United Nations A/AC.105/C.1/119

General Assembly

Distr.: General
16 November 2020
English
Original: English/Spanish

Committee on the Peaceful Uses of Outer Space
Scientific and Technical Subcommittee
Fifty-eighth session
Vienna, 1–12 February 2021
Item 15 of the provisional agenda*
Space and global health

Responses to the set of questions regarding policies, experiences and practices in the use of space science and technology for global health

Note by the Secretariat

I. Introduction

1. At the fifty-sixth session of the Scientific and Technical Subcommittee, in February 2019, the Working Group on Space and Global Health of the Subcommittee agreed on a set of questions regarding policies, experiences and practices in the use of space science and technology for global health (A/AC.105/1202, annex III, appendix II), to be circulated by the Secretariat in 2019 and 2020 to States members of the Committee and international intergovernmental and non-governmental organizations, in accordance with the Working Group's multi-year workplan (A/AC.105/1202, annex III, appendix I).

2. Accordingly, a communication was sent on 16 October 2020 with the invitation to provide responses to the set of questions by 13 November 2020 so that the information provided could be made available to the Subcommittee at its fifty-eighth session.

3. The present document has been prepared by the Secretariat on the basis of information received from six Member States, namely, Australia, Germany, Japan, Mexico, Paraguay and Turkey.

* A/AC.105/C.1/L.387.

II. Replies received from Member States

Australia

[Original: English]
[13 November 2020]

Question 1

The Australian Antarctic Division, an Australian Commonwealth Government agency, signed a memorandum of understanding with the National Aeronautics and Space Administration (NASA) of the United States of America in 1993, which is still in effect. This memorandum of understanding specifies the terms for cooperation in the Antarctic between certain programmes within the NASA Life Sciences Division and the Polar Medicine Branch of the Australian Antarctic Division.

Question 2

University stakeholders identified an online forum as a useful platform for communication, allowing for programmes, issues and updates in the field to be posted and discussed as they arise. They noted that such a platform could be limited by institutions having restricted Internet access.

Question 3

The Australian Academy of Science established the National Committee for Space and Radio Science (NCSRS), which will deliver the plan entitled "Australia in space: a strategic plan for space science". The Australian Space Agency is a key sponsor of the strategic plan, as it aligns with the Agency's purpose, as well as its "leapfrog" approach to identifying priority areas for research and development. The strategic plan aims to both grow and transform the use of space in the broader areas of the economy, such as the health and medicine sector.

The Space Health and Life Sciences Working Group of NCSRS is focused on space life sciences rather than health outcomes/clinical practice involvement with the space sector. The Working Group will deliver an initial report to NCSRS about how to best position Australia in the international space life sciences landscape of the coming decade by engaging in the following:

(a) Identifying opportunities and priority areas for action and leadership in space medicine;

(b) Delivering a report to NCSRS which provides a stocktaking of current and future capabilities and resources in the area; identifies national and/or international opportunities, requirements and potential innovations in the next decade; and suggests strategies and resourcing necessary to maximize new opportunities;

(c) Discussing next steps and implementation plans to advance the space medicine sector of Australia in the national context.

Question 4

In the period 2019–2020, the Australian Government Department of Health supported the Bureau of Meteorology and the Department of Agriculture, Water and the Environment to deliver the Reducing Life Lost from Heatwaves project. The project brought health, social and environmental data together, including datasets from Digital Earth Australia. The results provide a national picture of heat-related health risk across Australia, including spatial analysis across the capital cities in each state and territory.

The Australian Government Department of Health has previously undertaken analysis of disease outbreaks, including global geospatial representations of the exposure risk for polio in Australia.

The Australian Institute of Health and Welfare (AIHW) regularly publishes reports and web products from its health and welfare data collections that use data at various geographical levels. AIHW also undertakes spatial analysis of health and welfare data, which are often published on the AIHW website.

AIHW is committed to providing statistical information that governments and the community can use to promote discussion and inform decisions on health, housing and community services. AIHW holds valuable data from a wide range of health and welfare data collections at a range of geographical scales, such as public health areas, Statistical Areas (levels SA2 and SA3) and smaller areas. Strict privacy and confidentiality controls are applied to small-area data. Results are sometimes unable to be reported for all areas in Australia in cases where reporting small numbers could risk disclosing private or confidential information. At the present stage, AIHW does not have a policy specific to providing open access to their geospatial data holdings. The data collections published according to geography are available at www.aihw.gov.au/about-our-data/aihw-data-by-geography.

AIHW plans to make small-level geospatial data available to key stakeholders through secure access for two projects.

On 26 February 2016, the Government of Australia released the Geo-coded National Address File (G-NAF) of PSMA Australia and its Administrative Boundaries datasets. PSMA is an unlisted public company owned by the nine governments of Australia, including the Commonwealth and state and territory governments. PSMA receives location data from each of the jurisdictions and standardizes, formats and aggregates the data in authoritative location-based national datasets, which can be used for personal navigation applications, infrastructure planning, business planning and analysis, logistics and service planning, and government service delivery and policy development. The first release of the G-NAF and Administrative Boundaries datasets was made available for use and reuse at no cost to end users through the online data portal of the Government of Australia (www.data.gov.au) on 26 February 2016. Updated versions of the data are published quarterly.

The Government of Australia is investing 36.9 million Australian dollars ($A) for Digital Earth Australia, the digital infrastructure that uses satellite data to detect physical changes across the territories of Australia in unprecedented detail. This will be accessible for government offices, industry and individuals, allowing for a wide range of applications such as the monitoring of environmental and health changes. Examples are the use of satellite imagery to monitor disease outbreaks and to improve disaster risk reduction strategies.

The Australian Government Department of Health has created a coronavirus disease (COVID-19) resources hub that includes authoritative information on Commonwealth respiratory clinics and national COVID-19 assessment centres. The hub also includes the locations of Australian aged care services, Australian public and private hospitals, pathologists, respiratory medicine specialists and general practitioners. The hub improves access to geospatial assets by enabling COVID-19 response activities at the national level and amplifying critical data, such as the location of testing sites, at the local level.

Question 5

The National Health Services Directory contains geographical information for general practitioner, allied health, specialist and other health facilities and services.

AIHW is currently exploring software and application options for geocoding relevant health and welfare data collections.

Question 6

See the response to question 3 regarding the Space Health and Life Sciences Working Group.

Question 7

A strategic pillar under the Australian Space Agency's strategy entitled "Advancing space: Australian civil space strategy 2019–2028" is the "Inspire" pillar, which aims to showcase Australia's achievements in space activities to inspire young people to take up careers in science, technology, engineering and mathematics (STEM) and support growth in the future workforce. That pillar also includes the aim of identifying opportunities to increase capability in the space sector. While this strategy is not explicitly linked to the health sector, it provides a foundation for increasing capacity-building as the space health industry grows in Australia.

A university stakeholder stated that it was aware of high school-level programmes to engage students' interest in space and acquire a range of skills to develop and use space technology. An example of such a programme is found at Hamilton College in Adelaide.

The Space Expo and other community-based programmes conducted in Adelaide facilitate community awareness and encourage students to engage with the space programme early in their schooling. However, those programmes are focused on STEM subjects rather than medicine and life sciences.

Question 8

AIHW has a geospatial strategy in place to build capability in geographical information systems data, analysis and reporting through the use of web-based products.

The Government of Australia is investing more than $A 260 million in better global positioning systems and new ways for industry to access and use satellite imagery and position, navigation and timing data that can support medical and health-related applications. The investment includes:

(a) $A 160 million to deliver a satellite-based augmentation system to provide positioning capability to an accuracy of 10 cm across all of Australia, with applications in agriculture, mining and other industries;

(b) $A 64 million to establish a national positioning infrastructure capability that will drive productivity and innovation in a number of industries, including transport, agriculture, mining and construction, by providing more accurate global positioning data;

(c) $A 36.9 million for Digital Earth Australia (discussed in the response to question 3).

Question 9

Briefings of the Bureau of Meteorology are routinely incorporated into summer-preparedness activities. Their briefings provide a weather outlook for the likelihood and types of natural disasters forecast for the summer season. These are used to inform jurisdictional risk management strategies before summer begins.

Ambulance authorities use geospatial tracking for their assets. Global positioning trackers are also worn by Australian Medical Assistance Teams on deployment overseas.

Question 10

The Australian Space Agency's strategy entitled "Advancing space: Australian civil space strategy 2019–2028" has listed "'leapfrog' research and development" as a national civil space priority area. Space medicine and synthetic biology are listed as areas of opportunity within research and development that can grow and transform Australia's space sector.

See the response to question 3 regarding the Space Health and Life Sciences Working Group.

Question 11

The SmartSat Cooperative Research Centre is currently considering a “mapping project” to identify cross-sectoral dependencies of space technology.

See the response to question 3 regarding the Space Health and Life Sciences Working Group.

The Department of Health has used interactive mapping and static mapping to respond to the 2019/20 bushfire emergency. This has included use of live geospatial feeds from the EMSINA network, along with key health and aged care spatial datasets.

The Department of Health has used interactive mapping and static mapping to respond to the COVID-19 pandemic. This has included key spatial datasets such as those relating to COVID-19 case numbers, testing rates, demographic information and vulnerable populations, as well as key health facilities.

Germany

[Original: English]
[13 November 2020]

Question 1

The key issues paper entitled “Digitalization of the health-care industry” (“Digitalisierung der Gesundheitswirtschaft”) (2017), published by the Federal Ministry for Economic Affairs and Energy (BMWi), describes that means such as digitalization, telemedicine, uniform standards for telematics infrastructure applications and better use of health-care data can and should be used to provide better and more humane patient care.

Although space infrastructures and technologies already offer solutions to individual problems and challenges in other sectors, there is still too little knowledge and transparency of the technological potential for the domestic industry to be able to adequately assess the competences and performance of the space sector. The use of space infrastructures and services is still underrepresented in the specialist discussions on digitization and modernization of the health sector and modern medicine and should be promoted at the national level in order to initiate innovation.

The Federal Ministry of Health (BMG) also emphasizes the importance of integrating new technologies and services (e.g., spaceflight, digitization and artificial intelligence) into the health-care system and patient care. Currently, the health-care system is facing decisive changes: digitization, globalization, the use of artificial intelligence and robotics, and demographic change will have a major impact on the health-care sector and further increase the efficiency of preventive health care and medical care.

A central element of the space strategy of the Federal Government of Germany, “Making Germany’s space sector fit for the future”, is to strengthen the links between the space industry and other sectors. This is in line with the objectives to expand strategic space expertise and develop new markets. In order to support the strategic exchange between the space and health sectors in particular, the DLR Space Administration has placed a new focus on this issue through the “INNOspace” initiative (www.dlr-innospace.de), which offers a platform at the national and European Union levels for identifying cross-sectoral solutions and initiating their implementation.

As part of INNOspace, the “Space2Health” network (https://space2health.de) aims to ensure the sustainability of the exchange between the space and health sectors and to identify and initiate common topics for cooperation. The network serves as a new component of the INNOspace initiative and a communication platform for the intensive exchange of knowledge and ideas between the space and health sectors. The

aim of the network is to establish cross-sectoral ties and to initiate and consolidate synergies between the two sectors. In February 2020, the DLR Space Administration held a conference on space technologies and services for the health sector in Stuttgart, Germany. The aim of the conference was to identify the potential for innovative applications of satellite-based Earth observation, navigation and communication, as well as the potential of technology transfer for the health-care sector. The conference was attended by both space professionals and health-care experts, including representatives of health insurance companies and medical colleges.

A longstanding institutional arrangement for cooperation and exchange between the health and aerospace sectors is the DLR Institute of Aerospace Medicine (www.dlr.de/me/en/desktopdefault.aspx). The Institute conducts interdisciplinary research into the health and performance of humans in space, in aviation and on the ground. Its biological, medical and psychological research examines the effects that environmental conditions have on the basic mechanisms of human health, living conditions and human performance. The Institute's research results and technological innovations are directly implemented into psychological and biomedical applications. Within the Institute, a digital health working group is studying how modern technologies can be provided locally to patients over a spatial distance.

A practical example of cooperation between the space and health sectors was the Myotones experiment (www.dlr.de/content/en/articles/missions-projects/horizons/experimente-horizons-myotones.html), conducted during the "Horizons" mission of astronaut Alexander Gerst to the International Space Station (ISS) in 2018. The project aimed to analyse the basic biomechanical properties of the skeletal muscles in a non-invasive way by measuring and evaluating the changes in human resting muscle caused by the lack of gravity. The experiment was a collaborative effort between Charité – Universitätsmedizin Berlin, the University of Southampton, the medical company Myoton AS, the DLR Space Administration and the European Space Agency. Insights from this experiment can be applied to optimize rehabilitation and training programmes while enabling the objective evaluation of the effectiveness of such programmes in clinics and in practice.

Another example of advantageous cooperation between the health and space sectors is the Crew Interactive Mobile Companion (CIMON) (www.dlr.de/content/en/articles/news/2018/1/20180302_cimon-the-intelligent-astronaut-assistant_26307.html), an autonomous astronaut assistant featuring artificial intelligence that has been deployed to ISS twice since 2018. CIMON is a cooperative effort between the DLR Space Administration, Airbus, IBM and the Ludwig-Maximilian-University (LMU) Hospital in Munich and aims to support astronauts in increasing the efficiency of their work. Given the high exposure of astronauts to stress, LMU scientists want to study whether CIMON can act as a partner and assistant to astronauts, thereby reducing their exposure to stress. Possible applications on Earth could be to support engineers, researchers and doctors, address artificial intelligence-based enquiries about medical symptoms and provide everyday assistance to elderly people living alone.

Question 2

Effective coordination among various national and international actors on global issues is desirable in principle. On the issue of health in particular, the coronavirus disease (COVID-19) pandemic has demonstrated the demand for collaboration on a global scale. Space applications have played an important role in monitoring the implications and effects of the pandemic (e.g., through Earth observation by satellite) and in adapting to life with the coronavirus (e.g., through space-enabled telemedicine). Furthermore, the space sector creates innovations that can be used on Earth and in everyday life, including with regard to global health issues. Through information, communication and cooperation, cutting-edge space technologies and services have the potential to help solve today's health challenges.

Improving the coordination among actors on space and global health issues, and the mechanisms through which this could best be achieved, is therefore an important area for the Working Group on Space and Global Health to consider.

In this regard, how existing space-related coordination mechanisms can also allow for effective coordination on space and global health issues should be investigated in particular. The Inter-Agency Meeting on Outer Space Activities (UN-Space) has a proven track record of bringing together United Nations entities to discuss matters related to the use of space technologies in their activities. In 2015, the Office for Outer Space Affairs, the World Health Organization (WHO) and other entities prepared an excellent special UN-Space report on the many ways in which United Nations entities were already using space science and technology for public health (A/AC.105/1091). Based on that positive experience, UN-Space could explore further ways to enhance coordination on space and global health within the United Nations system, for example, through closer cooperation and coordination between the Office for Outer Space Affairs and WHO. Another mechanism could be the designation of WHO collaborating centres, where national institutions focused on space science and technology could carry out activities in support of WHO programmes.

Another avenue to explore could be a concept involving regional support offices and network infrastructures similar to those established in relation to the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), aimed at connecting the space and disaster management communities. Experiences from the aforementioned “Space2Health” network in bringing together the space and health communities could be provided.

Question 3

An important aspect of space-enabled technologies in support of global health is the trustworthiness of information. The COVID-19 pandemic has demonstrated how dependent an effective epidemiological response is on the collaboration of society as a whole. In order to improve access to and use of space-based applications, users need to be able to rely on information provided to them. One mechanism to explore is the use of digital signatures in space-enabled health applications to validate that the information provided is from trusted sources, such as international or national health agencies, and has not been altered. The adding of information for spatial public health analysis through another entity for decision support can also be digitally signed. Furthermore, public-private-key methods can be used to append a digital signature to any encrypted or non-encrypted digital spatial information from the health or space domain.

Questions 4, 5, 6, 8 and 9

Further information may be provided at a later stage.

Question 7

The medical research facility “:envihab” of the DLR Institute of Aerospace Medicine is dedicated to studying human spaceflight problems whose answers might also yield beneficial applications for problems of life on Earth, such as ageing, being bedridden, immobilization and isolation. Through a wide range of research opportunities, it allows young scientists to explore future challenges of human spaceflight, as well as problems related to life on Earth.

Additional information on further mechanisms may be provided at a later stage.

Question 10

The key principle of the space strategy of the Federal Government of Germany is to use space for the benefit of the Earth and to assess space activities according to their contribution towards solving societal challenges. The strategy notes that

significant potential lies in applications and services markets that are only made possible through space-based infrastructures. It considers space activities as constituting an enabling technology that can provide an infrastructure for new value chains in other economic sectors, especially in downstream value-added services. The space sector creates innovations that can be used for everyday life. Through information-sharing, communication and collaboration, new space-enabled applications can reach other sectors of the economy and act as promoters of innovation (for example, smart cities). Such applications can be used in the service of modernizing the health sector.

The key issues paper "Digitalization of the health-care industry" by the Federal Ministry for Economic Affairs and Energy (BMWi) describes that means such as digitalization, telemedicine, uniform standards for telematics infrastructure applications and better use of health-care data can and should be used to provide better and more humane patient care. The Federal Ministry of Health (BMG) also emphasizes the importance of integrating new technologies and services (e.g., space applications, digitization and artificial intelligence) into the health-care system and patient care. Currently, the health-care system is facing decisive changes: digitization, globalization, the use of artificial intelligence and robotics, and demographic change will have a major impact on the health-care sector and have the potential to further increase the efficiency of preventive health care. The high-tech strategy of the Federal Government of Germany furthermore states that particular attention will be paid to research into providing health-care services more effectively to hard-to-reach population groups, an effort in which telemedicine will prove beneficial.

The DLR Space Administration has initiated and supported initiatives to promote innovation, cross-sectoral technology transfer and commercialization. The INNOspace initiative was founded on behalf of BMWi in 2013. INNOspace creates incentives and platforms for the transfer of technology, services and knowledge between the space industry and other sectors of the economy (spin-offs and spin-ins). The emphasis of the INNOspace initiative is also focused on supporting the new space economy and commercialization of space technologies. INNOspace is aimed at companies, colleges, universities, research institutions, and industry associations and clusters, as well as policymakers and investors, ministries and public authorities.

Question 11

Please refer to the previous answers for specific practices and initiatives.

Japan

[Original: English]
[12 November 2020]

Question 1

In 2015, the Japan Aerospace Exploration Agency (JAXA) and National Center for Global Health and Medicine (NCGM) of Japan signed a cooperation agreement. Under that agreement, NCGM developed and improved terminals for collecting biological information, established a monitoring system by collecting clinical information such as physiological tests from medical institutions in developing countries, and examined the possibility of improving technologies related to disease diagnosis that could contribute to improving the lifestyle of patients with lifestyle diseases.

Question 2

The Office for Outer Space Affairs could possibly collaborate with the Future Earth Health Knowledge-Action Network ("Health KAN") platform. Health KAN is a global research programme designed to provide the knowledge needed to support transformations towards sustainability. It focuses on systems-based approaches,

which seek to deepen our understanding of complex Earth systems and human dynamics across different disciplines.

Question 3

In Japan, the Basic Plan for Space Policy was created pursuant to article 24 of the Basic Space Law (Law No. 43, 2008). The Basic Plan, a comprehensive space policy of Japan, has been published five times, in 2009, 2013, 2015, 2016 and 2020. The current Basic Plan includes, like its three predecessors, a section referring to the promotion of international cooperation in the space activities of Japan. The Basic Plan of 2020 includes contributing to global challenges such as energy, climate change, environment, food, public health and large-scale natural disasters by utilizing Japan's space technology.

Question 4

In Japan, there is an open and free platform called "Tellus" that is aimed at creating a new business marketplace using governmental satellite data. Tellus contains not only governmental satellite data, but also a great amount of commercial ground and satellite data. By using the cloud, graphics processing units and computing storage resources, the services are made openly and freely available, with some limits.

Question 5

There is an existing effort for the geotagging of patients and infections, conducted by NCGM.

Question 6

There is cooperation in the field of atmospheric chemistry and health in the Monsoon Asia and Oceania Networking Group (IGAC-MANGO). The main objective of IGAC-MANGO is to form a cohesive network of atmospheric scientists in the Asian monsoon region, facilitate collaboration between Asian and international scientists, and foster the next generation of scientists in this region. IGAC-MANGO plans to use data acquired from Japanese satellites.

Questions 7, 8, 9 and 11 (a), (c) and (d)

Not applicable.

Question 10

Please refer to the Japanese expert's presentation delivered in the meeting of the Working Group in February 2019.

Question 11 (b)

NCGM is engaged in tele-epidemiology in the Lao People's Democratic Republic.

Remote sensing is one of the efficient ways of tackling environmental health. One example of Japanese initiatives is air pollution monitoring using Himawari data. Himawari is a Japanese geostationary meteorological satellite used for weather forecasting, and it could monitor particles such as desert dust and air pollutants, which affect the quality of the atmosphere. Also, the Global Change Observation Mission–Climate (GCOM-C) has the capability of observing atmospheric particles (including desert dust and PM2.5 particulate matter) on a global scale, and it will also contribute to air pollution monitoring. One idea is to utilize those data to predict areas where people suffer from health problems due to air pollution.

Question 11 (e)

Japan would like to suggest that the Secretariat designate health experts, not just outer space experts, as members of the Working Group.

Japan would like to point out that current lack of access to the necessary data (e.g., weather data) may hinder the effective research in the fields of space and global health. The lack of access is often caused by the cost and the difficulty of understanding how to attain data. The common data platform may possibly improve the situation.

Mexico

[Original: Spanish]
[10 November 2020]

Question 1

The Mexican Space Agency currently collaborates closely with:

(a) The National Academy of Medicine of Mexico, an advisory body to the Federal Government on issues relating to public health in Mexico;

(b) Various health institutions that, in addition to providing medical care to citizens, carry out medical research in the country's health sector;

(c) The faculties of medicine of several educational institutions in Mexico (various activities).

Question 2

Every year, the Mexican Space Agency organizes a national congress on space medicine with the aim of bringing together both national and international health, education and governmental institutions so that the various actors can learn about each other's work and establish synergies leading to knowledge and technology transfer from the space sector to the health sector, thus generating solutions to health problems in Mexico. The congress could be elevated to the international level, and for Mexico it would be an honour to serve as pilot venue.

Question 3

The members of the governing board of the Mexican Space Agency include representatives of the National Autonomous University of Mexico and the National Academy of Medicine, which are working hand in hand to establish mechanisms enabling the effective use of space technologies for the benefit of public health in Mexico and to extrapolate the results to other regions of the world. Specifically, the National Autonomous University of Mexico and the Mexican Space Agency have concluded a cooperation agreement providing for the establishment of a specialized division as part of the University's Faculty of Medicine in order to build capacity and knowledge with regard to the use of space technology in the health sector. Furthermore, the work with the National Academy of Medicine in this area has led to the publication of a book that sets out a public policy proposal for promotion of the use and development of space technology in the health sector.

Question 4

There is currently a platform in Mexico that uses remote sensing to obtain geospatial information relating to such issues as the coronavirus disease (COVID-19) and vector-borne diseases such as zika, Chagas disease and dengue. The project was funded by the joint fund of the Mexican Space Agency and the National Science and Technology Council.

Question 5

Response pending.

Question 6

The Mexican Space Agency has held meetings with the National Commission on Space Activities (CONAE) of Argentina for the purpose of exchanging experience relating to the topic of environmental pollutants and the potential emergence of diseases such as COVID-19. It has also held meetings with the European Space Agency for the same purpose.

Efforts are being made to harness remote-sensing technology as a means of contributing to the implementation of projects that benefit the population. The Mexican Space Agency is working to establish a joint initiative with the Ministry of Health of Mexico, with the aim of helping to solve public health problems.

Question 7

As already mentioned, the Mexican Space Agency organizes a space medicine congress that enables young doctors and other participants to learn, through electronic media, how space technology has a positive impact on the health sector and how advances in space medicine can help to address health issues.

Moreover, the National Autonomous University of Mexico is a few months away from inaugurating, as part of its Faculty of Medicine, a specialized division focused on capacity-building in the area of space medicine and its use on Earth.

Question 8

The Mexican Space Agency has sought to hold meetings with various space agencies with a view to exchanging information and experience relating to the use of space technology and existing problems in the health sector. It would be desirable to formalize these mechanisms and to share at the global level the information and data obtained. For Mexico, it would be an honour to contribute to the establishment of a repository for the exchange of such experience.

Question 9

During the current global health emergency, the Mexican Space Agency has helped to ensure that technologies such as those used in telemedicine and/or tele-assistance are applied so that the population receives medical and psychological support. In addition, the data obtained have been geo-referenced in order to generate maps that make it possible to locate, understand and predict the spread of the disease.

Question 10

(a) Six Mexican congresses on space medicine;

(b) Five forums on the theme “Towards new horizons in medicine”;

(c) A book on space medicine (Mexican Space Agency-National Academy of Medicine-National Science and Technology Council);

(d) A book on space nursing (Mexican Space Agency-National School of Nursing and Midwifery);

(e) The launch of specialist programme on aerospace medicine at the National Autonomous University of Mexico.

Question 11 (a)

There is an area dedicated to telemedicine in every state in Mexico. However, the procedures involved and technical issues such as connectivity are posing significant challenges.

Question 11 (b)

Platforms for epidemiological surveillance and laboratories for environmental health surveillance have been established in Mexico. However, it is necessary to build an international framework for facilitating government institutions' formal use of such information sources in decision-making.

Question 11 (c)

In Mexico, educational institutions have made great progress in this area. There are eminent Mexican researchers working on the subject.

Question 11 (d)

Government bodies carry out these activities and the Mexican Space Agency cooperates with those bodies in order to provide information to decision makers.

Paraguay

[Original: English]
[13 November 2020]

Question 1

The Paraguay Space Agency (AEP) is working closely with the Ministry of Health, specifically with the National Malaria Eradication Service (SENEPA) (www.mspbs.gov.py/senepa), which deals with all vector-borne diseases. The main objective of this collaboration is to provide tools for better decision-making using satellite data and geographic information systems (GIS), learning from the best practices and lessons learned of other countries.

The collaboration between AEP, Pacific University (www.upacifico.edu.py) and the Center of Geomatic Studies (https://centgeo.com) makes it possible for GIS students to develop projects to solve real health-related problems.

The plan is to conclude a memorandum of understanding between AEP and the Ministry of Health in December 2020, after presentation of the first results on dengue fever.

Question 2

The sharing of information and knowledge is crucial to solving not only health needs but also other needs; it will be constructive to have a centralized portal to share data and provide access to capacity-building; this is vital because we share almost same challenges in all countries. There are best practices and lessons learned that represent a valuable knowledge base for improving the government response.

Some countries had an excellent response, for example, during the coronavirus disease (COVID-19) pandemic, that can help to better understand and respond to a health crisis.

Questions 3 and 5

The respondents do not have information on these subjects.

Question 4

The Ministry of Health has an open-data policy, and that is how Paraguay enables the collaboration between academia, the Government and the private sector. AEP is promoting the strengthening of government capacities to more actively and effectively use geospatial data.

Question 6

AEP is actively exploring possibilities with other space agencies such as the National Commission on Space Activities of Argentina (CONAE), the National Commission for Aerospace Research and Development of Peru (CONIDA), the European Space Agency, the National Aeronautics and Space Administration of the United States of America (NASA), the State Space Corporation "Roscosmos" of the Russian Federation, and the National Space Organization of Taiwan Province of China, and with entities such as the Office for Outer Space Affairs, the Group on Earth Observations and AmeriGEO, to provide data and capacity-building. In 2019, Paraguay twice activated the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (International Charter on Space and Major Disasters).

Question 7

Paraguay joined the NASA Global Learning and Observations to Benefit the Environment (GLOBE) programme in 2000, engaging students and teachers to promote science; there are more than 120 schools involved. The initiative is promoted by civil society organizations. The country coordinator is Dr. Antonieta Rojas de Arias, President of the Scientific Society of Paraguay.

Question 8

AEP and other institutions of the Government of Paraguay are starting to use more actively space derived data and information. The Ministry of Health has a portal on COVID-19 (www.mspbs.gov.py/monitoreo-fases-covid19.html) and the initiative mentioned in the response to question 1 above is aimed at improving decision-making in other epidemics through the use of an open data policy.

Question 9

Since 2019, AEP has been working with the National Emergency Secretariat and helping to provide better data and tools for decision-making through active international cooperation. In 2020, AEP started to collaborate with the Ministry of Health, including to provide space-related tools to improve the response to dengue fever, as a first step. For 2021, the plan is to extend to other vector-borne diseases such as zika, chikungunya, leishmaniasis and Chagas disease.

Question 10

The described initiatives are in development; the results are planned to be published next year. The Charter activations are in the Charter portal, and the planned activities for 2021 will also be published, when the results are available.

Question 11 (a)

The national Government has a programme called Digital Agenda (www.mitic.gov.py/agenda-digital/portada) that will improve access to telemedicine and telehealth.

Question 11 (b)

The response to question 1 above describes an approach on this subject.

Question 11 (c)

There are no plans at the moment.

Question 11 (d)

The activation of the International Charter on Space and Major Disasters was the beginning of efforts relating to emergency response and humanitarian aid.

Question 11 (e)

As mentioned above, some initiatives, such as the NASA GLOBE programme, involving students, teachers, scientists and citizens to promote science and learning about the environment, have been developed and executed with the help of schools for many years.

Turkey

[Original: English]
[13 November 2020]

Question 1

There is no existing or planned formal cooperation or other institutional arrangement concerning space activities.

Question 2

The principles and coordination for the provision of personnel, materials and services should be determined for space-based global health support. An insurance fund should be established for all people in need, in order to provide uninterrupted and accessible health-care services worldwide. In addition, there is a need for health service support with increased accessibility, such as a space-based communication network infrastructure. Among the United Nations, there will be a need for a platform to establish coordination and principles and to distribute responsibilities and manage standards. Personnel, materials and service management should be planned using a strong health information system. Service management should take into account the needs of both the patient and health-care professionals in health-care delivery, such as by providing wearable biosensors, telehealth, intelligent decision support systems and voice recording.

Question 3

Turkey does not have a standing policy-based environment and governance mechanism in place or in planning for the removal of borders for global health purposes. For the purpose of sharing and processing health data by means of global technologies, legal and administrative arrangements first need to be made. It is necessary to be able to gather health data for scientific studies, provided that military and public privacy is preserved and ethical approvals of countries are obtained.

Question 4

The issues of providing health-care support by means of an information system on international platforms on open data-sharing and participatory approaches for the development and improvement of global health information are still being discussed and improvements continue.

Question 5

Integration of the information infrastructure for the management of health systems through geotagging is in our medium- and long-term plans.

Question 6

There is no existing or planned intra-sector coordination and cooperation for efficient international, regional, national and subnational competence-building activities in the application of space science and technology in the field of global health.

Question 7

There is no existing study on this subject.

Question 8

There is no existing or planned initiative on our behalf to incorporate space-based data into global health decision-making processes more comprehensively and to harmonize and share this data. Should the issues of privacy, ethical approvals and protocols be addressed, integration in our area of responsibility can be supported.

Question 9

Space technologies can support the planning and management of emergency situations on an integrated platform where remotely manageable systems (e.g., the da Vinci surgical system and biosensors), communication systems (e.g., satellite and drone systems) required by telehealth systems and aerial vehicles (e.g., drones, aeroplanes and helicopters) are used together.

Question 10

No reference document on this subject has been provided.

Question 11 (a)

Space should be used for the communication network infrastructure that will support the communication infrastructure in the field of telemedicine and telehealth, for example, for the strengthening of regional communication using virtual private networks and encrypted high bandwidth support via satellite, drone, etc.

Question 11 (b)

By using airborne platforms equipped with visual sensors and biosensors, analysis of water conditions, environmental pollution, and biological and chemical risks can be made.

Question 11 (c)

No contribution.

Question 11 (d)

It is considered to be life-saving in emergencies where teleprotection systems supported by reinforced communication systems and space platforms are used.

Question 11 (e)

Given the developments in space technologies, attention should be paid to the necessary structural and technical regulations for the different frequency band models used in communication in order to have a minimal impact on human health.