may request to this end, including the making available of facilities.
   b) In the fields where organized users exist, the Agency will not undertake tasks unless as requested by them.[10]

THE EVOLUTION OF THE COMMUNICATIONS SATELLITE PROGRAM IN THE EUROPEAN SPACE AGENCY

In 1976, ESA proposed a major new communications satellite program package, which was adopted at the ESA Council meeting of ministers in February, 1977. The declaration[11] stated that the Agency should under-

take a comprehensive communications satellite program extending existing programs and consisting of the following elements:

1) an extension of the MAROTS program, providing a second spacecraft in orbit;
2) a European, regional communications satellite system to be launched on the Ariane rockets, with the first satellite launch to take place in 1981;
3) a program to develop a heavy platform with a payload primarily devoted to direct television broadcasting;
4) an "Advanced Systems and Technology Program."

This ministerial declaration also instructed the Director General to speedily conclude negotiations with the Telecommunications Administrations to obtain satisfactory agreements concerning the operational use of MAROTS and the European regional space segment (Phase 3, ECS), and to create an entity entrusted with the management of these systems.[12] The ministers also requested the Director General to make proposals for the next steps to be taken regarding all the elements of the comprehensive program.

Because of the previous decision to apply the ESA Convention even before its formal entry into force, it was naturally decided to adopt the legal framework foreseen in the ESA Convention to execute these new programs. Consequently, the ESA Council resolved at its meeting of December, 1977, that the four elements of the comprehensive communications program be executed within the framework of the Agency and invited the interested states participating to adopt the appropriate legal texts. Under this resolution, declarations[13] were drafted to extend the MAROTS program, and to execute the Advanced Systems and Technology Program and Phase 3 (ECS) of the communications satellite program. Moreover, at the request of INTERIM EUTELSAT, the organization responsible for the operational management of the ECS satellites, a further declaration[14] was adopted on Phase 3, which added two more satellites to those already approved under the communication satellite program. The declaration on Phase 3 provided not only for contributions by member states participating in the program but also for a contribution by INTERIM EUTELSAT. Thus, the communications satellite program had a double nature: it was an optional program in the sense of article V(1)(b) of the ESA Convention, but it was also an operational program in the sense of article V(2) of the Convention.

THE L-SAT PROGRAM

Legal Instruments

Adoption of the various legal instruments relating to the L-SAT program, the fourth element of the comprehensive satellite program, took place in successive stages over a period of several years. This delay was the result of the difficulties that ESA member states had in agreeing on the objectives, technical content and financial budget of the program. Phase A having been evacuated within the general budget of the Agency, the program finally started with Phase B, concerned with the definition of the program,[15] which was extended by a B2 sub-phase[16] and completed by a bridging phase.[17] Neither Germany nor France took part in Phase B,[18] but Austria and Canada announced a desire to participate. By declaration of October 28, 1981, it was decided to undertake the developmental phase proper (Phase C/D) of the program.[19] The development phase work did not start under December 22, 1981, when the final amount of known contributions had reached more than 80 percent of the budget. The participating states also drafted implementing rules for the program, which the Council approved on December 9 and 10, 1981. The rules cover both the conditions for carrying out the program and for using the satellite.

Specific Features of the L-SAT Program

The L-SAT program will provide Europe with a large satellite comparable in size, mass and electric power to the largest communication satellites built anywhere in the world so far. L-SAT is also a unique experimental satellite which is designed to provide valuable information for the management of subsequent operational systems. The objectives of the L-SAT program are:

1) The development, launch and in-orbit operation of a large multipurpose platform designed for a broad range of future telecommunications activities to ensure maximum future competitiveness on the world market; and
2) The development and operation in orbit of a number of communication payloads to arouse the interest of users and to promote new commercial applications by means of a complete program covering testing, demonstration, and utilization.

There will be four payloads:

1) a direct-broadcast payload;
2) a specialized business services payload;

3) a propagation beacon payload; and
4) a millimeter-wave communications payload.

British Aerospace was chosen as prime contractor for the L-SAT program in November, 1979, and was awarded the definitional phase contract the following month. The industrial structure for the main development phase of the program evolved during the definitional phase and has now been completed. Within this structure, some forty industrial firms from twelve countries will be responsible at sub-system or equipment level. The detailed arrangements for the main development plan envisages a launch early in 1986. Three development test models will be built prior to fabrication of the flight model. A launch with the European Ariane launcher is scheduled but the satellite is also fully compatible with the U.S. shuttle. Plans are being prepared so that the user community can employ the satellite for experimentation, technical testing, or demonstration of new applications.

The total budget of the definitional phase and the intermediate phase was some 36 MAU ($48 million U.S. at mid-1980 prices) which covers the industrial expenses and the cost of program management by ESA. The budgeted cost of the development phase, comprising the industrial contract, launch, establishment of the ground segment, in-orbit operation for at least five years and program management is 388 MAU ($520 million U.S. at mid-1980 price levels). With the entry into force on December 21, 1981, of the program's legal arrangements, the development activities started with the award of the main contract worth some 257 MAU ($345 million U.S. at mid-1980 prices).[20]

Several factors of the program are worth noting. As only six members of ESA were interested, participation in the L-SAT program is unusually low. The withdrawal of France and Germany before the definitional Phase B has clearly been one of the reasons for the program falling behind schedule. Their withdrawal is politically regrettable because these countries changed their minds after showing initial interest and approving the experimental orientation of the program. Both France and Germany have decided to build directly and jointly a bilateral system of direct TV operational satellites (TV-SAT and TDF.1).[21] Thus European cooperation in this major area unfortunately has been weakened. The presence of two non-member countries, Austria and Canada, among the participants only partially offsets the absence of the two largest member countries. Having a non-European country in such a program may possibly raise some difficulties concerning the use of the satellites.

One consequence of this unusual situation is that the scale of contributions to the program deviates considerably from the proportional-to-national-income principle.

Participants	Scale of Contributions
Belgium	3.7
Denmark	1.3
Spain	2.6
Italy	32.8
Netherlands	11.8
United Kingdom	34.3
Austria	0.75
Canada	9.0
Other participants	3.75

Although the participants may arrange the scale of contributions as they see fit, it is clear that the United Kingdom and Italy, the two biggest and virtually equal contributors to the program, will have a particularly strong voice compared to their partners.

Specific Provisions of the L-SAT Program

While the ESA Convention offers, as we have seen, a fitting legal framework for carrying out optional programs—a framework which has simply to be filled in by making the necessary adaptations—there is nothing to prevent the participating countries from expanding it by adopting specific provisions relating only to the program in question. In the case of the L-SAT program, several original rules of this kind have already been incorporated in the texts covering this phase.

Annex A (technical) of the L-SAT Declaration states that the program's developmental phase includes the operational command of the satellite during launch and in-orbit functioning, together with the testing and demonstration of the communications systems during the satellite's lifetime. In the other ESA programs, the Agency itself is responsible for these kinds of operation, which it performs through one of its establishments: *e.g.*, the Operations Control Centre (ESOC) at Darmstadt in the Federal Republic of Germany. In view of Italy's particularly heavy financial participation in the L-SAT program, the participants agreed by resolution, dated December 8, 1981, to use the existing Italian facilities and those to be constructed by Telespazio, an Italian firm, for control of the ground segment of the satellite and for control of the L-SAT routine phase, coordinating these operations with the ESOC facilities.

One of the goals of the L-SAT program has been to demonstrate satellite capability and to promote the sale of subsequent flight units to foreign

markets. To this end, the participants added to the Declaration an Annex C on "principles for the commercialization of L-SAT." These principles embody the duties of the participants with regard to promoting and building the platform or payload, or their derivatives, while respecting as far as possible the distribution of work during the developmental phase.

CONCLUSION

This article has shown the evolution which took place within European space organizations to find a flexible legal framework for execution of space communications programs. The Convention of the European Space Agency now contains the necessary features to allow the Agency to fulfill its pioneering role in European space research and development, and to promote the creation of space systems, which, when in operation, are turned over to administering agencies leaving the ESA in charge of preparing future developments in space applications.

In the area of space communications programs, the initial TELECOM Arrangement has led to the establishment of the ECS system, which, managed by the new organization EUTELSAT, will provide Europe with a regional communications system for the next ten years. Furthermore, the approval of the L-SAT program is the first step along the path that should lead to the exploitation of a new generation of operational satellites. On balance, despite the many legal, financial and political problems in Europe, the European Space Agency can be proud of its achievements in the particularly important area of space communications.

NOTES

[1] Applications satellites are projects which have aeronautical, telecommunications and maritime uses, as compared with other uses, such as orbital satellites, which contribute to scientific research regarding the earth and its relation to the universe. For background materials discussing the evolution of European regional efforts in this area, see generally Bourely, *La Conference Spatiale Europeénne*, in PROCEEDINGS OF THE FOURTEENTH COLLOQUIUM ON THE LAW OF OUTER SPACE 176 (1971); Conférence Spatiale Europeéne, Rapport du Comité Consultatif des programmes, Doc. No. CSE/CCP (67)5 (Dec. 1967); Laffanderie, *Le programme europeen de satellite de télécommunications*, 12 LA RECHERCHE SPATIALE (1973); Thynne, *Télécommunications par Satellites Europeéns*, in PROCEEDINGS OF THE FOURTEENTH COLLOQUIUM ON THE LAW OF OUTER SPACE 115 (1971).

[2] ESRO was formed under a convention signed by Austria, Belgium, Denmark, France, the Federal Republic of Germany, Italy, the Netherlands, Norway, Spain, Switzerland, and the United Kingdom. Convention for the Establishment of a European Space Research Organization, June 14, 1962, 1964 Gr. Brit. T.S. No. 56 (Cmd. 2489) [hereinafter cited as the ESRO Convention]. ESRO launched about 300 research rockets during its existence and, between 1968-72, conducted a series of satellite launchings in the United States.

[3] ELDO was formed under a convention signed by Austria, Belgium, France, the Federal Republic of Germany, Italy, the Netherlands, and the United Kingdom. Convention for the Establishment of a European Organization for the development and construction of Space Vehicle Launchers, March 29, 1962, 1964 Gr. Brit. T.S. No. 30 (Cmd. 2391). The satellite launching development program it envisaged was hindered by technical and financial difficulties. None of its early launcher firings between 1967-71 were successful. The U.K. withdrew from ELDO in 1973, and program work was discontinued in April of that year.

ELDO's functions are carried out by the European Space Agency (ESA). *See infra* text accompanying notes 9-10. The ESA is currently developing a launcher under the Ariane program. *See* SUBCOMM. ON SPACE SCIENCE AND APPLICATIONS OF THE COMM. ON SCIENCE AND TECHNOLOGY WORLD-WIDE SPACE ACTIVITIES, 95TH CONG., 1ST SESS. 236, 263 (Comm. Print 1977) [hereinafter cited as WORLD-WIDE SPACE ACTIVITIES].

[4] *See generally* WORLD-WIDE SPACE ACTIVITIES, supra note 3, at 292; N. MATTE, AEROSPACE LAW 55 (1982). The ESC terminated with the creation of the ESA.

[5] *See* ESRO Convention, *supra* note 2, at art. II.

[6] Arrangement concerning the Execution of a Communication Satellite Program, June 1, 1973, 1976 Gr. Brit. T.S. No. 12 (Cmd. 6414) (entered into force September 21, 1973).

[7] *See* WORLD-WIDE SPACE ACTIVITIES, *supra* note 3, at 368.

[8] Arrangement concerning the Execution of a Maritime Satellite Program, Oct. 15, 1973, 1976 Gr. Brit. T.S. No. 53 (Cmd. 6528).

[9] Convention for the Establishment of the European Space Agency, May 30, 1976, 14 I.L.M. 864.

[10] The remainder of this article relies on ESA declarations, resolutions and internal documents which are not generally available. Inquiries concerning these documents should be directed to:

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[11] *See* Europ. Space Agency, Doc. No. ESA/C-M (Feb. 1977).

[12] The national post, telegraph and telephone members of the European Conference of Postal and Telecommunications Administrators and the recognized private operating agencies participated. *See* Agreement for the setting up of a European Interim Telecommunication Satellite Organization [INTERIM EUTELSAT], May 13, 1977 (entered into force on June 30, 1977).

[13] *See* ESA/CXXIII/Dec. 1 rev. 1 (March 7, 1978), ESA Doc. No. C(78)2g; ESA/JCB/(78)29 (April 6-7, 1978); ESA/JCB/XX/Dec. 1 (final) rev. 1 (March 7, 1978).

[14] *See* ESA/C/XXX/Dec. 1 (3-4) (April, 1979).

[15] *See* ESA/C/XXXIII/Dec. 2 (final) (July 26, 1979).

[16] *See* ESA/JCB/XXXV/Dec. (final) (December 6, 1979).

[17] *See* ESA/JCB/XLV/Dec. 7 (final) (May 5, 1981).

[18] Germany and France were engaged in a cooperative effort to develop their own direct television broadcast satellite (DBS) system. Also, Germany was concerned that the ESA DBS system would be too expensive and come on-line too late. *See* MATTE, *supra* note 4, at 180.

[19] Austria, Belgium, Canada, Denmark, Italy, the Netherlands, Spain, and the United Kingdom participated in this phase. Switzerland was interested in the idea, but was unwilling to contribute the required funds.

[20] The objectives and the technical and financial description of the program are given in the text and annexes of the Declaration of December 21, 1981.

[21] *See supra* note 18.