

7 February 2022

Original: English/Spanish

**Committee on the Peaceful
Uses of Outer Space**
Scientific and Technical Subcommittee
Fifty-ninth session
Vienna, 7–18 February 2022

**International cooperation in the peaceful uses of outer
space: activities of Member States**

Note by the Secretariat

Contents

	<i>Page</i>
I. Introduction	2
II. Replies received from Member States	2
Canada	2
Peru	5
United Arab Emirates	8



I. Introduction

1. At its fifty-eighth session, in 2021, the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space recommended that the Secretariat continue to invite Member States to submit annual reports on their space activities (A/AC.105/1240, para. 34).
2. In a note verbale dated 11 August 2021, the Office for Outer Space Affairs of the Secretariat invited Member States to submit their reports by 1 November 2021. The present note was prepared by the Secretariat on the basis of replies received in response to that invitation.

II. Replies received from Member States

Canada

[Original: English]
[23 January 2022]

Summary

In 2021, Canada was engaged in a number of diverse space activities. Canada continued to provide invaluable support to the International Space Station (ISS) through the use of the Canadarm2 and Dextre; continued the operation of Canada's Earth Observation satellite fleet, including the RADARSAT Constellation Mission, SCISAT and NEOSat; and became the Chair of the International Space Exploration Coordination Group. Canada also solidified a range of opportunities as part of its contribution to Lunar Gateway, including two astronaut flights to the Moon, and launched several initiatives under the Lunar Exploration Accelerator Program (LEAP) to deliver Canadian technologies to the Moon in the next 5 years. Furthermore, Canada supported the delivery of several Earth Observation modules for an Indigenous Mapping Workshop in November 2021, committed to the smartWhales initiative to advance innovative solutions to reduce the risk of right whale endangerment, and continued to actively support the International Charter "Space & Major Disasters". For the latest information, and more details on the programmes mentioned, we invite you to view the Canadian Space Agency website at: www.asc-csa.gc.ca.

The International Space Station (ISS)

Canada's contribution to the ISS, the Mobile Servicing System (Canadarm2, Dextre, and the Mobile Base System) continues to operate successfully, despite being impacted by debris in 2021.

Human health science remains a Canadian priority for the utilization of the ISS with the development of new multipurpose medical and research platforms to address the risks associated with human space flight. Canada also initiated the development of a novel and breakthrough biological sample preparation technology for the ISS, and pursued seven scientific studies related to health on the ISS: T-Bone, At Home in Space, Vascular Echo, Vascular Aging Wayfinding, Vection, and Radi-N2.

Planetary sciences

Canada's OSIRIS-REx Laser Altimeter (OLA) on NASA's asteroid-sampling mission OSIRIS-REx played a critical role in determining the sampling site from which OSIRIS-REx acquired samples in December 2020. OSIRIS-REx is now on its way back to Earth with its precious cargo, with an expected return in 2023.

Canada, via the Canadian Space Agency (CSA), became the chair of the International Space Exploration Coordination Group (ISECG), composed of 27 space agencies focused on enhancing international coordination in space exploration. Canada is also

working in collaboration with the United States of America, Japan, Italy and potentially others, to define an orbital mission to Mars carrying a Synthetic Aperture Radar to map the Martian subsurface water ice. An international measurement definition team has been formed to help refine the instrumentation requirements for this mission.

Lunar initiatives

In preparation for the Artemis programme and in return for contributing Canadarm3, a smart robotic system, to the Lunar Gateway, Canada will receive a range of opportunities for lunar science, technology demonstration and commercial activities, as well as two astronaut flights to the Moon. A Canadian Space Agency astronaut will be part of NASA's Artemis II, the first crewed mission to the Moon since 1972.

Under the Lunar Exploration Accelerator Program (LEAP), several initiatives are under way to deliver Canadian technologies to the Moon in the next five years: two contracts have been awarded to Canada-United States teams to define a rover mission to the surface of the Moon. This mission will deliver a Canadian rover carrying both United States and Canadian instruments on a NASA Commercial Lunar Payload Service Delivery flight in 2025–2026. In addition, Canadian organizations have been invited to team up with United States organizations to respond to NASA's Payloads and Research Investigations on the Surface of the Moon (PRISM) call. This opens the door to Canadian science instruments flying to the Moon also in the 2025–26 time frame. Finally, LEAP is also funding Canadian participation in commercial lunar missions: so far, three Canadian companies have secured flights to the Moon on at least three missions going to lunar orbit or the lunar surface.

Canada also initiated the Lunar Surface Exploration Initiative (LSEI), which involves activities to prepare potential options for consideration of the next major Canadian infrastructure contributions to human spaceflight, with a focus on the lunar surface. The CSA is also carrying out activities related to space and terrestrial food production; including the Naurvik Initiative, a renewable energy plant production system in Gjoa Haven, Nunavut (Arctic region); and working with NASA on the Deep Space Food Challenge.

Space atmospheric sciences

Canada's SCISAT satellite, measuring ozone and ozone depleting substances, continues to operate nominally. It remains the only satellite to measure hydrofluorocarbons (HFCs) from space and is well positioned to support monitoring efforts of the Kigali Amendment to the Montreal Protocol. It is also the only satellite able to measure all major greenhouse gases, including high-quality atmospheric profiles of carbon dioxide down to 5 km, which supports monitoring efforts of the United Nations Paris Climate Agreement.

Twenty years of Canada's Measurement of Pollution in the Troposphere (MOPITT) instrument on-board the NASA Terra satellite was highlighted at a national workshop on atmospheric sciences from space. The instrument continues to scan the Earth's atmosphere and collects profile measurements of carbon monoxide to support air quality and climate studies. MOPITT is the longest-running pollution monitor in space today and the longest continuously-operating space mission in Canadian history.

Space-based astronomy

Canada continues to support the James Webb Telescope project, a partnership between NASA, ESA and the CSA, which was launched on December 25, 2021. Canada provided two instruments: the Fine Guidance Sensor (FGS) and the Near-Infrared Imager and Slitless Spectrograph (NIRISS). This partnership will offer Canadian astronomers a share of the observation time on the most complex and powerful space telescope ever built.

Canada also continues to operate its own modest space telescope, the Near-Earth Object Surveillance Satellite, NEOSSat. Through the Canadian Space Agency's NEOSSat Guest Observer programme, Canadian astronomers publish near-Earth asteroid and comet observation data to the International Astronomical Union (IAU) Minor Planet Center (MPC), participate in international observation campaigns under International Asteroid Warning Network (IAWN), support the photometric follow-up of exoplanet candidates from NASA's Kepler and Transiting Exoplanet Survey Satellite (TESS), and other missions. NEOSSat astronomical imagery is published on CSA's Open Data portal and National Research Council of Canada's Canadian Astronomy Data Centre consistent with Canada's Open Government policy.

Space weather

Canada continues to operate ground imagers and magnetometers across Canada, through the support of the University of Calgary and the University of Alberta, to contribute to the NASA THEMIS mission through ground-based observations of the aurora borealis.

Canada continues to partner with the European Space Agency's (ESA) Swarm mission, which measures the magnetic fields generated by the Earth. ESA procured a Canadian Electric Field Instruments (EFI) for each of Swarm's three identical satellites.

Space Situational Awareness (SSA)

Sapphire, Canada's Department of National Defence's (DND) space-based SSA sensor, is still providing data on deep-space objects to the United States-led Space Surveillance Network (SSN) helping to maintain the safety of space objects in Earth orbit. The NEOSSat space telescope is still operational and supports advanced Space Situational Awareness R&D by collecting tracking data on space objects making close approaches.

Canada is in the planning stages for the development of a new SSA research microsatellite, named Redwing, which will continue advanced SSA research, development and capability demonstration in LEO. Finally, several Canadian universities are collaborating with international colleagues in an "all-sky camera networks", collecting observations on incoming debris/meteorites for logging and recovery purposes.

Earth observation

The RADARSAT Constellation Mission (RCM) continues to support the Government of Canada in its mandate to monitor the impacts of climate change, protect our environment and foster sustainable development, manage natural resources, and support disaster relief. The CSA also worked with partners on a SAR Mini-MOOC (Massive Open Online Course) to provide a course entitled "Winter, Water, Warming" that introduces learners to radar remote sensing applications, ongoing research and development, and operational use by the Government of Canada. In addition, the CSA cooperated with NASA in the preparation and delivery of several Earth Observation modules for an Indigenous Mapping Workshop in November 2021. This workshop was organized by the Canadian Firelight Group for Indigenous Nations and organizations supporting indigenous-led geospatial research.

STEM outreach

In the summer 2021, fifty-two young Canadians from across Canada spent a space-filled week with astronauts, scientists and engineers. They designed a lunar greenhouse, remotely operated a rover, used satellite imagery to help first responders, exercised with astronaut trainers and expanded their knowledge of careers in space fields. The CSA continues to work on Objective: Moon, a series of STEM initiatives and resources for youth and educators related to the Moon. The CSA also remains engaged in Women in STEM activities and initiatives, both internally and externally.

National technical, science and human capacity-building

In 2021, the CSA continued the Canadian CubeSat Project (CCP), where 15 teams composed of numerous researchers, professors and over 600 post-secondary students, from across all provinces and territories of Canada, are taking part in a real space mission, by designing, building, launching, and operating their own CubeSat. Canada also confirmed an additional investment of approximately \$16M in ESA's European Exploration Envelope Programme (E3P) that supports key Government priorities, as well as space industry and the scientific community.

Support to global challenges

Under the smartWhales initiative, Canada is investing \$5.3 million in five companies to advance innovative solutions that could enhance Canada's ability to detect and monitor the presence of whales in Canadian waters and predict their movements.

Canada continues working closely with international partners as part of disaster relief programmes, making our Earth observation data available in times of crisis, helping to assess impact and mitigate risk for natural disasters. While supporting domestic natural disasters, Canada continues to actively support the International Charter "Space & Major Disasters", a collaboration founded by ESA, CNES and CSA, that currently has seventeen members.

Space policy

The Canadian Space Agency continues its internal assessment of Canada's compliance to the *21 Guidelines for the Long-term Sustainability of Outer Space Activities* in order to identify gaps and areas for review to further strengthen our commitment to the safety and sustainability of outer space.

Canada is excited to have the Canadian Space Agency President, Lisa Campbell, contribute to building deeper partnerships with "@ll space people" through her election as Vice-President Agency Relations and Global Membership in the International Astronautical Federation.

Peru

[Original: Spanish]
[30 December 2021]

El Perú se encuentra adherido a los tratados de las Naciones Unidas sobre el espacio ultraterrestre y desarrolla actividades espaciales exclusivamente con fines pacíficos orientadas al desarrollo socioeconómico y el bienestar del país en los diversos ámbitos que comprende el campo espacial, teniendo como principal impulsor a la Agencia Espacial del Perú – CONIDA que junto con otras instituciones han trabajado en actividades y proyectos durante 2021, a pesar de las restricciones que ha impuesto la pandemia de COVID-19.

Actividades en el ámbito de las ciencias espaciales

La Agencia Espacial del Perú efectúa estudios de astronomía sobre cuerpos menores en el sistema solar desde el observatorio astronómico de Moquegua, instalado en el sur del Perú. Los estudios efectuados en colaboración con investigadores de otros países han producido durante 2021 publicaciones en temas sobre asteroides. Adicionalmente se viene efectuando un proyecto nacional para la evaluación de sitios candidatos a la instalación del futuro Observatorio de Rayos Gamma SWGO (Southern Wide-Field Gamma-Ray Observatory).

En el campo de clima espacial, la Agencia Espacial del Perú viene desarrollando instrumentación especializada; en ese sentido se ha desarrollado una estación receptora de ondas de muy baja frecuencia para el estudio de la ionósfera y el efecto de la actividad solar en la Tierra, cuyos resultados preliminares han sido publicados

en la conferencia 2021 de IEEE como “Development of a VLF receiver based on RedPitaya board for space weather Studies”. Adicionalmente se ha desarrollado un estudio sobre el efecto de la actividad solar en la ionósfera baja en la región Antártica en colaboración con investigadores del Brasil, publicado también en la IEEE como “Analysis of the night time lower ionosphere by monitoring VLF waves propagation in Antarctic”.

De otro lado, el Instituto Geofísico del Perú continúa efectuando investigaciones en la alta atmósfera, en las cercanías del ecuador magnético, en donde se producen fenómenos físicos como la “F dispersa”, que consiste en la formación de estructuras o burbujas de plasma ionosféricas que ascienden desde la parte baja de la ionósfera hasta alturas superiores a los 700 km, y que pueden afectar las comunicaciones de radio con los satélites; otro fenómeno físico en esta región de la ionósfera es el electro-chorro ecuatorial, que consiste en una corriente de partículas de carga eléctrica que circula alrededor de la Tierra a aproximadamente 100 km de altura. Para efectuar estos estudios el Instituto Geofísico del Perú utiliza diversos instrumentos entre los que destaca el radar ionosférico instalado en el Radio Observatorio de Jicamarca, o la red de instrumentos LISN (Low-Latitude Ionospheric Sensor Network) que comprende receptores GNSS (Global Navigation Satellite System) y de radiofrecuencia, receptores de señales satelitales, ionosondas, magnetómetros, cámaras de airglow e instrumentos ópticos.

En el campo de la astrofísica, la Agencia Espacial del Perú ha participado de un trabajo para analizar las capacidades de la red LAGO (Latin American Giant Observatory) para la detección de explosiones de rayos gama; adicionalmente se ha efectuado un estudio para determinar la influencia en la energía depositada en un detector Cherenkov cuando es alcanzado por varias partículas simultáneamente.

Actividades en el ámbito de las aplicaciones espaciales

En el marco de las actividades conmemorativas por el Bicentenario de la República del Perú, la Agencia Espacial del Perú, con el soporte técnico de AmeriGEO y en coordinación con el Instituto Nacional de Defensa Civil (INDECI); el Ministerio de Vivienda, Construcción y Saneamiento; el Centro Nacional de Estimación, Prevención y Reducción del Riesgo de Desastres (CENEPRED); y la Pontificia Universidad Católica del Perú (PUCP); organizaron del 28 de junio al 02 de julio de 2021, el primer Mapatón titulado “Unidos en las Observaciones para la gestión comunitaria del riesgo de desastre”, con la finalidad de mapear de manera colectiva problemáticas y resultados vinculados a la gestión del riesgo de desastres; en este evento los participantes tuvieron acceso a información satelital y generaron datos vectoriales y aplicaciones relevantes para la gestión de estos datos.

De otro lado, la Presidencia del Consejo de Ministros aprobó la Directiva para el acceso y uso de imágenes satelitales y aéreas para acciones de respuesta y rehabilitación por desastre o peligro inminente, mediante la cual se determinan las acciones y responsabilidades para la gestión de la información satelital y aérea orientada a la toma de decisiones en niveles altos de emergencia, en la cual interviene el Instituto Nacional de Defensa Civil; la Agencia Espacial del Perú; la Fuerza Aérea del Perú; el Instituto Geográfico Nacional; el Centro Nacional de Estimación, Prevención y Reducción de Riesgo de Desastres; y el Instituto Geológico, Minero y Metalúrgico.

Adicionalmente, la Agencia Espacial del Perú ha efectuado estudios para el control de la oferta de drogas en cooperación con la Comisión Nacional para el Desarrollo y Vida sin Drogas (DEVIDA), con el objetivo de generar de manera automática información geoespacial clasificada de la superficie cultivada de coca utilizando imágenes multispectrales proporcionadas por el Sistema Satelital peruano, y con la finalidad de disminuir la producción y el desvío de hoja de coca destinada a la producción ilícita de drogas.

El Instituto Nacional de Defensa Civil viene desarrollando investigaciones mediante el uso de imágenes satelitales en temas tales como el monitoreo de lagunas en los

andes, la evaluación de sequías agrícolas, o la identificación de daños en viviendas por sismos.

El Perú viene participando junto con UN-SPIDER, GLOFAS del programa Copernicus, Airbus y ZFL de la Universidad de Bonn, en un proyecto internacional con el objetivo de desarrollar un procedimiento para mejorar los Sistemas de Alerta Temprana en caso de inundaciones, mediante la incorporación de pronósticos sobre posibles impactos.

La Agencia Espacial del Perú ha ejecutado un proyecto de intercambio de experiencias en tecnologías geoespaciales con el Instituto Geográfico Agustín Codazzi en el desarrollo de metodologías para el aprovechamiento de las imágenes del satélite PerúSAT-1; como resultado, el Perú generó un modelo de elevación digital del distrito de Carabayllo validado para la generación de cartografía escala 1:25,000 y Colombia generó mapas de comportamiento de sequías y desarrollo del análisis para el comportamiento de los cuerpos de agua para inundaciones entre los años 2019-2020 del municipio de Bolívar.

Adicionalmente se ha hecho un uso intensivo de los recursos espaciales disponibles para la atención de emergencias nacionales en diversos tipos de situaciones tales como áreas afectadas por fallas geológicas, sismos importantes e incendios forestales.

Actividades en el ámbito de la capacitación y la divulgación científica

La Agencia Espacial del Perú desarrolla un programa de formación de especialistas peruanos en el uso de las imágenes satelitales y en tal sentido en 2021 se efectuaron 22 cursos virtuales en diversos niveles y 03 seminarios virtuales, alcanzando un total de 334 horas académicas y la participación de 2846 profesionales provenientes de diversos sectores y con distintas especialidades; con la finalidad de incrementar la difusión de estos cursos virtuales se ha puesto en línea un sitio web dedicado a la comercialización de los cursos. Adicionalmente, durante 2022 se tiene previsto ofrecer un diplomado en geotecnologías en cooperación con instituciones académicas locales con la proyección a maestrías y doctorados.

El Instituto Nacional de Defensa Civil y la Agencia Espacial del Perú co-organizaron el webinar internacional “Uso de la Tecnología Satelital en la Investigación para la Gestión de Riesgo de Desastres” llevado a cabo el 29 de abril de 2021 con participación de NOAA, UN-SPIDER, la Comisión Nacional de Actividades Espaciales de Argentina, el Instituto Geográfico Agustín Codazzi de Colombia y la Universidad Federativa de Santa María de Brasil; el evento tuvo una participación aproximada de 700 personas.

La Agencia Espacial del Perú y World Space Week Association co-organizaron durante la Semana Mundial del Espacio 2021 una serie de exposiciones virtuales con la participación de diversos ponentes nacionales e internacionales sobre diversas temáticas del campo espacial.

Actividades en el ámbito de las operaciones espaciales

El Perú lleva a cabo la operación del satélite PerúSAT-1 de manera responsable y observando los lineamientos de sostenibilidad a largo plazo de las actividades en el espacio ultraterrestre sobre seguridad de las operaciones espaciales, en este sentido el equipo de operadores peruanos efectúa regularmente ejercicios de entrenamiento para el mantenimiento y para la deorbitación del satélite una vez que concluya su periodo operativo. Durante 2021 se han efectuado maniobras de control para el mantenimiento de la órbita, así como también correcciones para evitar colisiones en resguardo de la infraestructura espacial peruana y con la finalidad de no incrementar la cantidad de desechos en órbita.

Actividades en el ámbito de la tecnología espacial

El 22 de diciembre de 2021 la Agencia Espacial del Perú efectuó el lanzamiento exitoso del cohete sonda Paulet 1C desde la base de lanzamiento de Punta Lobos, al

sur de Lima. El programa de cohetes sonda Paulet tiene como finalidad desarrollar un vehículo que pueda transportar al espacio ultraterrestre cargas útiles para estudios científicos de la alta atmósfera. El programa ha sido nombrado en honor al sabio peruano Pedro Paulet, quien hizo funcionar en 1900 el primer motor de combustible líquido, llevando por primera vez a la práctica la solución tecnológica que sigue siendo utilizado en la actualidad para lanzar satélites al espacio.

Asimismo, cabe destacar que en junio, el Ministerio de Transportes y Comunicaciones inició la implementación del proyecto de Internet satelital “Conecta Selva” que brindará este servicio a 1034 localidades en la regiones de Amazonas, Loreto, Madre de Dios y Ucayali. Se espera que esta herramienta contribuya al desarrollo del país, incrementando los servicios públicos y la inclusión social.

United Arab Emirates

[Original: English]
[3 January 2022]

Exploration Missions Supporting International Scientific Community

- Six years after the announcement of a Mars space programme, the Emirates Mars Mission (Hope Probe), was successfully launched on July 20, 2020, on-board a Japanese rocket and arrived successfully in orbit around Mars on February 9, 2021. EMM is the UAE’s first mission to Mars and is designed to orbit Mars and study the dynamics of the Martian atmosphere on a global scale, as well as on both diurnal and seasonal timescales.

Using three scientific instruments on board of the spacecraft, EMM will provide a set of fundamental measurements to improve the understanding of Mars’ lower and middle atmospheric circulation and weather. Combining such data with the monitoring of the upper layers of the atmosphere, EMM measurements will reveal the mechanisms behind the upward transport of energy and particles, and the subsequent escape of atmospheric particles from the gravity of Mars.

EMM was a result of a collaboration between the UAE Space Agency (UAESA), Mohammed Bin Rashid Space Center (MBRSC), University of Colorado, Arizona State University, as well as Mitsubishi Heavy Industry (MHI). The collected scientific data will be shared with more than 200 academic and scientific institutions around the world. On October 2021, the UAE has started sharing the first batch of data on the EMM official website.

- In 2021, the EMM team launched the fifth cycle of the Explore Mars Competition (EMC) offering science, technology, engineering, and mathematics (STEM) students an opportunity to explore the red planet using scientific data from EMM’s Science Data Centre. EMC aims to encourage students to conduct research that would contribute to the development of both the educational and specialized sectors, as well as deepen their scientific knowledge about Mars and gain an in-depth understanding and new skills for scientific analysis. The competition aims at enhancing knowledge transfer, scientific research, and science development for the benefit of the advancement of space sciences and all human kind.
- Built on the knowledge and experience gained through the success of the EMM, the UAE Space Agency announced the commencement of a new Emirati interplanetary mission, which involves an expedition to the orbit of Venus, followed by an exploration of the asteroid belt beyond Mars. The mission is set to launch in 2028 and land on the seventh asteroid in 2032. The mission is designed to further accelerate the young nation’s space engineering, scientific research and exploration capabilities and drive innovation and opportunity in the country’s private sector. The mission would also help to create economic spillover through the creation of new jobs, attracting more human resources, and

the establishment of new national companies that would contribute to the mission.

- Under the Emirates Lunar Mission – 2024, the aim is to study various aspects such as thermal properties of the lunar surface and the formation and components of the lunar soil. The mission also aims to pave the way for discoveries that can contribute to the development of science and specialized high-precision technologies in the space sector. On 18th of August 2021, the first prototype of Rashid Rover, has undergone a successful functional testing. Additionally, on 28th of October 2021, MBRSC signed a memorandum of understanding (MOU) with Airbus Defence and Space to collaborate on ELM in the field of material testing on site at the surface of the Moon by demonstrating adhesive material experiment. The MOU between the two parties further entails other scopes of work such as exploring the realization of an end-to-end In-Situ Resource Utilization (ISRU) demonstration, collaborating in capability development for lunar surface operations, mobility, robotics and regolith processing.
- MYSAT 2, is a 2U CubeSat, which is an educational mission developed by Khalifa University’s students with support from Al Yah Satellite Company (Yahsat) and Northrop Grumman. The satellite was launched on board of the Cygnus CRS-15 cargo mission and was deployed on June 2021 from the spacecrafts external deployer after departing from the International Space Station (ISS). The primary mission of the (second CubeSat, previously known as MYSat-2 OR MYSAT 2), is to enable students to design, implement, and test software modules for attitude determination and control systems (ADCS).

Capacity-building activities

- On April 2021, the second batch of the Emirati Astronaut Program was announced. Two candidates, Mohammed Al Mulla and Noora Al Matrooshi, the first Arab female astronaut, were selected from over 4,000 candidates. The programme aimed towards developing skilled and capable Emirati astronauts to embark on future space missions and serve as ambassadors for the UAE and the Arab world in space exploration, in addition to encouraging and inspiring young generations to be successful in STEM subjects to promote the culture of research and passion for exploration and innovation.
- In October 2021 and during space week at EXPO 2020, the UAE Space Agency announced the “Space Economic Zones Program” initiative. The initiative offers stimulus packages including quick establishment procedures for start-ups, easy financing options, workspace at affordable rates, access to space facilities in the UAE, promotion and access to the market, acceleration and incubation programmes for start-ups and companies to grow and many more. The initiative’s purpose is to bring together enabling requirements, infrastructure and national research facilities to increase utilization and to ensure private sector contribution and benefits.

Furthermore, the initiative promotes the creation of a sustainable framework to facilitate public-private partnerships in the space sector, build both an attractive and integrated business environment to meet local and global demands, stimulates innovation and adopts space technology in commercial space ecosystems, and lastly, supports the establishment of start-ups and increases their commercialization potential.

- Also in October of 2021, the UAE Space Agency has launched a new competition under Space Analytics and Solutions (SAS) Program, which offers up to AED 4 million in funding for next-generation proposals that addresses two key global challenges, which are climate change and food security. The participation is open for scientists, entrepreneurs, academics, and innovators who are seeking to address some of humanity’s greatest challenges. The Program aims to create commercially viable applications based on satellites

data, promote space downstream applications, increase demand for value-added services, and offer solutions to local and international challenges in the fields of food security and climate change.

Environmental and Disaster Management

- On March 2021, DMSat-1, the UAE's first environmental nanometric satellite, was successfully launched and deployed in space. The satellite was developed by Dubai Municipality in collaboration with MBRSC. The satellite will be monitoring air quality and Greenhouse Gas (GHG) emissions. It also detects the source of air pollutants and concentration of dust and its impact on public health in the UAE. The information provided by the satellite will help determine the necessary measures needed to address climate change and develop long-term environmental plans.
- On July 2021, a team of Emirati entrepreneurs has launched the first satellite to track wildlife in the UAE (Ghalib). The satellite was developed by an Emirati Company (Marshall Intech). It was successfully launched on SpaceX Falcon-9 rocket at Cape Canaveral Space Force Station, Florida. The satellite will allow researchers to track wildlife and bird migration in the remote areas, as well as help in monitoring animals and conservation.

Effective Local and International Partnerships

- The 72nd International Astronautical Congress (IAC), the world's premier space event was held at the Dubai World Trade Centre in Dubai from October 25th to 29th, 2021, under the theme "Inspire, Innovate and Discover for the Benefit of Mankind". The IAC this year hosted more than 6,500 space enthusiasts and participants from over 110 countries. This year's IAC comes from the UAE's commitment to join efforts in preserving outer space and by taking advantage of the practical experiences and contributions of different stakeholders to maximize the benefits of space to everyone, everywhere. Lastly, the IAC provided a platform for networking between global companies in the space sector, start-ups, and academic institutions at a regional and an international level.
- In March 2021, a MoU was initiated and signed between the UAE Space Agency and the Singaporean Committee on Space, which comes within the objectives of the Executive Council of the Emirate of Abu Dhabi.
- In October 2021, a memorandum of understanding "MOU" was signed between the UAESA and the Israeli Space Agency, with the aim of defining mutual projects and creating opportunities for investment and more cooperation between the two countries in the space field.
- Also, in October 2021, an MoU was signed between the governments of the UAE and the Russian Federation to enhance future cooperation and long-term partnership. The MoU will create investment channels between the two countries in the field of space, as well as supporting and encouraging start-ups to enter the market in both countries.
- In November 2021, UAE, the Russian Federation and Kazakhstan signed a trilateral agreement to modernize Baikonur Cosmodrome's launch site.
- On 15 November 2021, Dubai Airshow and the UAE Space Agency signed an MoU to further position the event as a key platform for companies and investors in the space sector.

Supportive Space Policies and Legislations

- The UAE Space Agency announced the new strategic direction for the coming period, with clear focus on supportive legal and regulatory framework, bringing together infrastructure and national research facilities to increase utilization and

private sector benefits, and building national capabilities through enabling the private sector's contribution.

Additionally, the agency announced the Space Science Technology Policy "SSTP". The SSTP aims to enhance the space sector's contributions to the national economy and promote the UAE's regional and international presence in the space sector. The policy sets the general technological and scientific priorities for the UAE's space industry and activities for the upcoming years.
