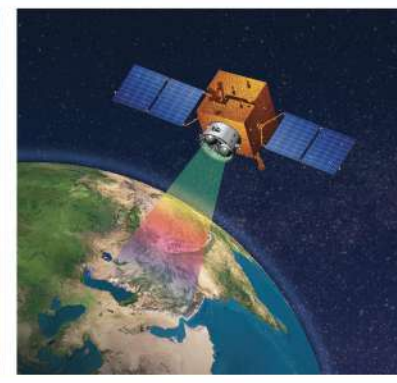




NATIONAL SPACE POLICY PAKISTAN



NATIONAL SPACE POLICY

PAKISTAN



Draft prepared by:

Pakistan Space & Upper Atmosphere
Research Commission (SUPARCO)

Government of Pakistan





يَا عَشْرَ الْجِنِّ وَالْإِنسِ
إِنِ اسْتَطَعْتُمْ أَنْ تَنْفُذُوا
عَنْ أَقْطَارِ السَّمَاوَاتِ
وَالْأَرْضِ فَانفُذُوا لَآ
تَنْفُذُونَ إِلَّا بِسُلْطَانٍ

“O company of jinn and mankind, if you are able to pass beyond the regions of the heavens and the earth, then pass. You will not pass except by authority (from Allah).”

(Quran 55:33)

Prime Minister's Statement

“ Verily! In the creation of the heavens and the Earth, and the alternation of night and day, there are indeed signs for men of understanding.”

(Al-Imran 3:190)

When the Earth is viewed from the vastness of space, no political boundaries are visible separating humankind, no ideological wars bleeding us and no distinction of language and color dividing us. It is where an observer could only see us all as ONE. Only while being there, perhaps we are able to make out our extremely humble place in this boundless universal construct, called cosmos. Space is where we are able to relate and communicate with our most distant yet nearest surroundings. It is due to this grand scheme of universal unification and boundlessness that space has continued to inspire humankind since times immemorial and remained the most popular discourse among philosophical and scientific communities alike.

In the middle of the twentieth century, the scientific

quest to explore the orbits and galaxies commenced among the developed nations. It took an instant to realize the benefits that space science, technology and its applications could bring to the life on earth and the paybacks were evident around the world. With time, space activities have evolved to be at the cutting edge of technology, spurring ingenious inventions and innovations the world over and bringing the benefits of scientific and technological development to all of humankind.

The role of space technology in the effective functioning of contemporary societies has increased manifold. This is the reason why more and more countries are entering in the arena of space technology and using space technology applications to cope with the traditional socio-economic development issues.

Establishment of a space research organization with the dawn of the space age was a signpost of the Government of Pakistan to exploit potentials of



outer space technology. SUPARCO, the National Space Agency, is working with federal and provincial ministries, divisions and departments in a host of socio-economic development areas bringing the benefits of peaceful uses of space technology to the nation. Pakistan is focused to achieve excellence in space technology and contribute toward solving national problems. The Government of Pakistan is determined to use scientific technologies for improving socio-economic development indicators and all federal and provincial entities are encouraged to use space technology and its applications for improving efficiency, enhancing transparency and reducing cost.

The national intent and priorities with regards to outer space activities have been declared in National Space Policy. This document reflects on the ambitions, potential and capabilities of the national space sector to effectively contribute in achieving national goals.

I would like to congratulate SUPARCO for preparing a comprehensive National Space Policy. I am sure that this document will be helpful in expanding space program at the national level and will bring opportunities for cooperation with the other space entities around the world.

May Allah be our guide and benefactor. Ameen!

Prime Minister
Islamic Republic of Pakistan

Foreword

Space technology and its various applications are now an integral part of our individual and collective lives. Space based systems and applications have changed the very nature of how we live and work today. Their contributions in the socio-economic development are evident around the world. Space science and technology is being used as a tool to provide essential data and services to a wide array of applications ranging from research and development to commercial services. Space is now considered as a catalyst for sustainable development that significantly contributes in diversified fields such as: communication infrastructure, disaster mitigation and management, education and health, agriculture, environmental protection and natural resource management. Space technology is one of the major technologies currently being used as the basic tool for technology-based planning and decision making.

Pakistan is a developing country with enormous potential for the peaceful uses of space technology. With about 250 million inhabitants, Pakistan is

the 5th most populous and the 34th largest country in the world in terms of area. Pakistan's economy, which is pre-dominantly based on service sector, is the 26th largest in the world in terms of purchasing power parity and 42nd largest in terms of nominal GDP. Despite considerable potential to develop, major challenges of national security, agricultural productivity, inadequate infrastructure, food security, limited health and educational facilities, rapid environmental degradation and recurring natural disasters have burdened the country and have hampered development of Pakistan.

The response to the aforesaid challenges lies in creating synergy between conventional capability and state-of-the-art space technology and applications. Space based applications offer a cost-effective means of addressing many of the stated issues and have made impressive advancements over the years. SUPARCO has played a pivotal role, not only in promoting but also popularizing the role of space technology in the country.



The Government is cognizant of this reality and encourages all national agencies to use advanced technologies, particularly space technology applications. In recent years, data and services available from space-based assets as well as information and communication technologies have been used most effectively in agriculture, water resource management, infrastructure development and disaster management.

The user agencies, planners and decision-makers need to realize the potential benefits of space technology in planning and implementation of developmental plans as well as good governance.

The National Space Policy will open new horizons for establishing a technology based era in resolving developmental issues. National Space Policy shall assist in effective utilization of space technology and application for achieving national targets. This policy is driven by the national priorities. Policy clearly defines the objective of Government of Pakistan for

space activities and emphasis on close coordination among governmental entities to utilize space applications for socio-economic development.

The National Space Policy is manifestation of the Government's will and commitment to achieve self-reliance in space science, space technology and its applications for the peaceful uses of outer space. The effective implementation of the policy will begin to make positive contributions to improve quality of lives of the people of Pakistan and to humanity at large.

Chairman SUPARCO

Executive Summary

For space activities as well as their conceived benefits for the socio-economic canvas to foster in Pakistan, the national intent and priorities have been declared in National Space Policy. Pakistan aims to develop Space based assets and applications to attain sustainable development goals and national targets as defined in the National Vision. Space Technology shall be applied as an effective tool to achieve objective of each of the seven pillars of the National Vision.

The National Space Policy clearly outlines objectives, principles and thrust areas that Government of Pakistan considers as essential for development of space sector. Pakistan shall conduct space activities for peaceful purposes, in accordance with international commitments particularly the five United Nations treaties on space of which Pakistan is a state party, centering on national development and well-being of the people of Pakistan.

The policy focuses on development of a vigorous space sector that caters innovation and indigenous development of space technologies moving towards self-reliance and reducing dependency on other nations. Establishing a strong link amongst

government, academia, research & development institutions and industry is considered cornerstone for promoting science technology and innovation in the country.

Key thrust areas of the policy are:

- Space Technology Applications for Socio-Economic Development and National Security
- Development of Facilities, Infrastructure and Space Professionals
- Research and Development in Science, Technology and Innovation
- Development of the Local Industry and Commercialization of Space Products & Services
- Space Education and Awareness
- International Cooperation and Collaboration
- Sustainable, Safe and Secure Space Environment
- Space Laws, Regulations and Governance Mechanisms



The Government shall provide necessary support and impetus to the Space Sector for using space technology and application to achieve faster, reliable and cost effective solutions. Development of the space sector merits high priority for Pakistan, thus much of the emphasis is on developing critical space technologies, infrastructure, and facilities leading towards a viable and sustainable space program. Pakistan shall conduct space activities consistent with safety, security and sustainability of outer space. Pakistan shall also foster research and innovation in Science, Technology, Engineering and Mathematics (STEM). Necessary programs shall be initiated to create awareness among all stakeholders of the benefits of space technology and its manifold applications.

Regional and international cooperation with other space agencies, intergovernmental, regional and international organizations that provide avenues for space research, technology development and its applications is considered pivotal for development of an effective space program and capacity building of human resources. Pakistan encourages cooperation with other nations for peaceful exploration and use of outer space and will pursue all avenues of bilateral,

multilateral and international cooperation and collaboration.

The policy shall be implemented through National Space Agency, which shall be responsible for its monitoring, review and revision. Guidelines provided by the National Space Agency shall be adopted by the relevant federal and provincial ministries, divisions, departments and agencies. Furthermore, policy, directs all relevant federal and provincial ministries, divisions, departments and agencies to extend full support in achieving objectives of the policy.

National space laws, regulations and mechanisms that are in conformity with national requirements as well as international obligations shall be formulated to expedite implementation of the National Space Policy.



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Policy Vision

In line with National aspirations, exploiting Space Science and Technology to improve quality of life of People of Pakistan while safeguarding National interest and sovereignty, duly conforming to international obligations and to nurture space industry by encouraging indigenization and private sector participation, fostering capacity building, promoting space education and awareness as well as expanding international collaboration.



1. Introduction

Pakistan's Space Program is fairly wide-ranging and diversified, implemented through Pakistan Space & Upper Atmosphere Research Commission (SUPARCO). SUPARCO was initially established as a committee in 1961 shortly after the launch of first artificial satellite Sputnik-1 in 1957, on the advice of Noble Laureate Dr Abdus Salam, the then scientific adviser to the President of Pakistan. SUPARCO was mandated to undertake scientific studies of the upper atmosphere with the help of sounding rockets. Pakistan launched its first sounding rocket Rehbar-1 for upper atmosphere research in 1962, becoming the third nation in Asia and the tenth in the world to launch such a rocket. This speaks volumes about the vision of our founding fathers to pursue space research in the country.

SUPARCO was granted status of a Commission in 1981 with additional responsibilities to advance research and development in Space Science and allied fields, enhance indigenous capabilities in Space Technology and to promote the peaceful applications of Space Science and Space Technology for the socio-economic development of the country. Further manifestation of the will of the Government of Pakistan was reflected in the successful development and launching of two indigenous experimental satellites (Badr-1 in 1990 and Badr-B in 2001), communication satellite (PAKSAT-1R in 2011) and two remote sensing satellites (PRSS-1 and PAKTES-1A in 2018).

Pakistan considers space as an important sector because of its benefits and contributions to society, economy and national security. The Government of Pakistan has approved National Space Program 2047 which is an expression of commitment of the Government and nation to accelerate space activities in the

country. Pakistan shall be progressively launching a series of communication, remote sensing and navigation satellites in the next several years to speed up the pace of socio-economic development and meet the national security requirements. It is also evident that, in a few years, there will be a large number of Pakistan's space assets in various orbits and their protection, monitoring and tracking, safeguarding from space debris and national liability protection will become imperative. Thus, it will require long term commitment, continuous support and policy directives from the Government to ensure sustainability of Pakistan's Space Program.

The Government of Pakistan has thus formulated the National Space Policy to gain the maximum benefits from space technology and applications. The National Space Policy aims at the most efficient use of space technology and its applications, providing modern state-of-art tools and solutions for the various sectors of society. It establishes a framework for addressing the contemporary issues that Pakistan faces related to national needs in space sector and challenging international environment. The National Space Policy covers the entire spectrum of the space activities that include: civil, commercial and national security. It contributes significantly in achieving Pakistan's National Vision objectives and the targets set by the Government for Sustainable Development Goals. The National Space Policy will be updated from time to time in order to remain aligned with the national policies and regulations, international space treaties and international laws regarding space sector, particularly those of which Pakistan is a signatory.

2. Objectives

The objectives of the National Space Policy are to:

- a. Provide direction and supervision for space related activities in the country.
- b. Enable promulgation of national legal and regulatory framework for the space sector.
- c. Harness the potential of space science, technology and its applications for socio-economic development and national security.
- d. Support and sustain Pakistan's Space Program. Encourage Public Private Partnership in space sector.
- e. Application of space technology in achieving National and Sustainable Development Goals.
- f. Promote local industry through spin-off technologies and enhance technological base in space sector.
- g. Strengthen national and international cooperation and collaboration in space sector.



3. Principles

Pakistan shall adhere to the following principles:

- a. Formulate legal framework to conduct space activities for peaceful purposes and in accordance with international laws and treaties.
- b. Conduct space activities to safeguard national interest in space and contribute significantly towards national security, economic development and national prestige.
- c. Achieve self reliance by promoting commercial activities, public private partnerships to reduce dependence on national exchequer.
- d. Focus on indigenous development and increase technological base to reduce dependency on other nations.
- e. Conduct space activities consistent with safety, security and sustainability of outer space.
- f. Conduct scientific research and support unrestricted access to outer space on the basis of equal and non-discrimination principles.
- g. Pursue all avenues of bilateral and multilateral cooperation and collaboration.



4. Thrust Areas

4.1 Space Laws, Regulations and Governance Mechanisms

With advancements in space technology, Pakistan will require formulation of laws, regulations and mechanisms that are in conformity with national requirements as well as international obligations. A high level of expertise in space law and regulatory issues would be developed to initiate space policies and space legal regimes, in order to keep pace with the expansion of space activities. Pakistan shall develop necessary laws, regulations and mechanisms to regulate space activities in the country.

4.2 Space Technology Applications for Socio-Economic Development and National Security

Pakistan is determined to acquire and apply space based data, information and services to support development of economy and national security. Pakistan shall focus on developing advance space based applications in communication, remote sensing and navigation, which include inter alia, agriculture, water resource management, forestry, environment, land use planning and management, geology and mineral exploration, glaciology, meteorology and urban development. Pakistan shall also utilize space technology applications for attaining Sustainable Development Goals (SDGs) and Pakistan's National Vision targets.

Also, Pakistan is vulnerable to a range of hazards-both natural as well as man-made. Space technologies are becoming increasingly vital to modern day disaster management and mitigation activities. Pakistan shall utilize remote sensing satellites and other space based technologies such as telecommunication systems, navigation systems as well as GIS systems for preparedness, relief, reconstruction, warning and monitoring the various phases of disaster management.

As a country that faces many internal and external threats, it is imperative for Pakistan to pursue a vibrant space program not only for scientific, technological and economic development of the country but also for national security. Pakistan shall develop and acquire space technologies and capabilities to enable various national

security activities. Pakistan will ensure that space technology and services are used to strengthen national security.

4.3 Development of Facilities, Infrastructure and Space Professionals

Pakistan shall strive to achieve self-reliance in satellite design, manufacturing and operation through accelerating research & development in requisite technologies. Pakistan shall build robust space capabilities including ground and space segments and necessary infrastructure to ensure sustainable development of space sector in the country.

The development of the requisite human resource within the nation's industrial, research and academic institutions is imperative. Pakistan shall develop a pool of scientists, engineers, and technologists in the area of space science, technology and applications to realize its policy objectives for achieving self-reliance in core technologies.

4.4 Research and Development in Science, Technology and Innovation

Pakistan considers Science, Technology and Innovation (STI) vital for the economic growth. Pakistan focuses on the development of a vigorous space sector, that caters innovation and indigenization of space technologies. Pakistan shall focus on carrying out advance research in the areas of astronomy, astrophysics, atmospheric sciences, planetary exploration and earth sciences, supported by developing space based and ground-based infrastructure. Pakistan shall also focus on developing primary robotic technologies and microgravity experiments in collaboration with national and international research institutions and organizations.



The national space agency shall promote use of satellite services / applications, support and encourage the universities, research institutions, public and private entities to build space related capabilities, develop next-generation space technologies, encourage innovation and entrepreneurship, and develop value-added products and services.

4.5 Development of the Local Industry and Commercialization of Space Products and Services

Development and promotion of a vibrant indigenous local space industry, that promotes and responds to the requirements of space program, is essential for sustainable development of a space sector. The government shall concentrate to initiate cooperative ventures with local industries to achieve self-reliance. This would require close association with small, medium and large scale industrial sectors either through procurement contracts, know-how transfer or provision of technical consultancy services. The space industry in Pakistan would then be capable of adopting space related technologies and handling manufacturing jobs.

Marketing of value-added space products and services is one of the important areas which require concentrated efforts and initiatives in order to have a revenue stream and promote space industry in the country. Pakistan shall also focus on developing marketing strategies and carrying out system studies for space related new technologies that would be developed as spin-off space technology program.

4.6 Space Education and Awareness

Pakistan shall initiate programs to nurture the national resources of Science, Technology, Engineering and Mathematics (STEM) education, in order to contribute towards an inclusive process of national capacity and capability development



in the domains of science & technology. For the space program to be meaningful, it is necessary to create public awareness of the benefits of space technology and its manifold applications. Further more Pakistan shall continue space education and awareness programs and activities throughout the country.

4.7 International Cooperation and Collaboration

Pakistan with international community shall pursue cooperation and collaboration in the use of space technologies and building partnerships for sharing space-derived information to extend and broaden the benefits of space. Pakistan shall pursue all avenues of bilateral and multilateral collaboration with space agencies, intergovernmental, international and regional organizations that provide avenues for space research, technology development and its applications.



4.8 Sustainable, Safe and Secure Space Environment

Space sector is competitive and witnessed diversification of actors and increase in activities. Pakistan supports development of international framework to secure continued access to space infrastructure and services. To ensure continued access to space and safeguard national interest in space, Pakistan will actively participate in promoting sustainable, safe and secure space environment, particularly with the United Nations Committee on Peaceful Uses of Outer Space (UNCOPUOS).



5. Guidelines

5.1 Functions of National Space Agency

National Space Agency is mandated to carry out all activities related to outer space which includes but not limited to the following:

- a. Formulate national space policies and legislations to fulfil national and international obligations and prepare comprehensive guidelines for space sector in Pakistan in coordination with the relevant national regulatory bodies and stakeholders.
- b. Plan, manage and execute National Space Program, outer space activities as well as projects relating to space science, technology and applications.
- c. Design, develop, launch and operate all types of satellites along with ground control infrastructure and related technologies, all kinds of space transportation systems and space launch facilities, satellite navigation systems and navigation signals' augmentation systems.
- d. Design, develop, build and operate space objects tracking and monitoring observatories.
- e. Maintain national register of space objects launched into outer space and submit information to United Nations.
- f. Commercial exploitation of space capabilities, technologies, applications, facilities and systems.
- g. Provide advice to encourage involvement of private sector in space science, technology and their applications.
- h. Coordinate/liaise with relevant international space organizations/agencies (UNOOSA, National Space Agencies etc).
- i. Represent Pakistan in relevant international space fora.

5.2 National Space Legislation

- a. Pakistan is a state party to the five United Nations legally-binding treaties on outer space and endorsed UN mandated principles / technical guidelines adopted by the United Nations.
- b. Pakistan also endorses the United Nations technical guideline on Safety Framework for Nuclear Power Source Application, Space Debris Mitigation Guidelines, and Guidelines for the Long Term Sustainability of Outer Space Activities.

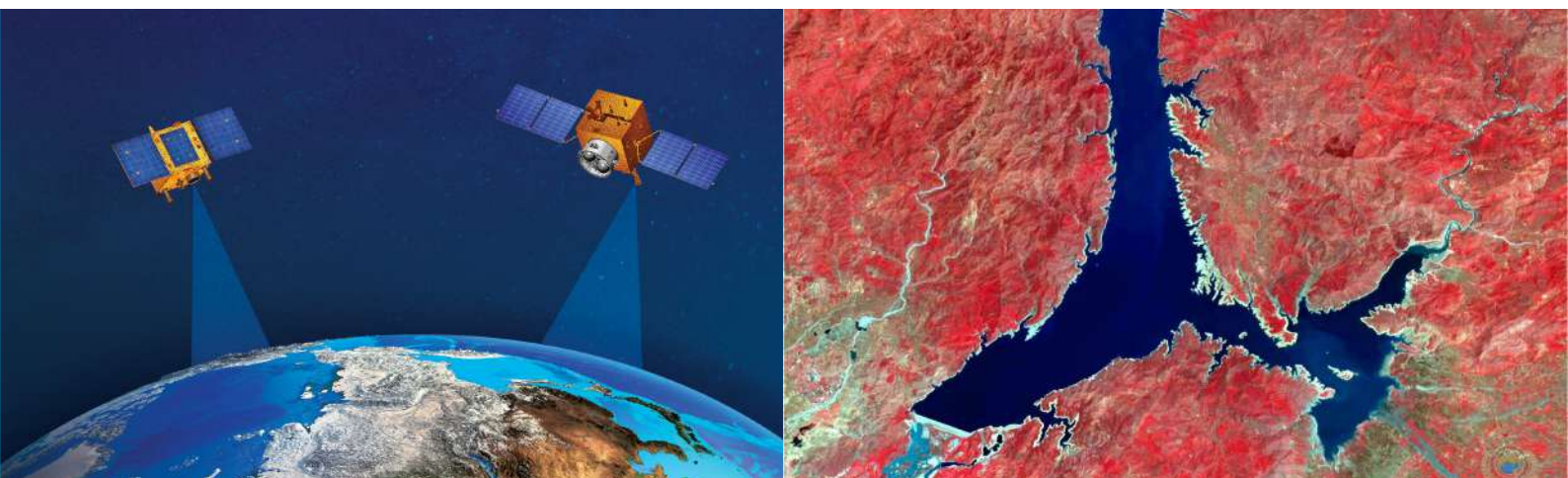


- c. Pakistan as a party to the convention on Registration of Objects Launched into Outer Space-1975 and is obliged to furnish information to the United Nations, about its space objects launched into outer space. SUPARCO shall maintain the national register of space objects launched into outer space and will furnish information to United Nations Office of Outer Space (UNOOSA) through Ministry of Foreign Affairs.
- d. National Space Agency shall formulate comprehensive guidelines for space sector in the country for the peaceful uses of outer space.
- e. National Space Agency shall formulate National Space Legislation to fulfill national and international obligations.
- f. Promote maximum utilization of National Space Assets.
- g. Registration of foreign satellite operators interested to offer services in Pakistan. Subsequent Licensing would be required from concerned regulatory bodies for provision of satellite based communication and broadcasting or any other related services.
- h. Use of National Space assets will be granted First Right of Refusal (FROR) only for the Federal Government, Government Departments, Provincial Government, Armed Forces or such other Government Agencies or Government Institutions as the Federal Government may determine for provision of satellites services in Pakistan.
- i. Coordinate with relevant Ministries and National organizations (MoIT&T, MoIB, PTA, FAB, PEMRA etc) for formulation of regulations/ framework/ guidelines for provision of satellite services in Pakistan.

5.3 Integration of Space into Development Plans

National Space Policy mandates the Planning Commission of Pakistan to use space technology and applications in all sectors of development for better monitoring and management; enhancing production through ensuring implementation of the projects; and exploitation of new resources. Federal and Provincial ministries, divisions and departments shall use space technologies and applications in the fields of agriculture, water & power and mineral exploration, urban planning and all other areas where space based data / applications could be used effectively for improving governance, increasing efficiency, promoting transparency and reducing costs.

Planning Commission of Pakistan shall take into account the objectives of National Space Policy while formulation of five year plans. The integration of National Space Policy with different sectors shall also be assured.



5. Guidelines

5.4 Financial Support

The Government of Pakistan shall allocate necessary financial support to the National Space Agency through Public Sector Development Programs (PSDP). National Space Agency shall also develop appropriate plans and projects in collaboration with the relevant government entities and financial institutions for effective implementation of the national space program. Efforts will be made to reduce reliance on the government funding through mechanism of Public Private Partnerships and joint ventures.

5.5 Capacity Development within Ministries and other Government Sectors

Capacity of the relevant ministries, agencies, government and non-government institutions and organizations at all levels would be strengthened by provision of adequate human resources, equipment, infrastructure and financial resources to enable them for effective utilization of space technology and its applications for different sectors as mentioned above.

5.6 Satellite Products and Services in Public Sector

- a. The Federal Government, Government Departments, Provincial Government, Armed Forces or such other Government Agencies or Government Institutions as the Federal Government may determine, shall mandatorily use national communication satellites for their satellite communication requirements and shall lease capacity only on national communication satellites. In case the required capacity is not available on a national communication satellites, services of any registered satellite operators may be utilized.
- b. National Space Agency shall act as sole proprietor to acquire, process and disseminate satellite imagery and its derived products of National and Foreign Satellites within and outside the country for the Federal Government, Government Departments, Provincial Government, Armed Forces or such other Government Agencies or Government Institutions as the Federal Government may determine.
- c. Pakistan remote sensing satellite data and imageries shall be used for better management and efficient utilization of natural resources.
- d. National Space Agency shall develop required capabilities and facilitate Federal and Provincial ministries, divisions and departments and agencies for optimal use of space technology applications.



5.7 Space Applications for Different Sectors

National Space Agency shall use as well as facilitate utilization of space applications in various sector of the economy which include but not limited to the following for the socio-economic development of the country.

5.7.1 Agriculture

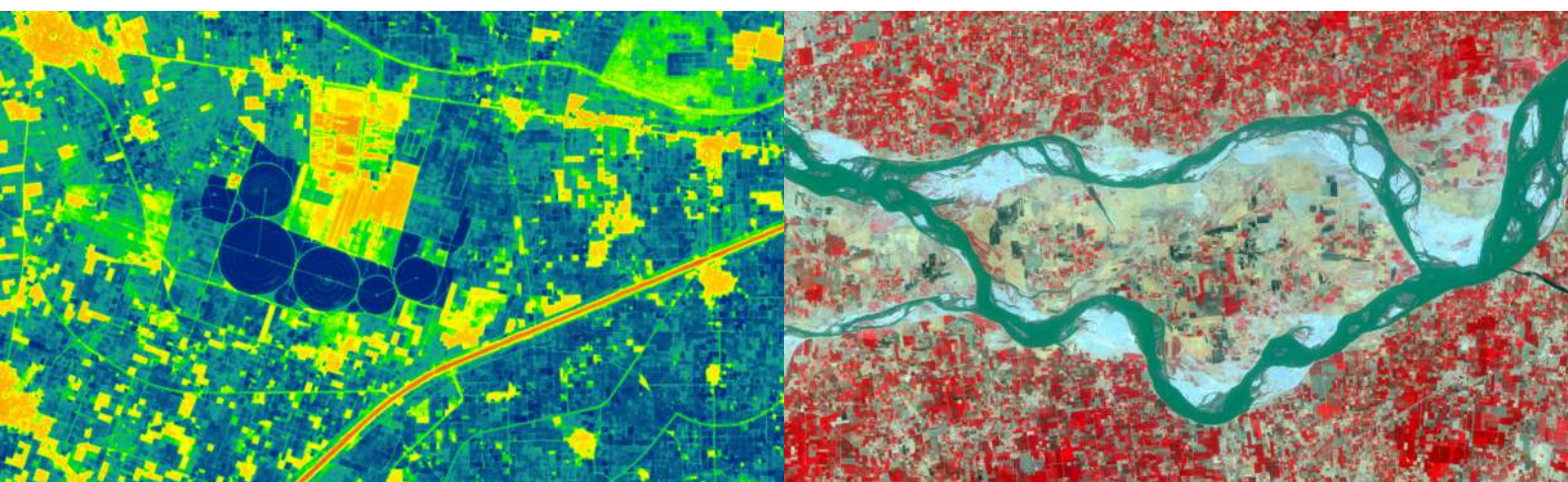
Satellite Remote Sensing (SRS) plays a vital role in mapping and monitoring agriculture resources. Remote sensing with its capability to repetitively acquire synoptic images shall be employed to classify various types of crops, provide crop area estimation, monitor crop health and crop growth and assist in crop production and yield estimations. SRS shall be used for:

- Estimation of crop area and yield
- Monitoring of crop growth and health
- Land suitability analysis (crops, fish ponds, and livestock)
- Farm water and fertilizer management
- Crop insurance and agriculture loan monitoring
- Plant production (pest diseases)
- Monitoring regional agriculture output for domestic food security

5.7.2 Forestry

Forests of Pakistan from northern mountains to coastal mangroves are rich in bio-diversity and a fair blend of flora and fauna across different ecological zones throughout the country. Remote sensing with its capability to acquire temporal images in different spectra regions shall be used to map and monitor biosphere. SRS shall be used to:

- Monitor and manage forest assets and operations
- Detect / Analyze change over time for reporting/inventorying
- Derive timely insights to improve and manage forest health
- Support better management of timber logging lifecycle
- Track illegal activities such as large-scale deforestation
- Identification of potential sites for afforestation



5. Guidelines

5.7.3 Water Resources

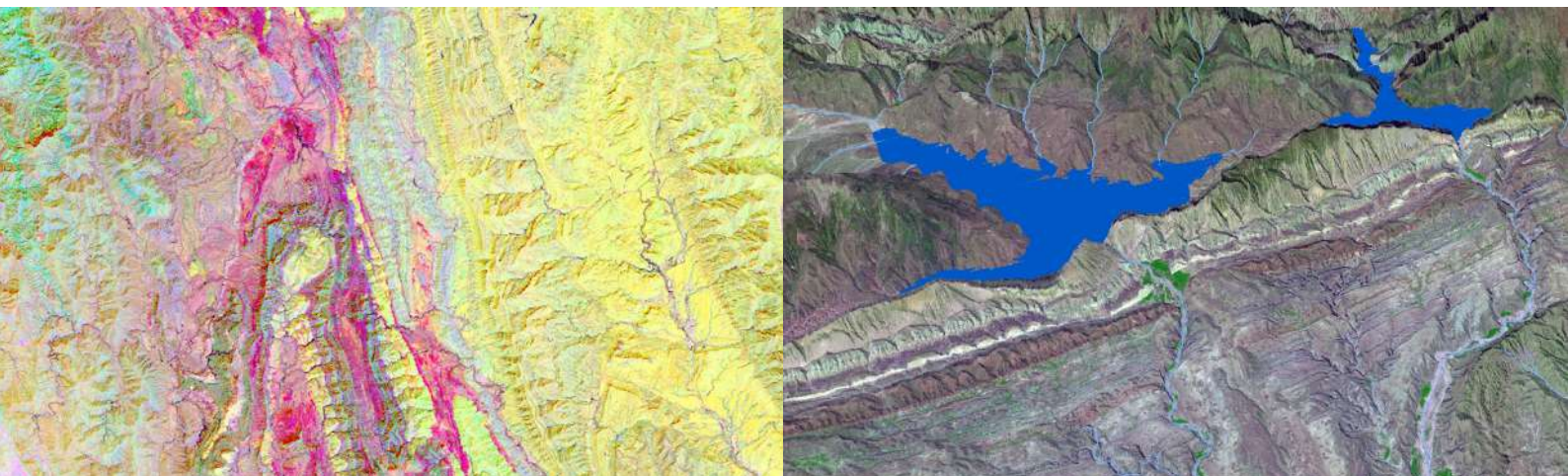
Pakistan is an arid country heavily dependent on annual glacier melts and monsoon rains. Remote sensing provides large scale multidisciplinary information for monitoring of sustainable usage of water resources which plays a pivotal role in formulating national strategy for food security. Important areas where SRS shall be applied are:

- Surface energy balance and evapotranspiration
- Hydrological modeling
- Mapping of surface water resources and irrigation networks
- Watershed modeling and integrated watershed management
- Ground water prospection
- Wetland ecosystem modeling
- Dam site selection
- Soil moisture estimation

5.7.4 Geology & Mineral Prospection

Satellite remote sensing provides information for classification of rock types, structural mapping, lineament detection and hydrocarbon prospection. Satellite based geological information shall be used to augment the conventional surveying technologies to expedite the minerals prospection process. Important areas of application shall be:

- Rock type's classification
- Geological and mineral prospection
- Hydrocarbon prospection
- Lithological and structural mapping
- Geo hazard monitoring
- Subsurface 3D modeling



5.7.5 Environment

Changes in environment and climate significantly influence the ecosystems. Remote sensing data shall be used to assess the environmental impacts. Important areas of SRS application shall be:

- Environmental monitoring (air, sea and land)
- Water quality monitoring
- Monitoring of fog / smog patterns, origin and its impact
- Development of baseline environmental profile
- Monitoring coastal zone ecosystem
- Marine pollution
- Environmental Impact Assessment for industries

5.7.6 Urban Planning and Management

Remote sensing techniques shall be used in various aspects of urban planning such as land use dynamics transportation management and infrastructure monitoring etc. Information produced from satellite data shall be used for effective policy making and pragmatic decisions. SRS application shall be used for:

- Land-use and land-cover mapping & monitoring
- Urban sprawl modeling
- Cadastral mapping and surveying
- Large scale mapping for urban/ rural planning
- Route planning for roads, railways, pipelines etc.
- Urban environment and infrastructure monitoring



5. Guidelines

5.7.7 Disaster Monitoring and Mitigation

Natural disasters are major risk to a country's sustainable development. Remote sensing and Geographic Information System (GIS) shall be used as supportive tools in all the phases of disaster i.e. prevention, preparedness, early warning and response and rehabilitation. The National Space Agency shall be responsible, for providing remote sensing information related to disasters that is acquired from space systems to other government agencies for:

- Disaster damage assessment
- Flood modeling and monitoring
- Drought mapping
- Multi-vulnerability hazard risk assessment
- Reconstruction / rehabilitation

5.7.8 Cryosphere Modeling

Glacier changes can affect resources especially drinking water supplies, agriculture hydroelectric power, transportation, tourism, coastlines and ecological habitats. Satellite imaging may be employed for monitoring of vast and increasable areas. Multi-temporal data may be used for estimation of current state and future predictions of the cryosphere, particularly for the following:

- Development of regional glacier database
- Monitoring of glaciers
- Glacial hazard mapping and modeling
- Glacier depletion monitoring
- Estimation of snow cover
- Snow melt and runoff modeling
- Study atmospheric conditions of the cryosphere



5.7.9 Geographic Information System (GIS)

Geographic Information System (GIS) and web based GIS technologies shall be used for:

- Information management systems for agriculture, health, education, land environment, disaster, tourism etc.
- Spatial decision support systems
- Vehicle tracking and fleet management
- Location based services
- Information system for emergency response
- Surveying and navigation

5.7.10 Coastal and Marine Resources

Coastal zones and marine resources are invariably considered rich natural resources for Pakistan. Remote sensing applications shall be used for:

- Oceanography
- Assess coastal and marine resources
- Monitor coast erosion and sedimentation
- Map coastal configuration, bathymetry, navigation channels and landforms
- Mapping of creeks and coastal lakes
- Aqua culture site identification and monitoring
- Monitoring fishing sites

5.7.11 Land Cover Mapping

Accurate land cover information is important for planning and management of food security, biodiversity, water resources and geomorphology. The National Space Agency shall acquire remote sensing capability and conduct research on natural and human-induced changes to earth's land,



5. Guidelines

land cover, inland surface waters, land surface data for national archive and its distribution. The National Space Agency shall also determine the operational requirements for collection, processing, archiving and distribution of land surface data to Government of Pakistan and other users.

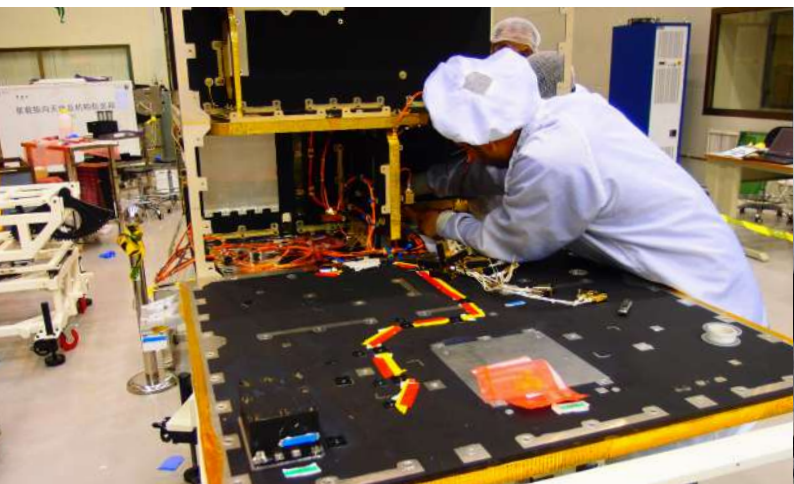
5.8 Public-Private Partnership

- a. Pakistan recognizes that returns on investment in space technology will be achieved through focused and continued government intervention enabling an environment where industry can flourish.
- b. Government of Pakistan shall provide incentives to patronize and encourage the development of local industry and seek preferential clientele for space-based services and product by the public entities within the country and offer products and services internationally on competitive prices.
- c. Public-private partnership for expansion in use of satellite services may be encouraged. Where necessary, sector specific advisory committee shall be formulated in consultation with relevant stakeholders.
- d. Introduction of one window operation to ease the investor and attract investments in space sector.

5.9 Technology Development and Innovation

Emerging technologies are best absorbed by the youth of any society, who then innovate tools for optimum utilization of these technologies. It is also the youth which then promote these technologies for greater utilization. The youth of Pakistan will be invited to venture into disciplines of space science and technology, as well as to prepare them to extend necessary support in national development by engaging them in various space related projects. National Space Agency shall actively collaborate with universities in order to:

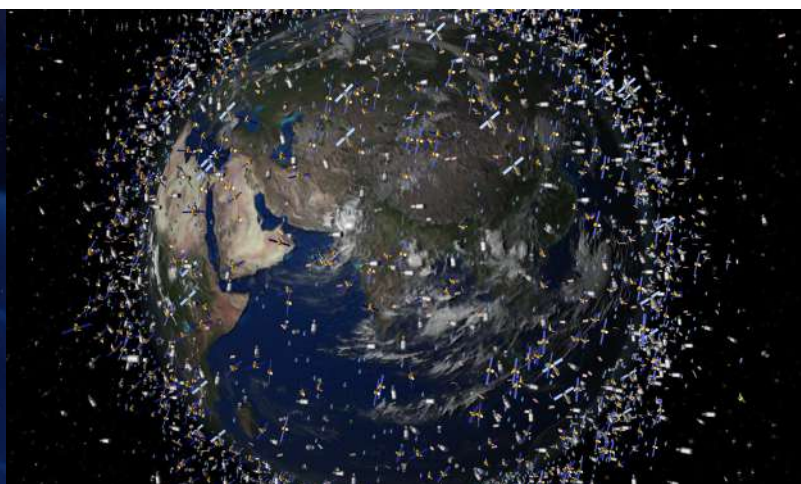
- a. Expand and disseminate knowledge of the Earth, its environment, the solar system, and universe.
- b. Promote research and development in space science and technology.
- c. Explore and create new opportunities for space-derived benefits.
- d. Acquire knowledge and capacity through cooperation and student-faculty-knowledge exchange programs with leading international universities related to space technology and applications.



- e. Support upgradation of the technical laboratories.
- f. Develop small satellites/student satellites to encourage young scientists and engineers in development, testing and demonstration of new technologies.
- g. Develop civil use space technology and applications in collaboration with civil space sector.

5.10 Sustainable Outer Space Activities

- a. Pakistan shall support all international efforts aimed at strengthening the rule of law in outer space and providing a legal regime that assures equitable access to all States irrespective of their levels of technological development.
- b. Pakistan is against moving, placing, using or threatening to use any kind of weapons, especially weapons of mass destruction, from outer space and is against militarization and weaponization of outer space.
- c. Pakistan shall support coordination between international entities, especially with regards to the draft on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT).
- d. Pakistan shall develop Transparency and Confidence Building Measures (TCBMs) and make efforts for implementation of Space Debris Mitigation Guidelines in order to promote and to ensure the long term sustainability of the outer space.
- e. National Space Agency, shall actively participate and promote international initiatives concerning long-term sustainability of outer space, space traffic management, space weather, space debris and Space Situational Awareness (SSA) to enhance the sustainability of regional and global space activities.
- f. National Space Agency shall develop national Space Situational Awareness capability, astronomical observatories and space weather monitoring facilities to monitor threats that could disrupt, degrade or damage space objects and infrastructure.



5. Guidelines

5.11 Implementation of United Nations Space Agenda 2030

Pakistan has endorsed "Space 2030" agenda which was adopted by the international space community during the first United Nations Space Summit of the twenty-first century, UNISPACE+50 high level forum. National Space Agency shall take part in the initiatives under the four cross-cutting pillars of "Space 2030" Agenda i-e; space economy, space society, space accessibility and space diplomacy.

5.12 Space Education and Awareness

- a. National Space Agency shall make all efforts to promote space education and awareness in all segments of society.
- b. National Space Agency shall work closely with Ministry of Education and Professional Training, Federal and Provincial education departments and institutions for inclusion of space related topics in curricula of primary and secondary classes.
- c. Interaction with societies on astronomy and other related organizations to promote astronomy and space science in the country.
- d. National Space Agency shall continue carrying out educational and awareness activities in collaboration with national and international entities and would develop national strategies for raising awareness and education.
- e. Due focus shall be given to utilize mass media to make special efforts for masses awareness and education.

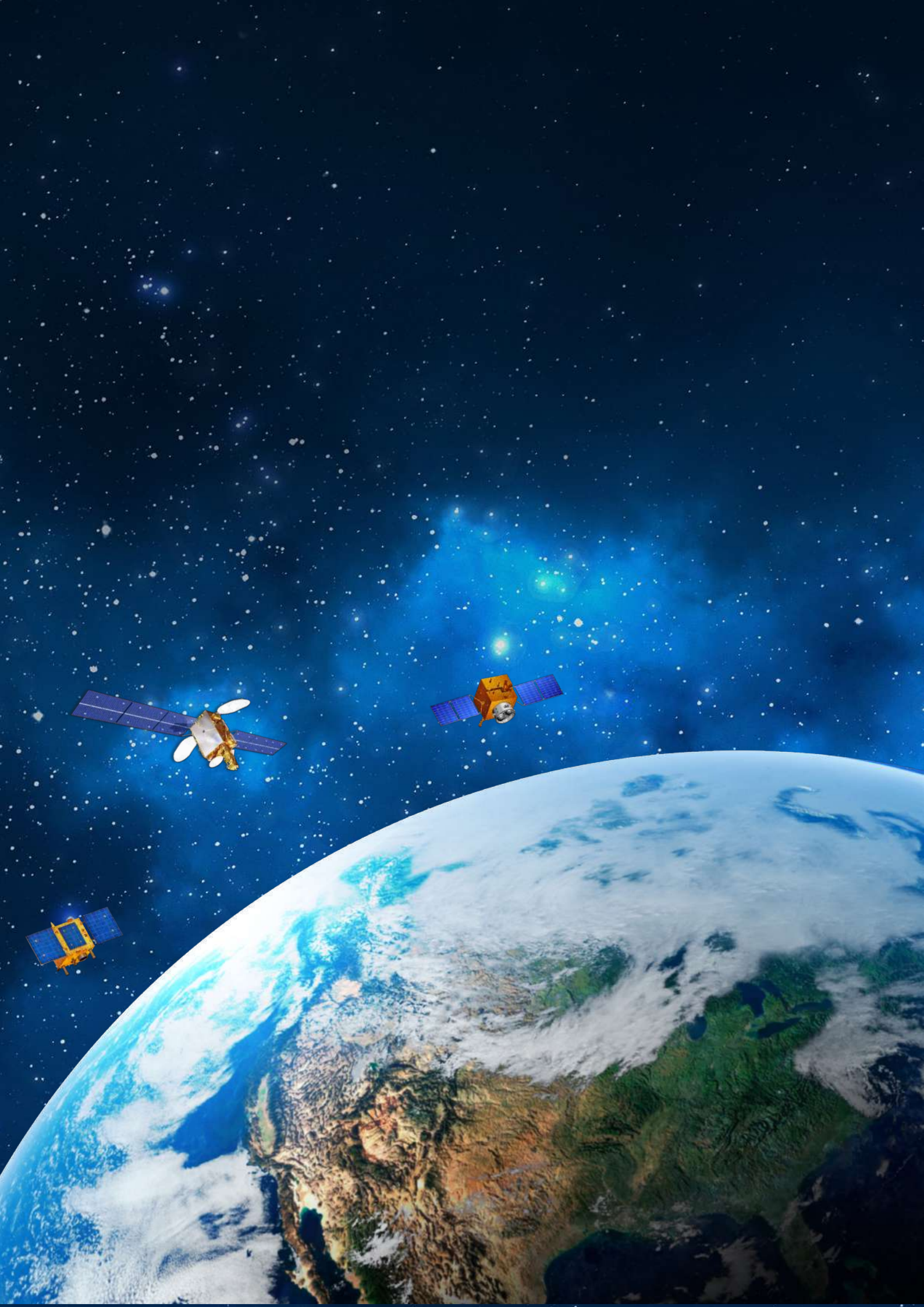




Launch of Pakistan's first Remote Sensing Satellite (PRSS-1) and Technology Evaluation Satellite (PakTES-1A), 9 July 2018

6. Implementation and Monitoring

- a. Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) shall act as National Space Agency of Pakistan and is mandated to carry out following:
 - Implementation, monitoring, review and revision of the policy
 - Identifying gaps and opportunities arising in space sector
 - Execution of the National Space Program as approved by the Government of Pakistan
- b. All Federal and Provincial ministries, division and departments shall extend full support in achieving the objectives of the policy.
- c. National Space Policy shall enter into force upon the date of its issuance.



Acronyms

FAB	Frequency Allocation Board
FROR	First Right of Refusal
GDP	Gross Domestic Product
GIS	Geographic Information System
MoIB	Ministry of Information and Broadcasting
MoIT&T	Ministry of Information Technology & Telecommunication
PakTES-1A	Pakistan Technology Evaluation Satellite-IA
PEMRA	Pakistan Electronic Media Regulatory Authority
PPWT	Prevention of the Placement of Weapons in Outer Space and of the Treat or Use of Force against Outer Space Objects
PRSS-1	Pakistan Remote Sensing Satellite
PSDP	Public Sector Development Programs
PTA	Pakistan Telecommunication Authority
SDGs	Sustainable Development Goals
SRS	Satellite Remote Sensing
SSA	Space Situational Awareness
STEM	Science, Technology, Engineering and Mathematics
STI	Science, Technology and Innovation
SUPARCO	Pakistan Space & Upper Atmosphere Research Commission
TCBMs	Transparency and Confidence Building Measures
UNCOPUOS	United Nations Committee on Peaceful Uses of Outer Space

NATIONAL SPACE POLICY

PAKISTAN





SUPARCO