



# Spectrum Policy Assessment System (SPAS)

National Spectrum Monitoring System project  
Country presentation

*SESSION 5: Trends in Spectrum Management: Trading & Automation of Spectrum Management Systems*

Rommel R. Natividad, Project Manager III  
CIO Corps  
Office of the Secretary



# Philippines

The Philippines is a Southeast Asian country in the Western Pacific, comprising more than 7,000 islands. Its capital, Manila, is famous for its waterfront promenade and centuries-old Chinatown, Binondo, Intramuros, a walled city in colonial times, is the heart of Old Manila. It's home to the baroque 17th-century San Agustin Church as well as Fort Santiago, a storied citadel and military prison.

Capital: Manila

Dialling code: +63

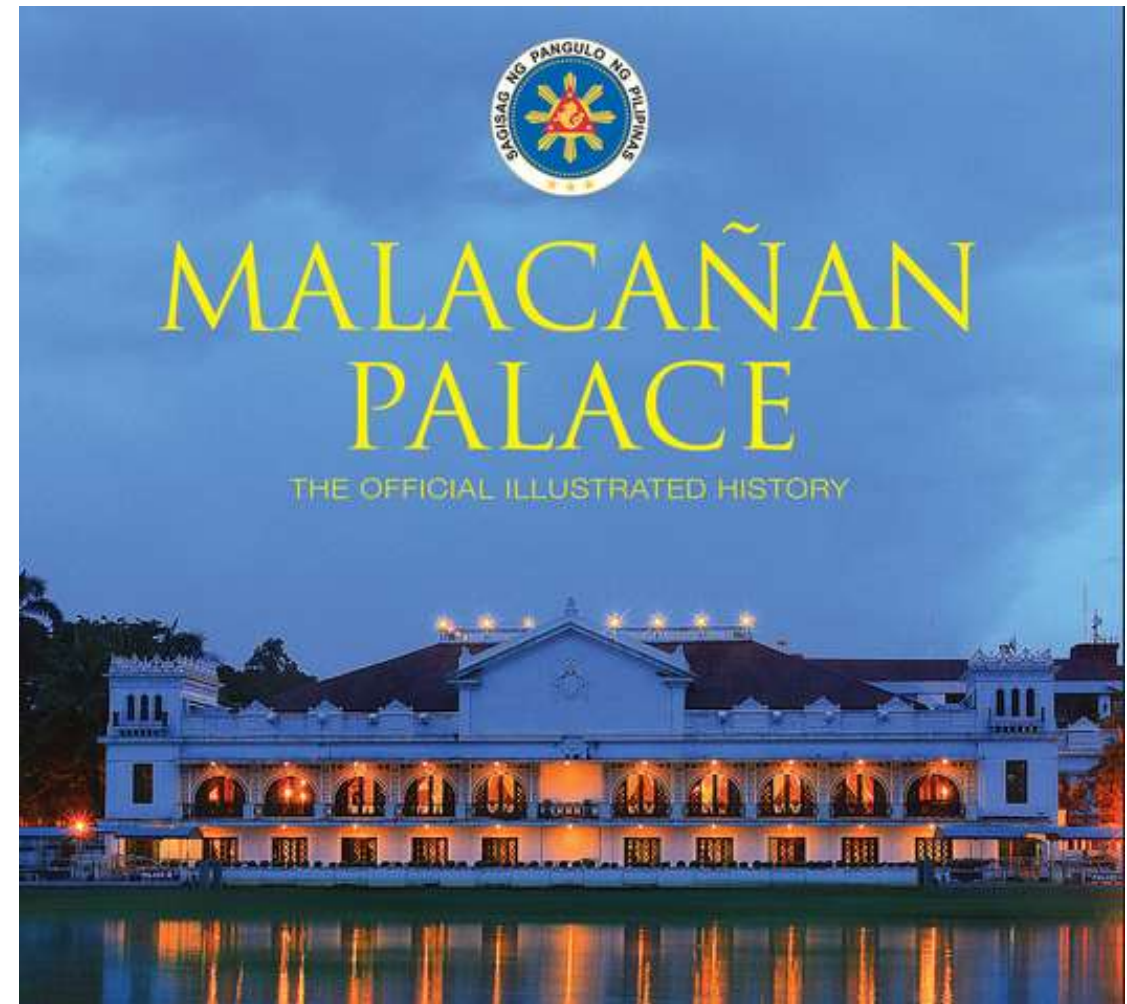
President: Rodrigo Duterte

Population: 115~ million

Currency: Philippine peso



REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF INFORMATION AND  
COMMUNICATIONS TECHNOLOGY



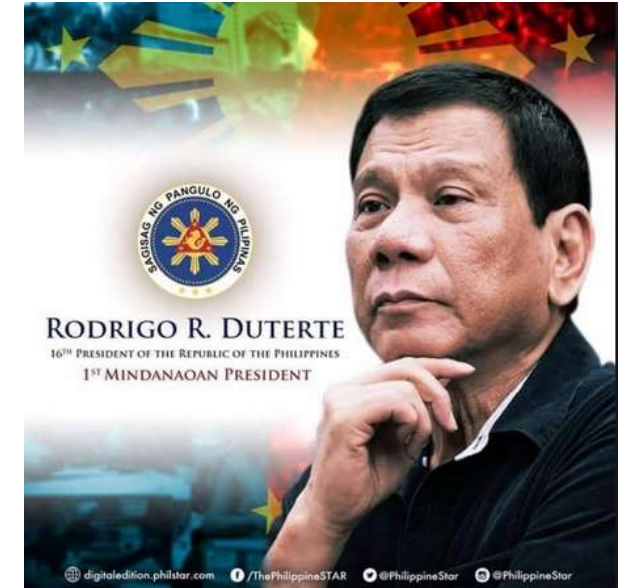
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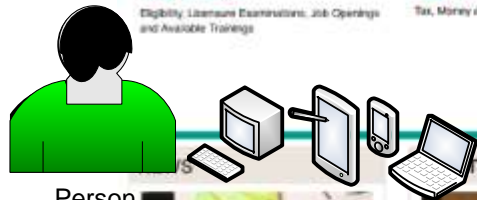
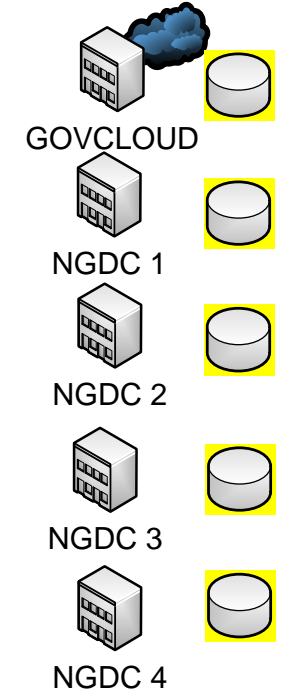
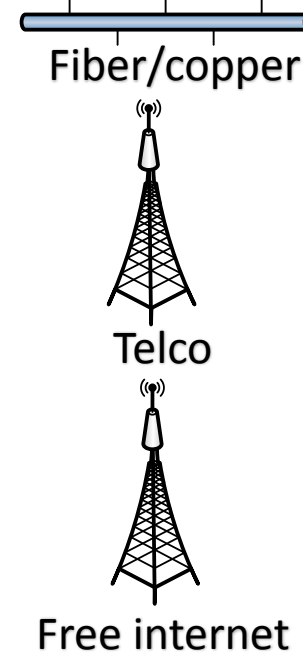
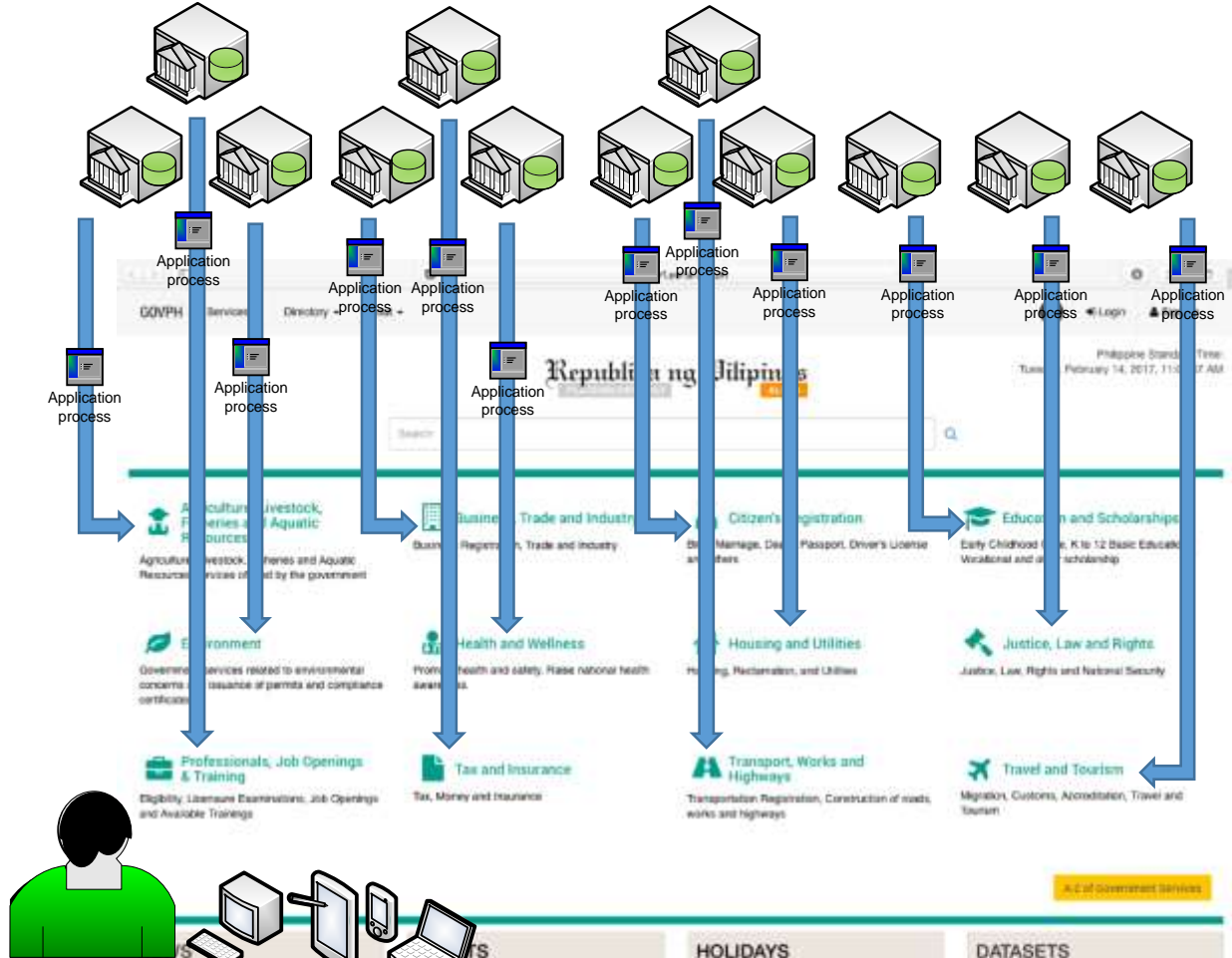
"Make use of the computer. I do not want to see people lining up under the heat of the sun. I do not want people lining up under the rain."\*



\* <http://www.rappler.com/nation/140878-extend-passport-validity-duterte-sona-2016>



# National Government Portal



Person  
**Rommel R. Natividad, Project Manager III**  
 CIO Corps  
 Office of the Secretary

## Spectrum Policy Assessment System (SPAS)





**Atty. Rodolfo A. Salalima**  
**Secretary**



**Official Logo**



**Central Office**





# Philippines



REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF INFORMATION AND  
COMMUNICATIONS TECHNOLOGY

## Policy Making Bodies

Office of the President  
Department of Information and Communications Technology  
Congress of the Philippines

## Regulatory Body

National Telecommunications Commission (NTC)



# DICT



REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF INFORMATION AND  
COMMUNICATIONS TECHNOLOGY

## DEPARTMENT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

### *MANDATE*

Primary policy, planning, coordinating, implementing and administrative entity that will plan, develop and promote the National ICT development agenda.

### *OFFICIALS APPOINTED BY THE PRESIDENT*

1. Rodolfo A. Salalima – Secretary  
Atty. Carlos Caliwara – Assistant Secretary for Legal Affairs
2. Eliseo M. Rio Jr. (Ret. AFP General) – Undersecretary for Cybersecurity and Special Concerns  
Allan Cabanlong (PNP) – Assistant Secretary for Cybersecurity and Special Concerns  
Alan Silor – Assistant Secretary for Cybersecurity and Special Concerns
3. Monchito B. Ibrahim – Undersecretary for Management and Operations  
Atty. John Henry D. Naga – Assistant Secretary for Management and Operations
4. Denis F. Villorente – Undersecretary for Development and Innovations

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Spectrum Policy Assessment System (SPAS)



SESSION 5: Trends in Spectrum Management: Trading & Automation of Spectrum Management Systems



# DICT



## ***POWERS AND FUNCTIONS***

1. Policy and Planning
2. Improved Public Access
3. Resource-sharing and Capacity Building
4. Consumer Protection and Industry Development

## ***DICT***

- 1) Information and Communications Technology Office
- 2) National Computer Center
- 3) National Computer Institute
- 4) Telecommunications Office
- 5) National Telecommunications Training Institute
- 6) All operating units of the Department of Transportation and Communications with functions and responsibilities dealing with communications

Attached agencies (for policy and program coordination RA 10844 SEC. 15-6b)

- 1) National Telecommunications Commission
- 2) National Privacy Commission
- 3) Cybercrime Investigation and Coordination Center



# DICT



REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF INFORMATION AND  
COMMUNICATIONS TECHNOLOGY

## NATIONAL TELECOMMUNICATIONS COMMISSION

1. Regulate the installation, operation and maintenance of radio stations both for private and public use (Act No. 3846, as amended)
2. Regulate and supervise the provision of public telecommunications services (RA7925, CA146, as amended)
3. Manage the radio spectrum (Act No. 3846, as amended and RA7925)
4. Regulate and supervise radio and television broadcast stations, cable television (CATV) and pay television (E0546)



## FOUR (4) MAJOR LAWS GOVERNING SPECTRUM MANAGEMENT

1. Act 3846- Radio Control Law
2. Executive Order No. 546, Creating the National Telecommunications Commission
3. Republic Act No. 7925- Telecommunications Policy Act of the Philippines
4. Republic Act No. 10844 – Creation of the Department of Information and Communications Technology



## TELECOMMUNICATIONS POLICY ACT OF THE PHILIPPINES

1. To **develop and maintain** a viable, efficient, reliable and universal telecom infrastructure using the best available and affordable technologies.
2. Expansion of telecom network shall give priority to **unserved and underserved areas**.
3. Radio frequency is scarce public resource that shall be **administered in the public interest** and in accordance with international agreements and conventions to which the Philippines is a party and granted to the best qualified.
4. Public telecommunications services **shall be provided by private enterprises**.
5. A **healthy competitive environment** shall be fostered where public telecom carriers are free to make business decisions and to interact with one another in providing telecom services.
6. Radio frequency **(RF) spectrum allocation and assignment** shall be **subject to periodic review** such that the use thereof shall be subject to reasonable spectrum user fees and where demand for specific frequencies exceed availability there shall be open tenders.



## Telecommunication Industry Structure

Type of Service	Year 2015
Local Exchange Carrier Service	70
International Exchange Carrier Service	13
International Gateway Facilities	11
Cellular Mobile Telephone Service	9
Value Added Service	
With Networks	
Coastal	18
Broadband	19
Without Networks	674

NTC data (ASEAN-U.S. Spectrum Management Conference 2016)



## ESTIMATED NUMBER OF SUBSCRIBERS (TELECOMMUNICATIONS SERVICES)

SERVICES	2015
CMTS	119,369,644
TELEPHONE	3,170,982
BROADBAND	10,749,542

NTC data (ASEAN-U.S. Spectrum Management Conference 2016)





## NUMBER OF BROADCAST AND CABLE TV STATIONS (NATIONWIDE)

SERVICES	June 2016
AM	414
FM	1,042
TV	437
TV RELAY	51
TV TRANSLATOR	54
DTU/DBS	6
CATV	1,500
MVDS	1
MMDS	5
TOTAL	3,510

NTC data (ASEAN-U.S. Spectrum Management Conference 2016)





## KEY MILESTONES

1. Adopting ISDB-T as the sole standard in the delivery of Digital Terrestrial Television Broadcasting Service in the country.
2. The reallocation of the band 470-512 MHz as additional band for Digital Terrestrial Television (DTT)
3. The identification of the band 3400-3600 MHz as IMT in the most recent WRC-15
4. Multiple Gigabit Wireless System on frequency around 60 GHz
5. Fixed Wireless Systems in the bands 71-76 GHz and 81-86 GHz

NTC data (ASEAN-U.S. Spectrum Management Conference 2016)



## FUTURE PLANS

1. Allowing the Use of Un-used VHF TV Channels (TV White Space) on Secondary and Non-Interference Basis (NIB).
2. Implementing Rules and Regulations on the Assignment of Channels 14 – 20 Digital Terrestrial Television Broadcasting band 470-512 MHz.
3. Frequency Sharing and Coordination between Fixed Satellite and Fixed Service Systems.
4. The re-classification of existing CMTS, 3G and BWA bands into one generic term Mobile or IMT.



# DICT



## CHALLENGES

1. Relevant laws (Public Service Act and Radio Control Law) were enacted in 1936 and 1931 need to be amended.
2. There is a need to strengthen NTC as a regulatory agency.
3. Amendment of the Telecom Policy Act (RA 7925) since there are provisions which are no longer applicable.
4. Implementation of migration from analog to digital TV.



# PROJECTS & PROGRAMS



## 2018 budget

National Broadband Plan – **915M USD**

## 2016-2017 budget

National Government Portal,  
Secured Government Network,  
National Government Data Center, and  
National Government Cloud – **9M USD**  
Philippine Government Information Exchange and  
Authoritative Registries – **14M USD**  
Free Internet in Public Places – **34M USD**

## 2015-2016 budget

SPAS Project (National Spectrum Monitoring System) – **2.5M USD**



**E-Government is the use of information and communications technology in public service.**

Technology improves **processes** and enhances **collaboration** among agencies, which result in faster and more efficient **services** to **citizens and businesses**.





# E-Government Master Plan (EGMP)

A blueprint for a harmonized government information system. It aims to achieve a networked and collaborative environment for improved delivery of public services.



## Objectives

- **For citizens:** provide fast and efficient services.
- **For government:** provide a roadmap for the establishment of an e-government.
- **For businesses and other partners:** provide plans and programs for participation and collaboration with the government.





## Strategies

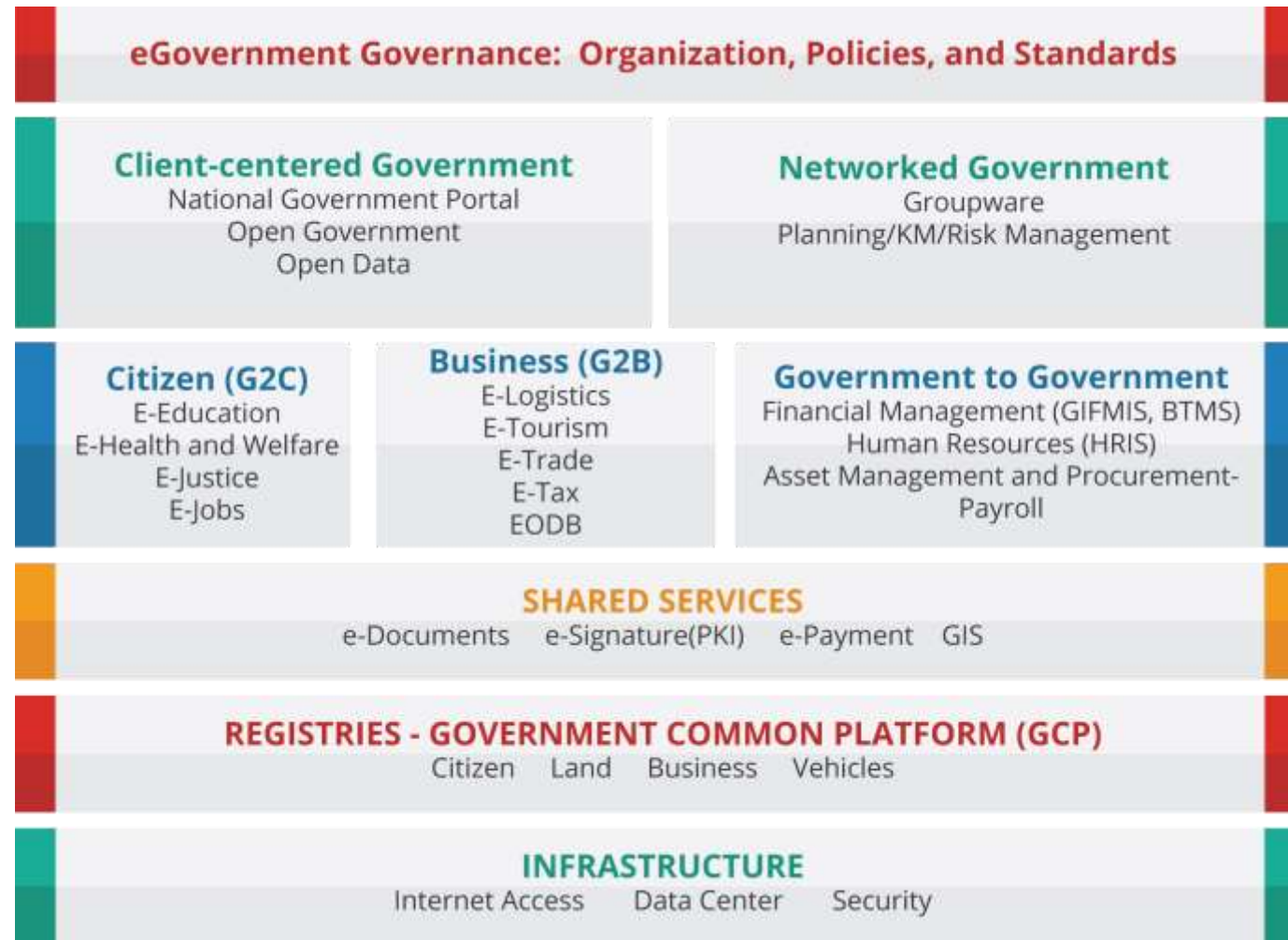
- Adopts a whole-of-government approach in support of the Philippine Development Plan.
- Implements priority projects that form the building blocks for achieving the government's ICT goals.
- Implements interoperability mechanisms that provide standards and policies for e-government.







# BUILDING BLOCKS OF EGOVERNMENT



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# RF Spectrum banking



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# National Broadband Plan



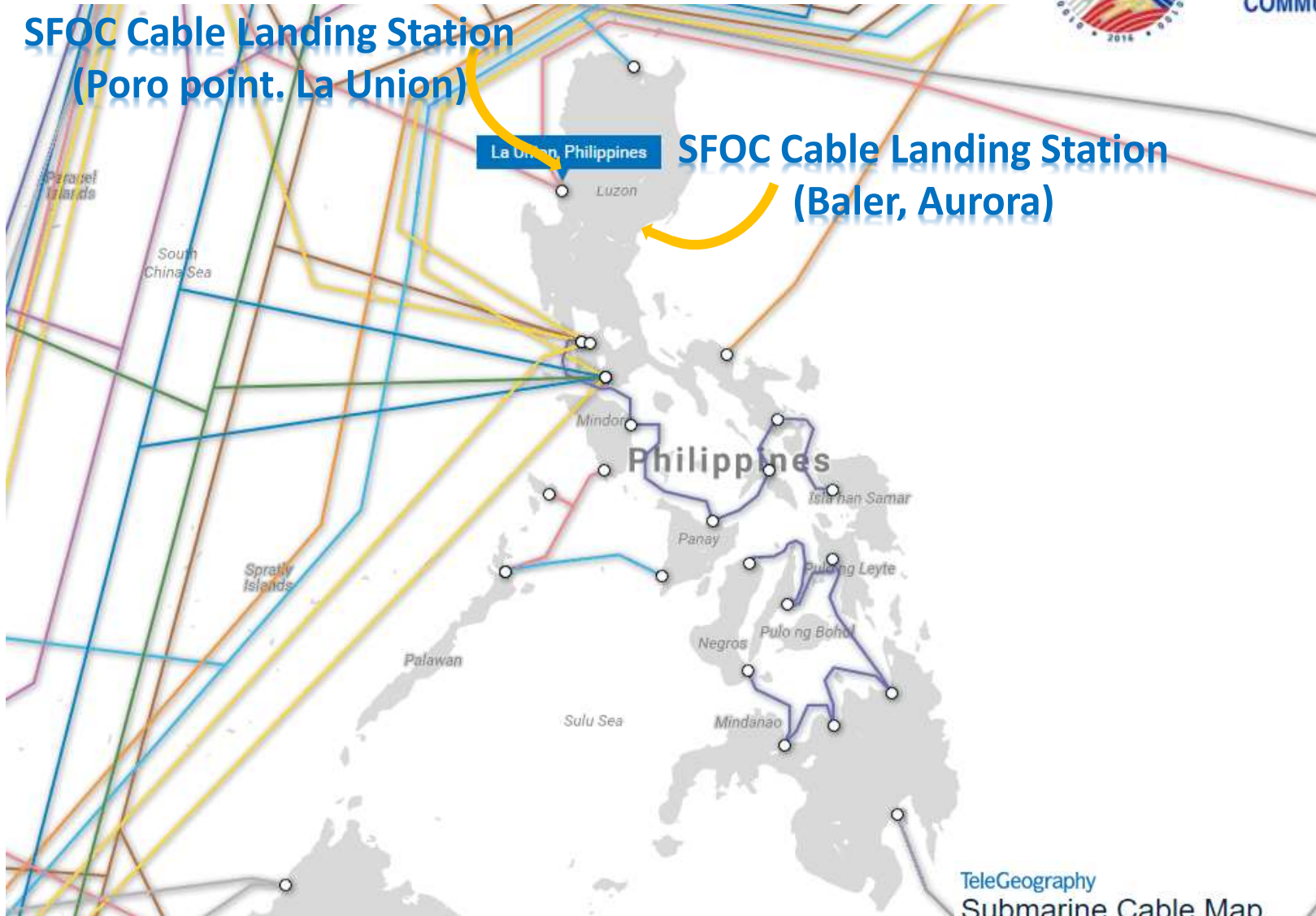
# LGU permits



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# Submarine Fiber Optic Cable



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## PROJECT BRIEF

PROJECT NAME	<i>National Spectrum Monitoring System</i>
PROJECT ALIAS	<b>Spectrum Policy Assessment System (SPAS) Project</b>
PROJECT OWNER	<i>Office of the Secretary, <u>Rodolfo A. Salalima</u></i>
PROJECT DIRECTOR	<i>Office of the Undersecretary for Developmental and Innovations, <u>Denis F. Villorente</u></i>
PROJECT MANAGER	<i>SPAS project, CIO Corps, Rommel R. Natividad</i>
SOURCE OF FUNDS	<i>General Appropriations Act 2015 and 2016 budget</i>
TYPE OF FUNDING	<i>Locally Funded Project</i>
TOTAL BUDGET	<i>Php 120.657 M</i>
	<i>FY 2015 Php 59.437 M for Phase 1</i>
	<i>FY 2016 Php 61.220 M for Phase 2</i>
PROJECT COVERAGE	<i>Nationwide</i>
SPECTRUM DEVICE TECHNOLOGY	<i>Fast Fourier transform (FFT)</i> <a href="https://en.wikipedia.org/wiki/Spectrum_analyzer">https://en.wikipedia.org/wiki/Spectrum_analyzer</a>
DEVICE COVERAGE	<i>9Khz to 6.2Ghz</i>
ANTENNA COVERAGE	<i>9Khz to 3.2Ghz</i>
	<i>FOR FUTURE EXPANSION 3.21Ghz to 6.2Ghz</i>

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**Spectrum Policy Assessment System (SPAS)**



SESSION 5: Trends in Spectrum Management: Trading & Automation of Spectrum Management Systems



# SPAS Rationale



- The Philippine Government through the Department of Information and Communications Technology is currently venturing into a project wherein **thousands of spectrum sensors** will be deployed all over the country to gather Radio Frequency (RF) signals from cities to the municipal level.
- The aspiration is to install around two thousand (2,000) sensors covering high-radio density locations in a span of two years. The 2015 / 2016 General Appropriations Act refers to the project as National Spectrum Monitoring System, also known as Spectrum Policy Assessment System (SPAS).
- During the 2015 conduct of request for funding, the intention of then ICT Office was to work under a **COLLABORATIVE RESOURCE SHARING** environment with NTC to achieve a common goal, a conduct that benefits the Filipino people. To this day, DICT still continues that intention. DICT's mandate RA10844: coordinate policy and programs with NTC.
- Based on the conduct of market study, roughly n# of sensors will be deployed at a nationwide scale to gather Radio Frequency (RF) spectrum occupancy as a basis for policy formulation and decision making. It is a **INFORMATION INFRASTRUCTURE (infostructure)** required for the crafting of an **EVIDENCE-BASED POLICY FORMULATION AND DECISION MAKING**. *We have to know what is out there.*



# SCOPE

The Philippines have a total land area of approximately 340,000 sq. km. wherein 120,000 square kilometer are high-radio density area. Roughly 39,000 sq. km. for cities, which includes highly urbanized cities (HUCs), 215,000 sq. km. for class 1-3 municipalities, and 86,000 sq. km. for class 4-6 municipalities.

The project scope is not dimensioned to provide total coverage of the country's territory, but is mainly set up taken into account user density in high radio-density locations. It is aimed to install sensors in high-radio density areas where there is also presence of analogue and digital broadcast signals.

There will be two types of monitoring units that this project will deploy as listed below:

- 1) Fixed Spectrum Gathering Unit (FSGU)
- 2) Mobile Spectrum Gathering Unit (MSGU)



Map of the Philippines (political boundaries)



# ITU RECOMMENDATIONS

- It is prudent to follow the best practices set forth by the ITU which can be found in the National Spectrum Management handbook, 2005 Edition. Also, references that served as an inspiration to this project are 1) Recommendation ITU-R SM.1536, Frequency channel occupancy measurements, 2) Recommendation ITU-R SM.1723-2, Mobile spectrum monitoring unit, and 3) Recommendation ITU-R SM.1537, Automation and integration of spectrum monitoring systems with automated spectrum management.

*The International Telecommunication Union, originally the International Telegraph Union, is a specialized agency of the United Nations that is responsible for issues that concern information and communication technologies.*





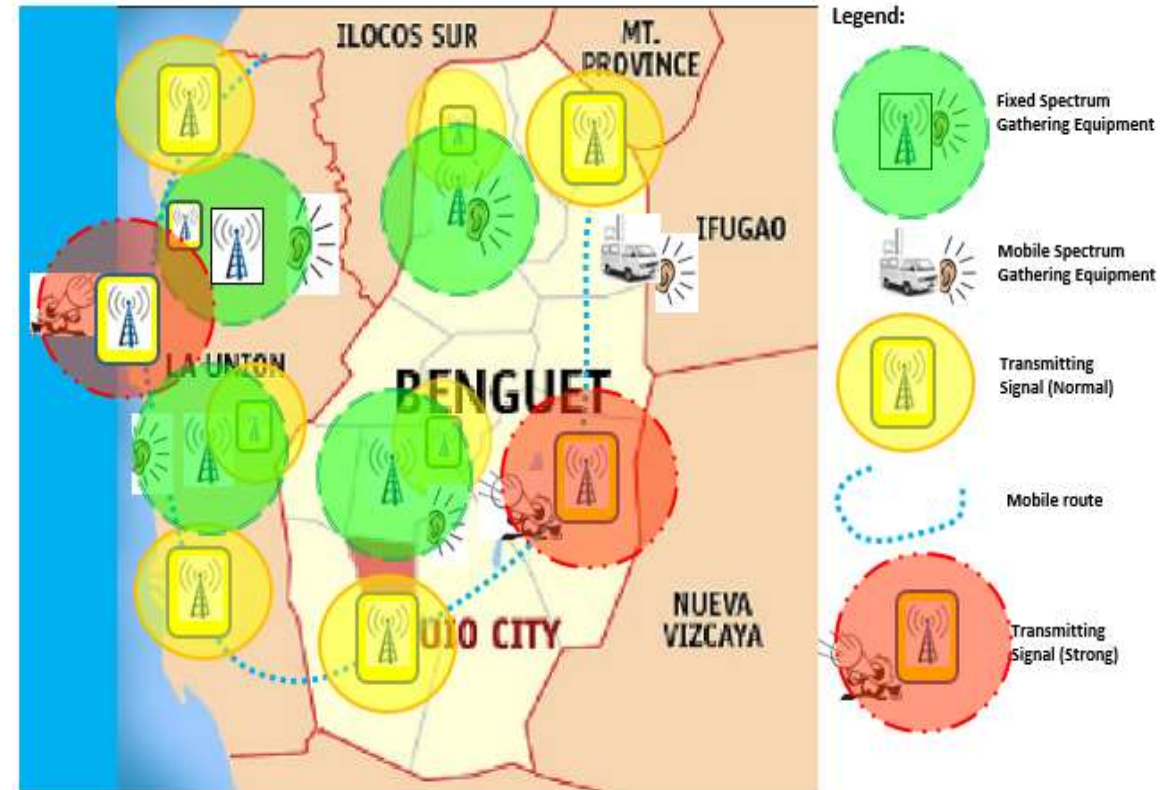
# RF SCENARIO



RF Spectrum Gathering Systems available in the market have different features, capabilities and coverage as described in the figure found below. Factors affecting the RF sensing is also affected by its elevation, antenna sensitivity, sweeping features, and clutter.

Transmitters are depicted in **yellow circles** and **red circles** for **“registered”** and **“beyond-registered”** transmission power, respectively. The **green circles** represent the area of coverage of the fixed spectrum gathering unit sensor. RF sensing of areas not covered by the green circle can be addressed by deploying Mobile Spectrum Gathering Units boarding a utility vehicle and possibly, Portable Spectrum Gathering units which is capable of ***going inside mountainous terrains or high-rise buildings***.

Vital information derived from NTC will determine the existence of red circles through the use of simulation software, Spectrum Management and Radio Network Planning Software.

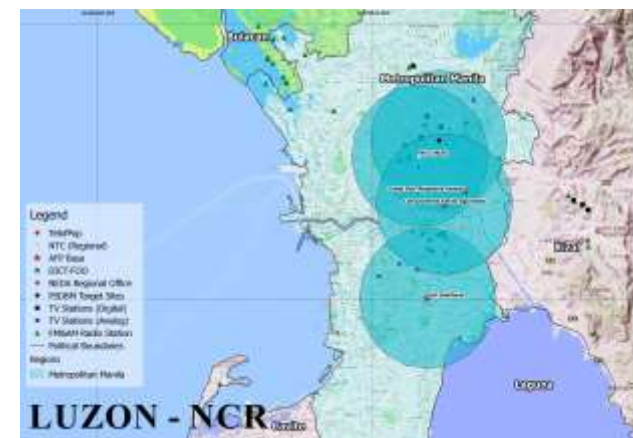


**Graphical Diagram for Fixed and Mobile Spectrum Gathering Units**



# PROPOSED SITES

## Luzon

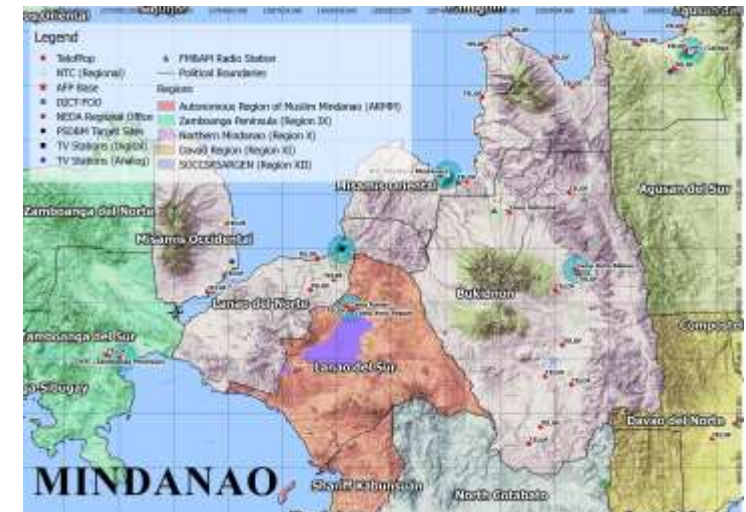


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# Visayas & Mindanao



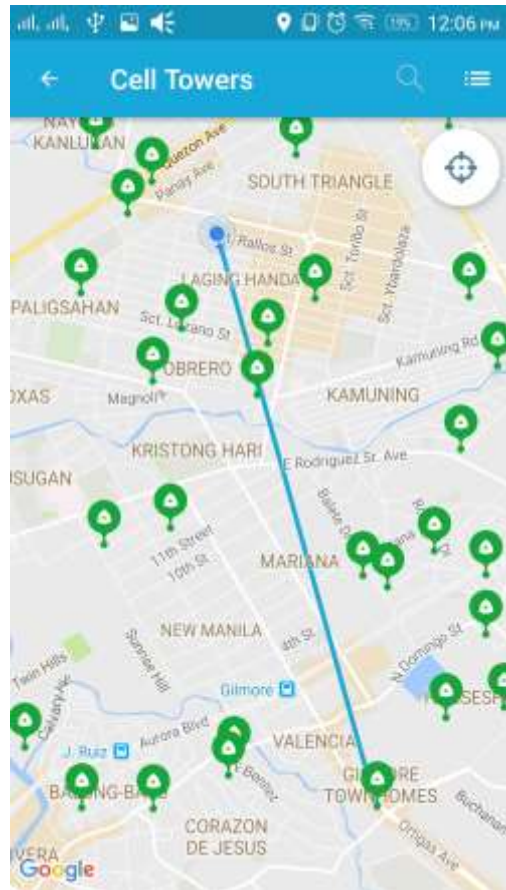
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**OpenSignal** is a company that specializes in wireless coverage mapping. The company crowdsources data on carrier signal quality from users who have its consumer mobile application installed. Consumers can view the crowdsourced data either online or in-app in the form of colour-coded maps that aid purchasing decisions by showing unbiased data from different carriers side-by-side.

**It gives a heat-map for 3G,4G, and LTE networks. It would be cluttered further if we add TV broadcast signals.**



**Screen Snapshot (Mobile Phone)**



**Screen Snapshot (Nationwide)**





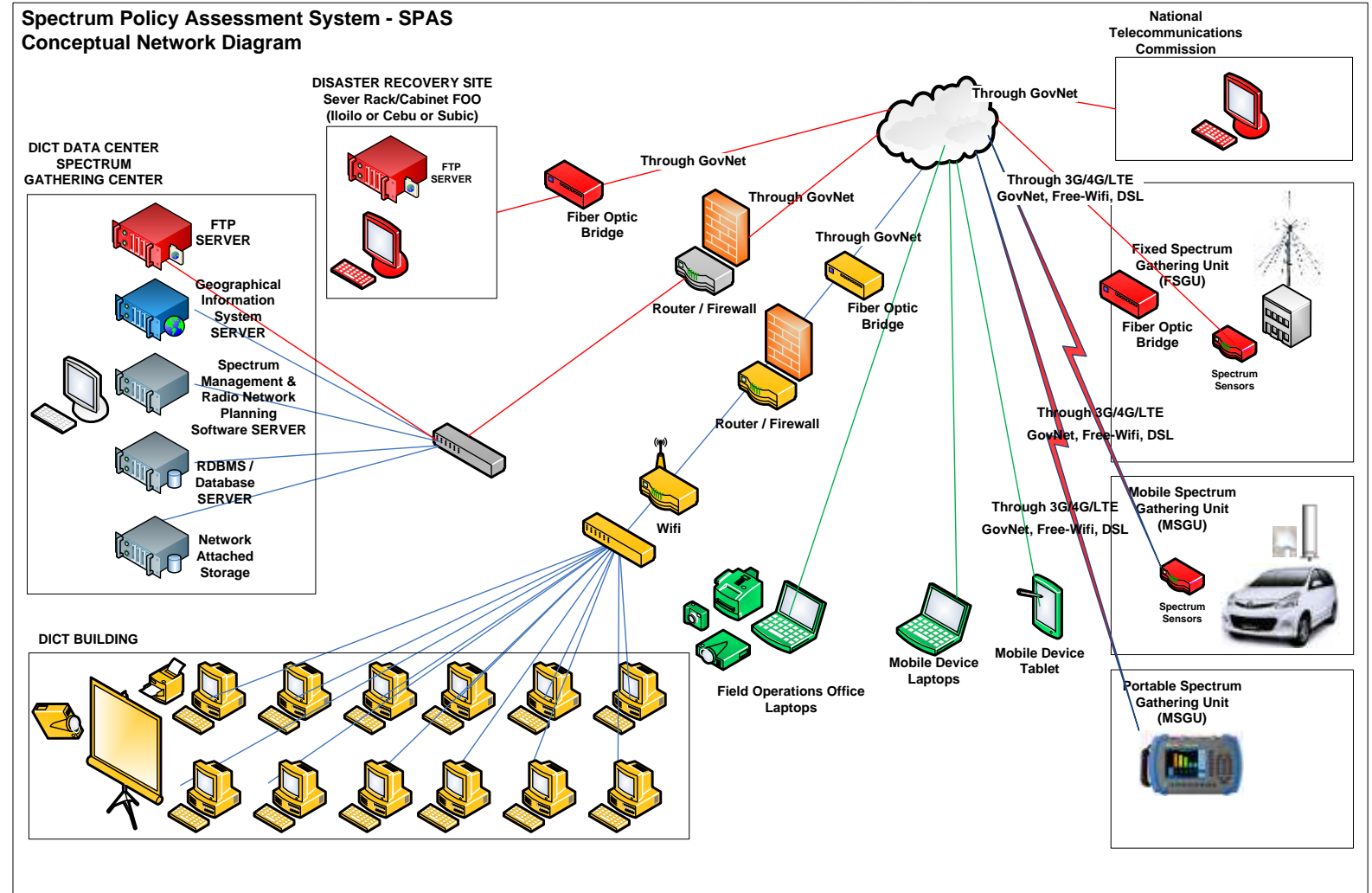
# Deployment Coverage Matrix

Category	Land Area (approx.)	n#+ FSGU	n#+ FSGU	MSGU
High-radio density locations	120,000 sq. km.	11,000 sq. km.	29,000 sq. km.	80,000 sq. km.
				It will take 3.2 years with 9 vehicles @ 7 days per location



# CONCEPTUAL NETWORK DIAGRAM

At later stage which requires funding, **Portable Spectrum Gathering Units (PSGUs)** can also be considered in order to identify when the frequency signal of interest is in mountainous terrains or high-rise buildings





# PROJECT TIMELINE



Implem Period	Description	Funding 2015	Funding 2016	Funding 2017	Funding 2018	Funding 2019	Funding 2020
2017	n#+ FSGU	Yes		-na-			
2017	4 PSGU	Yes		-na-			
2017 – 2019	O&M – By Winning Bidder 2 yrs	Yes		-na-			
2017	SMS/RNPS	Yes		-na-			
2017	Knowledge Transfer / Capacity Building	Yes		-na-			
2017	n#+ FSGU		Yes	-na-			
2017	One unit of e Filipino Innovation Prototype Assembly		Yes				
2017	O&M By Admin		Yes	-na-			
2017	4 Vehicles		Yes	-na-			
2017	Knowledge Transfer / Capacity Building		Yes	-na-			
2017	Stakeholder Engagement		Yes	-na-			
2017	Policy Formulation		Yes	-na-			
2018 – 2020	Knowledge Transfer / Capacity Building, Stakeholder Engagement, Policy Formulation		Yes	-na-			
2018	5 Vehicles				Requested		
2018	SPAS Lab/Roces				Requested		
2020	Continuation of O&M 2015						Requested
2018 - 2020	Continuation of O&M 2016				Requested	Requested	Requested

Phase 1

Phase 2

O&M Phase



# EXPECTED OUTPUT



The role of the Department is to achieve an **evidence-based policy essential for the efficient and effective utilization of the Radio Spectrum**, a national resource, **by competent and approved users**. The policy *memorializes* the basis on which government will take decisions.

## 1) *Infostructure*

In order to achieve this, the DICT needs “RF data” and will be gather by the deployment of RF sensors on a nationwide scale.

To date, no request for funding was put forward to develop a spectrum gathering system at a nationwide scale, to the municipal level. Since the DICT and NTC is now one family, it is easier to **share resources and data**.

Furthermore, the conduct of market research revealed that RF spectrum data gathering and RF spectrum monitoring and direction finding equipment can be performed by one and the same equipment.





## 2) Data (Data Gathering Duration)

Until device end-of-life or five (5) years, whichever is comes later.



### Data Transmission Matrix

#	Transmission Facility / Technology	Frequency	Format	Size
1	DSL/ Wifi / Govnet	24/7	CSV	GB
2	SMS/MMS, 3G/4G/LTE subscription	2 minutes duration every 15 minutes	CSV	100kb – 200kb
3	“Sneaker-Net”, thumb/hard drive transfer, through DICT approved transmission facility	Every two weeks with 24/7 capturing	CSV	GB



### ***3) Quarterly Analytics Report and Policy***

On the matters of policy formulation of national spectrum usage, a policy can be drafted by merely relying on **1)** professional background of the project owner, **2)** written and on-line reference materials, **3)** expert's advice, and **4)** public consultation, among others.

With the aide and backing-up of factual data, the recommendations, policies and frameworks will be more reliable and plausible.



The final policy output will then be consulted through a public consultation and will tackle, but not limited to,



- **Economy**

- 1) *encourage efficient spectrum use;*
- 2) *equitable and affordable access;*
- 3) *encourage the introduction of more spectrally efficient technologies;*
- 4) *support the development of rural communications; \**
- 5) *stimulate social and economic progress;*

- **Innovation**

- 6) *encourage technological innovation and competitiveness;*
- 7) *foster innovation in the development of infrastructure and provision of services;*
- 8) *promote scientific research, development, and exploration;*



## ➤ Security

➤ 9) *support the spectrum needs of the emergency and security services; \**

10) *serve national security and defense; \**

11) *safeguard life and property; \**

12) *support crime prevention and law enforcement; \**



## ➤ Transportation

13) *support national and international transportation system;*





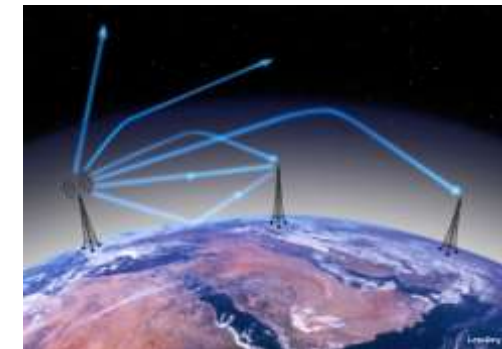
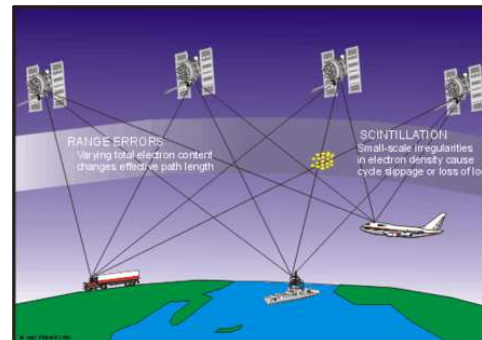
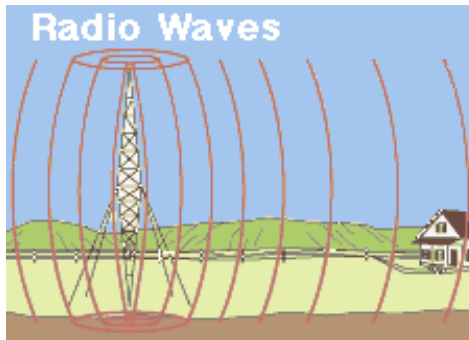
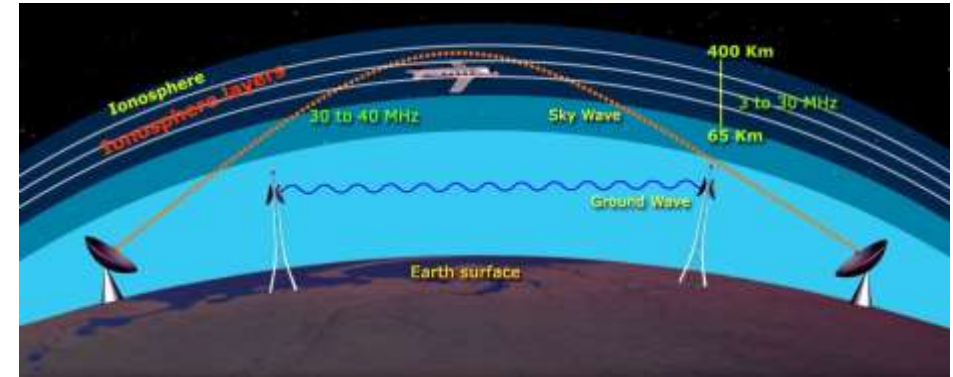
## ➤ National Resource

14) make available rapid, efficient, nationwide, and worldwide radio communication services;

15) foster conservation of natural resources; and

## ➤ Education

16) provide for dissemination of educational, general and public interest information and entertainment;





**It will also address the vital project components needed by the DICT for the**

- a) identification of the needed policy that will address possible **loss of government revenue** due to unlicensed use of Radio Frequencies;
- b) crafting of the **Spectrum Management plan** as one of the identified policy and regulatory initiative for the National Broadband Plan;
- c) roll-out and monitoring of the **last-mile technology deployment** that will not interfere with incumbent frequency users relating to the implementation of the Free-Wifi project; and
- d) with the enormous bandwidth capacity of the Secured GovNet roll-out, not now but in the near future, some of the fiber optic capacity **will have to come out as RF.**



#### ***4) Stakeholder Engagement and Knowledge Transfer***

Vendor arranged-classroom type training will be provided to administrators, users, and field operations for both DICT and NTC personnel, as well as stakeholders, for software and hardware, or both. Continuing education for support will also be part of on-going O&M funding requests.

#### ***5) Transition Plan***

DICT and NTC transition plan will be crafted together with inter-DICT transition plan.



# SUSTAINABILITY



Once the SPAS infostructure is installed and deployed, funding for operations and maintenance is inevitable to address sustainability by DICT or NTC.

The system will augment the current RF spectrum observation initiative of the AFP to address national security aspect.

It will also be a basis for formulation of the spectrum policy and plan that will also address national security and safety of lives, to name a few.





## **FUTURE CONSIDERATION**

A combination of additional off-the-shelf equipment FSGU and MSGU is needed to cover the remaining 80,000 sq. km. of high-radio density area. As for MSGU, these can be achieved with the utilization of dedicated vehicle to perform the data gathering tasks as per ITU Recommendations.

Filipino designed low-cost equipment can also be a practical solution for costing challenges wherein a proto-type will be designed and developed.



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DICT is your partner to help you realize the President's wish of reducing queues in government offices and provide faster, and more efficient services through the use of technology.  
Let's work together to put your services online for the benefit of the common people.



*DICT by the people, DICT for the people*

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