

THE REPUBLIC OF NAURU

TECHNOLOGY UPDATES



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Introducing Nauru

Location: Nauru is situated in the south pacific near the equator.

Area: 21km²

Population: 10,000

Currency: Australia dollar

ISP: CENPAC & Digicel

Computers: 54% owns

Smart Phones: 62% owns

Main Export: Phosphate
Nauru's phosphate can be described as a cash crop, because it is the only resource with which the island can sustain an economy. Nauru exports the majority of its phosphate to Australia.

Mobile Carrier: Digicel



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OLD equipment used in Nauru

Telecom and Information Industry

Modern telecommunications services started in 1970s as a government monopoly services by using Intelsat satellites. Situations were almost common among the Pacific Islands countries. Telecommunications services were provided by Nauru Telecom as a government monopoly services until 2009.

Telecommunications services in Nauru were evaluated very poor. The lines were installed in the 1970s. Dial-up access to the Internet was unreliable and expensive. In addition, people have been suffering from daily power cuts happening very often even today.

The government is the regulator and was used to be the provider of all telecom services in Nauru. However the broader state of telecommunications in Nauru resembles the country's own economic chaos. In 2003 the telephone system collapsed due to equipment failure leaving the island cut off from the rest of the world. By late 2003, Nauru could not afford to have its telecommunications repaired and in 2004 satellite communications were to be shut down for non-payment of subscription fees.

Transition from Nauru Telecom to Digicel

In June 2009, Government issued mobile telephone (GSM) and Basic Internet Access Service licenses to newly established Digicel Nauru Ltd (Digicel). Government also assured monopoly telecommunications service provider's status to Digicel for two years. In August 2009, Digicel started mobile services

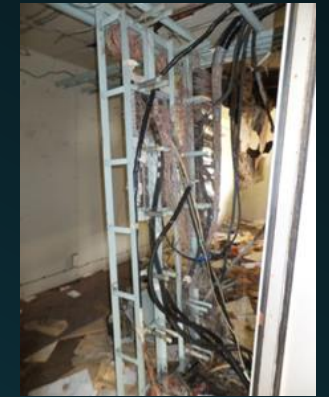
Digicel did not utilize existing telecommunications facilities of Nauru Telecom including earth stations and constructed its network and facilities by themselves.

At the time of Expert Mission's visit to 'former' Telecommunications Center of Nauru Telecom, they found that all telecommunications related facilities were destroyed.

Only one earth station were used by Nauru TV and Radio Nauru which are government owed public broadcasting system.

Government Policy on De-regulations

Two years' monopoly status of Digicel has ended in 2011. Government has decided to introduce competition step by step basis. First step was to issue a new license to Cenpacnet Inc. (Cenpacnet) for Basic Internet Access Business Service. Before 2009, Cenpacnet had operated an Internet Café at Civic Center. As government gave monopoly status to Digicel, Cenpacnet was obliged to stop its operation. Now Cenpacnet has re-opened the Internet Café by using Digicel's access network.



Resource Center

Australia AID Funded Project

Renovation of old Telecom building

Relocated the server machine and Network for government ICT system into Resource Center

**Resource Center for network aggregator of Governmental LAN
Connection with ICT, Finance, Transportation, Media
Hospital/Health Centers and Schools
Internet gateway to satellite
Police, Airport and University in future**

90% of all government departments are currently on government network



Resource Center 2016

- 20 ICT staff employed
- Fibre has been covered
- Building has been fully renovated
- Wireless solutions (P2P)
- Server Room
 - Controlled temperature
 - 10+ servers
 - 2 Physical Security 24/7
 - CCTV 24/7
- Stable power supply (UPS)
- Generator for the entire building
- Training Room



Optic Fibre

- Phase 1 (Completed 2014)
 - Laying of fibre from CENPAC → RON Hospital.
- Phase 2 (Completed 2015)
 - Connection CENPAC (ISP) → Government Building.
- Phase 3 (Pending 2017)
 - Connect Menen Side



Paradigm revolution to Optical fiber on Government network

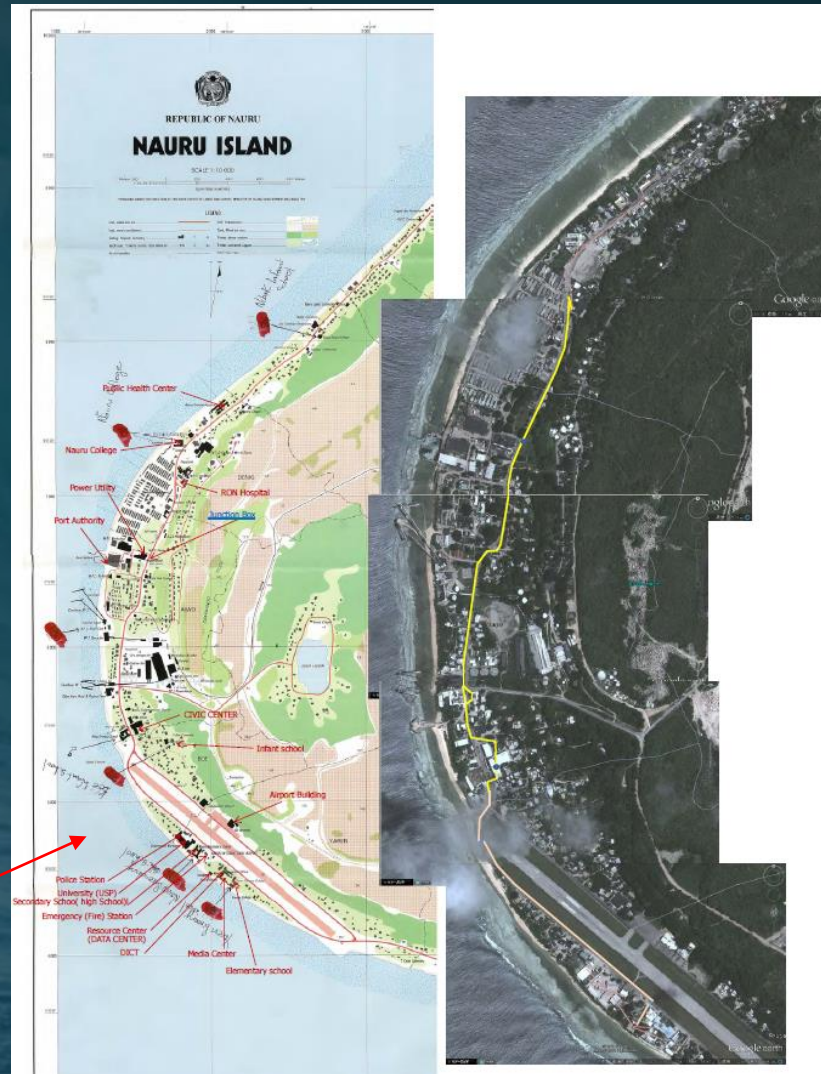
Installation Optical Fiber (M-PAC)

Practical experiment

Aerial and Under ground (same cable)
Temporary laying across the road

Copper wire over the ground → Armed Optical Fiber

Reliability? Less 50kbps → Reliable and 1Gbps



OCC Ocean Cable & Communications M-PAC for Nauru APT J2 Project

All-rounder

Aerial Direct buried Indoor

Cable Type	Self supported M-PAC with Tension Member
Installation Environment	Aerial, Direct buried, Indoor
Fiber Count (SMF)	4 Ribbon Fiber 4 ~ 12
	Loose Fiber 1 ~ 24
Typical Outside Diameter	8mm*18mm
Approximate Unit Weight	300kg/km(*1)
Allowable Tensile Strength	Cable + Supporting wire 7,500 N
	Cable 890 N
Allowable Lateral Pressure	1,960N/100mm
Allowable Bending Radius	Fixed 80mm
	Extended 160mm
One Continuous Length	As Ordered
Maximum One Length	12,000m

(*1) : Flame Retardant

Cross Section Diagram

OCC Ocean Cable & Communications **Optimal system configuration, and laying**

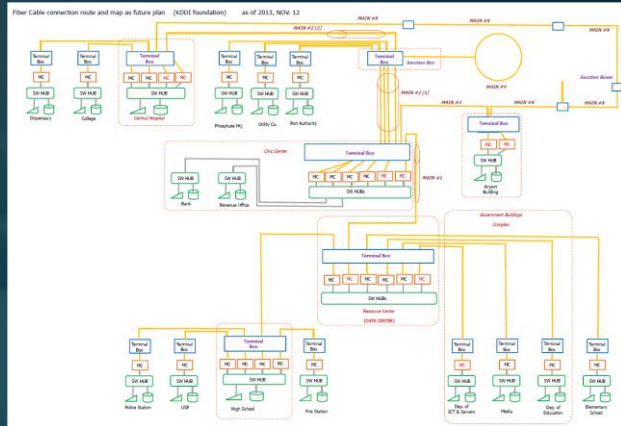
M-PAC spans are longer than conventional cable, it is possible to minimize the number of closures.

< Conventional cable >

< M-PAC >

- ✓ M-PAC, so thin and light, drum size is small. For this reason, it is possible to use a "Moving Supply". This is to achieve a speedy and safe installation. Many roller is unnecessary.
- ✓ M-PAC is able to minimize the cable joint. Which is minimized joint loss and can be achieve high transmission quality.
- ✓ And, direct burial cable laying provides a Total Network System Safety and Reliability.

More than 6km 3 sites, 2 junctions, 5 sites and connections



OCC Ocean Cable & Communication

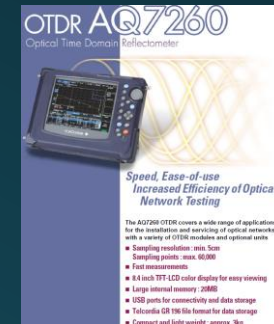
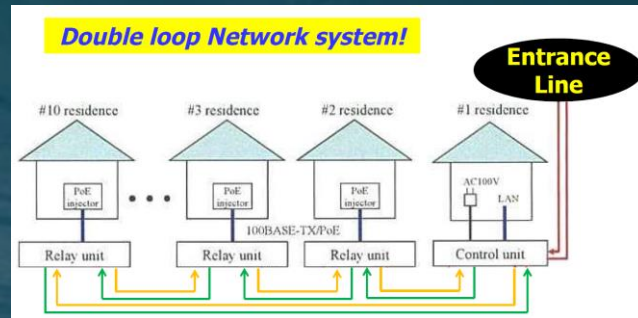
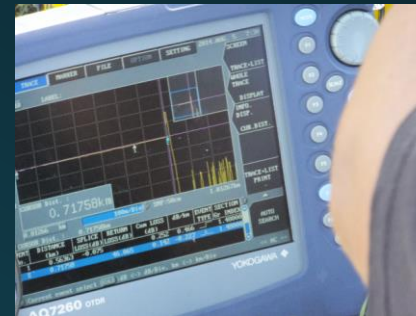
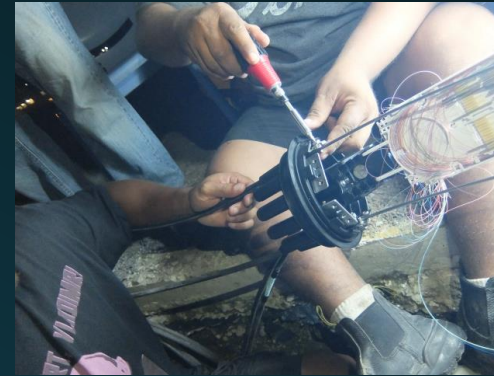
Superior Heavy Duty Cable "M-PAC"

- ◆ M-PAC is the heavy duty cable. It's the meaning of "Metal Packed Armored Cable".
- ◆ M-PAC is an optical fiber unit consisting of Stainless Steel Tube. M-PAC, therefore, has excellent mechanical and hermetic properties.
- ◆ The structure of M-PAC makes M-PAC cable thin and light weight. M-PAC cable also has excellent corrosion, rodent, crush, burning resistance. These features result in a variety of applications in many industrial fields indicated below.
- ◆ OCC has a Supply record of providing M-PAC more than 20,000km since 1990.

- ✓ Communication Cable for FTTX & CATV
- ✓ Railways Signal and Communication Cable
- ✓ Power and Communication Composite Cable
- ✓ Communication Cable in drain and Dam Penstock



Fusion Splicing by Technician of government (Department of ICT)



FSM-40F & 40PM Fusion Splicer

To keep up with the development of DWDM optical communication devices, Fujikura developed the FSM-40F for high strength splicing and the FSM-40PM for splicing of PM fibers. The FSM-40F splices dissimilar fiber combinations, especially Erbium-doped fiber to single-mode fiber using patented sweep-arc functions. The FSM-40PM combines all the features of the FSM-40F with excellent PMI capabilities. Designed for accuracy and increased productivity, the 40PM offers fully automatic splicing modes for PMD140 and 3M Tiger™ fibers.

Features

- Sweep arc technology minimizes splice loss when splicing dissimilar fibers
- Multi-functional movable V-groove and Z-mechanism provides short cleave length splicing with various coating diameters for high tensile strength splicing and small packaging requirements
- Fiber holder system increases splicing results by reducing skill dependency
- PC interface and power meter feedback function allows download of splice results and modification of parameters by connection of RS232C cable to PC

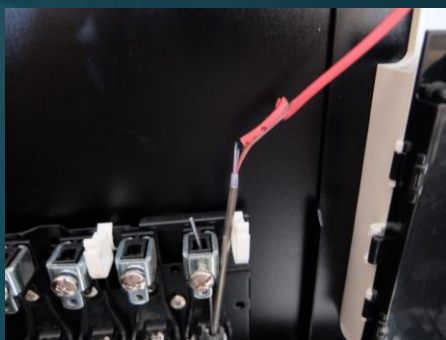
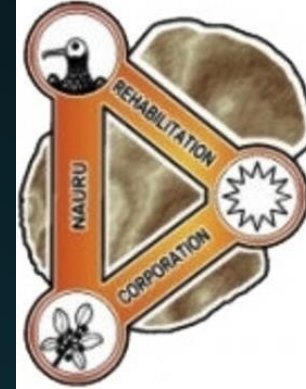
Automatic re-routing donated by Iwate Prefectural University and OCC

Two Fusion Splicing Machines and one OTDR donated by KDDI foundation

Challenges of laying optic fibre on Nauru

- Land issues
- Accidental damages of fibre
- Weather issues
- Arrangements
- Physical Man Power

Achievements



Future plans

- Nauru Airlines



- Menen Hotel



- OD-N Aiwo Hotel



- Nauru Media (HD TV)



Introduce mentoring software

- Log (Traffic speed)
- Up/Down Time
- Statistical reports for annual reports

Conclusion

- Nauru is a small country with the right amount of implementations, it will be able to optimize and utilize its current wireless, fibre and LAN technology to meet the needs of the users.
- With the changing of IT management at CENPAC Nauru has now ignited competition with Digicel and with this prices have been reduced for Government, SOEs, Private Sectors and large corporations.
- Nauru at this stage are still dependent on satellite internet which I find is enough for the island's size.
- Implementing new technology in places such as Nauru will need more awareness for the locals so they to understand what equipments are built and also what benefit is it to them.
- In terms of disaster management "domestically" we are able to backup, restore and assist faster with the current fibre implementation installed current fibre users.
- HDTV and other entertainment projects might not be the most important at this stage but are among future plans when infrastructure reveals its statistical sustainability, suitability and productivity.



Thank You

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