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Austrian Space Law Newsletter

RÜCKBLICK EINBLICK AUSBLICK REVIEW INSIGHT PROSPECT RÜCKBLICK EINBLICK AUSBLICK

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Astronautical Congress 6

NPOC Space Law Event 14

ITU Symposium 18

EDITORIAL

Irmgard Marboe

Archiv

Space law is becoming increasingly relevant, as we again witnessed in the past months. More than ever before, space law and policy are not only a matter of interest for a few governments, but increasingly shaped and influenced by new "actors" in space. Conversely, they also affect the population at large to a growing extent.

This change becomes apparent in many articles of the present Austrian Space Law Newsletter. I especially thank Cordula Steinkogler as the editor-in-chief, who has put together an impressive number of extremely interesting texts, including intriguing interviews with prominent personalities. The interview with Ambassador Helmut Türk, an active contributor in the treaty-making-phase of the Legal Subcommittee of UNCOPUOS in the 1970s, recalls that the "common heritage of mankind"-principle contained in the Moon Agreement originally was strongly supported by developing countries and the United States, but not by the Soviet Union. In view of recent development in the United States, this is remarkable. The new US "Commercial Space Launch Competitiveness Act" of 2015 will also be briefly discussed in the present issue.

Another topical issue is the proliferation of small satellites and other private space activities. The long-term sustainability of space activities might be at risk, if space operations are not carried out in a responsible manner. The interview with Peter Martinez, the Chair of the Working Group on the Long-term Sustainability of Outer Space Activities of the Scientific and Technical Subcommittee of UNCOPUOS provides valuable insights into the challenges before coordinated "Guidelines" will be agreed upon. A symposium organised by the ITU on the issue of small satellites was dedicated in particular to enhancing proper frequency coordination so that harmful interference can be avoided. On the other hand, we are pleased to read, in the interview with the Space Team of the Vienna University of Technology (TU Wien), that already a third Austrian small satellite is being developed by a team of space scientists and engineers, the Pegasus satellite.

A highlight of the activities of the NPOC Space Law Austria itself was the event on "US and European geospatial data policies". Professor Gabrynowicz came from the United States to share her experiences with an interested audience at the premises of ESPI. David Kendall, the current Chair of UNCOPUOS, moderated the event. The award of the "Polarsternpreis" by the Austrian Space Forum honoured the remarkable achievements of Professor Christian Brünner, including the foundation of the NPOC Space Law Austria at the University of Graz. At the IAC in Jerusalem, Ambassador and former Austrian Foreign Minister Peter Jankowitsch was elected as the new president of the International Academy of Astronautics (IAA). Professor Otto Koudelka from the Graz University of Technology was elected as Vice-President of the International Astronautical Federation (IAF). These remarkable honours show that Austrian experts are highly respected and influential on the international scene. The team of the NPOC Space Law Austria truely appreciates these distinctions and expresses its warm congratulations.

Other reports and articles in this Newsletter deal with outreach events in different settings and places. They show the broad variety of space related events that keep attracting more and more people to the fascinating area of space law and policy. We hope that this issue of the Austrian Space Law Newsletter will also be a contribution to this end.

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RÜCKBLICK *review*

The Difficult Negotiations of the Moon Agreement

Interview with Ambassador Helmut Türk, President of the Assembly of the International Seabed Authority and former Judge and Vice-President of the International Tribunal for the Law of the Sea

Cordula Steinkogler

Ambassador Helmut Türk was one of the main negotiators of the Moon Agreement in the 1970s. We had the opportunity to speak to him about the background of the negotiations, his particular role in the negotiation process and the final twist that made the adoption of the Agreement possible.

What was Austria's role during the negotiations concerning the Moon Agreement and how did you get involved in the negotiations?

Helmut Türk: When the Committee on the Peaceful Uses of Outer Space (UNCOPUOS) was founded, Austria was elected as its Chair. For many years, the Committee then met under Austrian chairmanship. Austria thus played a very important role in the Committee from the beginning.
In 1973 - at that time I was working at the International Law Department of the Austrian Ministry of Foreign Affairs - I was sent to New York to attend the Legal Subcommittee of UNCOPUOS. A Working Group to negotiate the Convention on Registration of Objects Launched into Outer Space had been established by the Legal Subcommittee. I was, although a novice, appointed Chairman of that Working Group and I was able to bring the negotiations on the Registration Convention to a successful conclusion. It was only because of this added prestige as a negotiator of the Registration Convention that I had a voice which was listened to attentively by the negotiators of the Moon Agreement.

Could you tell us a little bit about the general background of the negotiations on the Moon Agreement? Did other developments of that period influence the negotiations?

Assembly of the International Seabed Authority

Ambassador Dr. Helmut Türk is currently President of the Assembly of the International Seabed Authority. Previously, he was a Judge and Vice-President of the International Tribunal for the Law of the Sea. After finishing his law studies at the University of Vienna, he joined the Austrian Ministry of Foreign Affairs. For many years he worked in the International Law Department and as Legal Advisor of the Ministry. In this position he was regularly a delegate of Austria to the United Nations General Assembly. For several years he also served as Austrian representative on the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space. In this capacity he was instrumental for the adoption of the Moon Agreement as well as of the Convention on Registration of Objects Launched into Outer Space. He is the author of numerous publications in the field of international law.

In the early 1970s there were two parallel developments. The first was the third United Nations Conference on the Law of the Sea, which began in 1973 and ended with the adoption of

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the United Nations Convention on the Law of the Sea in 1982. The second was the elaboration of the Moon Agreement by the Legal Subcommittee of UNCOPUOS between 1972 and 1979. The negotiations regarding the Convention on the Law of the Sea had a strong influence on the final version of the Moon Agreement.

During the third UN Conference on the Law of the Sea one of the main proposals was to declare the deep seabed beyond national jurisdiction the "common heritage of mankind". In particular the developing countries were eager to have this concept enshrined in the new Convention on the Law of the Sea. It was this debate that also inspired the incorporation of the "common heritage" principle into the Moon Agreement.

What were the main points of discussion during the negotiations and what were the different positions of the negotiating states?

There were several controversial issues on which states had opposing views. The developing countries advocated declaring the resources of the Moon and other celestial bodies the "common heritage of mankind". Although the benefits obtained from the exploitation of these resources should accrue to all countries, the interests of developing countries should take priority. They therefore proposed the establishment of an international regime to govern the exploitation of the natural resources of the Moon. Until the establishment of such a regime there should be no exploitation of resources.

The United States supported the concept of "common heritage of mankind" but rejected the idea of a moratorium regarding the exploitation of lunar resources until an international regime to govern their exploitation would be established.

The Soviet Union strongly opposed the "common heritage" principle and insisted on not going beyond the concept of "province of mankind" as contained in the Outer Space Treaty. Furthermore, the Soviet Union wanted to limit the scope of the Agreement to the Moon and rejected the inclusion of other celestial bodies.

In your opinion, what was the primary cause for the prolonged negotiations?

While the diverging views on most of the controversial issues could be narrowed through formal and informal negotiations, the impasse concerning the principle of the "common heritage of mankind" remained. In my view, the primary cause for the prolonged negotiations was the insistence by the developing countries on enshrining that principle in the Moon Agreement and its rejection by the Soviet Union.

How was it finally possible to reach consensus?

In 1978, in order to break the stalemate, I submitted an informal compromise proposal encompassing the results of all previous negotiating efforts and offering a novel solution with respect to this main outstanding question concerning the "common heritage of mankind" principle. This Austrian compromise text became, with only very few changes, the final text of the Moon Agreement.

The core provision of the Moon Agreement, article 11, paragraph 1, which is based on that text, provides that "the Moon and its natural resources are the common heritage of mankind, which finds its expression in the provisions of this Agreement, in particular in paragraph 5 of this article". According to paragraph 5, States Parties undertake to establish an international regime to govern the exploitation of lunar resources as such exploitation is about to become feasible. Article 11, paragraph 7, sets forth the main purposes of the future international regime, which should include an equitable sharing of the benefits derived from the resources among States Parties, whereby the interests and needs of the developing countries as well as the efforts of those countries that have contributed to the exploration of the Moon should be given special consideration. This provision thus contains a balanced definition of the notion of equitable sharing of benefits as it proceeds from the assumption that equity is impossible without consideration of the efforts of states that have contributed to resource exploitation activities on the Moon.

The express link between the principle of the "common heritage of mankind" and the international regime to be established in the future as well as the specific limitation of the scope of that principle to the Agreement itself lay at the heart of the Austrian compromise text and was the basis for its general acceptance by the negotiating states. The implementation of the principle was postponed until the time when a practical need would arise.

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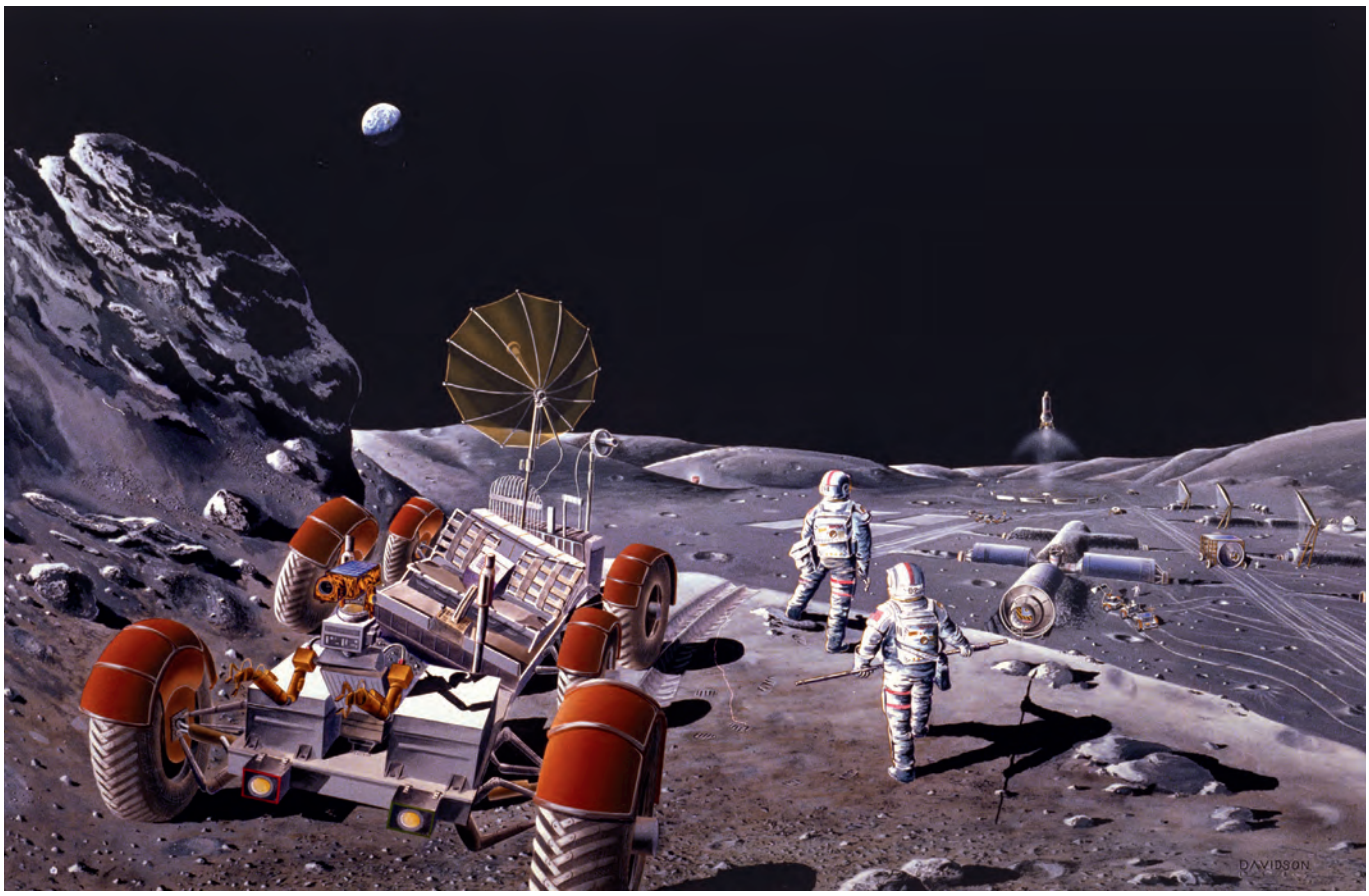

NASA / Artwork by Dennis Davidson

This artist's concept of a lunar base and extra-base activity was revealed during a 1986 Summer Study on possible future activities for the National Aeronautics and Space Administration. A roving vehicle similar to the one used on three Apollo missions is depicted in the foreground.

What is the relationship between the Moon Agreement and the Outer Space Treaty?

The Moon Agreement cannot be seen in isolation from the legal regime established by the Outer Space Treaty. The Agreement on the one hand contains provisions that reiterate or develop the principles set out in the Outer Space Treaty, on the other hand it includes provisions that are unique to it and contribute real added value with respect to the Outer Space Treaty, in particular by introducing the concept of the "common heritage of mankind" into outer space law.

The Moon Agreement

The "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies" was adopted by the General Assembly in its Resolution 34/68. It opened for signature on 18 December 1979 and entered into force on 11 July 1984. Until today it has been ratified by 16 states (including Austria) and signed by 4 states.

Why do you think the Moon Agreement has so far only been ratified by 16 countries?

It is true that since its entry into force over thirty years ago the Moon Agreement has been languishing. The principal reason for this is, in my view, the fact that the enthusiasm for exploiting the natural resources of the Moon, which had been so marked at the time of its adoption, had soon begun to wane. The Agreement was, however, from the very beginning perceived as an objective legal regime to be valid for all states, not only for the states party to it. This was the reason why only five ratifications were considered necessary for its entry into force. The adoption by consensus of the Agreement by the Committee on the Peaceful Uses of Outer Space and subsequently its adoption without a vote by the UN General Assembly also confirm this view.

Irmgard Marboe

The 66th International Astronautical Congress in Jerusalem

Irmgard Marboe

The International Astronautical Congress is the world's biggest event on space science, technology and law. It is organised by the International Astronautical Federation (IAF), the International Academy of Astronautics (IAA) and the International Institute of Space Law (IISL) and takes place annually since 1950. Between 12 and 16 October 2015, the Israeli Ministry of Science, Technology and Space and the Israel Space Agency hosted the IAC in the city of Jerusalem. The Austrian delegation consisted of representatives of the Austrian Research Promotion Agency (FFG), the Austrian Ministry for Transport, Innovation and Technology (BMVIT), the Association of Austrian Space Industries (AUSTROSPACE), Austrian universities and the Austrian National Point of Contact for Space Law (NPOC Space Law Austria).

The choice of the location was certainly venturous. On the one hand, Jerusalem, with its 3000 years of history, symbolising spiritual significance for multiple religions and cultures, is an exceptional location and incredible city to visit, as the Chair of the local organising committee and Director General of the Israel Space Agency, Menachem Kidron, rightly put it. On the other hand, parts of the city, in particular Eastern Jerusalem, are internationally disputed territory. This made it difficult for some Arab states and organisations to fully support the selection of the location. In particular, the UN Workshop, which is usually organised shortly before the IAC, was not endorsed by UNCOPUOS at its meeting in June and could not take place. Nevertheless, the main programme of the IAC was organised as usual and was rich in both technical sessions and accompanying events. Nearly 2500 participants followed the invitation to come to the 66th IAC in Jerusalem.

At the opening ceremony, an exceptional multimedia show with music, choreography and videos complemented the welcome speeches of the organisers and the local organising committee. A highlight of the first day was a panel discussion of the heads of space agencies, including Charles Bolden (NASA), Igor Komarov (Roscosmos), Johann-Dietrich Wörner (ESA), Xu Dazhe (CNSA), A.S. Kiran Kumar (ISRO), Naoki Okumura (JAXA), and Isaac Ben-Israel (ISA). It became clear that

the heads of space agencies, in particular the newly appointed ones, look for new ways of cooperation both between the agencies themselves and the private sector. The newly elected Director General of ESA, Dr. Wörner, raised a lot of attention with his ideas about a "Moon Village". Edwin "Buzz" Aldrin, the famous US astronaut and moonwalker (Apollo 11, Gemini 12) was also present and gave a press conference which was very well attended. He pointed to the new challenges of space flight in view of decreasing governmental budgets, but also to new opportunities in view of increasing international cooperation.

Austria was represented at a well-situated booth and with numerous technical presentations. A team consisting of representatives of FFG, BMVIT and AUSTROSPACE presented Austria's application to host the 69th IAC in 2018 in Vienna. Yet, the city of Bremen, Germany, had also prepared a powerful application, impressively supported by the presence of the German ambassador and the mayor of the city of Bremen, which, after having been rejected last year, was eventually given preference. Austria's application was, however, also very well received. The IAF Bureau encouraged Austria to consider a future application. Another encouraging event was the election of Professor Otto Koudelka (Graz University of Technology) as Vice-President of the IAF on the last day of the conference. And last, but certainly not least, the former Austrian Foreign Minister and long-time Chair of UNCOPUOS, Ambassador Peter Jankowitsch, was elected as President of the IAA.

As regards space law, the 58th IISL Colloquium on the Law of Outer Space again brought together the who-is-who of international space law. The keynote was given by Joanne Irene Gabrynowicz who spoke about "The Legal Evolution of a 'Use' in Space: The Case of Remote Sensing." Other interesting presentations were given by Steven Freeland, Peter Stubbe, Mahulena Hofmann, Olga Volynskaja, Rafael Moro Aguilar, Larry Martinez and Melissa Force, Kai-Uwe Schrogl, Jana Robinson, Frans von der Dunk, P. J. Blount, Alexander Soucek, Michail Chatzipanagiotis, Alvaro Fabricio Dos Santos, Lesley Jane Smith, Maureen Williams, Henry Hertzfeld and Chris Johnson, Guoyu Wang, Dennis Burnett, Tanja Masson-Zwaan, Yun Zhao, Shouping Li and José Monserrat-Filho.

The IAA/IISL Scientific Round Table was dedicated to the topic of "Universities as Actors in Space" and led to a lively discussion amongst the illustrious panel, including Sir Martin Sweeting (Surrey Space Centre and University of Surrey, well-known for being the first in developing small satellite projects together with students and then successfully founding a spin-off private company), aptly chaired by Kai-Uwe Schrogl (ESA). The IISL plenary event was dedicated to legal challenges of small satellite projects.

Irmgard Marboe (2)

The joint IAF/IISL Session on the Legal Framework of Space Activities was chaired by Bernhard Schmidt-Tedd (DLR) and Christian Bank (EADS Astrium). It focused on recent developments in the regulation of international cooperation, including the EU initiated International Code of Conduct for Outer Space Activities, which was the subject of a presentation given by Anita Rinner (Subpoint NPOC Space Law, University of Graz).

The NPOC Space Law Austria was represented in several sessions on space law and policy, both as speakers and participants. For the Business Innovation Symposium, co-ordinated by Ken Davidian (FAA/AST, USA), Bruce Cahan and Henning Roedel (both Stanford University, USA), together with the author of the present article, had prepared a paper entitled "Outer Frontiers of Banking, Financing Space Explorers, and Safeguarding Terrestrial Finance". It developed the idea of a space-based bank that would value space assets in accor-

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Irmgard Marboe

The Austrian delegation consisted of representatives of the Austrian Research Promotion Agency (FFG), the Austrian Ministry for Transport, Innovation and Technology (BMVIT), the Association of Austrian Space Industries (AUSTRO-SPACE), Austrian universities and the Austrian National Point of Contact for Space Law (NPOC Space Law Austria).

dance with their Unit of Space Convenience (USC) which would be the cumulative change in marginal cost of the capacities meeting the space economy's needs with vs. without the space asset(s) being considered for investment as added capacity. This type of new valuation of space assets could also facilitate and better protect private investments in space, which after the limited success of the Space Assets Protocol to the Cape Town Convention on Interests in Mobile Equipment, is still an unresolved issue. The paper furthermore raised the question of how space technology could be used to provide banking services without the pitfalls of terrestrial banking, including insecure and multiple transactions by too many intermediators.

In the session on "Recent Developments in Space Law" of the 58th IISL Symposium on the Law of Outer Space, the present author presented a paper entitled "European Earth Observation Data Policy: Meeting Various Goals by Multiple and Diverse Actors: A Herculean Task?" It raised the question of how the overall goal of "full and open access to data" could be reconciled with other policy goals and obligations. This is particularly pertinent within the Copernicus programme, the European programme of Earth observation for environment and security. While the EU, on the one hand, propagates the concept of an "open data-policy", it is, on the other hand, also committed to the protection of other rights, such as the right to private life, the protection of personal data and national security interests. In addition, not only EU policies, but also ESA policies and the policies of the individual European states have to be taken into consideration in this context.

Irmgard Marboe

In the same session, the IISL Symposium discussed recent developments in the area of space resource mining, in particular the bill presented in the United States which was to provide and protect property rights on space resources for private enterprises. The opinions on the legality of such property rights were split amongst the participants. While some defended the right to space mining by reference to the right to "free use" of outer space, others maintained that keeping in mind the interests of the international community as a whole was a basic principle for the use and exploration of outer space as the "province of all humankind".

The last days of the IAC were overshadowed by attacks by Palestinians against Israeli civilians and soldiers in the Old City of Jerusalem. As a consequence, police and military forces in the city were strengthened and some places were closed to the public. Due to the insecure situation, the finals of the Manfred Lachs Moot Court Competition were moved from their planned location at the Law School of the Hebrew University at Mount Scopus to the Crown Plaza Jerusalem Hotel next to the Jerusalem Israel Convention Center (ICC), the venue of the IAC. While this re-location on short notice was regrettable, it had the advantage that nobody had to move to another place so that the finals and the IISL Gala Dinner were very well attended. The University of Mississippi, School of Law, was the winner of the World Finals, while Athanasios Plexidas from the National and Kapodistrian University of Athens was conferred the Sterns and Tennen Award for Best Oralist. This Solomonic judgment by Judges Tomka, Bhandari and Gevorgian from the International Court of Justice (ICJ) was very well received and contributed to the overall assessment that this Moot Court, as the whole IAC in Jerusalem, was worth the effort and will remain in the memories of the participants as a once in a lifetime experience.

Anita Rinner

Prof. Christian Brünner and Dr. Gernot Grömer at the Polarsternpreis Award 2015.

Polarsternpreis Award 2015 Goes to Christian Brünner

Anita Rinner

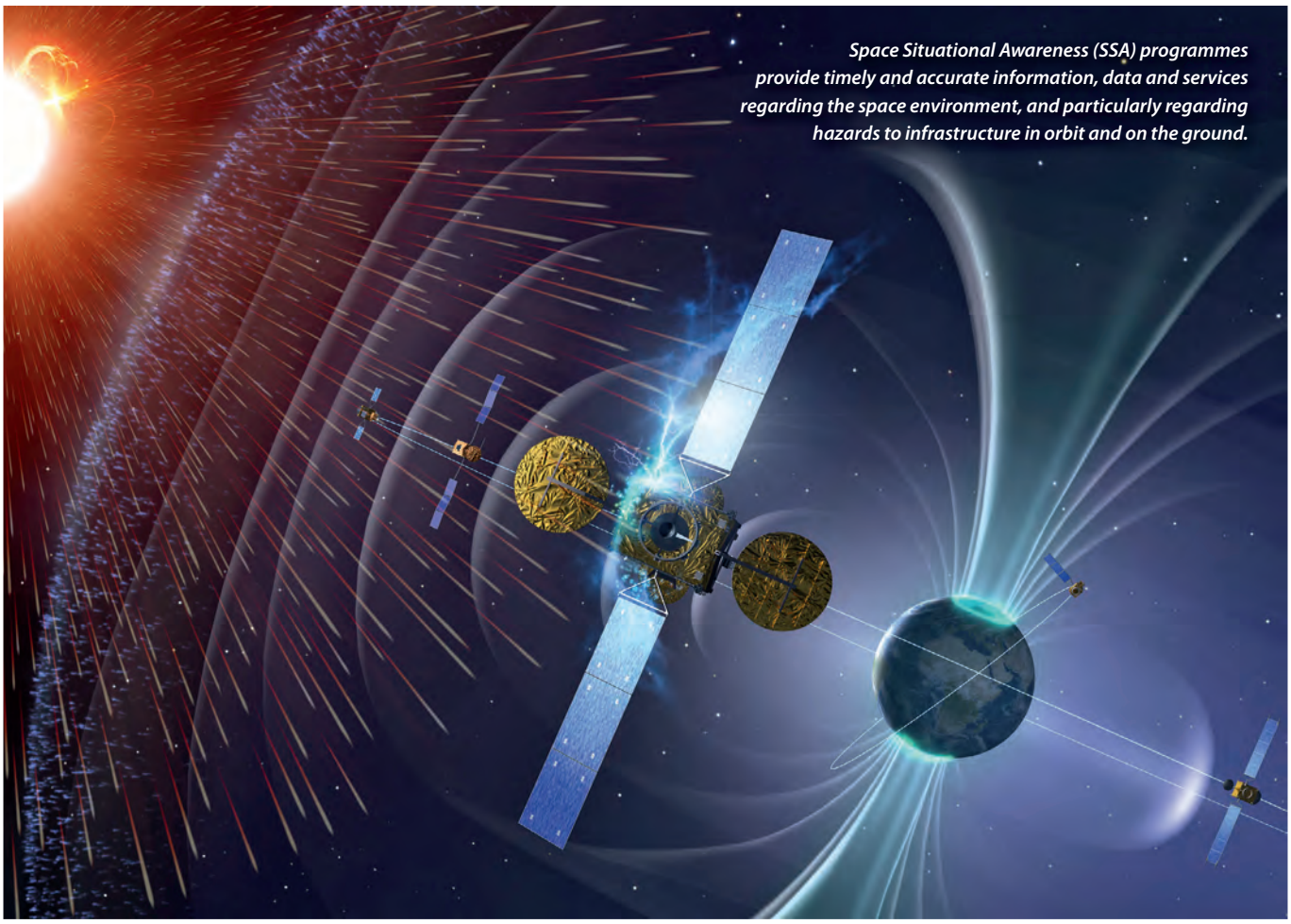
The Austrian Space Forum annually awards the "Polarsternpreis" to people for their exceptional work and engagement in space activities. The 2015 award went to Professor Emeritus Christian Brünner for his outstanding contribution to space affairs in Austria.

Professor Brünner was awarded the prize for his engagement in establishing space law and space policy at all University law faculties in Austria. In 2001 he established the Austrian National Point of Contact of the European Centre for Space Law (ECSL) in Graz. From 2001 to 2009 he chaired the National Point of Contact and then passed it to Professor Irmgard Marboe at the University of Vienna. Since 2003 he has been a board member of the European Centre for Space Law (ECSL), since 2006 a member of the International Institute of Space Law (IISL) and since 2012 a member of the International Academy of Astronautics (IAA).

In his laudatio Dr. Gernot Grömer, president of the Austrian Space Forum, highlighted the outstanding personal commitment of Professor Brünner in promoting students in space law and space policy matters. He made it possible to bring students to the annual Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) in Vienna and also helped students to get sponsored to participate in space conferences, summer schools and symposia. He supervised several diploma theses on space law and space policy topics. His space law lectures are interesting and he tries to provide an overview of all aspects of space law: legal, political, economic, financial, historical and cultural. Although he is a Professor Emeritus, he is still actively engaged in the field of space law. His focus is on teaching space law and space policy not only for law students but also for students with no legal background. His main credo is: "Encouraging students and young professionals".

Former "Polarsternpreis" awardees are Otto Koudelka, Werner Weiss, Mazlan Othman, Dietmar Hager, Barbara Imhof, Maria Pflug-Hofmayr, Mike Köberl (for more information see www.oewf.org/ueber-das-oewf/oewf-polarsternpreis/).

Karola Riegler



Space Situational Awareness (SSA) programmes provide timely and accurate information, data and services regarding the space environment, and particularly regarding hazards to infrastructure in orbit and on the ground.

ESA / P. Carril

We Have Become Accustomed to Taking the Benefits of Space Systems for Granted

Interview with Peter Martinez, Professor at the University of Cape Town and Chair of the Working Group on the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space (UNCOPUOS)

Cordula Steinkogler

At the occasion of the intersessional meeting of the Working Group on the Long-term Sustainability of Outer Space Activities in October 2015 we had the chance to speak to Professor Peter Martinez about the objectives of the Working Group, the importance of the Guidelines the Group is currently elaborating as well as about the main challenges he is facing as Chair of the Working Group.

What is the main objective of the Working Group on the Long-term Sustainability of Outer Space Activities?

Peter Martinez: The main objective of our exercise is to give guidance to states and international organisations, which conduct activities in outer space, on how they can carry out those activities in a way to promote the safety, security and sustainability of the space environment. Today, this is more

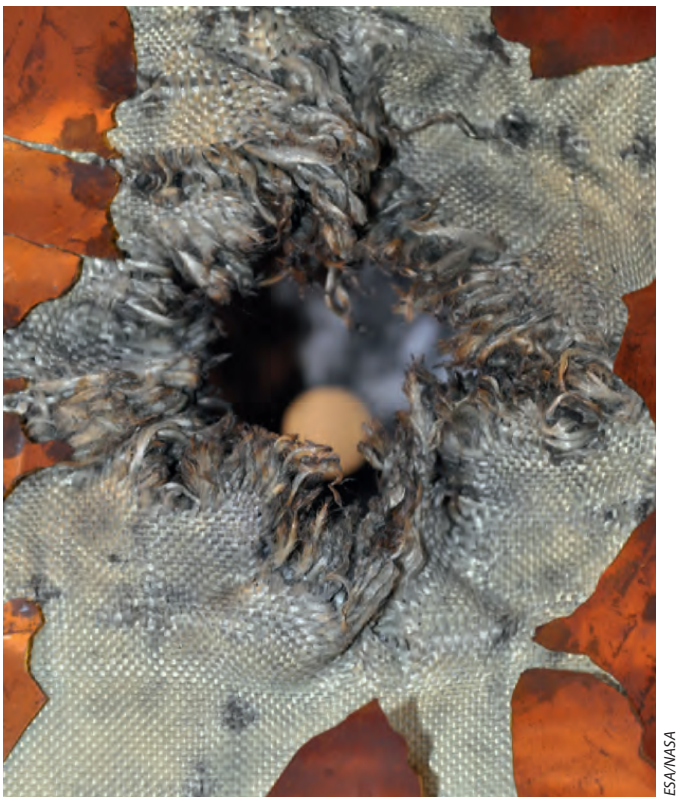
The Working Group on the Long-term Sustainability of Outer Space Activities was established by the Scientific and Technical Subcommittee of the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS) in 2010 in order to develop guidelines aimed at ensuring that outer space will remain an operationally stable, safe and conflict-free environment. Four Expert Groups elaborated draft guidelines covering the thematic areas of sustainable space utilisation supporting sustainable development on Earth; space debris, space operations and tools to support collaborative space situational awareness; space weather; and regulatory regimes and guidance for actors in the space arena. This set of draft guidelines is currently discussed and further developed into a coherent guideline document by the Working Group under the chairmanship of Professor Peter Martinez.

important than ever, since space activities are progressively becoming threatened by the increase in space debris and the congestion of the space environment due to the growing number of satellites. The Guidelines will be particularly helpful for the many new actors entering the space arena without prior experience.

How did the initiative for the Working Group develop historically?

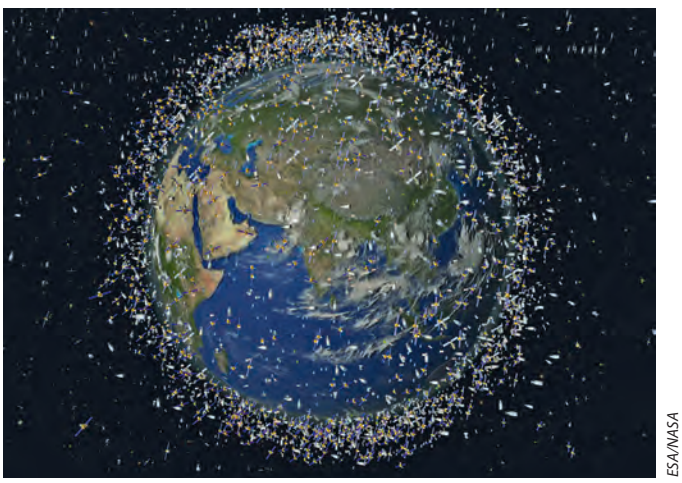
Historically, UNCOPUOS began to appreciate the need for such an initiative already about ten years ago. Throughout the years, the Committee has considered different aspects of the long-term sustainability of outer space activities, which led inter alia to the adoption of the Space Debris Mitigation Guidelines and the Safety Framework for Nuclear Power Sources. However, these initiatives were all developed under separate agenda items.

Building on past efforts, in 2010 the Scientific and Technical Subcommittee began considering the long-term sustainability of outer space activities as an agenda item and established the Working Group on the Long-term Sustainability of Outer Space Activities in order to consolidate all of these formerly discrete initiatives into one coherent initiative of UNCOPUOS.



ESA/NASA

An exit hole after hypervelocity testing of the multilayer shielding for ESA's ATV space freighter, simulating an impact by space debris.



ESA/NASA

The debris field shown in the image is an artist's impression based on actual data.

How are the Guidelines important for normal citizens in their everyday lives?

The Guidelines are very important for normal citizens, because we all rely on having access to the benefits of space systems every day. We have become accustomed to taking this for granted. Every time we use an automated banking >>


Archiv

Peter Martinez is Professor at the University of Cape Town (UCT) and since 2014 responsible for the coordination of the Space Studies programme at UCT. Previously, he worked for the South African Astronomical Observatory and was centrally involved in the reinvigoration of the South African space programme. He was the former Chairman of the South African Council for Space Affairs and has extensive experience in multilateral space diplomacy through his involvement with the United Nations Committee on the Peaceful Uses of Outer Space, where he currently chairs the Working Group on the Long-term Sustainability of Outer Space Activities. He is a member of the International Academy of Astronautics and of the International Institute of Space Law.

machine or a satellite navigation device on our mobile phone or the internet, we are usually not aware that these are technologies that rely on space systems for their operation. Also weather forecasting, the management of natural resources, disaster warning systems and even the functioning of traffic light networks depend on space systems. If we were to lose or have disruptions of these systems you can see how it would affect the daily lives of citizens.

What are the most important aspects of the Guidelines?

The most important Guidelines are those that seek to assure the safety of space operations as well as those that promote desirable behaviours that will help us to protect the space environment for future generations.

What are the main challenges with regard to the development of the Guidelines?

Space sustainability is an inherently multilateral issue that requires a multilateral response. It cannot be comprehensively addressed by one state, a group of like-minded nations or a


UNOOSA / Natercia Rodrigues

The meetings of the Working Group on the Long-term Sustainability of Outer Space Activities take place during the Scientific and Technical Subcommittee of the UN Committee on the Peaceful Uses of Outer Space at the Vienna International Centre.

region. Therefore, very broad support by the actors involved is necessary. The way we work in UNCOPUOS is through consensus. To achieve consensus necessarily compromises are to be struck.

There are some Guidelines, about a third, on which there is very broad agreement and therefore it should not be difficult to reach consensus. There is another group of Guidelines, also around a third, on which divergent opinions exist, but we nevertheless believe that it should be possible to achieve consensus on these Guidelines as well. Then there is a third group of Guidelines, the last third, where the divergences are somewhat greater and it will be very challenging to accommodate the different positions to reach consensus. We might need more time to achieve agreement on some issues and we should seek to find a compromise that allows us to move forward with what we all agree on and also allows us to discuss what needs further discussion.

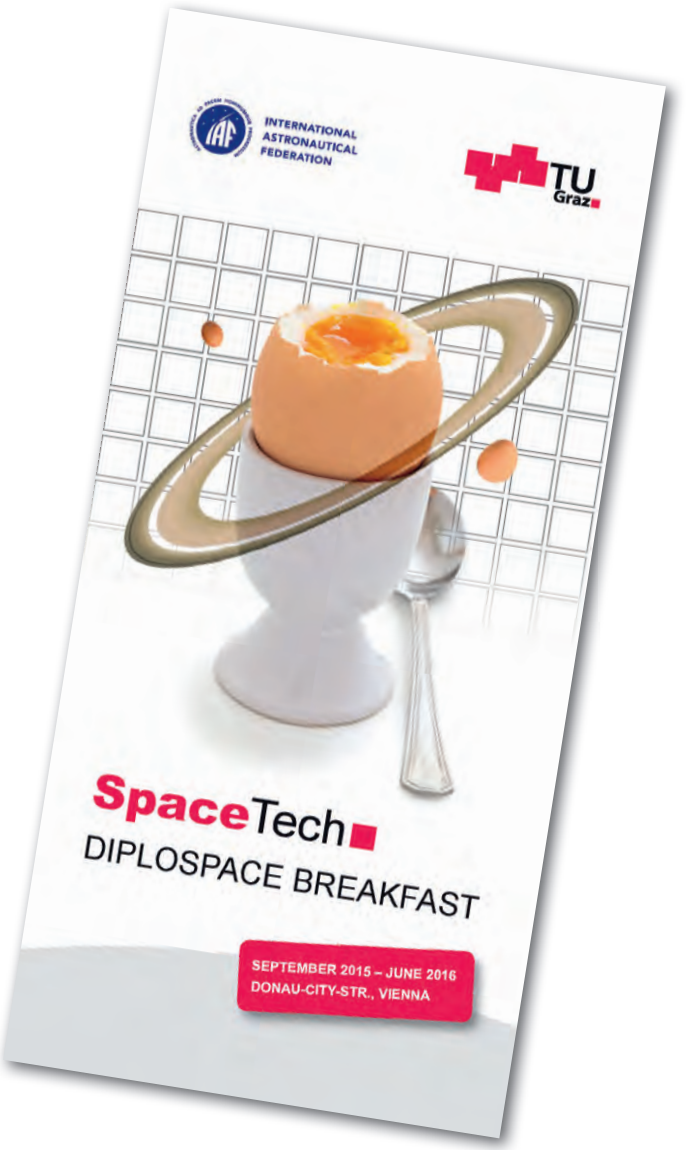
What is the legal character of the Guidelines and what is their relation to the existing UN Space Treaties?

The Guidelines are voluntary, which means they are non-binding. We are not negotiating new legally binding instruments. Thus, the Guidelines can be called "soft law".

However, non-binding does not mean non-legal. The Guidelines do have legal implications. That is also why one of the four Expert Groups of the Working Group was dealing with exactly the regulatory aspects. Furthermore, states can choose to implement the provisions of these non-binding Guidelines into their national regulations, which again emphasises that non-binding does not mean non-legal.

"DiploSpace Breakfast" - Space Lecture Series for Diplomats in Vienna

Cordula Steinkogler



Under the title "DiploSpace Breakfast" a series of lectures and presentations on space-related topics is organised for staff members of embassies and permanent missions in Vienna from September 2015 to June 2016. The "DiploSpace Breakfast" is an initiative in connection with the Master Programme on Space Systems and Business Engineering at the Graz University of Technology (TU Graz), under the direction of Professor Otto Koudelka, Head of the Institute of Communication Networks and Satellite Communications at TU Graz.

The idea behind the initiative is to offer diplomats, who have recently arrived in Vienna and are now dealing with space-related issues in the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), the possibility to learn about the basic concepts of space technology, space law and space policy. "This course gives diplomats the opportunity to familiarise with recent developments in a wide range of space aspects and to discuss space-related matters directly with international experts", says Professor Koudelka.

The "DiploSpace Breakfast" aims at providing an overview of current scientific-technical and legal-political issues in the space field as well as at giving an insight into the main areas of discussion in the United Nations Committee on the Peaceful Uses of Outer Space. Topics presented in the framework of the "Space Breakfast" include space debris, space security, the sustainability of outer space activities, space communication and navigation, remote sensing, space applications as well as the basics of space law.

The "DiploSpace Breakfast" meetings take place typically once per month at the Permanent Mission of Austria to the United Nations in Vienna. After the successful attendance of a one year cycle, a certificate of attendance is issued to the participants. "This serves as confirmation of the additional qualification of participants and at the same time makes Austrian space competence known on a global level", explains Professor Koudelka.

ESPI (7)

"Open Data Policy" and Its Challenges: Squaring the Circle? NPOC Space Law Austria Event on US and European Geospatial Data Policies

Cordula Steinkogler

On 17 June 2015, the National Point of Contact for Space Law Austria (NPOC) together with the European Space Policy Institute (ESPI) organised a conference entitled "US and European geospatial data policies: challenges of open data policy". Joanne Irene Gabrynowicz, Professor Emerita and former Director of the National Center for Remote Sensing, Air, and Space Law at the University of Mississippi School of Law and Editor-in-Chief Emerita of the Journal of Space Law, and Irmgard Marboe, Professor of International Law at the University of Vienna and Director of the NPOC Space Law Austria, presented a comparison of European and US policies on the use of geospatial data. The conference took place at the margins of the 58th session of the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS), held from 10 to 19 June 2015 in Vienna.

In the US as well as in Europe, the collection of data by Earth observation satellites represents an increasingly important application of space technology. In Europe, the Copernicus programme (previously Global Monitoring for Environment and Security - GMES) is being established to provide services in the fields of atmosphere-, marine- and land-monitoring, climate change, emergency management and security. In the United States, the land remote sensing satellite system Landsat has been operational already since 1972. Today, the current Landsat 8 is used together with other satellites for Earth observation.

Professor Gabrynowicz's presentation entitled "American Perspectives on the Use of Geospatial Data: Landsat and Beyond" focused on the laws and policies regarding geospatial data in the United Sates. She emphasised that the principle of free and open access and free re-use of data and information has been applied in the United States already for a long time. Yet, the protection of privacy, civil rights and liberties, and national security interests also plays an important role. She warned, however, that the balance between data collection for national security purposes and the privacy rights of citizens is increasingly challenged, in particular in view of the impro-

ving resolution capabilities of Earth observation satellites, the growing number of location aware technologies, the increasing use of military satellite data in the fight against terrorism and the diverse and very complex laws related to the access and use of geospatial data in the United States.

In her presentation entitled "Copernicus, Sentinel, and More: European Perspectives on Data Policy" Professor Marboe explained that the European data policy also adheres to the concept of full, free and open access to data. At the same time, it is committed to the protection of several other rights and principles, which limit the free, full and open access to Earth observation data, such as the right to private life, the protection of personal data and of intellectual property, the freedom of arts and science, entrepreneurial freedom as well as national security interests. Professor Marboe also stressed that the situation is further complicated by the multitude of European actors that are relevant in the area of geospatial data policy, including the European Space Agency (ESA), the European Union (EU), the Council of Europe as well as the individual European states. All of these actors pursue different aims, rely on different principles and are governed by very different structures and forms of decision-making, which leads to uncertainty. Professor Marboe emphasised that these limitations and uncertainties could be detrimental for the European internal market, prevent competition and inhibit the maximisation of the socio-economic benefits of Earth observation.

The conference was moderated by Dr. David Kendall, Senior Executive Advisor to the President of the Canadian Space Agency and Chair of UNCOPUOS for the period of 2016 to 2018. The presentations were followed by a discussion with the audience and a reception. The conference took place at the premises of the European Space Policy Institute and was financially supported by the Austrian Federal Ministry for Transport, Innovation and Technology (BMVIT), the Austrian Research Promotion Agency (FFG), ESPI and the Association of Austrian Space Industries (AUSTROSPACE). The audience was composed of delegates to the UN Committee on the Peaceful Uses of Outer Space as well as representatives from governments, academia, national space agencies and space industry.

Prof. Joanne Irene Gabrynowicz, Dr. David Kendall and Prof. Irmgard Marboe at the European Space Policy Institute.

Analogue astronauts during a rock sampling exercise.

ÖWF / P. Santek

AMADEE-15 Mars Mission Simulation: an Expedition into Alien Worlds

Alexander Soucek, Austrian Space Forum (Österreichisches Weltraum Forum - ÖWF)

In summer 2015, an international team under the lead of the Austrian Space Forum (ÖWF) undertook the Mars mission simulation AMADEE-15 at a rock glacier in the Austrian Alps.

For two weeks in August 2015, the impressive Alpine scenery of the Kaunertal glacier in Tyrol became the location for a truly alien scientific adventure: the conduct of the human Mars mission simulation AMADEE-15 – one of the few of its kind and complexity. There are only a few "Martian" analogue sites on Earth which allow scientists and space operation experts to test instruments, scientific equipment, exploration strategies and experiments in a high-fidelity environment. These sites represent the impressive array of landscapes and scientifically worthwhile places on Mars, from sub-surface caves to large volcanoes or polar ice caps.

August 2015 made history as one of the warmest, driest summer months ever since weather data were recorded. Yet, at almost 3 000 metres altitude, the field crew of AMADEE-15 had to overcome fierce thunderstorms, prepare for ice-cold nights, traverse glacier surfaces and avoid dangerous crevasses in their quest to conduct science. Based on a peer review process, a set of eleven experiments had been selected to form the scientific core of the mission. These experiments covered the fields of geology, human factors, astrobiology,

robotics, tele-science as well as exploration and operations research. The "landing site" in the Austrian Alps was selected because of its accessibility and the high number of micro-landscapes analogous to those expected on Mars in locations where water ice is present. In particular, permafrost landforms such as rock glaciers represent complex and therefore most interesting (sub-)surface features to conduct searches for possible extra-terrestrial life on Mars.

Yet, as remote and isolated as the crew members were "on Mars", they were not alone. AMADEE-15 was made possible by a highly motivated team of 88 space professionals and volunteers of 19 countries who accumulated a total of 5 500 person-hours before, during and after the actual field mission. The mission was coordinated on a 24/7 basis by a Mission Support Center (MSC) in Innsbruck, where well-trained expert teams provided the logistic, scientific and operational backbone of AMADEE-15. A flight control team, led by flight directors, monitored the mission's conduct and had the overall mission responsibility to manage a crew of almost a dozen persons, two advanced space suit simulators and four robotic and aerial vehicles. A remote science support team analysed field data in near real time, providing planning input for the management of the scarce field assets. In addition, a dedicated flight planning team, a crew of meteorologists and a medical team supported the field operations. To provide for a realistic baseline scenario, the ÖWF operated a permanent 10-minute satellite communication delay to simulate the time needed for any radio communication signals travelling from Earth to Mars or vice versa. Finally, a dedicated media communication team ensured the highest possible outreach, thus sharing the importance and benefits of space science and planetary exploration with an international audience.

The AMADEE-15 mission was not the first Mars analogue mission of the ÖWF. Over a period of ten years, the ÖWF has become one of the leading institutions in planning, conducting, and processing Mars analogue missions together with international partners, with 12 successfully conducted missions so far. In 2011, the European Space Agency (ESA) tested its Eurobot Mars rover simulation vehicle for the first time under field conditions during an ÖWF Mars mission simulation in the Rio Tinto region of southern Spain. In 2013, the Forum led a field crew of professional researchers and analogue astronauts into a month-long mission in the Sahara near Erfoud, Morocco, supported by the local government and an impressive number of space agencies, scientific institutions and industry

ÖWF / P. Santek

For the "Junior Explorers Programme" the Austrian Space Forum selected 15 high school students to accompany the researchers at the Mission Support Center and the test site at Kaunertal.

from over 20 countries worldwide. In 2014, the ÖWF selected a new class of five analogue astronauts – professional scientists and researchers trained over almost one year in order to operate the Forum's own 45 kg spacesuit simulators "Aouda.X" and "Aouda.S".

AMADEE-15 will also not have been the last Mars mission simulation of the ÖWF. After having tested technologies in the relative vicinity of the Austrian Kaunertal, new missions might lead far away again, to other places that – though on Earth – provide for truly alien landscapes and fascinating challenges.

To find out more about the Austrian Space Forum visit www.oewf.org.

Flight controllers from 19 nations worked at the the Mission Support Center, conducting activities ranging from flight planning and ground support to biomedical monitoring of the analogue astronauts.

ÖWF / V. Weingartner

Jiří Ryzsavy (5)

ITU Symposium and Workshop on Small Satellite Regulation and Communication Systems

Cordula Steinkogler

From 2 to 4 March 2015, the International Telecommunication Union (ITU) organised a three-day symposium and workshop on small satellite regulation and communication systems at the Faculty of Electrical Engineering of the Czech Technical University in Prague, Czech Republic. The symposium focused on the challenges posed by the increasing use of small satellites, including national and international regulatory issues, frequency management and radiocommunication standardisation. Leading experts from academia, research institutes, administrations and international organisations as well as satellite operators and industry representatives shared experiences, best practices and case studies regarding the development and operation of small satellite networks.

After welcoming remarks by high-level representatives of the Czech Ministry of Industry and Trade, the Ministry of Transport, the Czech Telecommunication Office, the Czech Technical University and the ITU, the symposium was opened by a keynote speech on "Sustainable Development of Small Satellite Systems" by Professor Kai-Uwe Schrogl, Chair of the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) for the period of 2014 to 2016.

The first day of the symposium focused on international and national regulations applicable to small satellite projects. Particular emphasis was put on regulatory aspects of the use of satellite orbits and the radio-frequency spectrum for small satellite systems. Topics included inter alia the outer space legal regime and the UN register of space objects, presented by Niklas Hedman, Chief of the Committee, Policy and Legal Affairs Section at the United Nations Office for Outer Space Affairs (UNOOSA), the authorisation of small satellites under national space legislation, introduced by Professor Tanja Masson-Zwaan, President of the International Institute of Space Law, and the application of the ITU Radio Regulations on small satellites, presented by Attila Matas, Head of the Space Publication and Registration Division at the Space Services Department at ITU.

A roundtable offered regulators, satellite developers and industry representatives the opportunity to discuss the topic of national legislation and regulation applicable to small satellites. During the roundtable, Professor Otto Koudelka, Head of

the Institute of Communication Networks and Satellite Communications at the Graz University of Technology, presented the case of the first two Austrian satellites "BRITE-Austria/TUGSAT-1" and "UniBRITE" launched in February 2013, which gave the impulse for the elaboration of the Austrian Outer Space Act that entered into force in December 2011.

The second day focused on small satellite technology as well as on experiences with the application of the ITU Radio Regulations. Representatives from Austria, Belgium, Czech Republic, Finland, Hungary and Slovenia presented case studies regarding the application of the ITU Radio Regulations to small satellite systems. In this context, Professor Koudelka shared his experience with the "BRITE-Austria/TUGSAT-1" satellite.

Other presentations held during the second day of the symposium addressed the issues of space debris mitigation and remediation, small satellite architecture, future small satellite technology and planned small satellite missions. A highlight was the keynote speech entitled "Small Sats present and future" by Professor Jordi Puig-Suari, Head of the Aerospace Engineering Department at CalPoly and co-inventor of the CubeSat standard.

The third day of the symposium was dedicated to the preparation of small satellite electronic filings with the ITU. A specific interactive workshop was organised to familiarise participants with the use of ITU online tools and software for submission and validation of small satellite network filings, the notification and recording of frequency assignments and the ITU harmful interference procedure.

During the presentations and discussions participants emphasised the need for small satellite missions to abide by existing international regulations and procedures, in particular with regard to the authorisation and registration of satellites, radiofrequency coordination and space debris mitigation. They also stressed the importance of implementing national regulatory frameworks in conformity with international regulations and standards.

During the discussions participants emphasised the need for small satellite missions to abide by existing international regulations and procedures.

The symposium concluded with the endorsement of the "Prague Declaration on Small Satellite Regulation and Communication Systems", which urges the small satellite community to comply with the applicable international and national regulations and procedures in order to ensure the sustainability and safety of small satellite missions in the future.

The symposium was attended by more than 160 participants from over 40 countries, including representatives from national administrations, the satellite industry and academia, as well as members of the small satellite user community.

More information about the symposium as well as all presentations and workshop sessions can be found online: www.itu.int/GO/ITU-R/Prague-2015.

EINBLICK *insight*

Exploring the "Ignorosphere"

Cordula Steinkogler

Interview with Dominik Kohl, PhD student and research associate at the Vienna University of Technology (TU Wien) and Chairman of the TU Wien Space Team

After the first two Austrian satellites "BRITE-Austria/TUGSAT-1" and "UniBRITE" were launched in 2013, the CubeSat "Pegasus" will be the third Austrian satellite in outer space. Dominik Kohl is one of the "founding fathers" of the TU Wien Space Team and has been closely involved in the development of the Pegasus satellite. We met him at his office at the Vienna University of Technology to find out more about the Pegasus project.

Could you tell us a little bit about the Pegasus project? Who is involved in the project? What is its main aim?

Dominik Kohl: The Pegasus project is carried out as cooperation between the University of Applied Sciences Wiener Neustadt (Fachhochschule Wiener Neustadt), the TU Wien Space Team, the Austrian Space Forum (Österreichisches Weltraum Forum), and the Department of Astrophysics at the University of Vienna. The project was initiated by the University of Applied Sciences Wiener Neustadt. The goal is to develop a 2-Unit CubeSat for the European QB50 project.

What is the QB50 project?

The main objective of the QB50 project is to launch a network of 50 CubeSats built by university teams all over the world. The nanosatellites will carry out atmospheric research in the thermosphere, which is a layer of the Earth's atmosphere.
For this purpose, three different types of science sensors will be employed. In the case of the Pegasus satellite, a Multi-Needle Langmuir Probe will be used to perform plasma measurements. This will allow evaluating whether the atmospheric models developed so far are accurate or whether they need to be modified.

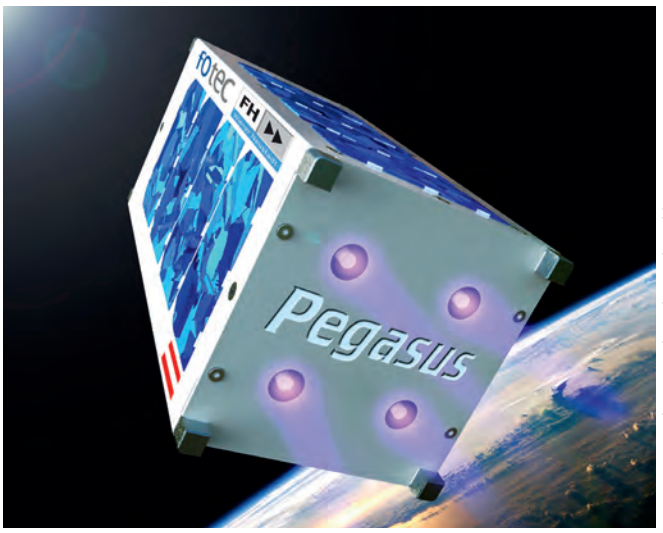
FH Wiener Neustadt

Dominik Kohl, TU Wien Space Team, with the Power Supply Unit and the On-board Computer.

TU Wien Space Team
The TU Wien Space Team was founded in 2010 by a group of 10 students at the Vienna University of Technology with the aim of developing their own rocket.

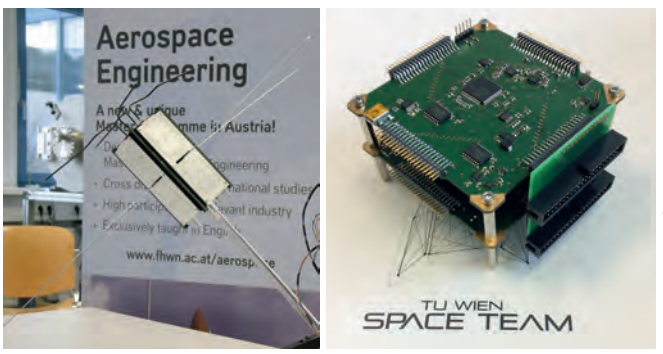
Today, the Space Team has over 60 members and is involved in several different projects including not only the construction of experimental rockets but also the development of satellites as well as the design of lunar landing modules.

The main idea behind the Space Team is to practically apply the theoretical skills acquired at university through the participation in student-led projects.
For more information see
http://spaceteam.at/meet-the-team/?lang=en



FH Wiener Neustadt / 3D-Rendering by Nembo Buldrini

Artist's concept of the Pegasus satellite.



FH Wiener Neustadt

© FH Wiener Neustadt / TU Wien Space Team

1:1 model (left) and On-board Computer of the Pegasus satellite.

Why is the project focusing on the thermosphere and what is the advantage of using CubeSats for the mission?

The thermosphere has also been labelled "ignorosphere" because it is the least explored layer of the atmosphere and therefore very little data exists on this region.

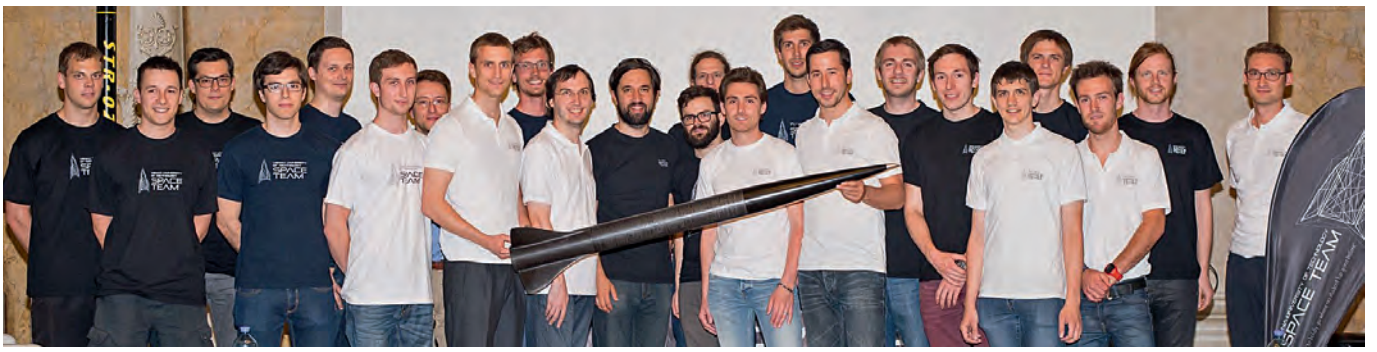
The cost of multi-spacecraft missions to carry out measurements in the thermosphere would be very high if large satellites were used. At the same time, the orbital lifetime of spacecraft at this low altitude is limited to a few months. The cost of a mission involving larger satellites would therefore not be justifiable in view of the short lifetime of the satellites.

Therefore, measurements in the thermosphere can only be realised by using very low-cost satellites, such as CubeSats. The benefit of a CubeSat is that it is cheap and can be built with reasonable effort by student teams such as the TU Space Team. >>

Pegasus
Involved Institutions:

- University of Applied Sciences Wiener Neustadt (FH Wiener Neustadt): Project lead, satellite structure, plasma thruster and attitude control system
- Space Team of the Vienna University of Technology (TU Wien Space Team): Power Supply Unit, energy management system and On-board Computer
- Austrian Space Forum (Österreichisches Weltraum Forum – ÖWF): Communication unit on the satellite, data communication to and from the satellite, data processing and storage, ground stations and Mission Control Center
- Department of Astrophysics at the University of Vienna: Software for the coordination of systems and processes on board the satellite

Objective: perform plasma measurements in the thermosphere as part of the QB50 mission
Size: 2-Unit CubeSat: 10 cm x 10 cm x 20 cm
Launch: planned for summer 2016, either from the International Space Station (ISS) or with a Dnepr rocket
Orbit:
Launch from ISS:
Altitude: between approximately 380 and 420 km
Inclination: 51,6°
Launch with Dnepr rocket:
Altitude: between approximately 450 and 490 km
Inclination: 97°
Ground Stations: planned in Lower Austria, Tyrol and Vorarlberg (Austria) and South Africa
Space Data Centers: planned in Innsbruck and Vienna
For more information see
http://spaceteam.at/cubesat/?lang=en
https://medienportal.univie.ac.at/uniview/forschung/detailansicht/artikel/studierende-erforschen-thermosphaere/
http://oewf.org/polares-wissenschaft/pegasus/



The TU Wien Space Team

Could you tell us a little bit more about the TU Wien Space Team? How did the Space Team become involved in the Pegasus project and what is its specific task in the development of the satellite?

QB50

The QB50 mission is aimed at demonstrating the launch of a network of 50 CubeSats built by university teams around the world to explore parts of the Earth's atmosphere. The project is funded by the European Union through its research and innovation funding programme "Seventh Framework Programme for Research and Technological Development" (FP7).

Objectives:

1. **Facilitating Access to Space:**
   - achieve a sustained and affordable access to space for small-scale research space missions
   - demonstrate that significant scientific and technological research can be achieved with small, low-cost satellite projects
   - enable the harmonisation and standardisation of the CubeSat platform by involving more than 50 CubeSats from different partners
2. **Scientific Research:** carry out atmospheric research in the largely unexplored thermosphere
3. **In-Orbit Demonstration (IOD):** serve as a platform for the demonstration of new and highly innovative concepts and technologies
4. **Education:** enable young scientists to gain hands-on experience in space engineering

For more information see
www.qb50.eu

The TU Wien Space Team was founded in 2010 by a small group of students. The idea was to gain practical experience by building rockets. Today the team has over 60 members and is involved in several different projects.

The Space Team joined the Pegasus project around two and a half years ago. There has always been a strong interest in space applications within the team and a lot of expertise in the field of electrical engineering among the team members. The Pegasus project was therefore a very welcome initiative to broaden the team's field of work beyond the development of rockets.

The Space Team's main task in the framework of the Pegasus project is the development of the Power Supply Unit and the integration of the On-board Computer. The Power Supply Unit will take care of the power supply from solar cell to electric load. The Board Computer will manage the data from sensors and radio frequency module as well as the software for attitude control and microthrusters.

The experience with designing the electronics for rockets was very useful for the development of the satellite components. In return, the experiences with the CubeSat positively influenced our work on the rockets. An important aspect for us is the skills we gain when manufacturing the components of the satellite. All components are designed, built and programmed by the Space Team. These skills can be used in various other fields later.

What is the timetable for the project? When will the Pegasus satellite be launched?

There has recently been a change in the timetable for the QB50 mission. The CubeSats are now planned to be launched from the International Space Station. Some of them, including the Pegasus satellite, might also be launched with a Dnepr rocket. Due to these changes, the launch has been rescheduled for summer 2016.

NPOC Austria Subpoint Graz Outreach Activities 2015

Hannes Mayer

The outreach activities of the NPOC Austria Subpoint Graz in 2015 included events on the occasion of the World Space Week 2015 as well as activities during the 2nd Graz Space Day and the global Asteroid Day.

Hannes Mayer

The "Asteroid Day" is a global awareness campaign to learn about asteroids and what can be done to protect our planet, families, communities, and coming generations from future asteroid impacts (for more information see www.asteroidday.org). Regionally organised large and small events were held on 30 June 2015 – from live concerts and community events, to lectures and other educational programmes. The Subpoint Graz organised a very small poster exhibition on legal issues concerning asteroids and planetary defence outside its office on the campus of Karl Franzens University Graz.

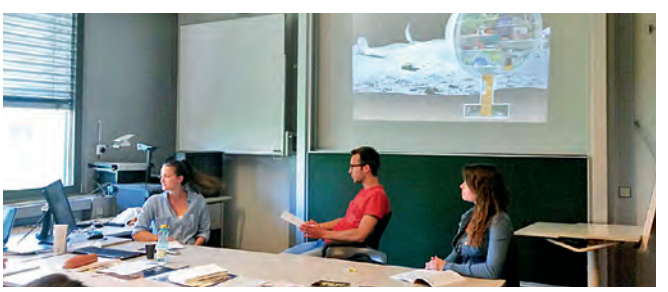
After the successful 1st Graz Space Day, the 2nd Graz Space Day was organised in 2015 (for more information see www.graz.at/cms/beitrag/10257233/6375649). Visitors could learn about space law in a "world café"-style workshop and the author took part in a public panel discussion on spaceflight and space research.

The Subpoint Graz once again cooperated with the Austrian Space Forum for the 2015 World Space Week, supporting space outreach activities at two Styrian Schools, BORG Monsberger and Skiakademie Schladming. Students at the Skiakademie discussed possible implications of the discovery of alien life and the marketing of planetary real estate, while students of BORG Monsberger went on a scaled down tour of the solar system following the paths of Voyager 1, Rosetta and New Horizons.

Seminar on Space Law and Space Policy at the University of Graz 2015

Christina Walits

The seminar on Space Law and Space Policy at the University of Graz forms part of the summer semester curriculum and was held by Professor Christian Brünner, Professor Yvonne Karimi-Schmidt, Anita Rinner, Alexander Soucek and Hannes Mayer.

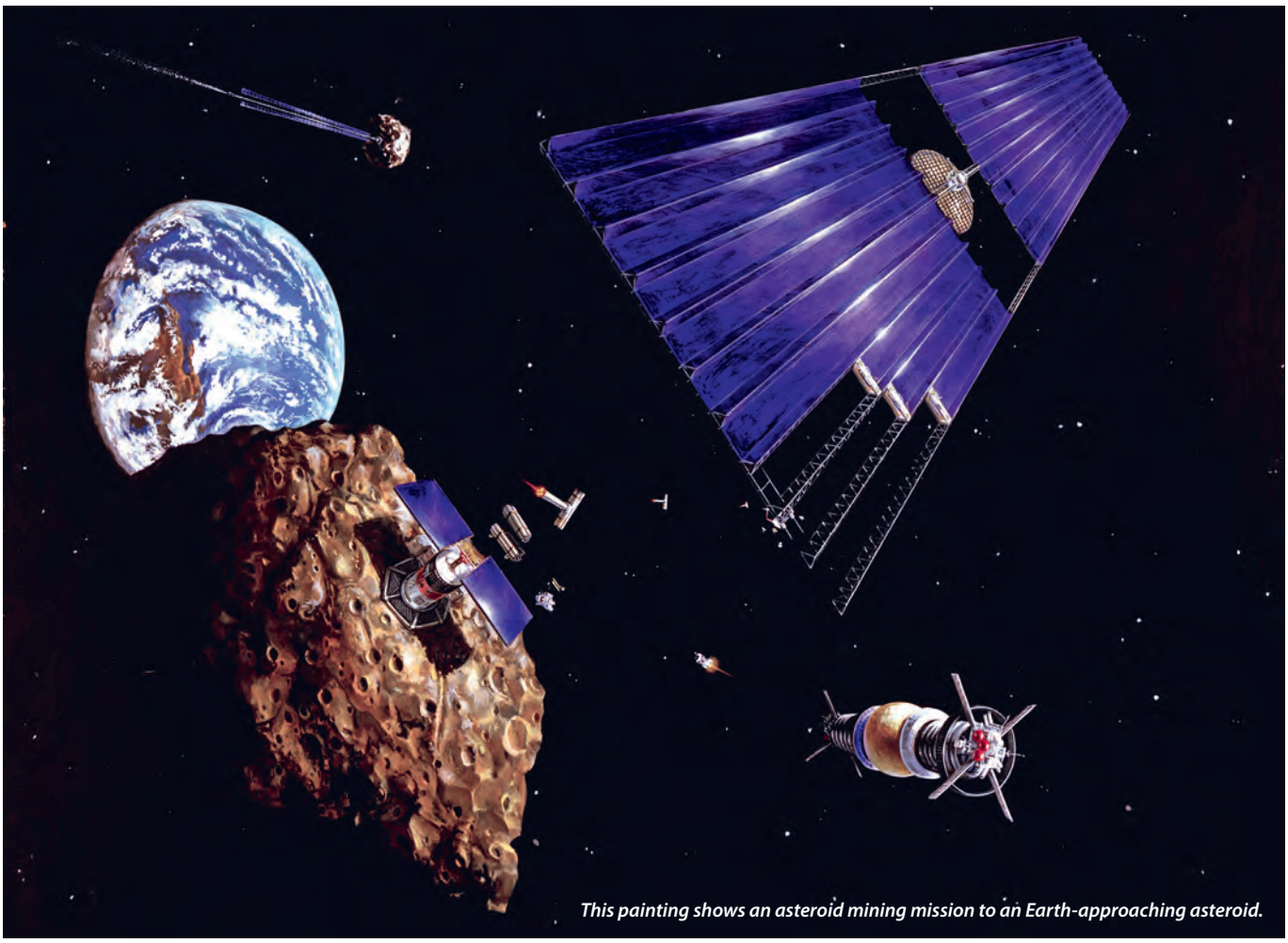

Anita Rinner

At first Professor Christian Brünner and Hannes Mayer gave the students some basic information about space law and space policy. In addition, a field trip to the opening session of the UNCOPOUS Legal Subcommittee in April was offered. During the field trip students had the chance to get to know delegates and UN staff.

The second part of the seminar was held by Professor Yvonne Karimi-Schmidt. She introduced the students to space law with special regards to developing countries. In the unit with Anita Rinner students had to elaborate case studies and give short presentations.

The last two units were held by Alexander Soucek. He explained how space law can be compared to similar legal regimes, such as the law of the high seas and the Antarctica. The students also learned about national space law, the role of the European Union and the European Space Agency. The seminar ended with a simulation exercise, where students had to elaborate a convention.

For the first time, "Space Law Essentials" (Vol. 1 (Textbook) Soucek and Vol. 2 (Casebook) Rinner/Mayer/Karimi-Schmidt/Brünner, Linde, Vienna, 2015) was utilised as teaching material, of which the students could make good use during the course.



NASA / Artist concept by Denise Watt

This painting shows an asteroid mining mission to an Earth-approaching asteroid.

New Developments in the Legal Framework of Space Resource Mining

Irmgard Marboe

Space resource mining has been a topical issue since the 1990s, when it was discovered that Helium 3, a gas that could be used to produce energy by nuclear fusion, could be extracted in large quantities from the Moon's surface. Yet, the halt the US government put on NASA to continue Moon exploration activities in the 2000s, slowed down the dynamic. Since the 2010s, private companies in the United States have been increasingly active in exploring ways of mining of asteroids for valuable material, mostly metals and gas, but also water. It has always been controversial whether the mining of celestial bodies would be in accordance with international law. Recent developments in the United States provide this debate with new inputs.

The Outer Space Treaty of 1967 states in its Article I (1), that the "exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind." This seems to rule out any unilateral "use" which is not "for the benefit and in the interest of

all countries". Yet, Article I (2) stipulates the "freedom of outer space", which is reminiscent of the "freedom of the high seas", and says that outer space, including the Moon and other celestial bodies, "shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law". The controversy centres around the question of the meaning and the extent of the "freedom of use" principle. Is mining of space resources a permissible "use"?

The United States seems to answer this question in the affirmative. On 25 November 2015, President Obama signed into law the US Commercial Space Launch Competitiveness Act (H.R. 2262). Its Title IV provides new norms on "Space Resource Exploration and Utilization" and may be quoted as the "Space Resource Exploration and Utilization Act of 2015". It mandates the US President to promote "the right of United States citizens to engage in commercial explorations for and commercial recovery of space resources free from harmful interference" (§ 51302). It furthermore determines that US citizens engaged in commercial recovery of an asteroid resource or a space resource under this chapter "shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use and sell the asteroid resource or space resource obtained" (§ 51303). Yet, the Act also provides that all this shall and will be done in accordance with applicable law, including the international obligations of the United States. In particular, the Act assures that the United States does not assert sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body.

The International Institute of Space Law (IISL), on 20 December 2015, issued a "Position Paper on Space Resource Mining" in which it attempted to analyse what the new US Act actually means and whether it represents a challenge to existing international space law or not (see www.iislweb.org/docs/SpaceResourceMining.pdf). The IISL observes that, in view of the absence of a clear prohibition of the taking of resources in the Outer Space Treaty, the new US Act is a possible interpretation of the Outer Space Treaty. It also points out, however, that whether and to what extent this interpretation is shared by other states remains to be seen. The IISL highlights, by way of a preliminary conclusion, that the US Act is a starting point for the development of international rules to be agreed by means of an international dialogue in order to coordinate the free exploration and use of outer space, including resource extraction, for the benefit and in the interests of all countries.

It was not long until the first response came. In February 2016, the government of Luxemburg announced that it would support the exploration of asteroid resources by private companies, including by financial means and incentives. The government was successful in getting former European Space Agency Director General Jean-Jacques Dordain as an adviser. Dordain urged European entrepreneurs to follow the example of American start-up companies that had already begun to consider how they could exploit the expensive metals, rare elements and other valuable resources in space bodies. He said that he was glad about this initiative by a European government because it was high time for following up with the developments in the United States (see www.bbc.com/news/science-environment-35482427).

NASA / JHUAPL

Asteroids contain many of the major elements which provide the basis for industry and life on Earth.

It remains to be seen how other governments will react. Their reaction will be decisive in determining whether the "right to mine" is indeed part of the "freedom of use" of outer space. In particular, the States Parties to the Moon Agreement, which declares the natural resources of celestial bodies to be the "common heritage of mankind" that needs an "international legal regime" for its exploitation, comparable to the regime of the Deep Seabed, might have a different view. Yet, it is also a fact that the Moon Agreement has only been ratified by 16 countries. Even developing countries, for whose benefit the Agreement would work, have refrained from becoming a party. It is probable that we are seeing a shift of perspective with regard to the issue what is "for the benefit and in the interests of all countries".

FFG / Klaus Morgenstern (5)

FFG FORUM 2015: "Living Cooperation" with a Focus on Space

Alexander Kosz, Austrian Research Promotion Agency (Österreichische Forschungsförderungsgesellschaft - FFG)

The FFG FORUM, organised by the Austrian Research Promotion Agency (FFG), is one of Austria's largest research, technology and innovation events. It is also the FFG's biggest annual event and was held for the sixth time in 2015 under the title "Living Cooperation". The general theme of the 2015 FORUM was economic and research policy strategy and the interplay between competition and cooperation, whereby a special focus was put on the space sector. Around 700 high-level representatives from research, business and administration met on 16 September 2015 in Vienna's MuseumsQuartier to discuss these issues.

Vice-Chancellor and Minister of Science, Research and Economy, Reinhold Mitterlehner, stressed that a focus on research and development, paired with close cooperation, is the right way to overcome current challenges. The Federal Minister of Transport, Innovation and Technology, Alois Stöger, highlighted the rapid social and technological developments and the importance of cooperation between companies, research institutes and public administration.

In his keynote speech, the Director General of the European Space Agency (ESA), Johann-Dietrich Wörner, emphasised that cooperation in space research, especially within ESA, should be regarded as a best practice example of international cooperation. However, the space sector is also experiencing increasing competition as new public and private players enter the arena. Consequently, greater networking is needed, as well as close coordination and a clear division of tasks amongst all those involved. "We need a 'United Space in Europe'", said Wörner. He also highlighted the excellent cooperation between ESA and Austria: "With its outstanding expertise in fields including space science and satellite applications, and as a developer of critical technologies, Austria plays a key part in this concert."

„We need a United Space in Europe", said ESA Director General Johann-Dietrich Wörner in his keynote speech at the FFG FORUM 2015.

Austrian research institutions and companies have been significantly involved in ESA projects and missions. Austria has contributed to five of the 21 instruments on the Rosetta mission, and Austrian measuring equipment, thermal insulation, GPS receivers and control systems have been integrated into a series of ESA satellites. Several companies and institutions are also involved in the processing and application of satellite data. "Currently over 100 companies and organisations with around 1 000 employees are active in the space sector," reported Stöger. "140 million euros in turnover, 20 patents and more than 1 000 publications a year are proof of the high level of activity in the Austrian space sector."

During a press conference held at the FFG FORUM, Wörner and Stöger announced a series of joint projects and activities. Austrian companies will have the opportunity to contribute to the new European Ariane 6 launch vehicle project. This will increase Austria's contribution to the Ariane 6 project from 1 million to around 26.2 million euros. According to Stöger, calculations suggest that this investment should generate around half a billion euros in subsequent production turnover for national industries over the entire lifetime of the Ariane 6. The Ariane 6 launch vehicle will be developed within the next five years, and will start operating in 2020. It will be the central launching system for European aerospace projects through to 2050.

Other joint Austrian activities with ESA include a business incubator for space technologies and a centre for the evaluation of Earth observation data in Austria. ESA has provided the ESA Business Incubation Centre Austria with 1.2 million euros in funding via the Austrian contribution. The goal is to initiate and support up to 30 space technology start-ups in the next five years. The Earth Observation Data Centre for Water Resources Monitoring (EODC) will process and evaluate the Earth observation data collected by the Sentinel satellites.
Further information can be found on the website of the Austrian Research Promotion Agency: www.ffg.at.

ESPI Autumn Conference 2015 "Access to Space and the Evolution of Space Activities"

ESPI (2)

Cordula Steinkogler

From 21 to 22 September 2015 the European Space Policy Institute (ESPI) hosted its 9th Autumn Conference, entitled "Access to Space and the Evolution of Space Activities". High-level speakers analysed future trends and changes in space technologies, in particular in the launch sector, and assessed their effects on the different aspects of space utilisation.

The conference was opened by ESPI Director Peter Hulsroj. In his opening remarks he focused on future developments in space launch technologies as well as on new approaches to space exploitation.

The first day of the conference, moderated by Herbert Allgeier, Chairman of the ESPI Advisory Council, focused on overall trends in access to space and their possible impacts on space activities in general. Speakers included CNES Director of Launchers Jean-Marc Astorg, who presented an overview of European launching capabilities, Cristina Chaplain, Director of the US Government Accountability Office, who explained how commercial space activities influence government space programmes in the United States, as well as Richard DalBello, Vice President of Business Development and Government Affairs at Virgin Galactic, who spoke about the potential of new space activities in the future, focusing in particular on suborbital manned spaceflight and small satellite launches.

On the second day, moderated by Per Tegnér, Former Chairman of the ESA Council, future scenarios for traditional forms of space utilisation were explored and the related needs in terms of governance and strategies were assessed. In the morning session, Eurisy Secretary General Stefaan de Mey gave an overview of the prospects for space applications, Robert Veldhuyzen, former ESA staff member, assessed the future development of human space flight and space exploration, Professor Shuang-Nan Zhang of the Chinese Academy of Sciences spoke about the possible impacts of future access to space on scientific progress and Leopold Summerer, Head of the ESA Advanced Concepts Team, presented an overview of the evolution of a variety of other game-changing space technologies that might impact human space activities in the future, such as human hibernation, in-space construction through 3D manufacturing and semi-autonomous exploration robots.

In the afternoon session Nina Witjes of the Austrian Institute of International Affairs focused on the impact of remote sensing capabilities on transparency building, James Schwartz, lecturer at the Wichita State University, presented ethical constraints on near-Earth resource exploitation and Jesse Phaler, Head of the Industrial Return Management Office at ESA, assessed the European options to deal with the decreasing costs of space utilisation.

Each presentation was followed by a question and answer session and a lively discussion with the audience. The conference was closed by concluding remarks on the overall findings of the event by ESPI Director Peter Hulsroj.

Videos and presentations of the conference are available on the ESPI website: www.espi.or.at

24th ECSL Summer Course on Space Law and Policy

Isolde Klinger

The 24th ECSL Summer Course on Space Law and Policy took place in Caen, France from 31 August to 11 September 2015 and was organised in cooperation with the University of Caen, Basse-Normandie. 38 students and young professionals from 22 different countries participated in the course.

During the two weeks participants enjoyed intensive lectures given by leading university professors and practitioners on the national and international legal and policy frameworks for space activities. After each lecture the participants had the possibility to ask questions and engage further with the presenters. One of the highlights of the course was the presentation by Mr. Jean-François Clervoy, a former ESA Astronaut, who gave an insight into his three space missions and on the daily life of astronauts in outer space.

The predominant theme of the course was satellite applications for smart cities or territories. The participants were required to work together in groups of five to master the exercise of representing a consultancy group advising ESA on a programme using satellite applications to support the development of smart cities. The objective was to draft an advisory report, identifying the major policy, legal and economic issues as well as the technical requirements for such an application. A tutor supported each group. At the end of the course the groups had to present the outcome of their work in front of a jury, who evaluated the projects.

ECSL (4)

To ease the rather busy schedule the hosts organised some excursions to historic sites such as the Caen Peace Memorial, which gives an insight into the horrors of World War II that took place in the region of Normandy. Furthermore, participants were able to enjoy the culinary delicacies of the region at a tasting event.

Apart from the official agenda there was also some time to explore Caen and its surroundings on one's own. Especially the weekend was used by participants to visit the beautiful and historic area of Normandy.

At the end of the two weeks a closing ceremony ended the 2015 ECSL Summer Course, during which the finest projects were awarded for the best oral, written and overall presentations. This ceremony was followed by a closing dinner at a nice restaurant at the Castle of Caen.

Planetary Defense Conference 2015

Hannes Mayer

The International Academy of Astronautics (IAA) Planetary Defense Conference is a scientific conference held bi-annually bringing together the world's experts on all aspects of the asteroid threat to Earth. The 2015 Planetary Defense Conference was held at the premises of the European Space Research Institute in Frascati, Italy.

The focus is hereby on five main aspects: finding potentially threatening asteroids and comets, tracking them, characterising them and deflecting them as well as on international coordination and education. In the latter case this includes a variety of activities from coordinating observations, to planning for how countries will work together when deflection is needed, to disaster preparedness for the cases where we are surprised by an impact, or where we only have hours, days, or weeks until impact.

The range of participants included representatives of space agencies, industry, research organisations, the military and academia. The presentation given by the author on the question of the necessity of a special legal regime for planetary defence measures was very well received.

Remco Timmermans

Upcoming Publication: "Small Satellites – Regulatory Challenges and Chances"

Small Satellites – Regulatory Challenges and Chances edited by Professor Irmgard Marboe addresses the booming phenomenon of small satellites. The rapid innovation of technology has made it possible to develop, launch and operate small satellites at rather low costs. Universities, start-ups and also governments see the chance to access outer space more easily and inexpensively. Yet, the importance to comply with existing rules and regulations that are in place to ensure that outer space is used and explored in a safe and responsible manner is sometimes overlooked. The book addresses this challenge and shows how it can be met. The contributors are renowned academics and practitioners from many different countries that share their experiences and insights and suggest practical solutions.
For more information see
www.brill.com/products/book/small-satellites

Title:	Small Satellites – Regulatory Challenges and Chances
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17 March 2016	ECSL Young Lawyers' Symposium "The Legal Framework for Space Activities – Encouraging or Favouring Industrial Investment", ESA Headquarters, Paris, France
18 March 2016	ECSL Practitioners' Forum "The Exploitation of Natural Resources in Outer Space", ESA Headquarters, Paris, France
4 April 2016	IISL-ECSL Symposium "40 Years of Entry into Force of the Registration Convention - Today's Practical Issues", VIC, Vienna, Austria
4 – 15 April 2016	55th session of the UNCOPUOS Legal Subcommittee, VIC, Vienna, Austria
12 April 2016	Yuri's Night, Vienna University of Technology, Vienna, Austria
27 – 29 April 2016	Manfred Lachs Space Law Moot Court - European Rounds 2016, University of Strathclyde Law School, Glasgow, United Kingdom
16 – 20 May 2016	International Conference on Space Operations (SpaceOps 2016) Daejeon, South Korea
6 – 7 June 2016	GLIS Conference (Global Conference on Space and the Information Society), co-organised by the IAF and the ITU, ITU Headquarters, Geneva, Switzerland
8 – 17 June 2016	59th Committee on the Peaceful Uses of Outer Space
11 June 2016	Conference "Looking to the Future: Changing International Relations and Legal Issues Facing Space Activities", University of Vienna, Faculty of Law, Vienna, Austria
6 – 8 July 2016	AGIT 2016 Symposium and EXPO for Applied Geoinformatics, Special Forum: Copernicus, University of Salzburg, Salzburg, Austria
12 – 21 July 2016	Summer School Alpbach "Satellite Observations of the Global Water Cycle", Alpbach, Tyrol, Austria
12 – 14 September 2016	UN/Austria Symposium "Integrated Space Technology Applications for Climate Change", Graz, Austria
15 – 16 September 2016	10th ESPI Autumn Conference "Space for Cooperation and Development" ESPI, Vienna, Austria
26 – 30 September 2016	66th International Astronautical Congress, Guadalajara, Mexico

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