



UNITED NATIONS
Office for Outer Space Affairs

The Necessity of National Space Agencies to Enhance Disaster Risk Preparedness in Southeast Asia: A Case Study of the Philippines

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Beijing, October 24th-26th 2018

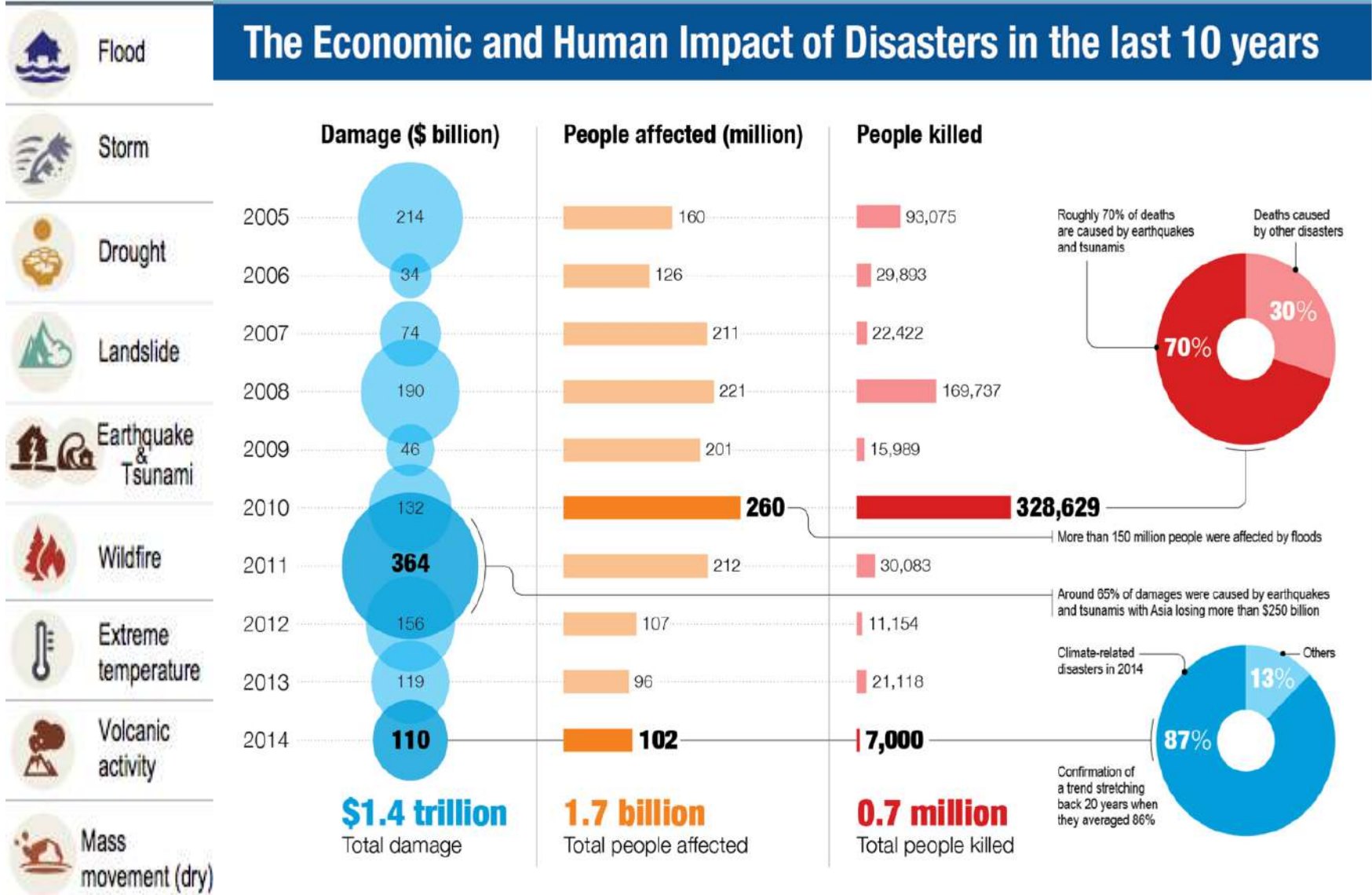


GSDM



東京大学
THE UNIVERSITY OF TOKYO

Background: Why Disaster Risk Reduction ?

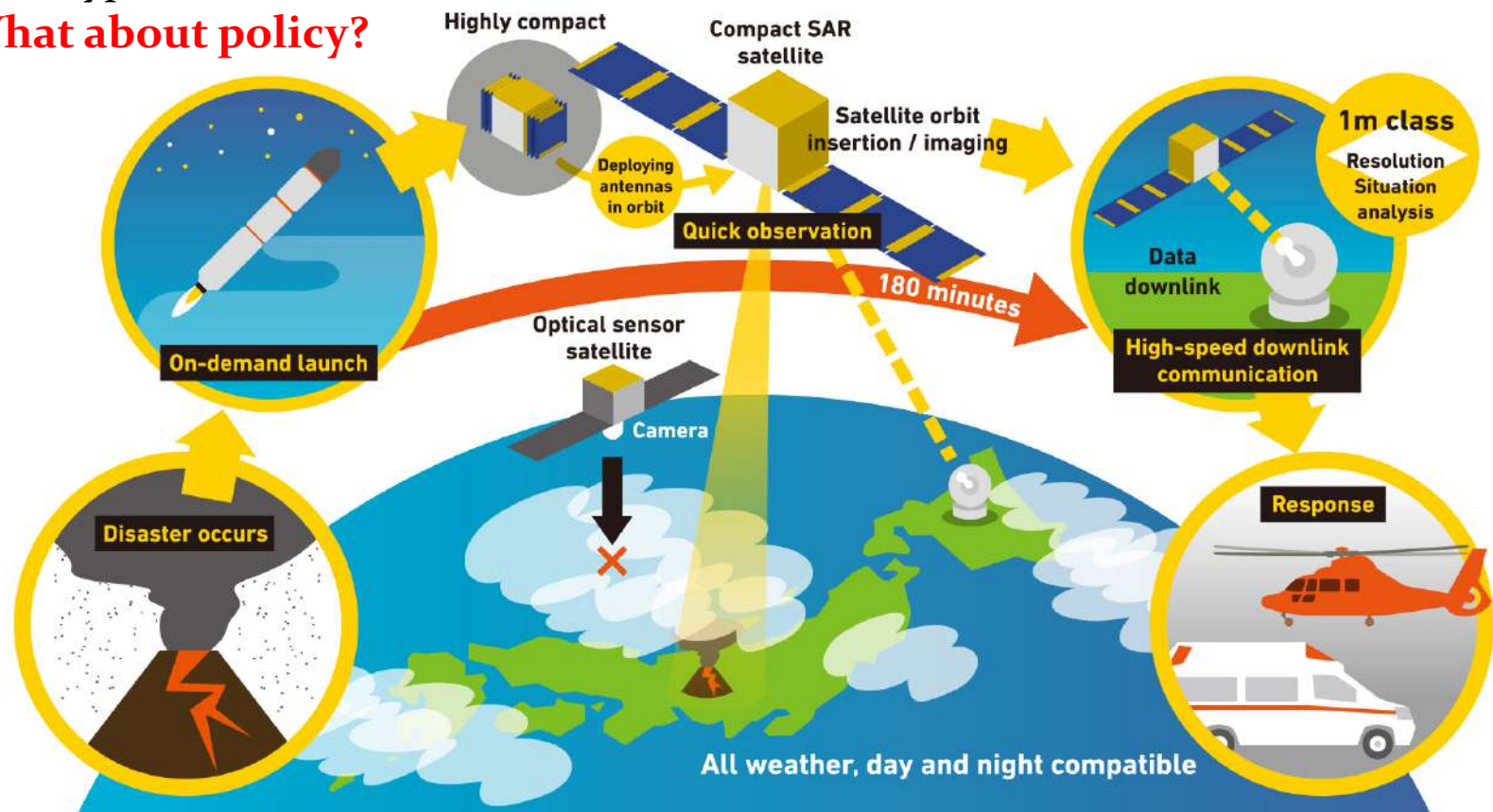


*The Economic and Human Impacts of Disaster in the last 10 years, UNISDR, 2014

Background: Research in JAXA

What technological and policy-oriented breakthroughs are desired to enhance Disaster Risk Preparedness Capabilities in disaster-prone developing countries? e.g. Southeast Asia

- **Technological Breakthrough:** Constellation of 100kg-class Synthetic Aperture Radar (SAR) satellites for 1-meter resolution Global Mapping: Cost: US\$20/satellite, prototype launch 2020 (scheduled)
- **What about policy?**



The Necessity of National Space Agencies to Enhance Disaster Risk Preparedness in Southeast Asia: A Case Study of the Philippines

Goals

- ❑ Identify the technological and policy-oriented bottlenecks pertaining to Disaster Risk Preparedness in the Asia Pacific
- ❑ Analyze the necessity and difference in agenda of having a national space agency for a developing nation in contrast to a developed nation
- ❑ Discuss a comprehensive early history of the Philippines Space Program, leading to the expected formal establishment of the recently proposed Philippines Space Agency (PhilSA) in 2018.
- ❑ Analyze the future role of PhilSA from an innovation studies perspective, both in national and international context.

Sources

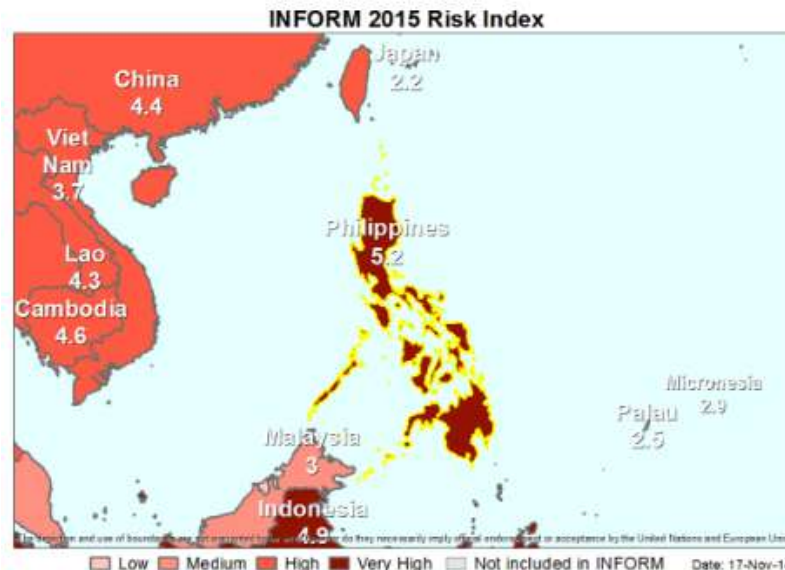
- ❑ Interviews of stakeholders
 - ❑ Field trip in January 2018, Manila, Philippines
 - ❑ 24th APRSAF in November 2018, Bangalore,
 - ❑ ISTS 2017, Matsuyama-Ehime, Japan
 - ❑ Workshop in Jakarta, Spring 2017
 - ❑ 23rd APRSAF in November 2016, Manila, Philippines
- ❑ Review of Philippine Government documents

Outputs

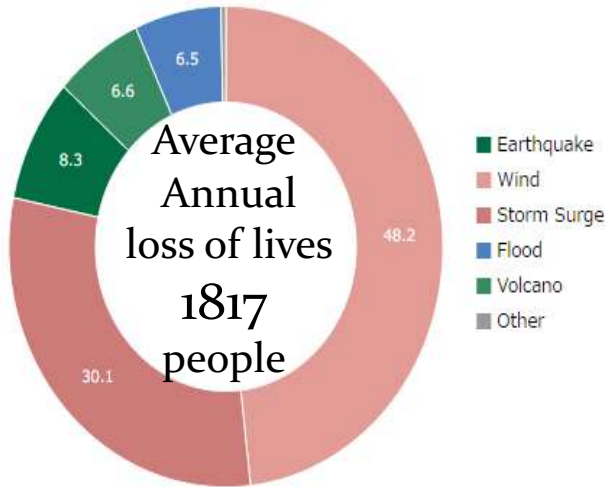
- ❑ First Conference paper on the Philippines Space Act presented at the 68th International Astronautical Congress (IAC) in Adelaide, Australia on September 2017, IAC-17:E5.4.8
- ❑ First Journal Article on the Philippines Space Agency (PhilSA) published in Elsevier Acta Astronautica, Vol.151, pp. 919-927, October 2018.

Background: Hydro-Meteorological Disasters in the Philippines

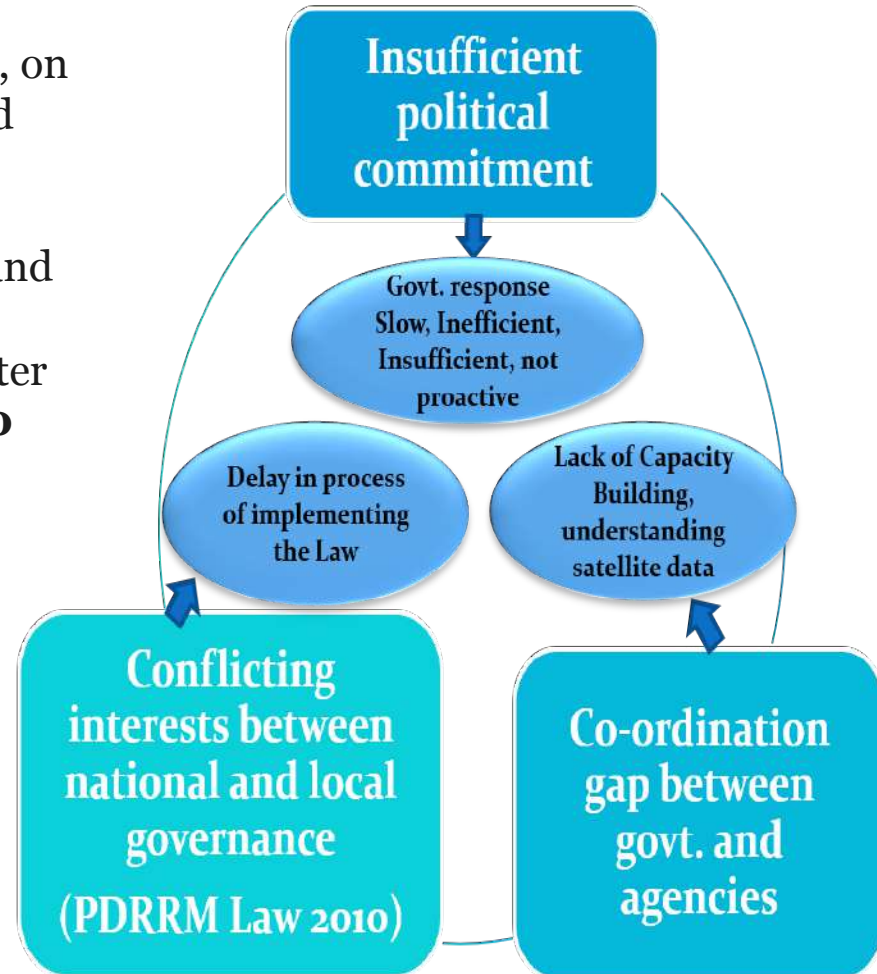
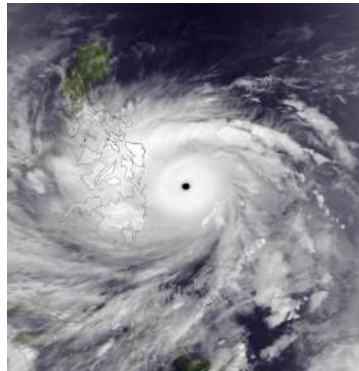
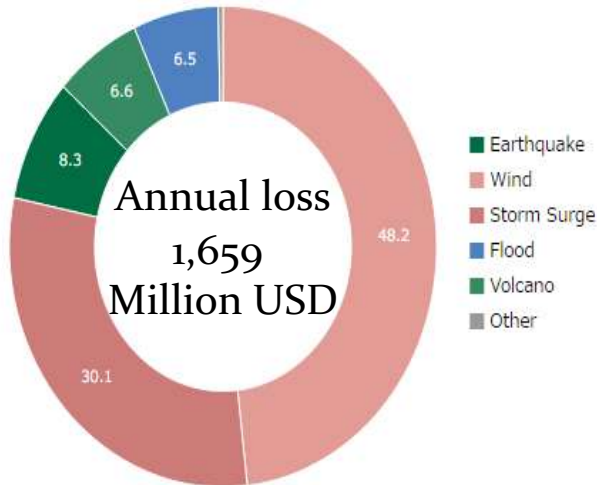
- The Philippines is particularly exposed to very-high disaster risks amongst ASEAN countries.
- **World Risk Index ranking:** 3rd/173 countries (Risk index-27.52%) in the WRR 2013 by the Alliance Development Works/BEH.
- 74% of the population are at 'extreme risk'
- Typhoons and storms counts 58% of all disasters that pose greatest threat to the country.
- 0.6% of the GDP is lost by natural disasters.



Impacts – Perspective



Super Typhoon Haiyan/ Yolanda, on Nov 8th, 2013 killed **6300 victims**, affecting over **16 million people** and causing economic damages 100 greater than the **US \$800 million** in the Philippines alone



Challenges

Lack of a Comprehensive Disaster Analysis



Lack of Technical Knowledge about the Geo-Hazards

- Lack of dedicated institutions and officers to educate the society to save themselves from geo-hazards and promote better understanding of threats.
- Municipalities face problem to appoint such capable personnel due to **lack of financial resources, unclear regulations and overall lack of priority for DRM.**



Inability to process procured data from Satellites quickly

- No coordinating agency to redirect data to analyze it.
- Available DRM information is scattered. Government agencies unwilling to share data.

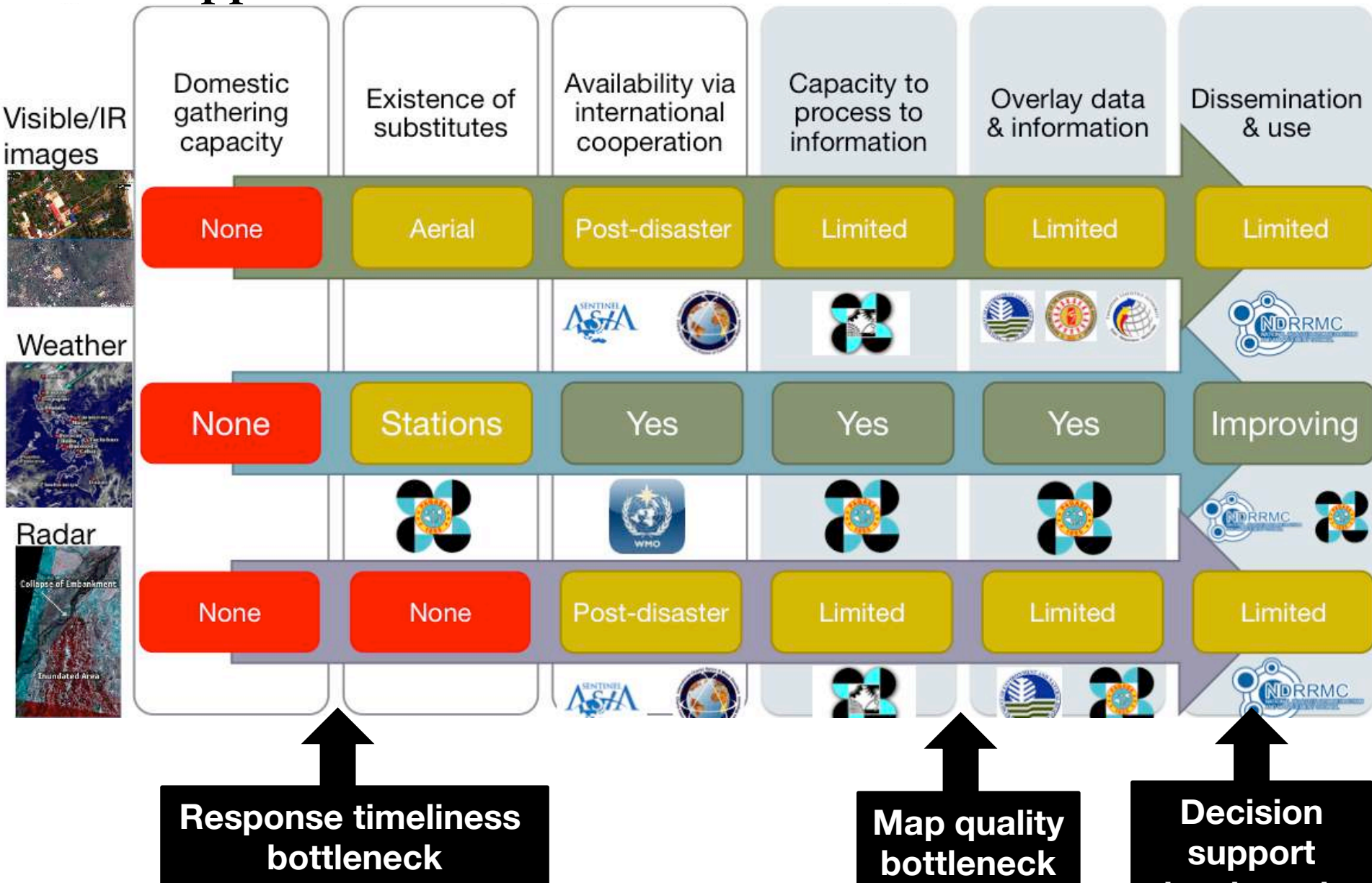


Misleading perception and belief of Local people (Miscommunication)

- Case study about the event in Tropical storm Washi in the southern island of the Philippines, Mindanao in December 2011.

Identification of Bottlenecks of Disaster Risk Preparedness in the Philippines

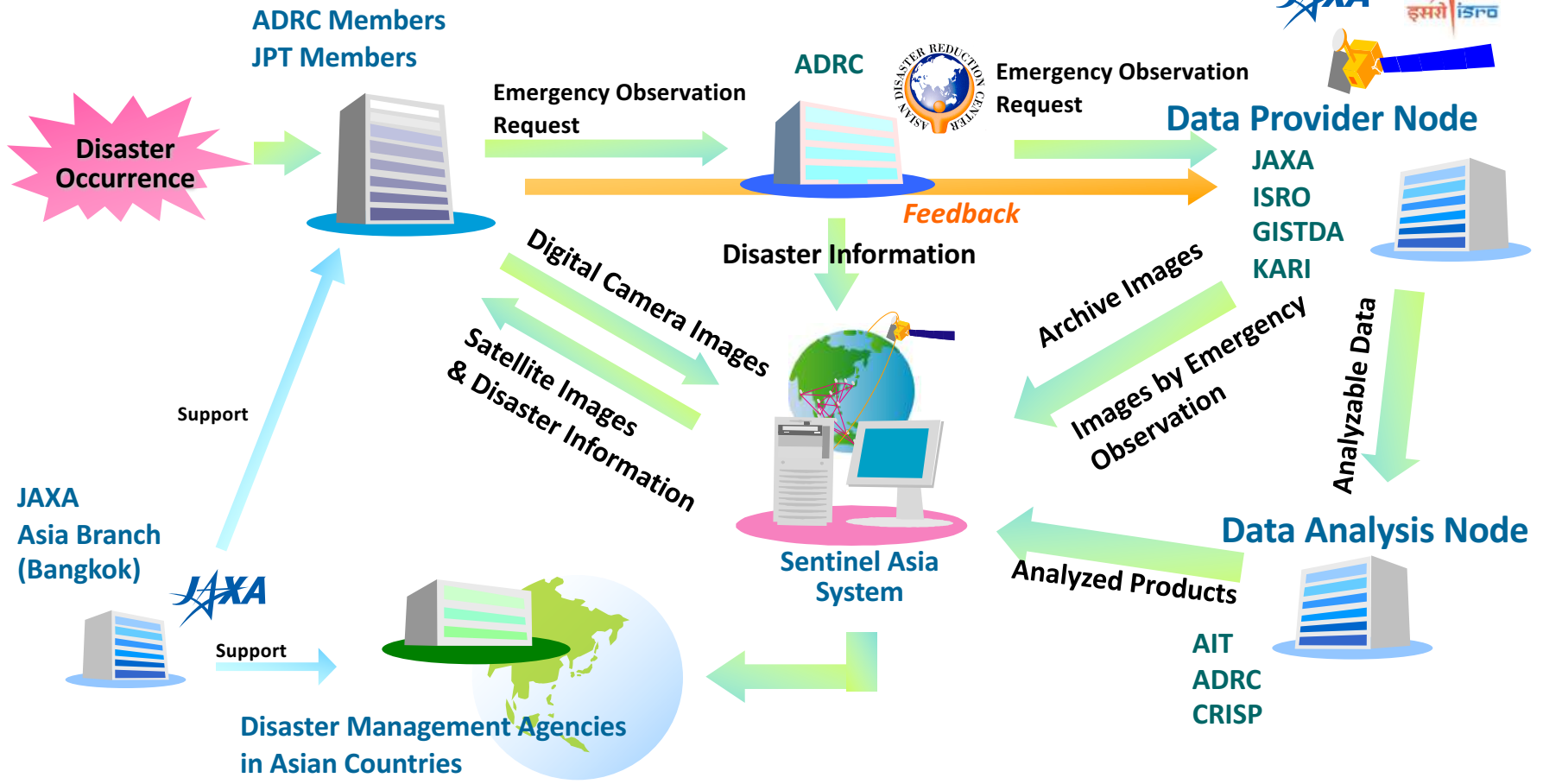
UNSPIDER Beijing 2018



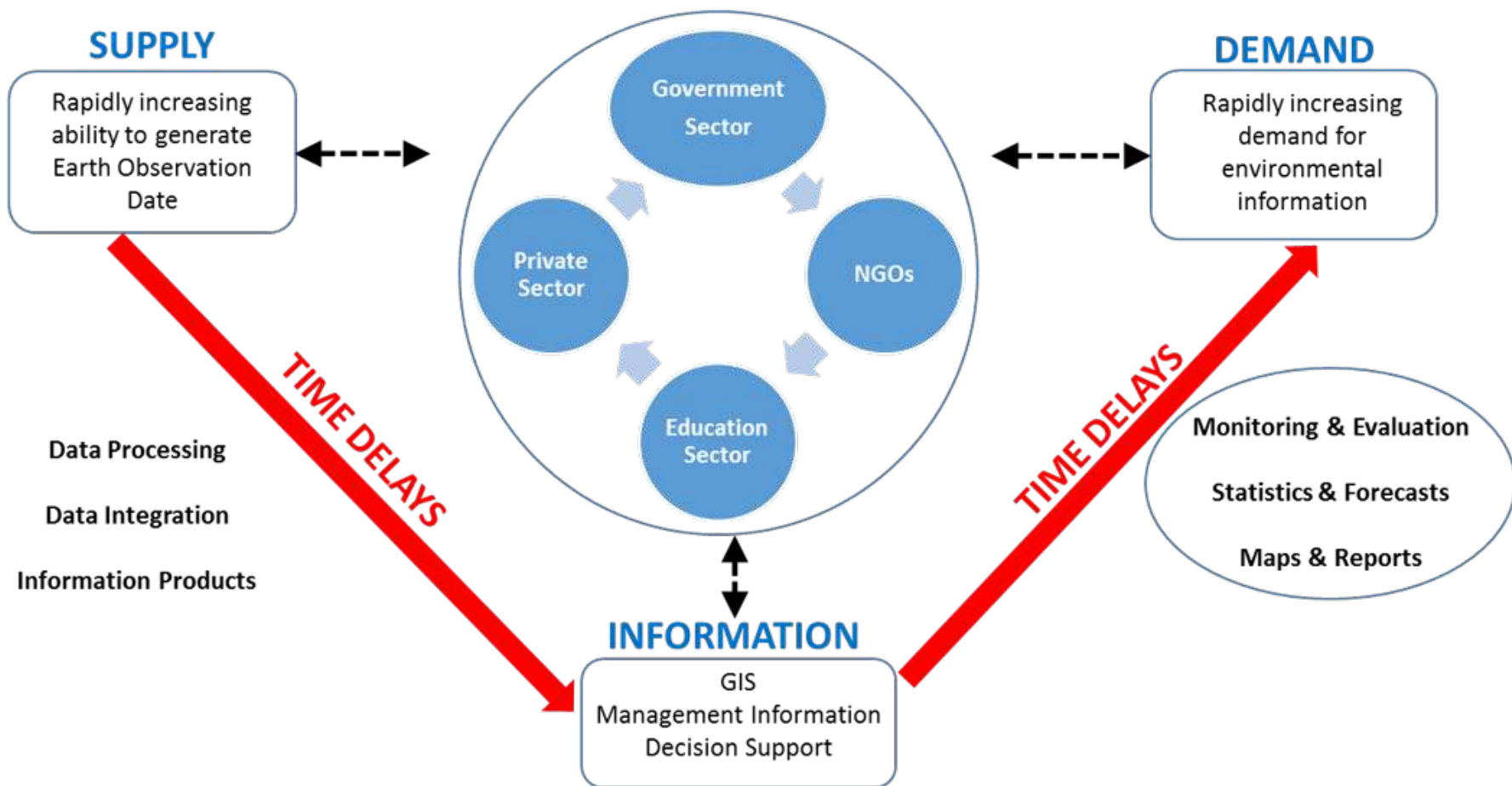
*Credits: Marc-Andre Chavy MacDonald, marc@m.sys.t.u-Tokyo.ac.jp

Sentinel Asia: Japan-led Example of International Cooperation

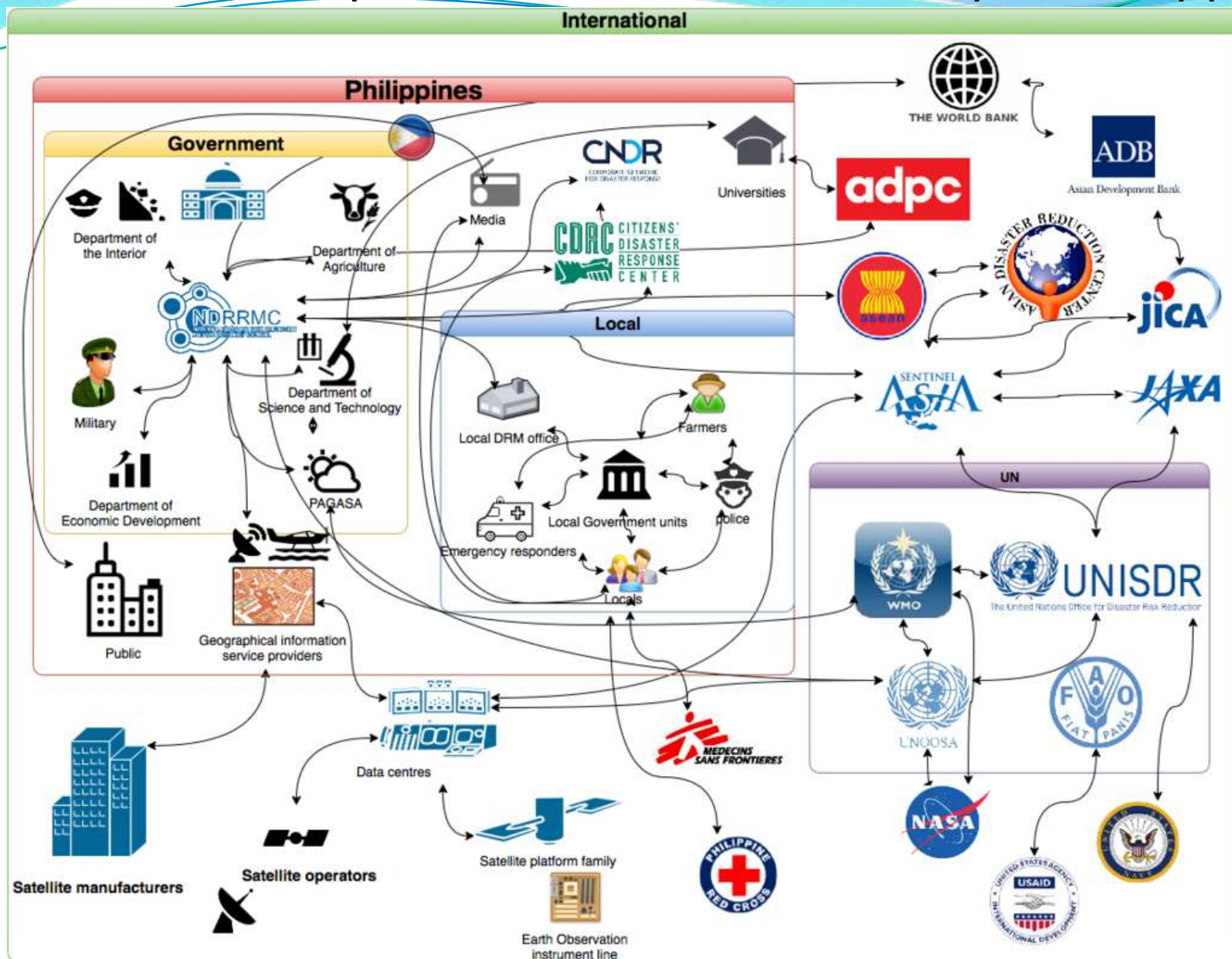
Sentinel Asia is a voluntary initiative by a collaboration between space agencies and disaster management agencies to assist disaster management in the Asia-Pacific region- **Problem of Time Delay in Data Acquisition on Request**



Data Processing Bottlenecks: Bureaucratic Time Delays due to over-reliance on International Cooperation



Disaster Risk Preparedness Stakeholder Map of Philippines



First Steps of Space Development in the Philippines

- First Proposal in Filipino House of Representatives– 2012
 - Inspired from Chinese Aerospace and SPARSSO of Bangladesh
 - Focus primarily on Communication and Space Exploration
 - Failed to Pass
- Change in Political Will after Typhoon Haiyan with primary focus on EO for Disaster Risk Management.
 - Establishment of NSDP and PHL Microsat
 - Introduction of new House and Senate Bills for PSA in 2015-2016.



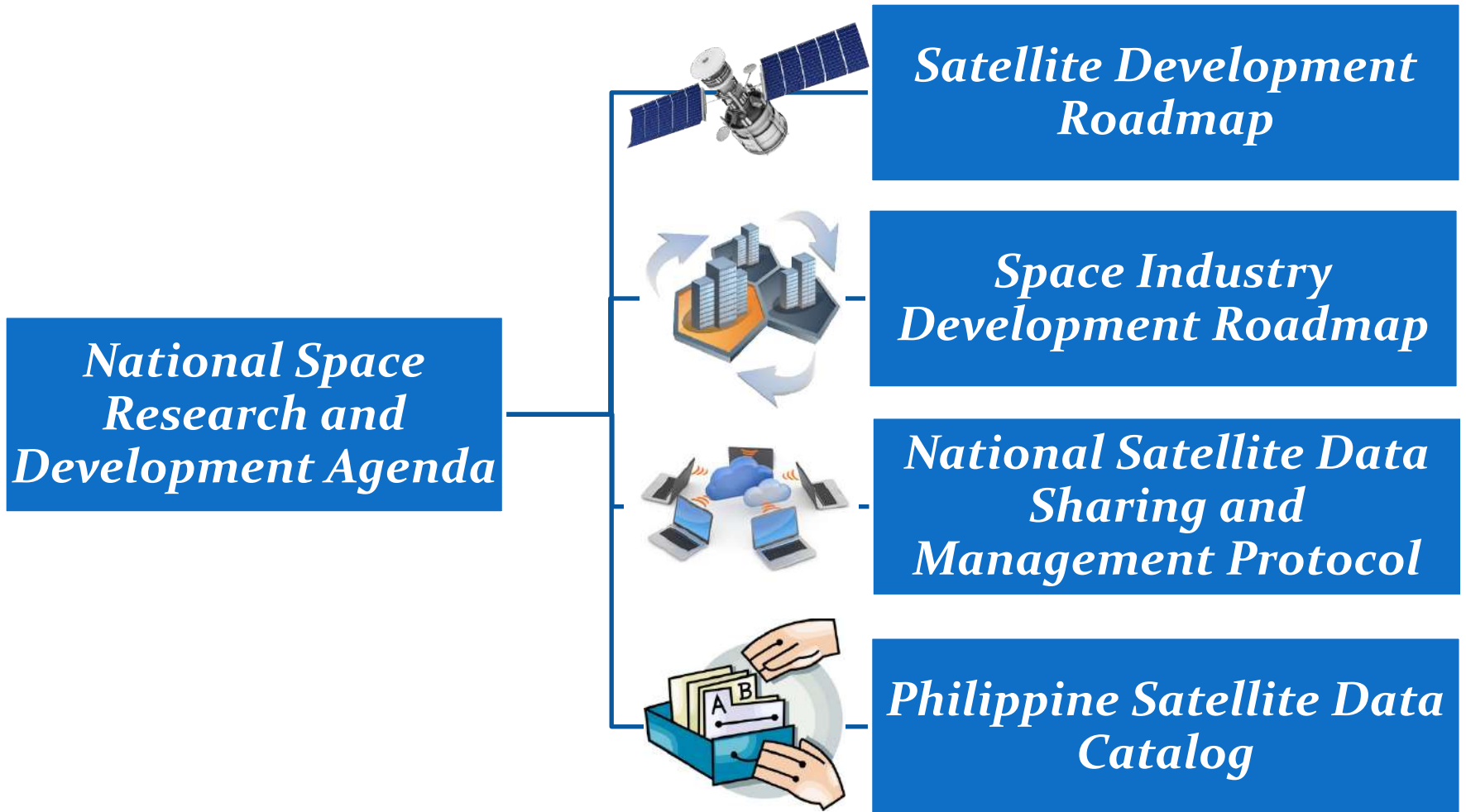
Philippine Space Development

NSDP
Estd. Sep. 2015

PHL-Microsat
Estd. Apr. 2016



National SPACE (Space Promotion, Awareness, and Capabilities Enhancement) Development Program (NSDP)



National SPACE (Space Promotion, Awareness, and Capabilities Enhancement) Development Program (NSDP)

International

Participating in regional forums on Space Technology

Collaborate with international organizations for space related activities

Domestic

Integrate PHL-Microsat and PEDRO into PSA

Define roles of domestic stakeholders in relation to PSA

PHL MICROSAT

*Diwata-2 scheduled to be launched in 2018

Tohoku
University



PHL
Engineers



Hokkaido
University



Bus

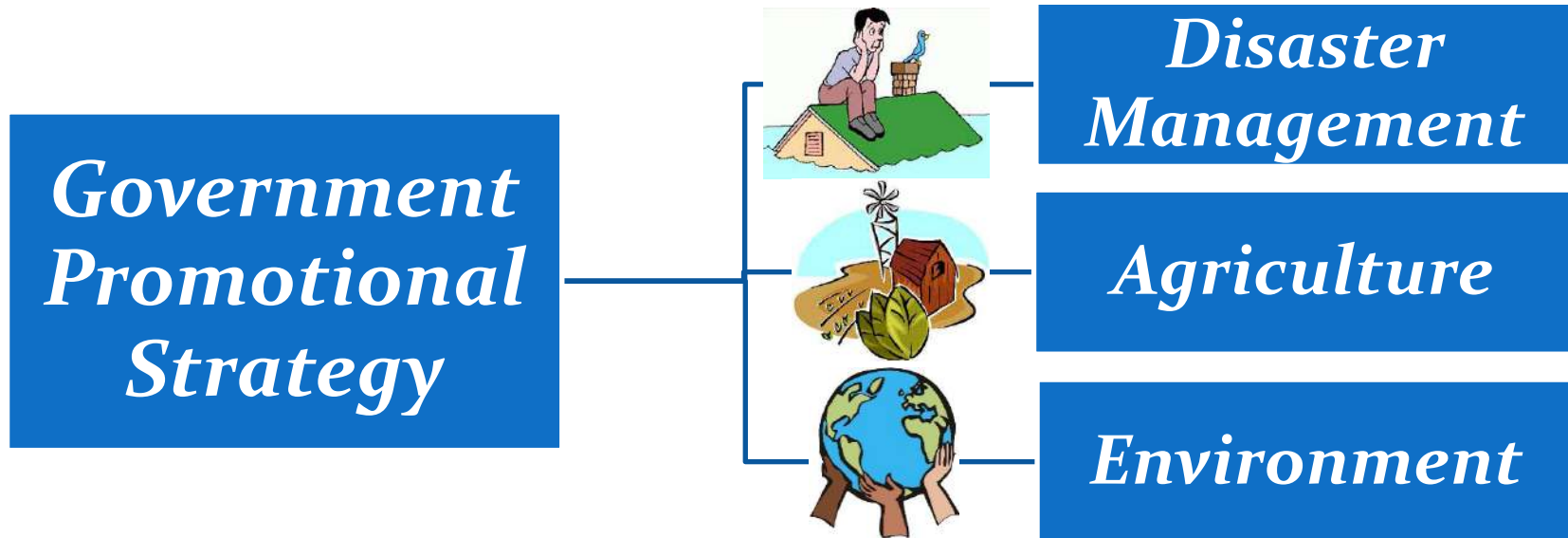
Payload
and
Thermal



Diwata-1, first satellite
developed by Filipino
Engineers

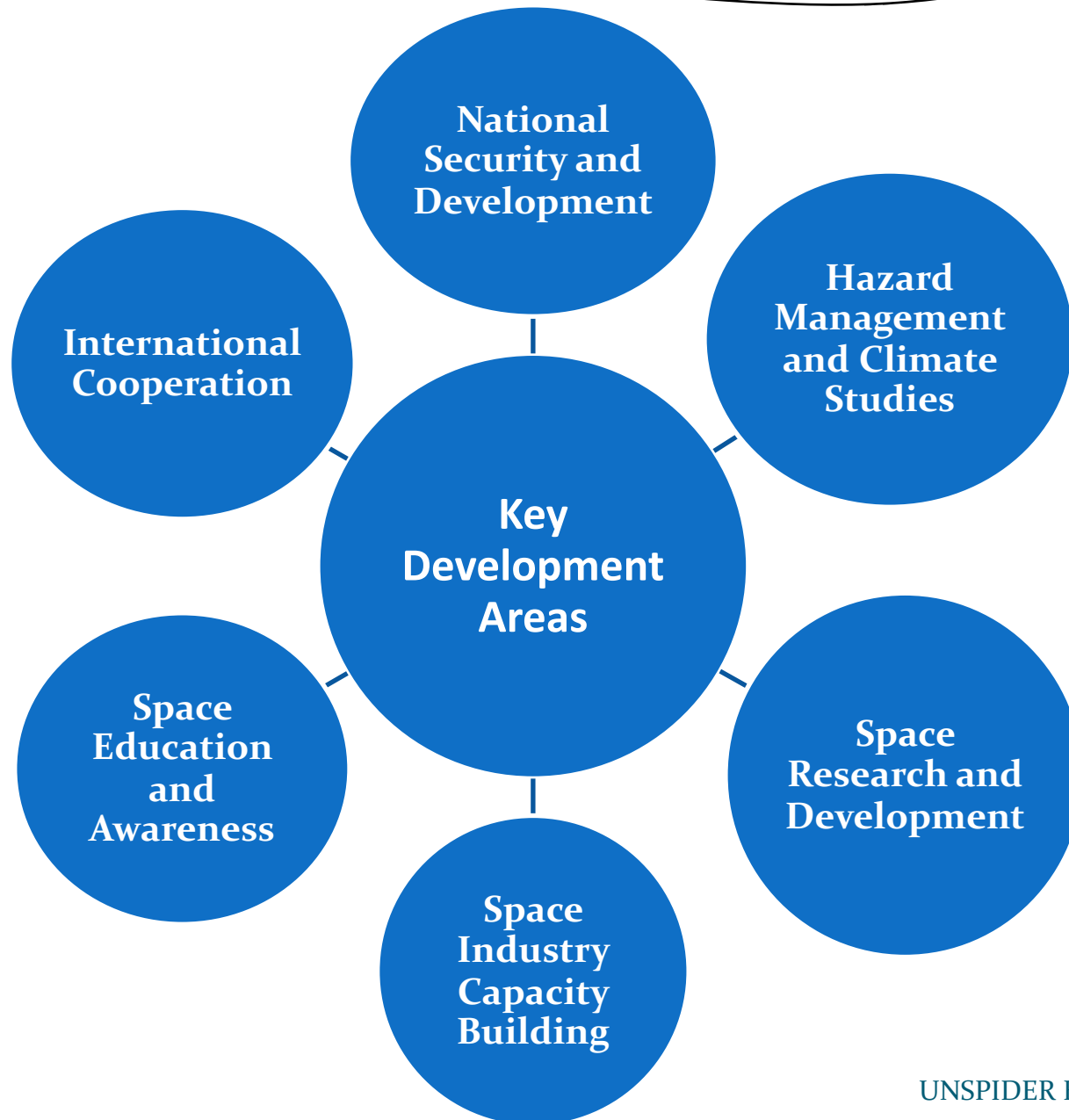
Diwata-1, launched from JAXA
Kibo Module in ISS

Public Support

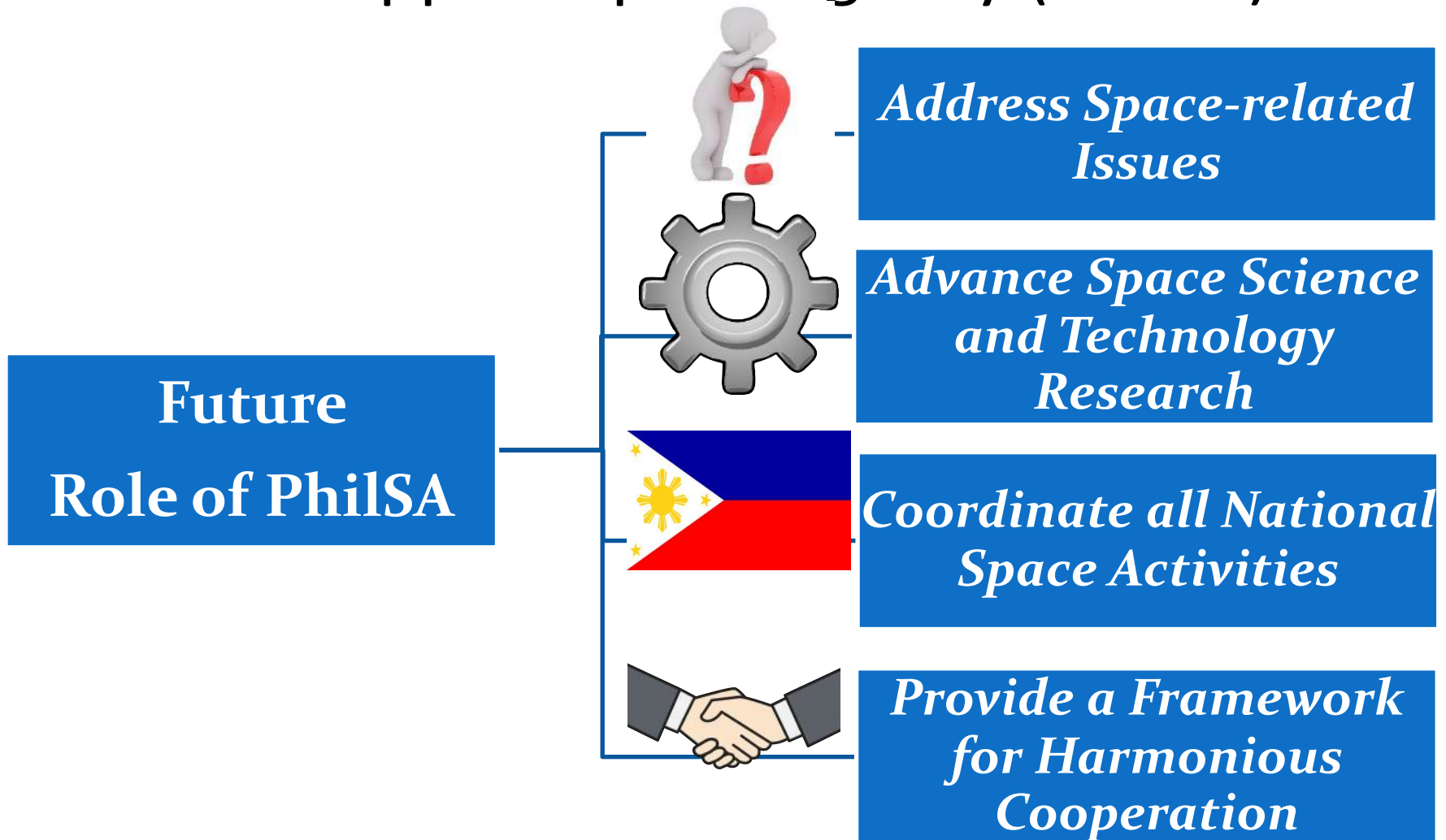


- Promotion of space technology in public outreach events organized by DOST like the annual National Science and Technology Week.
- The success of DIWATA-1 lead to strong domestic support.

Philippine Space Development and Utilization Policy



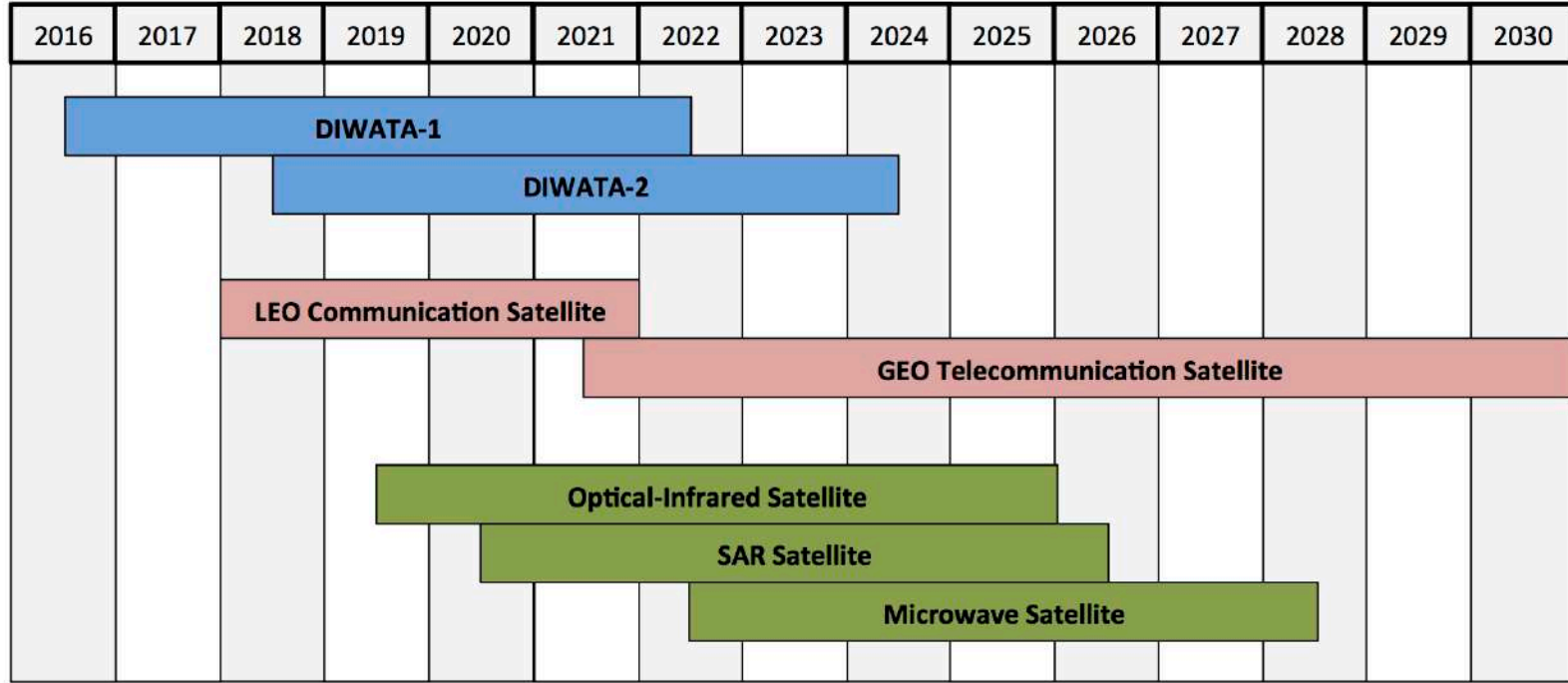
Philippine Space Agency (PhilSA)



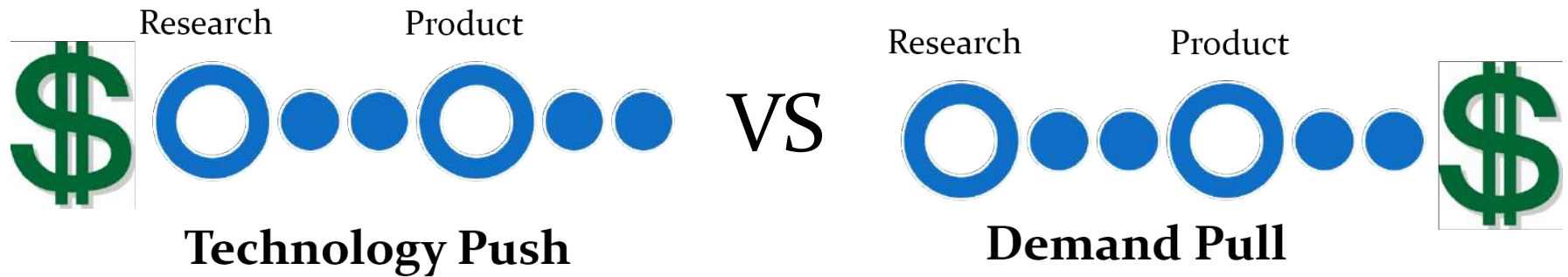
Satellite Applications

	Type of satellite				
	GEO Telecom	LEO Telecom	Optical-Infrared	SAR	Microwave
Communications	■	■			
Agriculture			■	■	
Forestry			■	■	
Environment			■	■	
Urban Planning			■	■	
Climate Studies			■		■
Coastal Monitoring and Ocean Studies			■	■	■
Disaster Risk Reduction and Management	■	■	■	■	■
National Security	■	■	■	■	■
Flood Monitoring				■	■

PhilSA Technology Development Roadmap



Considerations from Innovation Policy



University Spinoffs

- Help extracting value from university research, and work as a technology-push/demand-pull transition.
- Will further need Intellectual Property (IP) Policy.

LEO Launchers

- Complex engineering and policy problem, as it's related to Military Technology.
- Public Private Partnerships (PPPs) involving academia, military, defense and industry.

International Cooperation

- Several ASEAN countries willing to develop space capabilities, with shared efforts.
- Further support can be sought from space agencies of developed countries, e.g. JAXA

Political Support

- New Philippines Space Act Bills in the House and Senate as final steps for establishing PhilSA.
- Proposal of a Philippine Space Development Fund of US \$19.6 million to be granted by the Filipino Government.
- Additionally, US \$200 million to be transferred to PhilSA over 5 years.
- Senate Bill successfully sponsored by Sen. Aquino IV in September 2018.
- Once the bill is also passed by House of Representatives, it will proceed to the legislative committee and then, finally, to President Duterte to sign it within 30 days or it lapses into law.

Conclusion

- ❑ NSDP laid the groundwork for PhilSA.
- ❑ Some Technology-push complimented with primary focus on demand-pull may help to establish a space industry in the Philippines.
- ❑ Indigenous satellite development capabilities may be facilitated by university spin-offs.
- ❑ Launch capabilities should be limited to the more modest goal of LEO orbits.
- ❑ International Cooperation with ASEAN Countries along with Japan and U.S. are also desirable.