



“Lesson from 5 years continuous operation of DONET cabled observatory network”

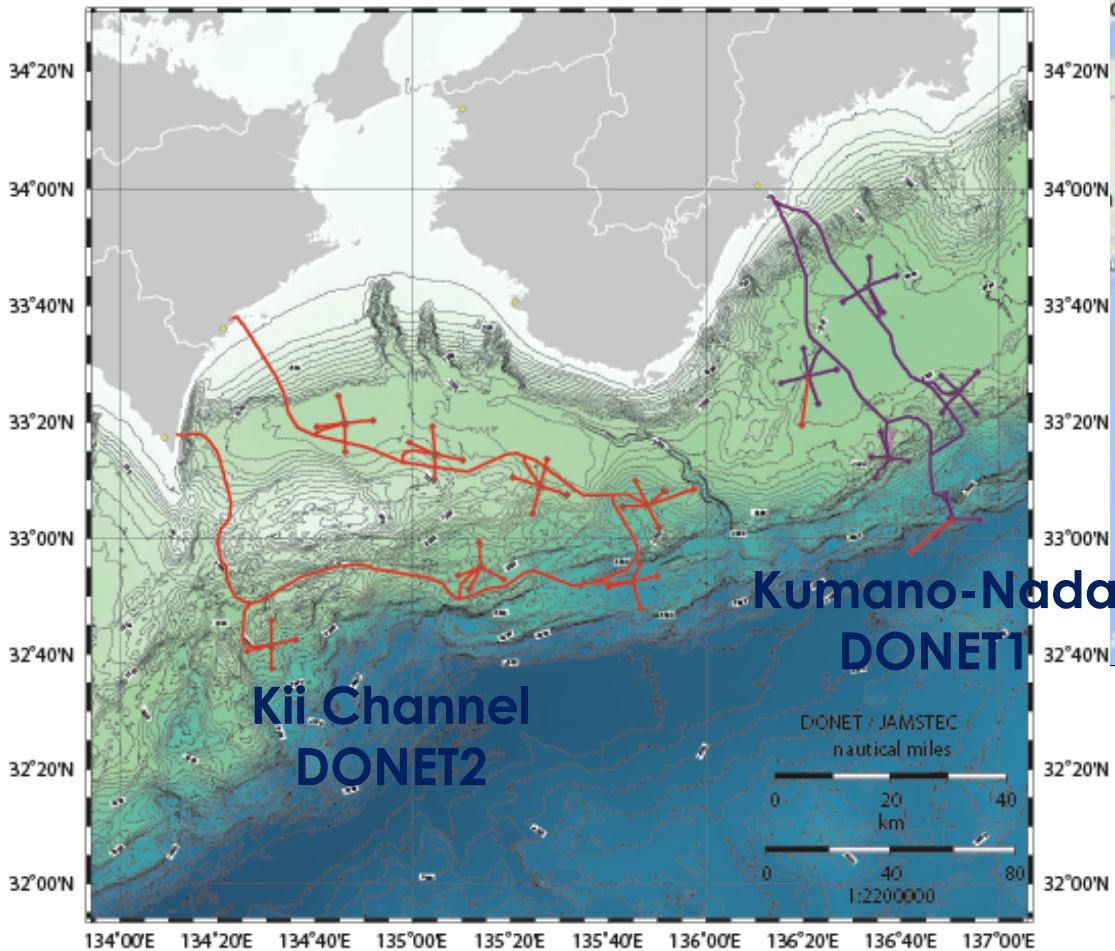
Katsuyoshi KAWAGUCHI
Deputy Director

Research and Development Center for Earthquake and Tsunami
Japan Agency for Marine-Earth Science and Technology
(JAMSTEC)

Site Location of DONET1&2



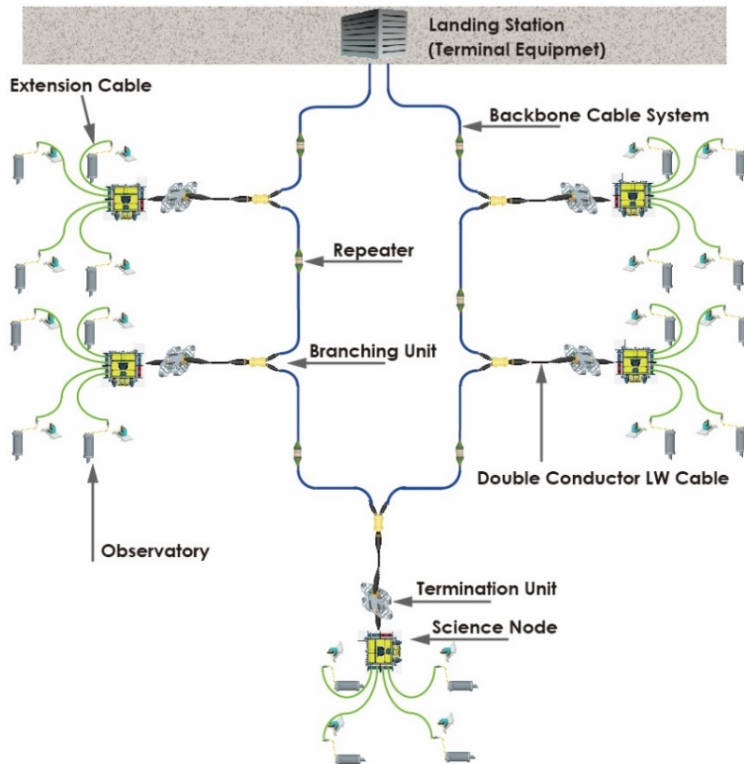
134°00'E 134°20'E 134°40'E 135°00'E 135°20'E 135°40'E 136°00'E 136°20'E 136°40'E 137°00'E



21
Nankai-Trough

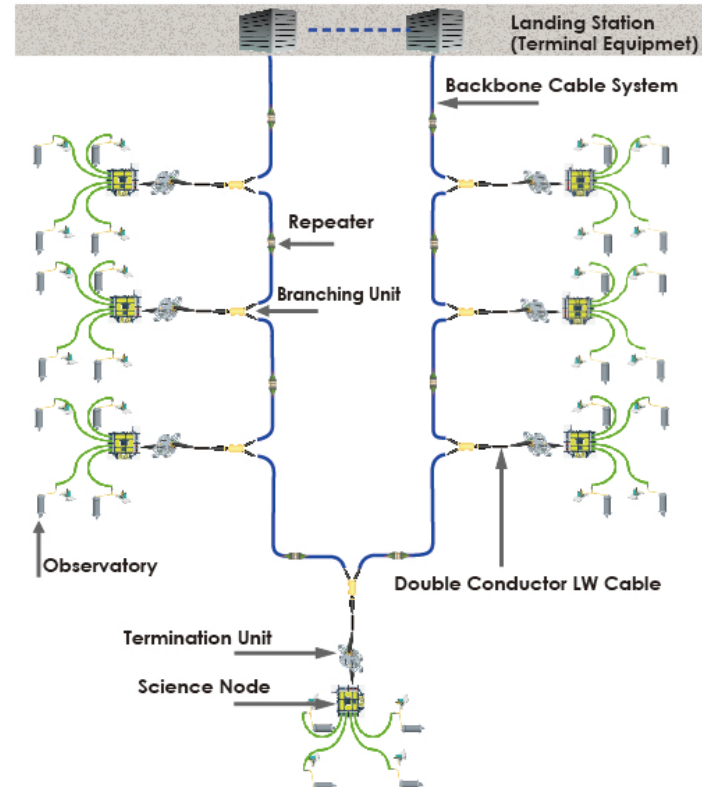


Scale of Seafloor Network



DONET

Backbone Cable = 320km
 Number of Science Node = 5
 Number of Observatory = 20+2additional+2Borehole
 In operation Aug. 2011



DONET2

Cable Length = 500km
 Number of Science Node = 7
 Number of Observatory=29
 In operation April 2016

Total 830km backbone cable, 14 repeaters, 12 BUs, 12TEs, 51 observatories and 2 boreholes





List of Defect

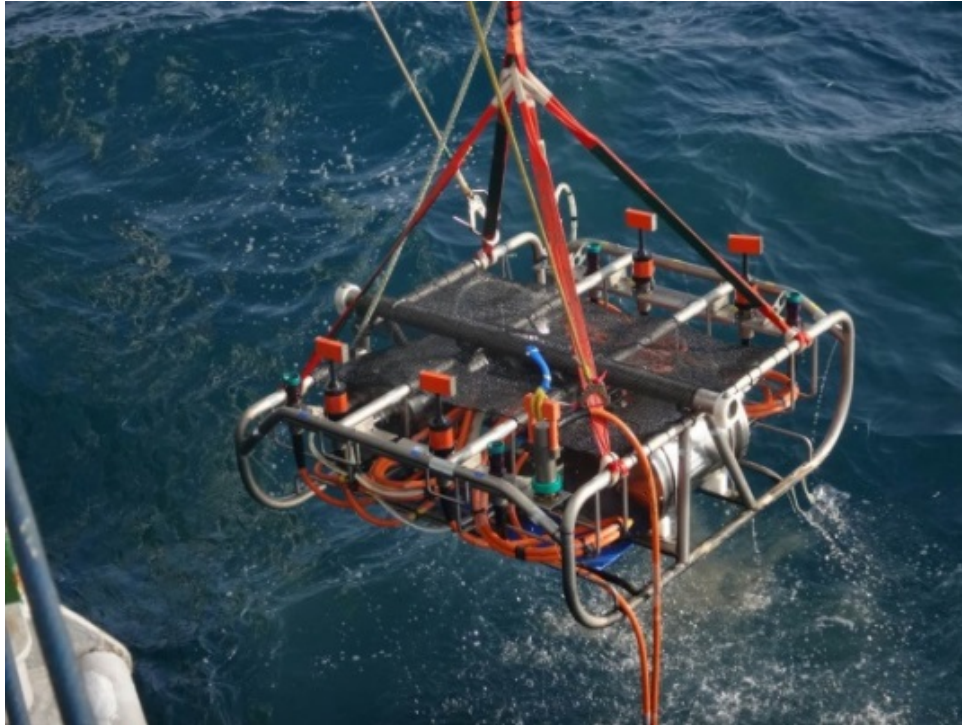
3 troubles listed in more than five years operation

- Loss of serial interface connection
- Ground fault of oil filled connector harness
- Mechanical defect of UMC interface

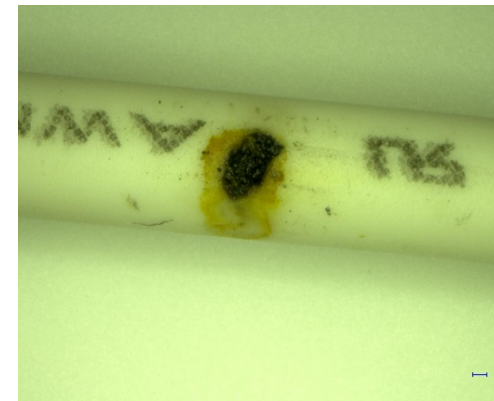
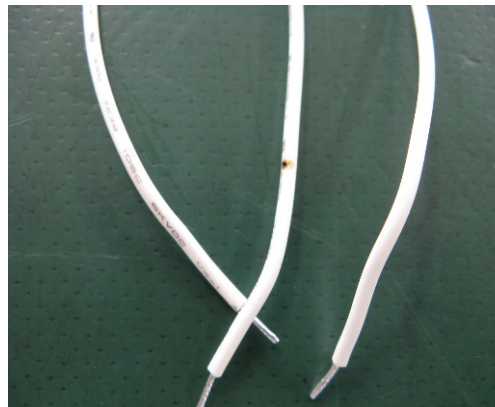
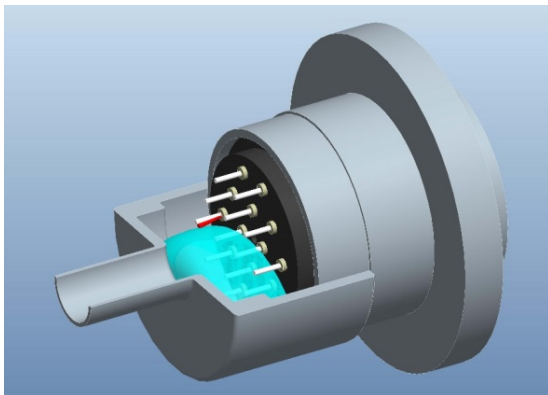
Data Availability of DONET 1&2 = 98.6%



- Ground fault of oil filled connector harness



DONET science node after 4 years operation in seafloor



Two defect in one connector harness

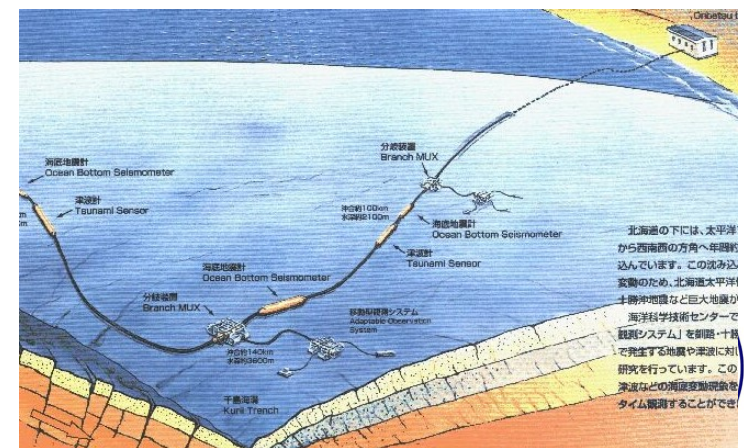
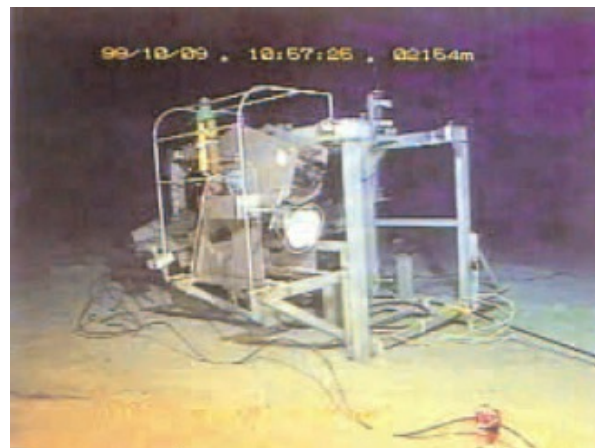
Learn from this accident

- Cannot survive from two different defect in one component.
- Occurrence of ground fault generate node break down incidentally.
- Double landing backbone system help system recovery very quickly. (in 10 hours)
- Connector and harness are always weak point.-> KEY Technology

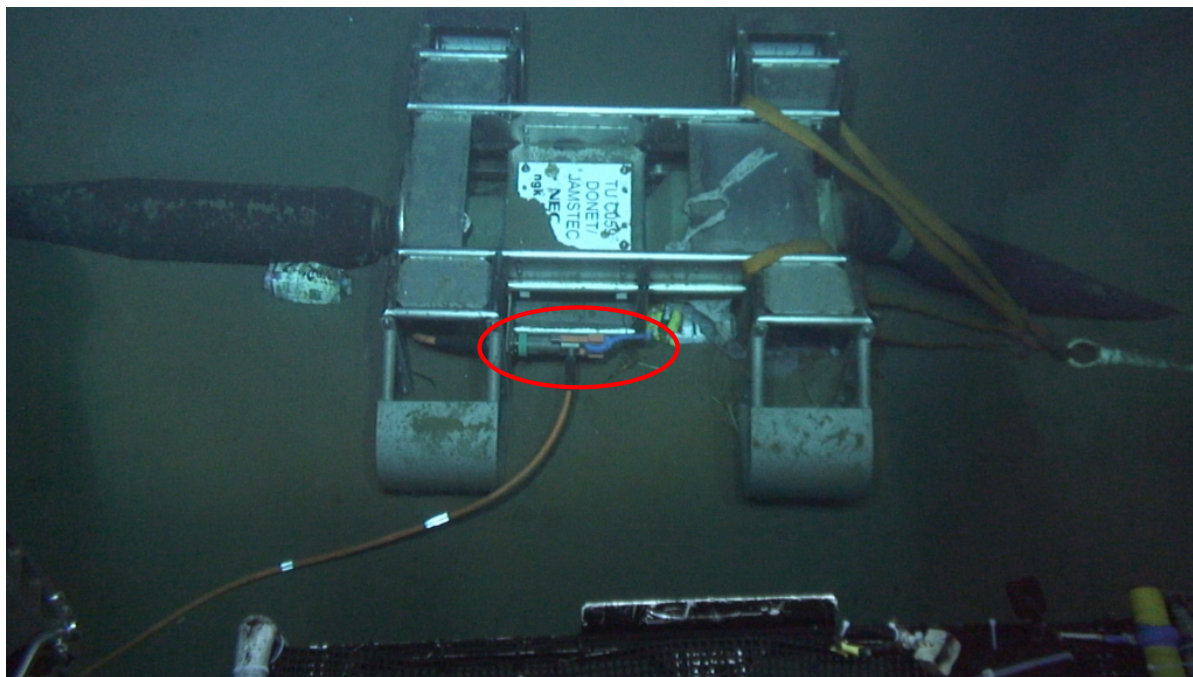
Back to historic records in Japan

-> VENUS Versatile Ecomonitoring Network by Undersea-cable System (1994-1999 in Japan) ->Node breakdown cause of mold connector twice

->Off Kushiro-Tokachi(1999-) (Adatable Observation System 2000-2003)
Defect of Optic fiber joint box->pressure housing crushed



- Mechanical defect of UMC interface



DONET1 TU-E(Terminal Unit)

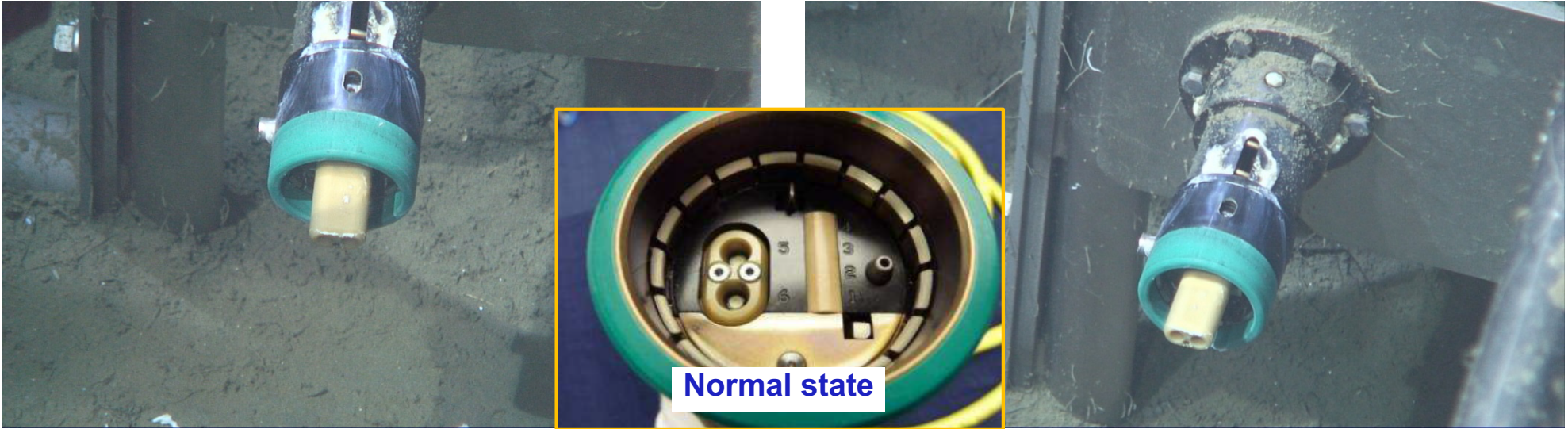


Ground fault around Site E -> March 6, 2016
Confirmation of Node condition by ROV -> June 8, 2016



Condition of UMC on TU-E (part of backbone cable system)

Terminal Unit E (TU-E) Side



Node Side

