The Eleventh Administrative Heads Meeting of the Asia-Pacific Space Cooperation Organization

The 11th Meeting of the Administrative Heads of APSCO was held on September 11-14, 2018 in Guangzhou, China. The distinguished Administrative Heads and accompanied delegates, in all thirty participants from Member States: Bangladesh, China, Iran, Mongolia, Pakistan, Peru, Thailand and Turkey, attended the Meeting.

Dr. Li Xinjun, Secretary-General of APSCO, welcomed the delegates and introduced the recent changes in the Secretariat International Staff. Progress on implementation of decisions reached at its 11th Meeting of the APSCO Council was presented to the Meeting by the Director-General Mr. Nasir Mahmood. In the subsequent sessions of the Meeting, respective Director-Generals of the Departments presented review reports of the activities of APSCO Departments and details on individual Agenda Items. Administration & Finance Department presented the planned Budget for the next year, 2019. Member States, seriously and conscientiously participated and deliberated on the Agenda, in respective sessions, and few proposals were brought up for discussion among Member States. The Secretariat also apprised on the preparations for the upcoming APSCO’s 10th Anniversary High-Level Forum and 9th International Symposium.

The Administrative Heads discussed all the Items on the Agenda of the Meeting and recommended those items for review/approval of the APSCO Council, on which consensus was reached.
Photo: During the 11th Administrative Heads Meeting of APSCO on Sep. 11-14, 2018 in Guangzhou, China

Photo: Group Photo of APSCO Member States’ delegates at the 11th Administrative Heads Meeting
The Implementation of APOSOS Project Phase I Successfully Closed-Out, while the Feasibility Study of Its Second Phase Successfully Concluded

Strategic Planning and Program Management Department

APSCO Secretariat organized the Final Acceptance Review Meeting on the Asia-Pacific Ground-Based Optical Space Object Observation System (APOSOS) Project Phase I on 25th June, 2018 in Beijing, China. The Project Lead, National Astronomical Observatories, Chinese Academy of Sciences (NAOC), presented all achievements to the Project Management Board (PMB), chaired by Dr. Manop Aorpimai, Director-General of Strategic Planning and Program Management of APSCO.
The PMB was satisfied with all deliverables submitted by the Project Lead, and unanimously agreed that the implementation phase of the project has been successfully completed, and ready to transfer into its operational phase for mutual benefits of all member States. A training course on space-object tracking data processing was also delivered back-to-back with the PMB meeting on 26-27 June, 2018, to provide necessary technical backgrounds to engineers from APSCO member States.

Right after the successful closed out the project Phase I, the Second Expert Group Meeting on the Feasibility Study Report of APOSOS Project Phase II was organized during 28-29 June, 2018 in Beijing, China.

Dr. Li Xinjun, Secretary-General of APSCO, gave a warm welcome speech to the experts from APSCO member States. He mentioned great challenges on implementation of this important strategic network of APSCO. Considering the heritages of the existing system, the 3-C Principle, Compatibility, Comprehensiveness and Cloud-funding, was emphasized by him as a guideline for formulating the implementation plan of the second phase of the project.
The meeting, chaired by Dr. Manop Aorpimai, Director General, Strategic Planning and Program Management Department of APSCO, went on smoothly with very fruitful outcomes. All FSR documents were thoroughly reviewed and discussed among the experts. It could be concluded, and, with some minor updates, it was recommended by all experts to propose to APSCO Council for their consideration, and approval. The delegates from all member States appreciated the contributions from the Space Debris Observation and Data Application Center (SDOAC), CNSA, on their leading role on conducting the project feasibility study.
The First Expert Group Meeting on Feasibility Study Report of APSCO Earthquake Signature Project Phase II Successfully Organized

The First Expert Group Meeting on Feasibility Study Report (FSR) of APSCO Earthquake Signature Project Phase II was held during 4-6 July, 2018 in Beijing, China. Delegates from all member States of APSCO participated in the meeting, including Bangladesh, China, Iran, Mongolia, Pakistan, Peru, Thailand and Turkey.

Dr. Li Xinjun, Secretary-General of APSCO gave a welcome speech to all participants on behalf of the Secretariat. He expressed sincere appreciation, especially for the
supports from Institute of Crustal Dynamics (ICD), China Earthquake Administration (CEA) for establishing the Ground-based Ionospheric Monitoring and Information Sharing Platform (APSCO GIMI Platform) in Phase I of this project. He emphasized his 3-C Principle - Compatibility, Comprehensive/ness and Cloud-funding, as a guideline for formulation of implementation plan of the second phase of this project.

The meeting chaired by Dr. Manop Aorpimai, Director-General of Strategic Planning and Program Management Department of APSCO, went on smoothly and accomplished its predefined objectives. All feasibility study report documents were discussed thoroughly by the experts, covering the topics on Technical Requirement.
Specification, Budget Estimates, Cost and benefits analysis, participation of APSCO member States. The experts from APSCO member States recommended to submit the updated Feasibility Study Report to the upcoming Council Meeting as a Basic Activity of APSCO.

After the EGM, all experts were invited to visit the APSCO GIMI Platform Data Center. The Project Lead, ICD, CEA, also gave a presentation on general introduction of the China Seismic-Electromagnetic Satellite (CSES) Mission and its preliminary results. The data received from sensors onboard the CSES will play the core part of the project phase II.
Final Installation Mission of Ionospheric Modeling Project Successfully Completed in Mongolia

Strategic Planning and Program Management Department

The Research on Atmospheric Effects of Ionospheric Modeling Project (Ionospheric Modeling Project) has achieved significant progress. Following up the Kick-off Meeting of the Project in 2016, APSCO and the Project Lead, China Research Institute of Radio Wave Propagation (CRIRP), have been embarking on installing the TEC/Scintillation Monitoring Receivers in participating member States to this Optional Activity, including Bangladesh, Pakistan, Peru and Thailand. The final installation has just been completed in Institute of Astronomy and Geophysics (IAG) affiliated to Mongolia Academy of Sciences (MAS), Ulaanbaatar, Mongolia during 25-28 August, 2018. As a part of the installation campaign, an on-site training on data processing and analysis, as well as equipment operation and maintenance procedures was also delivered to the technical team of IAG.

With this final measurement node completed, the APSCO Ionospheric Monitoring Network has now been maturely established. The participating member States can carry out their joint research works under APSCO coordination. APSCO and CRIRP ex-
pressed their sincere thanks and gratitude to the Communication and Information Technology Authority (CITA), Mongolia and IAG for their great support to the project and warm hospitality during the mission.

Photo: Group Photo of Mission Team at the Institute of Astronomy and Geophysics Astronomy, Ulaanbaatar, Mongolia

Photo: Meeting between MAS and CRIRP under Coordination of APSCO in Ulaanbaatar, Mongolia
As an important task under the Ground Segment part of the APSCO Joint SMMS Constellation Program, APSCO has been conducting Ground Station Survey in all member States since 2017. During July 5-6, 2018, the activity was carried out in Turkey. Officials and engineers from TUBITAK UZAY and Istanbul Technology University (ITU), Turkey, warmly hosted the expert team from the project lead, China, and the project manager from APSCO. During the site survey, the delegates visited the receiving station in ITU, where the site environment, existing facilities and infrastructures were thoroughly investigated. The engineers from both sides exchanged their views, especially on possible options and plan for upgrading the station to be compatible to the SMMS constellation.
The similar ground station survey activity was carried out on 9-10 July, 2018, in Peru with warm hospitality and excellent support from CONIDA. Besides, after visiting CNOIS, the expert from China delivered a short training on Satellite Remote Sensing Applications Demonstration to CONIDA staffs at the Headquarters in Lima.
IGMA Equipment Installation Completed in Thailand and Turkey

Strategic Planning and Program Management Department

During 30th July to 3rd August 2018, APSCO successfully installed the IGMA project installation mission in Thailand. A set of IGMA equipment, including a high-precision GNSS receiver and its peripherals, was installed at the IGMA station in Kasetsart University, Bangkok, under the support of the engineers from the hosting site. An on-site training on equipment operation and maintenance was also delivered to the host engineers.

The similar installation mission and training was successfully conducted during August 6-9, 2018 in Turkey. The IGMA station of Turkey is located in department of Geodetic and Geographic Information Technologies of Middle East Technical University.

After acquisition and testing phases, the IGMA sites in Thailand and Turkey, can start their operation and provide real-time GNSS data to the IGMA data center in Beijing. Meantime, the equipment installation mission will continue in the remaining member States. The full APSCO IGMA Network is expected to be completed by the end of this year.
The Second Training and Field Campaign of Radiometric Calibration of Satellite Sensors Project Successfully Conducted in Tuz Golu

Strategic Planning and Program Management Department

The Second Training and Field Campaign of Radiometric Calibration of Satellite Sensors Project was held in Nevsehir and Tuz-Golu, Turkey, during August 6-17, 2018. Participants from China, Iran, Mongolia, Pakistan, Peru, Thailand and Turkey attended the activities. During the opening session, on behalf of the project lead country, Dr. Erdal Yılmaz, Deputy Director of TUBITAK UZAY, welcomed all participants from APSCO member States. He appreciated the significant progress of the project, and he ensured full support from the Project Lead, Turkey. Dr. Manop Aorpimai, Director-General of Strategic Planning and Program Management Department represented APSCO expressed his sincere thanks and gratitude for great supports and warm hospitality from Turkey, especially the hard work and excellent preparation for the event by the team from TUBITAK UZAY.

The in-class training was conducted during August 6-13, 2018 in Nevsehir. It covered topics on Basic Principles of Radiometry; All About Calibration, Complexities, How to Calibrate, SAR: Basic Principle, SAR Theory and Applications, SAR Radiometric Calibration hands-on trainings, Satellite Image Processing and Calibration Process, Effects of Radiometric Calibration on Remote Sensing Applications, Hyperspectral Radi-

Photo: In-Class Training of Radiometric Calibration of Satellite Sensors
ometric Calibration in-class/hands-on, Thermal Imaging Basics, Thermal Radiometric Calibration in-class/hands-on training, Reflectance-Based Method, Site Selection with a contribution of trainers from Turkey and China.

The Field Campaign of Radiometric Calibration of Satellite Sensors Project was carried out in Tuz Golu, Turkey, during August 14-17, 2018, which includes calibration activities on: Irradiance-Based Method and Radiance-Based Method, Hyper-spectral Imaging Basics/ Hyper-spectral Radiometric Calibration, and Cross-Calibration. The atmospheric measurement and surface reflectance measurement were collected before and after Landsat-8, Sentinel-2A, THEOS-1 satellites over passed during the Field Campaign. Besides, Hands-on data processing training was also trained by the experts from China.

It was recognized by all participants that the Second Training and Field Campaign of Radiometric Calibration of Satellite Sensors Project was successfully organized according to the Project Implementation Plan. Excellent contribution and supports, as well as very warm hospitality from the Project Lead, TUBITAK UZAY that led such excellent achievements were highly appreciated by all participants from APSCO member States.
The Graduation Ceremony for MASTA 2016 and Course Completion Ceremony of MASTA2017 was held on June 29th, 2018 in the Beihang University, Beijing, China. This year total 15 MASTA students from APSCO Member States graduated successfully and received their graduation Certificates of Master degree in Space Technology and Applications.

The ceremony was attended by Dr. Mohammad Ebrahimi Seyedabadi, Director General of Department of Education and Training and Database Management, Mr. Li Yue, Consultant-Director of Department of Military-Civil Technology Integration, and Prof. Weng Jingnong, Dean of International School of Beihang University and other officials from respective sides including APSCO delegation, and issued certificates to all graduates. During the ceremony, excellent graduates, Mr. Loghman Fathollahi from Iran and Mr. Keawkaew Chinnatat from Thailand received their Certificates of honors by Beihang University. After issuing certificates Dr. Mohammad Ebrahimi Seyedabadi, Prof. Weng and representatives of supervisors and graduates gave speeches respectively.

MASTA (Master of Space Technology Applications) is one of the regular education and training activities of APSCO since it has been started in 2006. This program is sponsored by APSCO, China Scholarship Council (CSC) and Beihang University. Since 2006, a total of 160 students sponsored by MASTA Programme and 123 are graduated until June 2018.
The 2\textsuperscript{nd} Summer Camp of APSCO Student Small Satellite (SSS) Project Successfully Held

Education and Training and Database Management Department

Opening Ceremony

Based on the education and training programme of the APSCO Student Small Satellite (SSS) Project, and to extend the fruitful achievement of the First Summer Camp held in Beihang University, Beijing during summer of 2017, the Second Summer Camp, which is co-organized by APSCO and Middle East Technical University (METU), supported by TUBITAK-UZAY, kicked-off on July 30, 2018 in Ankara, Turkey. Over 40 participants from all APSCO Member States registered, and 15 more local students joined. Most of the participants are master students following aerospace engineering majors.

On the opening ceremony, the welcome speeches were given by Deputy Director of UZAY, Dr. Erdal Yılmaz, Director General of APSCO, Dr. Mohammad Ebrahimi Seyedabadi, Chairperson of Aerospace Engineering Department of METU, Prof. Dr. Ozan Tekinalp and the SSS Project leading party, Vice President of Beihang University, Prof. Dr. Huang Haijun.
Courses

Following the opening ceremony and the introduction on design and manufacturing status of SSS-2B CubeSat, the course sessions were conducted. The courses had given detailed information and knowledge of satellite Assembly, Integration and Testing, mechanical and structure analysis, electrical interfaces and thermal analysis for subsystem design analysis and test, and emphasized on the challenges for ADSs and solutions, ADS implementations with selection on hardware, attitude determination approaches, algorithms for satellite attitude determination; different aspects of the space environment, the production and acceleration of cosmic rays in the space radiation, micro-gravity and plasma environments; different attitude determination approaches, attitude determination from vector measurements and Kalman filtering for attitude estimation.
In order to maximize the effectiveness of the courses, a large number of experiments for students’ hands-on training were carried out in the aerospace laboratory. These include ANSYS workbench and its applications in FEM combined with laboratory experiments for the vibration of spacecraft subsystems; students were divided into eight groups so that they could have enough time and opportunity to follow the instructions and solve example problems given by the lecturer using the commercial FEM package ANSYS.

The laboratory session for embedded system lecture was carried out following the lectures and participants got the chance to learn little bits of programming essentials used in microcontrollers, which means participants gained a better understanding of most low-level components underlying embedded subsystems within larger data acquisition and communication systems through the self-operation on the facilities.

The Attitude Control lecture and laboratory aiming on ADCS Micro-Simulator Hands-on Training were given by Prof. Dr. Mehran Mirshams from K.N. Toosi University of Technology, Tehran, Iran. The course started with an introduction of ADC system, and was followed by the test set up introduction and demonstration on ADCS Micro-
Simulator. In the workshop assignment phase, participants were arranged into 8 groups and each group integrated and programmed on ADCS Micro-Simulator, and further tested and justified for model attitude control, with the help of designed controller. Finally, all teams made result evaluation on the integrated model by themselves. The whole content of the course was highly favored and admired by all participants.

Technical and Culture Visit

Beside the theoretical courses in class, the visit to the Turkish Atomic Energy Agency's Saraykoy Nuclear Research and Education Center, and the Gamma Radiation Facility was arranged, where a Co-60 source could be used for Total Ionizing Radiation tests and the Proton Accelerator Facility, for participants to help their on-site knowledge shaping.

While studying hard, trips to various prestigious locations were arranged during weekend.
1. Technical visiting to Turkish Aerospace Industries (TAI)
The delegation of the Second Summer Camp visited the satellite assembly, integration and test labs of TAI, which is an important aerospace industry of Turkey. During this valuable visiting opportunity, the introductory presentation of satellite AIT in every phase and testing facilities and procedures were shown by TAI engineers; all participants got the chance to see the functions of these facilities and how spacecraft parts are assembled and tested, and had deep understanding of AIT process.

2. Cultural Visit in Ankara City
The colorful cultural visit of Ankara City had been arranged during weekend. Participants are led to parliament house, old city of Ankara and museum, the mausoleum of Mustafa Kemal Ataturk.

Closing Ceremony
In the afternoon of August 17, 2018, the grand Closing Ceremony was held in the Middle East Technical University (METU). Dr. Lokman Kuzu, the Director of the Scientific and Technical Research Council of Turkey-Space Technologies Research Institute (TUBITAK-UZAY), Dr. Mohammad Ebrahimi Seyedabadi, Director General of Depart-
ment of Education, Training and Database Management of APSCO and Prof. Ozen Techinalp of METU attended the ceremony. The students, lecturers, and volunteers received certificates of attendance and appreciation from APSCO and METU. Excellent students were appreciated with special certificates as well.

Epilogue—Achievement and Significance

The Second Summer Camp of APSCO SSS Project followed the spirit of project feasibility study, and ideally designed by all project technical management team members from APSCO Member States. This activity concentrated on development of detailed technologies in the micro/nano satellite subsystems, which included the EPS, Tracking & Communications, ADCS, Structure & Mechanism, Thermal Control, etc., and mainly focused on unit/subsystem manufacturing and testing hands-on trainings.

The Second Summer Camp had a great significance in the further development of the project and APSCO itself. It not only enabled the participants to enrich their professional knowledge on the test and integration of satellites as well as to enhance their practical ability to design a satellite by themselves; but also, it provided a good platform for the universities from APSCO Member States to undertake the student satellite design and development and to impart space technologies among the Member States through the SSS project as well as hands-on training program; moreover, it brought opportunity of the team working in hands-on training and the technical and cultural visits in Ankara provide great opportunities to the participants to know each other and to learn more about Turkey, which would make great contribution to promote the communication and friendship among APSCO Member States and thus to build a solid foundation for their deep and comprehensive cooperation in the future.
The Asia-Pacific Space Cooperation Organization (APSCO) short training on Future Application of Small Satellites was successfully held during 27 August to 1 September, 2018 in Xi’an, China. The training was jointly organized by the Secretariat of APSCO and Northwestern Polytechnical University.

As the threshold of satellites manufacturing is lowering, the training is aimed to promote the application of small satellite and help Member States for their space program planning. A total of 10 lecturers from Northwestern Polytechnical University, Nanjing University, Wuhan University and CAST gave the lectures on different aspect related to the future application of small satellites.

The opening ceremony of the Training was conducted by Dr. Mohammad Ebrahimi Seyedabadi, Director General of Department of Education and Training and Database Management of APSCO, Dr. Sun Wubin, Vice Dean of International College of NPU, Prof Liu Peijin, School of Aeronautics of NPU. Dr.Sun Wubin, briefly introduced the history of School of Astronautics Northwestern Ploytechnical Universi-
ty, Dr. Mohammad Ebrahimi Seyedabadi expressed APSCO’s long term plans on Micro and Nano Satellite development and Education programs and thanked NPU for its strong support of this training course. They all welcomed the students from 8 Member States and wished all participants a wonderful and fruitful experience.

During the training time, students visited satellite-related labs which provide impressive acquaintance for all the participants. The training course was successfully concluded on 31 August 2018. The participants expressed their satisfaction over the content of the course and arrangement of technical and culture visits. They exchanged views with lecturers during the break time and also advice and suggestions were given for future improvements. At the end of the closing ceremony, Dr. Mohammad Ebrahimi Seyedabadi made the closing speech and expressed best wishes to all participants; the course completion certificates were awarded to the participants jointly by the Organizers.
Photo: Dr. Manop Aorpimai, Director-General of the Department of Strategic Planning and Program Management, represented APSCO Secretariat and delivered a Speech at UNESCAP Intergovernmental Consultative Committee-22 Meeting in Bangkok, Thailand on August 28-30, 2018

Photo: The UNESCAP ICC Meeting in Bangkok, Thailand on August 28-30, 2018
Photo: Ms. Byambasuren Erdenee, Senior Official of the Department of Strategic Planning and Program Management, represented APSCO Secretariat at the China-ASEAN ‘One Belt & One Road’ Space Information Corridor Cooperation Development Forum during September 11-12, 2018 in Nanning, China.

Photo: APSCO Presentation on Spatial Information Application in Asia-Pacific Region.
Photo: On September 11, 2018, APSCO delegation had a tripartite coordination meeting with: Mr. Niklas Hedman, Chief of UNOOSA, Ms. Yukiko Okumura, Associate Expert from UNOOSA and Mrs. Gulmelahat Dogan, the representative from TUBITAK UZAY on co-organizing UN-APSCO Space Law and Policy Workshop in Turkey in 2019.

Photo: APSCO Secretariat was invited by the National Digital Economy and Society Commission (ONDE), Ministry of Digital Economy and Society (MDES) of Thailand to participate in the Digital Thailand Big Bang, during September 19-23, 2018, in Nonthaburi, Thailand

Photo: Secretary-General Dr. Li Xinjun visited the Embassy of Iran and met with Minister Hassan Shahbeig, on September 26, 2018
Photo: Dr. Li Xinjun, the Secretary-General of APSCO, called on the Turkish Ambassador H.E. Mr. Abdulkadir Emin Onen on September 26, 2018

Photo: Secretary-General Dr. Li Xinjun called on H.E. Mr. Masood Khalid, the Ambassador of Pakistan on September 27, 2018
Photo: Qatar Ambassador H.E. Mr. Sultan Salmeen Almansouri visited APSCO Headquarters on September 27, 2018

Photo: Qatari guests visited APSCO Exhibition Hall on September 27, 2018
UPCOMING EVENTS

OCTOBER 2018

Strategic Planning and Program Management Department

1. 8-10 October, UNESCAP/ICC Meeting, Bangkok, Thailand: The Intergovernmental Consultative Committee (ICC) on the Regional Space Applications Programme for Sustainable Development (RESAP) organized by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).

2. 17-19 October, EMDR Project Demonstration and Final Review Meeting, Beijing, China:
   This Final Review Meeting is planned to present and review the results of the GNSS Application on EMDR project, demonstrate the function of the system, and finally to close out this Optional Project of APSCO.

3. 22-26 October, IGMA Project Installation, Bangladesh:
   The IGMA equipment will be installed in Bangladesh’s proposed site, and an on-site training will also be provided to the host engineers.

4. 29 October to 2 November, GEO Plenary and GEO Week, Kyoto, Japan

5. 4-9 November, ICG Meeting, Xi’an, China

6. 26-30 November, IGMA Equipment Installation, Peru
   The IGMA equipment will be installed in Peru’s proposed site, and an on-site training will also be provided to the host engineers.

7. 26-30 November, FAR Meeting and Training on Ionospheric Modeling through Study of Radio Wave Propagation and Solar Activity Project, Chongqing, China
   This Final Acceptance Review Meeting is aimed to conclude the implementation of Ionospheric Modeling through Study of Radio Wave Propagation and Solar Activity, and carry out a technical training for smooth operational phase of the network.

8. 2-6 December, Framework for Researches Project 3rd Technical Session, China:
   This 3rd TS is in order to conclude the 5 JRPs carried out after the 2nd TS, and to discuss sustainable establishment of APSCO Framework to facilitate joint research works on application of space technology for disaster monitoring in the APSCO Member States.
9. 18-20 December, 1st Workshop on Radiometric Calibration of Satellite Sensors Project, Bangkok, Thailand:
The First Workshop of Radiometric Calibration of Satellite Sensors Project is planned to be held in Bangkok, Thailand. The goal of this workshop is to share results of research in radiometric calibration and discuss data processing results of field campaigns on the Dunhuang, in China and Tuz Golu, in Turkey.

10. 18-22 December, IGMA project installation in Iran
The IGMA equipment will be installed in Iran’s proposed site, and an on-site training will also be provided to the host engineers.

Education and Training and Database Management Department

11. The 2nd APSCO and ISSI-BJ Space Science School will be organized during 9-19 October, 2018 in Sanya, Hainan.
12. APSCO Training Course on ‘Space-based technologies for emergency response mapping’ (Organized back to back with 8th UN-SPIDER Beijing Conference, 24-26, October 2018), 28 October-1 November, 2018, Beijing, China
13. The 9th APSCO International Symposium will be organized in November 2018 back to back with APSCO’s 10th Anniversary High-Level Forum on ‘Community of Shared Future through Space Cooperation’. The symposium will be organized under the sub-theme of ‘Developing Next-Generation Aerospace Innovative Talents through Space Cooperation’.

External Relations and Legal Affairs Department

15. The 12th Council Meeting of APSCO will be held on 11-13 November, 2018 in Beijing, China.
16. APSCO 10th Anniversary High Level Forum & 9th International Symposium will be organized on 14-16 November, 2018 in Beijing.