

# Proposal for the Creation of the NATIONAL SPACE DEVELOPMENT AND UTILIZATION POLICY and the NATIONAL SPACE AGENCY



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# What is Space Science?

Branch of science that is concerned with anything related to outer space and related fields.

**Astronomy and Astrophysics**

**Aerospace Engineering**

**Astronautics**

**Satellite Technology**

**Space Exploration**

**Earth Observation**

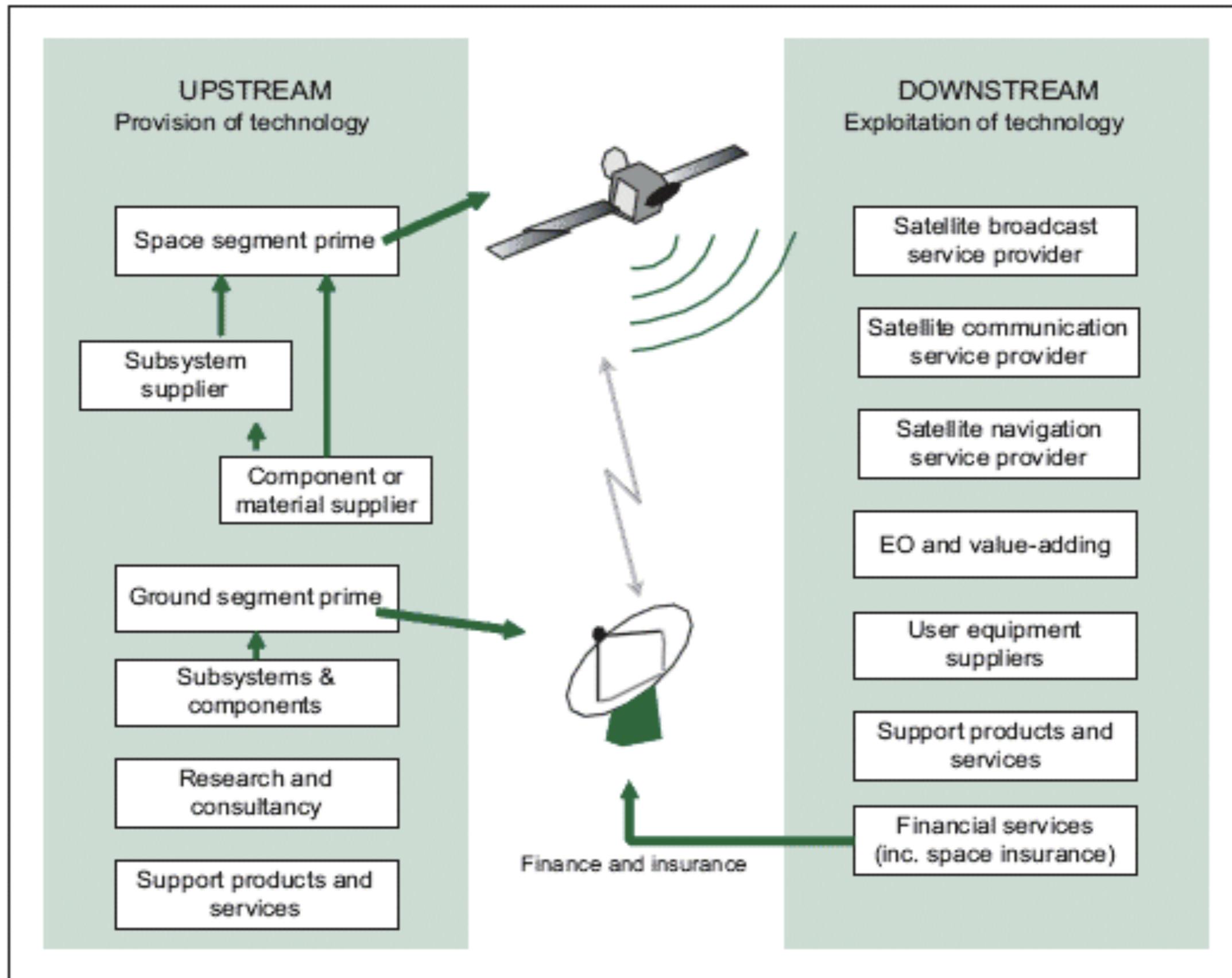
**Space Medicine**

**Space Policies and Laws**

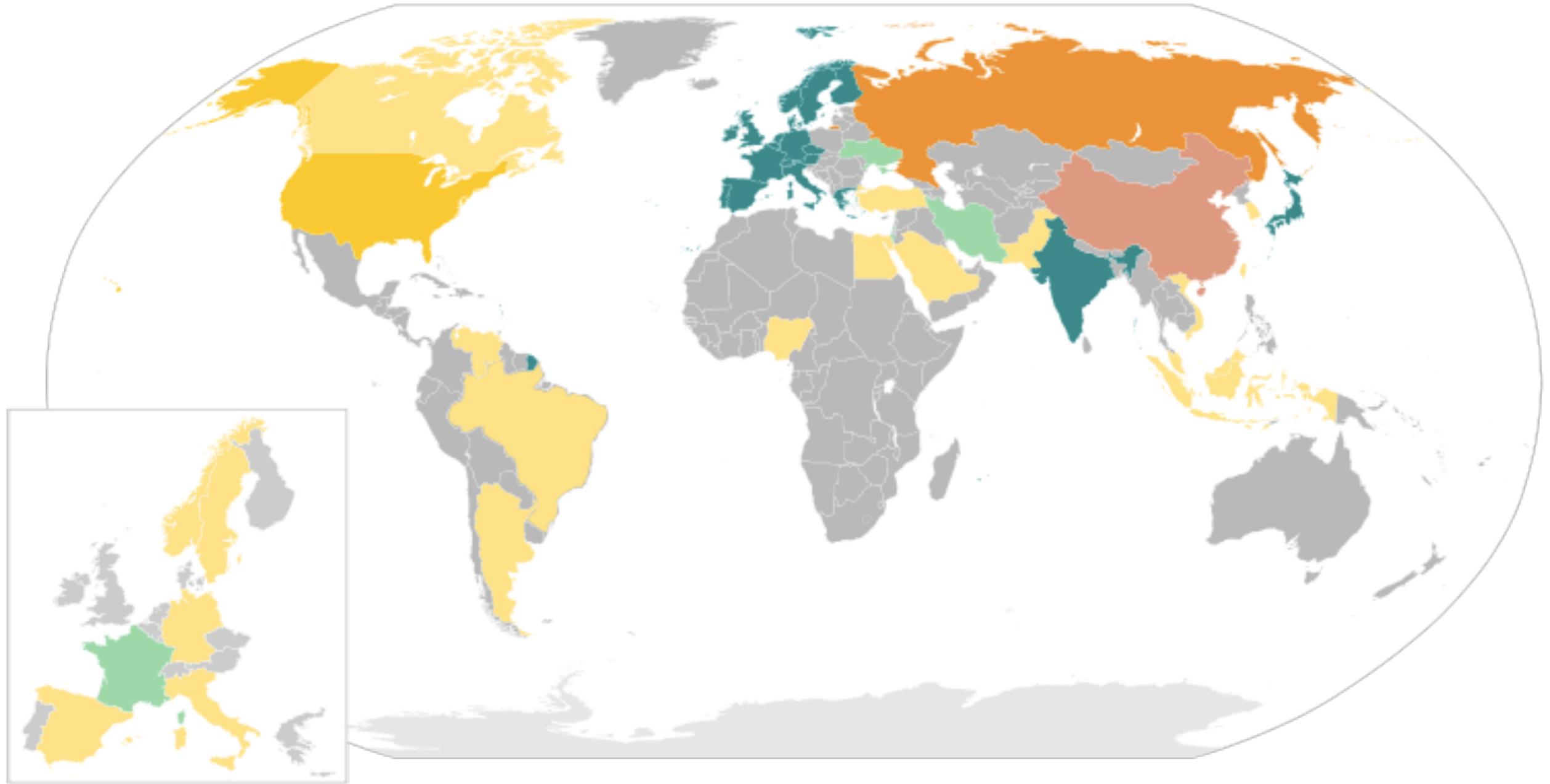


UNITED NATIONS  
Office for Outer Space Affairs

# Space Technology Sector

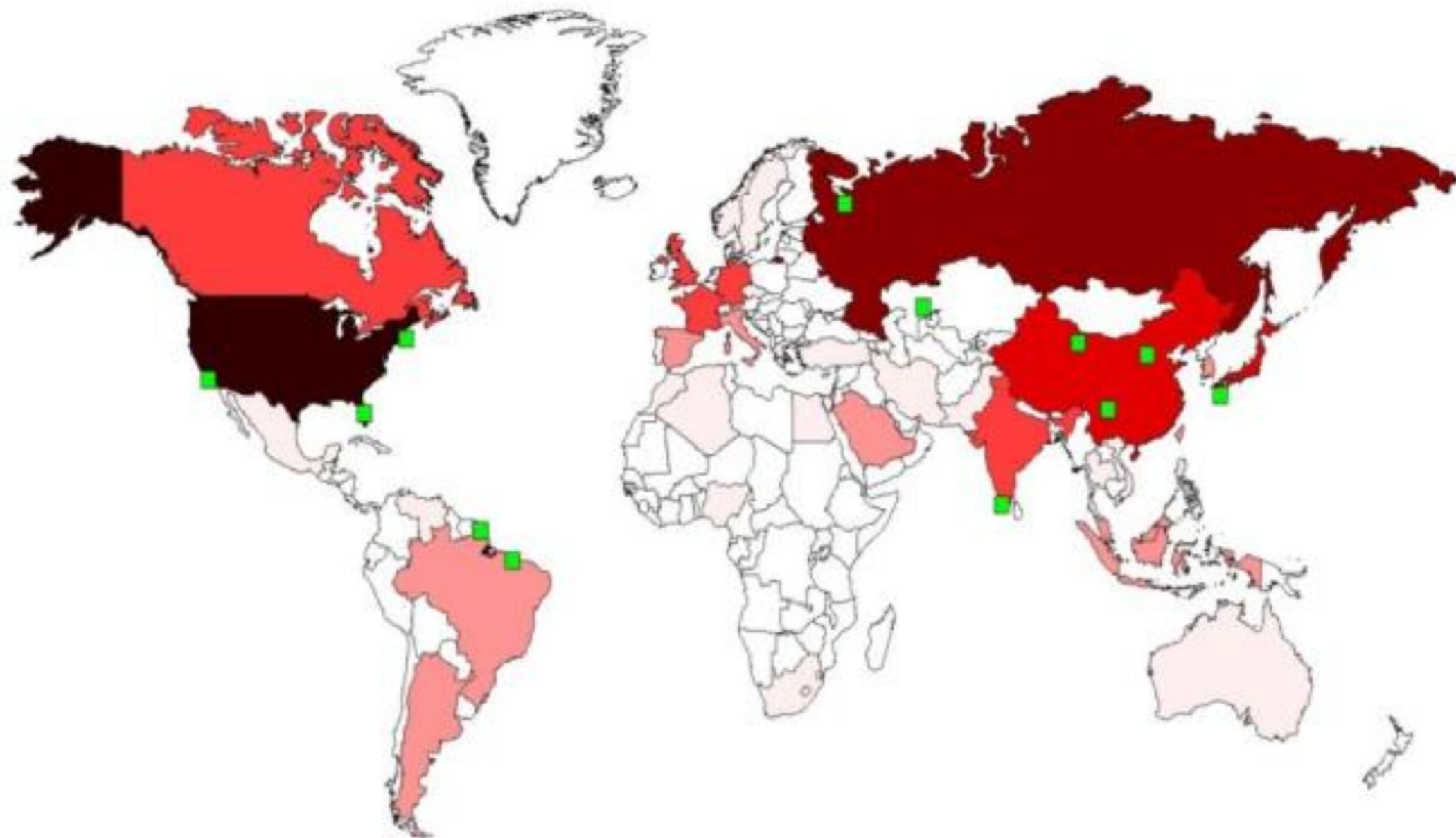


# Countries with Existing Space Programs



- Manned Extraterrestrial Exploration** + Operates Space Station + Manned Space Flight + Operates Extraterrestrial Probes + Launch Capability + Operates Satellites
- Operates Space Station** + Manned Space Flight + Operates Extraterrestrial Probes + Launch Capability + Operates Satellites
- Manned Space Flight** + Operates Extraterrestrial Probes + Launch Capability + Operates Satellites
- Operates Extraterrestrial Probes** + Launch Capability + Operates Satellites
- Launch Capability** + Operates Satellites
- Operates Satellites**
- None Of The Above**

# Countries with Operational Satellites (2010)



# Status of Philippine Space Development

## **NO ACCESS TO SPACE**

The Philippines has no direct access to space and is lagging behind neighboring ASEAN and Asian countries. This limits the capability for surveillance, space technology development and utilization for civilian and military purposes.

## **RELIANT ON FOREIGN SATELLITES**

Despite having two orbital slot allocations, we do not have any satellite in orbit; all satellite data and communications uses foreign satellites which the country has no control.

## **LACK OF TRAINED EXPERTS**

Currently, the country has a very small pool of trained astrophysicists, space scientists and engineers that are capable of doing research and development

## **SMALL SPACE R&D AND INDUSTRY**

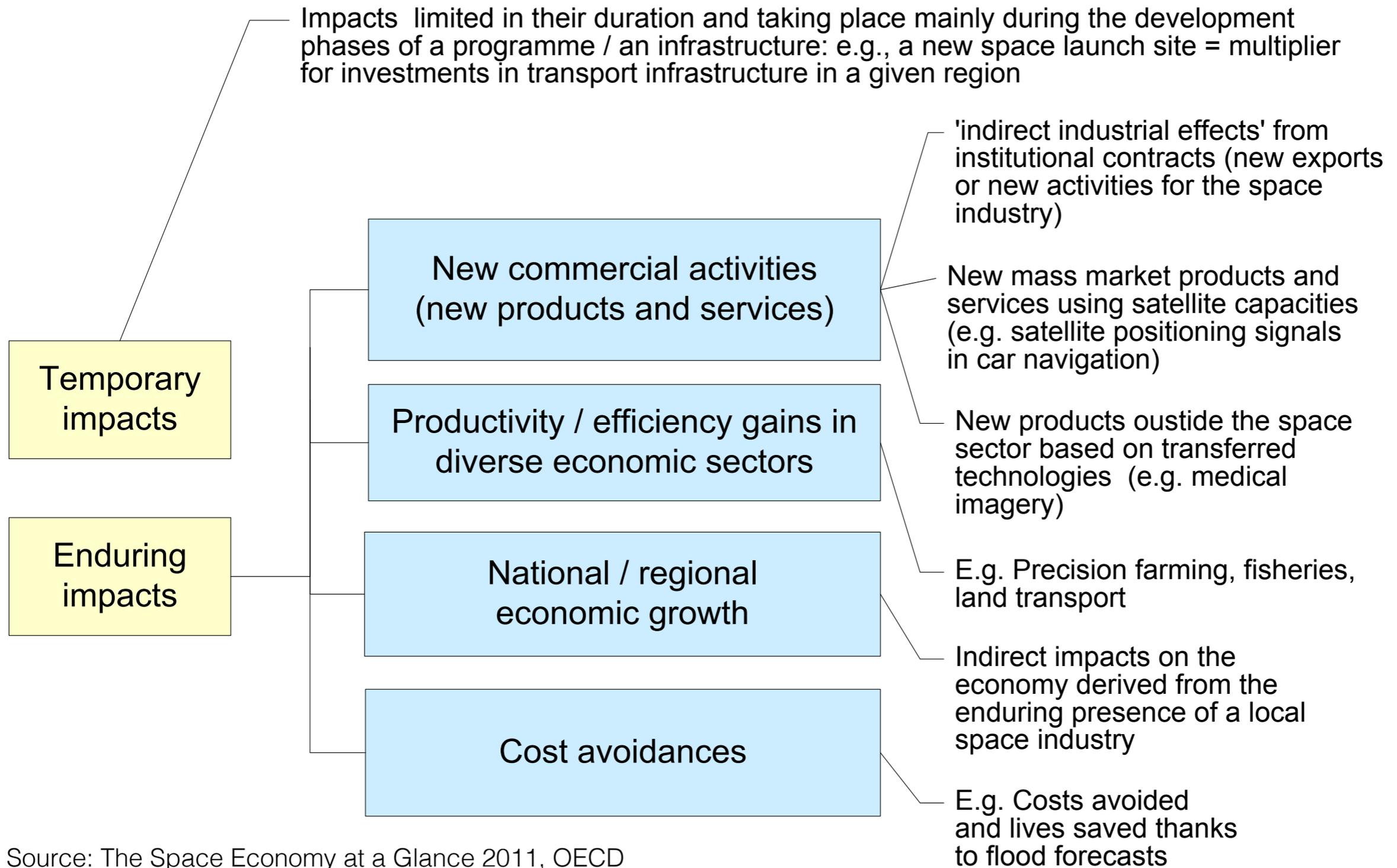
Due to lack of technology transfer and R&D, the Philippines has no existing capability to launch rockets and payloads to high altitudes and outer space.

## **NO EXISTING SPACE POLICY OR FRAMEWORK**

The Philippines is not a signatory to most international space treaties and currently has no space policy or agency to provide a cohesive space development strategy.

# National Impacts of a Space Program

## Review of possible impacts derived from investments in space programme



Source: The Space Economy at a Glance 2011, OECD

# Economic Value of SSTA

**SSTA is one of the main frontrunners of technological development.**

**National investments in space programmes are often justified** by acquired scientific, technological, industrial and security capabilities.

**Provides interesting socio-economic returns** such as increased industrial activity, and bring cost efficiencies and productivity gains to other fields.

Commercial space sector constitutes approximately **75% of the current space economy.**

On average, **an investment of \$1 in space development generates a economic return of \$4**

# Previous Space-Related Programs

Optical and Radio Astronomy since 1897

Project Santa Barbara in the 1970s

AGILA-2 Telecommunications Satellite in 1990s

Committee on Space Technology and Applications (COSTA)

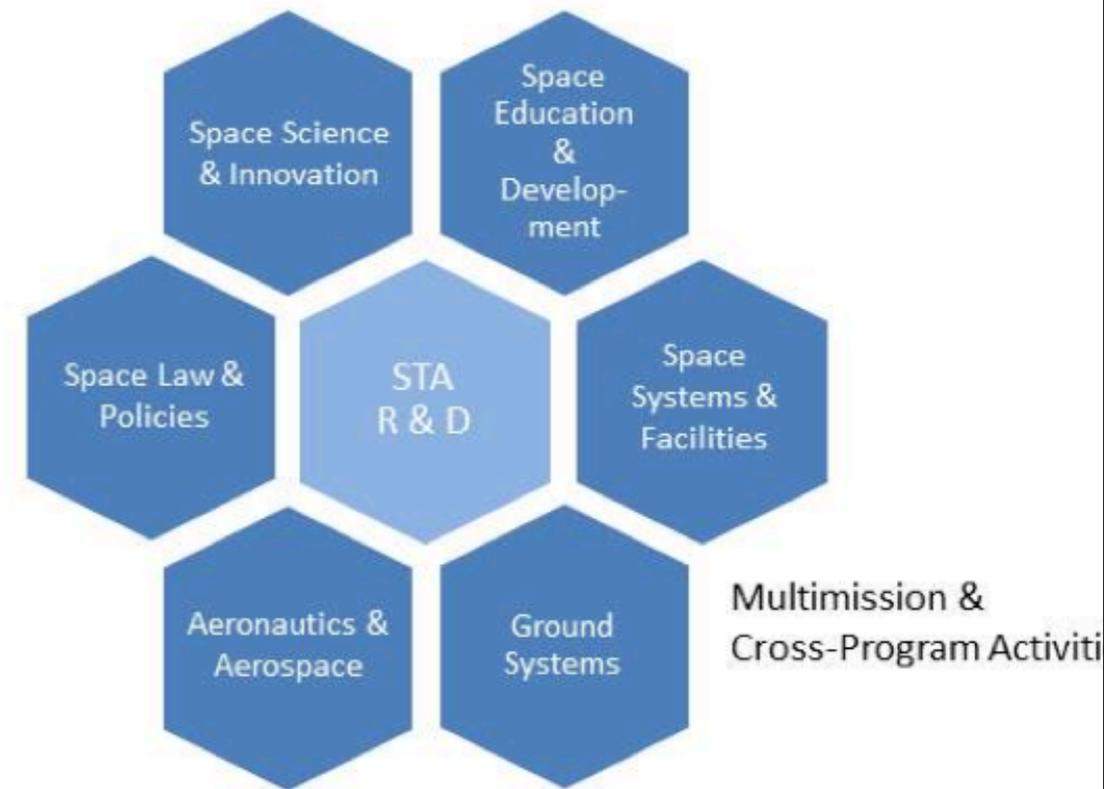
National Conference on Space Technology and Applications Research (NC-STAR)

Philippine Space Science Education Program

National Astronomy Week and World Space Week

HB 6725 Philippine Space Act of 2012

10-Year Baseline Research of Space Science and Technology Applications (SSTA)



# Outcomes of the SSTA Baseline Research

Functions of a space agency is **distributed to various government agencies and units**.

**There is a need for a National Space Policy** that would create a cohesive and unified strategy for short, medium and long term space development.

There is also a **need for a National Space Agency** that would all issues related to space that would affect the nation.

**Identify key areas for space development that would serve as its niche in the global space community** and develop the necessary tangible and intangible assets.

Education and industry funding support should be provided to **create a strong space R&D and robust space industry**.

**Enhance national and international cooperation** through joint projects that would be beneficial to all parties involved.

# Project Methodology

The project was conducted in three months from September to December 2014 by Regulus SpaceTech with funding from PCIEERD. The development of the space policy was done by:

- 1) Desktop review and analysis of national space policies of foreign countries;
- 2) Analysis of the results and recommendations of the SSTA Baseline research;
- 3) Private discussion with space policy experts and space lawyers in the international space community;
- 4) Conduct six (6) stakeholders meeting to gather inputs from the various sectors namely: industry, academe, government, defense, Visayas and Mindanao regions;
- 5) Drafting of the NSDUP and NSA Proposal

# **The National Space Development and Utilization Policy**

# Objectives of the NSDUP

- 1) Serve as the primary strategic roadmap for space development in the next decade.**
- 2) Focus on areas of space science and technology applications that would address national issues and concerns.**
- 3) Promote efficient utilisation of space assets and resources among various stakeholders through proper coordination and cooperation.**
- 4) Establish capacity-building measures to produce a space-capable workforce and necessary infrastructure to create a vibrant and sustained space economy.**
- 5) Enhance international cooperation with space agencies and organisations through joint agreements and linkages.**

# Framework of the NSDUP

The NSDUP focuses on six (6) Key Development areas (KDA) to develop space science and technology.



# KDA 1: National Security and Development

**“The Philippines will focus on space applications that can preserve and enhance the country’s national security and promote development that is beneficial to all Filipinos.”**

- commits the country to become a space-enabled nation by 2020;
- future space development will focus on addressing critical national issues such as food security, territorial integrity, disaster management, social inclusivity and communication gap;
- access to satellites plays a key role, thus, the Philippines will launch and maintain several nano- and micro-satellites for multi-spectral Earth observation, provide maritime domain awareness and monitor vital natural resources.
- the Philippines will also launch a geosynchronous telecommunications satellite by 2022 for civil and military use.

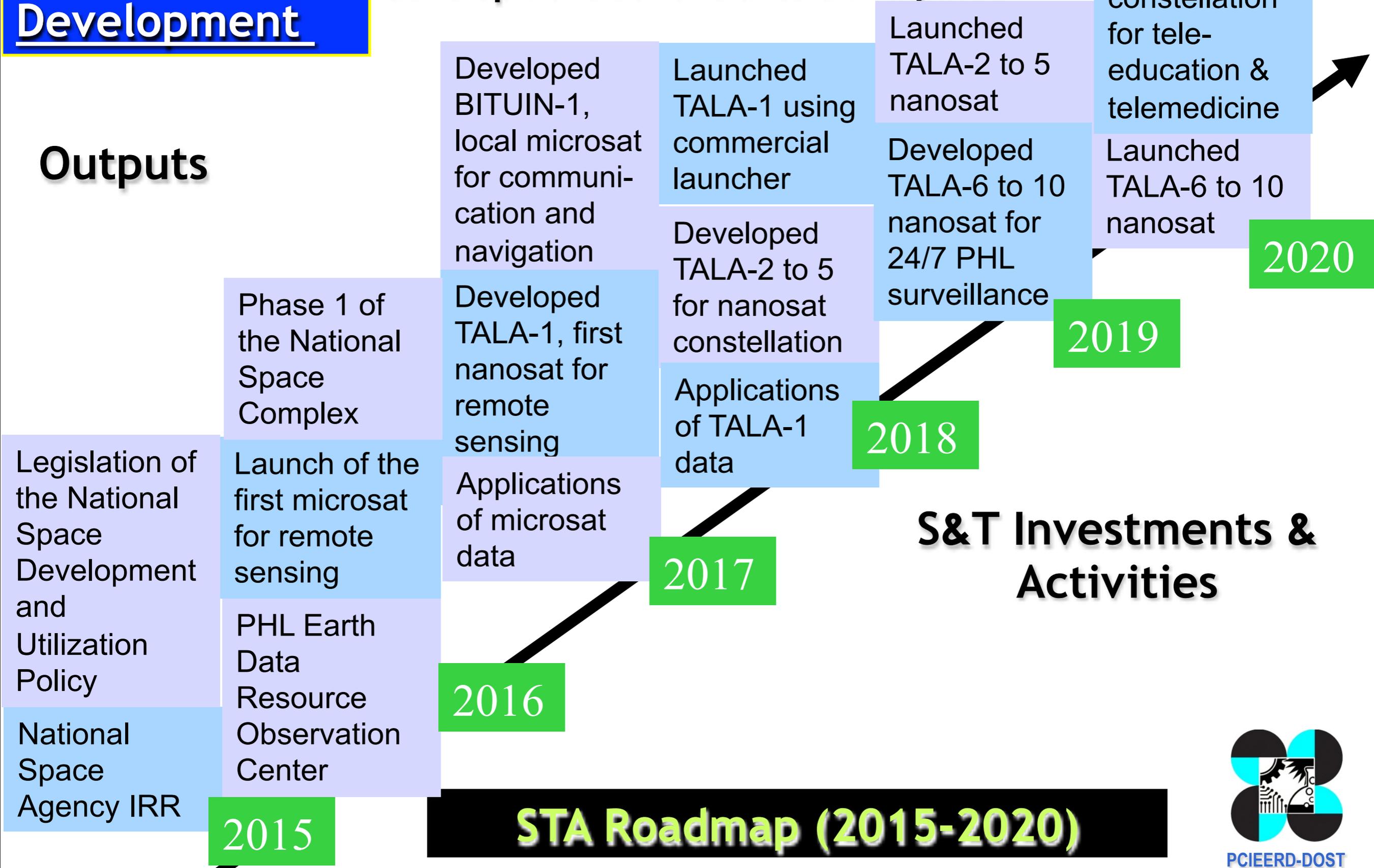
# KDA 1: National Security and Development

- development of precision agriculture to increase agricultural productivity through extensive crop monitoring surveys, accurate yield estimation, farm mechanisation and automation;
- Effective resource planning and management using remote sensing data to harness and utilise the country's rich biodiversity and natural resources;
- Access to satellite navigation systems to monitor air, land and sea transportation throughout the archipelago;
- Develop indigenous satellite and launch vehicle technology through continuous R&D as the country's niche in the global space community and guarantee that the Philippines will have continuous access to space;

# KDA 1. National Security and Development

**Preserve and enhance the country's national security and promote development beneficial to all Filipinos**

## Outputs



## STA Roadmap (2015-2020)

## S&T Investments & Activities



PCIEERD-DOST

## **KDA 2: Hazard Management and Climate Studies**

**“The Philippines will develop and utilize space science and technology applications to enhance its hazard management and disaster mitigation strategy as well as ensure the nation’s resiliency to climate change.”**

- proper utilisation of remote sensing data to address gaps in the country’s disaster management and risk mitigation strategy;
- development of space-based information system and data-sharing protocols under the National Space Agency in cooperation with other government agencies and academic institutions to ensure that information is easily available to key users and decision makers;
- focus on utilisation of space information for climate studies and enhance the country’s adaptability to climate change;
- create extension programs to bridge the gap between national agencies and LGUs on using remote sensing data for disaster response and management;

# KDA 2. Hazard Management and Climate Studies

Develop and utilize STA to enhance its hazard management and disaster mitigation strategy and ensure the nation's resiliency to climate change

Persistent monitoring of climate conditions using TALA nanosatellite constellation.

## Outputs

Hazard maps using locally acquired satellite data

Space information system and data sharing protocols

Space-based information for local land-use planning and development

Decision support system for resources management using space-based information

Climate change resilient communities utilizing space technology (e.g. DIWATA and PEDRO)

Enhanced monitoring system for GHG, sea-surface temperature and other climate conditions.

2015

2016

2017

2018

2019

2020

## S&T Investments & Activities

**STA Roadmap (2015-2020)**



PCI EERD-DOST

# KDA 3: Space Research and Development

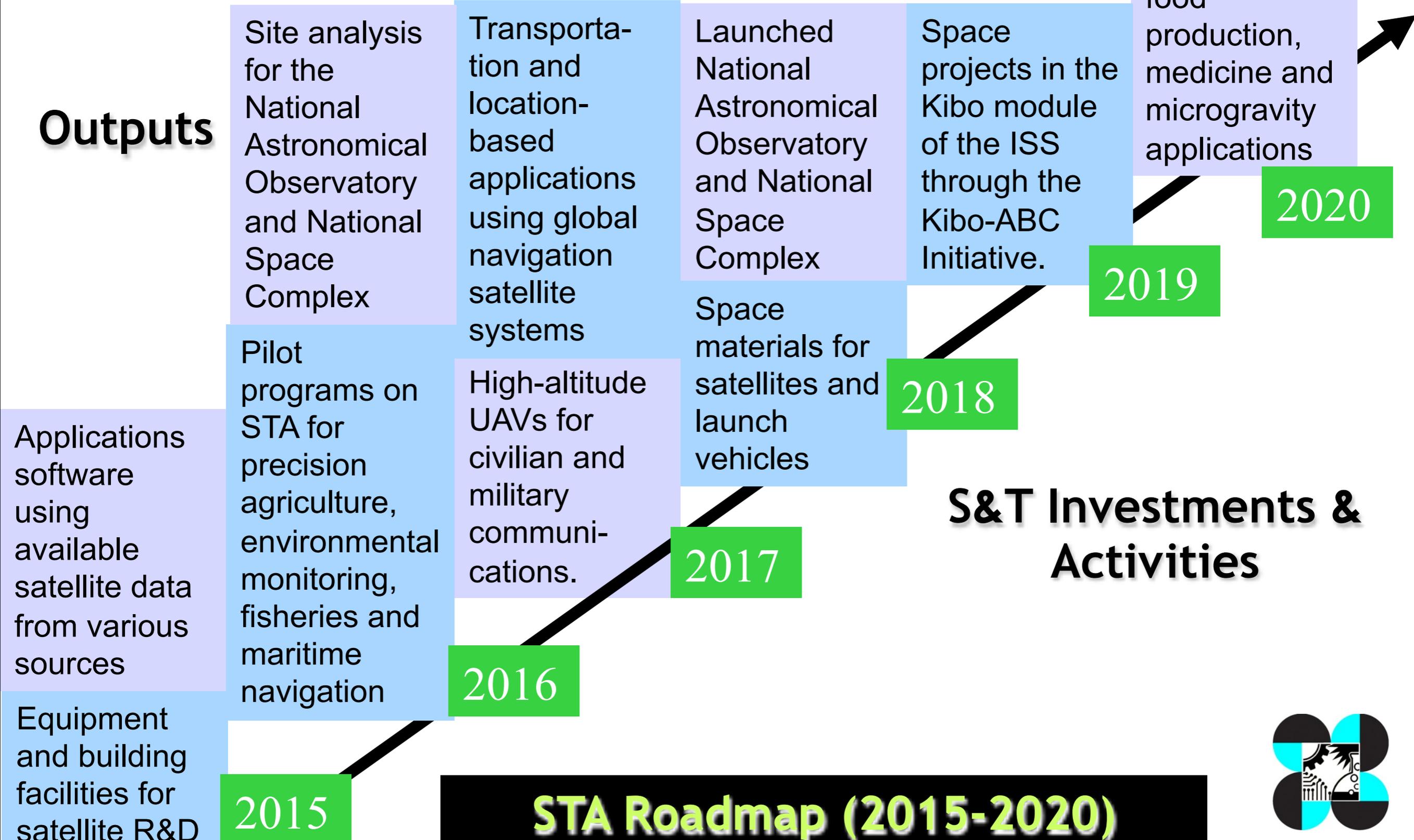
**“To spur rapid scientific growth, the Philippines will focus on conducting research and development endeavours in vital areas of space science, technology and allied fields.”**

- develop satellite building capabilities from nano-satellites to geosynchronous satellites;
- launch of a long-duration micro satellite constellation with optical, radar and AIS capabilities;
- creation of satellite AIT facilities, ground receiving stations and data archive centres;
- establish astronomical observatories and space centers for basic research in astronomy and astrophysics;
- develop the necessary infrastructure, capabilities and partnerships for launch vehicle development;

# KDA 3. Space R&D

Spur rapid scientific growth, the Philippines focus on conducting R&D endeavors in vital areas of space science, technology and allied fields

## Outputs



## STA Roadmap (2015-2020)



PCIERD-DOST

# KDA 4: Space Industry Capacity Building

**“The Philippines will create a robust and thriving space industry to support the country’s space program through private sector involvement and cooperations.”**

- focus on high-value space technology and services provided by a pool of talented and trained Filipino space scientists and engineers;
- provide incentives for current and future space companies in various forms (e.g. tax holidays, reduced tariffs etc.)
- the government will commit an amount of at least 1 Billion Pesos for developing a local space industry;
- provide government support for projects related to creation of upstream technologies such as satellites, ground systems and launch capabilities;
- inclusion of space personnel in Magna Carta for S&T Workers, exemptions from SSL and certain CS regulations for scientists and engineers working in the NSA and private space companies;

# KDA 4. Space Industry Capacity Building

Create a robust and thriving space industry to support the country's space program through private sector involvement and cooperation

## Outputs

Joint projects between academe-government-industry on development of microsatellites and geosynchronous satellites for national use

Creation of Space Industry Development Agenda  
incentive programs for space companies in the Philippines

Space Technology Industrial Park within or adjacent to the National Space Complex.

Joint projects between academe-government-industry on development of rockets and launch vehicles

Training and internship programs for students and educators.

Local space industry catering to national and international clients.

2015

2016

2017

2018

2019

2020

**STA Roadmap (2015-2020)**

## S&T Investments & Activities



PCIERD-DOST

# KDA 5: Space Education and Awareness

**“The Philippines aims to establish a sustainable pool of trained space scientists, engineers and communicators that will be critical for the country’s future space program and increasing public awareness on its value and benefits.”**

- establish space education centres in key areas to educate the public on the benefits of a space program;
- Regular observance of events such as the National Astronomy Week and World Space Week;
- Provide training and continuing education program for future and in-service teachers on space science and technology
- Integration of space science in the basic education curriculum, including development of materials suitable for Filipino students;

# KDA 5: Space Education and Awareness

- Mandate HEIs to offer space science related subjects and degree programs (CODs and COEs);
- Provide local and foreign scholarships for students willing to pursue careers in space science and related fields;
- creation of a university consortium to harmonise space research activities in the tertiary level;
- create training programs in space industry companies to pave the way or employment of future space degree program graduates;
- establish partnership programs with foreign universities and research institutions;

# KDA 5. Space Education and Awareness

## Development of expert manpower, curriculum and education materials at all levels

First regional space center in Davao

### Outputs

- Highly trained HEIs with upgraded STA facility
- Instructional materials for space science and information
- Space Awareness Programs for teachers and the public

- Elite group of graduate research students trained in microsatellite development
- Established Microsatellite Laboratory
- Universities as Centers for Dev't on STA

- IEC for astronomy and space science
- Exchange programs with foreign universities and institutions

- First regional space center in Palawan
- MS / PhD Curriculum for Distance Learning Education

- IEC for astronomy and space science
- First regional space center in Cebu

- Student internship employment programs

2015

2016

2017

2018

2019

2020

**STA Roadmap (2015-2020)**

### S&T Investments & Activities



PCI EERD-DOST

# KDA 6: International Cooperation

**“Through international partnerships and collaborations, the Philippines will become a key player in the ASEAN and global space community by providing significant contributions and capabilities on space science and technology applications.”**

- ratification of the four remaining international space treaties;
- establish bilateral and multilateral agreements for cooperation with other nations to impart mutual scientific and technological benefits;
- pursue possible areas for collaboration to address security and other issues in the SEAsian and Asia-Pacific region.
- Active participation in regional and international organisations such as UNOOSA, IAU, IAF and APRSAF;
- Host major international conferences starting with the APRSAF in 2016;

# KDA 6. International Cooperation

## Become a key player in the ASEAN and global space community as a service- and manpower- provider

### Outputs

Established linkages with space agencies and organizations

Inform the International Telecommunications Union on the intent of the Philippines to utilize its allocated orbital slot within the next seven (7) years.

Hosted the 23<sup>rd</sup> Asia Pacific Regional Space Agency Forum

Signed Missile Technology Control Regime Agreement to facilitate rocket technology transfer.

Joint partnership for the development of TALA nanosat

Bilateral agreements with foreign space agencies

Hosting of the 70<sup>th</sup> International Astronautical Congress

Multi-lateral regional agreements for partnerships, technology exchange programs and joint space projects.

Proposal in Hosting the International Astronomical Union General Assembly

2015

2016

2017

2018

2019

2020

**STA Roadmap (2015-2020)**

### S&T Investments & Activities



PCI EERD-DOST

# **Space Development Long Term Goals**

**Indigenous Satellite Development Capability**

**Indigenous Rocket and Missile Launch Capability**

**Space Technology Applications for Nation-Building**

**Pool of Civilian and Military Experts**

**Robust and Thriving Space Economy**

# **The National Space Agency**

# The National Space Agency

To implement and realize the goals of the National Space Development and Utilization Policy, the Philippines will create a **National Space Agency (NSA)** that will:

- serve as the country's sole agency responsible for addressing all space-related issues and promote the development of space science and technology;
- unify all national space activities by coordinating with existing government units to provide a framework for a cohesive and harmonious cooperation;
- be responsible for ensuring the country's space development goals for the next 5-10 years are achieved;

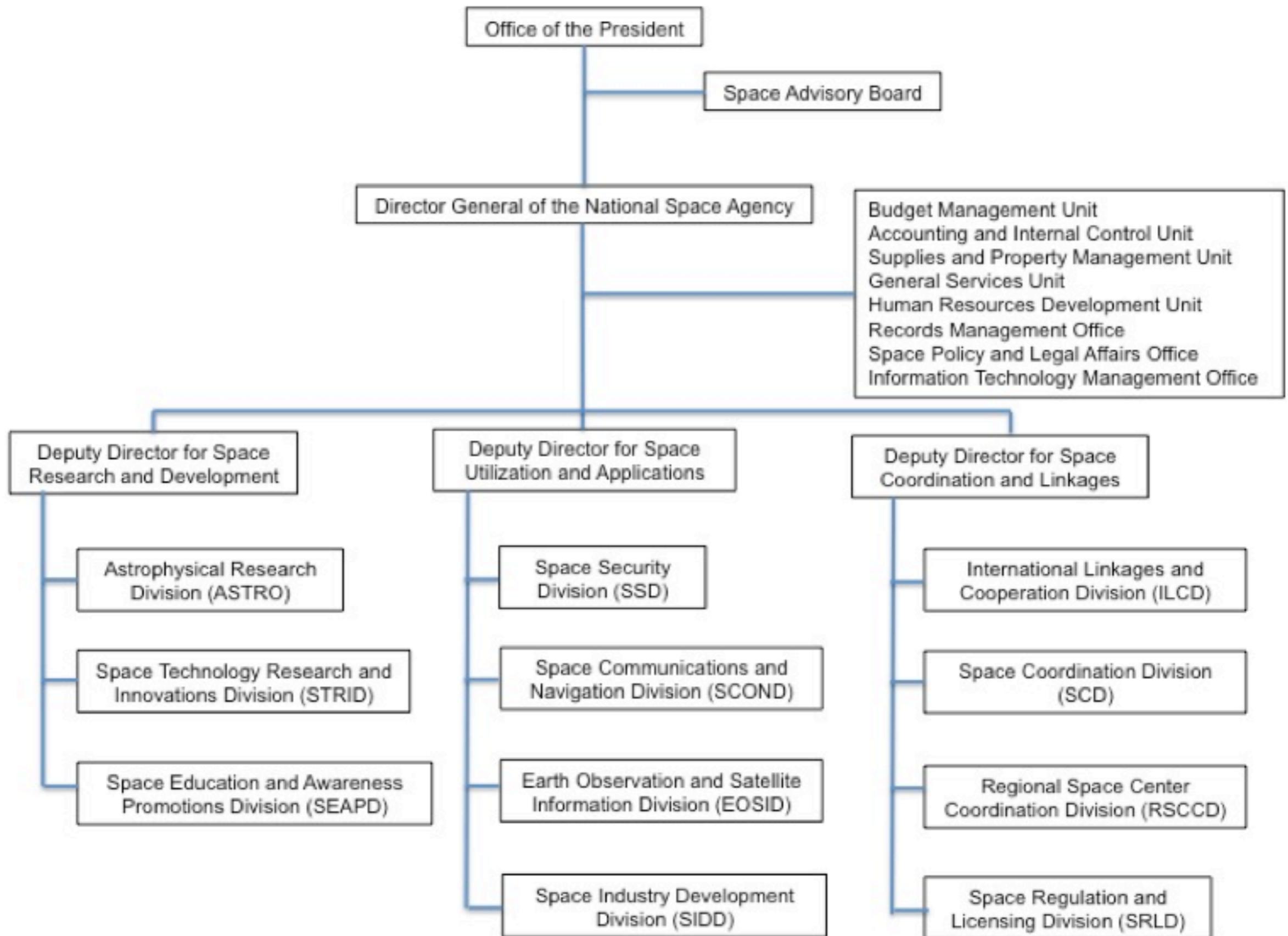
# Vision and Mandate of the NSA

**“The National Space Agency will be the country’s sole agency responsible for addressing all space-related matters and issues.”**

The official functions of the NSA are:

- 1) Implement the National Space Development and Utilization Policy;
- 2) Coordinate all space activities of various sectors and stakeholders in the Philippines;
- 3) Promote the growth of space technology through research and development;
- 4) Establish programs that would develop space education and promote public awareness;
- 5) Foster the creation of a robust and vibrant local space industry;
- 6) Provide appropriate and accurate advice to the President of the Philippines and other government agencies on space-related issues and concerns.

# Organizational Structure



# Office of the Director General

The National Space Agency will be headed by the Director General who will have the following duties and responsibilities;

- 1) Ensure that the NSDUP is properly implemented and its goals are achieved;
- 2) Ensure that the mandate and functions of the NSA are properly executed;
- 3) Shall have full control and supervision over the work of the NSA;
- 4) Shall represent the country in the international space community;
- 5) Shall have the authority to enter into agreements with foreign space agencies, organisations and/or institutions on behalf of the Philippines;
- 6) Shall have a position equivalent to a Cabinet Secretary serving a duration of six (6) years irrespective of administration change with no prejudice on reappointment;

The Office of the DG shall perform the administrative function of the NSA with the IRR to be drafter within 90 days upon creation of the Agency.

# Space Advisory Board

The Space Advisory Body (SAB) will serve as the main consultative body of the NSA and will takeover the mandate and functions of the current COSTA. It will be composed of:

Director General, National Space Agency (Chairman)  
Chairperson, Senate Committee on Science and Technology  
Chairperson, Lower House Committee on Science and Technology  
Secretary, Department of Science and Technology  
Secretary, Department of National Defense  
Secretary, Department of Transportation and Communication  
Secretary, Department of Agriculture  
Secretary, Department of Environment and Natural Resources  
Secretary, Department of Education  
Secretary, Department of Foreign Affairs  
Secretary, Department of Trade and Industry  
Commissioner, Commission on Higher Education  
Director General, National Security Council  
Director General, National Economic Development Authority

Members will serve for 6 years unless withdrawn. The SAB shall provide recommendations for the revision of the NSDUP every 10 years.

# Office of the Deputy Director for Space Research and Development (DD-SRD)

The DD-SRD shall be in charge of developing the capabilities of the country in fundamental and applied space science. He/she shall serve as the OIC in the absence of the DG and shall be selected from a list of qualified applicants. His/her term shall be co-terminus with the DG.

The DD-SRD shall handle three (3) units focused on basic and applied researches in space science and education:

Astrophysical Research Division (ASTRO)

Space Technology Research and Innovations Division (STRID)

Space Education and Awareness Promotions Division (SEAPD)

# Astrophysical Research Division (ASTRO)

The Astrophysical Research Division shall focus on conducting research in the field of astronomy and astrophysics.

- The ASTRO shall absorb functions of the Astronomical Services Unit of PAGASA which will be fully transferred upon creation of the NSA;
- Shall conduct researches that will increase the knowledge and understanding of the Earth and the Universe and its potential impact to future applied R&D.
- Shall maintain a network of astronomical observatories and computing facilities through the country for its research activities;

# Space Technology Research and Innovations Division (STRID)

The Space Technology Research and Innovations Division shall conduct research in aerospace, astronautics and related fields to spur the development of space-based assets and capabilities.

- Shall conduct researches in areas necessary for space development such as material science, fuel technology, aerospace engineering etc.;
- Shall manage facilities for space systems assembly, integration and testing as well as maintain and operate test launch sites;
- Shall takeover and absorb the space development functions of PADDC;

# Space Education and Awareness Promotions Division (SEAPD)

The Space Education and Awareness Promotions Division shall focus on developing and promoting space education to Filipino students on all year levels as well as the general public.

- Shall provide short and long-term education and training programs for various levels in astronomy and space science in partnership with DepEd, CHED and SEI;
- Shall provide scholarships for local and foreign studies in space science and related fields (in cooperation with SEI);
- Shall conduct public awareness and promotions program to increase public appreciation of space science and technology;
- Shall absorb the function of the Philippine Space Science Education Program of SEI and takeover the management of the Manila Planetarium and PAGASA Planetarium.

# Office of the Deputy Director for Space Utilization and Applications (DD-SUA)

The DD-SUA is tasked to develop programs for the utilisation and application of space science and technology to address national issues. Thus, it is in charge of ensuring that the benefits derived from SSTA is maximised and utilised efficiently. His/her term shall be co-terminus with the DG.

The DD-SUA shall handle four (4) units focused on effective space utilisation and application programs:

Space Security Division (SSD)

Space Communications and Navigation Division (SCOND)

Earth Observation and Satellite Information Division (EOSID)

Space Industry Development Division (SIDDD)

# Space Security Division (SSD)

The Space Security Division shall be responsible for the development of space-related technologies for national security and military applications. The SSD shall:

- work in close coordination with DND and NSC on space-related programs that can affect the country's national security;
- be composed of civilian and military personnel and will be subject to security clearances prior to employment;
- be accessible only to SSD personnel and top NSA officials only.

# Space Communications and Navigation Division (SCOND)

The Space Communications and Navigation Division shall utilise space-based communication and navigation with focus on civilian applications.

The Division will:

- focus on research and development of technologies such as satellite broadcasting and communication, GNSS applications, tele-medicine, tele-education etc.

- share some resources with SSD for dual-use resources and applications but will operate independently without compromising security;

# Earth Observation and Satellite Information Division (EOSID)

The Earth Observation and Satellite Information Division shall focus on applying remote sensing data for research and development. It shall:

- primarily focus on development of various space-based tools and applications that can assist decision-makers and LGUs;
- operate a network of ground receiving stations (in coordination with STRID);
- provide and maintain a central satellite data archive of the whole Philippines;
- coordinate with NAMRIA for data sharing and redundancy;
- provide satellite data to the Philippine government and local academic institutions;

# Space Industry Development Division (SIDDD)

The Space Industry Development Division shall focus on assisting local aerospace companies. The SIDDD shall:

- provide capacity-gilding measures for local space companies;
- analyze and assess potential niche areas for local space industry development;
- coordinate with the ILCD for possible partnerships with foreign aerospace companies to enhance local research and technology transfer;

# **Office of the Deputy Director for Space Coordination and Linkages (DD-SCL)**

The DD-SCL is tasked to coordinate space development and utilisation activities of the various units of the Philippines for efficient utilisation of space assets and infrastructure. It shall also be tasked to establish linkages and collaboration with foreign space agencies and institutions. His/her term shall be co-terminus with the DG.

The DD-SCL shall handle four (4) units focused on fostering local and international cooperation, technology transfer and collaborative projects.

International Linkages and Cooperation Division (ILCD)

Space Coordination Division (SCD)

Regional Space Center Coordination Division (RSCCD)

Space Regulation and Licensing Division (SRLD)

# International Linkages and Cooperation Division (ILCD)

The International Linkages and Cooperation Division shall serve as the international liaison and coordination office of the NSA. The ILCD:

- shall establish and maintain linkages with foreign space agencies/ organizations;
- shall institute cooperation agreements to boost technology transfer and partnerships;
- will monitor the activities of foreign space agencies in order for the NSA to be aware of any activity that is of interest or concern to the Philippines;

# Space Coordination Division (SCD)

The Space Coordination Division is in charge of coordinating space-related activities with other government agencies and local institutions. The SCD shall:

- ensure that the various space activities of the government are in line with the NSDUP;
- facilitate and handle requests for assistance from government agencies and local institutions on space-related matters;
- shall refer the said concerns to the appropriate division or unit of the NSA;

# Regional Space Center Coordination Division (RSCCD)

The Regional Space Center Coordination Division shall maintain an network of space centres throughout the country. These centres shall operate as local data archive and space education centers. The RSCCD shall:

- initially establish Regional Space Centers in Cebu, Davao and Palawan and shall be expanded to one centre per region;
- provide satellite data to government units within their jurisdiction to facilitate rapid data dissemination;
- perform the functions of the other service Divisions within their jurisdictions if such functions are deemed necessary to be done outside the NSA Main Office (e.g. observatories, AIT facilities, launch centres etc.)

# Space Regulation and Licensing Division (SRLD)

The Space Regulation and Licensing Division shall be in charge of regulating academic, government and private companies conducting space research to ensure that all activities are compliant with existing international and national space treaties/regulations. Furthermore, the SLCD shall:

- be in charge of assisting patent applications for locally-developed space technologies/applications;
- sales of satellite archive data provided by EOSID;
- management of satellite orbital allocation and official liaison to the International Telecommunications Union;
- conduct space object registration in compliance with the 1974 Registration Convention;

# Initial Appropriations

AGENCY UNIT	INITIAL BUDGET	PLANTILLA
Office of the Director General	480,000,000.00	50
Office of the Deputy Director for Space Research and	50,000,000.00	5
Astrophysical Research Division	60,000,000.00	15
Space Technology Research and Innovations Division	200,000,000.00	25
Space Education and Awareness Promotions Division	30,000,000.00	20
Office of the Deputy Director for Space Utilization and	50,000,000.00	5
Space Security Division	200,000,000.00	20
Space Communication and Navigation Division	200,000,000.00	20
Earth Observation and Satellite Information Division	200,000,000.00	20
Space Industry Development Division	200,000,000.00	10
Office of the Deputy Director for Space Coordination and	50,000,000.00	5
International Linkages and Cooperation Division	30,000,000.00	10
Space Coordination Division	30,000,000.00	10
Regional Space Center Coordination Division	200,000,000.00	25
Space Regulation and Licensing Division	20,000,000.00	10
<b>TOTAL</b>	<b>2,000,000,000.00</b>	<b>250</b>

# Strategy for Legislation

The NSDUP and NSA shall be established through an Executive Order signed by the President of the Philippines.

Upon creation, the NSA shall establish its Implementing Rules and Regulations within 90 days.

The NSA shall push for the ratification of the four remaining international space treaties and other relevant agreement.

The NSA shall lobby for the formal legislation of the NSDUP and NSA in both the Lower and Upper House of the Philippine Congress.

# SUMMARY

The Philippines needs to address and embark on developing space technology to keep up with the rest of the world and to address national security issues.

Space technology can benefit both the military (intelligence gathering etc.) and civilians (disaster response etc.)

Local space technology would create a pool of local experts and remove the exposure of the Philippines in terms of access to space and satellites;

Developing space technology is highly beneficial and advantageous for the economy and the nation in the long run.

**Having a space program is costly, but NOT having a space program is even costlier for the country.**