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UNIVERSEH: European Space University for Earth and Humanity

Emmanuel Zenou[1], Eric Tschirhart[2], Tadeusz Uhl[3], Jonas Ekman[4], Stefan Marschall[5]

[1]Université de Toulouse Midi-Pyrénées, ISAE-SUPAERO, Toulouse, France
[2]University of Luxembourg, Luxembourg
[3]AGH Univ of Science and Technology, Krakow, Poland
[4]Luleå University of Technology, Luleå, Sweden
[5]Heinrich-Heine Universität, Düsseldorf, Germany

Abstract

The conclusions of the 2017 Social Summit in Gothenburg encouraged the European Union members to strengthen strategic partnerships across the European Union between Higher Education Institutions and encourage the emergence of "European Universities", an innovative bottom-up network of universities across the EU. Université Fédérale de Toulouse Midi-Pyrénées (France), Université du Luxembourg (Luxembourg), Luleå Tekniska Universitet (Sweden), Akademia Górniczo-Hutnicza (Poland) and Heinrich-Heine-University (Germany) teamed up to develop the Alliance "European Space University for Earth and Humanity", or UNIVERSEH. Within the Erasmus+ program funding, the European Commission selected UNIVERSEH as a broad space-dedicated "European University'' in July 2020. UNIVERSEH aims to build a cross-European University which will develop an inter- and multi-disciplinary higher education curricula for the Space sector, implement new pedagogical approaches using modern technologies and tools, and support student and staff mobility, multilingualism, entrepreneurship, innovation, equity, inclusion and diversity among students and staff. This article depicts the UNIVERSEH project, its vision and objectives, and details the approach that has been developed and especially the associated work packages.

Keywords: space, Erasmus+, student, European Universities

1. Background and Context

1.1 European University Initiative

In September 2017, President Macron (France) gave a speech on new initiatives for Europe, one of them considering the bond of culture and knowledge as the education landscape across Europe is changing: "*I believe we should create European Universities – a network of universities across Europe with programs that have all their students study abroad and take classes in at least two languages. These European Universities will also be drivers of educational innovation and the quest for excellence. We should set for ourselves the goal of creating at least 20 of them by 2024. However, we must begin setting up the first of these universities as early as the next academic year, with real European semesters and real European diplomas.*"

In December 2017 at the Gothenburg Summit, EU leaders rapidly outlined a vision for education and culture. In its December 2017 Conclusions, the European Council called on Member States,

the Council and the Commission to take forward a number of initiatives, including the '*strengthening strategic partnerships across the EU between Higher Education Institutions (HEI) and encouraging the emergence by 2024 of some twenty 'European Universities', consisting in bottom-up networks of universities across the EU which will enable students to obtain a degree by combining studies in several EU countries and contribute to the international competitiveness of European universities*'.

This rapid commitment laid the ground to build the European Universities Initiative, co-developed by HEI, student organisations such Erasmus Student Network, member states and the European commission, under the Erasmus+ programme.

The outcome of the first two calls for European Universities ended up in financing 41 European Universities alliances involving more than 280 HEI all over Europe. They comprise at least three HEI from three different member states or Erasmus+ programme countries. Despite the apparent large number of institutions involved, the programme remains very competitive and selective as only approximately 5% of all European HEI participate in this initiative.

From a higher education policy viewpoint, and considering the first mid-term evaluation, all stakeholders should keep a balanced approach to safeguard the essence of the initiative, but also look at it in a holistic way. This means considering foremost the concerns, fears and needs of the participating universities, systemic and regulatory issues such as diploma recognition and issuance of diploma. Finally, the political ambitions of the member states in a context of a fierce European and worldwide competition to attract and retain talents is of considerable significance.

It must be stressed that sufficient leeway, time, and resources should be provided to the HEIs engaged in the European Universities Initiative. This will allow all partners to deepen their collaboration and pursue their strategic goals, as agreed in their joint vision at the initiation of the initiative. It must be remembered that the European University Initiative is an ambitious and complex endeavour requiring very substantial adaptations at all levels of operations: governments, regulations, and particularly universities themselves. Having the collaboration driven by the HEIs themselves is key. A bottom-up approach will guarantee an appropriation by all of the benefits of innovation generated by the alliances, before dissemination and integration all over Europe.

1.2 The Space sector

Why address the space sector? One of the most obvious and relevant answers is that the Space sector is becoming one of the most strategic sectors for Earth and Humanity.

Historically, it has a very long cultural and scientific history, and is a multicultural sharing: all civilisations are concerned. Still, space is already very present today in our daily life (communication, navigation, Earth monitoring at a world scale..) but is a vibrant futuristic field of scientific, socio-economic and societal development.

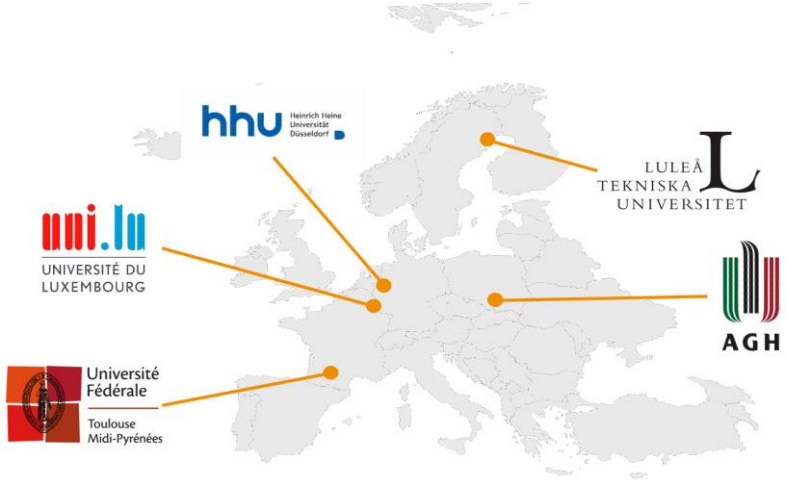
This sector is highly dynamic, and more and more accessible to many new actors that faced insurmountable barriers ten years ago: new countries on the one hand, and private actors on the other hand. It is a source of new jobs and new skills in all disciplines.

In other terms, the space sector is a source of considerable economic, (geo)political and (geo)strategic issues to be addressed by the European Union, European countries themselves and European Universities.

Last but not least and most importantly, Space remains a dream catcher for the youngest and the oldest!

1.3 The UNIVERSEH Project & Consortium

Université Fédérale de Toulouse Midi-Pyrénées (France), Université du Luxembourg (Luxembourg), Luleå Tekniska Universitet (Sweden), Akademia Górniczo-Hutnicza (Poland) and Heinrich-Heine-University (Germany) teamed to create a European University addressing the Space sector and which takes into account social, societal and environmental issues: UNIVERSEH, the European Space University for Earth and Humanity.



The Université de Toulouse Midi-Pyrénées (France)

Specifically, the Université de Toulouse Midi-Pyrénées is a federal University which groups 31 HEI (4 Universities, 18 Engineering schools, 1 university Hospital, 7 research centers and one national university institute). 5 HEI participates directly to the project: Université Toulouse 2 Jean Jaurès, which focuses mainly on social & human sciences, arts and humanities, Université Toulouse 3 Paul Sabatier, which focuses mainly on science and Health, Toulouse INP, which regroups several engineering schools tackling a wide spectrum of domains, ISAE-SUPAERO, which focuses on Aerospace science & engineering, and TBS, which focuses on Business and Management.

Toulouse in the European capital of Space, with 25% of the European space workforce, 12,000 jobs in more than 400 companies, 2 world leaders (AIRBUS Defense & Space and Thales-Alena-Space), major players (in Satellite Imagery, Meteorology, Geo-localisation and navigation, telecommunication, oceanography, etc.), and the main technical center of the French space agency

(CNES)

The University of Luxembourg (Luxembourg)

The University of Luxembourg shapes societal, cultural, technological and economic development in proactive dialogue with public and private stakeholders of society.

Over the last two decades, Luxembourg has undergone a deep transformation and diversified its economy towards a knowledge-based society. Luxembourg is developing new economic activities, which are technology- and knowledge-intensive and require substantial investments in skilled human resources, research and innovation. Science and innovation are key factors that will help Luxembourg's move to smart, sustainable, inclusive growth, able to solve societal challenges while being internationally competitive. The University of Luxembourg sees itself as a driving force, generating knowledge and human capital based on research and education at the highest international level.

The Akademia Górniczo-Hutnicza im. Stanisława Staszica (Poland)

AGH University of Science and Technology in Krakow is a modern public university developing partnership cooperation with universities in the country, Europe and the world established over 100 years ago. The University's priority is the implementation of tasks included in the knowledge triangle: education - research - innovation. The AGH University of Science and Technology is a technical university in which the basic sciences are very strongly represented and constitute the basis for the development of a wide spectrum of applied sciences with the gradually increasing role of social sciences and humanities. In line with global development trends, we create new directions of education, necessary for the proper development of science, technology and the economy of Poland and Europe. The AGH is organized in a scheme of 16 Faculties and over 700 research laboratories. The AGH University of Science and Technology conducts research at a high global level in various fields and scientific disciplines, being one of the fundamentals of the functioning and position of the University. From the very beginning, AGH UST has been a university strongly associated with the national economy implementing the service for the Polish economy and consulting for state and local authorities. The university supports all activities aimed at creating strong research teams: inter-faculty, inter-university and international. The strong position of the AGH University of Science and Technology requires the intensification and activity of the University in the field of domestic and foreign cooperation in both educational and research areas. An element of such a strategy is the creation of a network of affiliated universities, research and industrial units. The AGH is a kind of academic and economic consortium developing its own economic activity by creating conditions for technology transfer and entrepreneurship incubation. The newest initiative is creation of Space Technology Center which is dedicated to conduct education and research in a new space focused on application of space technologies to sustainable development of Poland and Europe.

Within the Space strategy for Europe and the New skills agenda for Europe, UNIVERSEH is assembling European, knowledge-creating teams of students, learners, academics, researchers, businesses, regional and civil society stakeholders to offer innovative and multi-disciplinary courses to train students and future entrepreneurs for the jobs of today and tomorrow to ultimately

strengthen the European Union as a global leader in the space domain.

The Luleå Tekniska Universitet (Sweden)

Luleå University of Technology of Sweden is Scandinavia's northernmost university of technology. It has four campuses, located in Luleå (the main campus), Kiruna (space science), Skellefteå (wood technology, 3D graphics and computer game engineering) and Piteå (Department of music and media). Luleå University of Technology is experiencing strong growth with world-leading competence in several areas of research. Our research is conducted in close collaboration with industries such as LKAB, Ericsson, Boliden, ABB, Epiroc and leading international universities. Luleå University of Technology has a total turnover of SEK 1.7 billion per year.

The Heinrich Heine University Düsseldorf (Germany)

Heinrich Heine University Düsseldorf (HHU) is one of the younger higher education institutions in the German state of North Rhine-Westphalia. Founded in 1965 as a state university, HHU encompasses five faculties: the Faculty of Mathematics and Natural Sciences, the Faculty of Arts and Humanities, the Medical Faculty, the Faculty of Law and the Faculty of Business Administration and Economics. Today about 30,000 students study at a modern campus under conditions ideally suited to academic life. A large share comes from abroad, from more than 100 different countries. HHU's departments enjoy an excellent reputation due to an exceptionally high number of collaborative research centres. The Heinrich Heine University cherishes and promotes international cooperation and networks. Most recently, HHU has developed into a “citizens’ university” and an interdisciplinary-focussed, networked and comprehensive institution of higher education.The Rhine region and the state capital Düsseldorf provide an attractive environment with a high quality of social and cultural life within a prosperous economic region.

2. Vision, mission and objectives of UNIVERSEH

Our vision: a long-term student-centered vision for space education

Europe has historically been at the forefront of space exploration. European academic and scientific excellence has brought revolutionary technology advancements and expanded humankind’s scientific knowledge. However, the international space context is changing fast. An important global competition is present with new contestants bringing new ambitions. Space, and space activities, are becoming increasingly commercial with key private stakeholders, disrupting an almost 50-year old business model. Reductions in cost of accessing or exploiting space have been fundamentally observed. Technological changes such as digitalisation and artificial intelligence and new types of reusable spacecrafts allow the emergence of a “New Space”, or entrepreneurial space, encompassing a globally emerging private spaceflight industry. “New Space is a global trend encompassing an emerging investment philosophy and a series of technological advancements leading to the development of a private space industry largely driven by commercial motivations”.

Furthermore, Space is an enabler for several vertical industry processes. For instance, space-based infrastructure projects such as Galileo and Copernicus serve as precursors for many space-related

applications in different areas (location-based services, agriculture, natural disasters, health…). Thus, the space industry provides important incentives for other technologies, with a new value proposition for innovation, intellectual property, and consequently global business opportunities.

In this "New Space" business arena, comprehensive higher education is critically needed to realize the above-mentioned ambitions. Student-centred and innovative educational approaches are key for transferring research-based innovative knowledge, competences and skills to take the next wave of this revolutionary approach to space exploration and use.

Our mission: address key societal challenges through space education, research and innovation.

Higher education is vital in sustainable development. It equips students with the (pre)-requisite knowledge, skills, attitudes and values to create a sustainable future. According to UNESCO, education for sustainable development "empowers people to change the way they think and work towards a sustainable future". UNIVERSEH commits to contribute to the European Green deal (e.g. clean energy, sustainable industry, biodiversity, eliminating pollution) and the 2030 Agenda for Sustainable Development and its 17 SDGs (Sustainable Development Goals) and 169 associated targets. UNIVERSEH will have a particular focus not only on SDG4 which aims to "By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university." but also on gender equality (SDG5); decent work and economic growth (SDG8) and climate change (SDG13).

UNIVERSEH promotes civic engagement and reinforce training and research in culture, space technologies, infrastructure, services and data which contribute to provide the EU with the tools needed to address societal challenges and global concerns. For example, climate change has been identified by the EU Space Strategy as one of the biggest challenges that Europe is facing, which highlights the crucial role Space can play in tackling it. Earth observation makes it possible to monitor the complex variables involved, which has changed the perception of our impact on the environment.

UNIVERSEH develops training and skill acquisition, enhance research in Earth observation, by valorising the experience gained from the EU project Fabspace 2.0 led by one of the members of UNIVERSEH; it was aimed at making universities open innovation centres for their regions and improving their contribution to the performance of societies. Further, our associated partner NEREUS (Network of European Regions Using Space Technologies) is involved in the project EO4GEO 'Towards an innovative strategy for skills development and capacity building in the space geo-information sector supporting Copernicus user uptake'. Earth observation is fro example a key component of UNIVERSEH space actions.

Focusing on Space education, research and innovation in the EU addresses key societal challenges, nurture job and industrial growth and ensure EU autonomy. This also contributes to addressing the growing need for high skilled workers and more labour market relevant skills to ensure productivity growth and competitiveness . Since 2015, opportunities for highly-skilled individuals have grown and this will continue at least until 2025 . 40% of European employers have expressed difficulty finding people with the right skills. Students are concerned by the mismatch between what they learn and the skills they need for work . The European Commission also calls for developing digital competences and skills. In this context, higher education institutions (HEI) have a vital role to train highly-skilled students to match the current and future needs of the labour market.

Our objectives

Within the Space strategy for Europe and the New skills agenda for Europe, UNIVERSEH is assembling European, knowledge-creating teams of students, learners, academics, researchers, businesses, regional and civil society stakeholders to:

- Offer innovative and multi-disciplinary courses to train students for the jobs of today and tomorrow;
- Support entrepreneurship and innovation;
- Develop digital, open science and transferable skills among students and researchers;
- Contribute to match skills of graduates with the requirements of the labour market;
- Break the real and perceived barriers between academic and other sectors;
- Strengthen the European Union as a global leader in the space domain.

These objectives will be achieved through the installation of a comprehensive university alliance, UNIVERSEH. The members of UNIVERSEH are convinced that a challenge-based and multidisciplinary approach will bring together resources and knowledge across different fields, technologies and disciplines, including social sciences and the humanities. UNIVERSEH also supports research, innovation and development of skills by encouraging horizontal synergies and multidisciplinary approaches. UNIVERSEH will offer student-centred, personalized and flexible curricula of use for the space sector but also for the society in general. The following academic fields are considered: Science and Engineering; Economy, Business and Finance; Medicine and Health; Social and Human Sciences; Art and Cultural Studies and Innovation; Patents and Entrepreneurship.

3. Our Concept: A comprehensive University on the space sector

3.1 Overview

UNIVERSEH, as one inter-university ‘campus‘, envisions its governance as a structure to enable and facilitate the establishment and development of projects in education, research innovation and valorisation. UNIVERSEH sees the approach as bottom-up, to facilitate emergence of ideas and adherence to the project, as well as the transmission of decisions to the universities. UNIVERSEH is organized as such that exists a balanced relationship between the central bodies and committees on one side and the decentralized structures on the other.

UNIVERSEH installs a comprehensive university Alliance out of over 130.977 students, 13.030 staff and 59 associates from five HEIs from five countries. With a focus on “Space” and “New Space”, the Alliance is addressing five transversal and crucial areas of higher education:

- **Enhancing mobility and multilingualism**

We will enhance current support services and develop common ones such as the “Feel at Home'' program. Further, the alliance will develop mobility opportunities, create new partnerships and organize short term mobility. UNIVERSEH will also promote and facilitate access to different language courses, diversify the offer and contribute to developing students’ tandems.

- **Developing new joint Interdisciplinary and cross-sectorial curricula**

UNIVERSEH will involve different stakeholders; collect information on the current and future needs, then, based on courses from the alliance, UNIVERSEH will create new interdisciplinary curricula.

- **Creating new pedagogical models**

We will explore new innovative opportunities: personal learning networks, hybrid and virtual learning and student to student learning

- **Becoming an entrepreneurial "university"**

UNIVERSEH will develop new common entrepreneurship courses adapted to the European space sector, develop different activities such as call for projects with stakeholders, support to students' projects, networking and mentoring program, student practical experience in research and innovation infrastructures. All the actions will be supported by a strong Business-University cooperation.

- **Addressing some of the barriers students can face when it comes to joining higher education in general and studying abroad in particular**

The Alliance will produce a EuroCharter on Equity, Inclusion and Diversity: towards European standards, testimonial videos of Women in the Space sector, a blog for students with specific needs to enable them to share experiences and staff seminar for common guidelines and improvement of services for mobile students.

3.2 A comprehensive University...

Most importantly, UNIVERSEH offers student-centred, personalized and flexible curricula of use for the space sector but also for the society in general. As a consequences, UNIVERSEH is a comprehensive University that addresses all academic sectors:

1. Science & Engineering
2. Economy, Business & Finance
3. Medicine & Health
4. Social & Human Sciences
5. Art & Cultural Studies
6. Innovation, Patents & Entrepreneurship

3.3 … addressing the space sector...

Specific content related to the major segments of the space field are being implemented. The space sector has been divided into the four following sections:

1. Space for Earth and Society
2. Space Sustainability
3. Space Settlement and Resources
4. Space Exploration and Deep Space

3.4 …. and taking into account social, societal and environmental issues

- **Space for Earth and society**: EU space policy aims to tackle some of the most pressing challenges today, such as fighting climate change or managing natural resources. Space technology, data and services have proven to be indispensable in the life of Europeans and

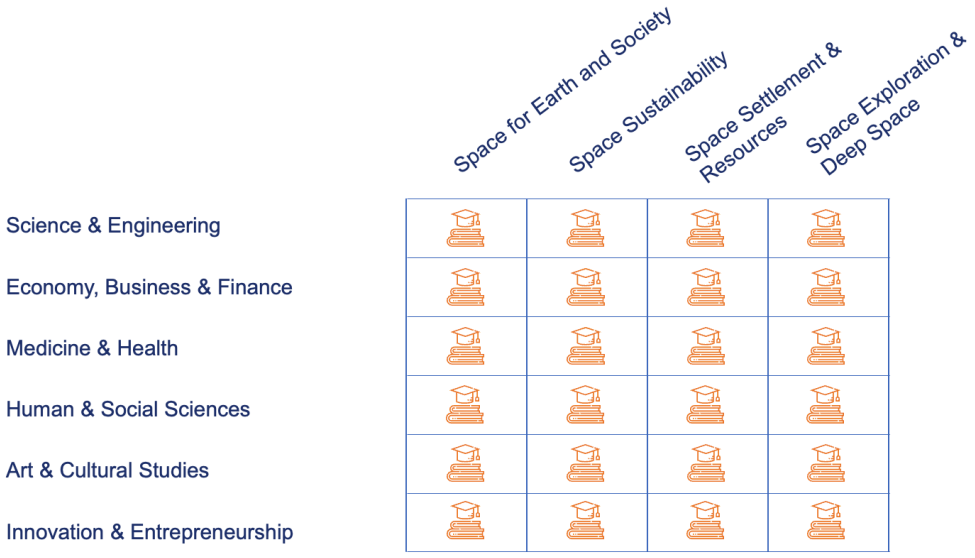
for sustainable development. For example, EU space data is transforming our daily lives with services such as: increasing efficiency in agriculture and fisheries, helping regions and people access knowledge and information, improving crisis response, protecting the environment and helping to tackle climate change, increasing security, improving citizens' health, optimising transport. Especially, the EU COPERNICUS programme aims to '*provide a unified system through which vast amounts of data are fed into a range of thematic information services designed to benefit the environment, the way we live, humanitarian needs and support effective policy-making for a more sustainable future*'

- **Space Sustainability**: Working on sustainable space is essential to guarantee the ability of all human beings to continue to use outer space over the long term. There is a need to make the space sector more sustainable and to work on how technology and the environment can thrive together. UNIVERSEH is also conscious that the proliferation of space debris remains the most serious risk of the sustainability of space activities and will contribute to the European effort to address this issue. Moreover, access to space in a sustainable way is a key challenge to be addressed for future missions, especially considering the new space economy and new business opportunities such as space tourism.
- **Space settlement & resources**: Settling on Moon and Mars is no longer considered as science fiction. Many programmes ambition to develop deeper Moon exploration (Artemis & Lunar Orbital Platform-Gateway by NASA, Chandrayaan by ISRO, Chang'e & Long March by CNSA, SLIM by JAXA, HERACLES by ESA & JAXA, Luna Program by Roscosmos...) and Mars exploration (Mars Sample Return by NASA, Mangalyaan by ISRO, Martian Moon Exploration by JAXA, Phootprint by ESA…) and many studies have been conducted for long-term inhibited missions using local resources (ISRU: In-Situ Resources Utilization) and new technologies such as 3D print and additive manufacturing. Specific domains have to be adapted to the Moon/Mars environment such as Architecture (e.g. Mars City State Design Competition), water management, energy management, and specific challenges have to be handled: telemedicine, confinement and long-term human isolation, robotics & AI, etc. Further, the identification and utilisation of space resources is fast becoming a reality, driven by a revolution in space technology, accelerating exploration of outer space and the eventual scarcity of certain resources on Earth. In this context, asteroid mining may constitute a serious option for scarce materials on Earth, despite the high cost of spaceflight, difficult identification of asteroids suitable for mining, and potentially serious extraction challenges.

- **Space exploration & deep space**: Space exploration and deep space is certainly the most ancient section of space. Many old societies refer to stars and constellations, much before the concept of 'space' itself. It would be futile to cite all the works of art referring to deep space, everyone knows them whether in literature, cinema, or any other form of artistic expression.

3.5 A comprehensive curricula

UNIVERSEH is an integrator of knowledge transfer by offering cross-curricula courses to support an effective interdisciplinarity. A matrix of this interdisciplinarity fully explicitates the crossover of courses between the fields of disciplines which are classically independent. Actually, our intention is to offer to students at least one course in all boxes of the 6-disciplines 4-sections matrix:



UNIVERSEH is a key enabler for several crucial aspects of space education which have not been tackled before such as New Space and its capitalistic derivatives. Further, technological changes such as digitalisation and artificial intelligence and new types of reusable spacecrafts allow the emergence of this New Space, or entrepreneurial space, encompassing a globally emerging private spaceflight industry. UNIVERSEH will train the talents of tomorrow to be part of this new scientific, technological and socio-economic endeavour. In this “New Space” business arena, comprehensive higher education is critically needed to realize the above-mentioned ambitions. Student-centred and innovative educational approaches are key for transferring research-based innovative knowledge, competences and skills to take the next wave of this revolutionary approach to space exploration and use.

4. Detailed Description of the Project

The UNIVERSEH project is splitted into 7 work packages. Each University participates in all work packages, even if they are all coordinated by one University of the consortium.

4.1 General Management and Coordination (WP1)

The objective of this work package is to put in place governance and coordination bodies and tools to ensure the implementation of the project to the highest possible standards according to the work plan set out in this form, as well as all legal, financial and administrative rules. More specifically, this WP deals with the establishment of governance and coordination bodies, financial and

administrative management, quality monitoring and assurance, intra-consortium communication and coordination, and risk management.

4.2 Mobility and Multilingualism (WP2)

This work package deals with the development of tools supporting the mobility of students and staff, and with the promotion of multilingualism in the space sector. Morespecifically, it will address the preparation of the mobility by identifying issues before the mobility and developing cultural awareness, and the support of students and staff during the mobility with a dedicated tool called 'MOPLAT' (Mobility Platform). It will also organise short-term mobility of students such as summer or winter programs, for which ERASMUS+ does not support financially the mobility, and propose specific short programmes such as

- a summer school and space resources and mining
- a summer school on law, governance & ethics, and business
- a summer school on "space in arts and culture"
- and an Arctic winter school in space science, technology, humanities and social sciences

It will also address the development of a *multilingual and illustrated dictionary of space concepts* (DSC), in which some space concepts will be illustrated especially through various art works.

4.3 Interdisciplinary and cross-sectorial curricula (WP3)

This Action Line has the following main objectives:

- Building future collaborative actions by analytical comparison of existing courses at partner universities and feedback from stakeholders on future needs for student competences.
- Implementing joint common courses to share cross-sectoral expertise
- Implementing joint common programmes to provide new interdisciplinary curricula

Essentially, these work packages will manage the mapping and sharing of partner competences, coordinate the study on today and tomorrow's needs for student skills and competencies for the space sector, propose new courses to complete the 6-disciplines 4-sections matrix, and propose new courses, short programmes, semester exchange, joint bachelor, master and doctoral programs to ba shared among partners.

4.4 Innovative Pedagogical Models (WP4)

To meet the demands of 21st century society and become a future ready Higher Education we need to explore more flexible and dynamic, innovative approaches to learning and teaching. This also entails reconsidering the traditional roles and players in education, and opening up to a wider range of stakeholders and communities, creating an education that is more interactive, personalised and engaging by new technological tools. The skills and competencies necessary for the future need to be part of Higher Education, which should be personalized, digitized and international in its nature. WP4 is the exploratory foundation that delivers methods, know-how and a base for pedagogical implementation to other WPs. WP4 further prepares knowledge capital among teachers, delivers pilot implementations, establishes digital platforms and accurate resources.

4.5 Entrepreneurship and Innovation (WP5)

This work package focuses on entrepreneurship and innovation. First, a map of existing courses will be built at the consortium level. New common course/entrepreneurship modules adapted to the European space sector will be developed, with a specific focus on entrepreneurial and innovative mindset using Geo-data from Earth Observation. Entrepreneurial mindset and creativity will be stimulated along with an awareness about intellectual property and financing opportunities. Some calls for projects with stakeholders such as industry/NGOs (e.g. ActInSpace) will be proposed along with the setting up of a networking and mentoring programme. FInally, a practical experience in research and innovation will be proposed to students and student projects will be supported for innovation.

4.6 Equity, Inclusion and Diversity (WP6)

All UNIVERSEH partners have signed and respect the rules of the Erasmus Charter for Higher Education (ECHE), the first paragraph of the document says:" respect in full the principles of non-discrimination set out in the Programme and ensure equal access and opportunities to mobile participants from all backgrounds"

The objective of this work package is to address some of the barriers students can face when it comes to joining higher education in general and studying abroad in particular.

Inclusive Education is important as more cohesive societies need learners from disadvantaged socioeconomic backgrounds, those from a migrant background, those with special needs.

UNIVERSEH will build on the local initiatives, harmonize the best practices at the Alliance level and will go beyond to become a role model of good practices for other higher education institutions. The Alliance will have a particular focus on learner mobility, and will ensure that all students, without distinction, have the possibility to study, train and learn abroad.

To support partners in their efforts towards the inclusion of people with disabilities, membership to the The Global University Disability and Inclusion Network (GUDIN) will be given due consideration.

4.7 Sustainability and Dissemination (WP7)

This work packages is splitted into two topics

Sustainability
The Alliance members' motivation and commitment ensure that management, units, services and individual members of the five universities will guarantee a degree of cooperation sufficient to fulfil the objective of UNIVERSEH. The sustainability of the Alliance will also be facilitated by the willingness to work together on the long term, based on the development of joint policies and

guidelines with the clear purpose of remaining in place and evolving beyond the lifetime of the initiative.

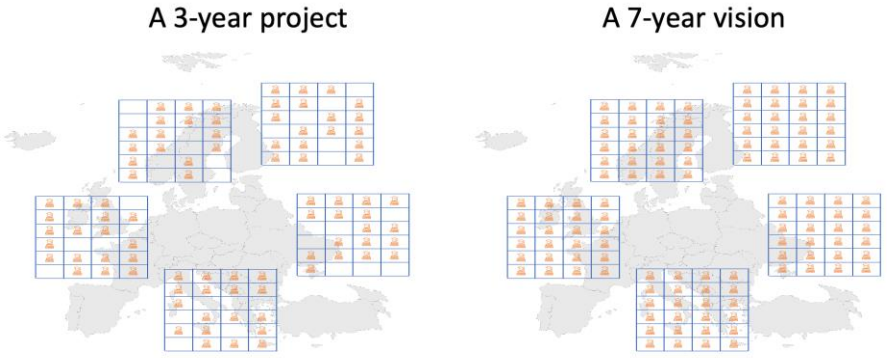
Dissemination/Communication

UNIVERSEH communication policy has the objective of getting its strategic message to all its target audiences: present and potential students, employees of partner universities, other universities and networks, national and international administrations, policy makers, industrial companies, NGOs and the society in general. We will pay particular attention to use an inclusive communication approach to make sure we reach our target audience irrespective of gender or background.

5. Roadmap & Future Work

The UNIVERSEH project is funded for three years from November 2020. A second call will be launched to accompany the project for 4 extra years. This project has been designed for three years of immediate operation, but with a seven-year vision.

To illustrate this articulation, one of our 3-year objectives is to have at least one module in all containers of the 6-disciplines 4-segments matrix *somewhere* in one of the partner universities. A seven-year objective is to have all courses in all boxes accessible from all students independently of their location, in face-to-face or at distance, synchronously or asynchronously.



A research-oriented project, called ‘beyond UNIVERSEH’ has been funded by the EU to accompany the education-oriented UNIVERSEH project. It aims to develop a common research roadmap for UNIVERSEH members in the space sector. There is a particular attention to develop research areas also outside science and technology. This project aims to

- develop a research roadmap 2035 and a vision 2050
- develop new infrastructures, accessible from everywhere
- develop specific research areas
- develop research transfer and innovation strategies
- develop dissemination on the space sector

The ‘beyond UNIVERSEH’ project is running in parallel with the ‘UNIVERSEH’ project and is funded by an H2020 SwafS (Science With And For Society) call.

6. Conclusion

This article summarizes the academic content of UNIVERSEH, the European Space University for Earth and Humanity, a European University under the Erasmus+ scheme. It presents the concept, our vision, missions and objectives, and gives an overview of all work packages. Ultimately, it presents the future of the project, with a 7-year vision and the research side of the initiative called 'Beyond UNIVERSEH'.

Space is an enabler for several vertical industry processes. Also, the space industry provides important incentives for other technologies, with a new value proposition for innovation, intellectual property, and consequently global business opportunities. Space activities in the EU contribute to meeting key societal challenges, supporting job and industrial growth and ensuring EU autonomy. In the "Space" and "New Space" business arena, a comprehensive higher education is critically needed to realize the above-mentioned ambitions. Student-centred and innovative educational approaches are key for transferring research-based innovative knowledge, competences and skills to take the next wave of this revolutionary approach to space exploration and use. UNIVERSEH will provide the essentials of Space education, research and innovation, address key societal challenges, nurture job and industrial growth to ensure EU autonomy within the entrepreneurial space.

7. Contact authors email:

email: emmanuel.zenou@universeh.eu

8. Copyright statement

1.1 Headers and Footers

Notice the 'AEC' logo should only appear on page 1. In the LATEX template this is done automatically. After page 1, all pages have the title only in the header, right justified. The title in the header needs to fit in a single line - if too long please use a "running title", i.e. a simplification of the title, or a shorter version of the title, such that it fits in one single line. For LATEX users, in order to do so, please make changes in the *aec2021.cls* file, line 93. For Word users, please modify the header directly in order to include your "running title".

Footers, except for the first page, contain the page number, centred.

2. Preparation and Submission of an Electronic Paper

2.1 Use of this Template

The papers should be prepared, if possible, using the format like this document.

2.2 General Procedures for Submission

The final, pdf version of your paper must be submitted using the **Conference Platform** available at https://aec2021.meil.pw.edu.pl/?page_id=75

- Login to your existing account using your username and password
- Choose AEC 2021 Conference and go to **ABSTRACTS AND PAPERS** menu
- You may add paper to the accepted abstract available listed on your account.
- You will receive confirmation message shown on the screen after correct paper addition.
- It is possible to modify once added paper using **Update paper** button.
- There is no specific limit in the number of pages for the paper, but it is generally accepted that a good conference paper will have between 6 and 10 pages in the present format, including all illustrations. The *.pdf* file size must not exceed 5 Mb and will be typically less than 1Mb in size. Problems with over-large file size are usually the result of using unnecessarily high resolution in graphics. See section 2.5.

2.3 Software Used and Final Paper Format

The papers must be submitted in pdf format. The electronic submission tool will not accept any other format. When creating your pdf file please select 'include all embedded fonts'. If available, please create the pdf file in PDF/A standard.

2.4 Diagrams and Figures

Care should be taken over the preparation of diagrams and figures which may incorporate colour where it adds to the presentation. Captions should only have the first letter capitalised. The figure caption should be preceded by 'Figure' followed by the figure number. For example, 'Figure 1 - The vortex shedding...'.

Figure 1 – Example of a figure.

2.5 Photographs and illustrations

Authors should recognise the possibility for full colour publishing of photographs and illustrations. Image files should be optimised to minimise size without compromising the quality. Do not use raw bitmapped files in the final document, compress them to *.png*, *.jpeg* or *.gif* format. The figures should have a maximum resolution of 300 dpi.

2.6 Equations

Using the appropriate editor each equation should occur on a new line with uniform spacing from adjacent text as indicated in this template. The equations, where they are referred to in the text, should be numbered sequentially and their identifier enclosed in parenthesis, right justified. The symbols, where referred to in the text, should be italicized.

$$E = mc^2 \tag{1}$$

3. General Style Preferences

3.1 Style of Writing

Papers are accepted on the basis that they may be edited for style and language. The authors themselves are responsible for the correctness of the scientific content.

Abbreviations should be spelt out in full the first time they appear and their abbreviated form included in brackets immediately after. Words used in a special context should appear between single quotation marks the first time they appear.

3.2 References

The papers in the reference list must be cited in the text. In the text the citation should appear in square brackets '[ ]', as in, for example, "the red fox has been shown to jump the black cat [3] but not when. " In the Reference list the font should be Times or Times New Roman with 10 point size. The Author name list should be terminated by a 'full stop', last Name first. The citation number should be enclosed in brackets.

Book titles should be in italics, followed by a 'full stop'. Proceedings or journal titles should be in italics. Only the first letter of the title should be capitalised in the article name.

3.2.1 Example

Please see references at the bottom of the document

4. Copyright Issues

The copyright statement is included in the template and must appear in your final pdf document in the position, style and font size shown below. If you do not include this in your paper, CEAS is not allowed and will not publish it.

5. Sending Your Electronic Paper & Contacting the Editor of the Electronic Proceed- ings

Please refer to section 2.2 and follow the submission method described there.

For question concerning the paperlayout please
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6. Submission Dates

Since the Proceedings will be published on-line and will be downloadable at the AEC2021 webpage, it is essential that:

- The written version of the paper is submitted to the proceedings editor, in the prescribed format, by **15 October 2021** for the formal review;
- The final (revised) version of the paper is submitted to the proceedings editor, addressing all issues within formal review, by **1 November 2021**;
- At least one author has registered as a Conference delegate by 15 October 2021.

The selected papers, after recommendation done by session will be recommended to publish in one of the following journals:

- CEAS Aeronautical Journal
  The CEAS Aeronautical Journal has been created under the umbrella of CEAS to provide an appropriate platform for excellent scientific publications submitted by scientists and engineers. It is supported by the German Aerospace Center (DLR) and the European Space Agency (ESA).
- CEAS Space Journal
  The CEAS Space Journal has been created by the CEAS Space Branch to provide an appropriate platform for the excellent scientific publications submitted by scientists and engineers. Under the umbrella of CEAS, the German Aerospace Center (DLR) and the European Space Agency (ESA) support the Journal.
- Transactions on AEROSPACE RESEARCH (TAR)
  The Institute of Aviation has been publishing Transactions of the Institute of Aviation since 1956 and since 2 years renamed into TAR and edited by SCIENDO . It publishes new, original articles written by researchers collaborating with the Institute, including those from abroad. The scope of the publication is closely related to the area of activity of the Institute and the scientific conferences organized there. All articles are reviewed before publishing.

7. Contact Author Email Address

The contact author email address should appear explicitly in this section to facilitate future contacts. For example, mailto: corresponding@author.com

8. Copyright Statement

References

[1] Smith J, Jones B and Brown J. *The title of the book*. 1st edition, Publisher, 2001.

[2] Smith J, Jones B and Brown J. The title of the conference paper. *Proc Conference title*, where it took place, Vol. 1, paper number, pp 1-11, 2001.

[3] Smith J, Jones B and Brown J. The title of the journal paper. *Journal Name*, Vol. 1, No. 1, pp 1-11, 2001.