ITU Green standards week

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Telecom Cables for Monitoring: Reconciling Differing Objectives

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Discussion Points

- Telecoms meets Monitoring
- Perspectives from Japan's submarine monitoring networks – an update
- Views on the way forward

Differing Motivations

Telecoms

- Dedicated use – reliable global connectivity
- Landings determined by projected traffic demand, politics, budgets
- High up-front CapEx, low OpEx
- Operational life 25+ years
- Maximising design capacity within budget
- Network availability a priority
- Currency – IRUs

Disaster Warning (e.g. Seismic/Tsunami)

- Dedicated use – civil protection
- Locations determined by naturally-occurring geology
- High up-front CapEx, moderate OpEx: natural events require repairs to cable
- Operational life targeted at approx. 25 years
- Fixed bandwidth demand
- Non-availability = human risk
- Currency – human life, infrastructure, prosperity

Environmental Monitoring (e.g. Ocean Climatology)

- Flexibility of use has value - scientific objectives may evolve over lifetime of observatory
- Project duration ~5 years, hope to extend
- Funding released annually
- Future bandwidth demand unknown (but probably ever-higher)
- Data outages may be tolerable
- Currency – data → knowledge → global sustainability

Differing Motivations – Marine Impacts

Telecoms

- Safest routes
- Shortest routes for cost and latency reasons
- Cable burial or other protection where necessary to ensure availability
- Design for minimal maintenance

In-line

Disaster Warning (e.g. Seismic/Tsunami)

- High risk routes
- Meandering routes
- Surface laid cable (but self-burial possible)
- Expect periodic maintenance in case of seismic activity

In-line

Environmental Monitoring (e.g. Ocean Climatology)

- ‘Interesting’ routes
- Type, location and spacing of sensors can vary
- Wet-mate connectors in scope
- Marine fouling possible
- Annual sensor upgrades or maintenance may be necessary/desirable

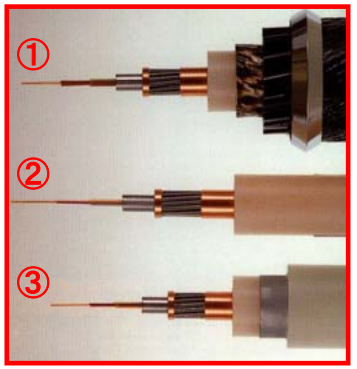
Nodal

In-line system

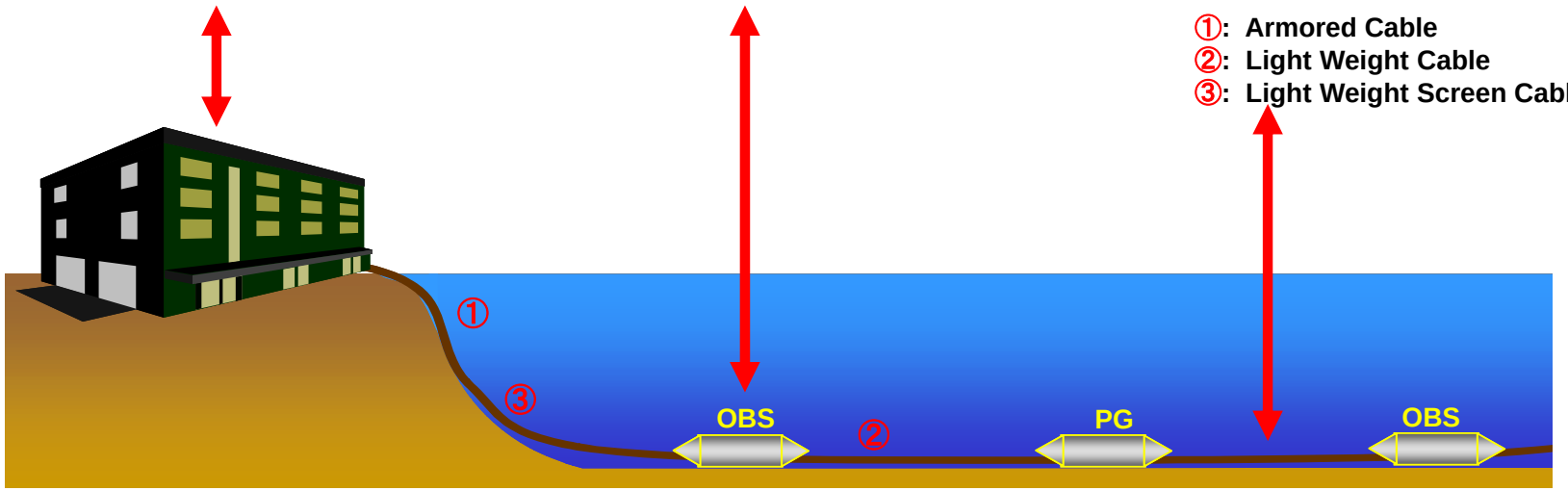
Terminal Equipment

Ocean Bottom Seismometer (OBS)

Cables & Fibres

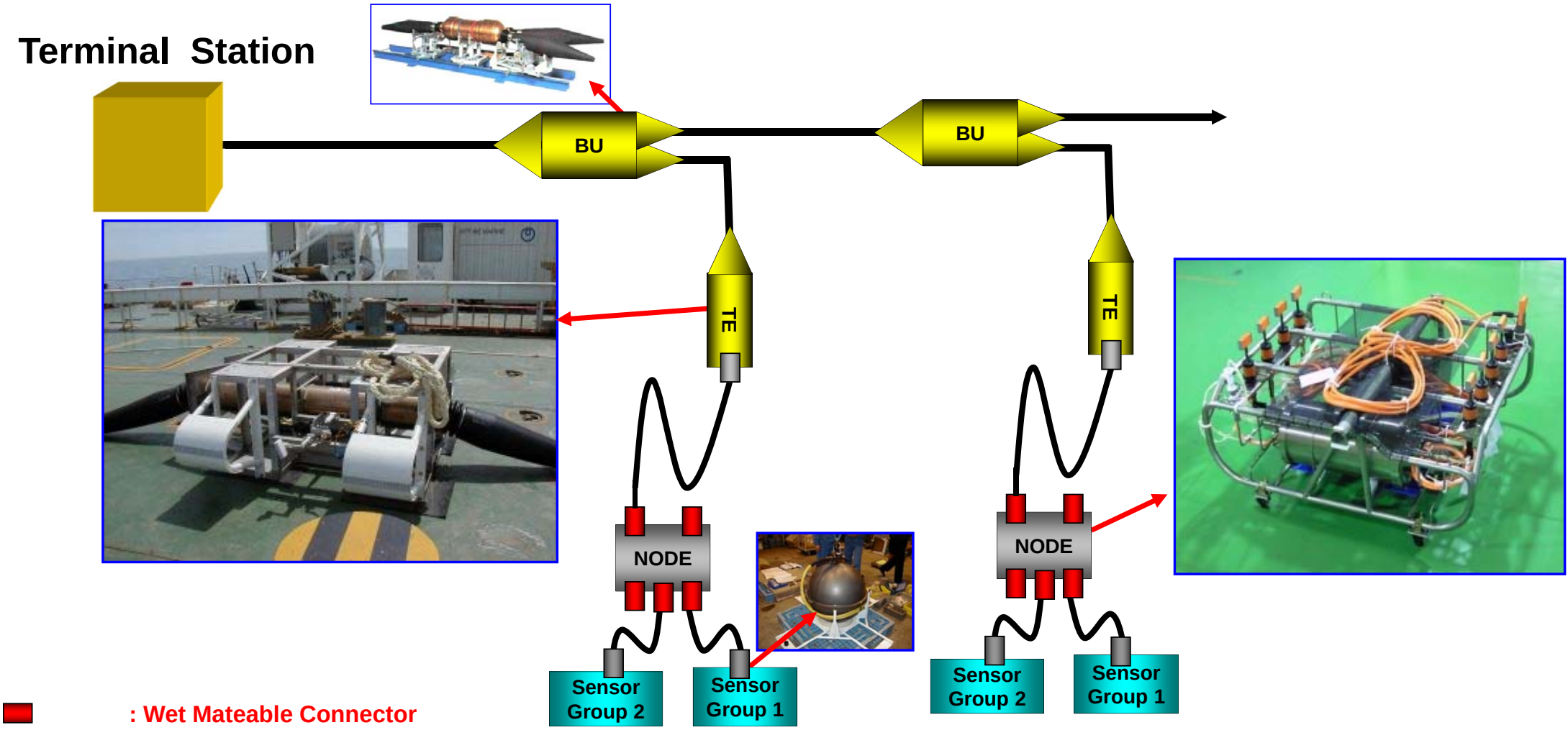


①: Armored Cable
②: Light Weight Cable
③: Light Weight Screen Cable



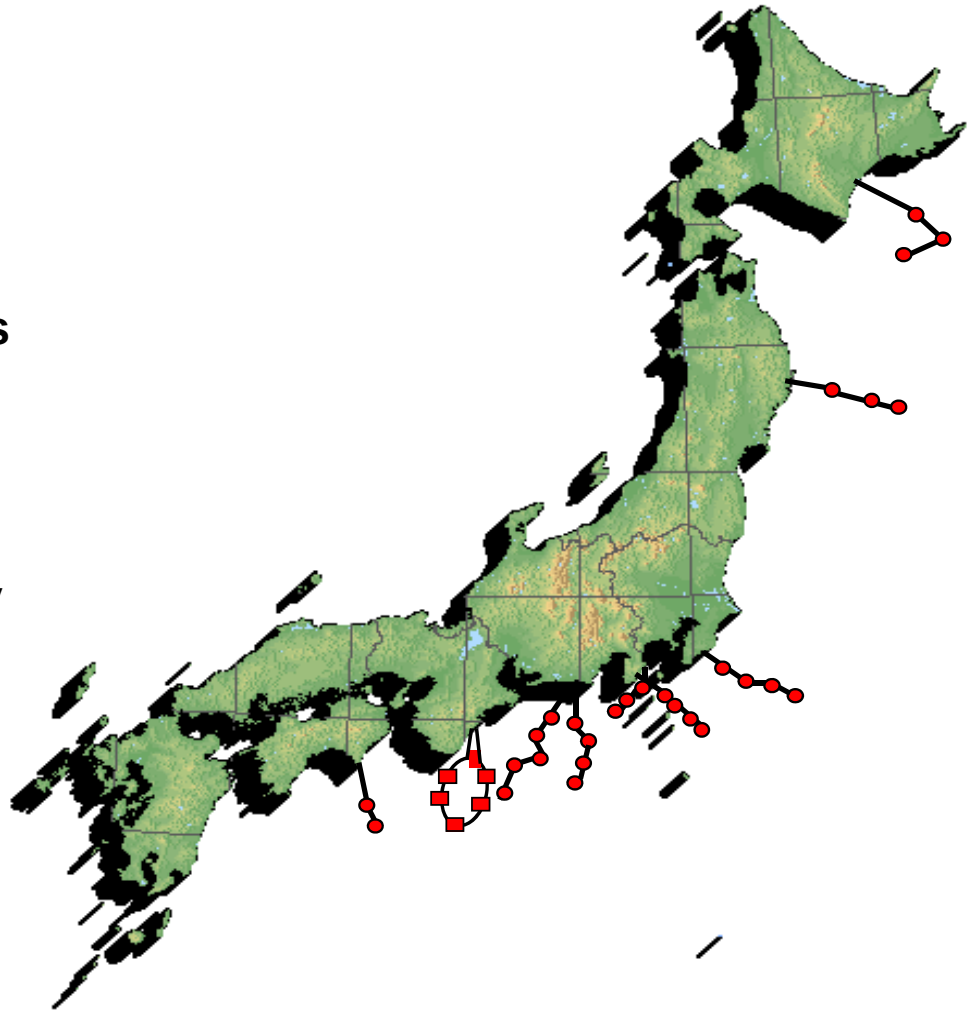
Provided by JAMSTEC

Node System



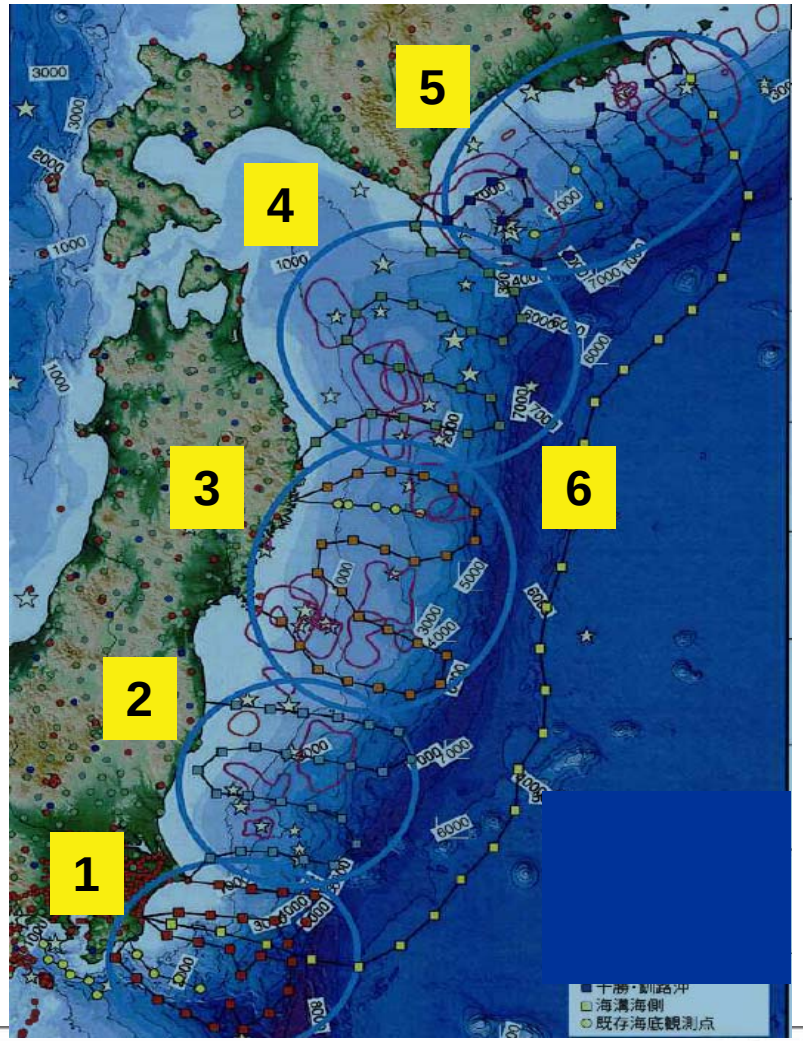
Existing Observation Networks in Japan

- Long history – first system built in 1979
- Early Detection of Earthquakes and Tsunamis
- Real-time Data Transmission to On-shore Stations
- 24/7 Ocean Bottom Observation
- Contribute to Disaster Management through Early Warning to the Public
- All dedicated systems: no dual use cables have been built

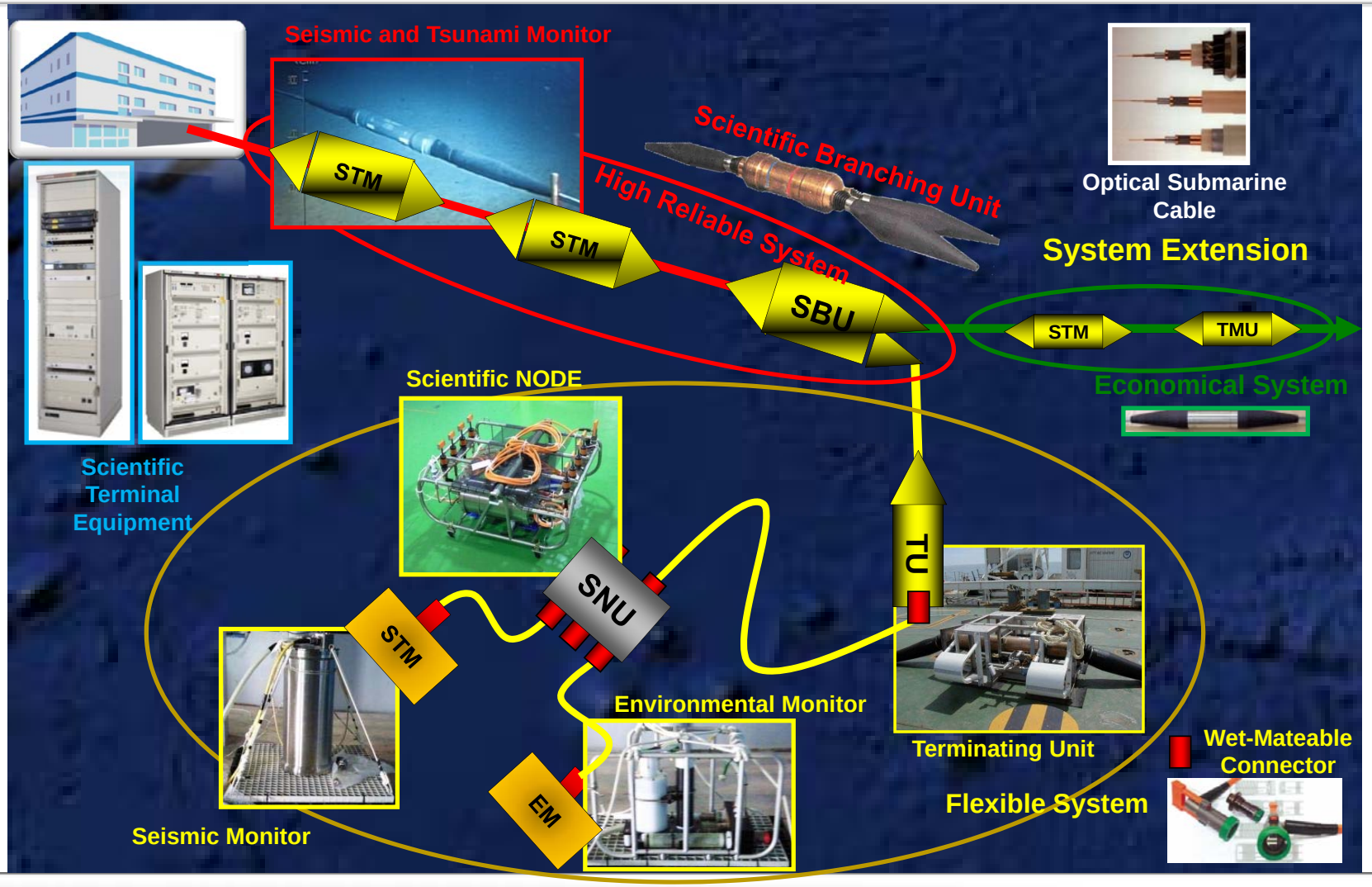


New Observation Networks in Japan

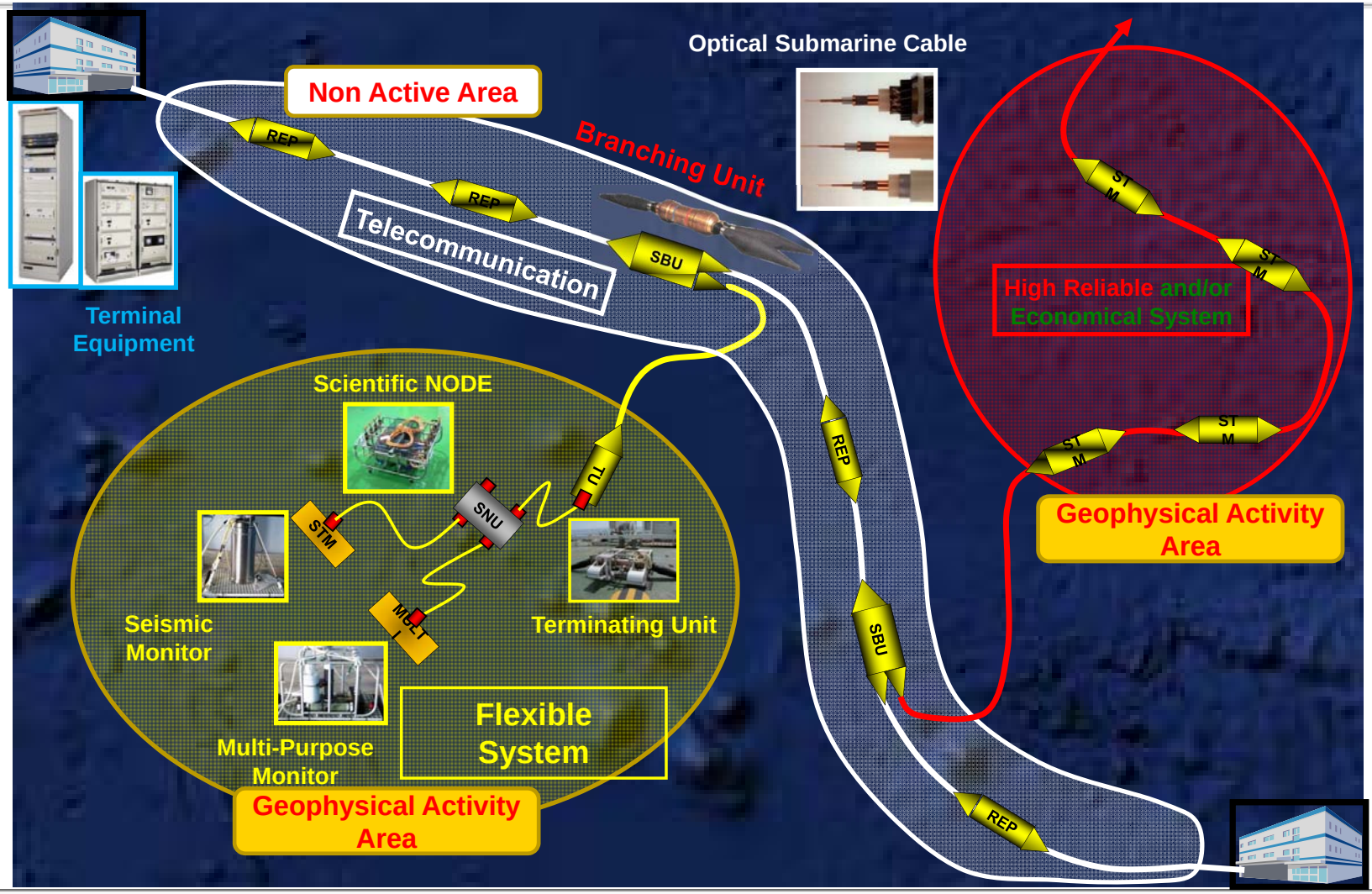
- Planned and funded by the Japanese Government
- 3-year plan currently under way
- Intended for Real-time Observation of Earthquakes and Tsunamis
- Over 5,000km of Submarine Cable
- Over 150 Undersea Units with Seismometers and Tsunami Sensors



NEC Scientific Monitoring System



Hybrid Telecoms and Scientific Monitoring System



Conclusions

Japan's Experience

- Submarine cable based monitoring systems have been used for over 30 years in Japan
- Those systems have proven effective for real-time monitoring of seismic activities and tsunamis
- Built as dedicated monitoring and observation systems, not with commercial telecommunications capabilities

Current Practical Thoughts

- Dual use cables are technically feasible
- Motivations and practices differ between telecom and monitoring communities
- Some measure of separation between telecom and monitoring systems seems to be the most practical approach today
- Further discussion and collaboration may advance these arguments

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