European Space University for Earth and Humanity

UNIVERSEH is an alliance of five European universities established to develop a new way of collaboration in the field of Space, within the "European Universities" initiative.

The alliance aims to create new higher education interactive experiences for the university community, teachers and students, and for the benefit of society as a whole. Such initiatives will enable broadminded, informed and conscientious European citizens to capture and create new knowledge and become smart actors of European innovation, valorisation and societal dissemination within the Space sector, from science, engineering, liberal arts to culture.

In Beyond UNIVERSEH, the alliance will develop the research and innovation dimension. By creating a research policy roadmap for 2035 and a vision for 2050 within the space sector, the alliance expects to notably transform the future Space and New Space research landscape, as well to enhance the links between education and research.

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Deliverable n°15/ D2.1 – Harmonisation Activities with EC, ESA, UN and related PPPs and Projects

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UNIVERSEH – European Space University for Earth and Humanity is an alliance of

Dissemination Level

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Document History

Version	Date	Author	Partner	Summary of main changes
1	24/02/22	René Laufer	LTU	Initial setup of first draft
1.1	25/02/22	Margot Clauss, Bernd Weiss	LTU	Stakeholder and Requirements Analysis
1.2	28/02/22	Margot Clauss, Bernd Weiss, René Laufer	LTU	Finalising Deliverable D2.1

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1 – Work Package Objectives

The main objective of WP2 is to host all the related activities for generating a complete 2035 Roadmap and 2050 Vision for the development of the research dimension of the European Space University for Earth and Humanity (UNIVERSEH) and propose a set of specific actions for their future implementation within a corresponding timeline. The roadmap must be understandable for a wide non-technical audience, as it will likely be read and reviewed by policymakers and other potentially non-technical stakeholders. To this end, WP2 includes the following objectives:

- Identification of the societal needs including current and future global challenges, that space related research and innovative technologies can solve in a sustainable way;

- Bringing together and establishing an effective dialogue, cooperation and integration among the various constituencies that are currently active in the field of space technologies, as well as with a critical mass of industrial and academic representatives to create an ecosystem that will shape and drive the future innovation and developments in the space sector;

- Evaluation of the enablers to sustain and maximise the implementation of the technologies promoted in the roadmap;

- Elaboration of a UNIVERSEH research roadmap for 2035, that is adoptable, interdisciplinary, collaborative, innovative, enabling to scale excellence by joining forces at a European level;

- Elaboration of a UNIVERSEH Vision for 2050 that will have the EU being a cornerstone of the related developments.

2 – Deliverable Description

In alignment with the Task 2.1 description the Deliverable D2.1 will report on the outcome of the investigation to identify possible stakeholders, alliance members and related partners, as well as other relevant information providers. Their potential input for the Beyond UNIVERSEH 2035 road mapping as well as 2050 vision strategies will be taken into consideration to be included in an initial data base of such information. Such information sources will provide the starting points for the UNIVERSEH data collection via strategic intelligence, interviews, and workshops to be conducted in Task 2.2 with Deliverable D2.2 reporting on its outcome.

Task 2.1 - Harmonization and synchronization activities with parallel road mapping of European and Global Initiatives in the Space Sector

This task will focus on the harmonization and synchronization activities of UNIVERSEH with related road mapping and vision strategies from the European Commission (EC), the European Space Agency (ESA), major national European space agencies as well as relevant global space agencies and UN bodies. The strategies include the development of innovative space technologies and applications, entrepreneurship, operational and management concepts, utilisation of GNSS and space data for scientific, public and commercial purposes, public and private partnerships in ground segment networks, suborbital platforms, launch services, satellite constellations, payload technologies, robotics and artificial intelligence (AI),

the Big Data Value Association (BDVA), the AI on-demand platform, AI4EU, ESA's Ministerial Council, Council Meetings, Global Space Economic Forum and other international high-impact initiatives that may emerge in the near future. Notably, Beyond UNIVERSEH will study and evaluate the lessons learnt and the related supporting activities and mechanisms to achieve an overall integration and true cooperation among UNIVERSEH and the space academic sector to achieve the maximum impact of fast technology and knowledge transfer with space industry in Europe. Beyond UNIVERSEH will also perform a harmonization of its activities with the Digital Innovation Hubs (DIHs) as well as other European and global activities towards innovation road-mapping for the direct and early adoption of space technology. The evolution of future technologies is expected to have a radical impact on the current business models and approaches. Thus, Beyond UNIVERSEH considers evaluation of strategic links to and lessons learned from existing DIHs as a major and significant activity of this task. Beyond UNIVERSEH will also connect to the respective regional innovation hubs and business incubators with the overall objective to strengthen the impact of innovative activities in the European space sector, and to bridge identified gaps in space research competences from an industry perspective. The roadmap will respect European standards, will follow guidelines and constraints, and will include best practices, ensuring and facilitating interoperability and early adoption of the UNIVERSEH roadmap's priority actions.

The definition of the roadmap will involve stakeholders (public and private) as well as alliance members, and the preparatory work will take the form of workshops and questionnaire to gather information.

3 – Stakeholder and Requirements Analysis

During the application stage the UNIVERSEH project received support from more than 60 stakeholders – a number that increased during the implementation stage's first year (see UNIVERSEH WP5 Deliverable D5.8). The group comprises of commercial entities and industry, agencies and other governmental institutions, local and regional stakeholders. Stakeholders are engaged in various aspects of UNIVERSEH and Beyond UNIVERSEH, including involvement in project governance as well as the alliance's advisory group.

Initial research conducted in Task 2.1 identified more than 150 possible WP2 stakeholders and other relevant sources of information being able to provide valuable input to the road mapping and vision strategies and with potential benefits in being involved in the Beyond UNIVERSEH WP2 intelligence and information collection. It is suggested to consider clusters of industry and institutional organisations as well as lead companies and entities in identified industry trends and topics of increasing importance: for example, digital innovation hubs, business incubators,

Industry 4.0, additive manufacturing, robotics and automation, new space and up-/downstream space commercialisation, public-private-partnerships, to just name a few (see table below for a more comprehensive list). The data base includes European and other international space organizations, space industry representing start-ups and SME, academia and research, associations and interest groups, hubs and business communities.

Trends and Topics of Increasing Importance	Additive Manufacturing, Big Data, Circular Economy, Cybersecurity, Energy Transition, Green Space, Industry 4.0, Machine Learning and Artificial Intelligence, New Space and Space Commercialisation (Upstream/Downstream), Quantum and Edge Computing, Reusability, Robotics and Automation/Autonomy	Trends and topics of increasing importance indicate evolving or transformative directions of industries or innovation in general closely related to space

In preparation for the upcoming task the next step is to finalise and (if necessary) expand the list of stakeholders and other relevant sources of information to evaluate their documented needs and existing plans for strategic, capacity, product, or technology roadmaps. The information will be collected through websites, conference papers, and public announcements as input for the planned intelligence and information collection through interviews and surveys where appropriate to gain enhanced insights.

In addition, the following organizations are considered high-level sources for input and their existing roadmaps shall be considered for integration into the Beyond UNIVERSEH 2035 Roadmap and 2050 Vision: ESA, EUSPA, Space Programs of UNIVERSEH alliance member countries, and major international organisations like NASA, JAXA, CNSA to name a few. The following table provides an overview with categorization of stakeholder groups, a concise summary, and explanatory comments to provide additional rational on their selection.

Stakeholder Group	Summary	Comments
Academia	UNIVERSEH alliance members, collaborating partner universities, global consortia of leading international universities, universities related to other stakeholder groups.	Academic institutions are major actors in providing capacity building and capability development as well as innovative research and development to fulfil future needs of industries.
Governmental Institutions	ESA, EUSPA, alliance member states space agencies (CNES, DLR, LSA, POLSA, SNSA), major space agencies (NASA, JAXA, CNSA as well relevant space agencies of other continents), AI4EU, OECD, ESA's Ministerial Council, ESA's Technology Transfer Programme Office (TTPO)	Governmental institutions are important for the development of the space sector in Europe and globally, they provide policy frameworks for innovation, capacity building, and workforce as well as acting as anchor customers.
Industry	Business Incubators (for example, ESA BIC, TECHNOPORT), Industry Accelerators (TECHSTARS, EYNOVATION), Multi-national Business Groups, Start-Ups and SMEs, Venture Capital and Angel Investors	Industry stakeholders can provide insights into their planning and product innovation cycles. Venture Capital, investors, and business incubators focus on innovative, novel products and the creation of new value streams.
Ecosystems and Hubs	Aerospace Valley Toulouse, European, Munich Aerospace, NL Space Campus, Region Norrbotten, SpaceResources.LU, among others	Business communities/ecosystems and innovation hubs bundle industry needs, support product development, innovation, capacity building and workforce development to meet regional and national needs
Associations and Interest Groups	ActInSpace, Aerospace Cluster Sweden, AI On-Demand Platform, Automation Småland, Big Data Value Association, European Association for Artificial Intelligence, Global Space Economic Forum, World Economic Forum, Space Analog Mission Providers, Swedish Aerospace Research Center	Focusing on and lobbying for the interests of their members, associations and interest groups can provide valuable, first-hand insight into current interests, needs, future visions and the required support needed by industry and other interest groups

Table 1: Stakeholder Groups and Example Overview.

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