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INTERNATIONAL CONFERENCE ON SPACE AND TECHNOLOGY “TECHNOLOGY FOR SPACE 2.0: CHALLENGES AND PROSPECTS”

MINUTES

The INTERNATIONAL CONFERENCE ON SPACE AND TECHNOLOGY “TECHNOLOGY FOR SPACE 2.0: CHALLENGES AND PROSPECTS”, held on 7th July, 2023 in Thessaloniki, Greece, provided a captivating voyage through the cosmos and the cutting-edge technologies shaping the future of space exploration. Each presentation at this remarkable event unveiled facets of space and technology that continue to push the boundaries of human knowledge. Here is a concise summary of each presentation:

1. “Astronaut’s day in Space”

Adrianos Golemis – ESA

Summary: “This lecture aspired to provide the summer school attendees with insight on the schedule and work of astronauts. It started off with information on how astronauts spend their time on Earth, meaning their training and duties before their mission. This included references to space simulations and analogues, like PANGAEA and Antarctica. A significant part of the astronauts' preparation is also comprised by the many health tests they undergo and their training on medical procedures. This presentation provided information on both of these aspects and then moved on to how an astronaut's day looks in space, during their mission. There we touched upon the countermeasures that astronauts use to minimise the effects of the space environment on their physiology and psychology. We also talked about the detailed schedule of astronauts on the ISS and their research, maintenance, educational and media duties. The medical support on all 5 phases of a spaceflight (pre-flight, quarantine and launch, in-flight, landing, post-flight) was laid out as well.”

2. “A Geostationary Satellite Mission: From Design to EOL Operations”

Dr. Vasilios Kapinas – Hellas Sat

Summary: “Throughout its lifetime, a GEO satellite must be maintained within an operational window centered at a given orbital slot. To accomplish that, orbital correction maneuvers with the aid of propulsion means must be applied to the spacecraft periodically so as to compensate for any perturbations that push the vehicle out of the nominal limits. Flight dynamicists exploit the measurements taken from ground tracking stations and perform continuous orbit determination to always have

an updated knowledge of its actual orbit. Additionally, monitoring the continuous flow of telemetries and having the capability to send critical telecommands, can ensure the good health of the spacecraft and quality of service offered. During its lifetime, a GEO satellite can drift to another orbital location according to the needs of the mission. At the end of the mission, the satellite must be deorbited away from the GEO protected region according to the international safety regulations. In all phases of the mission, the distance of the satellite with third spacecrafts and space debris shall exceed a specific threshold which ensures a trivial (or even zero) probability of collision.”

3. “Commercialization of Outer Space Resources”

Prof. Philippe Achilleas – University Paris - Saclay

Summary: “We are witnessing a new golden age of space conquest. During the Cold War the United States and the Soviet Union had sought to place their space exploits in the framework of international law. Today that trend towards accountability is being reversed. Individualistic logic is prevailing and the founding principles of international space law are increasingly being put aside. Legal scholars and practitioners must now find a balance between the development of space activities funded by the private sector and the interests of all states. The use of space resources, commonly referred to as In Situ Resource Utilization (ISRU), involves the processes and operations to harness and utilize resources in space (both natural and discarded) to create products for subsequent use. ISRU is the harnessing of local natural resources at mission destinations, instead of taking all needed supplies from Earth, to enhance the capabilities of human exploration.”

4. “Military Uses of Outer Space”

Prof. Frans von der Dunk – University of Nebraska

*Summary: “So far, outer space has merely become involved in terrestrial armed conflicts as part of the supportive infrastructure for military activities. Unfortunately, the risk that this change is considerably growing, and it can no longer be excluded that (armed) force will become used in outer space, either directed towards Earth or within outer space itself. This raises serious issues in the legal context, where space law so far has been premised on the hope that armed conflicts in outer space could be avoided whereas the law of armed conflict was not required so far to deal with the use of force in outer space. For the same reason, there is hardly any relevant State practice that could provide guidance here. While both legal regimes can loosely claim to constitute *leges speciales* as compared to the *lex generalis* of general public international law, and hence are doctrinally superior to the latter, this does not solve the issue of hierarchy in application as between those two *leges speciales*.”*

5. “Governments supporting New Space as anchor customers and first buyers – situation in the US and Europe”

Dr. Ingo Baumann – BHO Legal

Summary: “Dr Ingo Baumann from BHO Legal, Germany, gave an overview of the different European regimes on space procurement, the European laws harmonising the procurement of Member States, the EU’s own procurement rules as per the EU Financial Regulation and the Space Programme Regulations, as well as the regime of the European Space Agency as an independent intergovernmental organisation. Dr

Baumann then discussed the needs and expectations of space industry, especially the numerous start-up companies, for governmental support through contracts. In the US, anchor tenancy approaches have been instrumental in creating world market leaders such as MAXAR and SpaceX. All European public stakeholders are now working on similar approaches supporting the growth and competitiveness of the industry.”