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EUROAVIA - AN EXAMPLE OF INTERNATIONAL COOPERATION TO PREPARE THE GLOBAL SPACE WORKFORCE OF TOMORROW

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EUROAVIA - European Association of Aerospace Students - is a Europe based non-profit organisation for international students and young professionals interested in space and aeronautics to support and enhance both their professional and personal development. Established in 1959, two years after the Treaties of Rome that paved the way for economic cooperation in Europe, EUROAVIA connects nowadays more than 2000 members in 40 different cities of 19 European countries. Its goal is to stimulate cooperation between the industry, the institutions and the academia in aerospace research and technology and its applications, preparing the members' association to become the skilled and knowledgeable space workforce of tomorrow. On March 16, 2014, EUROAVIA celebrates an outstanding milestone in its history: the XI Lustrum.

For 55 years, hundreds of aerospace passionate members have been gathering to witness, understand and experience the long-term outcome that those treaties would have had on all European countries. All this while promoting the grounding idea of cooperation as a matter of education to prepare students for this purpose.

The XI Lustrum also renews EUROAVIA commitment to develop the current and future global space workforce by fostering the EUROAVIA spirit, a set of common values based upon hard work, innovation, cultural awareness, teamwork and international networking. Preserving these values, building a global culture mindset and a cross-functional cooperation are the next challenges to meet. While preparing the technical workforce to collaborate successfully on joint space projects, a particular attention to the intercultural management issues has to be paid. In this context, the paper discusses opportunities and innovative approaches to embrace the aforementioned challenges. Moreover, a special focus is put on our core activities that bring aerospace students and young professional leaders together with world key space actors, including ESA, CNES, DLR, Arianespace and Airbus Space Defence.

Such activities count annual congresses, technical symposia, training sessions and design workshops such as the "Preliminary Design of an UAV for Exploration of Mars" hosted by EUROAVIA and ESA Estec. In conclusion, the importance of enhancing existing synergies with the world of industry and institutions along with creating new partnerships is highlighted as key factor to prepare the future space workforce. The foundation of the last two EUROAVIA branches in Toulouse and Kourou, within the Guiana Space Centre, proves our added value to members' education and careers development in space.

I. INTRODUCTION

EUROAVIA, the European Association of Aerospace Students, is an international student association with several Affiliated Societies across Europe that spread and live the EUROAVIA spirit, a set of common values based upon hard work, innovation, cultural awareness, teamwork and international networking.

At today EUROAVIA counts more than 2000 members, in 19 countries and 40 Affiliated Societies located in [1]: *Aachen, Ankara, Athens, Beograd, Berlin, Braunschweig, Bremen, Bucuresti, Budapest, Cádiz, Cluj-Napoca, Covilha, Delft, Dresden, Hamburg, Helsinki, Istanbul, Kourou, Kyiv, Leuven, Lisboa, Madrid, Manchester, Milano, München, Napoli, Oostende, Palermo, Paris, Patras, Pisa, Rzeszów, Sevilla, Southampton, Stuttgart, Technion, Terrassa, Toulouse, Valencia and Zagreb* (Figure I).

Established in 1959, EUROAVIA works to develop current and future leaders in the aerospace field and wants to be a bridge between companies, universities and students.

Its goals are [1]:

- To promote European cooperation in the aerospace field by providing opportunities for its members to meet, exchange and learn at all levels.
- To internationally represent European aerospace students.
- To acquaint student members with their future working environment stimulating contacts with the industry.

Being both a non-political and non-profit association, EUROAVIA is managed exclusively by voluntary students with its various activities and projects entirely financed by membership fees, sponsorship and participation fees [1].

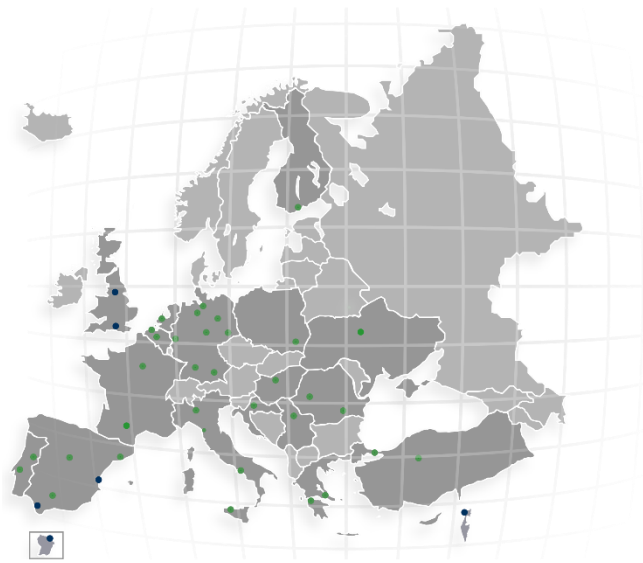


Figure I: Map of the 40 EUROAVIA affiliated societies.

II. HISTORY: FROM THE FOUNDATION TO THE XI LUSTRUM

Back in 1957, students of the Technische Hochschule Aachen and ENSA in Paris jointly began to discuss the future of aerospace in Europe [2]. They observed that the European aerospace programmes were individual, national projects, limited by national resources. This prevented European companies from keeping pace with the other global competitors. Then, they soon concluded that working together was a key for survival. Cooperation in aerospace was the motivation that led to the foundation of EUROAVIA in March 1959 (Figure II).



Figure II: EUROAVIA founders.

Aerospace students from France, Germany, the Netherlands and Italy jointly raised their voices with the determination to develop ways and means to create an awareness for the necessity of cooperation: *“Single European nations cannot provide resources for further development of the European Aerospace. For that reason it is essential to meet the problems and challenges of the future with a collective cooperation of the European states on a civil, military and university basis”* [3].

It was a long and challenging process, but EUROAVIA was heard, it found support and it started to grow [2]. European cooperation started to grow as well with the TRANSALL,

CONCORDE, AIRBUS and common efforts in space activities. Awareness no longer needed to be developed: it was there.

Having achieved its main objectives, in the 70's EUROAVIA lost its momentum and entered a severe crisis. Through a remarkable effort in the early 80's, EUROAVIA revised its aims, defined a new organisational structure and quickly raised a unique force of more than 1000 student-members in 13 countries dedicated to European cooperation.

Promoting the grounding idea of cooperation as a matter of education has been the core objective that led EUROAVIA to celebrate its 55th anniversary on March 16, 2014 (Figure III).



Figure III: Participants in the XI Lustrum.

The XI Lustrum was organized in Stuttgart and saw the participation of 60 alumni and students from all over Europe. It showed the great diversity of EUROAVIA, not only in terms of generations and interests, but also in terms of its power of connecting people on a personal and professional level. During this event, EUROAVIA renewed its commitment to develop the current and future global space workforce, highlighting the importance of building a global culture mindset and a cross-functional cooperation.

III. OUR MISSION

The purpose of EUROAVIA is to support its student-members in the broadest possible way, with a specific emphasis on the European cooperation. The association grounds all its efforts on the following ideas:

- The age of national interest is gradually coming to an end. It is increasingly important for the upcoming generation of decision-makers to be open-minded, looking beyond corporate and national interests, to concern themselves with the welfare of humankind in its ecological, economic and cultural aspects. An increasingly integrated Europe and a highly connected European aerospace industry provide an ideal starting point for acquiring the necessary techniques to meet the challenges of our common future.
- The ongoing European integration of companies in the aerospace engineering sector is not matched by the curricula offered at the majority of European graduate and postgraduate schools.

- The student's personal knowledge of foreign matters is generally not sufficient to enable him to work and live confidently, competently and comfortably in a multinational environment.

IV. OPPORTUNITIES AND INNOVATIVE APPROACHES TO PREPARE THE GLOBAL SPACE WORKFORCE OF TOMORROW: OUR CORE ACTIVITIES

EUROAVIA achieves its afore-mentioned goals by providing opportunities for its members to meet and exchange experiences. In this way, students can broaden their horizons by experiencing foreign cultures. EUROAVIA also provides students with opportunities to get acquainted with their future work environment through contacts with and visits to industry.

International events are the true core of EUROAVIA, the moment when the EUROAVIA spirit gets instilled in every participant and, for those few days, the dream of our founding fathers becomes extremely clear. There are many types of international events, each focusing on developing specific aspects, part of the EUROAVIA goals.

All international events are organized by one of our Affiliated Societies and supported by the International Events Working Group. The latter, working together with the organizers, makes sure that the quality and the traditions of EUROAVIA international events are always met. Their duration can vary between 3 and 7 days.

This section presents an overview of the types of international events offered to the EUROAVIA members, as well as some examples showing how technical and intercultural management skills are developed within EUROAVIA.

Annual Meetings of the EUROAVIA Congress

The Congress is EUROAVIA's legislative body. Two meetings are held every year: the EMEAC (Electoral Meeting of the EUROAVIA Congress) and the AMEAC (Annual Meeting of the EUROAVIA Congress). Representatives from all the Affiliated Societies gather to discuss and decide about EUROAVIA current and future policies, about the status of the Association and the steps to take in the near and far future. Given the importance of the Congress, these meetings are characterised by law-like and professional discussions, which train our member-students to work in a more formal environment.

Formation Workshop

The Formation Workshop is a one-week high quality training-event designed to increase knowledge and share best practices between members and top leaders. After having completed a Formation Workshop, the participants will have attained and practised various leadership skills, and will be able to carry on with passion and dedication the successful achievements of EUROAVIA.

The Formation Workshop 2013 (Figure IV), organized by EUROAVIA Istanbul and which took place from January 27 to

February 3, offered the one-of-a-kind chance to attend trainings delivered by Airbus Group representatives, focused on Project Management.



Figure IV: Participants in the Formation Workshop 2013.

The special sessions led by executives presented detailed tips and tricks to improve management skills, within Strategic Planning, Quality System, Configuration Management and Contract Management. These sessions were designed to dive into specific topics by providing best practices on skills and strategies needed for business success. Moreover, the interactive sessions offered by experienced members of EUROAVIA simulated a real-life work situation, providing the answers for immediate gain of the full value of the association.

The participants completed a total of five days of intensive workshops on skills development and entrepreneurship, aiming to help them transform their ideas into business opportunities and assess their viability. At the same time, the participants had the chance to test their knowledge and skills, but, most importantly, their motivation and drive to continue their entrepreneurial journey through the next stages of academic and professional life.

Technical Symposia

Symposia are technical events that, through lectures, workshops, visits to laboratories and companies, aim at developing one specific topic. In this way, participants are given the unique chance to improve their knowledge and expertise of the topic the symposium focuses on.

As a matter of example, EUROAVIA Toulouse organized the "Zero-G adVENTURE" international symposium between June 3 and 8, 2013 (Figure V).



Figure V: Logo of the "Zero-G adVENTURE" Symposium.

The Zero-G adVENTURE symposium saw members coming from all over Europe to attend lectures about the status of the art of the space sector and human spaceflight, delivered in particular by professors at Institut Supérieur de l'Aéronautique et de l'Espace. The French space agency, on the other hand, offered a debriefing on the ESA Council meeting at ministerial level, held in 2012 in Naples. Furthermore, a visit to the clean room facilities of Airbus Defence and Space was organised, as well as a visit of Cité de l'Espace, a theme park focused on space and the conquest of space. Finally, the event also included some practical trainings about entrepreneurship delivered by the Aerospace Valley.

Training Sessions

Beyond the international events, many activities to prepare the future space workforce of tomorrow happen at a local level in the different affiliated societies.

EUROAVIA Kourou, for instance, founded in March 2013 within the Guiana Space Centre, offers unique training opportunities for its members thanks to its proximity with key space actors.

Passionate visits of the industrial sites (Figure VI and Figure VII) of the space centre (Final Assembly Building- BAF, Weather and Radar Stations, Physics and Chemistry Labs), launch pads and interesting meetings with high-level representatives from ESA, CNES, Arianespace, Airbus Defence and Space, MT Aerospace, Snecma, Europropulsion, Regulus have been regularly organized since then.



Figure VI: Visit of Eutelsat E25B in the final assembly building on August 21, 2013.

Design Workshop

The Design Workshop (DeWo) is a high-rewarding as well as educating event, a great source of ideas a company might use for its own development, a venue for the most talented and motivated engineering students and young graduates coming from all over Europe. The holding company sets the topic of the contest and has complete reserved rights on all new concepts and ideas developed during the three weeks workshop.



Figure VII: Visit of MN Colibri.

On the other hand, students and young graduates boost their practical and academic skills, while getting in touch with the industry and building the network of their future. That is why this Workshop has a long reputation and tradition within EUROAVIA.

All participants of the Design Workshop are selected through a Design Contest (DeCo), a competition where participants have to write a paper on a subject chosen by the hosting company. A first screening of papers is done by EUROAVIA, which is also responsible for the formation of the jury. The jury itself, composed by representatives of both companies and universities, evaluates the selected papers.

After the selection, follows the Workshop itself where a group of 25 students and young graduates work for three weeks on the design project put forward by the holding company. Creativity and enthusiasm of students are coupled together with a professional working environment and the raised new concepts and ideas are ready to be brought to fruition. Moreover, participants are trained to work in team in an extremely dynamic and challenging environment, a basic requirement for today's aerospace industry.

Working in international teams and thinking "out of the box" are soft-skills that each fellow EUROAVIAN trains during all projects and international events of EUROAVIA. These skills will give an added value to the design project and will bring it a step forward.

Meanwhile, the holding company will increase its international visibility, giving students a much better insight of the business of its concerns.

To give few examples, some of the organised Design Workshops (DeWo) are [4]:

- DeWo 8th-19th April 1991 in Friedrichshafen; 22 students and 12 tutors from 11 nations. Supported by: DORNIER, Fokker Space & Systems, Kayser-Threde, LEGO, ESA/ESTEC, Kiel University, Imperial College London, DARA, Stuttgart University/ISD. Subject: preliminary phase of a study on the ULYSSES reference Mission (URM), a small scientific satellite LEGO mock-up in scale 1:2 was built.
- DeWo 2nd -15th August 1992 in Noordwijk; 20 students and 23 tutors from 10 nations.

Supported by: ESA/ESTEC, Fokker Space&Systems, Kayser-Threde, DARA, MAN technologie, Matra Marconi Space, Dassault Aviation, TU Delft, Polytechnic of Haarlem, Space Research Organisation Netherlands, Netherlands Space Agency (NIVR), MBB and ISY.

Subject: A preliminary design of an ecological monitoring satellite for Europe's ecosystem. This satellite will supply on-line data of the most critical pollution parameters to a wide range of institutions companies directly.

- DeWO 7th-24th August 1995 in Noordwijk; 25 students and 6 tutors from 11 nations.

Supported by Austrian Ministry of Science, Carlo Gavazzi Space, Commission of the European Communities, DARA, ESA ESTEC, Daimler-Benz Aerospace, Fokker Space and Systems, Kayser-Threde, Laben, LOTUS, Matra-Marconi Space, MAN Technologie, TU Delft, NIVR, ORS, Schrack Aerospace, Setyr-Daimler-Puch, University of Southampton, Vensim.

Subject: Preliminary design of a satellite, the Lunar Investigating Orbiting Navoigator (LION) which will find a suitable landing site for LEDA on the Moon, will map the lunar surface with a 4m resolution, and be an emergency relay for LEDA's Rover in case of a communications blackout.

V. CONCLUSIONS

Activities such as Symposia, Congresses, Workshops, Trainings – all in a European context – represent excellent tools to prepare the global space workforce of tomorrow.

These are valid today and they will be valid tomorrow. More, however, needs and can be done. Enhancing existing synergies with the world of industry and institutions, along with creating new partnerships is an important key success factor.

Since the foundation of EUROAVIA in 1959, the concept of Europe has been dramatically evolving. The way Europe positions itself regarding the other big economies, as well as emerging countries, is crucial for its survival. Moreover when looking closer at the space sector, the space projects involve larger and larger investments that cannot be sustained neither by a single nation neither by a single continent.

Today, Space is more than ever an international affair and can be the answer to many challenges humankind is facing and will face. To stay ahead of these challenges and lead the transition to what professor Luigi Gerardo Napolitano defined as the “fourth environment”, EUROAVIA needs to foster intercontinental mobility among students and keep maximizing its efforts on professional cooperation as well as international team working.

The new minds will be global and aware of the importance of looking at the Space to solve problems on Earth. This represents a crucial step in educating current and new generations. This is why contacts with former members should also be intensified,

since these often play a leading role in several organisations and can largely contribute to help and guide students in their learning process.

Extending EUROAVIA values across Europe and creating new branches in the other continents is definitely a concrete action to run in both a short and long term timeframe. EUROAVIA, without any doubt, is on the right way, and it is here to stay as a valuable asset for the European Aerospace Community.

VI. REFERENCES

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