



Issue 28

All About The Chinese Space Programme

Go TAIKONAUTS!

龙腾太空

March 2020



with detailed report from the
5th CCAF in Wuhan 2019



致敬

This issue of the magazine is dedicated to the people of Wuhan.

CASIC



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Content

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5th CCAF – China (International) Commercial Aerospace Forum Jointly Building an Industrial Ecology to Lead the Development of Commercial Aerospace

by Jacqueline Myrrhe

There is this saying in the commercial world that the first five years of a business are the most crucial for its survival. On the other hand, five years is not really long, in particular not for big endeavours. So, let's say: It is **only** five years ago that commercial space companies in China entered the scene.

The initial spark set the Chinese government in 2014 with its document no 60 "The State Council's Guidelines on Investment and Financing Mechanism Encouraging Social Investment in Innovation and Key Areas". It allowed the privatisation of high-tech companies, including space. That was a surprise since it meant the monopoly of the space giants CASC, SAST and CASIC would inevitably be challenged. But this policy also encouraged those state giants to buy innovation, services and hardware for a competitive price from the commercial sector. Whether it - indeed - opened up a two-way road of mutual win-win remains to be seen. The second milestone on the way to a sustainable Chinese commercial space industry was set when President Xi Jinping urged further integration of military and civilian undertakings. In January 2017, the Central Commission for Integrated Military and Civilian Development was introduced to lead efforts in this regard. The military-civilian integration is not only limited to the space sector. The intention behind this move is to gain "twice the benefit with half of the investment", meaning taking advantage from dual-use in both ways: re-feeding military high-tech, paid by tax payers money, back into the economic circulation as well as buying cheaper in the commercial world. Ever since, other policies for public private partnerships supported the whole process which saw the emergence of mixed-ownership commercial companies, spin-offs and venture capital supported space businesses.

5 years of commercial space industry in China – basically means: in **only** five years unprecedented progress has been made. Not considering the commercial spin-off Expace with its successful Kuaizhou launches and ChinaRocket with its Jielong launcher, this short time period included already China's first commercial flight, achieved by iSpace in July 2019. And others are to come! Considering the first 5 years of its Chinese existence, commercial space is seen as much as an opportunity as a challenge. This résumé has been the focal point of the 5th CCAF on 19 and 20 November 2019 in Wuhan, organised by CASIC which has been pioneering the development of commercial space from day one.

The 5th CCAF was the 3rd international edition since 2017 and each one of those last three conferences has been different

while the purpose of the gathering - offering industry, academia and space agencies a platform to exchange ideas on commercial aerospace development and future perspectives - has remained consistent.

Also, the overall number of around 500 participants remained stable since the 3rd conference, though the atmosphere and the talks have always been unique, year by year. The number of foreigners in 2019 was slightly lower compared to 2018. Roughly 80 foreigners from Russia (many!), Sweden, Switzerland, Ukraine, Japan, the UK, Greece, Germany, the Netherlands, US, Serbia, Turkey, UAE, and France came to Wuhan. Several of them even coming on a frequent basis.

Two factors prevented that the number of international participation in 2019 was higher:

Originally the date for the 5th CCAF was set for end of August. The organisers estimated that if that date would have been kept, roughly 100 more foreign participants would have been able to come to Wuhan.

It was highly unfortunate that at the same time of the Wuhan Forum, other important space conferences took place around the globe:

- SpaceCom Expo on 20 and 21 November in Houston,

USA

- SpaceTech Expo Bremen from 19 to 21 November in Germany

- APSCC 2019 Satellite Conference & Exhibition from 19 - 21 November 2019, in Bangkok, Thailand

- 18 to 20 November Zhuhai - International Symposium on the Peaceful Use of Space Technology

Those parallel events occupied many of the leading managers of the commercial space industry. Still, Martin Sweeting, Directors of the Swedish Space Corporation and high-ranking Russian representatives were worthy representatives of the "Western" hemisphere. Considering all of this, Wuhan still saw a significant audience - national and international - and they made soundly the best out of this.

In 2019, the organisers returned to the place of the 3rd CCAF - the Eurasia International Convention Hotel. The hotel and the facilities are very good. However, after the grandiose location for the 4th CCAF in 2018 - the Intercontinental Wuhan Expo - the Eurasia Hotel was on a different scale, although the facilities for conference, exhibition and lunch are ideally located: opposite CASIC's office building and in a business district, easy to access with the metro station in front of the hotel and easy to move around, including short distances to the city centre, the airport, and the Hankou train station.



VIPs arrive at the conference hotel. Credit: GoTaikonauts!



It took a full wall to display the conference programme.



Conference souvenirs: pins and reading marks.



Like always, the first day was buzzing with all the space officials, politicians and VIPs present. The opening speeches were given by the Chinese high-level officials like the Vice Mayor of Wuhan, a representative from the Beijing Ministry of Science and Technology, officials from CMSA, CNSA, CASIC and the China-Russia Committee of Friendship.

Hu Yabo, Executive Deputy Mayor of Wuhan, was the first to welcome the guests, saying that the local government has given its support to the forum since its introduction in 2014 and will continue to do so. He confirmed that the city administration is highly motivated to support the development of the commercial space sector in Wuhan. There is a strong drive for moving the industrial value chain to the high-tech and high-quality end. The Wuhan National Aerospace Industry Base adds to a healthy industrial mix of different innovative and future oriented sectors. In the last five years, more than 60 commercial space companies have started business in China. Wuhan is already today the connecting hub for them. However, by 2035 the city intends to double the number of inhabitants. This explains why even an outsider can recognise that in certain areas in Wuhan whole apartment blocks are not inhabited – waiting for new arrivals. So, please, addressed the Mayor the audience, be welcome to set up your business here in Wuhan! There is certainly no lack of infrastructure.

Despite the success so far, Hu Yabo identified some challenges along the way. The Military-Civil Integration is a two-way road and should be seen as such. He thinks that the military has not yet recognised the full potential of the civil commercial companies, the civil remote sensing satellites as well as its applications. Furthermore, there are still many open questions regarding IP protection. Also, what benefits can Chinese commercial space companies bring to the Belt-and-Road Region? With this food for thought he wished the forum much success.

The representative from the central government, **Zheng Fangneng**, Director of the Department of High and New Technology Development and Industry of the Ministry of Science and Technology echoed many of Hu Yabo's points. He stressed that the technology transfer from the military to the civil society is helping to strengthen the commercial space industry for the global competition in which China can position itself favourably.

An interesting aspect of the 2019 CCAF was the involvement of high-leading representatives from governmental space organisations. At the first sight this might look strange for a commercial space forum, however the speakers from CMSE and CNSA were fully aware of the relevance of commercial space companies for their state-owned organisations.

Deputy Director **Lin Xiqiang** of the China Manned Space Engineering Office emphasised that he is convinced that high-end technology and innovation will derive from the work of the Chinese commercial space sector. In the never-ending course for space exploration and towards our common goals he looks forward to work with all relevant players.

Tian Yulong, Vice Administrator of the China National Space Administration looks at the commercial space industry as a source of growth. Its open and inclusive character will make a new type of industrial ecosystem possible. He pointed out that the drafting of a policy framework is in the making and he realises the urgency of it. Like the speakers before him said, the expectations from the commercial sector are high, as well as the trust in the innovative power of the diverse players. As some example for unprecedented development potential, he pointed out the integration of artificial intelligence, of big data and the conversion of academic results into commercial space products.

Sergey Nedoroslev, the President of the Council on Science and Innovation of the Russian-Chinese Committee of Friendship, Peace and Development conveyed the regards from the members of his organisation. He is convinced that the cooperation between both States will grow stronger and will inevitably involve all areas of the society. Based on a long tradition of close neighbour relations, science and space have always been a fruitful field for progress and development.

Liu Shiquan, President of CASIC, recalled that CASIC initiated the CCAF to provide a platform for business cooperation and trade and to speed up the development of the commercial aerospace industry by seeking the



A display of all exhibitors, speaker's organisations, sponsors and contributors



sustainable support of relevant state administrations and local governments, as well as the extensive attention and assistance from all communities. During the last five years, said Liu, CASIC has focused on the built-up of the production capacity for launcher, satellites and space hardware and promoted the coordinated development of the entire industry chain in a strategic, systematic and innovative way. The reduction of launch costs, the development of satellite constellations and the applications of their data within a new generation of spatial information system which is integrating communication, navigation, remote sensing and ground-based information, laid the foundation for new trends in the commercial space sector. Liu concluded that: "Whoever develops faster and better in commercial aerospace will be earlier to benefit from it, and human society will enjoy more convenience and services brought by space technologies earlier." Information technologies such as big data, and artificial intelligence and the cross-integration of new materials and advanced manufacturing technologies have facilitated disruptive innovation in aerospace technology and enable the shift of China's economy from a high-speed growth to a high-quality growth. CASIC's leadership, so Liu Shiquan, regards it for granted to contribute to this.

Liu Shiquan, also confirmed that the in-orbit testing of the Hongyun 1 satellite concluded successfully - including tests under different weather conditions, and for different business scenarios such as website browsing, video chats and high-resolution streaming services. During the tests, there was no frame loss or buffering, and all functions and indicators met the design requirements.

By the beginning of 2020, users across China will be able to access the demonstration system of the Hongyun Constellation, and they will be able to take advantage of what he described as "Hongyun speed".

In 2020 four more satellites are scheduled for launch and by the middle of the 14th Five-Year Plan (2021-25) the initial configuration of 156 satellites should be in orbit and operational.

Cao Guangjing, the Deputy Governor of the People's Government of Hubei Province confirmed that he and his colleagues are happy to provide any support needed for commercial space industry in Wuhan and Hubei – 24/7 for everyone! He is convinced that the currently under construction satellite control centre will give way to commercial applications and new products.



Cao Guangjing is talking. Credit: GoTaikonauts!

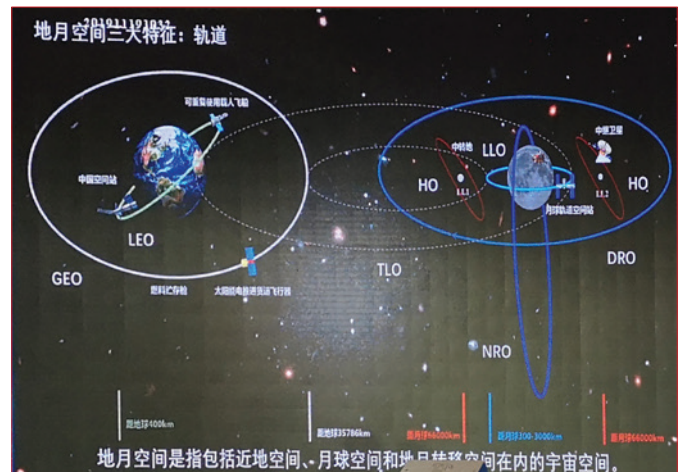
Zhao Lihong, the Party Secretary of the District Committee of the Xinzhou District People's Government of Wuhan gave an overview on the status of the construction of the international space city, the living and residential area for the workers and their families of the Wuhan National Aerospace Industry Base. The main road, the Space Avenue is ready, as well as the football park (!) and the school and kindergarten. Until the end of the

year, the production facility for the launchers, satellites along with the satellite control centre are expected to be ready. The infrastructure outside the manufacturing is complete anyway.



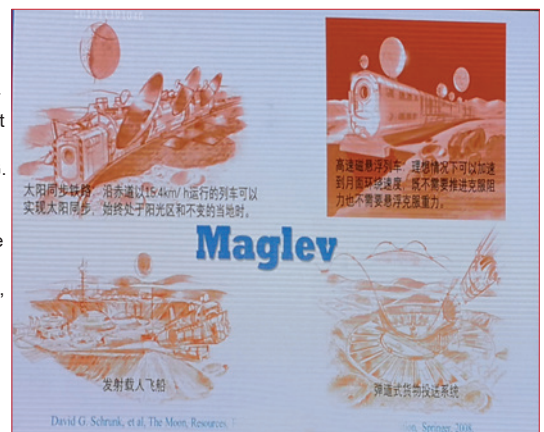
Zhang Yulin, the former Deputy Commander of the China Manned Space Engineering Agency, mentioned in his talk the new buzzword "Lunar-Earth Economy". Considering that the resources on Earth are limited and the Moon is the nearest destination, it makes sense to include its resources along

with those of the Solar System. According to Zhang Yulin, the utilisation of outer space will become a natural move as soon as the capacities in transport, energy and industry are available. Zhang Yulin stressed that the cislunar utilisation is a strategic project to extend the sphere of living for mankind. He showed two interesting technology applications, he proposed to be suited for the Moon: the Maglev technology and tether technology application. (compare: Quarterly Report, section: China National Space Day 2019, page: 13)



A slide of Zhang Yulin's presentation showed concepts of a "Lunar-Earth Economy".

A slide of Zhang Yulin's presentation showed a lunar Maglev concept from the publication: David G. Schunk, et.al. The Moon, Resources, Future Development and Settlement, Springer 2007



A slide of Zhang Yulin's presentation showed space tether concepts from the publication: David G. Schunk, et.al. The Moon, Resources, Future Development and Settlement, Springer 2007



Hou Xiufeng, CASIC spokesperson, informed the audience about the readiness status of the production facilities in the Wuhan National Aerospace Industry Base. The smart production line for satellites, allowing batch processing, is expected to be commissioned in 2020. Its initial capacity is 120 satellites per year with a later expansion stage of 240 satellites.

The rocket assembly centre will be ready by the end of 2019. The new facility will support the mass production of rockets. The annual production capacity in the first phase is 20 rockets which will be increased to 50 in the second phase. An innovative assembly process foresees the initial assembly of components which will be tested before joining together for the rocket assembly and final check and tests of the whole launcher ahead of transport to the launch site. Hou Xiufeng illustrated that the Wuhan Base is representing a complete industrial chain of rocket manufacturing, satellite building, ground applications production and other developments.

The Wuhan National Aerospace Base will commission its rocket assembly centre by the end of 2019. The annual production capacity will be initially 20 carrier rockets and up to 50 per year in the second phase. The Wuhan National Aerospace Base will also host a complete industrial chain of rocket manufacturing, satellite building, ground applications production and other development. The advanced satellite production line is expected to be commissioned in 2020 with an annual production output of 120 satellites when working in one shift, and 240 satellites by having two shifts.



Tang Yihua, the Vice President of the 1st Academy of China Aerospace Science and Technology Corporation, told the audience that the medium-lift CZ-8, purposely designed for commercial launches, has entered its final assembly phase and is expected to make its first flight in 2020. With its payload capacity of 4.5 t, lower cost and a short production cycle it is well suited for the competitive international market. It is expected that 10 annual launches are a reasonable forecast which might double over the years.

ChinaRocket, the commercial arm of CASC, had its successful first launch of the Jielong 1 rocket in July. Tang Yihua, announced that the launches of Jielong 2 can be expected in 2020 and of Jielong 3 in 2021.

China's new commercial carrier rocket to make maiden flight next year

China's new carrier rocket the CZ-8, a medium-lift carrier rocket designed for commercial launches, has entered its final assembly phase and is expected to make its maiden flight in

2020, said Tang Yihua and Zhuang Guojing during the 5th China (International) Commercial Aerospace Forum (CCAF).



Tang Yihua gives his talk. Credit: GoTaikonauts!

In particular revealing was the talk by Venture Capitalist **Yan Jingyu**, Vice President of Galaxy Industry Group. He is responsible for a fund of 20 billion RMB. Among his clients are iSpace and SpaceTY. He gave some insights into the financial support to commercial space companies from his point of view. The majority of new start-ups come from the "national team" (aka: state-owned companies) with a mainly technical background. He thinks they lack management skills, thinking in business models and maintaining networks. He is not always convinced that the newcomers have a solid understanding of the commercial methods needed to survive in this business.

He also took a critical look at the new commercial space companies, pointing to some conflicts (as a commercial company relying on governmental orders), challenges (international marketing) but also mentioning the opportunities (enormous growth potential).

He briefly outlined which factors the Galaxy Industry Group is evaluating when deciding for financing a commercial space company: team background, target customers/market segment, cost control and customer base. Regarding cost control Yan Jingyu is more convinced that savings will be achieved rather by mass production and standardisation than by innovation. He also thinks that the national market could be suitable for solid business models. In particular if commercial space industry is able to provide launch services to the military. Not only him but also other speakers reflected on the situation in the U.S. and take SpaceX' development as a reference model. It was an interesting revelation that Chinese commercial space entrepreneurs are very carefully studying what is happening in the U.S. commercial space sector.

Yan Jingyu concluded his presentation by saying that the development of the commercial space sector in China is a long-term journey. Nobody is expecting a quick return of investment.

This strong orientation on what the U.S. is doing and that the efforts in the field of commercial space in the U.S. are serving as a role model for Chinese entrepreneurs was echoed by several speakers, not only by Yan Jingyu. Some of them also stressed that the mechanism like seed money from NASA within the COTS programme are not existing in China. Also, the technology transfer for SpaceX and Blue Origin is unique to the circumstances in the U.S. Some managers of the space companies present in Wuhan, especially the younger CEOs, expressed their wish, China should pursue the best practices of the U.S.

Despite concerns that there is not a big enough market for more than one or two commercial launch service providers, all new space companies have different ideas on that.

There is a strong belief that the mastering of low-cost access to space will create unknown markets which can be as simple as advertising or very down to people services. Users, which in the past have chosen for cheaper, non-space solution will be willing to take the space-solution as soon as the price is affordable. And if that would happen, the national market with a population



Yan Jingyu, Vice President of Galaxy Industry Group. Credit: GoTaikonauts!



left: At CASIC's exhibition booth, a model of the Xingyun satellite was presented. The Xingyun constellation for IoT is expected to comprise 156 satellites until 2025. centre: Takayuki Kawai (left), Head of JAXA's Strategic Planning and Industrial Promotion Division. right: View into the conference hall. Credit: GT/Yang Yugang/Milan Mijovic

of 1.4 billion has a unknown potential. The critic that the space start-ups have not yet a viable marketing strategy is refuted by those companies by saying that first the core technology has to be ready otherwise no investors are willing to provide funds, and no products can follow.

Some other speakers, in particular of CASIC and the governmental presenters did not miss the opportunity to point out to 2020 which will become a really busy year for China in space, regardless whether it will be commercial or governmental: China is scheduling 30 missions, including the Chang'e 5 lunar sample return mission, the Mars mission, the completion of the Beidou 3 constellation. Also, it was announced that until the end of the year, two IoT satellites for the "Xingyun" LEO constellation of 80 smallsats will still be launched. The Xingyun Project aims at providing low cost communication capacities, complementary to ground-based network in areas with no or weak signals.

In the afternoon - still during the conference programme, the organisers invited the foreign participants (only) for a cocktail reception. It was nicely organised and meant to bring the foreigners together but not all people could get away from the conference immediately since they had to present their talks. But the opportunity for that casual meeting was most welcome and helped to get in closer contact with the other presenters. One cannot overestimate the importance of creating a community, of creating a network, and of staying in contact. The cocktail reception should remain a feature for the years to come and if possible, should include all participants or even grouped by interests. Maybe this in-person activity could be complemented by the set-up of an online community to make it easier to share and stay in contact.

Another interesting activity which could be incorporated into the CCAF is something similar like the B-2-B meetings done at other conferences or the match-making-game of the China-UN forum from April 2019 (see: GoTaikonauts! issue no 25, pages 20-23) which has been a nice example of how common interests can be identified and facilitated (out of the 4 matches

GoTaikonauts! made in Changsha, 2 lead to follow-up projects, meaning a success rate of 50 %).

The second day was less busy and followed a normal conference routine. Even the conference poster wall outside the hotel was taken down because the next conference (a medical one) took over the territory. So far for Chinese business efficiency.

Also on the second day, CASIC launched a space-based network ground service platform. That particular workshop took place in Chinese language only and ran in parallel with the conference programme. The full details of this service platform were not obvious, but in summary it can be said that it is an online service platform to make satellite resources more accessible for users. The aim of the platform being to provide integrated satellite resources - communication, navigation and remote sensing - in a user-friendly way. It stores, manages, processes and distributes the data, which is like establishing a satellite "resource pool" for users to select from. The platform is meant to enable the efficient use of the national satellite resources, which are all connected to this platform and are customised to the customers needs.

Some Observations

It is always a pity when two sub-fora run in parallel because one has to decide which to follow and which to miss. That left almost no time for visiting the accompanying exhibition. Although the exhibition was not comparable in size to the one in 2018, it is always interesting to have a look and to have an opportunity to get in direct contact with the experts.

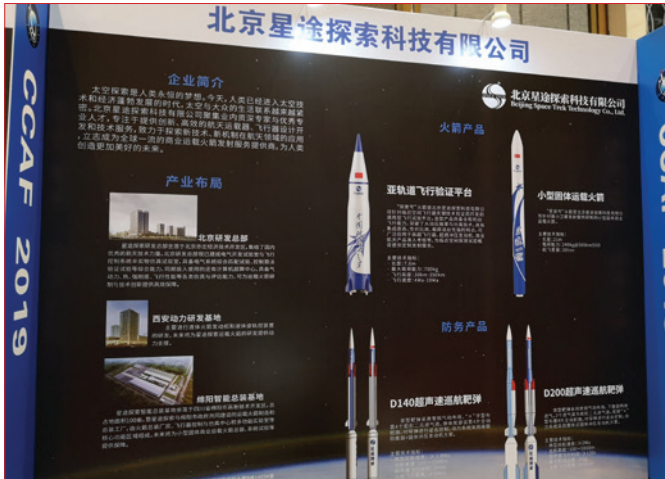
In the lead up to the 5th CCAF there was talk by the organisers to include panel discussions on different topics. Panel discussions might not really be a set-up, which Chinese are at ease with. Huo Jia, Vice President of iSpace referred in his presentation to the podium talk between Jack Ma and Elon Musk in September in Shanghai, which he found inspirational and important. Maybe the format of panel discussions could bring a special note to the Wuhan commercial forum, giving it a new and fresh approach, underlining its international atmosphere and would have gotten



Exhibition booth of Chang Guang Satellite Technology Co., Ltd. Credit: GT!



Exhibition booth of MinoSpace. Credit: GoTaikonauts!



The exhibition booth of Beijing Space Trek Technology Co., Ltd. Credit: GT!

the whole event away from the standard PowerPoint talks.

The 5th CCAF showed a strong diversification of the commercial space sector in China, new services and products were presented.

It was obvious that data became an important product, its applications and the services generated out of data not only for China but very much so for the Belt-and-Road region and further on for the African continent. Data without application makes no sense, as one speaker pointed out. It might be very likely that at the next forum, the growing importance of data will become even more prominent. Since there is no other country where AI, 5G, machine learning and data are planned to be strongly combined, super-innovation can be expected from that.

Language remains a problem – also during the conference. Despite a qualified translation service, some details are always lost and the information over the headset comes a little bit later than the slides are shown on the screen. This becomes in particular challenging when the presenter is rushing through the view graphs. Also, more and more Western speakers are able to present in Mandarin... One needs to speak Chinese in China!

Language also remains an obstacle in outreach and PR around the CCAF. For example, rocket manufacturer iSpace produced a brilliant marketing video showing the product portfolio and the direction the company want to go in the future. The same was the case in 2018 when CASIC showed in the exhibition inspiring and high-quality promotional videos. All those features along with the presentations are limited to the view by the audience during the conference. Also, there is always a photographer taking photos of the presenters and a camera recording the presentations. It must be possible to either stream the conference or at least put the presentations and talks online so that interested people around the world could have access to the content. We believe to develop a mature rocket technology is harder to do. Surely, the forum could become better known if a PR strategy could be defined and applied and if that strategy would include targeting the international audience. It made us proud when international participants told us that the only information on the forum they could find was posted on the GoTaikonauts! website but it also made it clear that there is a big potential if outreach activities, even easy ones like having an extended, more detailed conference webpage or blog or community website, could be applied more intensively.

Next Year's venue?

It is undecided as to where the next years venue will be.

The Wuhan National Aerospace Base might be ready in 2020 including a conference centre. The organisers were thinking already this year about tours to the base but in the end decided against it. However, such an opportunity would boost the

whole scope of the forum since everybody is curious to see at last the industrial park and hopefully also the interior of the manufacturing facilities.

CASIC, the owner of the new Wuhan satellite industry park within the Wuhan national space industrial base, confirmed during the 5th CCAF that the satellite manufacturing facility will become operational in 2020 and will have an output of annually 120 satellites for general use, each weighing less than a ton. The rocket assembly facility is scheduled to start operation by the end of 2019. Its production capacity will be around 20 rockets a year.

Challenges and Opportunities

Five years is also a good occasion to take stock. So what has the CCAF achieved?

So, far the forum has been drawing from its novelty - now it has to gain profile. The new location in the Wuhan Base could become a significant incentive for conference participants to come along. So, finding a profile might be a hard challenge in a politically difficult arena. But with the Wuhan Aerospace Industry Base, CASIC has a joker in its hand.

From the organisational point of view it might be beneficial to find continuity. During the last three years, each time the organising committee had a different composition. Also, the recent change in management of CASIC has to show that there is the will for consistency.

Provided the challenges are taken up, it can easily be seen that the forum will grow stronger, in particular if the organisers manage to form a close network also among the international community. The average participant might not always be from the higher management of the space sector. To find a balance between experts from the high ranks, medium management and working level will engage a broader spectrum of space experts where each group of specialists can contribute from its point of view. Already in 2019, the classic structure of launcher sub-forum and satellite sub-forum was not strictly applicable because many more experts from the wider "ecosystem" or the so-called "down-stream sector" were present: finances, insurance, supplier, applications. What the organisers have not yet tried is to involve soft-topics, such as outreach, education or art. For that, more international outreach might help.



GoTaikonauts! wishes to thank the organising committee of the 5th CCAF, in particular Prof. Yang Yugang and Zhang Zuotian who did their utmost to make all international guests feel welcome. Without their personal care and support the Wuhan forum would not be same. We hope to meet again in 2020.



The report from the 3rd CCAF 2017 can be found on the GoTaikonauts! website or by scanning the QR code to the left: https://www.go-taikonauts.com/images/newsletters_PDF/2017_Wuhan_web.pdf



For the report from the 4th CCAF 2018, please, follow this link or scan the QR: <http://satellitemarkets.com/events/2018-china-commercial-aerospace-forum>



5th CCAF – China (International) Commercial Aerospace Forum Impressions of the forum by international participants



Helen Tung

Founder,
NewSpace2060

In which function or assignment did you come to the 5th CCAF to Wuhan?

I was invited by Prof. Yang to come and speak at the 5th CCAF. At the time I had spent 6 months working on EU-

Japan NewSpace and as I had previously trained NewSpace entrepreneurs, I was very interested in what the start up scene in China was like. At the time I attended as Founder of NewSpace2060 currently I am working as a Senior Associate in a local German-led law firm.

Which topic did you present during the 5th CCAF?

At the 5th CCAF, I primarily focused on the overview of NewSpace and also international events that may be of interest to NewSpace startups in China. For instance, I mentioned the Moon Village Association, the International Aeronautical Congress and other startups for comparison. One of the challenges, at least from my experience is that there is limited time and resources and so for startups, they have to direct their mind on where they want to focus.

The interesting aspect about NewSpace is because the potential is huge, as the technology being developed may be for a totally new purpose or it may be a further development to say small sats, my view is that the scope of a 'customer' is much larger - due to the fact it is still a developing sector. It is wonderful to see how developed some of the NewSpace startups are, in fact I would say it is very impressive. However, if they want to be an international player they have to also be seen and think of ways of how to best partner with other space, non-space businesses.

Did you get feedback on your presentation?

I think the feedback was limited, though then again, that's usually the case with conferences. However, I thought the organisers really wanted to make a great conference inviting many high-level officials and did everything they could to make the speakers and attendees feel good. I think there was ample opportunity to network with local and perhaps more so with international attendees.

What is your overall impression of the 5th CCAF?

I think the 5th CCAF lays a good groundwork to connect key space players on the ground. As you know, China is a large country and so it was good to see people coming in from different regions of China to attend, specifically from Beijing. It was also a wonderful opportunity for me to see Wuhan and know of the many opportunities that are being developed in Wuhan like the Aerospace city that is being envisaged.

Personally, I know of Wuhan as a city that is very strong in international law and as a port city I think that Wuhan has great potential to become a recognised international centre. I guess, like things, it takes time though I think the organisers did an incredible job to compile such a great and diverse programme. For instance, I heard that this is the first time that an insurer was invited to speak and that the market now realises that there is potential for this field as NewSpace startups mature. The fact that the remit of their speakers are expanding is a good indication that the market is maturing too.



Dr. James Kass

Director of
James R. Kass Space Consulting
Den Hague, The Netherlands

In which function or assignment did you come to the 5th CCAF to Wuhan?

I was invited as speaker to the forum.

Which topic did you present during?

The subject of my presentation was '*Harnessing space infrastructure to enable marketable innovative applications*'.

We are currently witnessing an unprecedented increase in the number of satellites launched into orbit whose key goals are facilitating potential commercial services to billions of new and existing users. But even today space infrastructure is very much underused; and when used, the increased potential achieved by combining different space services, such as earth observation, navigation, communication, for B2B and B2C applications, is seldom capitalised.

My paper presented a practical model for facilitating start-ups and SMEs, with the help of space agencies and large companies, to develop cutting-edge potentially commercializable innovative applications that harness space infrastructure as a key part of their solutions. Examples of successful implementation of this model were drawn from the European Space Agency's Business Applications programme. As a member of the inter-directorate task force responsible for designing and setting up this program, I was able to provide first hand examples of projects successfully initiated, as well as current and future domains of potential exploitation.

Did you get feedback on your presentation?

Yes, both at the convention in person, as well as afterwards, confirming that the information garnered was useful and prescient.

What is your overall impression of the 5th CCAF?

My overall impression was very good. The hosts were especially kind to us foreign participants, and did their utmost to be of help to us, and even reserved seats at the front of the auditorium for us. I found the presentations at this forum to be very useful and relevant.



The 2019 motto of the 5th edition of the China (International) Commercial Aerospace Forum was: "Jointly Building an Industrial Ecology to Lead the Development of Commercial Aerospace"



Milan Mijovic
President
SERBSPACE



In which function or assignment did you come to the 5th CCAF to Wuhan?

I have attended the 5th CCAF as the President and the Founder of Serbian Office for Space Sciences, Research and Development (SERBSPACE) as well as Space law Ph.D. student and Air and Space law Research assistant at the Law School Union University in Belgrade.

Which topic did you present during the 5th CCAF?

With great pleasure I have presented and talked about the first South-East Europe Space conference to be held at Science Technology Park, Belgrade, Serbia on 2 and 3 April 2020*, which will include academic, educational and business panel, industry 4.0, technology and innovation session and space and society segment.

SEE Universe 2020 shall gather international and national stakeholders and experts from the domain of space sciences and industry. SERBSPACE believes that this conference will place Belgrade on a global map of innovation and industry 4.0, which shall enable development of national capacities, technology and innovation as well as international cooperation and knowledge exchange, all in service of sustainable development.

Between 100 and 150 participants are expected to attend from national and international universities and organisations, governmental and industry representatives as well as speakers from space agencies and the UN Office for Outer Space Affairs. The conference shall include three thematic sessions: Academia, Industry and Societies.

Did you get feedback on your presentation?

I was very satisfied with the impact my presentation made on the participants of the Forum. My impression was that stakeholders from the Chinese space sector are looking forward to international cooperation as many of them approached me after my presentation and required more information about the SEE Universe 2020 Space conference.

What is your overall impression of the 5th CCAF?

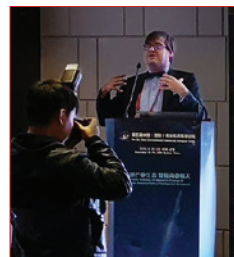
Being for the second time in China in one year, the organisers fulfilled my expectations for the Forum. Being an invited key speaker, the LOC provided my plane ticket and accommodation costs and the entire process went smoothly. I was particularly

impressed by the high level of planning of members of the LOC as well as other engaged staff.

I found the punctuality and content of agenda admirable, especially given the outstanding number of participants, presenters and high-level speakers. Several side events were a perfect venue to network and exchange ideas with future partners and colleagues.

Attendance at the Forum was of particular success for me and my Office, given the fact that I had an opportunity to meet representatives from the Chinese aerospace industry sector. Personally, this was a unique opportunity to invite them at the SEE Universe 2020 Space conference which is being organised next year in Belgrade by my Office. In this light, I am glad that I have been able to establish outstanding cooperation with various companies from China and looking forward to welcoming them in Belgrade.

**The interview was given in January 2020. In the meanwhile the SEE Universe Conference had to be postponed.*



P. J. Blount

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Adjunct Professor, LL.M. in Air and Space Law, University of Mississippi School of Law

In which function or assignment did you come to the 5th CCAF to Wuhan?

I came as a researcher from the University of Luxembourg where I work as part of the team of the SES Chair in Space and Communication Law.

Which topic did you present during the 5th CCAF?

I presented on the need for Space Traffic Management in the commercial sector. Essentially I argued that the lack of an STM system for the coordination of responsible space activities is a critical challenge for the commercial space industry. Solving this problem will require a great deal of cooperation among states and private actors, but will be essential to future space operations, especially in light of emerging technologies.

Did you get feedback on your presentation?

Yes, in general it seemed very well received by the participants. This is likely because of the rising interest in STM in China.

What is your overall impression of the 5th CCAF?

It was an enjoyable experience, and an excellent forum for hearing about the commercial industry in China. This is important because Chinese commercial space activities often get overlooked or lumped in with China's civil and military space efforts. The Chinese portfolio of commercial space activities is expanding and the CCAF was an excellent forum for learning about these developments.



Thinking
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