

**TEMPLATE B**  
**RESPONSE FOR CAPACITY-BUILDING NEEDS-ASSESSMENT: “Space2030” Agenda Mid-term Review**

**For Member States**

NOTE BY SECRETARIAT: the following template is designed to allow Member States to provide standardized responses to any of the 4 Overarching Objectives and to demonstrate their respective challenges and needs

<b>Overarching objective [1-4]</b>	2.1
<b>Country</b>	Ecuador
<b>Outline the nature of your national challenge(s)</b>	Owing to its geographical location and features, Ecuador is threatened by a number of natural hazards that have caused major natural disasters resulting in considerable loss of human life and economic damage.
<b>Please explain more, including whether you have already identified a space solution?</b>	With respect to natural hazards, the availability of satellite information is essential for the implementation of prevention and mitigation plans and projects, and in facilitating the urgent action that must be taken during and in the aftermath of a disaster.
<b>What kind of assistance would be most beneficial for you in this regard?</b>	Access to satellite imagery and training in its use and exploitation
<b>Relevant SDGs</b>	10 and 11
<b>Name of relevant national stakeholder</b>	Military Geographical Institute

<b>Overarching objective [1-4]</b>	1.4, 2.2, 3.2 and 4.10
<b>Country</b>	Ecuador
<b>Outline the nature of your national challenge(s)</b>	As an emerging space nation, Ecuador faces several challenges, of which the following are the most significant: <ul style="list-style-type: none"> <li>– Legal vulnerability in the space domain</li> <li>– Natural disasters linked to the country's being located on the Pacific Ring of Fire, as well as the effects of El Niño (ENSO) and La Niña, amplified by climate change</li> </ul>
<b>Please explain more, including whether you have already identified a space solution?</b>	Ecuador does not have space-related legislation establishing an entity responsible for space-related matters. The national legal framework provides for the establishment of administrative entities by executive

	<p>decree, which creates political vulnerability given that such an entity could also be abolished by decree, whereas a law has a stronger legal basis and would make it possible to establish the bodies necessary for the development of the space sector. Ecuador therefore considers it necessary to seek cooperation with UNOOSA and COPUOS through the Space Law for New Space Actors programme.</p> <p>Ecuador is situated on the equator and on the Pacific Ring of Fire, where there is significant geological activity. The territory of Ecuador comprises a mainland area and the Galapagos archipelago. The Andean mountain range crosses the mainland from north to south, creating altitudinal variation and a range of landforms. The country is directly affected by the El Niño and La Niña phenomena, which bring about changes in weather and climate. It shares borders with countries that historically have experienced social problems, and internal conflict is rising sharply as a result of the influence of transnational crime.</p> <p>While there are universities in Ecuador offering a formal education for future professionals in the exploitation of satellite information, the country does not have its own satellites enabling continuous monitoring of the territory, taking into account its existing geographical idiosyncrasies. Moreover, there is a taboo with regard to space activities that prevents the Government from allocating resources for the development of space technology, as a consequence of which the country has become a user of satellite information, especially that made available by space agencies.</p> <p>Ecuador needs to develop a space system that makes it possible to carry out Earth observation activities in order to monitor the various threats that affect its territory, and so that the information gathered can be used to</p>
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	support economic and social development.
<b>What kind of assistance would be most beneficial for you in this regard?</b>	Support in preparing the National Space Act through the Space Law for New Space Actors programme.  Ecuador requires support through global partnership in space exploration and innovation, international cooperation towards low-emission and resilient societies, and capacity-building for the twenty-first century.
<b>Relevant SDGs</b>	1, 8, 9, 10, 11 and 17
<b>Name of relevant national stakeholder</b>	Military Geographical Institute

<b>Overarching objective [1-4]</b>	2.2, 2.3 and 2.5
<b>Country</b>	Ecuador
<b>Outline the nature of your national challenge(s)</b>	As a developing country, Ecuador faces many challenges in the development of space technology, especially in the development and production of spacecraft such as nanosatellites. The main challenges include the lack of training, of technical personnel with qualifications and experience in space-related subject areas, of significant investment and of space infrastructure and technology, and the fact that no regulatory frameworks are in place.
<b>Please explain more, including whether you have already identified a space solution?</b>	Solutions: (1) International technical cooperation between developed countries in space-related matters and developing countries in the space domain; (2) Capacity-building and training for the staff of institutions regulating the space sector in Ecuador; (3) Investment in education and in the development of space technologies, beginning, inter alia, with schools and universities.
<b>What kind of assistance would be most beneficial for you in this regard?</b>	(1) Programmes of training in space technologies in order to build national capacity for the development of space technologies – specifically, for the development of nanosatellites;

	<p>(2) Technical advice provided by developed countries in relation to space technology, for the purpose of training in the design, manufacture, launch and operation of nanosatellites, as well as space data analysis;</p> <p>(3) The sharing of expertise and experience with Ecuador through joint projects, workshops and programmes;</p> <p>(4) Access to affordable space technology suited to the country's needs.</p>
<b>Relevant SDGs</b>	9 and 17
<b>Name of relevant national stakeholder</b>	Military Geographical Institute

<b>Overarching objective [1-4]</b>	1.4 and 2.2
<b>Country</b>	Ecuador
<b>Outline the nature of your national challenge(s)</b>	<p>Ecuador ventured into the space domain with the establishment of the ERIS Station (NASA), which was later transferred to the State through the former CLIRSEN for the reception of satellite information at the Cotopaxi Station. Since then, the country has faced a number of challenges, one of the most daunting being the maintenance of that infrastructure.</p> <p>Despite the efforts of the former CLIRSEN (now the Military Geographical Institute (IGM)) to keep the Cotopaxi Station operational, it must be acknowledged that the equipment installed at the Station has far exceeded its useful life, which was estimated at five years. Thirty-five years have passed since the equipment was installed, during which time its manufacturers have discontinued its production, as well as the production of its parts or spare parts. In order to prolong its operation, second-hand or reconditioned spare parts have been used.</p>
<b>Please explain more, including whether you have already identified a space solution?</b>	At the Cotopaxi Station, most of the equipment and instruments, which were acquired in 1989, are clearly

	<p>obsolete. One of the most critical components is the radio frequency front end, the main element of which - the antenna - has developed faults in several of its electronic systems. Owing to the age of the equipment, it is practically impossible to obtain spare parts, a situation that has seriously compromised the system's ability to operate. A complete overhaul of data reception, storage and processing systems has therefore become essential.</p> <p>It is expected that, following a comprehensive upgrade, the Cotopaxi Station will be able to directly receive data from state-of-the-art satellites, which would substantially improve the country's technical capabilities in the area of Earth observation.</p>
<b>What kind of assistance would be most beneficial for you in this regard?</b>	<p>Support from the State and inter-institutional cooperation at the regional and global levels are needed in order for a new satellite data receiving station to be installed at the Cotopaxi Station.</p> <p>The implementation of the project and the expected results will undoubtedly contribute to the strengthening of space science and technology in Ecuador and enhance the prospects of the country's joining a regional network, which would bring immense benefits.</p>
<b>Relevant SDGs</b>	1, 4, 9, 16 and 17
<b>Name of relevant national stakeholder</b>	Military Geographical Institute

<b>Overarching objective [1-4]</b>	2.2, 2.3 and 2.5
<b>Country</b>	Ecuador
<b>Outline the nature of your national challenge(s)</b>	<p>Ecuador faces a number of challenges in terms of support for space science and research; there is limited investment in space programmes and a lack of consolidated government policies for the promotion of research in that field.</p> <p>Although Ecuador has made progress in the use of satellite images for, inter alia, information-gathering, monitoring and the development of applications, it continues to rely</p>

	heavily on data provided by foreign space agencies, which limits its autonomy in the area of research.
<b>Please explain more, including whether you have already identified a space solution?</b>	<p>In order to overcome that challenge with regard to the provision of satellite images to Ecuadorian public enterprises, it is necessary to strengthen international cooperation with the most developed countries and to invest as much as possible in physical infrastructure and human capacity-building. It is also essential to define and implement public policies that promote research and the use of space technologies for the purpose of fostering sustainable development.</p> <p>A possible space solution to that challenge might consist in access to technology and up-to-date knowledge in this field, including the access of professionals to training programmes, access to data and collaboration with public and private international space agencies, which would strengthen the country's research capacity.</p>
<b>What kind of assistance would be most beneficial for you in this regard?</b>	Ecuador is of the view that the Access to Space for All programme is an initiative that could facilitate access to space technology, research and exploration. Given that the programme is aimed at promoting inclusion in the global space sector and supporting nations with limited resources in the development of their own space capabilities, it is in line with the country's current needs.
<b>Relevant SDGs</b>	9 and 9.5
<b>Name of relevant national stakeholder</b>	Military Geographical Institute

<b>Overarching objective [1-4]</b>	1.2, 2.7 and 3.4
<b>Country</b>	Ecuador
<b>Outline the nature of your national challenge(s)</b>	<p>Poverty maps: using satellite data and statistical models, high-resolution poverty maps can be created, enabling identification of the areas most in need of assistance.</p> <p>Water resource management: satellites can monitor water levels in rivers and lakes, which contributes to</p>

	<p>the more effective management of water resources.</p> <p>Emergency response: satellites can provide high-resolution images of areas affected by natural disasters, thus facilitating rescue and relief operations.</p>
<p><b>Please explain more, including whether you have already identified a space solution?</b></p>	<p><b>Urban planning and land management</b></p> <ul style="list-style-type: none"> <li>– Satellite imagery: provides a detailed view of urban areas, enabling the identification of trends in growth, risk areas and opportunities for sustainable development.</li> <li>– Geographical information systems: by integrating satellite data with other types of information, geographical information systems make it possible to create detailed maps and models for urban planning and land management.</li> </ul> <p><b>Disaster risk reduction</b></p> <ul style="list-style-type: none"> <li>– Early warning systems: satellites can detect and monitor natural phenomena such as hurricanes, floods and earthquakes, enabling early warnings and saving lives.</li> <li>– Damage assessment: satellite imagery enables the rapid assessment of damage caused by natural disasters, facilitating rescue and reconstruction efforts.</li> </ul> <p><b>Environmental monitoring</b></p> <ul style="list-style-type: none"> <li>– Air quality: satellites can measure air quality in cities, thus making it possible to identify sources of pollution and take measures to improve public health.</li> <li>– Waste management: satellite imagery can help to identify illegal landfills and monitor solid waste management.</li> </ul> <p><b>Sustainable infrastructure development</b></p> <ul style="list-style-type: none"> <li>– Route optimization: satellite navigation systems make it possible to optimize public and private transportation routes, thus</li> </ul>

	<p>reducing congestion and emissions.</p> <ul style="list-style-type: none"> <li>– Construction monitoring: satellite imagery can be used to monitor the progress of construction works and ensure that quality standards are met.</li> <li>– Social inclusion; access to services: satellite data can facilitate the identification of areas with the most limited access to basic services such as drinking water, sanitation and energy, thus enabling the formulation of more effective public policies.</li> </ul>
<b>What kind of assistance would be most beneficial for you in this regard?</b>	<p><b>Education and training</b></p> <ul style="list-style-type: none"> <li>– Programmes of training on space technologies, to strengthen national capacities in the use of geographical and satellite data</li> <li>– Development of mobile applications, to facilitate access to information and public services</li> </ul> <p><b>Institutional strengthening</b></p> <ul style="list-style-type: none"> <li>– Technical advice, to improve the capacity of governmental and local institutions to implement public policies related to the 2030 Agenda</li> <li>– South-South cooperation, to learn from the experiences of other developing countries</li> </ul>
<b>Relevant SDGs</b>	11 and 17
<b>Name of relevant national stakeholder</b>	Military Geographical Institute, higher education institutions and institutions of the central Government that are involved in natural resource management

<b>Overarching objective [1-4]</b>	1.1
<b>Country</b>	Ecuador
<b>Outline the nature of your national challenge(s)</b>	Connectivity in regions where land-based networks are limited or non-existent
<b>Please explain more, including whether you have already identified a space solution?</b>	<p><b>Satellite infrastructure</b></p> <ul style="list-style-type: none"> <li>– Satellites in geostationary orbit (GEO), medium orbit (MEO) and low orbit (LEO) are the main</li> </ul>



	<p>nodes of the satellite-based mobile telecommunications network (MSS). They act as repeaters in space, transmitting signals between ground stations and mobile devices.</p> <p><b>Accessibility and global coverage</b></p> <ul style="list-style-type: none"> <li>– The use of outer space involves the management of specific frequency bands (including L, S, C, Ku and Ka), which are regulated at the international level by the International Telecommunication Union (ITU).</li> <li>– Proper spectrum allocation and management avoids interference and optimizes service quality.</li> </ul> <p><b>Innovation and technological development</b></p> <ul style="list-style-type: none"> <li>– The proliferation of satellites in low Earth orbit (such as those of Starlink) is revolutionizing global connectivity through lower latency and higher bandwidth. The combination of satellite networks with 5G technologies is driving the evolution of telecommunications.</li> </ul> <p><b>Regulatory framework and security</b></p> <ul style="list-style-type: none"> <li>– When operating in space, mobile satellite services must comply with national and international regulations with regard to licensing, the radio frequency spectrum and cybersecurity.</li> <li>– Protection against interference and cyberattacks and space debris management are also key challenges.</li> </ul>
<p><b>What kind of assistance would be most beneficial for you in this regard?</b></p>	<p>ARCOTEL would benefit from technical assistance and training.</p> <ul style="list-style-type: none"> <li>– Updating of regulations: advice on establishing and updating regulations to adapt them to technological advances (such as 5G, IoT and satellite telecommunications)</li> <li>– Training on cybersecurity and personal data protection: training on international regulations, risk management and</li> </ul>

	<p>telecommunications security mechanisms</p> <ul style="list-style-type: none"> <li>– Radio spectrum management: optimization of spectrum use through international best practices and technological tools</li> </ul>
<b>Relevant SDGs</b>	9
<b>Name of relevant national stakeholder</b>	Telecommunications Regulation and Control Agency (ARCOTEL)

<b>Overarching objective [1-4]</b>	1, 2, 3 and 4
<b>Country</b>	Ecuador
<b>Outline the nature of your national challenge(s)</b>	Increased use of remote sensing in relation to specific factors that affect crops and to vegetation cover in order to determine the species that require protection, the impact of diseases, water stress, nutritional deficiencies, the ecological dynamics of destructive and beneficial species, species management, variety improvement and other relevant factors with a view to achieving sustainability and food security.
<b>Please explain more, including whether you have already identified a space solution?</b>	<ul style="list-style-type: none"> <li>– In order to implement those processes efficiently and effectively, remote sensing, IoT, artificial intelligence and other solutions have been taken into account.</li> <li>– Improvement of efficiency and reduction of agrochemicals to reduce pollution caused by agricultural activities</li> </ul>
<b>What kind of assistance would be most beneficial for you in this regard?</b>	<ul style="list-style-type: none"> <li>– Accessibility with respect to research on the use of multispectral, hyperspectral, thermal, LiDAR, radar and meteorological imaging technologies</li> <li>– Workshops to disseminate information relating to advances in research on remote sensing applied to agriculture</li> <li>– Participation in the establishment of criteria for the selection of technologies and bands for satellite technologies in accordance with international</li> </ul>

	requirements in the areas of agriculture and the environment
<b>Relevant SDGs</b>	1, 2, 3, 6, 9, 10, 12, 13, 14, 15 and 17
<b>Name of relevant national stakeholder</b>	National Institute of Agricultural Research (INIAP)

<b>Overarching objective [1-4]</b>	1, 2, 3 and 4
<b>Country</b>	Ecuador
<b>Outline the nature of your national challenge(s)</b>	Increasing the use of sensors, remote sensing, IoT and modelling to create systems providing early warning of meteorological and biological hazards to crops and vegetation and of climate change impacts.
<b>Please explain more, including whether you have already identified a space solution?</b>	In order to implement those processes efficiently and effectively, remote sensing, IoT, artificial intelligence, geographical information systems, modelling-based zoning and other solutions have been taken into account.
<b>What kind of assistance would be most beneficial for you in this regard?</b>	<ul style="list-style-type: none"> <li>– Accessibility with respect to research on the use of multispectral, hyperspectral, thermal and meteorological imaging technologies and on space weather</li> <li>– Accessibility with respect to continuous data transmission</li> <li>– Workshops to disseminate information on advances in research concerning the use of remote sensing in relation to risks and climate change impacts in agriculture</li> <li>– Participation in UN-SPIDER and in the emergency protocols of the Charter with respect to impacts on the agricultural sector</li> </ul>
<b>Relevant SDGs</b>	1, 2, 4, 8, 9, 15, 16 and 17
<b>Name of relevant national stakeholder</b>	National Institute of Agricultural Research (INIAP)

<b>Overarching objective [1-4]</b>	1.8
<b>Country</b>	Ecuador

<b>Outline the nature of your national challenge(s)</b>	Continuous updating of cartographic information identifying growth zones in urbanized areas
<b>Please explain more, including whether you have already identified a space solution?</b>	Through the use of Landsat satellite images and a script developed at INEC for use in Google Earth Engine, areas of urban growth can be analysed, and through field operations relating to statistical sampling, specific areas of interest can be surveyed.
<b>What kind of assistance would be most beneficial for you in this regard?</b>	The provision of more up-to-date imagery or high spatial resolution inputs so that changes in statistical mapping in urbanized areas can be studied.
<b>Relevant SDGs</b>	In order to generate information from census mapping and census data in support of the SDGs, it is important to have the appropriate technological infrastructure, which the National Institute of Statistics and Censuses (INEC) currently lacks; the processing of geographical data linked to the statistical component needs to be strengthened considerably so that quality indicators that are updated over time can be established and published.
<b>Name of relevant national stakeholder</b>	Ecuador – National Institute of Statistics and Censuses (INEC)

<b>Overarching objective [1-4]</b>	3.6
<b>Country</b>	Ecuador
<b>Outline the nature of your national challenge(s)</b>	<p>Given that the challenge involves developed countries, it is necessary to foster international cooperation among governments, international organizations, the private sector and research bodies in order to ensure accessible, inclusive and sustainable solutions.</p> <p>Access to satellite information on maritime climate makes it possible to validate forecasts in time and space so as to maintain accurate or more reliable information.</p>
<b>Please explain more, including whether you have already identified a space solution?</b>	In order to implement those processes efficiently and effectively, remote

	sensing, IoT, artificial intelligence, geographical information systems, modelling-based zoning and other solutions have been taken into account.
<b>What kind of assistance would be most beneficial for you in this regard?</b>	<ul style="list-style-type: none"> <li>– Access to original or processed climate information</li> <li>– Training in the management of remote oceanic or meteorological information</li> </ul>
<b>Relevant SDGs</b>	Climate action
<b>Name of relevant national stakeholder</b>	National Committee for Regional Research on the El Niño Phenomenon

<b>Overarching objective [1-4]</b>	1.2 and 2.3
<b>Country</b>	Ecuador
<b>Outline the nature of your national challenge(s)</b>	Ecuador faces major challenges with respect to the conservation of its natural resources (forest, soil and water) and natural disaster risk management. The “Space2030” Agenda and its action plan is relevant to all of them in addressing those crucial development challenges.
<b>Please explain more, including whether you have already identified a space solution?</b>	<p>With regard to climate hazard management, seasonal and subseasonal forecasts have high potential to support decision-making in key productive sectors of the Ecuadorian economy, such as agriculture and electricity generation, as well as in the management of climate risk associated with such phenomena as droughts and floods. Currently, those forecasts are generated by at least 10 global centres for climate forecasting, and are available worldwide. However, the use of that information by the Ecuadorian Meteorological Service is still in its early stages, owing both to the diversity of existing models, sets of models and products and to limited knowledge as to whether those products are capable of reflecting local meteorological conditions adequately. This situation has an impact on the degree of certainty with which climate information is communicated to users in such</p>

	<p>sectors as agriculture, energy and risk management.</p> <p>A fundamental step in promoting the effective use by the Ecuadorian Meteorological Service of climate forecasts is to ensure unrestricted and cost-free access to those products. Such access is key to automating the climate information production chain for the agricultural and energy sectors, and to guiding action relating to the identification and characterization of hydrometeorological hazards, the latter being a critical stage in the risk management chain.</p>
<b>What kind of assistance would be most beneficial for you in this regard?</b>	<ul style="list-style-type: none"> <li>– Access to open data and space infrastructure for the storage and processing of big data</li> <li>– Support in technology training</li> </ul>
<b>Relevant SDGs</b>	<ul style="list-style-type: none"> <li>– Smart cities, through the use of global navigation satellite systems, Earth observation and satellite telecommunications</li> <li>– Disaster management</li> <li>– Monitoring of infrastructure</li> <li>– Search and rescue operations</li> </ul>
<b>Name of relevant national stakeholder</b>	Yachay University for Research on Experimental Technology