

Contributos de Pedro Tavares da Rosa:

Senhora Professora Maria da Graça Carvalho,

Como o fiz na sessão de 9 de Julho no IST, quero agradecer o convite para participar no seminário sobre os programas europeus de ciência e inovação e ainda por ter aceite a sugestão de referir a importância que pelo Artigo 189 do Tratado de Lisboa os programas de ciência e exploração espaciais obtiveram: no mesmo contexto penso que o relatório que está a preparar poderá referir ainda outra especificidade que os programas espaciais claramente possuem: as relações adequadas com a Agência Espacial Europeia (§ 3 do mesmo artigo).

Por outro lado será curial admitir que qualquer programa espacial, por menos ambicioso que seja, assume sempre uma magnitude que exigirá sempre a cooperação com programas de outras nações empenhadas na exploração espacial, tanto as já estabelecidas neste domínio como as que actualmente emergem com algum êxito: as sinergias e as economias obtidas através deste tipo de cooperação têm mostrado benefícios cruciais para o avanço da ciência e exploração espaciais (se achar necessário obter mais informações sobre esta matéria terei muito prazer em lhe enviar alguns textos produzidos neste âmbito).

Após as longas intervenções que me precederam, referi ainda na sessão que não me parecia haver necessidade de despender mais tempo sobre os mecanismos que podem ser simplificados. As considerações que se seguem foram preparadas com base em textos de diversos autores especializados no domínio do espaço e ainda na gestão de programas inovadores nesta área; eles concordaram, sem reservas, que os seus textos pudessem ser por mim utilizados para este fim. O resultado desses acordos é o seguinte texto:

### **Simplifying the Implementation of the Research Framework Programmes**

The Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the European Community was signed at the in December 2007 by representatives of the twenty-seven Member States, entering into force on 1 December 2009, after being ratified by all the Member States. The resulting consolidated version of the Treaty on the Functioning of the European Union establishes in its new Article 189 that the Union will draw up a European space policy and that "to this end, it may promote joint initiatives, support research and technological development and coordinate the efforts needed for the exploration and exploitation of space". In determining this, the Treaty also established that the "Union shall establish any appropriate relations with the European Space Agency", institutionalising thus a longstanding partnership. Although not constituting a completely new

paradigm, this support to the space activities in Europe clearly consubstantiates previous decisions taken by the Council of the European Union on its approval of the last version of the European space policy [Council of the European Union, Council Resolution: *Taking forward the European Space Policy – adoption*, 13569/08, 29 September 2008], *inter alia* affirming that “space exploration is a political and global endeavour and that Europe should undertake its action within a worldwide programme, without any monopoly or appropriation by one country: the different actors taking part with their own capacities and priorities”. This legal and political framework of the highest relevance for Europe also consubstantiates previous proposals by the European Commission [Commission of the European Communities, *Communication from the Commission to the Council and the European Parliament: “European Space Policy”*, COM(2007) 212, 26 April 2007; and Commission of the European Communities, *European Space Policy Progress Report*, COM(2008) 561, 11 September 2008.], not least of which certainly is the assumption by the Council of the contribution of space to innovation and competitiveness in the context of the European Economic Recovery Plan [Council of the European Union, *Council Resolution on “The Contribution of Space to Innovation and Competitiveness in the Context of the European Economic Recovery Plan, and Further Steps”*, 10500/09, 29 May 2009].

This political context clearly indicates that the time is up to reappraise the goals of space exploration and exploitation whilst reassessing the instruments and funds necessary to achieve these objectives, all in a wider and more ambitious scale, simultaneously reaffirming its role as an enabler for progress in many different scientific and technological domains, as a result of its quite evident multiplier effect. In fact, space activities have been addressed consistently over the years by the European Space Agency and in the European Union, particularly within the successive framework programmes for research and technological development, leading further to their implementation and entry into operation. In this perspective, the development of navigation (i.e. Galileo) and Earth observation (i.e. GMES) systems constituted very important components strengthening the worldwide European position in this field. These endeavours are also complemented at Member State level through the development of adequate national programmes and the activities of their respective space agencies.

It was recently proposed adding space exploration as new major building block of future European space programmes, particularly from 2014 on, a recommendation based on considerations on its benefits for the European citizens and on the constitution and implementation of an integrated and coherent flagship programme. It becomes thus quite clear that such a flagship programme will complement relevant projects already developing into the operational phase, such as Galileo and Global Monitoring of Environment and

Security (GMES), thus bringing them to the usefulness to the benefit and advantage of the European citizens and institutions.

Since Europe, via its appropriate institutions, has played in the near past a major role in international efforts and account taken of known projects in this field, such a coherent flagship programme will remarkably reinforce international partnerships through the sharing of challenging and peaceful goals. Being the aim of space exploration to expand the range of activities for humankind, it must take, then, the form of a European long-term plan for the robotic, eventually leading to human exploration of the solar system: it will be the first step in the constant endeavour of humanity of spreading out from its native planet towards locations within its reach [*Vide, inter alia, The Global Exploration Strategy, The Framework for Coordination*, May 2007, developed by ASI (Italy), BNSC (United Kingdom), CNES (France), CNSA (China), CSA (Canada), CSIRO (Australia), DLR (Germany), ESA (European Space Agency), ISRO (India), JAXA (Japan), KARI (Republic of Korea), NASA (United States of America), NSAU (Ukraine), Roskosmos (Russia).

[http://esamultimedia.esa.int/docs/isecg/Global\\_Exploration\\_Strategy\\_Framework.pdf](http://esamultimedia.esa.int/docs/isecg/Global_Exploration_Strategy_Framework.pdf) and Norman R. Augustine (Chairman, Wanda M. Austin, Christopher Chyba, Charles F. Kennel, Bohdan I. Bejmuk, Edward E. Crawley, General (ret.) Lester L. Lyles, Leroy Chiao, Jeff Greason, Sally K. Ride, *Human Spaceflight Worthy of a Great Nation*, Review of U. S. Human Spaceflight Plans Committee, Washington D. C., October 2009].

The success of the future European space programme will also depend on the instruments used to address the space thematic areas. In the space area the possibilities of combining the activities of the European Space Agency and other national research and innovation programmes through joint lines of action with the Research Framework Programme offer also great potential.

Different from other European Union research and technological development programmes, the correspondent space activities specifically bear two characteristics:

1. the cooperation with the European Space Agency, now institutionalised through the Treaty on the Functioning of the European Union
2. the need to provide for extensive international cooperation with established and emergent space-faring nations, particularly in programmes of certain magnitude and ambition.

Within European Union programmes, the use of combined calls within for instance the Seventh Space Programme priorities [i.e. within the "Cooperation specific programme" with ICT, Security, Environment, or Health, but also with other Specific programmes like Capacities on research infrastructures or People for training and networking] could

be certainly be put in better use. Specific thematic interaction with other programmes outside the Framework Programme like Competitiveness and Innovation Programme (CIP) or European Institute of Technology (EIT) should be strongly considered in order to support knowledge triangle views with innovation and higher education.

The following figure depicts the combination of different types of programmes for space, its central part representing the type of space programmes which are common in Europe [notice that the memberships of the EU and ESA are not exactly the same].

[Figure: Multi-scenario of space programmes](#)

Meanwhile, the European Commission has consistently emphasised cooperative research in the Research Framework Programmes instruments [in Seventh Framework Programme termed as “funding schemes”] contained in the rules for participation. They have demonstrated its usefulness over years. The Sixth and Seventh Research Framework Programmes have enforced the use of instruments with a “structuring” role in the European Union like “integrated projects” or “networks of excellence” but all of them were “community instruments” financed through Research Framework Programmes budgets. For the Eight Research Framework Programme and beyond the relationship between Community and Member States programmes will be reconsidered to increase mutual synergies.

The European Research Area-Networking Plus (ERA-NET Plus) is considered a valid instrument for the space domain, implying however a strong coordination of the efforts carried out by national space agencies of Member States with the participation of Seventh Research Framework Programme (and, maybe, ESA in providing some space platforms as a part of the implementation strategy). The possible identification of areas susceptible of being covered by an ERA-NET Plus could yet be launched through a specific support action (SSA) supported by Seventh Research Framework Programme.

There are many potential areas for ERA-NET Plus in the satellite domain. As an example, the development of scientific instruments for deep space exploration, the creation of a network of facilities for simulation and control of remote probes, the space grid for processing satellite data are possibilities to be explored. In all these cases, close cooperation amongst agencies and involvement of many Member States (even without string space industry) can be used as a lever for defining the future European space programme.

The Treaty on the Functioning of the European Union offers additional possibilities by stimulating better coordination with Member States’ programmes. In the case of space, part of this need has been covered through the coordination between ESA and the European Commission with a problem derived from the different membership on these two

contexts [in the near future, this problem will become less important if a closing up in membership between both entities continues]. Joint Council meetings and a quasi-permanent coordination structure with European Commission and ESA services have partially solved the mentioned problem.

The implementation of new research funding instruments based on the use of articles 185 and 187 of the Treaty has been considered a relevant evolution in Seventh Research Framework Programme from the conventional funding schemes used in previous Research Framework Programmes [ARTEMIS, ENIAC, IMI, FCH or Clean Sky have represented a very different way of addressing some S&T priorities moving resources from open calls in the Cooperation programme to internal activities of the approved JTIs. In all these cases, Member States and industrial sector have committed additional resources. With respect to ERA initiatives launched on the basis of Article 185 (where public funds are available) space has not been considered a priority until now. Present article 185 approved initiatives were EDCTP (from FP6), AAL and EUROSTARS on Seventh Framework Programme. A fourth one, on metrology will be formally approved very soon. In some cases, the roadmap towards these article 185 ERA initiatives came from previous ERA-NET Plus initiatives]. The use of these articles to support joint programmes or "joint technology initiatives" has implied a transference of some funding from Seventh Research Framework Programme to specific new legal structures where other funding sources from Member States and private entities defined a different structure.

The use of article 187 of the Treaty on the Functioning of the European Union is a very flexible solution to accommodate different ways of implementing *ad hoc* programmes. As an example, it is used today for two different goals:

- For implementing Joint Technology Initiatives (JTIs): no specific JTIs related to space have been launched. Galileo was considered several times as a candidate case but the specific Galileo Joint Undertaking evolved towards public commitment (at least in a first phase) for operational use but not to support research activities. Global Monitoring of Environment and Security (GMES) has been addressed as a public process from the beginning and it will take years to change this status.
- For implementing European Research Infrastructures Consortia (ERICs): apart from the European participation in the International Space Station, particularly the European Columbus module, and the scientific exploitation of some deep space probes, pure space research facilities have not been included in the European Strategy Forum on Research Infrastructures (ESFRI) roadmap (with 44 research infrastructures) [in the list of future research facilities for environment research ESFRI has included in the roadmap a set of

initiatives which combine satellite data with other from observations on the Earth. These are: EURO-ARGO (Global Ocean Observing Infrastructure) which intends to deploy 3.000 floats over oceans and data from satellites. Another case is IAGOS (In service aircraft for Global Observing System) to be composed by 10-20 aircraft (Airbus) for long-term observations for chemical components. ICOS (Integrated Carbon Observation System) will provide the basis for integrated observations of trace gases. LIFEWATCH will provide special services for scientists and policy users of biodiversity as a network of observatories complementing GMES and GEOSS. Finally, SIAEOS (Svalbard Integrated Arctic Earth Observing System) will integrate information for monitoring Arctic evolution]. The approach was to complement space observation with *in-situ* sensors in order to complement observations. A re-analysis of this situation could be necessary.

Another future instrument for European research will be the definition of "Joint programmes" (JPs) promoted by the Council. At this moment the Member States are identifying in a specific Scientific and Technical Research Committee (CREST) configuration the candidate topics to be selected as joint programmes. This is a responsibility of the Member States which decide to fund a new joint research programme by fully opening their national programmes.

It is too early to know what will be the topics for joint programmes will be endorsed by the Council but it is considered that the role of "space" should be taken into account as a specific and powerful tool both from its horizontal and vertical dimensions.

A large number of Member States are also committing resources to ESA [both in its mandatory and voluntary programmes] with a sense of fulfilling the space needs. On the other hand, additional commitments from Galileo or Global Monitoring of Environment and Security (GMES) in a second phase have also covered the operational needs of these two main European flagships.

The scope of future space activities should cover innovation and industrial policy. Industrial policy is always an overarching element in European Union policy; however, an expanded space engagement must have another element, namely to reinforce the Europe's position in the global context as a courageous and innovative player.

This wider scope of the future Space programme should also enhance Member States capacities in the space sector. To ensure this role there are two possible conditions:

1. Any new Space programme should be a European enterprise and the national capacities will prosper by necessity through the involvement of industry in the execution or exploitation. In any case, this is compatible with different levels of involvement of Member States.

2. There are space based applications that depend on the political will to use them, e.g. for environment monitoring, climate change mitigation, security, air traffic management, etc. Then, in some areas, the full benefits of the applications depend on the legislation, e.g. if there is no legislation that require reporting on environment related matters, the unique capability of space to support reporting will not be sufficiently exploited and there will be no applications developed.

The need to simplify the implementation of the Research Framework Programmes becoming evident, the specificities of the space theme ought to be taken also in consideration in any new or modified forms of European public funding in research and innovation. The rapporteur of the European Parliament on simplifying the implementation of the framework research programmes is therefore invited to add whatever consideration is deemed fit to include these specific characteristics.

Espero que estas sugestões possam merecer a sua atenção e a sua aquiescência como a que referi no seminário de 9 de Julho passado obteve.

Agradeço-lhe ainda o empenho em tentar ultrapassar alguns dos obstáculos mais evidentes que todos sentimos na área da investigação e desenvolvimento tecnológico e desejo-lhe sinceramente que tenha muito êxito nesta sua incumbência.

Apresento-lhe os meus cumprimentos

Pedro Tavares da Rosa