

Edoardo Amaldi and the origins of ESA

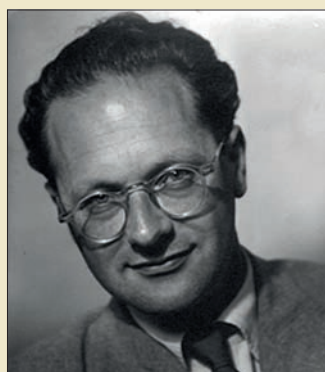
In 1962, two organizations were founded to promote European efforts in space – four years after Edoardo Amaldi had first discussed his vision for a European space organization similar to CERN.

Towards the end of July 1958, at a house in the hills south-east of Rome, three Italian scientists discussed key ideas that were to form the foundations of the European Space Agency (ESA). Edoardo Amaldi, who had been instrumental in the establishment of CERN four years previously, was with Giorgio Salvini – whose house it was – and Gino Crocco, who was Goddard Professor of Jet Propulsion at Princeton in the US. During their conversation, the old friends discussed how European countries, in particular Italy, could become involved in space research. Only the previous October, the Soviet Union had opened up the space age with the launch of the first artificial satellite, Sputnik 1. This had been followed in January 1958 by Explorer 1, launched by the US. So what could Europe do?

As Salvini recalls, the conversation was “long and animated”. While Crocco was sceptical about what Italy could achieve, Salvini was more optimistic, and Amaldi, with all of his experience in setting up CERN, saw the case for an organization that would enable European countries to work together on research in space. In particular, Amaldi insisted on two points: that there should be no military involvement and that such an organization should be based on the successful model that had given rise to CERN.

At the end of the year, Amaldi wrote to Crocco at Princeton, describing the contacts that he had made in the meantime with some influential scientists. In the letter, Amaldi went on to describe how he thought the project to launch a “Euroluna” (“Euromoon”) satellite for scientific research should take shape. The letter makes clear his insistence that the underlying organization should not be linked to the military but should be purely scientific and based on the same principles as CERN.

As a starting point, Amaldi suggested that a small group of experts from the major European countries could prepare a plan for creating an appropriate organization. By early 1959 he had discovered an ally in an old friend, Pierre Auger, the French cosmic-ray



ESA's 3rd Automated Transfer Vehicle (ATV), right, named in honour of Edoardo Amaldi, left, was launched by an Ariane rocket on 23 March to take supplies to the International Space Station, 50 years after the birth of the organizations that gave rise to ESA. (Image credit: Left, E Amaldi Archives. Right, ESA.)

physicist who had also been involved in setting up CERN. By May, after several interactions with Auger, Amaldi had written the first draft of his paper, *Space Research in Europe*, with the aim of stimulating discussions on the formation of a European organization for space research. A French version, together with supportive comments from several countries, was distributed in December (Amaldi 1959).

In Amaldi's original vision, not only the development of the satellites – the “Eurolunas” – but also that of their launchers would be the responsibility of the organization, which would need experts in the technology and engineering of rockets as well as space scientists. The idea was to mirror CERN, which had accelerator physicists and engineers to build its own machines for the high-energy-physics community to use in scientific research. By collaborating at CERN,

Europe's scientists had access to accelerators that no country had the means to build on its own.

It soon became clear that this vision was not to be, albeit not to begin with. There was too much political and commercial interest surrounding the construction of rockets. Governments, in particular the British and French, began the negotiations that would separate the business of building launchers >

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Anniversary

from that of making the satellites for scientific research. On 29 March 1962 in London, seven countries – Belgium, France, Germany, Italy, the Netherlands, the UK and Australia (associate member) – signed the convention that created the European Launcher Development Organisation (ELDO). Three months later, on 14 June 1962 in Paris, Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden, Switzerland and the UK signed a different convention, in this case to create the European Space Research Organisation (ESRO).

The foundation of these separate bodies may have been counter to Amaldi's vision for an organization similar to CERN but they were the forebears of ESA, which was established in May 1975. With the formation of ESA, the science and the means to do it were brought into the same fold.

Amaldi's letter to Crocco, which is translated from Italian on the following pages, constitutes the first document in which a European space organization is mentioned. It is for this reason that 10 copies recently went into space on board a spacecraft taking essential supplies to the International Space Station (ISS). ESA's 3rd Automated Transfer Vehicle (ATV), named in honour of Amaldi, arrived at the ISS on 29 March 2012, exactly 50 years to the day of the convention to create ELDO being signed in London. Appropriately, the ATV had been launched by an Ariane rocket built by ESA. The copies of the letter will be signed by the astronauts and brought back to Earth by a Soyuz spacecraft. One will be given to CERN.

● Further reading

E Amaldi 1959 "Créons une organisation européenne pour la recherche spatiale", *L'Expansion de la Recherche Scientifique* 4 6; see also cdsweb.cern.ch/record/1435143/files/.

For more about the foundation of ESRO and ELDO, see:

J Krige and A Russo 2000 *A history of the European Space Agency 1958–1987* ESA SP-1235 I.

M De Maria 1993 *Europe in Space: Edoardo Amaldi and the inception of ESRO* ESA HSR-5.

Résumé

Amaldi et les origines de l'ESA

En décembre 1958, Edoardo Amaldi, qui avait joué un rôle-clé dans la création du CERN en 1954, envoyait à son collègue Gino Crocco, une lettre dans laquelle il donnait sa vision d'un programme européen de recherche scientifique dans l'espace. La lettre, reproduite ici, constitue le premier document dans lequel est mentionnée une organisation spatiale européenne. C'est pour cette raison qu'une copie du document a été envoyée dans l'espace, à bord d'un vaisseau spatial servant à approvisionner la Station spatiale internationale, 40 ans après la signature des conventions donnant naissance aux deux organisations qui devaient, ultérieurement, constituer l'Agence spatiale européenne.

16 December 1958
Prot. No 4674/A

Distinguished Prof.
Gino Crocco
College Road 74
PRINCETON – N.J.

Dear Gino,

After our discussion at Salvini's home in Rocca di Papa at the end of July, I thought over the possibility to develop an appropriate activity in Europe in the field of rockets and satellites. It is now very much evident that this problem is not at the level of the single states like Italy, but mainly at the continental level. Therefore, if such an endeavour is to be pursued, it must be done on a European scale as already done for the building of the large accelerators for which CERN was created.

The launch of one or more "Euroluna", performed by a dedicated European organization, would definitely be of the highest importance, both moral and practical, for all the nations of the continent.

With these ideas in mind, at the end of July I wrote a letter

to [Luigi] Broglio who replied, at the end of August, expressing his substantial agreement with the theoretical formulation of the problem but also a considerable scepticism with regards to the practical feasibility of an actual project.

During the Conference of Geneva, held in the first half of September, I had the opportunity to discuss it with [Isidor] Rabi who reacted very positively and stated that, if this would have developed further, he would have done everything possible for obtaining the support of the United States. Actually, himself being a representative of the United States in the NATO Science Committee, he thought that this could be the initiating body for this activity; however, I think this wouldn't be appropriate, as I shall explain later.

In November I spoke to [Harrie] Massey of [University College] London who, however, was rather sceptical; though this is the normal British attitude in front of any continental initiative.

At the beginning of December I spoke about the matter with [Francis] Perrin who was very interested and convinced and he promised me to look for some competent people in this specific field in France that could flag the problem.

The idea I have about this organization is that, in addition to the six EURATOM nations, Britain and the Scandinavian countries should participate in the manufacturing of satellites. Britain would at first limit itself to sending some observers and would probably show some resistance, but would certainly end up contributing substantially, would the project start taking shape.

It should, in my opinion, proceed as follows: some authoritative expert in the field (Broglio I hoped, but he seems not to have the necessary enthusiasm) should start flagging the problem and obtaining some level of participation of one or two experts of the largest European countries. Some Italian, French and German experts would be needed to start. These five or six people should prepare, within a few months, a plan of technical development containing :

- 1) a very well defined scope which should be so ambitious to be comparable with the targets that the USA and the USSR have set for themselves in this field, and in order to justify the European character of the endeavour;
- 2) an assessment of the cost and its time distribution;
- 3) an assessment of the specialized workforce;
- 4) a realistic time frame.

Such programme should be submitted to the governments for approval and for the resulting creation of the final organization which should be provided with the necessary resources.

In the case of CERN, things essentially developed as mentioned above; however, that case took advantage of the existence of UNESCO which, by calling the representatives of the governments to a first conference, played the role of the mother and nurse of CERN. I do not know who could be the mother and nurse of the new organization; according to Rabi this could be the "Science Committee" of NATO, but I believe that it wouldn't be the best mother for such organization. As a matter of fact, I think that it is absolutely imperative for the future organization to be neither military nor linked to any military organization. It must be a purely scientific organization open, like CERN, to all forms of co-operation both inside and outside the participating countries. I have the impression that all attempts to set up international organizations of a military nature have either failed or, if they didn't fail, present such characteristics that do not minimally satisfy even their own promoters and managers.

The high level start-up project should include :

- a) the construction of common European laboratories for solving the various major problems,
- b) a related research programme to be run in the participating countries.

Through either one or the other of these activities, the individual countries would have all the technologies at their disposal, and therefore their scientific-technical structure would be greatly strengthened. Such strengthening would bring, evidently, great advantages also in the military sector in case the defence activity would be necessary but it wouldn't make the realisation of the programme more difficult and complicated as would occur if the military, directly or indirectly, were the masters.

The financial problem, definitely irresolvable within the economy of one single country, could be solved in the context of the

European continent.

The problem of the specialized workforce constitutes a second difficulty, but I believe that this could be solved in such a project; this would have the double advantage of attracting the liveliest part of the new generation and making it possible to recover academics who work outside Europe.

I would like to ask you to think about what I wrote here and to reply, as soon as possible, to the following questions which, in a more or less direct manner and on different levels, are related to the project mentioned above :

- 1) I would like to know whether you are interested and whether you would like to take an active role or even the leading role in it. Personally I don't want to be involved in all of this except for launching the idea, at this stage, and later – in a few years – if the idea becomes reality, for participating in collecting the scientific data which can be obtained with this kind of activity;

- 2) I would like to know from you the names of the most competent and open persons in this field in Italy, France, Germany, Great Britain and in the Scandinavian countries. As I already told you, I contacted Broglio since July, but he seemed to be too sceptical for taking this route for the moment at least;

- 3) I would like to know which organizations, even of modest size, exist in Italy in this field and can provide an absolute guarantee of trust; for example, I came in contact with SAMI's engineer Salvatore but I have no idea of neither the value and competence of this person nor the robustness of the company. The seriousness of the people is a very fundamental issue; this venture is destined to fail, if people who are not sufficiently trustworthy slip into the initial organization committee.

Furthermore, I would like to have von Karman's address; Rabi asked me permission to speak to him about this and I agreed, but I don't know if he actually did it and whether this would be of any help. I would like to have your opinion on this subject too; nevertheless, I think that an authoritative person like him could, if favourable, have a considerable influence.

I believe that you will be very much surprised by this letter of mine; it is based on my experience with CERN: in 1952 only three or four persons in the whole of Europe believed in the possibility of creating CERN, but in 1958 the laboratories in Geneva have exceeded 800 workers, the first machine has started running giving first class scientific results and the second machine will work before mid-1960.

I believe that, if the European experts in the field of rockets and satellites start moving already now, they will be in a condition, together with the American and Russian groups, to contribute very substantially to the study of space by 1965.

I take this opportunity for sending you and your wife my best wishes, including among them the wish for a Euroluna before 1965.

E Amaldi

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