NEC's Submarine Cable System

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Broadband Network Operations Unit
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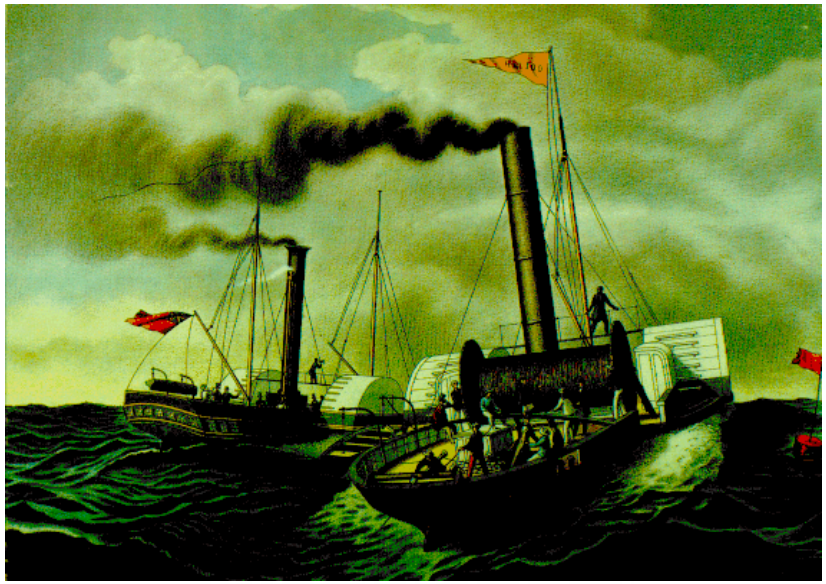
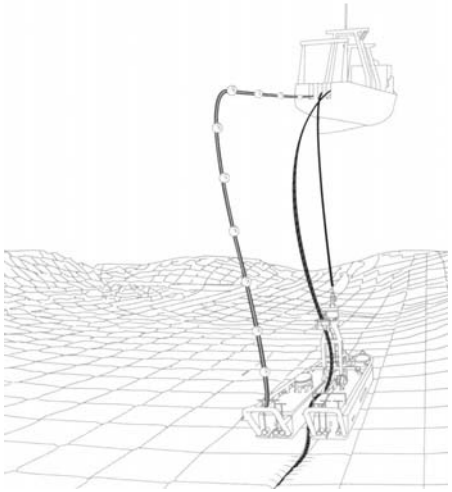
1. Outline of Submarine Cable Systems

1-1. The History of Submarine Cables





1850:First Telegraph cable at Dover Strait

1858:First Trans-Atlantic Telegraph Cable

(1876：Graham Bell invents the Telephone)

1906: Submarine Cable Tokyo-Guam

1956:First Trans-Atlantic Coaxial Cable

（1963： Satellite Communications between Japan and US begins)

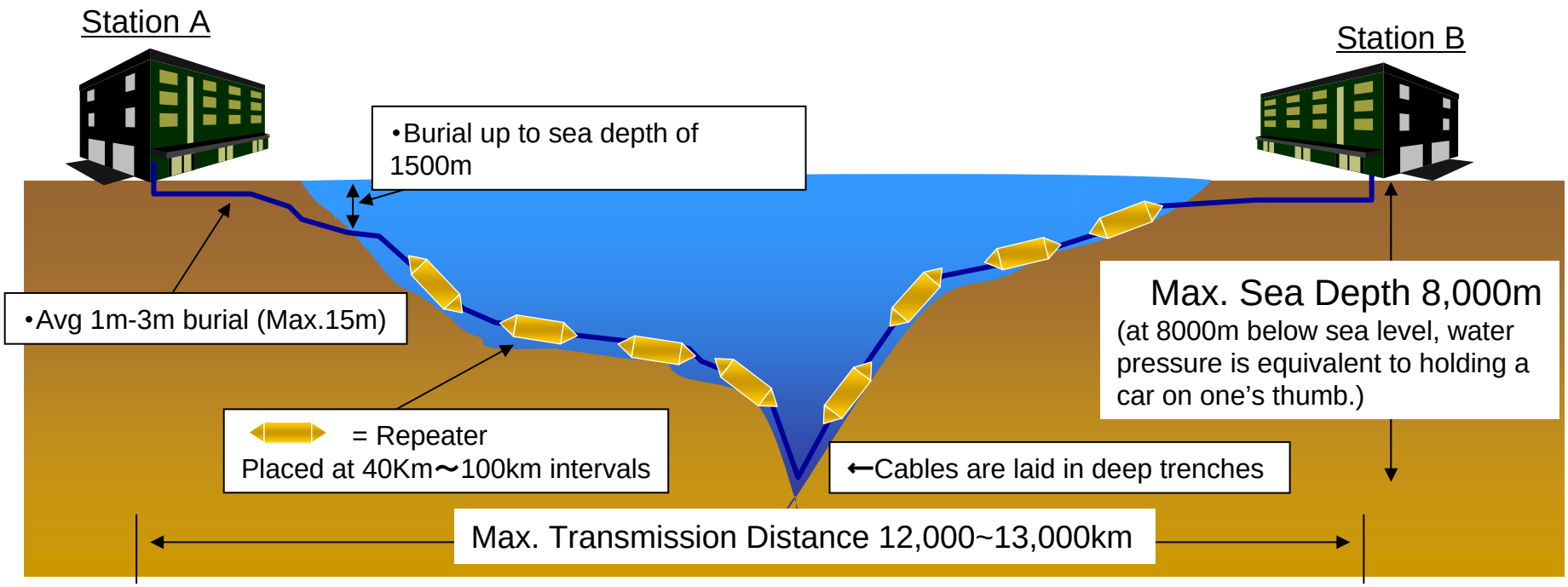
1964:First Trans-Pacific Coaxial Cable

1988:First Trans-Oceanic Optical Cable(1 Gb/s)

1999:Trans-Oceanic Optical Cable (640 Gb/s)

2001:Trans-Oceanic Optical Cable (1.28~Tb/s)

1-2. Summary of Submarine Cable Systems



1-3. Components of a Submarine Cable System

Dry Side

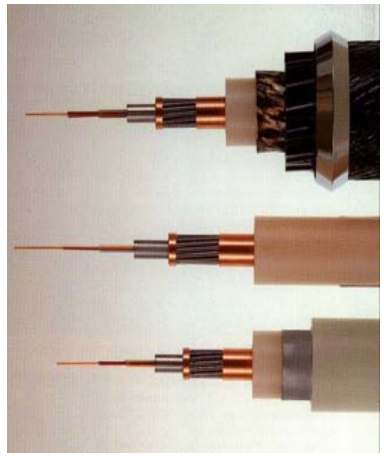
Line Terminal Equipment

Supervisory System
Overall System Monitoring
Repeater Performance Monitoring

Power Feeding Equipment

Network Protection Equipment (SDH system)

Wet Side

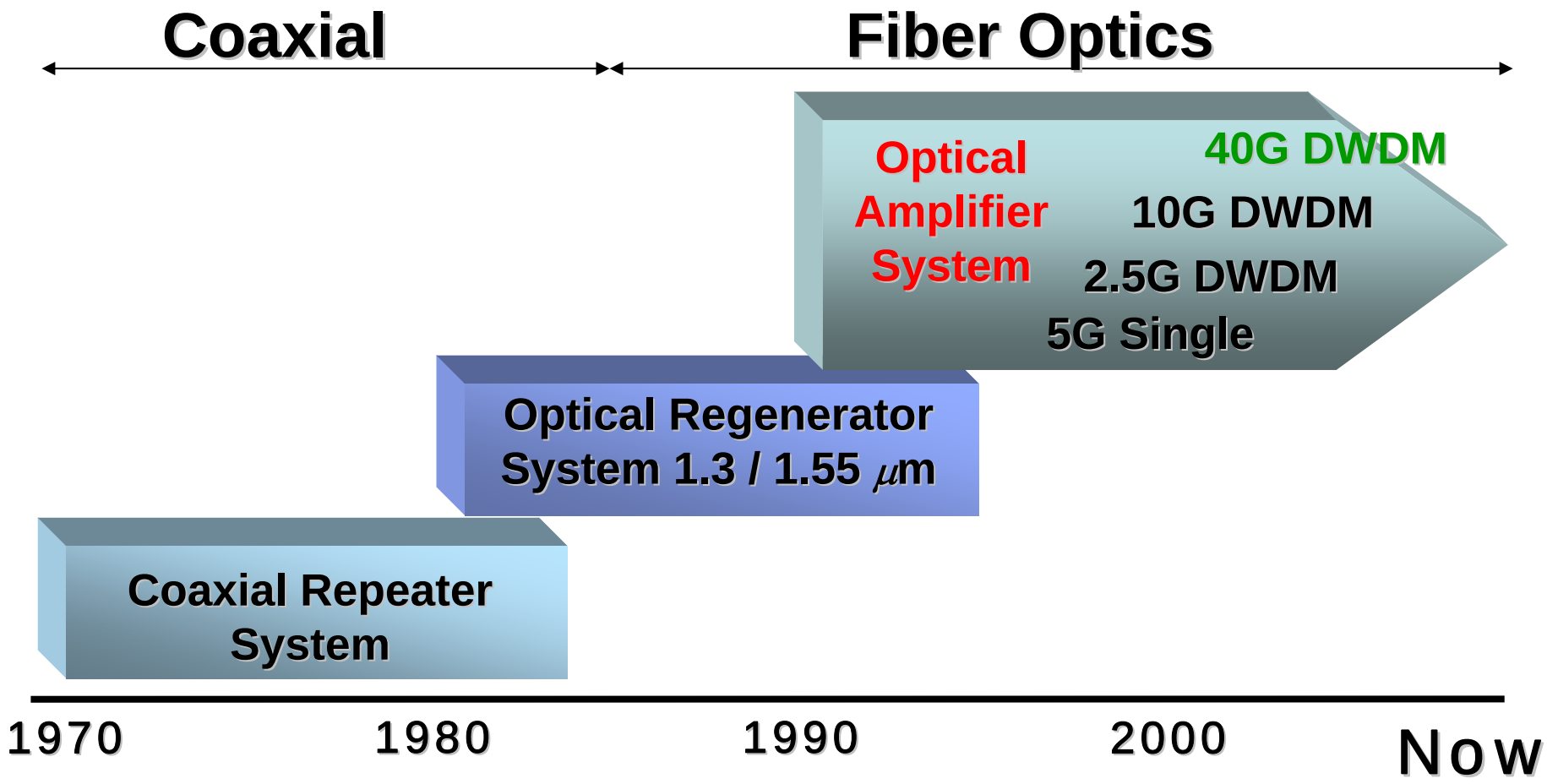


Submarine Cables (inc.. fiber.)

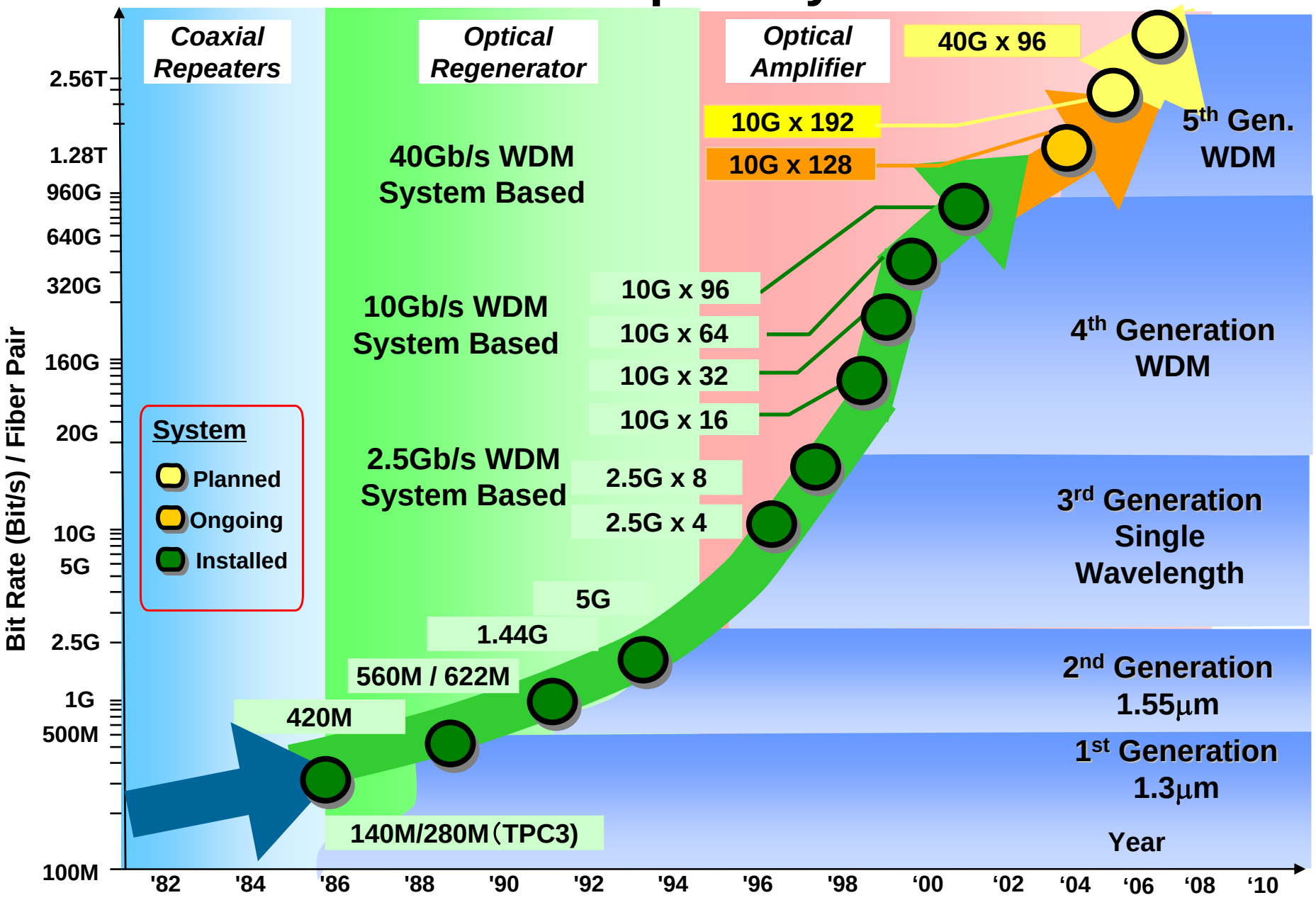
Submarine Repeater

Installation Cableship

1-4. Technical Trends



1-5. Transmission Capability



1-6. Latest Transmission Capacity

The Maximum Transmission Capacity for the latest Submarine Cable System, using the latest Optical Transmission technologies, is 10.24 Terabits/sec.

◆**So, how fast is 10.24**Tbps？

1 Cable can carry **Approx. 160Mil. Telephone Circuits** simultaneously

or

1 Cable can send **Approx. 272 DVD Disks** between continents within 1 second.

10.24 Tbps

10.24Tbps = 10Gbps x 128WDM x 8fiber pairs

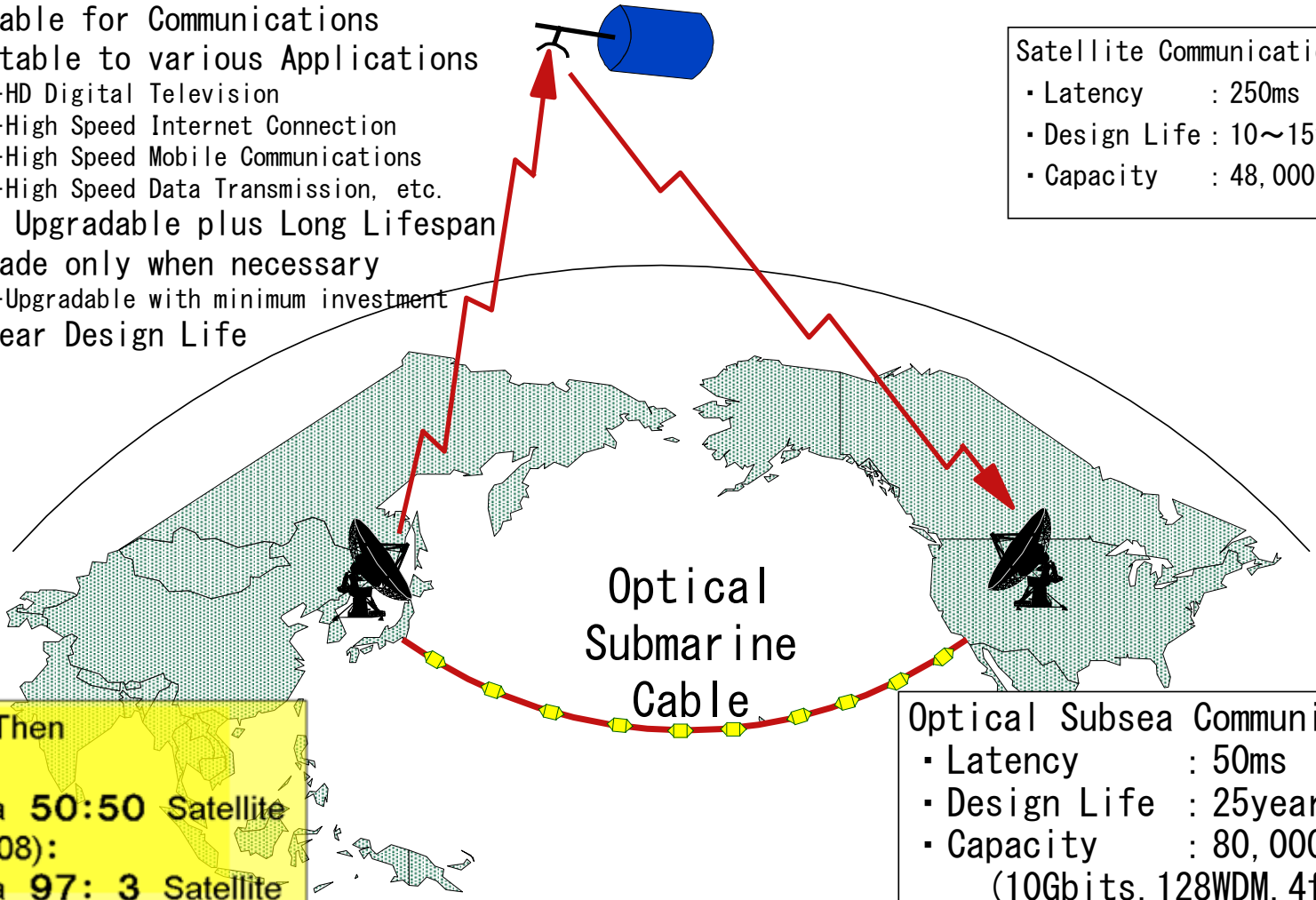
a) 10Gbps： 1 wavelength (color) can carry 10Gbps worth of data

b) 128WDM： 1 fiber can carry wavelengths (colors) up to 128 colors

c) 8fiber pairs： 1 Submarine Cable can accommodate up to 8 fiber pairs.

1-7. Comparison between Submarine Cable and Satellite Communications

1. Enables Highly Reliable and Affordable Broadband Communications
   1) Suitable for Communications
   2) Adaptable to various Applications
      —HD Digital Television
      —High Speed Internet Connection
      —High Speed Mobile Communications
      —High Speed Data Transmission, etc.
2. Easily Upgradable plus Long Lifespan
   1) Upgrade only when necessary
      —Upgradable with minimum investment
   2) 25 year Design Life



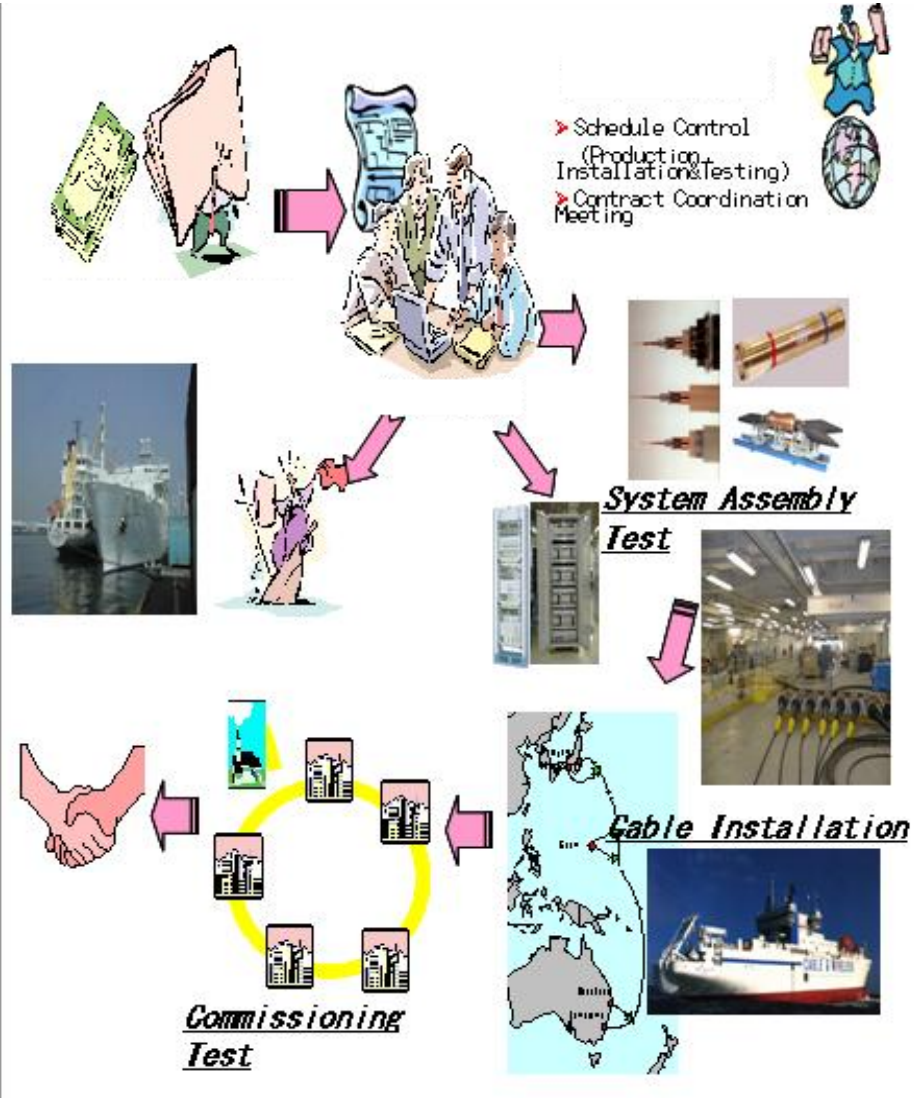
Satellite Communications
- Latency : 250ms
- Design Life : 10～15years
- Capacity : 48,000ch

Optical Subsea Communication
- Latency : 50ms
- Design Life : 25years
- Capacity : 80,000,000ch
  (10Gbits,128WDM,4fp)

Now and Then
In 1995:
Subsea **50:50** Satellite
Today (2008):
Subsea **97: 3** Satellite

2. Features of Submarine Cable Systems

2-1. Submarine Cable Projects



Features

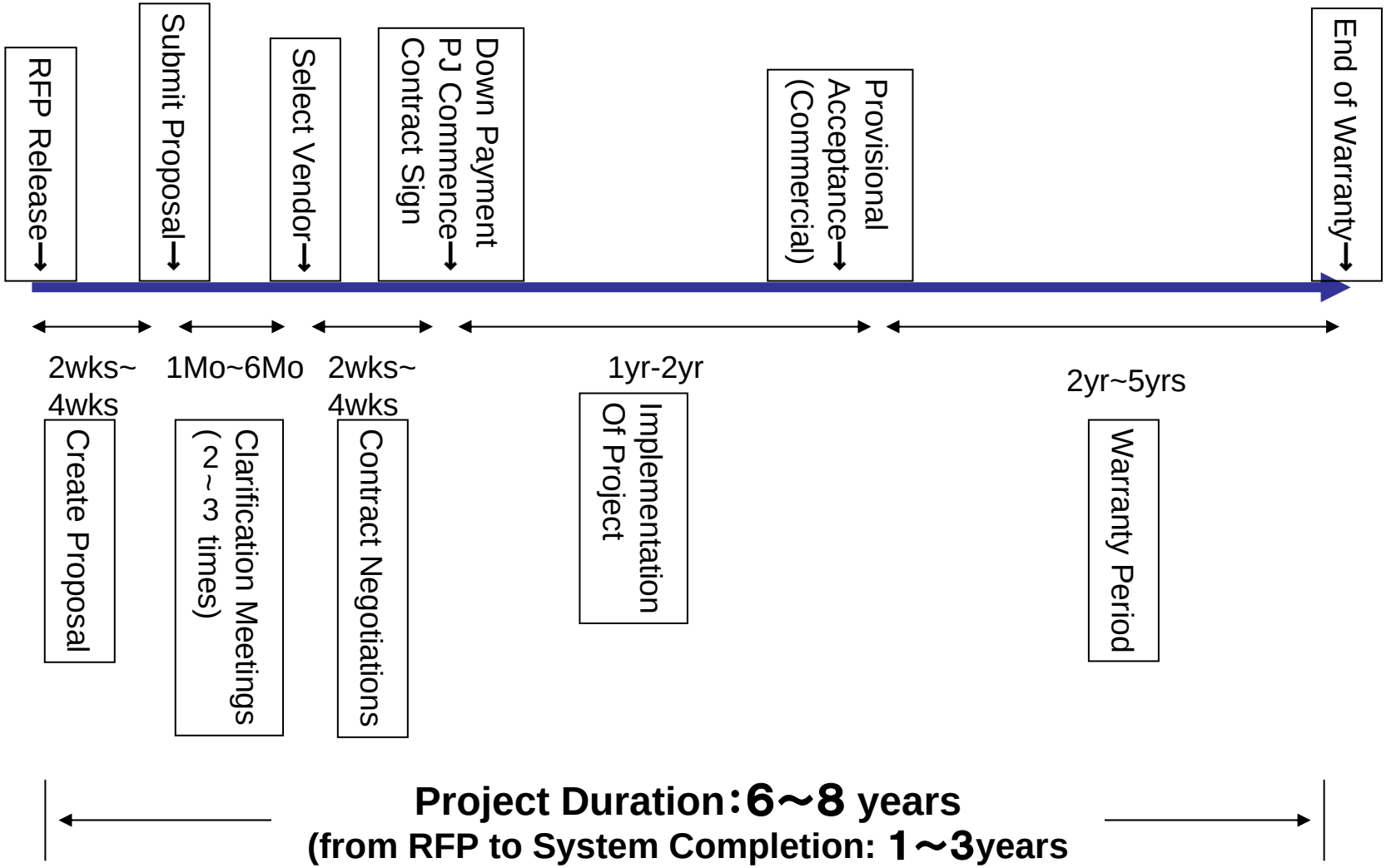
- Infrastructure for Int'l Traffic
  (Construction Period 10~18 Months)
- Large Capacity Transmission
- System Design Life 25 years

Project Formation

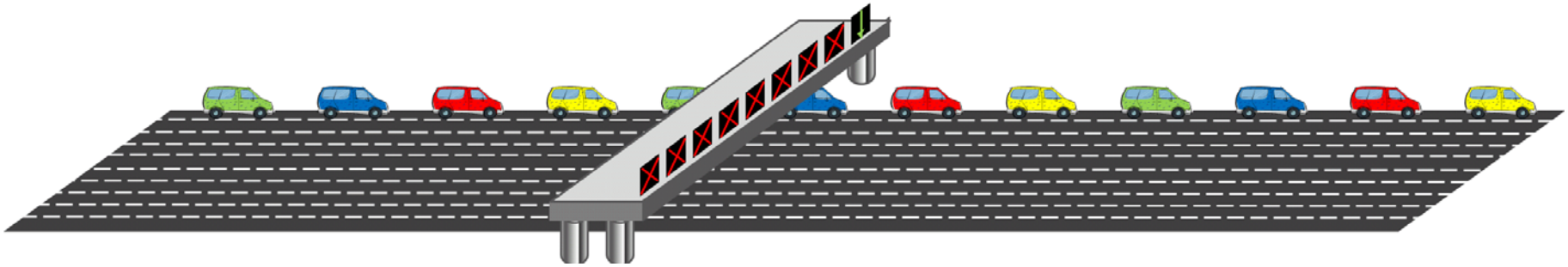
NEC

System Design Subsea Repeaters Line Terminals Power Feed Integration Project Management	Cable OCC	Marine NTT•WEM KCS KTS ACPL others

2-2. Flow of a Typical Project



2-3. Construction of New Cable vs. Upgrade



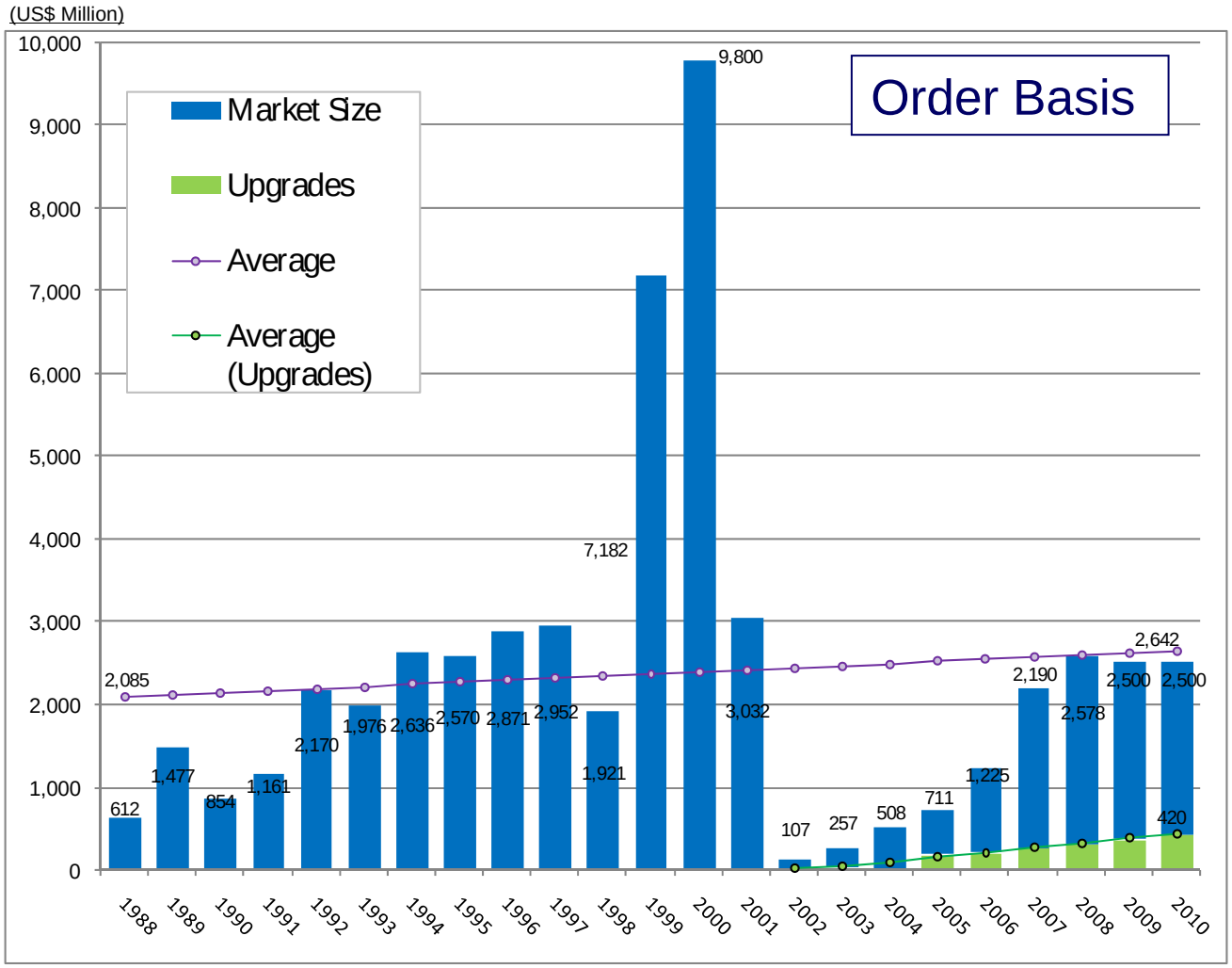
Construction of a New Cable ≒ Like building a 10 lane expressway (but use only 1 lane)

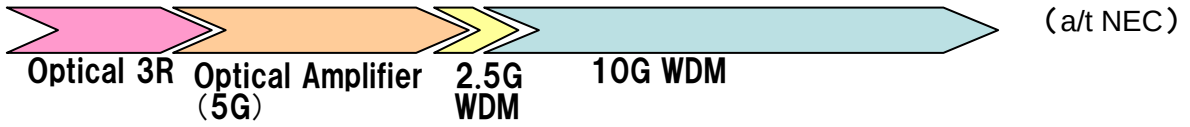
Capacity Upgrade ≒ Like opening one lane at a time. No New Construction.

- Constructing a New Cable is like constructing a 10 lane expressway but using only 1 lane at the beginning. If traffic increases, more lanes will be opened.
- A 10 lane expressway costs more to build than a 1 lane expressway, but is less than building ten 1 lane expressways. Initial investment works out to be high, but are being build to cope with future demands.

3. Submarine Cable Systems Market

3-1. Global Trends





(a/t NEC)

- Demands were high during 1999-2001, but a 20 year trend seems stable at US$2,100M～2,500M
- 2007 saw demands coming back to mid 90's level. Expect moderate growth for coming years
- CAGR of Upgrades is approx. 100.2%
- Expect high demands in Asia-Pacific, Indian Ocean, Middle East and Africa

4. NEC's Strategy towards Submarine Cable Systems

4-1. NEC's Strategy for Submarine Cable Systems

1. Focus on the Asia-Pacific region(Maintain regional strength)
   - Produce High Quality products from Ohtsuki plant(**25** year warranty)
   - Focus marketing resources to Asia-Pacific
2. Maintain Stable Growth
   - Total Supply from Terminal Equipments to Repeaters & Cable
     Stable Supply made possible with acquisition of OCC
   - Maintaining Profitability while Minimizing Risk
   - Avoid High-risk / High-return projects, and maintain stable growth
3. Spin-Off ～ Ocean Bottom Seismograph Systems
   - Sole supplier of Ocean Bottom Seismograph Systems in Japan
   - Detect "P-wave" from earthquakes for the Meteorological Agency's "Earthquake Early Warning System"

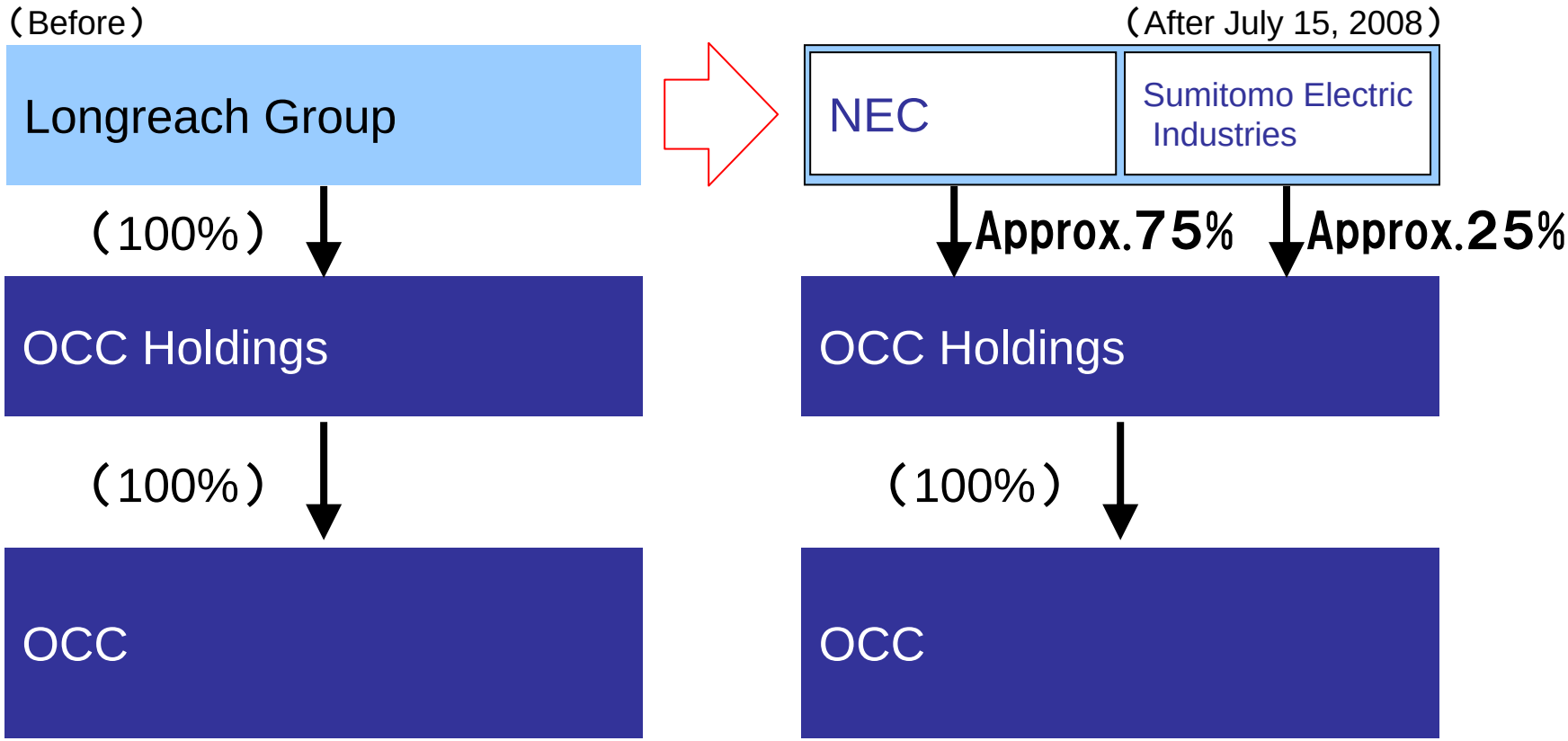
4-2. Status of the Submarine Industry（Top 3 suppliers）

	Tyco	Alcatel	NEC
System Integration	tyco a vital part of your world	Alcatel·Lucent	NEC
Manufacture of Submarine Line Terminal Equipment	tyco a vital part of your world	Alcatel·Lucent	NEC
Manufacture of Submarine Repeaters	tyco a vital part of your world	Alcatel·Lucent	NEC
Manufacture of Submarine Cables	tyco a vital part of your world	Alcatel·Lucent	OCC Ocean Cable & Communications
Marine Work & Maintenance	tyco a vital part of your world / Cable Install Company	Alcatel·Lucent / Cable Install Company	Cable Install Company

- Top 2 Suppliers can manufacture, integrate and implement, and provide Maintenance Services with own resources within.
- By acquiring OCC, NEC is now able to provide services nearly equal to the top 2 suppliers.

4-3. Structure of OCC Aquisition

Acquired interest of OCC Holdings



NEC Corporation and Sumitomo Electric Industries acquired OCC Holdings from the Longreach Group.

4-4. Company Overview for OCC

OCC
Ocean Cable & Communications

Operations	Subsea Cable：Design, Manufacture and Sales of Communication purpose Submarine Cable and Surveillance cables. Terrestrial Cable：Manufacture and Sales of Communication purpose Terrestrial Cables.
Offices	Head Office ：Yokohama, Japan Plants： Submarine Cable （City of Kita-Kyushu） Terrestrial Cable （Kaminokawa Township）
Founded	June 1935
Capital	2.255 Billion Yen（as of March 2008）
Sales	17.46 Billion Yen （for year ending March 2008）
Director	Yoshihisa Okada, President and CEO
Employees	Approx. 221 pax.（not including directors and temp.staff）
Shareholders	OCC Holdings（100%）

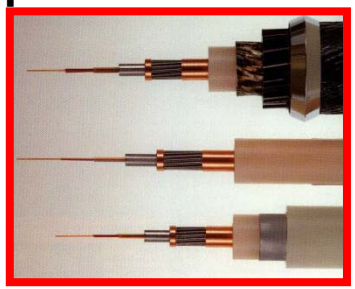
4-5. Ocean Bottom Seismograph System

- Constantly transmits data gathered from the Seismograph through Optical Fiber Cable to the Terrestrial Station.
- Technology base: NEC's Submarine Cable System and Subsea Equipment

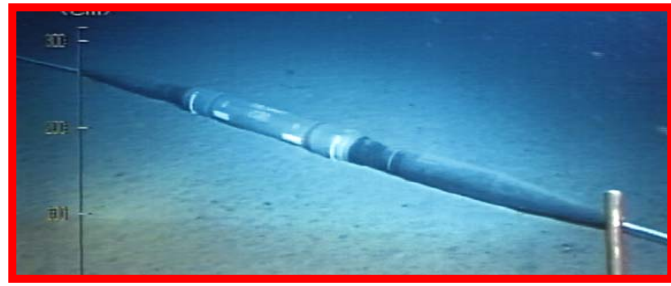
(Features)
- Enables real-time monitoring of seismic activities 24/7
- Enables Tsunami readings off the coast before reaching the shores.
- Enables Reliable and Stable Monitoring

Line Terminal Equipment

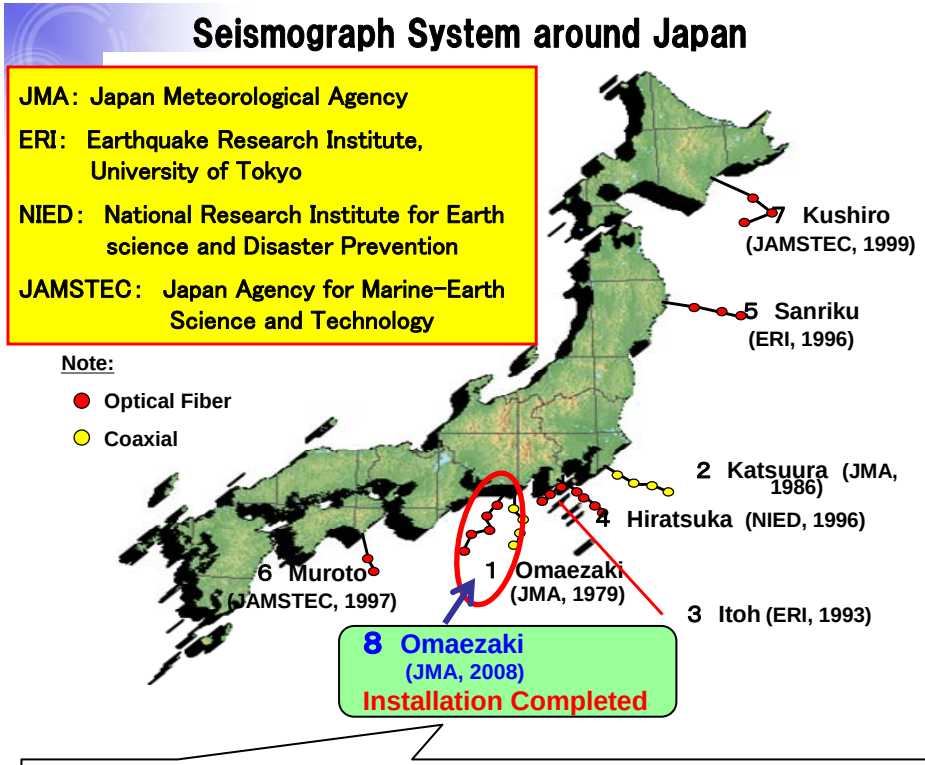
Optical Fiber Cable



Ocean Bottom Seismograph



4-6. Seismograph System of Omaezaki



Features

- Installed as part of strengthening the observation system of Tokai area

- NEC was selected as supplier for this project on the followed account;

1. In 1976, NEC supplied the first Ocean Bottom Seismograph System to JMA
2. NEC is the only supplier of Ocean Bottom Seismograph System and has a supply record of 7 systems around Japan

Project Outline

- **Customer: JMA**
- **Installation completed for the first 2 year phase (Project Duration : total 4 years)**
- **Scope of work: Supplying Ocean Bottom Seismograph/ Tsunami gauge**

Future outlook

◆Upgrade project of Hiratsuka, and New projects in Sanriku and Kii Peninsula

Empowered by Innovation