Getting Customer-oriented:

ESA Procurement in Cooperation With Other Organisations

Signature of procurement contract for Sentinel-1 with Thales Alenia Space, at the Paris Air Show,18 June 2007. From left to right: Volker Liebig, ESA Director of Earth Observation, Jean-Jacques Dordain, ESA Director General, and Pascale Sourisse, President and CEO Thales Alenia Space.

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ESA is entering more and more cooperative undertakings with other organisations, whether providing assistance in procurement, or in jointly developed space systems and infrastructures. This role acknowledges ESA's expertise as a public procurement agent, but challenges us to maintain and adapt our procurement processes to suit both internal and external needs.

Introduction

Procurement is the channel for ESA both to implement our mandate assigned to us by Member States and to secure the means required for such implementation. Indeed, within the classical ESA institutional frame, the Director General proposes programmes to the Member and Cooperating States which, in turn, give mandate to the Director General to implement them within defined technical, financial and schedule boundaries.

To implement the programmes, the Director General concludes contracts with European industry and research institutions that conduct the studies, develop the satellites and build the infrastructures. As such, procurement is

ESA and Astrium signing the contract for Sentinel-2 Earth Observation satellite. From left to right: Karl Trauernicht, German Ministry of Transport, Evert Dudok, President of Astrium Satellites, Volker Müller, Astrium Contracts Dept., Volker Liebig, ESA Director for Earth Observation, Jonas Amnéus, ESA Contracts Dept., Valère Moutarlier, European Commission, Head of GMES Bureau and Uwe Minne, Director of Earth Observation & Science for Astrium (Astrium)

at the centre of ESA's daily operations. Each year, the largest part of our budget is spent on contracts in the Member and Cooperating States for research or project-related activities. The efficiency of the procurement process then greatly impacts on ESA's overall functioning.

Both the public and international nature of the process means that its efficiency is measured primarily against its achievement in the most effective use of the European taxpayer's money. The procurement process has developed around boundaries that are important for satisfying specific goals, such as: maximising competition and securing its fairness, and transparency in the decision process towards contract awards.

Today's ESA procurement process is the result of practices that have applied to a variety of programmes over a period and that have seen major changes in the industrial and programmatic landscapes. These practices have led to procurement becoming multidisciplinary and going well beyond the setting-up of contract clauses. Procurement thus encompasses a combination of techniques and dimensions starting from, indeed, the definition of Technical Requirements and Cost Estimation to legal formulation, Industrial Policy and Financial Control, going through Technical Monitoring, Cost Engineering and Auditing.

In parallel to this internal evolution, ESA has maintained a constant interface with not only European industrial and academic actors, but also intergovernmental and national organisations. As far as these organisations are concerned, ESA has been acting as procurement agent for, or joint customer with, the other organisations (also referred to as 'Third-Party Organisation'), such as Eutelsat, Eumetsat, the European Commission and national governments.

What is the specific added value that ESA offers to these third parties? What responsibilities and challenges does this role entail for ESA? To what extent does the experience of such joint undertakings reinforce a customer-oriented culture in ESA? These issues are now explored.

Which Cooperations?

Procuring in cooperation with other European organisations was initially seen as a natural way for ESA to act within its mandate of developing an organisation, while preparing the ground for other, dedicated organisations to take over the operations of the space systems developed. Whether in the field of telecommunications or meteorology, ESA would be in charge of the procurement for the development phase (the 'prototype' satellite), while the procurement for the operational phase (operation of the prototype and, sometimes, procurement of the recurrent satellites) would be retained by these organisations, respectively Eutelsat and Eumetsat.

In a second stage, and mainly for what concerns the cooperation with Eumetsat, the two organisations realised that grouping the procurement of the prototype and – at least some of the – recurrent satellites would allow achieving economies of scale. Therefore, and in spite of the fact that, for instance in the case of Meteosat Second Generation (MSG), the prototype would be mainly financed by ESA and the two recurrent models entirely by Eumetsat, the two organisations agreed that ESA would award one single contract to industry, covering the three satellites, with ESA thus acting as Eumetsat's procurement agent for the purpose of the part of the contract covering the two recurrent satellites. In the case of the MetOp series of satellites, and while the basic framework was rather identical to the one of MSG, the agreement between the two organisations foresaw that they would both sign the contract with industry covering the development, manufacture, test and delivery for launch of the three satellites.

To affirm ESA's role as the 'Space Agency of Europe', and in line with the Framework Agreement between ESA and the EC, the last years have seen the two organisations cooperating on two major programmes, i.e. Galileo and GMES (Global Monitoring Environment and Security). In both cases, the programmes aim at ultimately providing services that have been recognised as strategic by the Union and that go much beyond the objectives that had been

classically pursued by previous ESA programmes. In both cases, the choice has been made to entrust ESA with the responsibility of conducting the procurement, irrespective of the particular funding arrangements prevailing, but with adjustments to the usual ESA procurement rules so as to make the procurement compatible with the rules applicable to EU public procurements.

Recently, an assistance agreement was concluded between ESA and Spain's Centro para el Desarrollo Tecnológico Industrial (CDTI). According to that agreement, the Agency provides assistance to CDTI for the purpose of the procurement of the SEOSAT/Ingenio satellite, which is exclusively financed by the Spanish government. Taking into account that particular context, the industrial contract(s), although fully funded by CDTI, will be placed by ESA, but they will secure delivery to and ownership by CDTI of all results thereof.

Visibility to the Financing Organisation and Management Autonomy to ESA

As suggested, one of the first peculiarities of procuring in cooperation with another organisation is that the subject of the procurement is not, or not exclusively, financed by the ESA Member or Cooperating States, but, in whole or partly, by that other organisation. It is therefore only normal that, irrespective of the extent of the procurement mandate given to ESA, sufficient visibility is granted to the financing organisation on the progress of the procurement.

The experience shows how important it is for the organisations to clarify the modalities of such visibility. Special separate treasuries must be put in place in the ESA financial books to accommodate the financial instalments paid by the third-party organisation and that will eventually allow ESA to pay the contractor's invoices when justified by achievement of the technical milestones. Clear procedures must also be put in place between the organisations for ensuring swift and timely handling of these invoices. Regular Bilateral Review Groups must be accommodated for the two organisations to review the changes to the contract, being proposed by industry or by one of the two organisations, and to decide on the allocation of their costs between them.

In all cases however, it is essential for the efficiency of the procurement that those bilateral exchanges do not affect the empowerment of the ESA Project Manager to act as sole customer vis-à-vis industry, and to be perceived as such by all stakeholders.

All these implementation modalities are put in place in Project Implementation Plans between ESA and the third-party organisation, allowing ESA to efficiently fulfil its two mandates: being the customer of industry and satisfying the operational needs of its own customer, the third-party organisation.

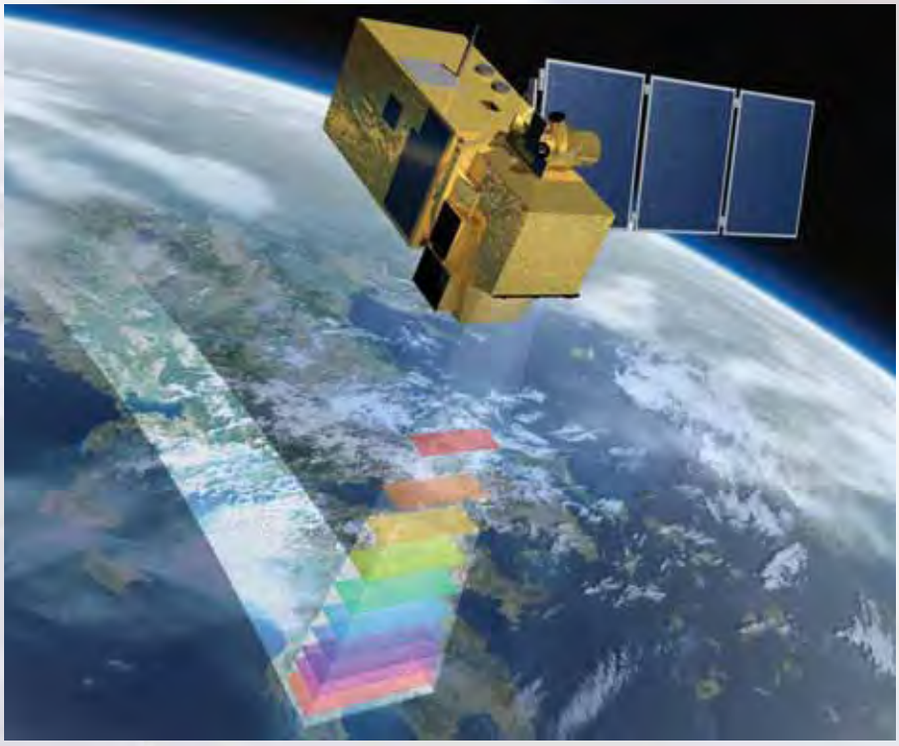
Risk Management

The specificity of ESA's experience in procuring space systems and infrastructures lies in the volume of the procurements it has conducted over 30 years, and the fact that they all involved developments that were at the forefront of the existing technologies, and that they expanded in a timespan that saw substantial evolution in the industrial landscape. This has led to the devising of procurement approaches aiming at the completion of such ambitious and non-standard projects within controlled schedules and financial envelopes, through tailored risk management schemes.

ESA, in dialogue with the European space industry, is in constant evolution on this aspect of the procurement approach and is in a position to put its experience at the disposal of its own customers.

Because of the non-standard, often pioneer, nature of space projects, their cost-estimation is difficult. Also based on the experience gathered over the years and within the framework of systematic and – as far as comparable – data, ESA conducts parametric cost estimations that can contribute to

Artist's impression of Sentinel-2 in orbit



Volker Liebig, ESA Director of Earth Observation, and Pascale Sourisse, President and CEO of Thales Alenia Space, signed the contract for Sentinel-3 Earth Observation satellite on 14 April 2008 in Paris. Sentinel-3 will provide crucial data for information services to the European Union and its Member States as part of GMES

validating those estimations or quotations submitted by industry and providing the basis of estimated financial envelopes. During the Preparatory Phases of the Programme/Project, pre-feasibility and feasibility studies not only cover the technical scope of their intent, but also, indeed, produce cost estimations that are based on the design assumptions they have produced.

A central concept in the overall ESA project management culture is the one of 'Phasing'. 'Phases' are not only important in terms of sanctioning the reaching of cardinal technical milestones towards the manufacturing and operation of a satellite (e.g. Pre-feasibility Study, Feasibility Study, Preliminary Design Review, Critical Design Review, Acceptance Review and Commissioning Review), but they also guide the process of what must be a consolidation of the requirements, the identification of the risks, their management and progressive (but never complete) mitigation.

Based on its experience, ESA promotes approaches, also for third-party procurements, dedicating sufficient funding to the preparatory phases and, during the latter, to maximise, as far as possible, the initiation and maintaining of competitive, parallel contracts with industry. These preparatory phases must allow the generation of a detailed set of requirements documents (management requirements and tasks, deliverable item list, system requirements, Ground Segment Interface Requirements, Product Assurance Requirements, Documents Requirements List, Interface Control Documents, etc.) that will form the contractual baseline for the development, manufacturing and commissioning phases, document the industrial contractor commitment for these phases and, in the case of fixed price arrangements (see below), constitute the reference against which contract modifications will be assessed and the bearing of their financial consequences will be allocated.

From the above, it results that, irrespective of the programmatic and funding arrangements made with the third-party organisation, ESA articulates procurement approaches around the principle of conditioning the start of the development and manufacturing phases to the consolidation of the requirements, including the closing of those technical trade-offs that are inherent to the feasibility studies.

Even when such progressive and systematic consolidation of requirements is pursued, the very nature of the space projects makes it unavoidable to still face risks during the manufacturing and development phases. The ESA procurement approach in that area pursues the separate identification, in the contract, of those risks covered by a dedicated financial margin and those – if any – which, typically because of their nature or potential magnitude, remain outside of the industrial contractor's commitment. This proactive approach must provide funding third-party organisations with the same transparency on the reality of industrial commitments to the one that is being provided to the Member/Cooperating States within the regular institutional ESA framework.

Prime Contractor and Subcontractor Selection

Given the international public nature of the ESA procurement process, the internal rules that govern the preparation of the Invitations to Tender/Request for Proposals, their publication, and the evaluation of the industrial offers, as well as the decision of contract award are characterised by a strong formalism, which aims at securing the fairness of the competition at each stage. The process is, however, based on a strong technical presence that, being it at the stage of the requirements definition or at the one of the assessment of the industrial offers, mobilises specialised ESA engineers and scientists at both system and sub-system level, and that constitutes the very core of ESA's added value. This technical competence is not only represented by ESA's dedicated project team, since the latter benefit also from the detailed expertise of the ESA Technical Directorate, that is in a position to provide support in all areas and technologies concerned by satellite and space infrastructure development.

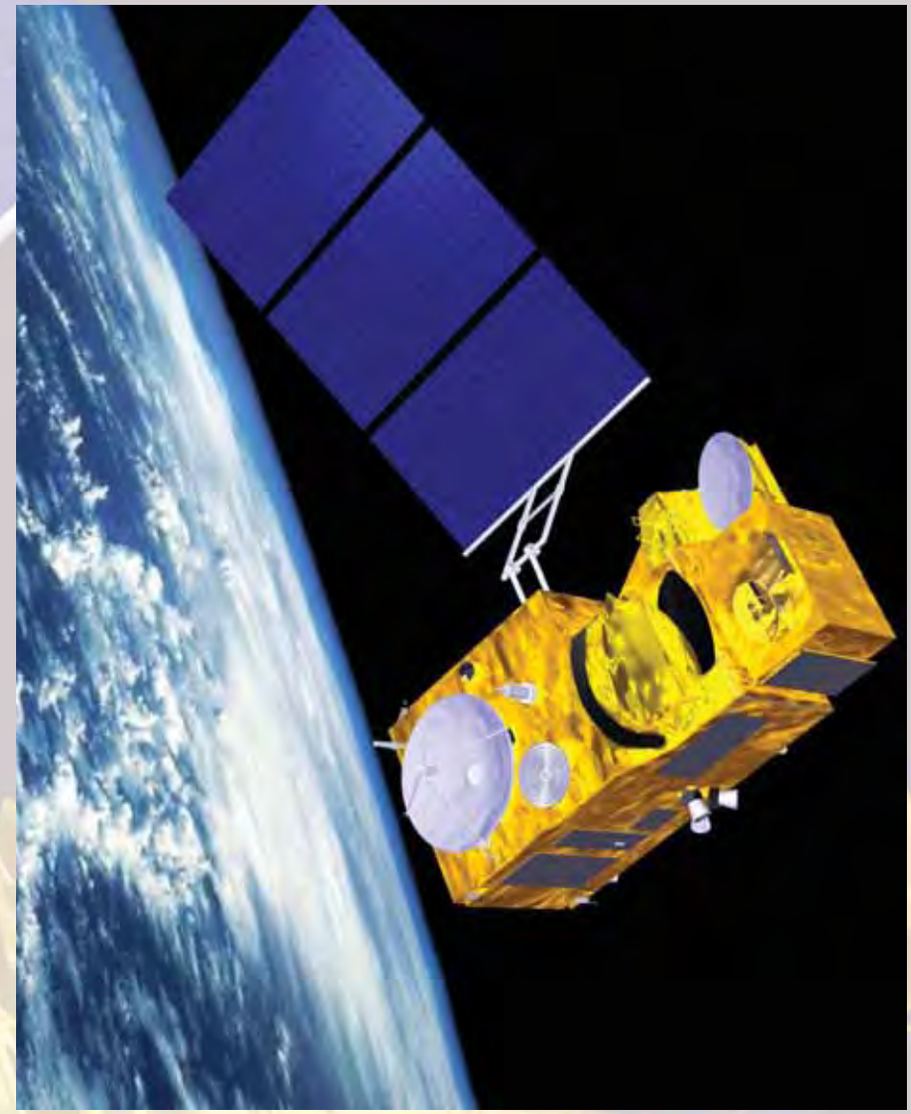
When procuring in cooperation with other organisations, ESA tailors the above-described process, so as to allow, at the same time, these organisations to benefit from its competencies and to fully involve them in all steps.

The process described above does not only apply to the selection of prime contractors, but also to the one of the subcontractors. ESA has over the years developed a so-called 'Best Practices for the selection of subcontractors by prime contractors in the frame of ESA's major procurements' ('Best Practices'). The Best Practices are based on the concept that ESA guarantees, by its presence in the process, that the principle of fair competition is applied also to the subcontractors selection process. Under Best Practices, ESA is given full visibility – and right to participate to – the Invitation/Request for Quotation preparation by the prime contractor, its evaluation process, its selection of the tenders, including the right to perform audits on the prime's overall procedure. In conducting the Best Practices, ESA has put at the disposal of the European space industrial community dedicated tools, like EMITS (European Mail Invitation to Tender System), that ensures the publication in line of all invitations to tender.

Within the regular institutional ESA framework, the Best Practices have, with time, evolved towards also including a function of implementing tool for specific ESA Industrial Policy considerations, like geographical return or share of the work between prime contractors and non-primes, etc.

Even when the funding third-party organisation does not subscribe to any, or to the same considerations of Industrial Policy, ESA organises the subcontractor selection process so as to safeguard the Best Practices' role of a management tool, allowing the end customer to keep visibility, to the extent desired, on the process followed by the prime to constitute its consortium, without impairing the absoluteness of its contractual commitment at end-system level.

Furthermore, ESA is in a position, depending on the third-party organisation's wishes and/or constraints, to either put EMITS at their disposal, or to ensure a parallel publication of the Invitations to Tender/Requests for Quotations through both EMITS and other means. An example of this is provided by the Sentinel-1, Sentinel-2 and Sentinel-3 satellites developments in the GMES programme. Given that part of the space element of the programme would be deemed to be funded from the EC Frame Programme 7, the relating Invitations to Tender for subcontractors are currently published not only through the ESA EMITS, but, in parallel, through the dedicated EC tool, 'CORDIS' (Community Research and Development Information Service).



Artist's impression of Sentinel-3 in orbit

Finally, the Industrial Policy considerations that have contributed to the ESA procurement process over the years have allowed generating data and information that benefit today the third-party organisations cooperating with ESA: industrial competitiveness at large, mapping of national and European competencies, industrial networks, etc.

Contract Management and Monitoring

Detailed and focused technical competence does not only determine the tendering phase of the ESA procurement. It is also at the centre of the contract

management and monitoring performed by ESA customer, it being in the frame of its own programmes or for the benefit of those of third-party organisations. During the entire timeframe of the development, and without taking over the financial and contractual responsibility that must and does remain the one of the industrial contractor, ESA puts in place the tools allowing a close technical monitoring of the work progress, at all critical levels of such undertaking and of the industrial consortium.

This technical monitoring takes the form of regular progress reports from, and progress meetings with, industry, which allow the keeping abreast of the real status of the project, reinforce the technical and schedule control of those elements that are on the critical path, and impose redirections and additional investigations where judged necessary.

The strictly contractual tools have, also, been developed and adapted over the three decades of ESA's operations, with a view to match the particular context in which contracts are placed and to serve the particular reality these contracts cover (development of complex, innovative, precursor space satellites and infrastructure).

This has led to the progressive development of clauses and practices, including all aspects of the contract. As is the case for its own procurements, ESA pursues, in contracts covering third-party procurements, clauses that secure the timely and performing delivery of the end product, within the agreed price. The contractual areas that are more primarily concerned by these three elements are the price-type, the guarantees, and incentive/penalty schemes.

The three types of prices commonly practiced by ESA in its contracts are the fixed price, the ceiling price and the cost-reimbursement price. While the ceiling price is by nature and as its name indicates a price subject to refinement 'within its ceiling' at a later stage of the contract and when uncertainties have been clarified, different schools of thought continue to coexist on the respective merits of fixed price and cost reimbursement price.

Since the fixed price is essentially not subject to any refinement, irrespective of the actual evolution of the cost incurred by industry, it is seen that to be sustainable by the latter it must contain a sufficient margin to accommodate unforeseen events. This would, in turn, plea for the fixed price to be concluded for portions of the development where such risks are reasonably foreseeable and measurable, or, as suggested above, keep the unforeseeable or immeasurable risks out of the fixed price.

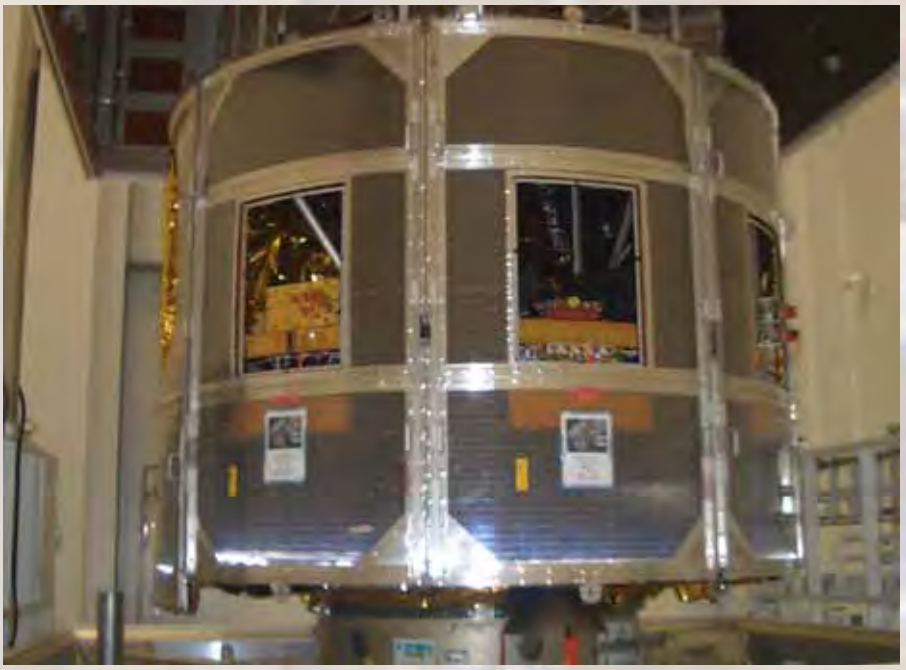
The cost-reimbursement price foresees the reimbursement of the allowable costs incurred by the contractor, plus a profit, that can be either fixed or linked to the achievement of schedule, costs or performance objectives. By its nature, it thus implies a much stronger and systematic implication of ESA in the administrative management of the project, and it would provide, if not a protection against, at least a better visibility on the elements eventually generating costs overruns.

Whatever the price retained, however, it looks obvious that none of them could make up for an insufficient financial envelope. It is therefore essential to invest time, skills and competencies in the accurate cost-estimation exercises that are leading to the definition of such financial envelopes, and ESA pursues constant improvements in these domains.

The concept of 'guarantee' takes a different resonance in the context of space satellite or infrastructure procurement than it has in the field of ordinary consumables: it does not appear feasible to pursue replacement of an in-orbit faulty satellite as would be the case for, e.g. a non-functioning car. Contracts have adapted to that reality, and, as an example, the obligation of satellite manufacturers under guarantee clauses may take the form of them investigating and providing, at their expenses, ground-segment based remedies: engineers would, from Earth and thanks to software 'patches' try to correct the defect observed or to mitigate its effects.

When the contract covers a series of satellites, the guarantee clause may take the form of a 'retrofit' obligation: the

MSG-2 was launched on 21 December 2005 from Kourou, French Guiana. Two more MSG satellites should guarantee continuity of service through to around 2018. MSG-3 is in storage, and is planned to launch early 2011. MSG-4 is planned for a launch not earlier than 2013



obligation of the satellite manufacturers will consist in bringing to the not-yet launched satellites, at their expense, all corrections necessary to avoid reoccurrence of the defect on these not-yet launched satellites. However, such clauses are of a very onerous nature for industry, and ESA's practice has therefore been to associate them with a limitation of the financial liability to which the contractor would be exposed under their application.

As suggested here, third-party organisations cooperating with ESA for the purpose of their procurement very often have stringent operational needs and constraints. ESA is committed to proposing industrial contracts that serve such reality. To do so, clauses contributing to the timely and performing completion of the undertaking are of key importance. For many years, the standard way of dealing with that aspect of the contract was to agree on financial penalties, to be paid by the industrial contractor – in fact subtracted from the agreed price – in the event of late of non-performing delivery.

Over the years, the contracting parties took the measure of the not optimal effect of such a negative exclusively sanctioning approach. In an attempt to deal with the issue in a more positive and effective manner, they have developed mixed incentive/penalty schemes. The principle of such schemes is that part of the agreed price, including sometimes part of the nominal profit of the industrial contractor is put at risk and may be lost, nominally earned, or multiplied, depending on the reaching of criteria that can be of calendar (achieving acceptance and/or delivery of the satellite on or before a given date) or technical (achieving technical parameters after a defined timeframe in-orbit) nature.

Another aspect of the procurement where ESA strives to adapt itself to the operational needs of its partners is the regime of Intellectual Property Rights (IPRs). Within the regular institutional ESA framework, the industrial contractor retains IPR on the information/intellectual property generated under ESA contract, but ESA and its Member/Cooperating States have the right to use the data for their own purposes, often including the right to grant sub-licences.

The contract and cooperation agreement for construction of the MSG-4 satellite being signed at ESA Headquarters in 2004 by Jean-Jacques Dordain, ESA Director General, Lars Prahm, Eumetsat Director General, Pascale Sourisse and Volker Liebig

Depending of the nature of the cooperation with the third-party organisation, the contract placed by ESA will foresee adjustments to such regime, and provide for either a share of the rights between ESA and the third-party organisation or even the granting to the latter of increased, exclusive rights, for instance in the case of full funding by the third-party organisation.

Conclusions

For more than 30 years, the ESA procurement process has constituted the formal and concrete way for the organisation to interface with the European space industry and research organisations, thereby implementing the mandate derived from the ESA Convention.

In doing so, the process has had to adapt to the evolving landscapes it applies to, to implement the Industrial Policy decided by Member and Cooperating States, while securing Europe's presence in space and guaranteeing its access to space. This adaptability has sometimes led us to touch on the very fundamental principles of public procurement: ESA has concluded contracts that were at the centre of public–private partnerships, deviating from the classical governmental contribution to space developments.

All these experiences have made ESA procurement develop into much more than a process. They have contributed to make it into a combination of multidisciplinary skills, which are all geared at reaching the same goal: conducting and completing complex technical undertakings in time, within budget and to an uncompromised level of technical standard.

As such, today's ESA procurement is a robust and flexible tool that is in a position to integrate contexts other than our internal ones, and that can thus be used by our partner third-party organisations for satisfying their operational needs.

At the same time, with the ever-renewing challenges that these new realities represent, ESA finds a nurturing and dynamic element that will also contribute to the constant improvement of our service to Europe and to its citizens.