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## 1. Czech Space Office mission

The Czech Space Office (CSO) is a nonprofit organization that since its inception in 2003, strives to support development in the Czech Republic. The main objective of the CSO is creating and maintaining the space information infrastructure fostering a representative and efficient participation of Czech research, development and industrial organizations in the international space projects. To reach that goal the Czech Space Office gains related expert knowledge needed for successful results of space establishment in the Czech Republic and promotes Czech space related capabilities on international space fora.

CSO operates as a contact point and professional consultant, providing information to decision-makers and industry organizations on the Czech and international scene.

CSO staff is involved in the activities in four programme committees and councils of the European Space Agency (ESA). The Office is also represented in the Czech PRODEX committee recommending the development of Czech science experiments for ESA missions. CSO is also a member of the International Astronautical Federation (IAF) and is an associate member of the international organization Eurisy.

### 1.1. Strategy and fields of activity

The strategy of the CSO activities reflects the specifics of the Czech Republic implying necessity of the international cooperation for making any national space project possible. Hereafter an important part of the CSO activities is to support intensive and broad participation of the Czech Republic in the international space programmes by promoting peaceful use of outer space and the benefits derived from it.

Czech Space Office operation is based on the strategic goals broken down into specific activities that can be divided into several areas:

- analysis and studies about Czech participation in space programmes and projects,
- consultancy and seminars about space project opportunities and project administration,
- promotion of Czech space organizations at major international events,
- support of education and student space projects.

The above mentioned actions are an instrument for achieving the set goals. All activities constituting the CSO's performance during the year 2014 can be divided into the following sections:

- Science and Technology development,
- Efficient communication and management,
- Education and outreach,
- International relations.

## 1.2. Staff and governance

The Czech Space Office has a status of independent non-profit organization and it is managed according to the Czech respective law. In compliance with the law, the Managing Board and Supervisory Board are the key ruling as well as advising bodies of the CSO. They meet regularly throughout the year and provide management guidance to the Director on the Czech Space Office's performance, operations, budget control as well as on current priorities and future opportunities in which the CSO should participate, both at a national and international level. The management and control structure has been built around senior experts from space research, administration and public sector.

The CSO workforce comprised total of 17 people during 2014 professionally covering main topic fields of space research and development, documents publication and general internal administration, travel and financial services. Financial resources used by CSO in 2014 stemmed from grant projects awarded by the Ministry of Education, Youth and Sports and EU Structural Funds.

## 2. Sustainable engagement in space

The Czech Space Office provides support to Czech academic and private research teams to be successful in their competition on an international level. It assists and advises for activities with strong involvement in ESA and other bilateral science missions and projects. The research projects, in which the Czech researchers participate, are a key condition to secure sustainable Czech participation in space programmes and to keep long-term access to benefits the space brings to entire society.

In strategic outlook the Czech Space Office is repeatedly proposing to respective ministries to create a modest space technology programme which might bring together academia and industry in developing the next generation technologies required for future missions.

Following cooperation agreement with XCOR Aerospace Inc., the CSO continued in 2014 providing detailed information about flight services on Lynx. This include explanations of technical requirements of packaging, environment conditions, safety, operational flight profile

and interface for both automated experiments running without man's involvement, and those experiments requiring human operator.

## **2.1. Consultancy service on new opportunities in space**

Due to the ever growing complexity of space programmes, consulting and advisory services supporting the successful use of new opportunities for scientific research and technology development are even more needed. The Czech Space Office receives requests for information from government, private and academia sector. Content is wide-ranging and covers issues from space policy to requests for careers advice.

Specifically, CSO has provided consultancy to academic, industry and public sector organizations to advance their space related technologies to higher technology readiness levels. This improves industry's ability to accelerate innovation, expand sales in the commercial space market and reinforce the Czech position as a stronger player in future international space programmes. In 2014 the CSO performed 93 individual consultations of which 43 were with research organizations, 29 with government bodies and 21 with industry.

Consultancy and advising discussions with research institutions included mainly explanatory description of procedures and requirements for running a space project, helping to determine suitable foreign partners or discussing specific demands of ESA projects. Besides that CSO informed interested organizations about updated opportunities in ESA optional programmes and EU Horizon 2020 space calls.

Ministry of Education, Youth and Sports, Ministry of Industry and Trade, and Office of the Government were among governmental bodies asking CSO information or view on specific issues of Czech participation in international space programmes, namely European Space Agency and European Union, and of national space documents. For the Czech Republic's embassy in Beijing the CSO has prepared documents for meeting of ambassadors with representatives of Chinese organizations active in space research and development.

Benefiting from its membership in the IAF's International Project Management Committee, CSO has recommended qualified personnel from two Czech companies with space project experiences to the NASA space project management course held in February 2014 at the Kennedy Space Center in Florida. Through this channel CSO brings a unique opportunity for the Czech professionals to get high-level knowledge about the space project management in the international environment.

## Space Exploration

The most frequent item discussed during meetings targeted on space exploration included ongoing projects within the Solar Orbiter mission, JUICE, Proba-3 and proposals for new projects of ESA PRODEX. Czech organizations have been informed about the call for the fourth ESA medium-sized mission M4 selection which is expected in mid 2015. In one case, CSO assisted in preparation of the proposed study phase. Over the year, CSO informed periodically Czech companies on the technology development opportunities for future ESA missions and on tenders for components and systems on probes under development.

Czech Space Office also distributed information about the joint ESA and Roskosmos plans to explore the Moon to interested Czech organizations. Consequently, some of them requested more detailed consultations about possibilities to participate in the MREP-2 programme and the ExoMars 2018 landing platform.

## Microgravity research

The main event in 2014 was the announcement of ESA calls for project proposals for biological experiments carried out on the International Space Station (ISS). CSO actions were primarily focused on required assistance in finding project partners, preparation of project proposals and negotiations with ESA experts.

CSO participated in a scientific workshop and networking to the call for new experiments on the ISS in the field of life sciences and discussed the possible implementation of Czech proposals.

Apart from the preparation of proposals for ISS experiments, CSO together with academic partners has started the work on study of low cost drop towers construction. Yet another consultations were devoted to the possibilities of suborbital flight and stratospheric balloons for research experiments. Many of these activities will continue in 2015.

## Earth and surroundings

CSO regularly circulates updated information on upcoming project opportunities in the ESA Earth Observation Envelope Programme (EOEP). Selected parts of work plan for next period has been presented to value added and technology companies as well as to universities engaged in research in remote sensing and Earth sciences.

Examples of information topic include field of geodesy and refinement of the geoid model derived from existing satellite data, preparation of new missions for research of the Earth's gravitational field using laser interferometry, gathering information about ocean currents from the magnetosphere data, job and project opportunities for young graduates, scientific conferences and ESA educational workshops, development of new algorithms for data

processing and new data products that combine satellite data of new missions, development of services and satellite data products for large international financial institutions and software and hardware processing, distribution and archiving satellite data through the ground segment.

CSO has provided consultancy service to several research and development companies about new satellite missions MetOp-SG, Jason-CS and Sentinel-5. Individual talks were specified to certain hardware and or software development using available technical documents and considering possible foreign industrial partners. Communications with several companies having interest will continue in 2015.

### **Telecommunications systems**

In 2014, the CSO also informed about new development in the ESA's Advanced Research in Telecommunications Systems (ARTES) programme. Specifically, dedicated messages and reports included the main technological element ARTES 5.1, as well preliminary studies (ARTES 1), Integrated Applications Promotion (ARTES 20) and new element for development of new satellite platform Neosat (ARTES 14). In response, CSO was repeatedly approached with requests for providing further details about selected projects and for help with identification of potential collaborators.

Czech companies have shown interest mainly in areas of electronic boards and sensors, global monitoring systems for decision support, data processing and development of integrated space applications. In the field of satellite navigation, a project opportunity was discussed in the troposphere and ionosphere research using satellite navigation signals. Czech financial contributions to discussed ARTES programme elements have been exhausted in 2014. Unfortunately, despite of CSO warning and recommendation no increase of the Czech contribution was done. This fact substantially limits the participation of Czech institutions in ARTES programme in next two years.

### **Space technology development**

CSO distributed information and provided consultation services on a number of project opportunities in ESA General Support Technology Programme (GSTP) and Basic Research Technology Programme (TRP). The information was distributed by individual emails and updates on pre-identified activities for each organization.

CSO informed over four dozens of industrial companies as well as academic institutions. Approximately one quarter of established communications resulted in further dialogue about specific conditions in these activities, assistance in finding project partners and responsible personnel in the ESA.

Discussed projects were related to the development of special hardware, new technological processes and joining materials, the development of optical components and surface treatment technologies, fiber optics, new technical computing and modeling the radiation environment in space or acoustic loads of satellite components during the rocket launch, the radiation characteristics of satellite components, development of new detectors and new types of antennas for telecommunications.

### **Launchers**

Participation of Czech institutions in the ESA Future Launchers Preparatory Programme (FLPP) was practically precluded as the Czech contribution to the programme of 1.0 million euro was fully expended in 2014.

CSO expressed its concern about this issue in its analytical document. However, the Czech Republic did not give any new contribution to FLPP programme at the ESA Ministerial council. For this reason possibility for Czech organizations to get involved in FLPP has disappeared till next Ministerial council.

### **Space Situational Awareness**

CSO also regularly informed about the developments in the ESA Space Situational Awareness (SSA) programme. Since the Czech Republic participates in this programme only from the beginning of 2013, it had been necessary to build an awareness of the programme benefits. Despite it and thanks to interest of several Czech institutions, CSO succeeded with support of three research teams working on ESA projects in areas of space weather and near-Earth asteroids.

In 2014, ESA workshops were held on the new proposed architecture of distributed SSA systems. Thanks to participation in the event, CSO could efficiently assess proposals of activities and monitor the progress of current projects, to develop contacts with international partners and to contribute to definition of long-term plans for SSA programme, including development of specific satellite payload and related services.

## **2.2. Consultancy service on project management**

In this year, the CSO has expanded its activities to consultancy on project management, specific part of every space project, in addition to technical capacities. Management skill and knowledge of its specificities regarding space projects is highly required capability at project proposal evaluation at every space programme. General level of space project management needs to be improved in the Czech Republic, therefore CSO has devoted specific effort to this field.

Along with publication of several dedicated introductory articles in the Czechspace magazine and on the CSO website, a survey mapping the situation in space project management in Czech companies has been prepared. Questionnaires were sent out to several hundreds of organizations from which 46 responses were received. Thorough analysis of answers will lead to comprehensive analysis being planned for the next year.

### **2.3. Workshops and seminars**

In 2014, CSO carried out total of 4 events attended by over 70 experts from different organizations.

As the first one, CSO organized the Seminar on Small Satellites in cooperation with the Department of Measurement, Faculty of Electrical Engineering of Czech Technical University in Prague on March 4, 2014. The event provided a platform for lively discussion about the current status and the future of this specific area of space sector in the Czech Republic. About three dozen participants with various practical experiences in CubeSat design and development including all teams preparing a small satellite in that time – a group of enthusiasts working on czCube, PilsenCube team from the University of West Bohemia in Pilsen, the CzechTechSat team of Czech Technical University in Prague and VZLUSAT-1 from the Aerospace Research and Test Establishment in Prague.

Speakers informed about their achievements and shared their view about the main obstacles in their work. At the end participants have established an informal network for information exchange of common interest in more coordinated manner.

Seminar on the opportunities in the European space programmes for the ICT sector was prepared in collaboration with ICT Alliance and CzechInvest on March 19, 2014 during the AMPER fair. CSO informed over three dozens of Czech ICT companies on relevant project opportunities in different ESA and EU programmes. Discussion after the presentation has revealed specific interest in integrated space applications for transport (e-call), health (e-health) or urban planning.

Seminar Opportunities for Research in Conditions of Reduced and Increased Gravity, held on May 5, 2014, was attended by 17 participants, mostly from academic sector. At the seminar, CSO informed on international research and development programmes offering new opportunities for projects in microgravity and hypergravity. The particular emphasis was put on research on the International Space Station and ground equipment simulating the selected conditions of space flight. Rules of calls and funding opportunities in the Czech Republic were described and explained to participants. The Czech organizations having practical experience with related projects shared their opinions and recommendations at the end of the seminar.

On December 12, 2014, CSO also organized a special seminar on. A total of 15 participants attended the CSO Seminar on opportunities in space telecommunications and navigation held in December 2014. Contents and rules of the relevant ESA programmes (ARTES, EGEP) including the current invitations to tenders as well as the EU programmes (H2020, GSA) were presented and discussed. In the second part of the seminar, five companies summarized their experiences from successfully completed projects in the mentioned programmes.

Workshop on Czech research in the field of human spaceflight, microgravity and hypergravity took place on November 21, 2014. The workshop was focused on research in microgravity and hypergravity conditions, aspects of human presence in space and related technologies. Information on international, bilateral and private research and development programmes was given to participants with attention to specificities of project implementation in the field of manned spaceflight, microgravity and hypergravity. Specific projects accomplished in some Czech institutions were presented by their respective investigators and sharing their challenges and experiences in open manner. The general challenges related to the implementation of space research were discussed in closing session.

## **2.4. Database**

In 2014, the CSO began forming two separate databases, which will be unique source of information of which will benefit professionals and the public.

The first of these is the Great encyclopedia of artificial space objects SPACE 50 that contains records of all man-made space objects. In the first year, the main and the backup server equipped with relation database were installed. In parallel, the method for creating new records and appropriate data gathering procedures were prepared and described in a separate document. As first output of the database, the annual report on the use of geostationary orbit has been published containing the list of geostationary satellites active to the December 31, 2014. The database is accessible on the website [www.space50.org](http://www.space50.org).

The second database is planned to provide basic overview on capacities of Czech institutions in the space sector. It will contain information on individual research and development organizations, industrial companies and universities, their professional skills and projects they have already been involved in. The database website will be unique place allowing straightforward access to kind of information requested and needed for everybody looking for partners in the Czech Republic. The quality and scope of the data will be guaranteed by each organization as it will be responsible for keeping data updated. In 2014, a complex questionnaire was prepared, pre-filled and distributed to 160 Czech organizations.

### 3. Public relations

Space development, related technology, knowledge and space based services are touching all facets of human life in the country. Task of great importance in the Czech Space Office work plan is creating awareness about the space programme benefits among the general public, especially young people. Great effort has been given to publications, educational activities like lectures, interactive sessions with students and media campaigns on important events. Through its communications efforts, the Czech Space Office has been highlighting the importance of the developed and robust space and satellite industry for the national economy. The CSO staff continued working to keep people up to date with the latest news and developments in this exciting and inspirational field. Cooperation with all kinds of media has been very productive and fruitful resulting in more than 340 direct mentioning and citation in 2014.

#### 3.1. Press conference and press releases

In December 2014, the CSO organized autumn meeting with journalists focused on the evaluation of the Czech participation in the Council of the ESA Member States at ministerial level. The Czech delegation had no mandate to expand the Czech contributions into programmes that were open to new financing. This decision adversely affects on the development of Czech institutions in the field of space. In reaction to that, CSO suggests necessity of elaboration a realistic and specific plan of sustainable space development in Czech Republic within European space programmes which gives a firm and sound reasons for adequate funding.

The other topic of the conference was the theme of development and construction of small satellites in the Czech Republic. Representatives of the three organizations involved in the CubeSat development talked about their plans, described their satellites and problems they have to face during their work.

In 2014, the CSO also published three press releases related to important events with CSO participation.

#### 3.2. Web information

Website is the main channel, that the Czech Space Office uses for distribution of wide range of information including opportunities for involvement in ESA and EU programmes, results of completed projects with Czech participation, information about seminars and training opportunities for students, as well as on the latest developments in the Czech space science and industry.

The website has been operated in the Czech and English languages. English version contains articles about the Czech activities and achievements, information adopted from otherwise accessible foreign sources is given only in Czech.

The reader can find the requested information either by area of interest (e.g. general technology, microgravity research, Earth observation, education) or by the type of content (e.g. news, programmes, publications, opportunities). Publications such as the annual report, the Czechspace magazine and educational articles are also available for free download.

Over the last twelve months there have been 250 new articles visited by 20,499 visitors and more than 60,500 separate page views.

Social media is another important mean of direct CSO's communication with wide audience. People can now follow us on digital channels such as Twitter, Google Plus and Facebook. The Facebook profile has been filled with news especially for the purpose of addressing a community of young people who often use social networks. This kind of communication allows closer contact with the reader and provides interactive feedback. It is also used to publish photos or videos. During the last twelve months, the number of Facebook followers has increased to 928. The total number of users who have seen any content associated with a CSO Facebook page was 65,668 representing an average of 178 unique visitors per day.

### **3.3. Electronic newsletter**

Electronic newsletter includes a brief annotation about the last month news published on the CSO website with a link to the full text. Newsletter has been regularly distributed free of charge every month to subscribers counting now over 330.

### **3.4. Printed publications**

Along with the electronic publications, CSO has prepared and distributed significant number of documents in the paper form, as well. During 2014 following documents were published in the Czech language:

- 2 issues of the Czechspace magazine (number 9 and 10),
- Proposal of the Czech Participation in ESA: Analysis of State and Outlook of the Czech,
- Republic's participation in optional programmes of the European Space Agency in 2014,
- 10 information sheets on projects (project infosheets),
- 2 newsletters Centre of Student Activities CSO,

- 2 issues of educational magazine MAT 21.

One of the document was distributed in English language:

- Brochure Czech Space Activities.

### **Czechspace magazine**

Two issues of the bi-yearly, 36-page Czechspace magazine were released at the end of the first and the second semester, respectively.

Ninth issue of the magazine contained an analysis of the Czech Industry Incentive Scheme programme lasted for six years (from the Czech Republic's accession to the ESA until 2014). The programme was intended only for the Czech organizations to facilitate their involvement in ESA projects and prepare them for competition with other Member States. The other highlight topic was the life experiences of Luboš Perek who is a significant personality of Czech and world astronomy or the activities of private companies involved in space industry.

The tenth issue was devoted mainly to evaluation of the ESA Ministerial Council in 2014, which influenced the development of Czech workplaces involving in space projects. Besides that, a detailed look at the manufacturing process of the Czech CubeSat VZLUSAT-1 were described together with the future of the global GEO initiative, the situation of project management in space in the Czech Republic or educational project Materials for the new millennium.

Each issue was printed in 500 copies and distributed free of charge among 350 interested users - experts, politicians and enthusiasts. The magazine copies have also been handed out to participants at seminars, conferences and consultancy meetings. Moreover, an electronic version of the complete issue has been downloaded from the CSO web page more than 640 times.

### **Proposal of the Czech Participation in ESA: Analysis of State and Outlook of the Czech Republic's participation in optional programmes of the European Space Agency in 2014**

CSO has released the Analysis of State and Outlook of the Czech Republic's participation in optional programmes of the ESA that was prepared as a document contributing to the preparation of the Czech Republic's position for the ESA Council at ministerial level in 2014. The output recommendations have been based on the Czech participation in ESA programmes up to now and on the assessment of the existing possibilities and capacities of Czech organizations. The goal was to create conditions for better and wider participation in ESA programmes. Individual parts have been devoted to each optional programme relevant to the ESA Council at ministerial level in 2014. In general, the document recommends a visible

increase of the Czech commitments to ESA programmes. The size of suggested contribution and its distribution among individual programmes is specifically presented in respective numbers in the last chapter of the document. The analysis has been translated into English and can be downloaded from the CSO website.

### **Project Factsheets**

In 2014, the Czech Space Office further extended a package of standard printed sheets describing completed space projects with the Czech participation. Named as a factsheet, it includes simultaneously Czech and English description of a Czech partner in selected significant space projects. Along with project task description, every information sheet contains main results achieved by the Czech organization involved together with its professional profile. Altogether 10 new sheets were printed during the year and added to previous projects in the file.

### **Information brochure Czech Space Activities**

The brochure gives general and introductory overview about past and present of the space activities in the Czech Republic and summarizes the major Czech space projects and capacities relevant to the recent years. A slim publication presents main Czech achievements from space science and space awareness to microgravity research, launchers, space technology, space applications to education and outreach. In 2014, the brochure was updated and released in an edition of 500 copies. Czech Space Activities brochure has been distributed to international partners and among space community, especially on the occasion of the 65<sup>th</sup> International Astronautical Congress.

### **Student Newsletter**

The newsletter gives basic information on educational actions and events organised or supported by the CSO. Its target readers are students in primary and secondary schools. The CSO's Centre of Student Activities has published two issues in 2014 (spring and autumn). Along with a list of student programmes and activities available in next period of time, the newsletter brings stories about Czech students and teams taking part in international projects. Newsletters were added in prepared information packages for teachers and distributed at outreach events with CSO participation.

## **4. Education and outreach**

Space acts as a beacon to attract a new generation of engineers, scientists and entrepreneurs into activities that are vital in generating the economic activity needed to drive sustainable growth of society. CSO continuously strives to ignite the spark of awareness and appreciation in young minds for Earth observation technology, satellite technology and space science and

space operations. There are two directions in which CSO is working in this field: the one is to educate for space – addressing the need for skilled graduates and technicians in the space sector. The other is space for education – using the exciting context of space to inspire an interest in science, technology, engineering and mathematics.

#### **4.1. School supporting**

The Czech Space Office is establishing itself as the main national source of teaching resources using the context of space to inspire students. CSO works together with school teachers since its formation performing space outreach initiatives in every region of the country.

Teachers and students of primary and high schools from the list have been regularly informed about education activities available in ESA, NASA, CSO and other organisations. More than 800 subscribers received information email of the CSO Centre of Student Activities every month with an updated overview of student competitions, courses for teachers, student internships and sponsored conferences.

Supported by the European MAT (Materials for the New Millennium) project on education in science, more than 850 listeners including teachers took part in 24 courses and lectures given by CSO personnel during 2014. Moreover, several dozens of new schools subscribed to the CSO electronic Education bulletin. Two issues of MAT 21 magazine have been distributed together with a CD containing short popularizing movies prepared in cooperation with the CSO.

Eight articles about space topics written by CSO staff were also published in two issues of the MAT project newsletter.

CSO targets also the youngest generation of children in effort to create awareness of the elementary nature processes, technical tools and their applications in real world and practical life. For that, CSO contributed to The Guide of simple exercises possibly attractive for four-year children with examples from space and astronomy. The Guide has been distributed as a supporting and training tool to kindergarten teachers. In addition, the CSO personnel presented 30 educational lectures and accomplished 24 practical workshops for kindergarten teachers.

CSO actively participated in organization of the European Commission's European Space Expo exhibition. Prague was the 21<sup>st</sup> European city in which the exhibition has been placed. During the week from July 7 to July 15 two CSO employees were giving lectures to groups of students about space programmes and specifically, about Czech activities in the Space Situational Awareness programme.

## 4.2. Student actions

CSO supported participation of four students and two teachers in the final round of the European CanSat competition in Norway and also helped two students in their preparation for the global meeting of the winners of the space architect's contests in Europe and USA.

The CSO has also individually given advices to students mostly about administration and organisational conditions of participation in ESA contests (e.g. balloon and micro/hyper-gravity experiments, robotic and CanSat competitions) and how to be successful in getting internships in ESA centres.

For eight years the Czech Space Office has been co-organiser of the student knowledge competition the Expedition Mars. The competition run every year and is designated for teams of young people of age 13 to 18. After several rounds of elimination system the winning team gains a practical training at the Centre for young astronauts in the Belgian base in Transinne. Under auspices of the first Czechoslovak astronaut Vladimír Remek and the first Slovak astronaut Ivan Bella, twelve children from both Czech and Slovak Republic took part in space flight simulation during the final event.

## 4.3. Mission X

Mission X: Train Like an Astronaut is an international educational programme designed by NASA, supported by ESA and led in the Czech Republic by the Czech Space Office. It aims to inspire the interest in science, nutrition and fitness in school students aged 8 to 12 years by using astronaut training as a context. This year was the third one when CSO managed the programme among 23 school teams equating to a total of 367 pupils nationwide. Children were tasked to undertake a variety of physical exercises and learning lessons similar to those in astronauts' training. The programme also grew internationally with a total of 24 countries now involved, providing more opportunities for Czech schools to network globally.

## 4.4. Outreach

The Czech Space Office has been the National Coordinator of World Space Week (WSW) for twelve years. This UN event is held every year from October 4 to October 10. In order to create interest and awareness on space research, astronomy and related physics, 10 dedicated WSW events took place over the Czech Republic attended by more than 700 people. A national report 2014 was sent to the WSW international organizers.

In parallel to international actions the Czech Space Office was involved in a bunch of national events. Beside others, CSO was co-organizer of the biggest Central European meeting of space enthusiasts Kosmos-News Party 2014 with more than hundred participants from 4 countries. CSO also organized 48 training events for elementary, middle and high schools and young

scientific and technical workers and participated in the national event the Scientist's Night bringing science to the general public.

## 5. International activities

The Czech Space Office makes its best effort to maintain high-level knowledge about updated opportunities for international collaboration in space programmes. Building on that knowledge, CSO can successfully fulfill its role of supporting, advising and intermediary body on international cooperation with required associated information exchange between domestic and international space environment.

During the year, CSO participated in various multinational projects and forums, including International Astronautical Congress, and took part in work of several bodies of the European Space Agency.

### 5.1. European meetings

Members of CSO staff are national delegates in five ESA committees and programme boards.

Two of them are the ESA Programme Board for Human Spaceflight, Microgravity and Exploration (PB-HME) and its scientific and technical advisory board (PB-HME-EUB). The meetings were mainly devoted to the development of experiments on the ISS as well as ground equipment for ELIPS-4, expansion of the ELIPS-4 programme for 2014 and preparation of several scientific calls. In the field of robotic exploration of the solar system, the ExoMars mission has been continuously monitored and the future exploration of Mars has been prepared in the MREP-2 programme. CSO has participated in the discussion and approval of the new programmes and the continuation of the existing ones for the ESA Council at ministerial level in 2014. CSO has also attended two workshops focused on ESA participation in exploration of the Moon with return of samples from the polar regions and on the ILSR 2014 call of new life sciences experiments on the ISS, which should be implemented after 2015.

CSO representative in the Technical Advisory Board of the ESA Programme Board for Earth Observation (EO-PB/ DOSTAG) followed its work primarily focused on the implementation of the EOEP-4 programme, the development and construction of Earth Explorer, Sentinel and Meteosat Third Generation satellites. CSO took the opportunity to express its opinion on policy and method of distribution and processing of satellite data.

The delegate from CSO has been also present at the ESA Board of Space Situational Awareness (SSA) and workshops on the proposed new architecture of distributed ESA SSA systems to monitor outer space – space weather, near-Earth asteroids and objects in orbit. The CSO thus

participated in approving the preliminary proposals of activities, monitoring the progress of running activities, development of international cooperation and determination of ESA long-term plans.

One of the CSO workers has participated in the ESA Science Programme Committee (SPC) to ensure the Czech participation in Solar Orbiter, JUICE and Proba-3 missions. The CSO had the representation also at the meeting on selection of the third medium-sized M3 mission,. The meeting resulted in the selection of PLATO mission, which will examine the conditions for planet formation and the possibility of life, and the solar system functioning.

CSO has also attended meetings of the ESA Advisory Committee for Education (ACE), where the possibility of the launch of three student CubeSats by college teams from ESA Member States, the creation of three new training centres ESERO, and high school CanSat competition have been discussed.

One of the CSO representatives took part in the ESA industrial day, where he made 33 bilateral meetings with European institutions that are active in space and thereby significantly expanded the possibilities of the Czech companies for future international cooperation.

## **5.2. International organisations**

CSO has been active member of international organizations such as the International Astronautical Federation (IAF), the International Academy of Astronautics (IAA) and took part in programmes of the UN Office for Outer Space Affairs (COPUOS).

Membership of CSO in the International Astronautical Federation has been well established for many years. In recognition of its expertise and experience in the field, the Czech Space Office is represented on several IAF committees, namely the Earth Observation Technical Committee, International Project/Programme Management Committee, Workforce Development – Young Professionals Programme Committee, Space Education and Outreach Committee and Knowledge Management Technical Committee. In 2014, during the IAF spring meeting and the International Astronautical Congress, the CSO participated in the meetings of these committees, where it informed about related activities in the Czech Republic. Besides that, the CSO director has also attended meetings of the Space Universities Administrative Committee (SUAC). This committee is a platform for establishing the links between universities. As no Czech university is a member of this committee so far, a brief information about space activities in the Czech universities was given. A target is to motivate Czech universities to apply for membership in this IAF committee.

Director of the Czech Space Office has been re-elected IAF vice-president by the General Assembly of the Federation in October 2014. In his capacity of the vice-president for finance

he is a member of the IAF Bureau and chairs the Financial Committee of the Federation. Under his leadership the Committee discussed negative financial results from previous year at the spring meeting 2014. The proposed mitigation action plan was presented by the chair to the Bureau. After its approval the plan has been satisfactorily implemented for the financial management in 2014.

As a member of IAF Bureau, the CSO director represented IAF at the UN Committee on the Peaceful Uses of Outer Space (COPUOS) meeting in Vienna in June 2014.

The Director of the Czech Space Office has attended the Heads of Space Agencies Summit in Washington. CSO has been invited to contribute to the discussion of key organizational, technical and social issues of space exploration. Along with seven other participants the CSO has been given the opportunity to express an opinion on the usefulness of space in a broader sense at a dedicated panel discussion. At the Conference on the Outer Space Exploration following the summit, the Director was co-author of a paper on multicultural foundations of manned spaceflight, experience and perspectives for the future.

During 2014, CSO started preparations for hosting the 20<sup>th</sup> IAA Humans in Space Symposium 2015 in Prague. The Symposium is organized once in two years and in 2015 the Prague is going to host the event. The CSO is responsible for the Symposium logistics, establishment of the Scientific Committee and the range of scientific topics presented at the conference. During the year, the official web of the Symposium has been launched and the second announcement with scientific topics and dates for abstract submissions has been published.

For many years, CSO regularly participates with its own booth at the exhibition part of the International Astronautical Congress. In IAC 2014 in Toronto, the CSO stand presented CSO activities including cooperation with XCOR Aerospace, together with results of some Czech institutions and companies. Nine Czech organizations used the CSO offer and presented their instruments and scientific results at the exhibition. The main interest of visitors was concentrated on possibilities of cooperation in European programmes, the experiences and capabilities of the Czech institutions and on examples of the Czech space projects. CSO has managed to establish dozens of new contacts, to gather new possibilities for cooperation in student satellites and information about potential scientific instruments for small satellites.

In February 2014, CSO became the Czech national point of contact of the Space Generation Advisory Council (SGAC) confirmed by the Memorandum of Understanding signed by both organizations later in the year. Newly established cooperation opens additional possibilities to support Czech students and young professionals by distribution of the information on international projects, competitions and other activities. SGAC and CSO are now planning to organize joint conference and competition for Czech students in 2015.