

Report on the principal programmatic areas of future space policy

Space policy: Daring or decline

How to make Europe world leader in the space domain

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Since the 2004 announcement by the USA of its return to the Moon, planned for 2020, there has been a spate of major events in the space sector, whether this is a coincidence or not. China made its second human spaceflight in 2005, and has initiated a lunar program for 2020. In the military domain, China neutralized an American spy satellite by dazzling it with a laser beam in 2006, and less than six months later, destroyed one of its own older satellites in orbit with a ballistic missile. Also in 2006, India announced a human spaceflight program for 2014, and early in 2007 retrieved one of its satellites intact from orbit, thus taking another step towards landing an Indian astronaut crew on the Moon in 2020.

Abstract

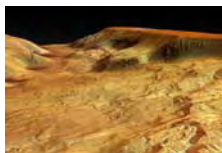


Ariane ECA - 2005 (CNES)

Compared with the situation at the beginning of the decade, future prospects for the space sector have taken a sharp upward turn and its vitality

has been restored.

While the future of the space sector appeared to lie essentially in the merchant services domain – telecommunications, TV broadcasting, positioning, etc. – and although these missions are still there, others are now coming to the fore, missions vital for mankind, with



Mars seen by Mars Express (ESA)

the study of climate change and the search for ways and means of combating the greenhouse effect. The space sector constitutes a mandatory tool for all of these.

After the initial orbital probe missions to the Moon, Mars and Venus, and the giant planets Jupiter and Saturn, the period of major discoveries concerning the solar system appeared to have come to an end.

But now the search for life on Mars is regarded as essential for understanding our origins, and

solar probe missions as a prelude to solar meteorology as equally essential for more efficient management of Earth.

Was the Star Wars program no more than an aberration, spawned by confrontation between the two power blocks? *The rush for military satellites, for observation, transmission, listening watch and early warning is now bringing with it the creation of the means to destroy satellites in orbit.*

Considered to have reached a state of maturity, should the space sector now become a market activity? *Public investment is being stepped up by the leading powers, whether based on a market economy such those of the USA and India, or a state-controlled economy as is the case with Russia and China.*

The dynamics of the space sector development in general are not only merely on the move. We are now witnessing a race even more frenzied than that of the 1960s, but in this case involving a number



Ares-I and Orion (NASA)

of individual players rather than just the Eastern and Western blocks.

While the NASA budget of around \$ 17 billion is not increasing faster than prices, the USA is currently allocating a budget of \$ 20 to 25 billion to the military space sector, with an anticipated increase of 30% between now and 2012.

At the same time, and as a result of its oil and gas revenues, Russia has multiplied its civil space agency budget tenfold in eight years, reaching a level close to that of the European Space Agency (ESA) on an equal purchasing power basis. Japan is also accelerating its investments and has announced a lunar program for 2022.

With sharply rising budgets, of the order of one billion dollars, but in fact substantially greater if we take account of military budget and cost differentials, China and India are demonstrating their growing technical expertise year by year, as also their ambitions which now embrace human spaceflight and lunar programs. Another capital phenomenon is that space technologies – launchers and satellites – can increasingly be regarded as ‘*proliferating technologies*’, with more and more powers possessing long-range missiles capable of both launching and indeed destroying satellites.

It is to these radical changes that France and Europe must respond. The stagnation of their investment in the space sector has left them unprepared for this situation. However their history and expertise put them in a position to take up the challenge.

France is still the leading European space power. But the budget restrictions imposed on the French Space Agency, CNES, the public subsidy for which is increasing more slowly than inflation, is obliging the Agency to mark time. In contrast, Germany and the United Kingdom are stepping up their investment programs.

The increase in the mandatory ESA budget does not exceed the rise in prices, and the European Union takes the space sector inadequately into account in its common policies.

Taking national and mutualized investment together, Europe is investing one-quarter as much as the USA in the civil space sector, and one-twentieth as much in the military space sector.

The European space industry has been experiencing a period of very pronounced austerity since 2001, with a drop of 20% in its consolidated sales between 2001 and 2005, and a 16% fall in payroll numbers. The collapse of the commercial telecommunications satellite market, which formed the platform for the activities of the French and European industries, has unfortunately not been offset by an increase in public sector procurement. This contrasts sharply with the USA, where the public sector accounts for 90% of space business.

In real terms, to avoid finding themselves completely out of their depth in world competition in the space sector, France and Europe need firstly to analyze their present misapprehensions, and then declare a clear vision of the role of the space sector for the decades ahead.

The first misapprehension faced by France and Europe is the currently widespread opinion that space sector growth can be induced first and foremost by the *market*. No space power, with the exception of Europe, is making this mistake. Space sector investments are capital-intensive and long-term, and generate externalities which the markets do not take into account and can only fund with difficulty. Competition in this market is distorted by dumping by generally public sector industries, more interested in geopolitical influence than profit. In the absence of adequate public sup-



Galileo Constellation (CNES)

port, the European space industries are seeing their long-term future compromised by insufficient R&D capabilities and profitability. Institutional support for the space sector must consequently be amplified on an urgent basis, both at national and European levels.

Another misapprehension is that the space sector is *invisible* at the present time. Public opinion ignores the fact that a single day without satellites would produce twenty-four hours of economic and social chaos. Experiencing an unprecedented period of austerity, the space agencies and industries are concentrating their resources on their very survival. Reduced to their very simplest expression, human spaceflight missions lack the dimension required to stimulate imagination, meet the technological challenges of performance, dependability and complexity, irrigate industry and the economy, devise wise management for the planet Earth and move outward towards new frontiers in the Universe.

A new policy is thus essential for France and Europe. This policy must be reconstructed from its very foundations, and be based on a long-term vision of the French and European space sectors.

France must return to fundamentals – to a dual, strategic and scientific dimension, with absolute priority for autonomous and competitive launchers, support for national defense from the space sector, and world leadership in space science – and at the same time advance towards human spaceflight.

For its part, Europe must use the space tool to pursue its secular role in the domains of discovery and exploration, stiffen up its cohesion and federate worldwide investment in human spaceflight.

Space must win back its *priority* position in the French and European institutional mechanisms. A ten-year space program, to be reviewed in mid-term, must be prepared at the highest political level and approved by Parliament, in France as in Europe. The institutional organization of the European space

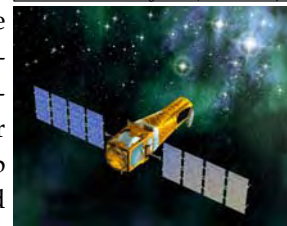
sector must be simplified, based on what functions efficiently – ESA (European Space Agency), and EUMETSAT (European Organization for the Exploitation of Meteorological Satellites). Public support for space research, whether fundamental or technological, must be included in French and European priorities, at the risk of the overall technological disengagement of the European Union. Without waiting for an unpredictable institutional future, the European space sector must move forward on the basis of concrete projects.

The truth of the matter is that France and Europe already possess technical skills of the first order, and a world leader position in a number of segments such as launchers and telecommunications and observation satellites. With a political ambition to match these scientific and industrial trump cards, Europe can set its sights on the position of leading space power in the world.

Like all the other space powers, France and Europe must use the space sector to confirm both their expertise and respective identities. Their investments in this sector must be stepped up considerably, and this for the additional reason of the resultant technological drive and economic benefits generated.



NGC 2207 and IC 2163 galaxies (Hubble, NASA)

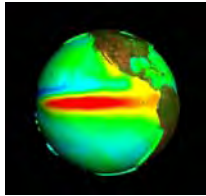


COROT satellite (CNES)

Europe is world leader in the *launcher* domain with Ariane-5. To retain this position, Europe must continue development of its flagship launcher, increasing payload capacity with the addition of a reignitable third stage and acquiring qualification for human spaceflight missions. Commissioning of Soyuz at the CSG and development of the VEGA launcher must be completed

of the VEGA launcher must be completed without delay.

France and Europe must take the fullest advantage of their exceptional expertise in the space science domain. Astronomical observation satellites, automatic probes and robot explorers will provide terrestrial observation activities with the additional data increasingly important for our comprehension of the Universe, only 5% of which is currently observed and identified, and the formulation, still largely incomplete, of the fundamental laws of physics.



El Nino - 1997 (Jason, CNES)

With their expanding capabilities, *telecommunications* and TV broadcasting satellites can take over the HR Internet, HD digital TV, television for mobiles and digital radio, and participate in widespread distribution of the new digital audiovisual technologies. It rests with Europe to devise major projects and remove political and bureaucratic obstacles, all of which are clearly trivial in the light of the issues at stake.

Satellite *positioning* and navigation services are becoming essential for both heavy and service industries, and also for the public at large, at a speed vastly greater than that observed in the past for other technologies including mobile telephony.

Observation satellites represent the ideal instrument for monitoring and controlling the implementation of sustainable development and measures for combating climate change. The Galileo and GMES (Global Monitoring of Environment and Security) projects clearly merit absolute European budget priority, in the same way as the major new project concerning "space for collective security and digital equality in Europe", designed to generate concrete and immediate benefits for the citizens of Europe.



E. ALDRIN (photo by N. ARMSTRONG - 1969 / NASA)



ORION capsule (NASA)



ATV approaching the ISS (CNES)



ARIANE-5 ECA (CNES)

As the space sector is recognized as an **irreplaceable military tool** for observation, communication with the armed forces and listening watch and early warning functions, to the point where military satellites themselves must be protected by new space-based systems, the leading European states involved in the space sector, and first and foremost France, Germany and Italy, must set up select multilateral cooperation agreements to move forward in all these domains.

Finally, the question of *human spaceflight* missions can no longer be sidestepped. A very minor partner in the International Space Station, Europe cannot continue to tag along behind the USA and Russia when it comes to transportation of its astronauts.

When the USA, China and India all have their permanent bases on the Moon, would the Europeans pardon their leaders for having missed out on this major step forward, one which will strengthen confidence in the future and lead to new technological progress and other major scientific discoveries?

Europe already possesses the technical means and financial resources to build an autonomous space transportation system compatible with other American and Russian systems.

Europe's duty is to develop its expertise and place it, independently, at the service of

The 50 recommendations (see enclosure) put forward proposals, in as precise terms as possible, for a new audacious space policy, one truly worthy of France and Europe.

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SPACE POLICY : DARING OR DECLINE
50 RECOMMENDATIONS
FOR A BOLD FRENCH AND EUROPEAN SPACE POLICY
Christian CABAL, Member of Parliament and Henri REVOL, Senator

I.- Bases for a new space policy

A. - Governance of the space sector in France

1. A *French space vision* is defined jointly by the Government, Parliament, CNES and industry.
2. The *principles of the French vision of space* are: autonomous access to space for Europe must be ensured; the space sector is the keystone of defense; France is world leader in space science; human spaceflight missions are an essential dimension for exploration of the Universe.
3. The Minister for space is a *member of the Cabinet* whose responsibilities are restricted exclusively to space.
4. To ensure the motive force behind, decisions concerning and monitoring of space policy at the highest level, a *Space Council* is set up with the President of the Republic.
5. The *High Council of Advisers for science and technology* is approached as rapidly as possible concerning "space technologies of the future", and two leading observers from the space sector are appointed immediately following the next rotation of High Council membership.
6. A *space planning law* covering a period of 10 years, and reviewed and revised if necessary after 5 years, is voted by Parliament.
7. The *CNES multiannual contract* is revised in 2007, with effect as from 2008.
8. The *national segment* of the CNES budget is increased by 8% *per year* as from 2008.
9. An *additional subsidy*, outside the framework of the multiannual contract, is allocated to CNES to enable it to take on the new regulation and certification functions assigned under the terms of the law relating to space law.
10. The CNES multiannual contract includes an *additional unallocated budget line* making it possible to respond to *new projects* set up by ESA or other partners in multilateral cooperation contexts.
11. CNES sets up a dedicated program concerning *technological research and demonstrators*, on a cooperative basis with industry and funded by a dedicated "technological research and demonstrators" budget line as distinct from the "space sciences" line, without delay.

12. The *Industrial Innovation Agency* and *National Research Agency* contribute to funding of future space programs.
13. CNES sets up *partnership* arrangements with the *regional and departmental authorities*, for the development of new space projects.
14. CNES develops *new information and communication resources* to meet its own needs and those of its partners, including industrial partners in particular, based on digital technologies, Internet and digital audiovisual satellite broadcasting, for more efficient information of the general public concerning current space achievement news.

B. - Governance of the space sector in Europe

15. *Decisions* by *ESA Council*, meeting at Ministerial or ordinary level, are taken on the basis of a *qualified majority*, defined by a minimum percentage of budget contributions.
16. The *ESA geographical return* rule applies to a set of programs, and not "program by program", and includes services as well as industrial production.
17. A *European space vision* is defined by an authority including the President of the European Commission, the Director General of ESA, the presidents of the national space agencies and the heads of space sector companies.
18. The *European vision* of space takes account of the *following principles*: the European space sector contributes to collective security, protection of the citizen, and the cohesion and balanced development of the EU; the European space sector adopts a transverse approach, and sets up systems of systems with the rest of the world; combining automatic probes and human space-flight missions, Europe participates in Universe exploration projects, and its aim is to federate these projects.
19. The European vision of space is *adopted* by the *European Council* of Heads of State and governments.
20. A *Space Council* is set up within the *European Commission*, comprising the commissioners in charge of enterprise and industry, transport, the environment, health and consumer protection and agriculture.
21. A *Space Commission* is set up within the *European Parliament*.
22. European space policy is formulated on the basis of concrete projects within the framework of a *European ten-year space development plan*, reappraised and revised where appropriate after five years.
23. Space applications are eligible for funding by the *CAP* and *ERDF*.
24. A major project designated "*space for collective security and digital equality in Europe*" is launched by the European Council in 2008.
25. The *European Union* contributes to the definition and funding of *European space policy*. The *prime contractors* for the corresponding programs are *ESA* and *Eumetsat*, also authorized to develop their own add-on programs.

II.- New French and European space programs and missions

A.- Launchers

26. The *EGAS program* is extended to offset the impact of the weakness of the US dollar on the Ariane-5 program. European funding is set up to complete the Soyuz launch pad, and install Soyuz and Vega at the CSG.
27. Research, development and test work on a more powerful new version of the EPS-AESTUS engine is initiated for the *ATV with a full load*.
28. Development of the *reignitable Vinci cryogenic engine* for the Ariane-5 third stage is initiated without delay, with the assistance of national and European public authorities.
29. A task force is set up for application of the Franco-American cooperation CFM model to the production of the new generation *Vulcain-3* launcher engine.
30. *Qualification* of Ariane-5 for *human spaceflight missions* is obtained within five years.
31. Sanctions are introduced for non-compliance with *European preference* for launching European civil or military institutional satellites.
32. Development of *sub-orbital flight* technologies is supported by the public authorities.
33. An *upstream research* program on engines for future launchers is set up by Europe in cooperation with *Russia*.
34. Studies and tests for *nuclear propulsion systems for deep space exploration* are reactivated by the Atomic Energy Authority (CEA) in liaison with industry.

B.- The defense space sector

35. *European defense space sector budgets are doubled every five years* up to 2020, within a select multilateral framework.
36. *The military telecommunications* space systems of European NATO member states are made *interoperable* within two years.
37. Investment in the *Syracuse-3C* and *Helios-3* satellites is committed in 2007.
38. Development of a protected *satellite HR Internet system* for mobile military units is initiated in 2007.
39. A European *integrated military telecommunications* system is supplied to NATO by the European Union member states.
40. A European *electromagnetic listening watch* system is set up within the framework of a select multilateral cooperation agreement.
41. Studies for a ballistic missile *European early warning* system are initiated in 2007, with the aim of commissioning the system within ten years.

C.- Space services

42. A *European 20-year plan*, ratified by the European Union and placed under the aegis of ESA, is initiated for the *observation and exploration of the Universe* by satellites and automatic probes, and integrated in the European 10-year space action program.
43. EUMETSAT is the operator for GMES space segment infrastructures.
44. Implementation of the *Galileo program* is accelerated so as to achieve *commissioning of the system in 2010*.
45. The role and access rights of the *Galileo international partners* are defined before the end of 2007, with coordination of the system reserved for ESA members.
46. Problems raised by the PRS (Public Regulated Service) are cleared in liaison with the NATO authorities.

D.- Human spaceflight missions

47. The conditions for operation of the *ISS International Space Station after 2015* are examined as from 2007, in cooperation with all partners.
48. The ESA *Aurora exploration program* is revised before the end of 2008, with a view to including the lunar project as a test bed for Martian technologies.
49. Development of the *European ATV-ARD space transportation system*, autonomous but compatible with the NASA and other transportation systems, including Russian systems in particular, is implemented as from 2007, with a view to experimentation in 2012.
50. *Moon landing* by a first *European crew*, and their return to Earth using the European space transportation system, are programmed for 2018.

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