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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.

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D6.11

Report on the first yearly joint conference on diversity and inclusion

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In this report:

AGH: AKADEMIA GORNICZO-HUTNICZA IM. STANISLAWA STASZICA W KRAKOWIE

HHU: HEINRICH-HEINE-UNIVERSITAET DÜSSELDORF

LTU : LULEÅ TEKNISKA UNIVERSITET

UNI-LU : UNIVERSITE DU LUXEMBOURG

UT: UNIVERSITE DE TOULOUSE

UT is a federal university which gathers:

INPT: INSTITUT NATIONAL POLYTECHNIQUE DE TOULOUSE

ISAE: INSTITUT SUPERIEUR DE L'AERONAUTIQUE ET DE L'ESPACE

TBS: TOULOUSE BUSINESS SCHOOL

UPS: UNIVERSITE PAUL SABATIER

UT2J: UNIVERSITE DE TOULOUSE JEAN JAURES

The **Student Conference** on diversity and inclusion in the space sector took place on **6 October** at the **University of Toulouse**. Parallel to the main event in Toulouse, European students were invited to **organize local workshops** in their respective universities.

The preparation for this conference was highly complicated by the pandemic situation due to COVID-19. We would first like to acknowledge and thank the students who mobilized despite this context to define the program, plan interventions and communicate about this event at their university.

We also want to warmly thank all persons who helped to prepare this student conference and/or took part in it.

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EUROPEAN UNIVERSITIES Erasmus+

Université Fédérale Toulouse Midi-Pyrénées

AGH

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LULEÅ UNIVERSITY OF TECHNOLOGY

hhu Heinrich Heine Universität Düsseldorf

We will first present the preparation and then the progress of this student conference.

I The preparation of the Student Conference

The conference has been prepared by a “Student international organization committee” (SIOC) which gathered:

- Axelle VANHAECKE (President) and François RULIER (UT)
- Beata CABALA and Gabriela OPIŁA (AGH)
- Alessio BUSCEMI and Nicola SCHREINER (UNI-LU)
- Milan GRIGULL, Seth BERK and YU WANG (HHU)
- Arnau BUSOM VIDAL and Kiira TIENSUU (LTU)

This Student international organization committee, and especially Axelle VANHAECKE who ensured the coordination of all the actions and meetings, has been in constant contact with the members of WP6 who have helped members of the SIOC and ensured the conditions for bringing their initiatives to life.

- Joanna PYRKOSZ-PACYNA has provided the link with the steering committee of UNIVERSEH and with the team from Toulouse (see just below).
- Lucie LOYON, Vincent SIMOULIN and Christina STANGE-FAYOS have looked at all practical arrangements in the host university, the University of Toulouse Jean Jaurès, and made sure to keep an averall logic to the Student conference.
- Katarzyna CIEŠLAK, Agneta LARSSON, Britta MOORMANN and Joanna WEST helped students in the member universities to prepare their interventions.
- Krystina GARIBYAN, Lucie LOYON and Aswin LUTCHANAH took over communication.

The Student conference was prepared during a large number of meetings in the spring and summer:

- 4 march 2021 : preparation meeting in Toulouse with local students
- 17 march 2021 : meeting of the WP6
- 16 april 2021 : preparation meeting in Toulouse with local students
- 19 april 2021 : preparation meeting in Toulouse with local students
- 23 april 2021 : meeting of the WP6
- 26 may 2021 : meeting of the Student international organization committee
- 8 july 2021 : preparation meeting in Toulouse with local students
- 21 july 2021 : meeting of the Student international organization committee
- 31 august 2021 : meeting of the Student international organization committee
- 7 september 2021 : preparation meeting in Toulouse with local students
- 24 september 2021 : preparation meeting in Toulouse with local students

After consultation in the universities of the consortium, the Student international organization committee identified 7 topics of particular interest to students and which should be explored by the student conference:

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The Poster of the first UNIVERSEH Student Conference

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1. Environment and space
2. The space sector within the different UNIVERSEH partners
3. Imagination and space
4. Women in the space sector
5. Settlements and future infrastructures
6. Who owns outer space ?
7. Jobs and careers in the space field

Given the pandemic situation, the conference was organized on hybrid mode.

61 persons had registered in order to follow physically either one part of the student conference or the whole day, of which 43 were students. Of course, for each workshop, the persons who registered for the “whole day” should be added to the number of registered attendees. For instance, 10 persons attended only to the opening ceremony, which means that 29 persons did actually attend this ceremony.

Table 1: registration of physical attendees

	AGH	HHU	LTU	UNI-LU	UT					Others	
					INP	ISAE	UPS	UT2J	TBS		
Opening ceremony	5		1		2			2			10
Workshop 1			1								1
Workshop 2						1					1
Workshop 3		2									2
Workshop 4						2		1			3
Workshop 5	2					1		2		1	6
Workshop 6				2		1					3
Workshop 7			1		1	1		1		1	5
Conclusions	7		1			1		1	1		11
Whole day	4		5	3	3			4			19
TOTAL	18	2	9	5	6	7		11	1	2	61

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30 persons had registered in order to follow online either one workshop, several workshops of the student conference or the whole day. Globally, 53 reservations were then made and the underlying table shows their share:

Table 2: registration of online attendees

	AGH	HHU	LTU	UNI-LU	UT					Others	
					INP	ISAE	UPS	UT2J	TBS		
Opening ceremony											
Workshop 1			1				1	1		1	4
Workshop 2							1			3	4
Workshop 3		1			1		1				3
Workshop 4		1			1					1	3
Workshop 5	3				1		1	1		2	8
Workshop 6	1	1		1			1	1			5
Workshop 7		2	1		2		1	1		3	10
Conclusions					1			1		2	4
Whole day	1	1	7				1			2	12
TOTAL	5	6	9	1	6		7	5		14	53

There again, for each workshop, the persons who registered for the “whole day” should be added to the number of registered attendees. For instance, 4 persons registered online only to the opening ceremony, which means that 16 persons did actually register online for this ceremony.

It is worth to say that one registration came from India, one from Brasil and two from USA. 14 were from non-members of the universities from the consortium. It shows that the student conference raised an interest which went beyond the members of UNIVERSEH.

These two tables correspond to the registration prior to the conference. They do not fully match the audience to each of the workshops. Some people who had foreseen to take part could not join, partly for technical reasons, whereas others joined the very day either one workshop or the whole conference. The next section will therefore state for each workshop the number of attendees.

As planned, all the workshops took place in Université de Toulouse Jean Jaurès, Maison de la Recherche, 5 allée Antonio Machado, 31058 Toulouse. The workshop 6 was partially streamed from University of Luxembourg.

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II The progress of the Student Conference

Compared to the planned progress of the Student conference (cf. poster in Appendix 1), several changes occurred during its actual course:

- Firstly, due to technical problems, the planned streaming to all the partner universities (LTU had booked meeting rooms for studets home in Luleå and Kiruna could watch the online event togehter) could not take place in the morning for the introduction and the first four workshops. The problem could be solved after these workshops and those of the afternoon took place on the hybrid mode. But all workshops have been registered and made available.
- It was very frustrating for the participants to not be able to attend all the workshops as on two occasions, three were planned simultaneously. Therefore, in the afternoon, the duration of the workshops was adapted and they took place one after the other.
- The order of workshops 5 and 6 was reversed as several guests from workshop 6 could not intervene later.

The Student Conference began with a series of speeches welcoming this initiative and presenting its course:

From the right to the left: Christina STANGE-FAYOS,
Joanna PYRKOSZ-PACYNA, Emmanuelle GARNIER and Vincent SIMOULIN

9h-9h20 – opening ceremony

Number of participants: 32 On site: 7 Online: 25

Emmanuelle GARNIER, President of the University Toulouse Jean Jaurès, began by telling her pleasure to welcome students and colleagues. The UNIVERSEH project is perfectly in line with the

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vision of the European Union that the President Emmanuel Macron proposed in his Sorbonne speech in 2017. It is also an ambitious project for the space sector, which employs many of our graduate students.
The program of UNIVERSEH questions the interaction of human and social sciences with technological and life sciences. With our expertise in languages, multilingualism, but also in psychology, sociology, geography, and the whole range of disciplines necessary for space exploration. Today's event is mostly significant and unique as it is a conference for students and by students. Students engagement has been an important part of our policy for a long time in this university.

Finally, she thanked all those who contributed to the organization of this day, the students of course, all the members of the work package 6 who works on the themes of inclusion and diversity.

Vincent SIMOULIN, Vice-President of the University Toulouse Jean Jaurès for teaching and student life, welcomed also the participants to this student conference. This was an important moment as themes of WP6 are also big priorities for University Toulouse Jean Jaurès. Its members are strongly attached to equity, to the fight against discriminations and to the support to all the students who have specific needs.

This conference by the students and for the students is very much in line with the perspective they want to develop and especially to the will to give all the students the best opportunity to succeed in their studies and to achieve objectives which may seem inaccessible to them. He especially thinks to space, to a whole series of professions that would not be considered as a priori dedicated to students in art, literature or human and social sciences. And yet, there can be jobs for them in translation, in design or in psychology in the space sector. So this is important to show to all our students that there are opportunities for them.

People that will make space missions, will have to understand each other, they will have to understand foreign languages, they will need to have some psychological concern and skills, and so the disciplines that we teach are very useful for the students and for the space exploration. And of course, it shall be true for boys and for girls. The video testimonials that we have produced in WP6 can be a kind of inspiration for the young women as that they can see they can be active in the space sector in the future.

In the last two years, a lot of cooperations have been launched in the UNIVERSEH project. He concludes by thanking all the persons who have come to Toulouse and all the ones who have contributed to the workshop

Christina STANGE-FAYOS, Vice-President of the University Toulouse Jean Jaurès for international relations, takes the floor and points the long preparation which was necessary for this student conference. The fact that this conference is in the research building naturalizes the link we are trying to build in UNIVERSEH with our partners between teaching and research.

The aim is to build a comprehensive university in the double sense of the term. First of all, a university that makes room to all disciplines, that is multilingual and that tries to balance between all the partners. And secondly a university where teaching is based on research and vice-versa research is based on teaching. This is also important to have a project which is developing with partners from center and north of Europe. That complements our strong links with other partners further south and reinforces the prospect of mobility that are offered to our students.

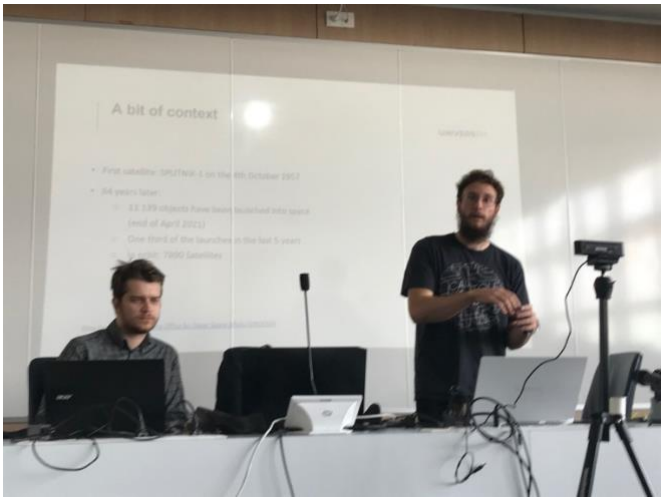
She also thanks all those who contributed to the organization of the day and gives the floor to Joanna who will maybe organize the next student conference in Krakow.

Joanna PYRKOSZ-PACYNA, AGH, leader of the WP6, says her satisfaction to open this conference. For a long time, it was difficult to imagine a collaboration between such different domains within space sector. This may seem unusual for some that a psychologist can work in a technological university, but this is very natural to students that different domains mix, that different cultures are collaborating, that different genders, different nationalities, different backgrounds, are all invited to collaboration.

We learn so much from our brilliant students, who are not only highly motivated and talented in their domains, but they are also very much aware on social inclusion needs and they are very open to these ideas. Diversity is much needed, it is good that it is happening, but this is also challenging. Therefore, the possibility like this to have international conference that is organized by students from five different countries and universities, this comes with very great discoveries but also with some troubles and difficulties. But this is a part of a very great experience of learning from one other, of looking at how we can improve our collaboration and how we can take our steps forward.

Similarly, space exploration has also a long history of very brilliant successes but also of very harsh difficulties and harsh, painful and costly failures. This conference is the first one, there will be two next in the project and we hope there won't be the last. We will continue to work and to collaborate in the space sector and learn and improve year by year.

9h30-11h15 - Workshop 1: Environment and space (lead LTU; Convenor: Arnau BUSOM VIDAL)
Number of participants: 10 On site: 10 Online: 0



Arnau BUSOM VIDAL (right) and Erik HAGEL on the stage

This Workshop was organized by LTU students: Arnau BUSOM VIDAL, Erik HAGEL, Amal VINOD and Kiira TIENSUU. It reviewed a number of issues related to environmental preservation during space

exploration. It explored five issues about the theme Environment and Space, each time with a short introduction followed by an open discussion:

1) **Space debris**: thousands of debris are present in space. They expose space missions to hazards and lead for example to erosion of surfaces, decompression of crew compartiments and electromagnetic interferences. Low earth orbit is too crowded, which was theorized by Kessler syndrome.
2) **Satellites and constellations**: the first satellite, Sputnik, has been launched on 4th october of 1957. On april 2021, 11139 objects have been launched into space, with one third of the launches in the last 5 years. 7890 satellites are currently in orbit. And Amazon, Airbus, SpaceX...are planning to launch hundreds of satllites. These satellites constellations are generating new debris, pollution with launches...
3) **Earth observation**: ground based observations on climate change are more and more difficult because of inaccessible areas and gas levels. It is not anymore an excellent option for climate observations.
4) **Reusable rockets**: the prospect of using reusable rockets is to reduce costs by a factor of 4, but it can also lead to an increase of launches and more pollution and debris. Environmental effects are then unknown at this stage.
5) **Green propellants**: the current propellants have effects in the upper atmosphere and particurlarly in the sensitive région above the ozone layer. Space industry is then trying to get greener and the green propellants are a promissing option which can reduce prices, mass and the safety precautions.

Throughout the Workshop, on each of the five themes, the organizers asked participants a question. Everything was going on the Kahoot site. Each participant had one minute to choose one of the four proposed responses. Each of these questions confronted us with our opinions on the topic under consideration.

The 5 questions and the associated possible responses were:

1) When will the Kessler syndrome become reality?
    a. In the next ten years
    b. Sometimes in the future
    c. In the next hundred years (the most frequent answer)
    d. Never
2) Satellite constellations should be:
    a. Banned
    b. Kept as they are
    c. Regulated (the most frequent answer)
    d. More please
3) Are ground based observations a viable option for climate observations?
    a. Yes
    b. Not with the current technologies (the most frequent answer)
    c. Yes but only in a limited area
    d. No
4) Will reusable launch vehicles have a good impact on the environment on earth and in space?

a. Yes on both (the most frequent answer)
b. Only in space
c. Only on earth
d. No

5) Are high performance green propellants a viable option for future space missions?
   a. Yes (the most frequent answer)
   b. Yes but only for low earth orbit missions
   c. Yes but not for deep space missions
   d. No

The lively debates on these five topics focused on the collect of debris, the regulation of space constellations and the environment effects of launches.

9h30-11h15 - Workshop 2: The space sector within the different UNIVERSEH partners (Lead: UT; Convenor: Axelle VANHAECKE**)**
Number of participants: 13 On site: 8 Online: 5

For this Workshop, Marine Prunier has presented the Club Mars and more precisely the scientific experience in the Utah desert which takes place every year and aims to understand better the life conditions on Mars: the Mars Desert Research Station (MDRS).

> She first explained that the 2022 mission stimulated during three weeks daily life during three weeks, from February 20 to March 12, of a 7-person crew. They were commissioned to prepare future missions and to test technologies. The MDRS consists of various modules, including one housing module, a 8-metre diameter cylinder, three telescopes, a botanical study greenhouse and a laboratory of biology and geology.
> Life in MDRS implies to comply to a strict ant tight timetable, to protocols for immersion in the surroundings and to write daily reports on missions, experiences and crew progress. Each member of the crew has one role (Commander, Journalist, Astronom, Engineer, Biologist, Botanist, Health and Security).
> During the mission, they conducted several experiments in partnership with laboratories and companies. The first one, LOAC (Light Optical Aerosol Counter), measured the concentrations of different particles in the air and classified them by their size. The second one, Mega-Ares LATMOS, measured the electric field and air conductivity. The third one was a physiological monitoring of cardiac and arterial changes of the crew in relation to physical activity and confinement stress.
> The mars project allows us to better understand the difficulties of living on a foreign planet.

Then, Kiira Tiensuu has presented the Giron Space Organisation which is an organisation established to boost space related student projects in Northern Sweden. It aims at helping students to find fundings and partnerships, to get support from alumni and at making the projects longlasting and sustainable.

> Student organizations in the Kiruna campus are united into one umbrella organization under which they organize various projects related to space. It makes Kiruna the “space campus” of LTU. It can be either an optional or a mandatory part of the education, from some ECTS to a full

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diploma. Three masters are indeed proposed to the students: one on Civilingenjör Rymdtechnik, one on SpaceMaster and one on Spacecraftdesign.

Students are currently working on 4 student projects:

- APTAS – Atmospheric Polar Transmission Alignment Satellite. The aim is to design, assemble, test and operate the first student CubeSat at LTU. This project is currently in the manufacturing and qualification phase. It gathers around 15-25 students.
- ASTER – Attitude STabilized free falling ExpeRiment. 17 students work together to develop a fast, low-cost, and easy to integrate attitude control system for free falling experiments ejected from sounding rockets.
- FASTER – Flying Attitude Stablized ExpeRiment. This is a spin-off from ASTER and this 9 students team aims to adapt ASTER's platform in order to improve microgravity conditions for experiments in parabolic flights.
- RAVEN – Rocketry and Aerospace Vehicle Engineering in Norrbotten. This 30 students team targets to 1) design, build, test, and launch a hybrid rocket that can reach an altitude of 10 km with a 10 kg payload 2) Create a foundation for a continuous rocket program.

Finally, AGH students from the "Spaceteam AGH" described the "AGH space oriented students clubs". In their university, which has been established in 1919 and gathers about 20.500 students, there are approximately 140 students research clubs.

For four years, they organize each together the KGK space resources conference (KGK SRC) which deals with exploitation of extraterrestrial mineral resources, mining, planetology and mechatronic engineering.

- The "Nucleus-Project Mars" is the oldest, as it established in 1985, is based on recent Curiosity rover discoveries. It works on materials fitting Martian conditions, products available on Mars and low-energy process.
- "AGH Space systems" was created in 2014. It counts 52 students and is organized in 3 sections: rockets, rovers, marketing. Its members gained a lot of students tournaments like the: Spaceport America Cup 2021; Indian Rover Challenge 2020; Global Space Balloon Challenge 2016…
- "Cosmo Drill", founded in 2019, was the first science club devoted to commercial use of space and space resources in Poland. It organizes each year a "space day".

The audience asked how to keep people in a science club project. The answer was that Student clubs have to organize interesting projects. Only in this way will they interest other students. The presenters pointed that Scientific clubs can be an excellent beginning of a scientific career.

It also appeared that sharing information between student organizations from different countries shows different approaches to action. This is very important and it supports the development of student organizations.

9h30-11h15 - Workshop 3: Imagination and space (Lead: HHU; Convenors: Milan GRIGULL and Britta MOORMANN)
Number of participants: 7 (5 AGH; 2 UT) On site: 7 Online: 0

This workshop was based on the idea that technical developments always had to follow the imaginary force of thought leaders and artists, avant-gardists who were able to imagine the unforeseeable. Our image of space is stamped by artists of various disciplines through literature, movies, comics and music. Long before we could even think and technically plan the act of flying to the moon, imagination in pop culture painted a picture of future journeys before the technical set-up was even that advanced.

Associations with space differ according whether they are based on personal imagination, influence of particular technical developments, or visionaries in art in its broadest sense. In any case, in the 21st century still, our images of space are significantly formed by media we consume since early childhood. It is still the fantastic sci-fi images that trigger us more than the black-and-white pictures from humankind impressive achievements during the space race.

The convenors then presented the Dictionary of Space Concepts (DSC). It is an Open source handbook for teachers & students developed by WP2/UDUS which focuses on specific space terminology and is designed to be freely available to everyone. The initial set-up shall consider terms (English, Polish, French, Swedish, German), literature, definitions, images corresponding to these terms in their relationship amongst each other. Interested students can participate in the DSC any time by submitting terms in all project languages, images, literature, definitions/terminology.
They then described the Collaborative part of the w3: *City Rallye – Go discover the space that surrounds us!*. The task is to take a photo, record a video, gather images of space you discovered. Key questions are 1) What images, associations, manifestations of space do you see in the city?; 2) How do space images shape the future design/architecture/structure/traffic dynamic of the city?

Britta MOORMANN in front of the group with Milan GRIGULL (first right)

They finally propose to the crowd to associate words to “space” and to comment on some images like the cover from “On a marché sur la Lune” (Tintin), one on Laïka (the first animal in space in 1957) and some from Star Wars and some other movies on space.

Some results/photos/imagery/short story were finally presented by the students and they were asked to comment them, which gave the underlying kind of comments:

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1) Staircase: illustration of the infinity of space
2) Colorful boxes: boxes to live in, limitation of space versus infinity
3) Panorama: optimistic vision in 50 years > way more trees, no cars; pessimistic vision of the city > looks worse, much more cars, no trees, catastrophic
4) Self-painted/-designed illustration: connection to space since the early childhood, expresses personal continuous „fight" to stay on track and invest in a succesful career within the space field (Student shared a self-written short story too)
5) Panorama/notebook: space cover of the notebook = academic focus; ambiguity: space refering to scientific focus and space as notebook is the students' most personal, intimate space
6) Green chair: like a chair in a rocket, hint towards the colonisation of space
7) Hallway/corridor: stairs to the corridor through which astronauts aboard the rocket and start their missions
8) Fun fact

Questions were asked to the audience via mentimeter:

1) What do you think about hearing the word „space"?
2) Describe space with 3 words!
3) Would you associate different words in your mother tongue?
4) Polish example: space > kosmos > flower

Creative and collaborative aspects of the workshop were very well received by participants. They appreciated the opportunity/room offered to share their thoughts/knowledge etc.

11h30-12h30 - Workshop 4: **Women in the space sector** (Lead: UT; Convenor: Axelle VANHAECKE)
Number of participants: 25 On site: 0 Online: 25

Two talks have been given in this Workshop 4.

The first one ("A short history of the women in space. Conquering equality") has been delivered by Helene Fourcade (PhD student in history at UT2J) and allowed us to have a historical perspective on the place of women in the space sector.

Hélène FOURCADE on the stage

She reminded us that women still remain a minority among astronauts. At the beginning, in the 1950s, the definition of the astronaut as a jet pilot, graduate from university and with more than 1500 hours of flight to his credit hindered women to apply to NASA's selections. Women could then only dream of being an astronaut wife. The image of the astronauts was indeed extremely controlled and their families were very much exposed to the media. Everybody expected from the wives to embody the stereotype of the American woman of the 1950s and 1960s, and to comply to the current social order.

Things changed at the end of the seventies with the advent of the space shuttle. The astronaut was now a scientist as much as a jet pilot. Women could then apply but firstly accounted for less than 20% of the applicants and secondly had to be far more graduated than the men in order to succeed. And the first female astronaut was a Russian, Valentina TERESHKOVA, in 1963.

An interesting paradox is that female astronauts usually had few or no children but that the ones who were mother or grandmother attracted more attention from it than from the scientific experimentations they conducted or from the number of days they spent in space.

It is in 1999 that a woman, Eileen Collins, for the first time was appointed commander of a mission. Even in space, things are changing and 67 women have so far boarded spacecraft. Young girls may soon be surprised to learn that women were so long excluded from being astronauts.

The second talk ("Women in space") has been given by Yulia Akisheva about the activities of the team "Our Giant Leap" which aims to learn more about gender equality in the space sector and to propose solutions.

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Yulia AKISHEVA on the stage

She first presented 48 portraits of women linked to space from 35 countries. Still, women only represent around 20% of the space industry workforce and this statistic stagnates for the last 30 years. On all indicators, women are strongly underrepresented compared to men and they are 2 to 3 times more likely than men to drop out at any stage of their training. This is due to lack of data on female body in space, representations, toxic work environments and divergence of targeting between girls and their parents.

There are however organizations which target women empowerment and fight to raise equality between men and women like “Women in aerospace”, “Space4women of UNOOSA” or “Space Generation Advisory Council”. It is indeed possible to raise the awareness of a young girl that a space career is a foreseeable future to her with only 30 minutes of mentoring, 5 minutes of acknowledgement and congratulations and 1 minute of sharing and celebration.

This is also the target of the “Space Generation Advisory Council” which has launched the program “Our giant leap”. Its main objectives are:

- Raise awareness and break stereotypes within and outside of SGAC
- Provide recommendations for implementation in industry and academia, and setting an example through SGAC
- Inspire and provide avenues for young women to join the space sector
- Enrich the aerospace industry by advocating for gender equality, diversity and inclusion.
- Create a lessons-learned and practice platform on inclusive outreach and education.
- Set up a global network of people and entities taking action for diversity and gender equality.

It led to five top recommendations which are:

- **Plan** an **all-female ISS mission** with diverse international profiles: increasing the amount of research focused on women and female astronauts; and consequently, investigating preventive measures and protection needs specific to women in space.

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- Provide **greater visibility** to **minorities of the space sector** (through communication campaigns, videos, and original and diversified content) in order to **underline** their **unique stories**, and **inspire** and **attract** people who identify with them.
- **Commit** to **full transparency** on the current **status** (statistics, ratio) and **objectives** regarding diversity and gender equality, and **provide feedback** on the implementation of **new policies** to achieve the objectives.
- **Sensibilise** the **younger generation** - and their **parents** - about **gender equality** and **inclusion** by creating educational programmes, speaking in schools and showcasing role models.
- Commit to: **change the perception** of **female-oriented research as a "plus"**, **promote** more **experiments and clinical trials with women,** and **pass legislations** standardising **sex-disaggregation of data** in space research.

These two talks have been followed by a round table. It was advanced that it would perhaps be soon possible that a whole crew would only gather women. The fact that women are usually not attracted to sciences raised also questions on the things to change in school and education in order to change this state of things. It was also pointed that women do not need to study biology or mathematics in order to work in the space sector.

Lunch (12h30-14h)

14h-15h30 - Workshop 6: Who owns outer Space? (Lead: Uni.LU; Convenor: Alessio BUSCEMI and Nicola SCHREINER)
Number of participants: 52 On site: 44 (36 UT; 8 Uni-LU) Online: 8

This workshop has focused on two topics:

- "The participation and representation of all humanity in space is an issue of international space law ever since the first phase of space exploration. Even though rights of non-spacefaring countries have been secured by declaring the exploration and use of outer space as the province of humankind, it has been argued that the present politico-legal regimes and their philosophic grounding advantage imperialist development of space."
- "The advent of commercial activities like space mining, space tourism, private exploration, and the development of many commercial spaceports, is leading many countries to consider how to regulate private space activities. The challenge is to regulate these activities in a manner that does not hinder or preclude investment, while still ensuring that commercial activities comply with international law."

Two talks have been given in this workshop 6.

The first one was delivered by Alexandros E. FARSARIS (UNI-LU) on "Legal and ethical implications around the permanent establishment of humans in outer space".

> The question of the property of space covers many aspects like the property of space resources, of physical installations, of territory…There are legal instruments and the experience of the ISS has helped to begin to elaborate an international space law. But national legislations are also of

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great importance and each problem must often be solved by ad-hoc solutions under due consideration of practical constraints and specific needs.
It leads to an emerging “Outer Space Legal Theory”.
Space exploration renews indeed a lot of legal questions like the status of State in Outer space, the nationality of a child born in space, the relevant jurisdiction for crimes commited in space, the preservation of human rights under extreme conditions and the dispute resolutions between extremely isolated humans or groups…

The second talk was delivered by Chiara VITTORIO TURTORO (UNI-LU) on “Moonia: the first human settlement on the Moon”.

The exploration of outer space implies to create real and sustainable settlements, as literature and cinematography have already portrayed it. This will anyway be new kinds of social societies, with the questions of the civil and social rights of these outer humans, of the outer space economic system and its regulation and of the protection of this new environment.
If we imagine life on the Moon and a settlement of 651 humans in the year 2426, we face a lot of surprising questions and their life on “Moonia” could look like this according to the answers we (or rather they) provide to these questions:

- Moonia could be either Earth’s 8th continent, a congregation of Earth based States grounded on an international agreement or a self-governed participatory Democracy with a high degree of autonomy and a Moon assembly.
- Moonians could still be nationals from Earth States, with their children acquiring the nationality of their parents on Earth … or holding the Moonian nationality.
- They would have basic rights like the grant of water, oxygen, food and a shelter.
- The Economy could be based on a monopoly or a competitive market. The questions of entering and exiting the market are of course a huge obstacle in the case of a competitive market.
- Environmental protection on Moonia sets the questions of the exploitation of its resources and of the compliance to the Moonian regulations. A “responsible exploration pact” should be elaborated in order to set up high standard for the protection of the environment of extra-terrestrial areas. It also implies that Moonians create effective enforcement mechanism by means of progressive penalties.

After these two rich talks, several speakers from Luxemburg added new viewpoints and elements:

Dovile MATULEVICIUTE, Policy officer at Luxembourg State Agency, underlined that Luxembourg was a pioneer when it adopted adoption on 20 July 2017 the Act on the Exploration and Use of Space Resources (the **Space Resources Act**). To date, this is the only country which proposes a framework for regulating the utilization of space resources. It is especially open to commercial space utilization and not only to space scientific research. Luxembourg proposes indeed a space exploration roadmap, of which the main principle is the non-national appropriation of the space resources.

Mahulena HOFMAN, Full professor of the SES Chair in Satellite Communication and Media Law. University of Luxembourg, also strongly pointed that international governance for the development of space activities could not contravene the principle of non-appropriation and impair the free access to resources and space. The question is whether it would be more

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efficient to set it by an international law or by national ones. Soft law regulating instruments could also be a solution as they don't need to question the recognition of the sovereignty of the States.
COPUOS, the "Committee on the Peaceful Uses of Outer Space" founded by the United Nations Office for Outer Space Affairs (UNOOSA), plays also a great part in the reflections upon dispute resolutions and the creation of an international Court of Justice on Space affairs.

15h45-17h - Workshop 5: **Settlements and future infrastructures** (Lead: AGH; Convenor: Beata CABAŁA and Gabriela OPIŁA)
Number of participants: 29 On site: 23 Online: 6

In this workshop too, two talks have been delivered.

The first one was from Dagmara STASIOWSKA (AGH) on "Bzzz Aldrin – who will pollinate extraterrestrial crops?"

Dagmara STASIOWSKA

She raised the question of food supply in outer human settlements. Even if it is assessed that extraterrestrial food production would be easy to produce and store, palatable and versatile, it remains the question of pollinization of plants as 75% on crops rely on it. Who could be pollinators in space?

Bees were in space several times and some astronauts had already the difficult and important task to take care of hives in space. But it appeared that bees had difficulties with microgravity and could not fly anymore. A very large amount of bees die when they have a very small room. These pioneer experiments were clearly under-proportionate and new and numerous researches are necessary if humans really want to set-up settlements in space and produce there their own food products.

And it is also important to stress that there is also a problem of pollinization on Earth, which means that the research conducted for space exploration could be useful as well for food production on earth.

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The second talk was from Gabryiela OPIŁA, Beata CABAŁA, Kacper PRYGA and Kamil RASZKA (AGH) on “Study of meteorites with solid-state physics methods”

AGH students began by presenting different types of meteorites and then the methods one may use in order to study them (geological microscope, SEM/EDS, Mossbauer spectroscopy, XRF, XRF M4 TORNADO micro analysis, XRD). They described pictures and diagrams which made their talk lively and diverse.

They concluded by pointing future plans and applications. Space exploration will probably allow more accurate measurement and quantitative analysis. It will provide us with a better information on solar activity over the years, new measurement and analysis methods and better knowledge on space resources.

Like is other workshops, they proposed questions to the audience and produced this way interactions with the listeners. One example of questions was:

1) We will use space resources?
    a. In hundred years
    b. In ten years
    c. We already use them

This example demonstrated to the audience that humans have used space resources for a very long time. A lot of objects on earth are made with extraterrestrial iron which was on meteorites which fell on earth. If we judge from the small resources we benefited this way we can imagine how much more and more precious resources wait us in outer space.

From the right to the left: Rafał KOTULA, Gabryiela OPIŁA and Emilia KOZŁOWSKA

17h15-18h15 - Workshop 7: Jobs and careers in the space sector (Lead: UT; Convenor: François RULIER)
Number of participants: 42 On site: 36 Online: 6

For jobs and careers in the space sector, the speakers will make a short presentation of their job and career and it will be followed by a round table which will allow participants to discuss with the speakers

William DESPRATS, PhD Student in Planetary Geodesy at AIUB (Astronomical Institute of the University of Bern)
René LAUFER, LTU, Professor on Onboard space systems, Division Space Technology.
Arnaud SAINT-MARTN, Researcher at Centre européen de sociologie et de science politique (CESSP, CNRS)
Nikola SCHREINER, UNI-LU, Student in Law

This roundtable began by a question on how the speakers came to space. It was an accident both to Nikola SCHREINER and Arnaud SAINT-MARTN, who were mainly interested in their discipline, respectively law and space. It was more voluntary from William DESPRATS and René LAUFER who were invested in the engineering field from the beginning.
François RULIER then asked what kind of jobs students in arts, literature or social sciences could expect to get in the space sector.

- René LAUFER insisted on the fact that space jobs are not only for engineers. Almost half of these jobs are not technical and deals with law, contracts…ESA needs for instance project managers and human skills.
- Arnaud SAINT-MARTN added that not a lot of work has been done on exploration of space as an organizational task, but if a new space economy raises, there will be great needs. New public policies will be designed.
- William DESPRATS and Nikola SCHREINER pointed the interdisciplinary character of all space matters.

From the right to the left: Nikola SCHREINER and François RULIER

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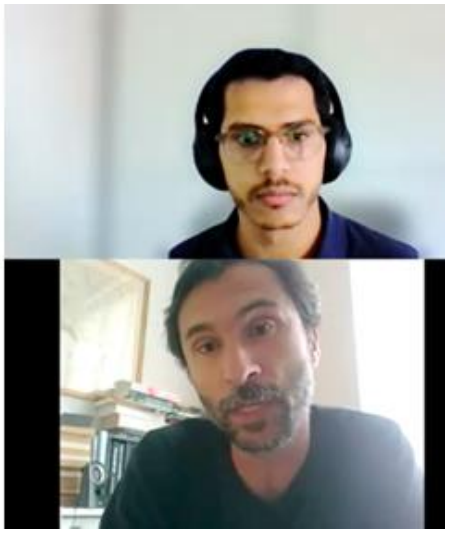

William DESPRATS and Arnaud SAINT-MARTIN (under)

In the audience, Dagmara STASIOWSKA (AGH) asked whether there were enough role models for youngsters to come in the space industry, and especially role models for young females.

Joanna PYRKOSZ-PACYNA (AGH) added another question on the possibility for social science researchers to publish. Shall they target journals of their discipline, which are mainly not interested in space questions, or journals of engineering, which are mainly not interested in social sciences?

- Arnaud SAINT-MARTN answered to the second question that the study by Diana Vaughan on the Challenger launch is a good example that space sciences have to integrate psychology, sociology, and that as a sociologist, He also faces the difficult challenge to publish both in sociological journals and in journals targeting other audiences.
- René LAUFER answers to the first question that it is also difficult to imagine these role models. In the space sector, jobs are more open and flexible than usually. You are often not representing your country nor your institution.
- Nikola SCHREINER said you had to be very proactive to get a job in the space sector as everything is new.
- Arnaud SAINT-MARTN added that it is still difficult to supervise PhD and to give expectations to bright students in such a field where there are no sure positions.
- René LAUFER said that it is also important to involve art students and artists. We should have a rule acting that large space projects should spend a part of their budget in art.
- William DESPRATS concluded by telling that spatial research is changing the things we are doing on Earth and that we have to design new role models.

Conclusion (18h15-18h30)

Finally, the debates of the day were so rich that participants decided to shorten the conclusion part. Anyone had to review the workshops and to wait for the report in order to elaborate on it new steps forward in the cooperation. Joanna PYRKOSZ-PACYNA thanked warmly all the present and all those who took part in the workshops and in their preparation. Joanna PYRKOSZ-PACYNA, Vincent SIMOULIN, Christina STANGE-FAYOS and the whole audience warmly praised Axelle VANHAECKE, the members of the SIOC and all the students who prepared the presentations for the quality of their work and the paths it opened for UNIVERSEH and especially the future actions of the WP6.

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Additional events:

At HHU on the Tuesday 5th of October:
An informational stand was positioned in front of the student service center to attract some attention and represent the project. A colleague from the multilingualism team of WP2 and a student were present to respond to the questions of interested students, staff and however passed by and was curious.

At UNI-LU on the Tuesday 5th of October:
9h30 – 11h30 Information desk at the ground floor MNO: Presentation of Universeh, distribution of flyers, Q&A, invitation to the workshop.
12h – 14h Information desk in front of Food House.

AT LTU on the Saturday 2nd and Sunday 3rd of October:
Presentation of UNIVERSEH and invitation to the Student conference at a infomration stand at Luleå Campus.
UNIVSERSEH project representatives and representatives from the Students Unions informed about UNIVERSEH for students. During the two days, about 120 students came there to talk about UNIVERSEH. In addition to this, these events was shared on the unions' instagram (this generated about 400 views at per shared post) and on LTU's Instagram (unknown number of views).

At LTU on the Tuesday 5th of October:
On the 5th of October the Giron Space Organisation (GSO) organized a pre-event to start the discussions and present some of the topics that would be discussed during the UNIVERSEH student conference in Toulouse on 6th of October.
They had interviews with experts on the different topics followed by a panel discussion. There was snacks and refreshments at the Kiruna Space Campus, as the convenors wanted to make sure to have interesting conversations and do some networking.
The event took place both on the Kiruna Space Campus and online from 15:00 to 17:00 (CEST).

Document History

Version	Date	Author	Partner	Summary of main changes
1		Vincent SIMOULIN and Axelle VANHAECKE	UT	

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