



Ring of Fire: ICT for Disaster Mitigation and Environment Protection



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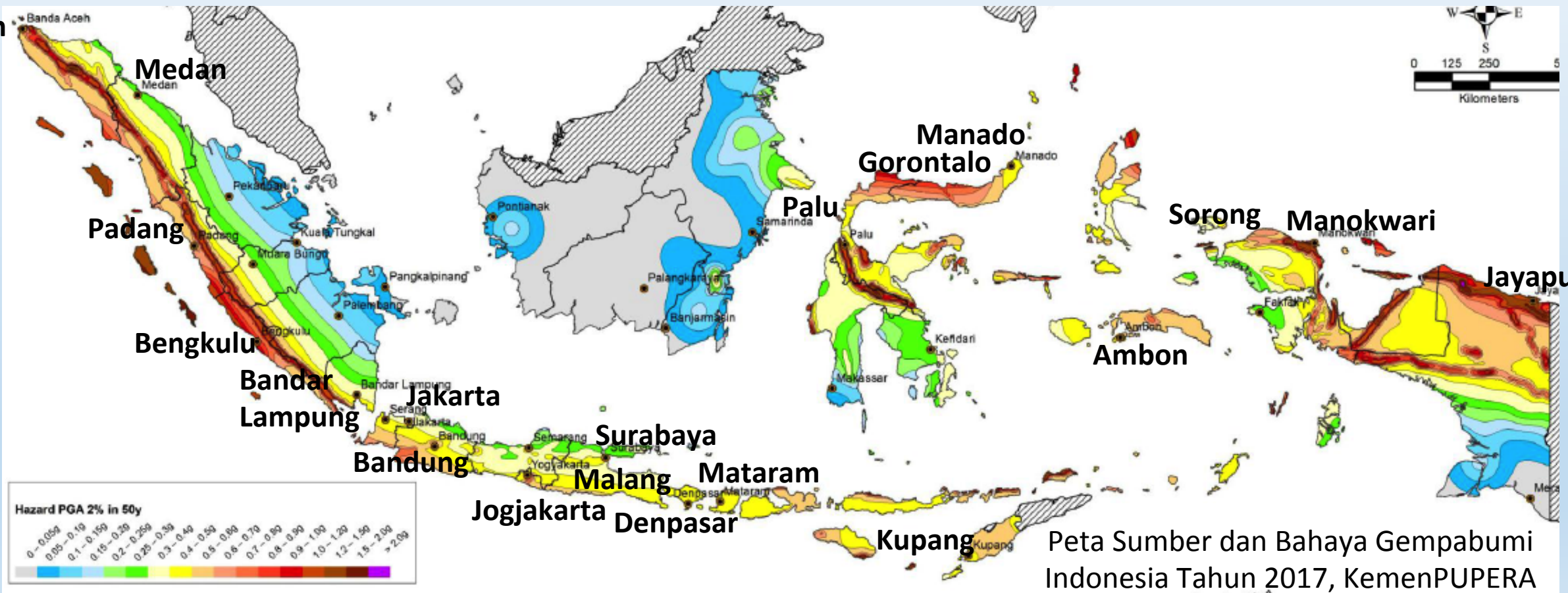


ASEAN ICT VIRTUAL ORGANIZATION FORUM 2018

INDONESIA - RING OF FIRE

Most of the big cities in the territory of Indonesia is in a high seismic zone, volcanoes

Banda Aceh



Peta Sumber dan Bahaya Gempabumi Indonesia Tahun 2017, KemenPUPERA



13 km Tenggara
Donggala-Sulteng



**PRAY
FOR
DONGGALA**

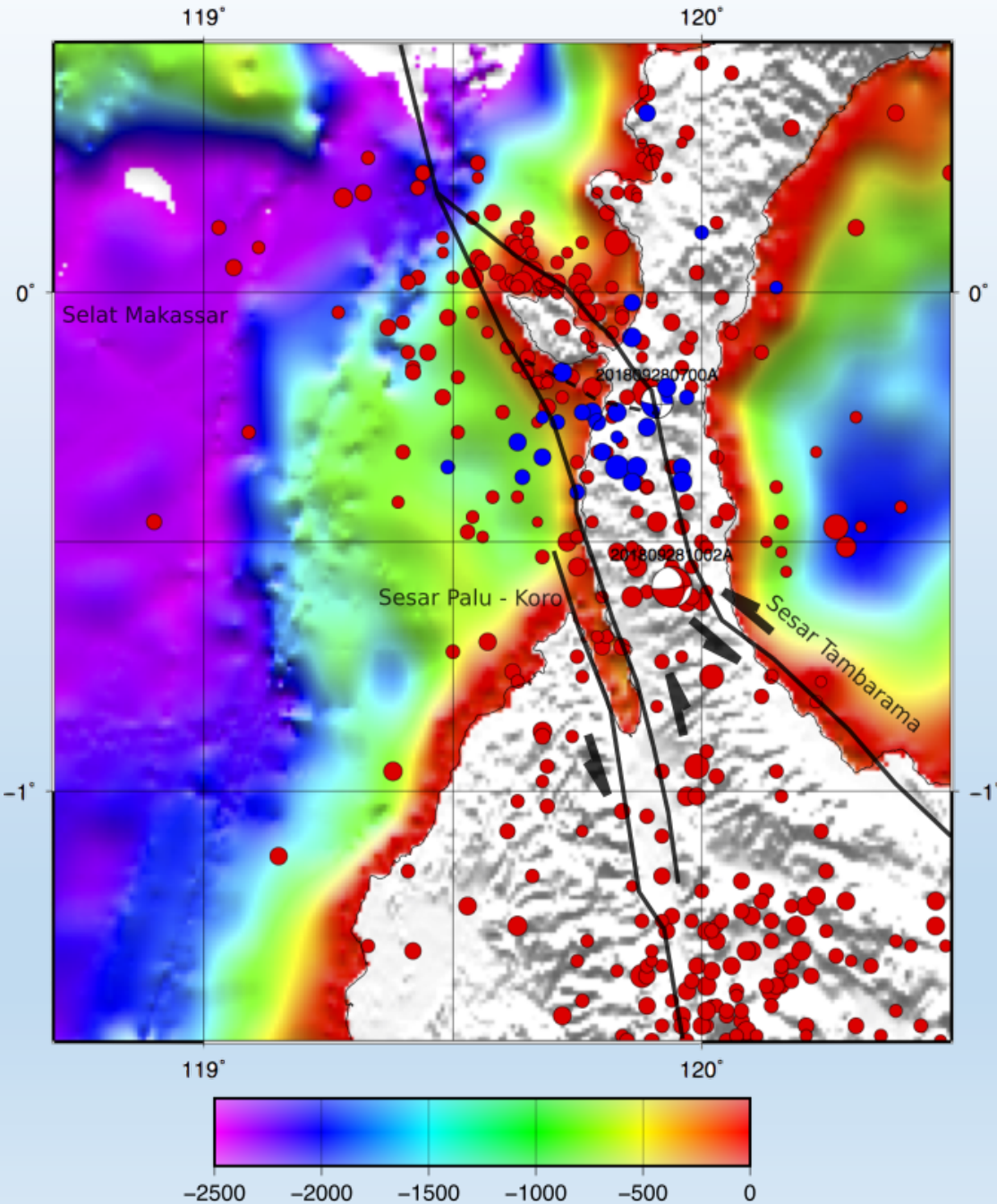
polhukam.id
SITUS BERITA TERPERCAYA

7,4 SR

**PRAY
FOR
PALU**

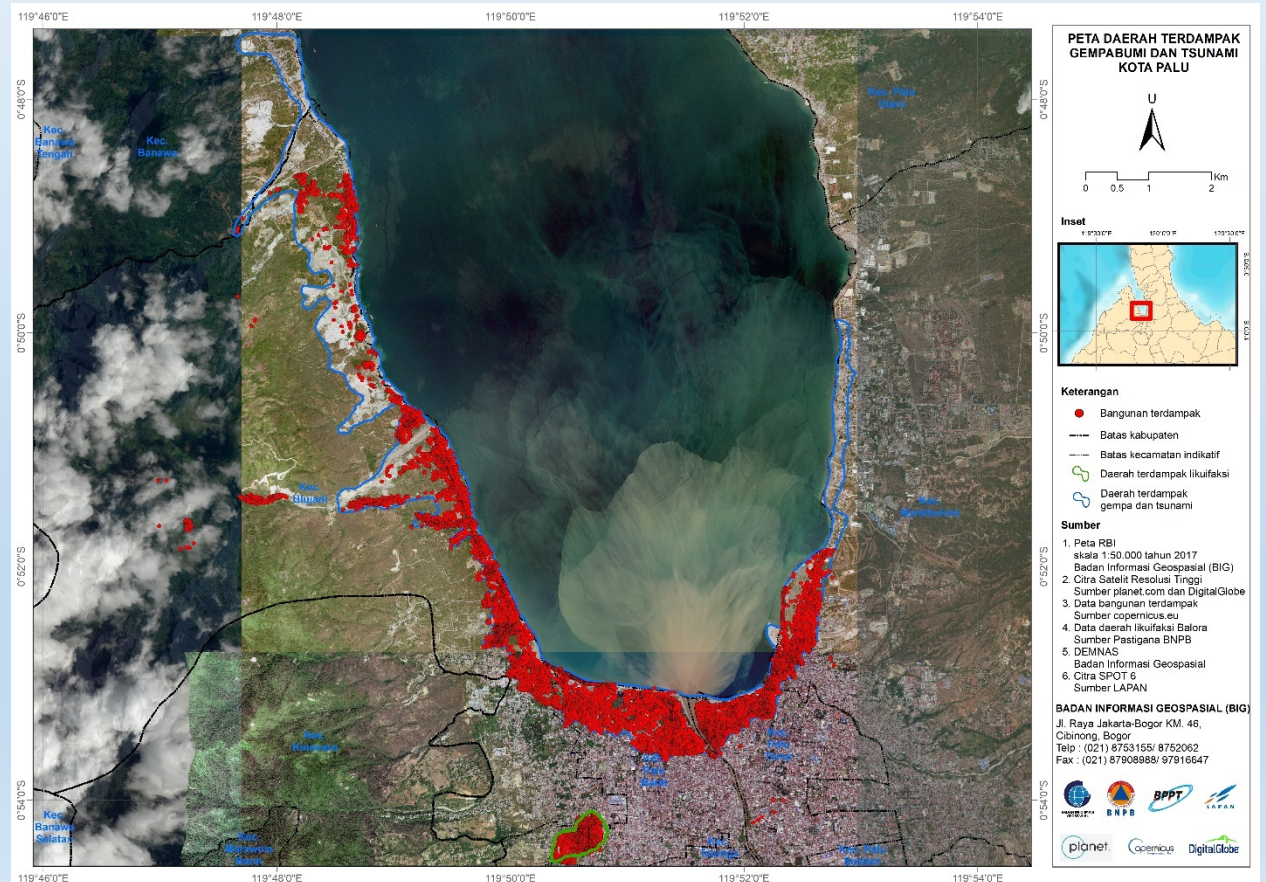
28 September 2018
Pukul 18.02 WITA
Pusat Gempa :
0.8 LS
119.85 BT
10 Km Timur Laut Donggala

www.polhukam.id



Palu-Donggala EQ/Tsunami

Structural map and earthquake distribution (CMT catalog and BMKG 2018, GEBCO Multibeam)



GEMPA BUMI

7.0 SR

LOMBOK PROVINSI NTB

(UPDATE 15 AGUSTUS 2018 PUKUL 17.00 WITA)



GEMPA BUMI BERKEKUATAN 7.0 SR MELANDA WILAYAH LOMBOK, PROVINSI NTB, MINGGU 5 AGUSTUS 2018, PUKUL 19.46 WITA BERPUSAT DI DARAT DENGAN KOORDINAT 8.37 LS DAN 116.48 BT PADA KEDALAMAN 18 KM (BERPOTENSI TSUNAMI). PERINGATAN DINI TSUNAMI TELAH DICABUT BMKG, DIMANA KEKUATAN GEMPA INI DIRASAKAN DI BEBERAPA DAERAH INDONESIA DAN MENYEBABKAN KERUSAKAN YANG BEGITU PARAH TERUTAMA DI PULAU LOMBOK ITU SENDIRI, SEHINGGA PEMERINTAH PROVINSI MENETAPKAN STATUS TANGGAP DARURAT.

K L U

404 Jiwa Meninggal
829 Jiwa Luka-luka
178.122 Jiwa Pengungsi
24.989 Rumah Rusak

MATARAM

9 Jiwa Meninggal
63 Jiwa Luka-luka
18.894 Jiwa Pengungsi
754 Rumah Rusak

LOBAR

39 Jiwa Meninggal
399 Jiwa Luka-luka
116.453 Jiwa Pengungsi
25.540 Rumah Rusak

SEBARAN KERUSAKAN AKIBAT GEMPABUMI LOMBOK



LOTENG

2 Jiwa Meninggal
NIHIL Jiwa Luka-luka
NIHIL Jiwa Pengungsi
4.767 Rumah Rusak

LOTIM

12 Jiwa Meninggal
122 Jiwa Luka-luka
104.060 Jiwa Pengungsi
25.540 Rumah Rusak

Upaya Penanganan

POSKO PENANGANAN DARURAT BENCANA GEMPA LOMBOK

(AP. SUPERSEMAK TALUNG - Jl. Raja Tanjung Depan Kantor Bupati Lombok Utara)

- MELAKUKAN EVAKUASI KORBAN GEMPA DAN INSTANSI TERKAIT
- MENDIRIKAN TENDA PENUNJANGAN & P.BERAN ILAK TERBUK KPO WARDA
- MENDIRIKAN BUKIT LAPANGAN & KOSLAP
- MENYALURKAN LOGISTIK BANTUAN
- PEMBERIAN SANTIAAN KORBAN YE MINGGAL
- MELATIH SORTA MEMBERSIKAN WARDA TRUKMA HEALING & PVA
- MENTALISASI JARINGAN TELP. AIR & USTRUK
- MEMANTAU/MENSAMATI PERKEMBANGAN GEMPA DNG BMKG & CALL CENTER
- PEMBUATAN HEK/TOILET PORTABLE KUPON BARISAT
- PENYALIRAN AIR BERSIH & PEMASANGAN TROMBOL/ TANGKI AIR
- MENDIRIKAN HUKTARA & SEKOLAH BARISAT

DAMPAK GEMPA BUMI LOMBOK PROVINSI NTB

466 Jiwa penduduk meninggal dunia

417.529 Jiwa penduduk mengungsi

1.054 Jiwa penduduk luka-luka

71.937 Total Bangunan & Fasilitas umum rusak

LOMBOKBANGKITLAGI #LOMBOKBANGKIT

f @posko.lombok @poskogempalombi paskogempalombok 085338639789 085961472837 0052-01-002421-30-8 (Posko PDB Lombok)



BENCANA TAHUN 2017

BNPB

1 JANUARI 2017 - 29 DESEMBER 2017

Bencana tahun 2017 tercatat 2.341 kejadian (29/12/2017). Bencana hidrometeorologi mendominasi kejadian bencana tahun 2017, banjir menempati urutan pertama diikuti puting beliung & tanah longsor. Bencana tahun ini menyebabkan lebih dari 3,5 juta jiwa menderita & mengungsi dan merenggut 377 jiwa serta merusak lebih dari 47 ribu unit rumah.

TOTAL BENCANA TAHUN 2017
1 Januari 2017 - 29 Desember 2017

2.341



KERUSAKAN
AKIBAT
BENCANA
TAHUN 2016

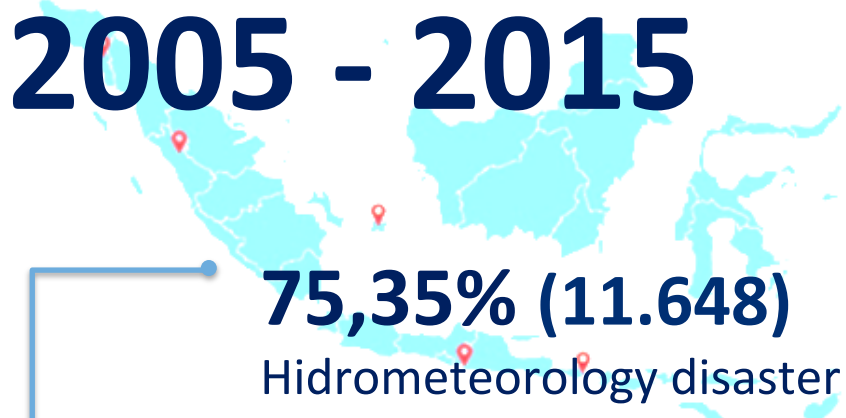
47.442
RUMAH RUSAK

1.272
FASILITAS
PENDIDIKAN
RUSAK

113
FASILITAS
KESEHATAN
RUSAK

698

NATURAL DISASTER IN INDONESIA 2005 - 2015



75,35% (11.648)

Hidrometeorology disaster

24,65% (3.810)

Geology disaster

15.458

Disaster Period
2005 – 2015

floods, extreme waves,
land and forest fires,
droughts and extreme
weather.

earthquakes,
tsunamis, volcanic
eruptions, and
landslides

**Victims and
Economic
Losses**

GEOLOGICAL DISASTER IN INDONESIA

It is at the meeting of continental plates and oceanic plates (mega thrust)

Some earthquakes in the back arc are also a threat that now appears

Major cities are partly in an earthquake-prone environment such as in the Palu-Koro fault



PENTAHAPAN & TARGET PERENCANAAN RIPB

2015 - 2045

RIPB Mempertimbangkan Capaian Kesepakatan Global

SENDAI FRAMEWORK	Scope and Purpose	1 Global Outcome	1 Goal
7 Global Targets	13 Guiding Principles		
4 Priorities for Action	at 4 Levels Local, National, Regional and Global		
Role of Stakeholders	International Cooperation and Global Partnerships		



RIPB 2015 – 2045
Centennial Resilient Plan

SFDRR
2015 - 2030

SDG's
2030

2015 – 2030
SDG, SFDRR &
AGENDA GLOBAL
Global Resilient
Plan

Indonesia Tangguh
Bencana untuk
Mendukung
Pembangunan
Berkelanjutan

2015 – 2019
RPJMN & Renas PB
Baseline Resilient
Plan

70% Daerah Tangguh
Bencana

2005

RPJPN 1

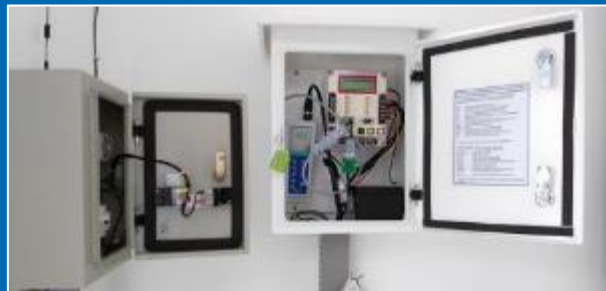
2025

RPJPN 2

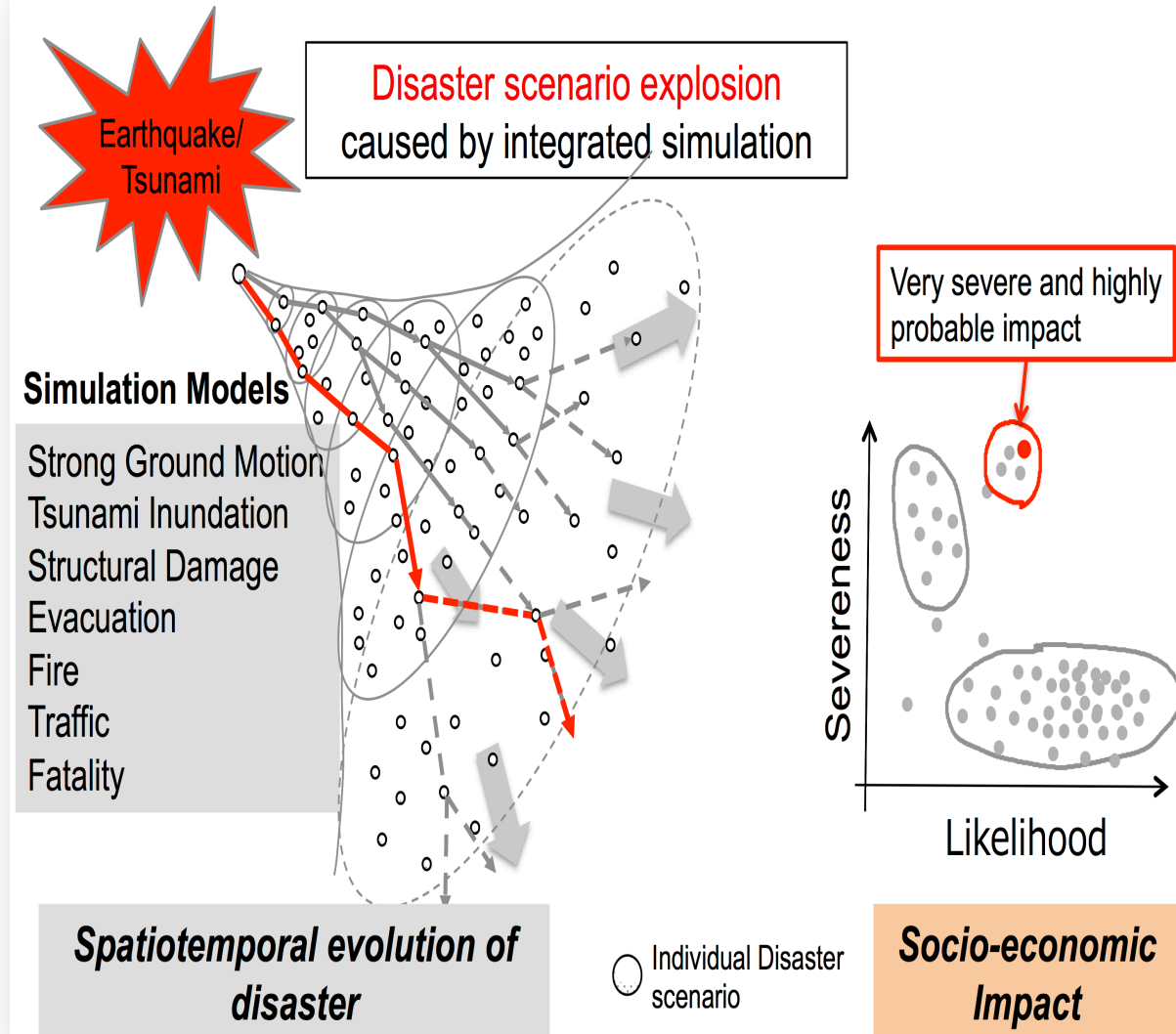
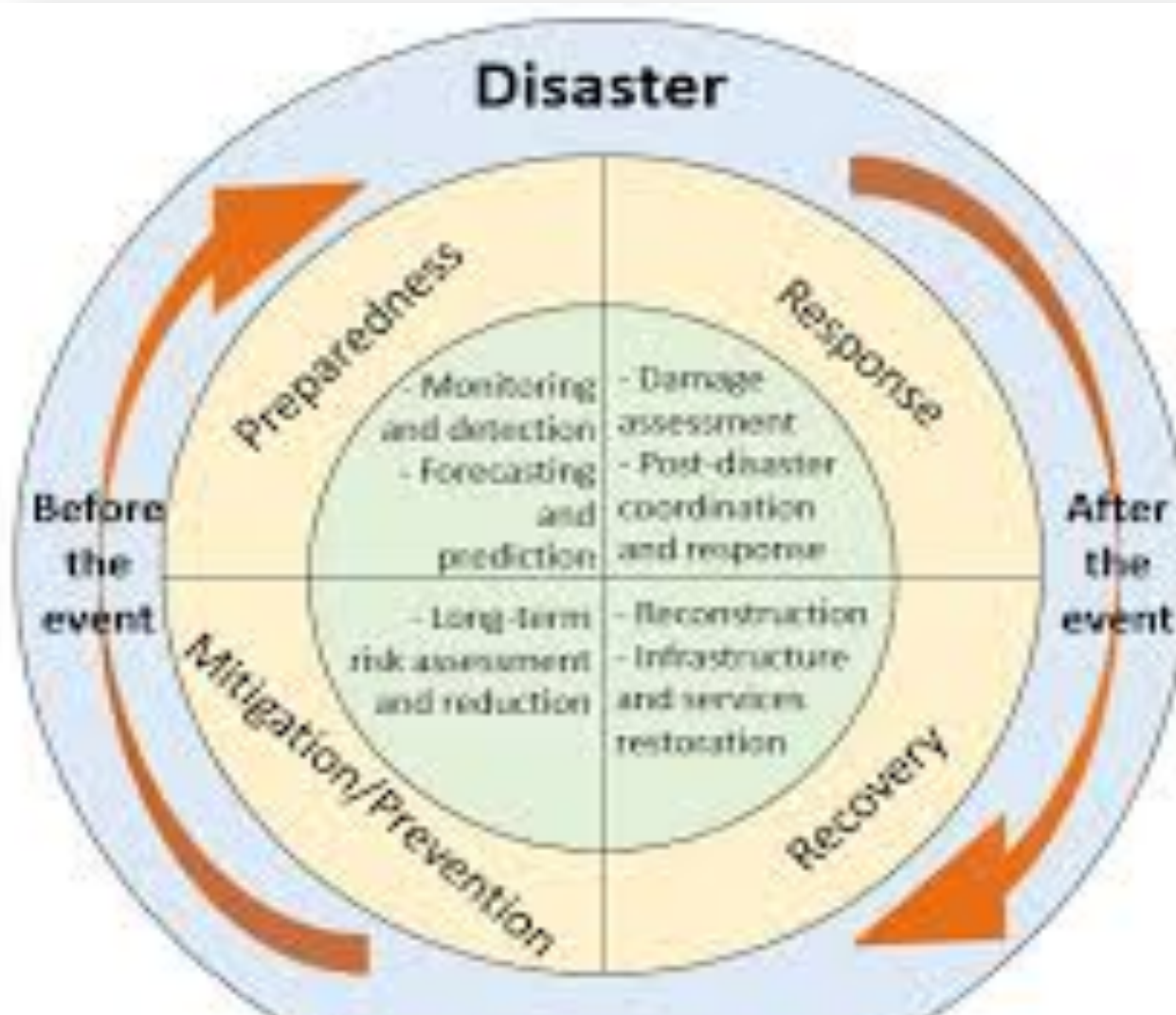
2045



BPPT Initiatives for ICT Research and Development In Disaster Mitigation and Environmental Protection



ICT in Disaster Lifecycle



PERESMIAN PEMBUKAAN INDONESIA INDUSTRIAL SUMMIT TAHUN 2018 DAN PELUNCURAN MAKING INDONESIA 4.0



The Indonesian President, Joko Widodo, has even officially launched the "Making Indonesia 4.0", a road map with comprehensive approach to national strategies entering the era of the 4th industrial revolution. The President expects all parties to actively support the government's efforts in facing this era of 4th industrial revolution, including those involved in the development of science and technology, research and education



6 BPPT ROLES FOR NATIONAL DEVELOPMENT



ENGINEERING

TECHNOLOGY
CLEARING



TECHNOLOGY
AUDIT

TECHNOLOGY
DIFUSION AND
COMERCIALIZATION



TECHNOLOGY TRANSFER



TECHNOLOGY INTERMEDIATION

- BPPT in carrying out its functions and roles for national development is expected to produce innovation and implementation of technology to answer the needs of industry and society and answer the nation's problems.
- BPPT is expected to be a leader in developing technology-based industries and leading the industrial revolution 4.0 and the development of digital economy in Indonesia.
- BPPT should realize the ideals of Indonesia to become a developed country based on industry and technology

NATURAL RESOURCES DEVELOPMENT TECHNOLOGY

TPSA (Deputy For Natural Resources Development Technology) as a strategic part of BPPT has an important role in mastering technology for natural resource management, environmental protection and disaster risk reduction in an innovative and sustainable manner;

One important TPSA's task to be answered in the development of industry4.0 and the digital economy in Indonesia, is how to realize the industry concept 4.0 in the context of developing natural resource management technology, environmental protection and disaster risk reduction.

R&D IN INFORMATION AND INSTRUMENTATION TECHNOLOGY

Some Innovation and Technology Development made by TPSA : IoT, Instrumentation, Monitoring, etc.

TPSA

Earth System Technology

Proof that TPSA has a strong commitment in utilizing information and communication technology

Center For Regional Resources Development Technology

Center Of Technology For The Environment

Center For Mineral Resources Development Technology

Center For Disaster Risk Reduction Technology

Laboratory For Marine Survey Technology

National Laboratory For Weather Modification Technology

Photogrammetry Disaster Rapid Assessment

Landslide & Geohazard Online Monitoring System

Under Water Remote Operated Vehicle Surveying

Side Scan Sonar for Seabed Seismic Surveying System

Radar - Rainfall Observation Early Warning System

Peatland Ground Water Level Monitoring System

Area Frame Sampling for Crop Area Estimation

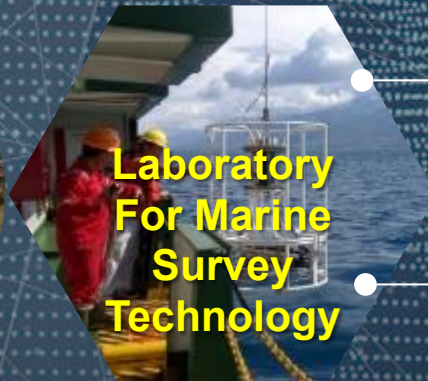
Peatland Fire Danger Rating System

Industrial Waste Water Monitoring System (SIMOLI)

Ambient Water Quality Monitoring System (ONLIMO)

Multi Chanel Cascading Ground Resistivity Logging

Mine Area Geohazards Monitoring System



GeoSpatial ICT Experience : KSA

ESTIMATION AND FORECASTING OF NATIONAL RICE HARVEST AREAS WITH THE AREA SAMPLE FRAMEWORK (KSA)



FUTURE ICT DEVELOPMENT

- **Integration of real-time sensor networks, satellite imagery, near-real time data management tools, simulation tools, and connectivity to other System Environment (Interoperability).**
- **Scalable Data-Driven Monitoring, Dynamic Prediction and Resilience Cyberinfrastructure**
- **Real-time remote data Modeling, data assimilation and dynamic behavior prediction**

CURRENT AND FUTURE ARCHITECTURE VIEWPOINTS

Information viewpoint

→ Data collection:

- Small Satellites
- Drones (UAVs)
- Direct Broadcast / Direct Readout
- Mobile devices
- “Internet of Things”
- Crowdsourcing



Computation viewpoint

→ Data processing & Analytics:

- Cloud Computing
- Big Data analytics
- Semantic services
- Machine Learning
- Model as a Services
- Interoperability services

exploring further benefits from data and information

Development Plan for Industry 4.0 Implementation in Earth Observation System

CYBER PHYSICAL SYSTEMS



- Weather Modeling & Prediction
- Pollution Index Modeling
- Early Warning System
- Risk Based Forecasting
- Geohazard Modeling
- Hydrometeorological Modeling
- Guidance Based On Observation



**HIGH PERFORMANCE
COMPUTING
FACILITIES**

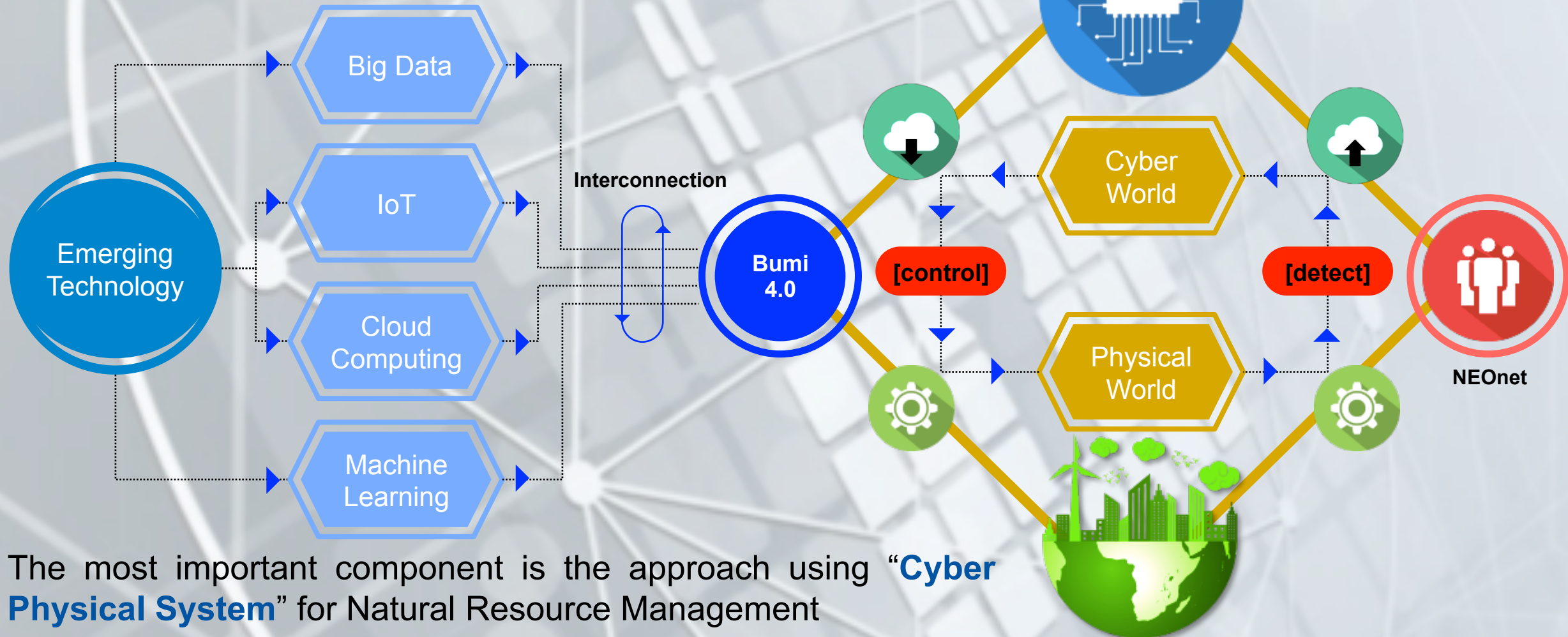


**BIG DATA CLOUD SERVER –
BJIK-BPPT**

CYBER SYSTEM ENVIRONMENT

BUMI 4.0 FOR EARTH MONITORING & OBSERVATION SYSTEM

BUMI 4.0 is an adaptation of the Industrial Concept 4.0 specifically for Earth Technology, which is an interconnection of several current trends in ICT technology.



The most important component is the approach using “**Cyber Physical System**” for Natural Resource Management

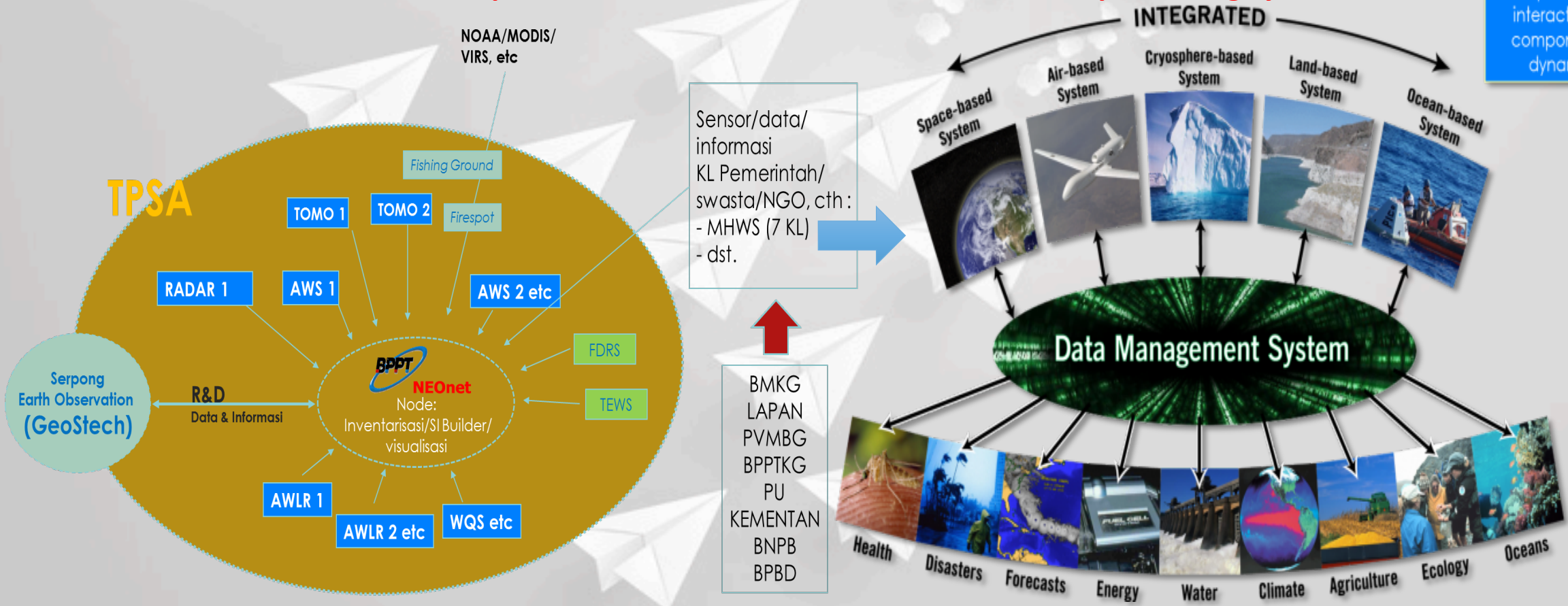
Indonesia's Earth Bigdata

Nusantara Earth Observation Network (NEOnet)

Global Earth Observation System of Systems (GEOSS)

GEOSS is a set of coordinated, independent Earth observation, information and processing systems

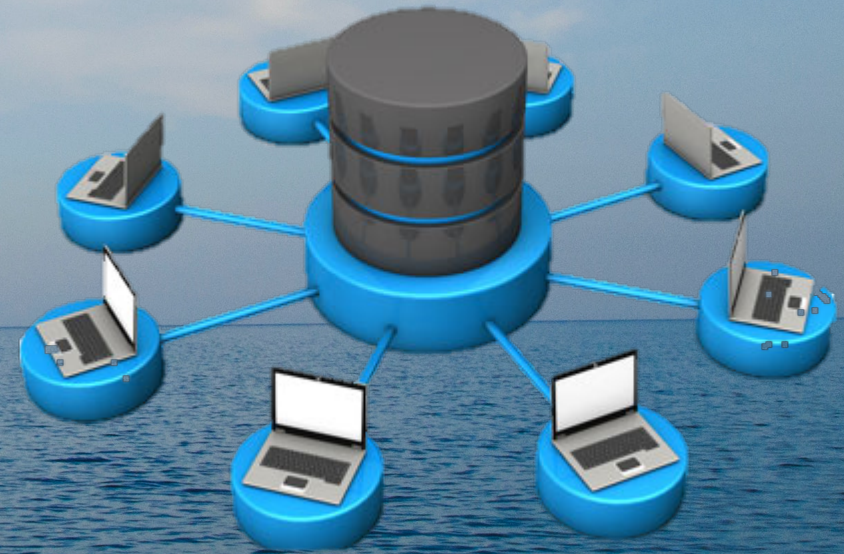
There is a solid dependencies and interaction between components in earth dynamic system



INDONESIA NATIONAL OCEAN DATA CENTER (NODC.ID)

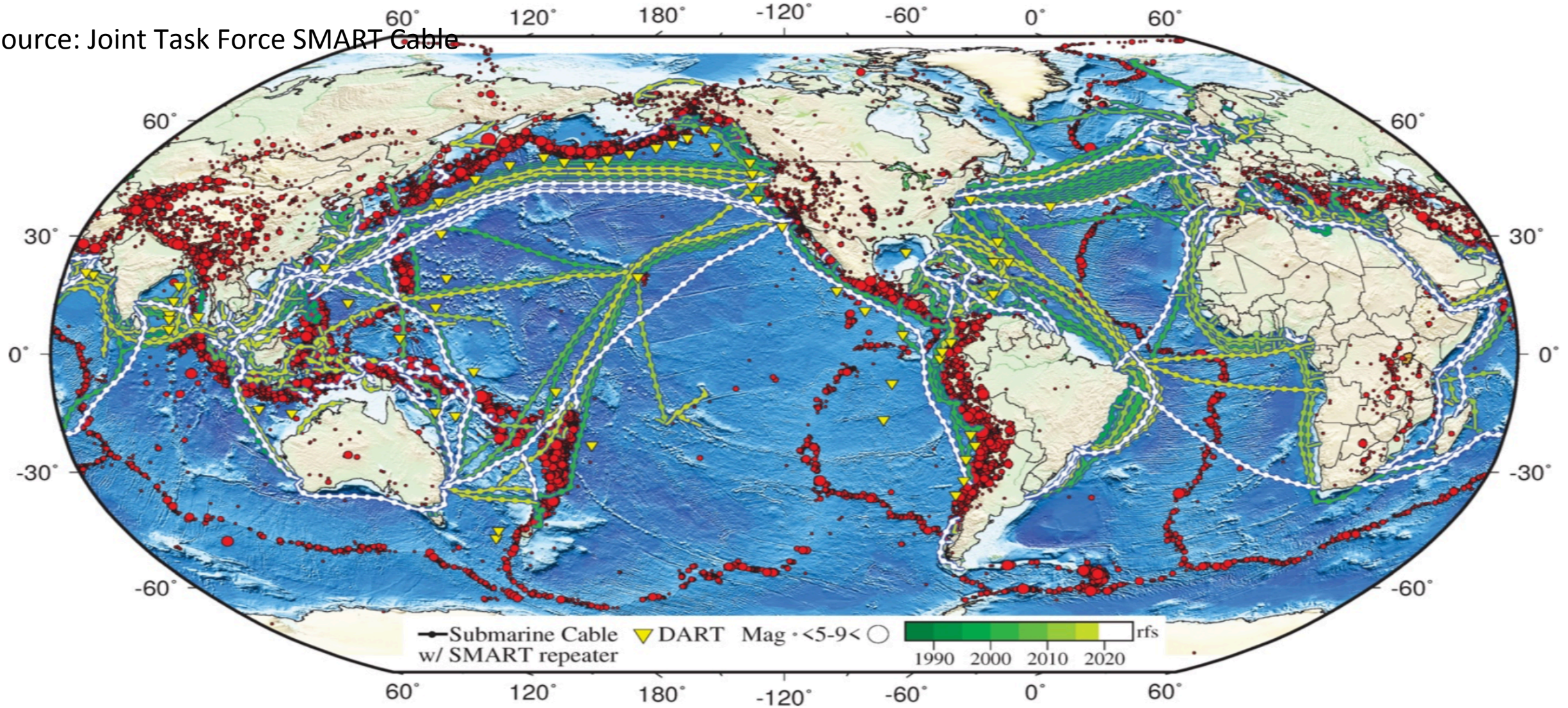


Integrated Data
Management



Data
Interoperability

Source: Joint Task Force SMART Cable



**SMART =The JTF SMART Subsea Cable Initiative Science Monitoring And Reliable Telecommunications
Climate Monitoring and Disaster Mitigation**

Figure 1. Submarine telecommunication cables span the oceans, crossing many zones of high earthquake and tsunami risk. Cables are shown by green (existing cables) and white (planned cables), with SMART repeaters, shown here every 300 km (normally every 50-100 km). Earthquakes are shown by red dots.



THANK YOU