

On the Production of Submarine Equipments to support the Submarine Cable Business



December 5th, 2008
NEC Yamanashi, Ltd.
President Ikuo Mito

Company Profile

Founded : **10th March 1998** *100% subsidiary of NEC
(Otsuki plant operation started in 1986)

President : **Ikuo Mito**

Employees : **205** (As of September, 2008)

Description of Business :

Production of the Devices for Fiber Optic Communication Systems, and Submarine Repeaters.

Certifications : **ISO 9001** (Certificated in December, 1994)

ISO 14001 (Certificated in November, 1996)

TL 9000 (Certificated in August, 2005)

Business Vision

As a member of NEC Group,
NEC Yamanashi contributes to achieve
wealthy society by the **stable supply of Fiber
Optic Devices and Optical Submarine
Repeaters** for Next Generation Network.

NEC Group Corporate Philosophy

NEC strives through "C & C" to help advance societies worldwide toward deepened mutual understanding and the fulfillment of human potential.

NEC Group Vision 2017

To be a leading global company leveraging the power of innovation to realize an information society friendly to humans and the earth.

Environment Philosophy

<Environmental Philosophy>

NEC Yamanashi contributes to establish sustainable development society by being harmonized with local community, developing human mind to co-habit with natural surroundings, and encouraging the environment friendly activities and production.

- 100% Environment-conscious device products
- Environmental load & cost reduction in all processes
- Reinforcement of environmental load reduction of corporate partners
- Environmental communication across the organization

All employees advance activity with high environmental awareness

Effluent treatment facility: Full closed system

Purified water is **100% recycled**. No drainage is allowed outside the facility.

Working to create **gentle environment for the earth** by conserving energy and achieving the goal of cutting waste to “Zero.”



Circular effluent facility



Centralized control

Areas of Business

1. Submarine Systems

- Optical Submarine Repeater, Multidrop Equipment, Equalizer
- Seismograph/ Submarine Tsunami Gauge

2. Fiber Optic Devices

- Optical Transceiver (Hi-Speed INF/ Access INF)
- MR (Magneto Resistive) Sensor

3. Product Analysis

- Reliability Evaluation, Failure Analysis Service
- Component Analysis for RoHS and other directives

The Core Competence of NEC Yamanashi

◆ Highly reliable technology of Submarine Equipments

Achievement of 25 years quality guarantee

Highly reliable manufacturing technology

Highly reliable manufacturing/testing equipments

◆ Ultra small optoelectrical hybrid mounting technology

Mounting technology to integrate silica waveguide, optical semiconductor element, and LSI

◆ World-Class Fiber Optic Device Manufacturing

1. Excellent mass productivity- **Passive alignment technology**

2. World's only **Waveguide formation technology by Atmospheric Pressure CVD**

3. World's only **IC Wafer/ Magnetic Thin film layering and integration technique**

◆ Production Analysis Technology

Equipped with excellent reliability testing system for consistent product failure analysis technology from process to analysis.

Fiber Optic Devices & MR Sensor

NEC Devices Family

Optical Network, Mobile Device

WDM, U-NODE, Terminal Devices



Computer, Broadcast Video Device

Super Computer Server, PC



Mobile Phone, Notebook PC

Mobile Phone Notebook PC



Customers
(NEC Grp)

NEC Tohoku
CJP(Miyagi)
NEWIN
NEC Saitama
NECE
NEC Magnus
NECAT

NECT

NEC Saitama
NECP

Optical Devices Family

"Key Devices" to support NGN

Hi-Speed Optical INF (2.5G ~ 10Gb/s)



2.5G SFP



10G FBT

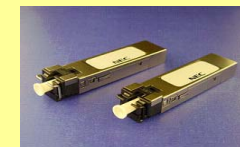


10G XFP

Access Optical INF (156M ~ 2.5Gb/s)



GE/G-PON



P2P-SFF/SFP

Hi-Speed Optical INF for Computers



OIP

MR Sensor

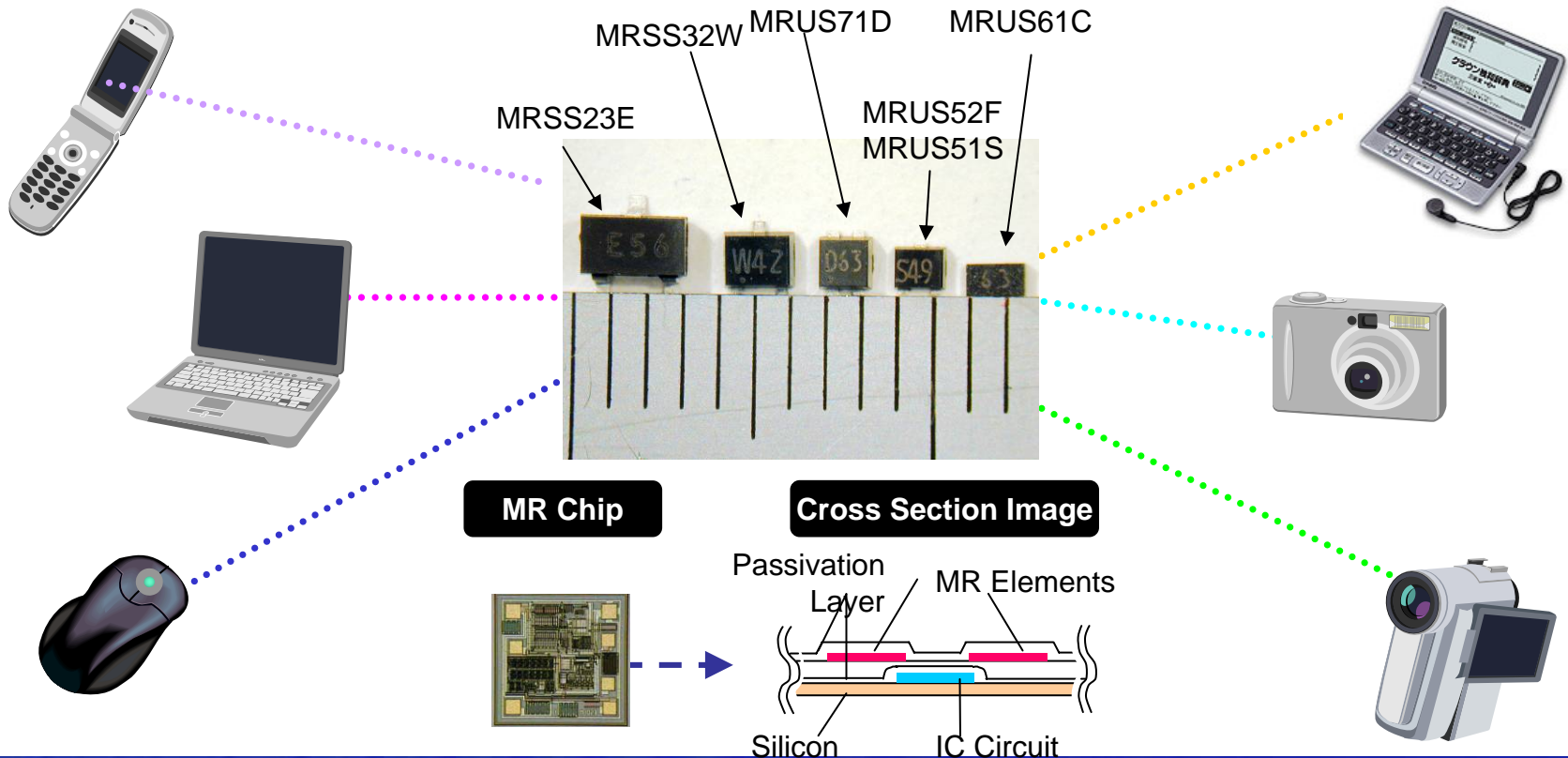
(Magneto Resistance Sensor)
Open/Close Detection,
Position Detection



MR

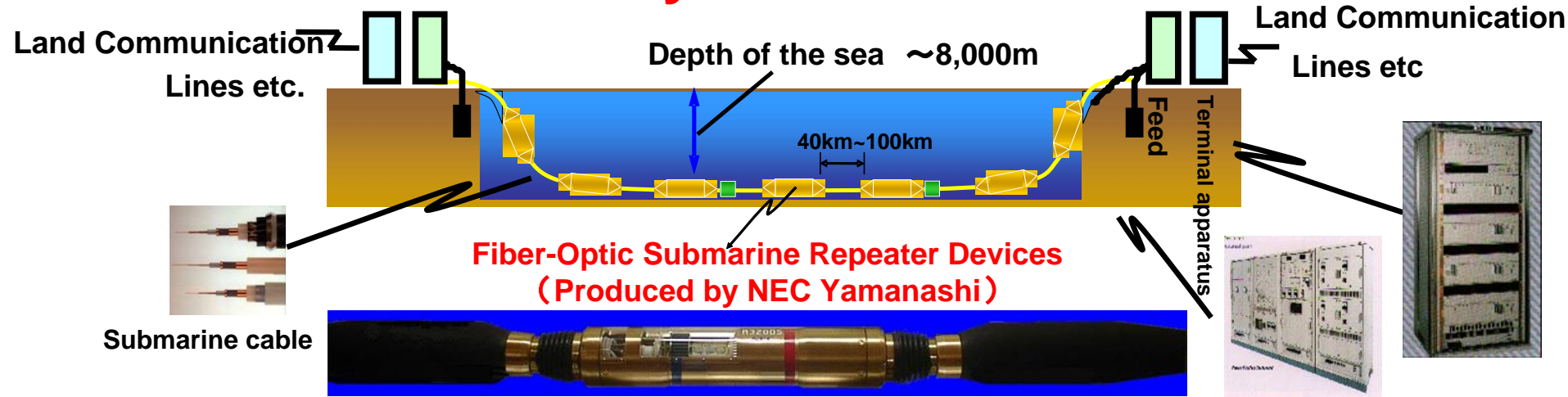
MR Sensor (No.1 World Share)

- **MR Sensor: Magnetic field sensing device – magneto resistive effect**
Comprised of MR elements and IC chip forming very compact sensor device
- **No.1 World Share (Approx. 12Mpcs/month)**
Chosen by world's major vendors for Mobile phone, Notebook PC, Digital Still Camera, and many other applications.

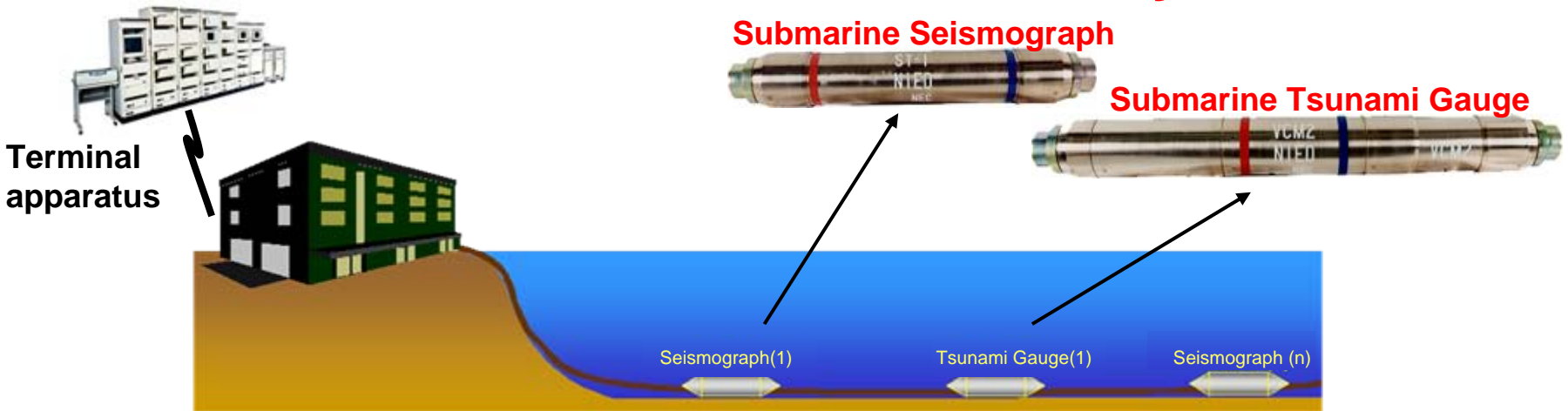


Submarine Systems Product Family

1. Submarine Cable System



2. Submarine Seismic Observation Systems



Submarine Equipments

1. Repeater(R160/320DS)

- 10-G64 wavelength, 128 wavelength etc.
- Amplify optical signals, Monitor troubles



2. Block Equalizer (Q160/320DS)

- Characteristics compensation



3. Branching Unit (B160/320)

- Submarine branching
(Power Switch, Fiber Switch)



Submarine Systems ~the core competence

Consistent, highly reliable production technologies, capabilities, and processes are maintained.

*On these basis, we are able to produce
Defect-Free, Highly Airtight, Highly Water Proof, and High Withstanding Voltage submarine repeaters.*

- **Airtight Sealing Technology**
(Internal humidity: 20%RH> over 25 years)
- **Production & Testing Technology of the Highly Water Proof structure products**
Equivalent to 8,000m water depth (78.6 MPa)
- **Technology to achieve High Withstanding Voltage, High Heat Radiation structure**
15,000V and above
- **Maintenance-Free**

“Zero” market defect



Submarine Equipments ~Highly Reliable Technology

Production Technology

- Airtight Sealing Technology
- Pressure Proof Technology
- WDM Testing Technology
- Environment (ESD protection, Clean Room)

Production Facility

Production Equipments

- **Molding Machine**
 - Connect Molding Machine
 - FT injection machine
 - Hi-strength fiber connecting machine
- **Electronic Beam Welder**
 - Hi-frequency brazing machine
 - Unit insertion machine
- Vacuum heating & drying

Testing Equipments

- **High pressure He Airtight Test**
 - Hydraulic testing equipments
 - Constant temperature water tank
 - Vibration tester
- WDM automatic test equipments
- Large/Mid. Constant temperature oven

Production Line (Submarine Repeater)

◇Optical Submarine Repeater Production Line (Second building 1F)

**Panel Assy
/Unit Assy**



Vibration Test



**Repeater Assy
/Airtight Sealing**



**Hi-pressure He
Airtight Test
(Pavilion)**



(8000m Sea depth)



Final Test



[Shipping Area]

OFT Assy/ Airtight Devices Assy



Empowered by Innovation

NEC

