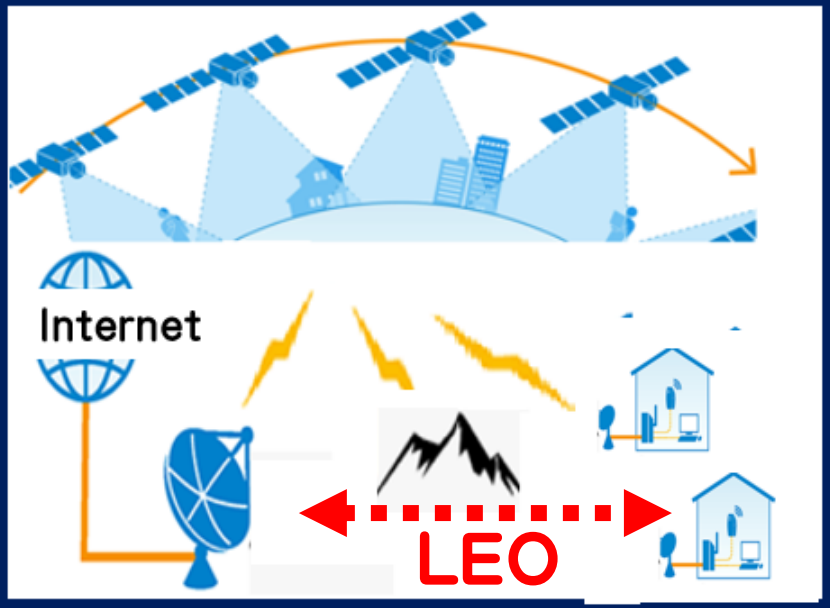
Saudi - Japan ICT Workshop

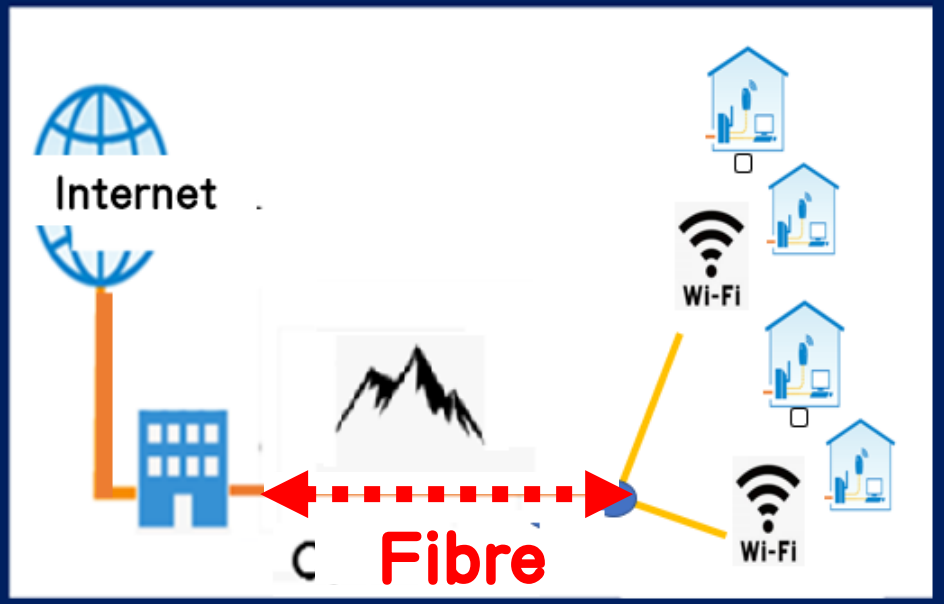
ITU-Standardized All-Terrain Optical Fibre Connectivity

Enabling 5G and Beyond at Every Corner of the Country

Dr. Haruo Okamura
Global Plan Inc., Japan
Jan. 27, 2022

Backhaul; LEO* or Fibre ** ?





* Low-Earth orbit Satellite

** Optical Fibre Cable

Data Rate 1	→	>>1000
Huge Investment (e.g., 10 B US$, Amazon's Plan)	→	DIY Installation e.g., 8.3 kUS$/km
Life 5-7 Years	→	25 Years

5G is Wired Wireless
Let's lay lots (and lots) of fiber

This statement is made by US Telecom CEO (Dec. 2019)

https://www.ustelecom.org/5g-is-wired-wireless/

Conventional Cable Installation

using Conventional Optical Cables

High Cost using Heavy Machinery !!

DIY is already happening

now it is fastest in Wales UK, June 2018

Hard Working !!

http://www.thefoa.org/foanewsletter.html

The farmer who built her own broadband

BBC Sign in

NEWS

Home | Coronavirus | Video | World

Conventional Cable must be protected by a pipe

Hard Working, Lancashire, UK, Dec. 2016

ITU-T Recommendations

Affordable DIY Fibre Connectivity

ITU-T

TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

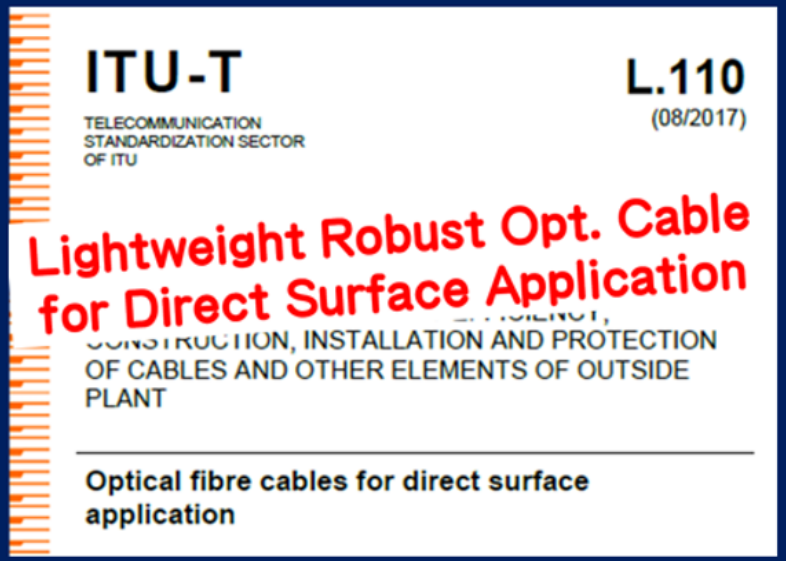
L.1700

(06/2016)

Affordability-First Concept for Closing Digital Divide

CONSTRUCTION, INSTALLATION AND PROTECTION OF CABLES AND OTHER ELEMENTS OF OUTSIDE PLANT

Requirements and framework for low-cost sustainable telecommunications infrastructure for rural communications in developing countries



ITU-T

TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

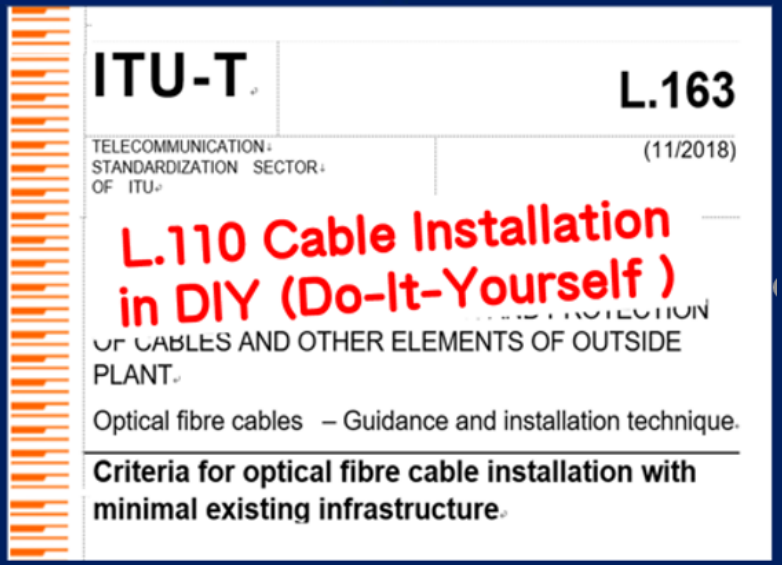
L.110

(08/2017)

Lightweight Robust Opt. Cable for Direct Surface Application

CONSTRUCTION, INSTALLATION AND PROTECTION OF CABLES AND OTHER ELEMENTS OF OUTSIDE PLANT

Optical fibre cables for direct surface application



ITU-T

TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

L.163

(11/2018)

L.110 Cable Installation in DIY (Do-It-Yourself)

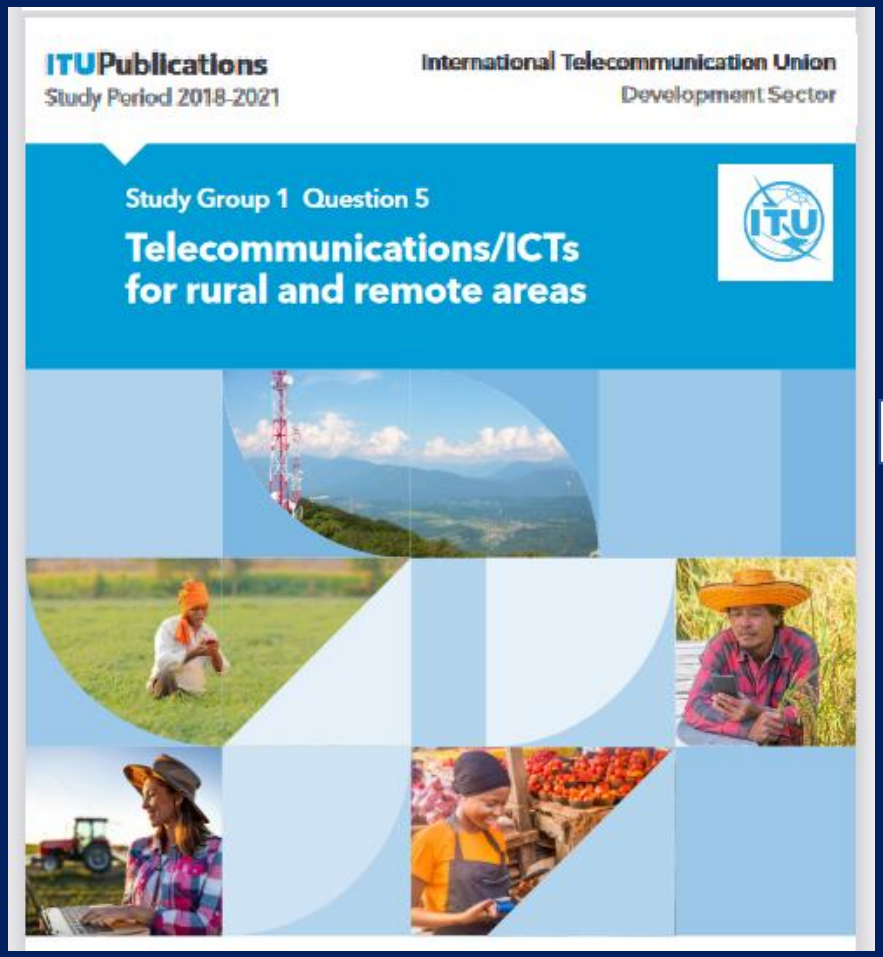
OF CABLES AND OTHER ELEMENTS OF OUTSIDE PLANT

Optical fibre cables – Guidance and installation technique

Criteria for optical fibre cable installation with minimal existing infrastructure

ITU-D SG1 Q5 (Rural Connectivity) Final Report (2018-2021)

https://www.itu.int/dms_pub/itu-d/opb/stg/D-STG-SG01.05.1-2021-PDF-E.pdf



ITU-T Recommendations

L.1700, L.110, L.163

Most Popular and Useful for Rural Connectivity

On-Surface Optical Cable for DIY

Lightweight, Thin Cable with a Steel Tube

11 mm

Laser Welding

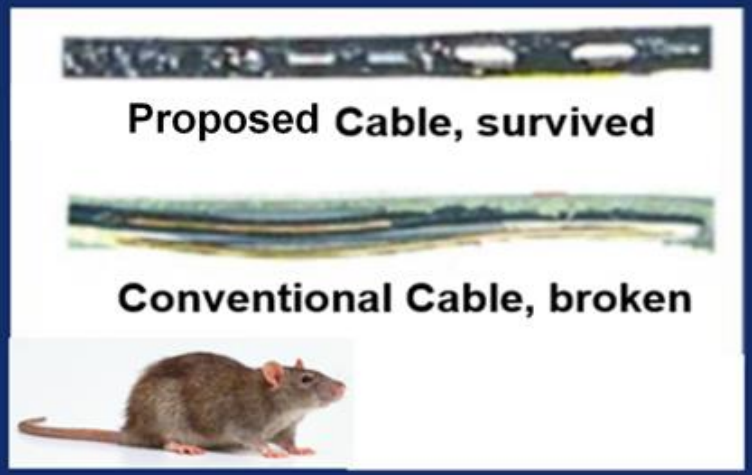
3.6 mm

Stainless Steel Tube

≤48 Fiber Cores

L.110 Optical Cable Durability

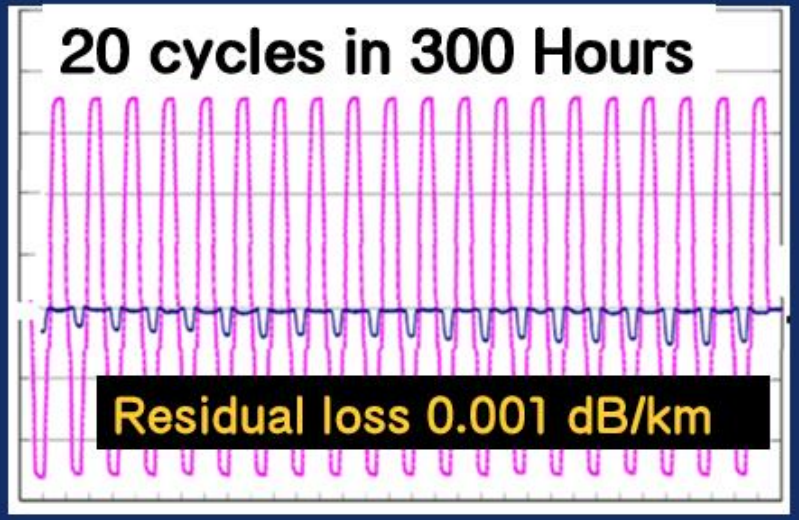
Rodent Proof Test



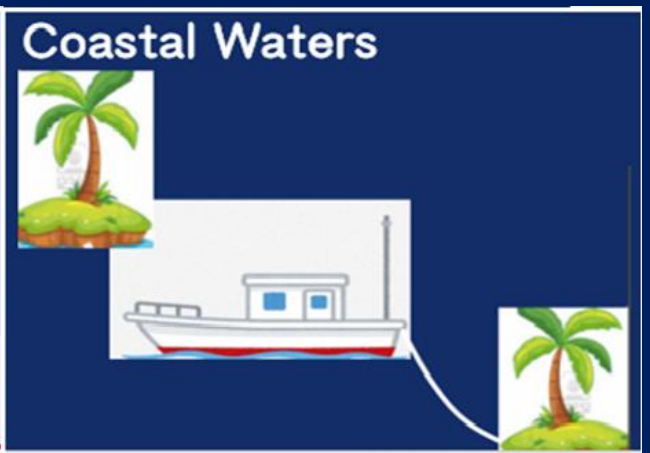
After 1180℃,15 min Loss <0.05 dB

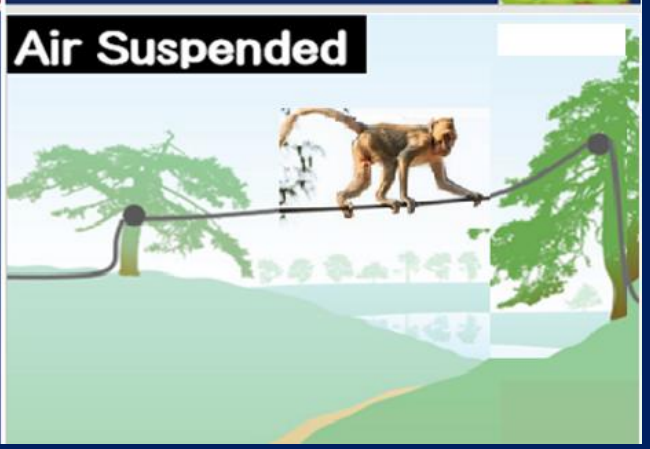
Crush Resistance (2 tons/10 cm)

Heat Cycle -50 ℃ to +70 ℃

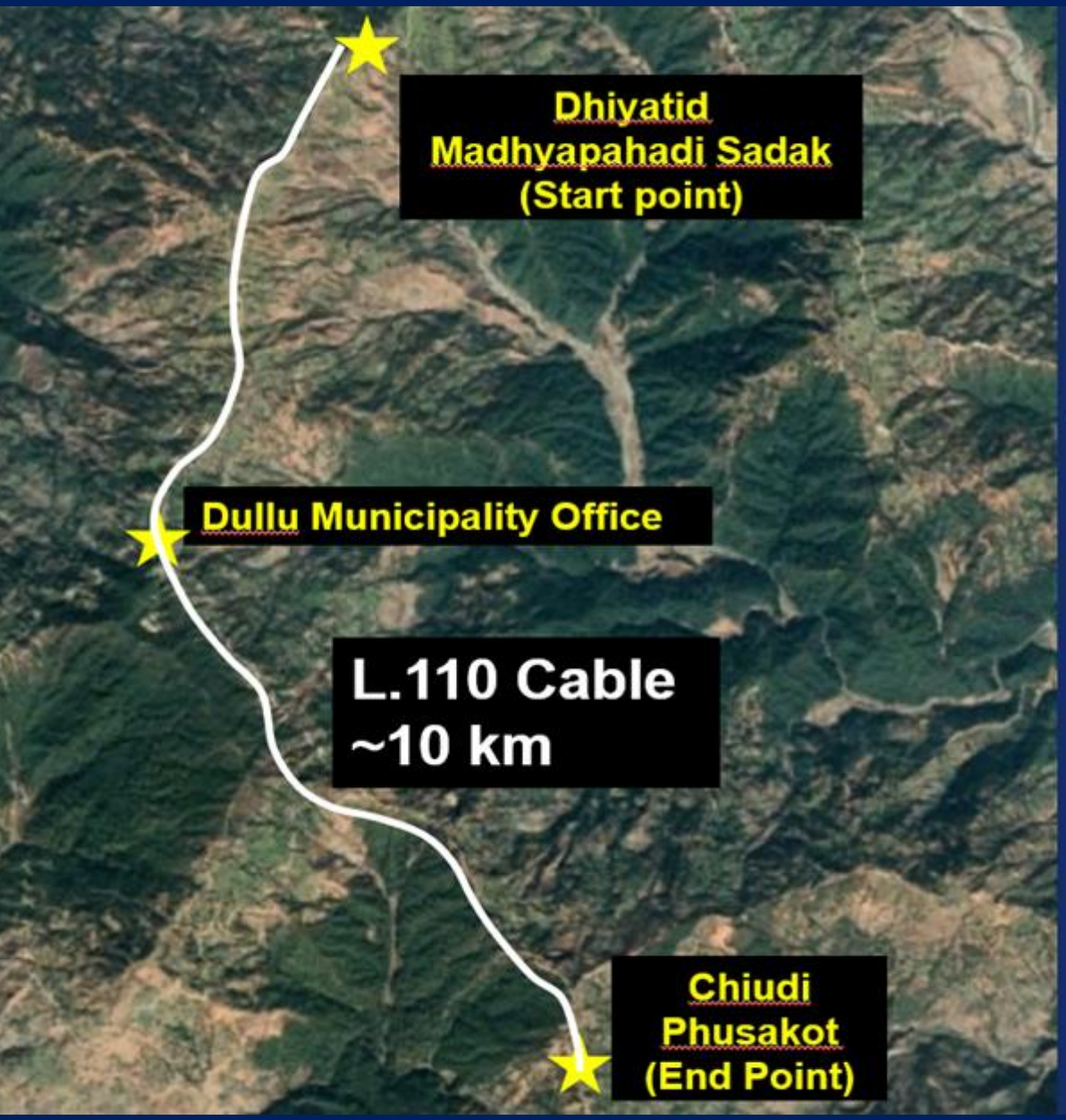


Solution BIRD with Ease of Installation





Solution BIRD in West Nepal, 2019



Broadband Connectivity in Dullu Municipality With

- -Hospital
- -Health Centers
- -Municipality Office
- -Ward Offices
- -School
- -Wi-Fi base stations

L.110 Cable installation Route

L.110 Cable after 2.5 years

Dullu Municipality, West Nepal, as of Aug. 2021

Surviving from

-Erosion
-Weathering
-Flood
-Small Landslide

CAPEX Reduction
By DIY Installation

Conventional Cable

Civil works	58	k US$/km
Cable	~ 1	k US$/km
Manhole	4.8	kUS$/km
Pipe	8.0	kUS$/km

72 k US$/km

data by Korea Telecom, at UNESCAP, Sept. 2013, Baku

88% Cost Reduction

L.110 Cable Solution BIRD

8.3 k US$/km

- Civil Works 3.3 k US$/km
  - 100 US$/head/day
  - 300 m/day (10 Workers)
- Cable < 4-5 kUS$/km
- No Manhole, No Duct

Mt. Everest Base Camp PJ 2020~

Altitiude 3440m to 5300 m

Mt. Everest Base Camp PJ 2020~

34 Cable drums arrived at Phaplu (2400 m) East Nepal, August 13, 2020

Phaplu; End point of the motor vehicle road
Drums are air-lifted to cable-laying sites

A helicopter for the cable-route survey

The Cable route to Mt. Everest Base Camp; the use of heavy machinery is not possible.

Remote tourism to financially support e-services at isolated villages on the way

Summary

The Solution BIRD* is Lightweight, Robust, Reliable Optical Cable Connectivity Applicable to Surface, Underground, in the Air and Underwater.

* Broadband Infrastructure for Rural-Area Digitalization

The Solution BIRD meets ITU-T Recommendations L.1700 (Concept), L.110 (Cable) and L.163(Installation)

The Solution BIRD is widely applicable from Urban Areas to Desert to Mountains to Near-by Islands toward 5G and Beyond with ease of construction without demanding deep burial, heavy machinery nor full-size submarine-cable laying ship.

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https://www.itu.int/net4/wsis/forum/2021/Agenda/Session/355

https://www.itu.int/net4/wsis/forum/2021/en/Agenda/Session/147

https://www.itu.int/net4/wsis/forum/2020/en/Agenda/Session/267