President’s Welcome

Dear colleagues,

It is a great pleasure to welcome you to this December edition of the IAF newsletter. This edition focuses on the upcoming Global Space Innovation Conference (GLIC 2015), preparations for the 2015 Spring Meetings and IAC in Jerusalem. There is also the usual members’ news highlighting the achievements and events of our member organisations, and an interview with Jörg Feustel-Büechl, GLIC 2015 IPC Co-chair.

I would like to thank the IAF community for their hard work throughout a very successful 2014, where we saw a record number of papers presented at the IAC in Toronto, and some excellent sessions at the Global Space Applications Conference (GLAC 2014) in June. I look forward to working with our IAF community in 2015, with best wishes for the holiday season,

Kiyoshi Higuchi
President

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RECENT PUBLICATIONS:
- IAC 2014 Final Programme
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IMPORTANT DEADLINES:
- Closing of applications for Emerging Space Leaders Grant Programme – 6 February 2015
- Closing of nominations for Young Space Leaders Recognition Programme – 13 February 2015
- Closing of call for IAF Awards – 13 February
- Closing of Call for Abstracts for IAC 2015 – 23 February 2015
- Call for Plenaries IAC 2015 closes 25 January 2015
Global Space Innovation Conference (GLIC) 2015

The Global Space Innovation Conference (GLIC 2015) takes place from 23 -25 June at the Munich Residence Palace in Germany. The latest in the IAF’s ‘Global Series’ conferences, GLIC 2015 is a high-level, specialised 3-day event focusing on entrepreneurship and innovation in space. Global leaders from these fields will address a select audience to present their vision and their organisations’ latest developments. Top-level keynote speakers will share their thoughts, while the ‘Results and Recommendations’ session at the end of the conference will focus and consolidate the key outcomes.

An exhibition will run throughout GLIC 2015, where leaders in space industry and entrepreneurship will showcase their innovations. There will also be high-level Opening and Closing ceremonies with keynote speakers, and a variety of social events including receptions and the Gala Dinner. The primary goal of the Global Space Innovation Conference (GLIC 2015) is to provide to governments, space agencies, industries and entrepreneurs a forum for exchange of experiences in innovation management and technology transfer. Registration will open in January 2015, and more information is available at www.glic2015.org.

IAF Spring Meetings and IAC 2015

The Spring Meetings will take place at the CAP-15 Conference Centre in Paris, from 24 – 26 March 2015. The 3 days begin with IAF committee meetings on Tuesday 24th and Wednesday 25th, followed by a Global Networking Forum (GNF) event and the IAF cocktail on the Wednesday evening. The International Programme Committee (IPC) general meeting and papers selection for IAC 2015 take place on Thursday. There will also be 2 sessions of the IAF Bureau. For more on this year’s IAF Spring Meetings, click here.

Preparations for the 66th IAC in Jerusalem, Israel, are also well under way. Registration is already open at www.iac2015.org, where you can also see the latest updates on the Congress from the local organisers, the Israel Space Agency (ISA). The call for abstracts is also open, and the deadline for submissions is 23 February. You can submit your abstracts at www.iafastro.net. There are a variety of sponsorship and publicity opportunities available for IAF member organisations, all of which are detailed on the iac2015 website.
Lockheed Martin Corporation – Orion Spacecraft takes first steps on journey to Mars with successful test flight

The Lockheed Martin-built Orion spacecraft gently splashed down into the waters of the Pacific Ocean at 11:29 a.m. EST Friday, Dec. 5, 2014, completing the first test flight of NASA’s deep space exploration capsule.

After a successful launch from Cape Canaveral, Florida aboard a United Launch Alliance Delta IV Heavy rocket at 7:05 a.m. EST, Orion orbited the Earth twice, reaching speeds of 20,000 miles per hour and traveling through belts of intense radiation before enduring a fiery, 4,000 degree F re-entry into Earth’s atmosphere.

“There were a few moments when I held my breath, but today’s flight couldn’t have gone better,” said Mike Hawes, Lockheed Martin vice president and Orion program manager. “Orion is going to push the boundaries of scientific discovery, and for the men and women of Lockheed Martin who have worked tirelessly for the last six years to make this test possible, it’s an honor to be a part of this moment in history.

Exploration Flight Test-1 (EFT-1) successfully tested a number of technologies that are fundamental to future deep space missions:

- Heat Shield: During re-entry, Orion’s heat shield withstood temperatures twice as hot as molten lava. Protection from the extreme heat of re-entry is critical for keeping astronauts safe on future deep space missions.

- Separation Events: A launch abort system, a service module, protective panels, and a forward bay cover successfully jettisoned from the spacecraft at predetermined times during the flight.

- Guidance and Navigation: Deep space missions require advanced avionics that guide the spacecraft using an array of sensors and thrusters. EFT-1 demonstrated Orion’s ability to guide itself autonomously through launch, orbit and re-entry.

- Radiation Protection: Twice during today’s flight, Orion traveled through the Van Allen belt, a layer of intense radiation located above Earth’s atmosphere. That will help engineers measure the effect of deep space radiation on both astronauts and on-board electronics.

- Crew Module Environmental Control: Sensors installed inside the crew module collected data on the acoustics, vibrations, forces, and temperatures future astronauts will experience during deep space missions.

- Parachutes and Recovery Operations: Orion’s 11 parachutes deployed in stages, slowing the spacecraft from a 20,000 mph re-entry to 20 miles per hour at splashdown, at which point the U.S. Navy and NASA Ground Systems led an at-sea recovery from the USS Anchorage.

“Throughout the flight we recorded data from the spacecraft, and later this month, when it arrives back to Kennedy Space Center, we’ll pull select components off the spacecraft to include in our overall analysis,” added Hawes. “The insights we’ll gain from today’s flight are invaluable for Orion’s future. Meanwhile the team will continue their work preparing for Exploration Mission-1, when Orion will be integrated and tested with the Space Launch System rocket for the first time.”

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Italian Space Agency (ASI) – Samantha Cristoforetti becomes the first Italian woman in Space

Members’ Corner

Check for more news on our Social Media
At 22:01:13 on November 23, the Soyuz (TMA-15M) rose from its launch pad, number 31. A few seconds later, the spacecraft and rocket were already gone beyond the clouds across the black Baikonur night carrying the three crew members of the ISS Expedition 42. The Russian commander Anton Shkaplerov, the American flight engineer Terry Virts and - as second engineer and co-pilot - the Italian Air Force captain and member of ESA’s Astronaut Corps, Samantha Cristoforetti.

Thus Futura begins, the second ASI long-duration mission (within the bilateral agreement with NASA signed in 1997), that will commit Italy’s @AstroSamantha for six months on the International Space Station. Nearly 600 people attended all stages of the launch live from the ASI headquarters in Rome, connected to Baikonur, during a huge event that was attended by the ASI President Roberto Battiston, Minister of Education, University and Research Stefania Giannini, ESA’s Director of Human Spaceflight and Operations Thomas Reiter and the Chief of Staff of the Italian Air Force, General Pasquale Preziosa.

“Those moments were the most exciting eight minutes of my life” said ASI President Roberto Battiston, commenting on the lift-off and all subsequent stages until orbit was reached. “I would like to say to Samantha - he added - to enjoy this unique moment, and I wish her my best in successfully concluding all experiments of the mission”.

**The American Astronautical Society (AAS)**

The AAS is pleased to report the publication of the English-language translation of Hermann Oberth’s seminal work, Die Rakete zu den Planetenräumen (The Rocket Into Planetary Space) (1925 second edition) by de Gruyter Oldenbourg. In anticipation of the publication of the translation, de Gruyter Oldenbourg also re-issued the original German-language edition. Dr. Trevor Sorensen led the translation and editorial effort for the AAS History Committee, supported by a team of specialists that included Dr. Joachim Kehr (DLR/GSOC ret.), Dr. Rick Sturdevant (AFSPC), Dr. Peter Englert (University of Hawaii at Manoa), Michael Ciancone (NASA), Lars Oliefka (ESA), and Joni Wilson (copy editor).

**VITO (the Flemish Institute for Technological Research)**

Exactly one year ago, VITO started real-time operations of PROBA-V. This miniaturised ESA satellite is tasked with a full-scale mission: To map land cover and vegetation growth across the entire planet every two days. It is flying a lighter but fully functional redesign of the ‘Vegetation’ imaging instruments previously flown on France’s full-sized Spot-4 and Spot-5 satellites, which have been observing Earth since 1998. PROBA-V, entirely built by a Belgian consortium, continues this valuable and uninterrupted time series with daily products at 300 m and 1 km resolution. Even 100 m products will become available early 2015, delivering a global coverage every 5 days. The blue, red, near-infrared and mid-infrared wavebands allow PROBA-V to distinguish between different types of land cover and plant species, including crops. Vital uses of these data include day-by-day tracking of vegetation development, alerting authorities to crop failures, monitoring inland water resources and tracing the steady spread of deserts and deforestation. Access to near-realtime data at 1 km resolution is free and open, while 300 m data are accessible for free to the research and development community. To download data please go to [http://www.vito-eodata.be](http://www.vito-eodata.be)

**Indian Culture at the Sergey Korolev Space Museum**

The year of India in Ukraine is coming to an end. To mark the event, the S. Korolev Space Museum opened an exhibition “The World of Art of Rabindranath Tagore” on December 5 2014. The project has been implemented in cooperation with the East
European Development Institute and the Tagore Centre. Tagore is one of the most prominent personalities in Indian and world culture. He was a poet, playwright, novelist, and a founder of Bengal style of painting and narration in Indian literature. He was the first non-European to win the Nobel Prize for literature, an innovative teacher and a social activist, and a humanist. On the opening day there were many students, teachers, writers, artists and public persons at the museum. The meeting provided an opportunity to visitors to learn more about Indian culture and works of the artist.

**SpaceLand Italia**

Time is ticking, as space debris is steadily increasing and chances of serious incidents in low Earth orbit increase: Given the consolidated fact that in the near future there will be a statistical chance of catastrophic satellite collision higher than 10%, a task-force for space debris management composed of weightless flight veterans is being gathered by SpaceLand around the former ESA Chairman of Technology Experiments on board the MIR Space Station, Carlo Viberti, IAF ITACCUS member, to get ready for a first series of weightless hand-on test flights to attempt tackling with this critical problem.

In this framework, SpaceLand is supporting European industries to optimize engineering and upcoming weightless test activities, in particular to validate a set of new technologies needed to be developed and get zero-gravity-qualified to counteract the junk satellites issue.

Moreover, a large wide-body weightless aircraft is being converted by SpaceLand in order to satisfy the program's tight timeline and provide the needed volume for weightless testing on such new orbital technologies, in the framework of a series of zero-gravity test flights needed within the end of February in order to cope with a very stringent schedule.

IAF members, research institutions and corporate interested in merging forces for such a rush-mission and its follow-on activities are welcome to join the next flight readiness review and microgravity hand-on training, planned at the SpaceLand Camp for the 14th and 15th of February; applications by email to SpaceLand@SpaceLand.it, info on www.SpaceLand.it

**Committee Broadcasts**

**Human Spaceflight Committee (TC 05): Expanded Membership and Activities.**

This has been a very intensive and fruitful year for the Technical Committee on Human Spaceflight.

A Successful Symposium including Commercial HSF Plenary & Session at IAC 2014

As prepared by a programme working group after the IAC 2014, IAC 2015 will include for the first time a high-profile session on Commercial Human Spaceflight, seconded by a Plenary Event co-organized with the TC on Commercial Spaceflight Safety on the same topic, expanding the scope of the HSF Committee on this booming topic of high interest for the public and experts. Together with the classic session topics related to governmental human spaceflight activities and the only IAF-ISSL joint session of the IAC, the Human Spaceflight Symposium attracted roughly 40% more abstracts than previously, reached a broader audience in all its sessions, and attracted new members.

**Committee Membership**

In conjunction with the above-described Commercial Human Spaceflight activities around IAC 2014, but also from the classic governmental programmes and as a consequence of
the ongoing generation change, the Committee attracted key players from both communities applying for membership, assuring competence, new ideas, and a wider network being brought into the Committee and its activities.

Governance Task Force

Following the adoption of the new IAF Bylaws, the HSF Committee has also installed a dedicated taskforce reviewing their consequences on the Committee’s governance. Especially membership rules, but also scope of activities and the Board’s operating rules will be thoroughly scrutinized and updated wherever needed. The task force’s proposals will be discussed and eventually adopted at the next IAF Spring Meeting.

Support of ASE Conference 2015

As one outcome of the intensified exchange and collaboration with other entities interested in Human Spaceflight, Committee members support the organization of one session of next year’s ASE (Association of Space Explorers) meeting in Stockholm on Exploration. Stay tuned for more information on this event in one of the next Newsletters! Peer-to-peer contacts are also being established with study groups of the IAA.

Space Propulsion Committee

The space propulsion committee at IAC 2014 elected two new co-chairs at the 64th IAC in Toronto in the Autumn: Prof Toru Shimada and Dr Helen Webber. Prof Shimada is Professor Flight Systems at the Japan Aerospace Exploration Agency (JAXA). Dr Helen Webber from Reaction Engines UK is a young professional and one of the 6 lady members of the committee.

The nine sessions of the 63rd IAC Propulsion Symposium were well attended with many good papers and presentations. In response to popular demand there was more emphasis on propulsion technology. A lesson learned is to try to find a better balance of more futuristic concepts and the inter-relationships with space transportation and missions. The poster session was very successful with Kento Hoshi from Japan winning first prize with his "Numerical simulation of satellite charging for electromagnetic orbital control".

As a new initiative the Committee also initiated an investigation into ‘yellow’ propellants. This is a new form of ‘green propellant’ which has the added advantage of stimulating cooperation and original thought. Initial trials indicated encouraging results with Canadian products. Further trials will be conducted in Paris and Jerusalem next year.

Workforce Development – Young Professionals Programme (WD-YPP) Committee

Are you aged 21 – 35 and working on an ISS-related topic? The Workforce Development – Young Professionals Programme (WD-YPP) Committee are proposing a plenary event (the ‘Next Generation Plenary’) at IAC 2015 in Jerusalem, with a panel of six young professionals in a discussion of their innovative utilization of the ISS.

Research on the ISS is key to our future both in space and on Earth. In the “Next Generation Plenary — International Space Station as the Gateway for Humankind’s Future in Space and on Earth,” selected student and young professional panelists will discuss their past, current, and future research and work on the ISS. Panelists will be selected to highlight their successful efforts in international research and engineering projects on the ISS, and how they have contributing to the future of humankind. If approved, this event will take place the week of 12 – 16 October, 2015, in Jerusalem, Israel. The plenary will be moderated in a format similar to a talk show, interweaving clips from the panelists’ audition videos with questions and comments from the moderator, other panelists, and the audience.

To qualify, the applicant’s work must have already flown to ISS, currently be on ISS, or have a confirmed flight to ISS, and the applicant must be a key player directly involved (for example, the lead engineer, systems engineer, principal investigator, co-investigator, or project manager)

How to apply? By January 15 2015, create a 15-second video telling us very briefly the subject of the innovative ISS research you are actively conducting or currently working on, that you would speak about on the panel, and why you should be chosen to address the IAC. The video must be posted on http://www.youtube.com. You must be on screen and be speaking for the full 15 seconds. Then complete the application at http://tinyurl.com/NextGenPlenary2015. The IAF will select the Round Two subset of candidates from the above and notify all entrants by February 1 2015. Specific details of Round Two requirements will be sent to the candidates in the notification. Selected candidates will be asked to create and post a three-minute video on a specified YouTube site by 1 March.

The IAF will make the final selection of plenaries for the IAC in Jerusalem the week of 23 March 2015 and will notify the finalists of its decision by 3 April 2015.

For questions, contact youthplenary@iafastro.org.
Astrodynamics Committee – Astrodynamics Symposium at IAC 2014

There is no doubt that IAC Toronto was a great success for everyone and every symposium. Astrodynamics Symposium is no exception. Almost every committee member participated and most importantly, we had 98 high quality papers and presentations and that attracted a good number of audience until the very last paper on Friday afternoon. The 20th John V. Breakwell Memorial Lecture was delivered by Dr. Jozef van der Ha. Before his retirement, Jozef was very active in the Astrodynamics Committee, serving as a member (1985-1991), Co-Chair (1991-1994) and finally as Chair between 1994-97. His lecture entitled “Lessons Learned from the Dynamical Behavior of Orbiting Satellites” was based on his 30+ years of spacecraft experience. He chose a few noteworthy examples of spacecraft anomalies and demonstrated the importance of analytical skills in understanding an anomaly and finding the solution. This was the twentieth time of the memorial lecture and at this milestone, the committee had invited the participation of the son of John V. Breakwell. We were thankful that his organization, Lockheed Martin, kindly supported his participation at the IAC. With his presence, John Breakwell Jr. told the audience a few interesting things about his father that nobody was aware of. At the end of the lecture, he presented the certificate of appreciation for the John V. Breakwell Lecture to Dr. van der Ha.

Committee Broadcasts / Interview

Interview

Interview with Jörg Feustel-Büechl, Advisor to The Bavarian State Ministry for Economic Affairs and Media, Energy and Technology (MWMET) and GLIC 2015 International Programme Committee (IPC) Co-Chair

1. What are the major influencing factors in spurring space entrepreneurship and new venture creation?

Space industries and research organisations have created an enormous wealth of know-how and patents which are now, thanks to initiatives of governments, space agencies and industrial companies, more readily available for terrestrial applications. In order to use this potential we need a continuous preparedness of the owners of the patents and know-how to make them available to young entrepreneurs with fair conditions. We further need business opportunities organisations that provide active support to new entrepreneurs for their business plans and during implementation of their new company. Finally we need active financial support from governments, space agencies and venture capitalist organisations.

2. Why are international space events such as GLIC 2015 important fora to discuss innovation management and technology transfer?

GLIC 2015 is the first IAF event which provides a global platform to discuss among all stakeholders the practices of innovation management and technology transfer. Presently there are many different approaches to support the use of space-driven innovations for terrestrial applications through new dedicated ventures. It is a great time to take stock of the different practices and their efficiency and provide guidance for future initiatives. GLIC 2015 will bring many players from around the world together who will present their approaches, inspire others and learn from positive results of other’s practices.

3. What are the 3 main advantages that GLIC 2015 will bring to the communities present such as space agencies, industry and entrepreneurs?

GLIC 2015 as a worldwide congress will bring together the three levels of technology transfer: The supporters, governments and space agencies; the enablers, incubating organisations and venture capitalists; and last but not least the entrepreneurs themselves. From the discussion among these parties we can learn more about how to optimize programmes, improve support of young entrepreneurs, and look at the practical experiences of the entrepreneurs, including their recommendations to governments, space agencies, incubators and venture capitalists.

5. How can business education and training, propagate innovation and development in the space sector today?

Innovation management and technology transfer is not a one-shot exercise. Normally it takes a considerable amount of time to generate a successful new company or service. The education
and training of specialists in business incubation organisations, who implement public technology transfer programmes, is an essential ingredient in the progression from a business plan to the completion of the transfer activity, a process which normally takes several years. The other stakeholders in this process, including the entrepreneurs themselves, have to be trained in order to understand the commercial and entrepreneurial rules and mechanisms of technology transfer.

6. Why is it important to have ‘role models’ in space entrepreneurship and innovation, and what can we learn from them?

The major goal of GLIC 2015 is to learn from successful implementation examples and to provide guidance for future initiatives at all levels. Competitions and prizes can spur entrepreneurial ideas, but structured business incubation and long-term support and coaching are essential requirements for ideas to become reality.

7. How can agencies and industry refine the ways in which they work together to achieve maximum innovation and economic benefit in the space sector?

In many countries, governments and space agencies are already supporting technology transfer programmes. As industries are the owners of the required know-how or patent the close cooperation of these two partners is key to any successful technology transfer. GLIC 2015 will address this aspect and discuss mechanisms of how to best support government policies by industry.

In Memoriam

Mr Hans Hoffmann, Former IAF Vice-President and Honorary Secretary

It is with profound sadness that the IAF reports the passing of one of its longest-standing and most deeply valued members, Mr Hans Hoffmann.

Hans began his career in 1961, as project manager of the “Third Stage” European ELDO-I Launcher in Bremen, Germany. In 1969, he became Vice-President of the European Launcher Development Organisation (ELDO) in Paris, and four years later returned to Bremen, as Managing Director and “Spacelab” Project Director at ERNO Raumfahrttechnik GmbH. In 1985, he created and became managing director of Intospace, an umbrella organisation of 90 European microgravity user organisations. Between 1989 to 1990, Hans was managing director of Dornier International; marketing director of DASA, Munich, and President of DASA (MBB) MSG in Bremen.

As President of STN-Systemtechnik Nord GmbH in Bremen between 1990 and 1994, Hans was responsible for the German/French development of the UAV “KZO Brevel” target location. Between 1994 and 2000, he was president of STN Atlas Elektronik GmbH in Bremen. In 1997, he also joined the Supervisory Board of STN Atlas Elektronik and became a full-time consultant for the company. After retirement in 2000, he held various consultant positions. He was highly involved in Orbcomm LLC, initially as CEO and President, and later as consultant and member of the Board of Directors. His other roles and functions included membership and Vice-Presidency of the Senate Committee of the German Aerospace Centre (DLR) (1988-2000); Chairmanship of the CALS Committee of the German Industry Association (1990-2000); and Fellowship and membership of the American Institute for Aeronautics and Astronautics and the American Astronautical Society.

Hans received numerous awards including the IAF Allan D. Emil Memorial Award (1986), the Engineering Science Award by the International Academy of Astronautics (1993) and the Ordre National du Merit by French President for German/French cooperation (1997). He was named “Man of the Year” by Aviation Week for the creation of Intospace in 1987. Hans was deeply involved in many areas of the IAF’s work, being IAF Vice-President from 1992 to 1996 and serving as the Federation’s Honorary Secretary since 2009. His colleagues on the Finance Committee have spoken fondly of his constantly wise counsel and judgement, and the tremendous sense of loss at his passing.

The IAF sends its most sincere condolences to Hans’s family, friends and colleagues.

The next newsletter will be issued in March 2015