# Optical Cabling Solutions to Enable FTTR

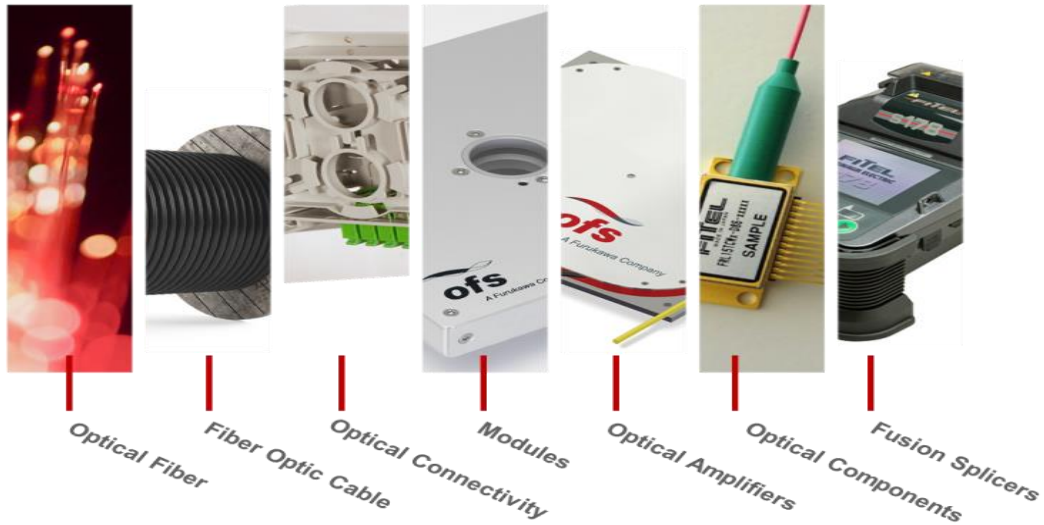
Martin Warne
Solutions Engineer
OFS

ofs
A Furukawa Company

Your Optical Fibre Solutions Partner®

# OFS Designs, Develops and Manufactures Optical Fibre Solutions





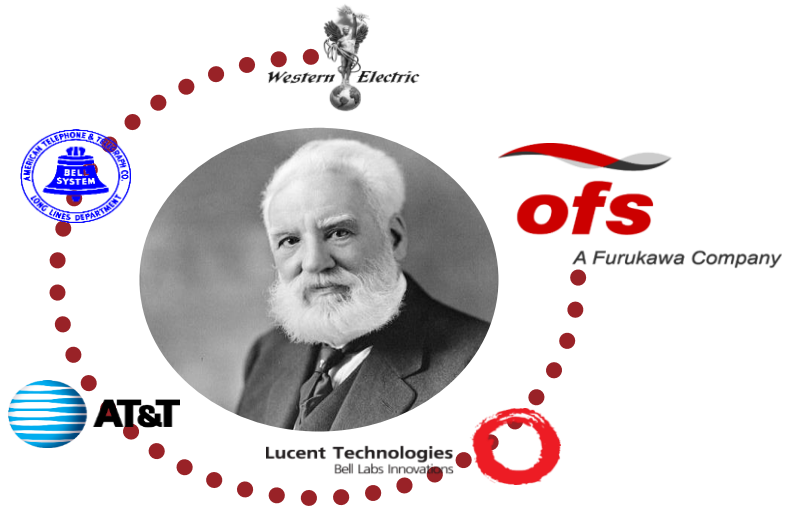

- $1.8B Communications Solutions Business
- Supplier to leading Communication Service Providers US and Worldwide
- 500 Million Km of Fibre Manufactured since the 1970s


Your Optical Fibre Solutions Partner®



A Furukawa Company

# OFS – Bell Labs Heritage - An original inventor of fibre




**1958**

Bell Labs patents its invention of the laser, creating the first light source powerful enough to transmit light.

**1974**

Bell Labs invents the modified chemical vapor deposition (MCVD) process for fabricating silica optical fibers, a major advance in optical fiber manufacture.

**1975**

Bell Labs invents the Biconic connector, the first optical fiber connector.

**1976**

Bell Labs researchers at the Atlanta facility conduct the first fiber optic telecommunications system experiment, for voice and data.

**1975**

Bell Labs invents ribbon fiber optic cable systems, including 12-fiber ribbon cable and the 12-fiber mechanical splice for rapid installation of high fiber counts.

**1983**

AT&T begins commercialized production of single-mode optical fiber.

**1977**

In Chicago, Illinois, AT&T conducts the first field trial of a lightwave system carrying voice, data, and video traffic.

**1998-2000**

Lucent introduces and patents AllWave® Optical Fiber - the world's first full spectrum fiber, enabling a 30% increase in fiber capacity.

**1995**

Bell Labs invents the LC Connector, a high performance, intuitive to use optical connector ½ the size of the SC connector.

**2002-2003**

OFS launches First Fully Dry Gel-Free OSP Cables meeting the Telcordia GR-20 standard, saving hours per cable end in preparation or restoration.

**2010**

OFS introduces first gel-free ADSS cable, PowerGuide® DT Cable.

**2014**

Furukawa Electric launches FITEL® NINJA - handheld fusion splicer, first splicer with removeable V-grooves, reducing maintenance time from days to minutes.

**2016**

OFS receives Emmy® Award for the "Pioneering Invention and Deployment of Fiber Optic Cable."

**2019**

OFS launches InvisiLight® ILU 600 Solution, world's first 0.6 mm surface mount fiber system.

**2008-2009**

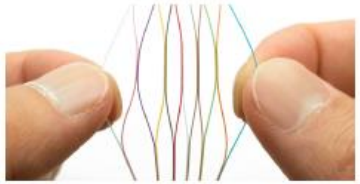
OFS introduces EZ-Bend® Optical Fiber - the first ultra bend insensitive solid-fiber and cable.

**2012**

OFS introduces InvisiLight® Optical Solution - Living Unit Invisible Fiber Installation.

**2015**

OFS introduces the InvisiLight® MDU Hallway Solution, a virtually invisible fiber system for existing multiple dwelling/tenant units.



**2017**

OFS optical cable product lines expanded to include new Rollable Ribbon technology, doubling fiber density.

# Fibre to the Room Deployment Challenges

To enable High Bandwidth for all technologies and reliability for differing platforms (tablets, IPTV, etc.)

## Theory

- Fibre is the easy part, just install single-mode from the RGW to each room via several AP's.


GSTP-FTTR(21)_F5-6

## Reality

- Restricted / no pathways
- Quick and hidden installation desired
- Corners !!!

Surface mounting may be the only option



ofs
A Furukawa Company

# Broadband Deployment For Dense Apartment Building Challenges

## Theory

- Fibre is the easy part, just install single-mode from the Basement Terminal and manage to each floor.

## Reality

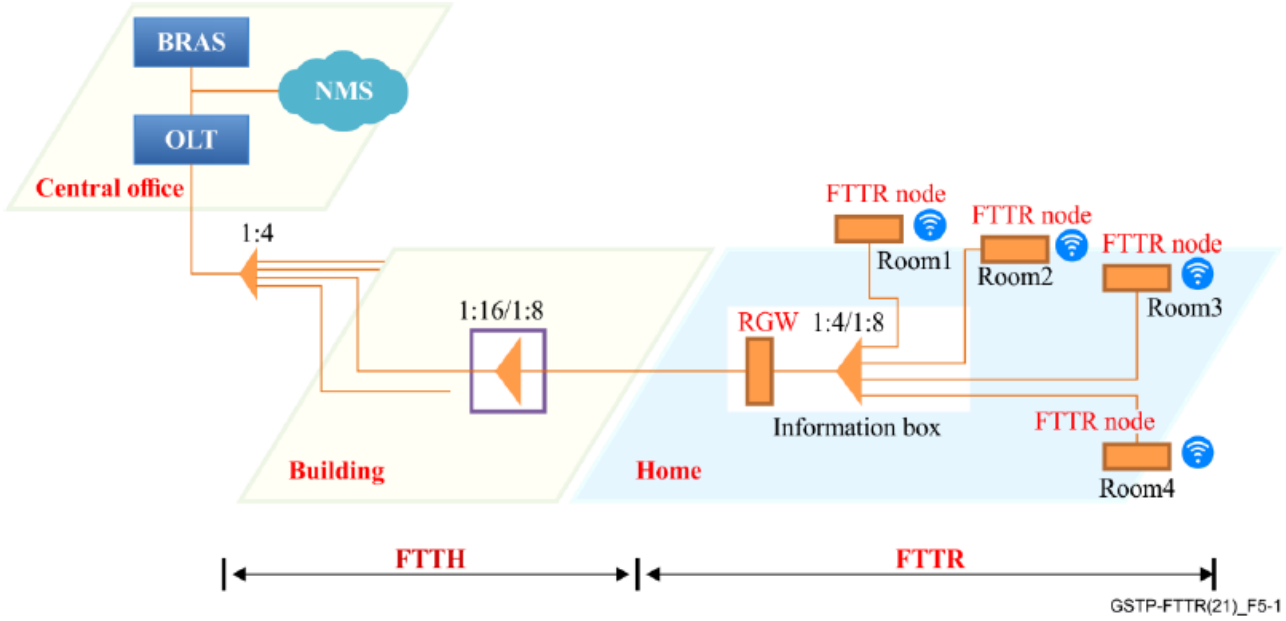
- Riser and/or Hallway Challenges
- Quick and discrete installation desired
- Internal and External requirements

ofs
A Furukawa Company

# Fibre to the Room and Dense Apartment Building Deployment Challenges

## Theory

- Increased bandwidth will require new technologies (XG-PON) with higher transmission wavelengths




## Reality

- Bend Insensitive fibres can become loss additions with higher wavelengths making the signal quality degrade.
- Ultra Bend Insensitive can enable future technologies without need for replacement of optical cabling to AP's.

ofs
A Furukawa Company

# Two Technologies Ease Fibre Deployment to the Room/Building

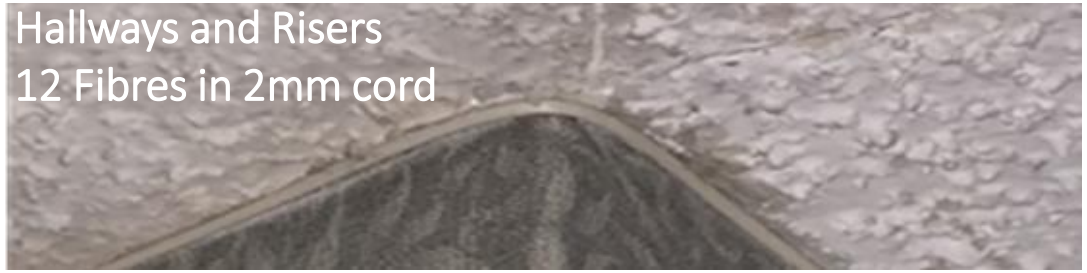
## ITU-T G.657.B3

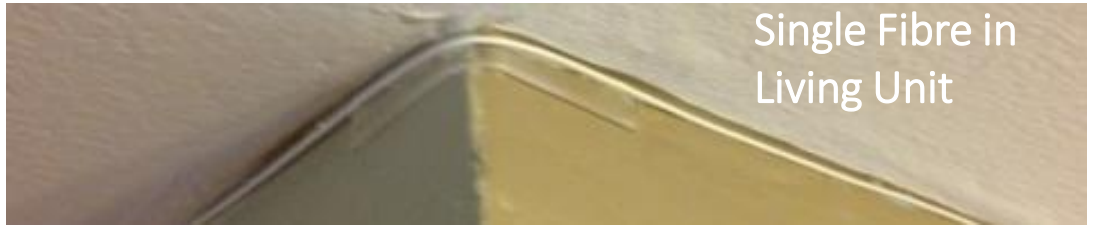
### Ultra Bend-Insensitive Fibre with 2.5 mm Bend Radius

EZ-Bend
3 mm cord
0.006 dB


- Superior to and compliant with G.657.B3
- 500 times lower bend loss than Standard SMF (G.652.D)
- 100 times lower bend loss than Standard Bend Insensitive SMF (G.657.A2)

## Surface Mount Fibre Systems

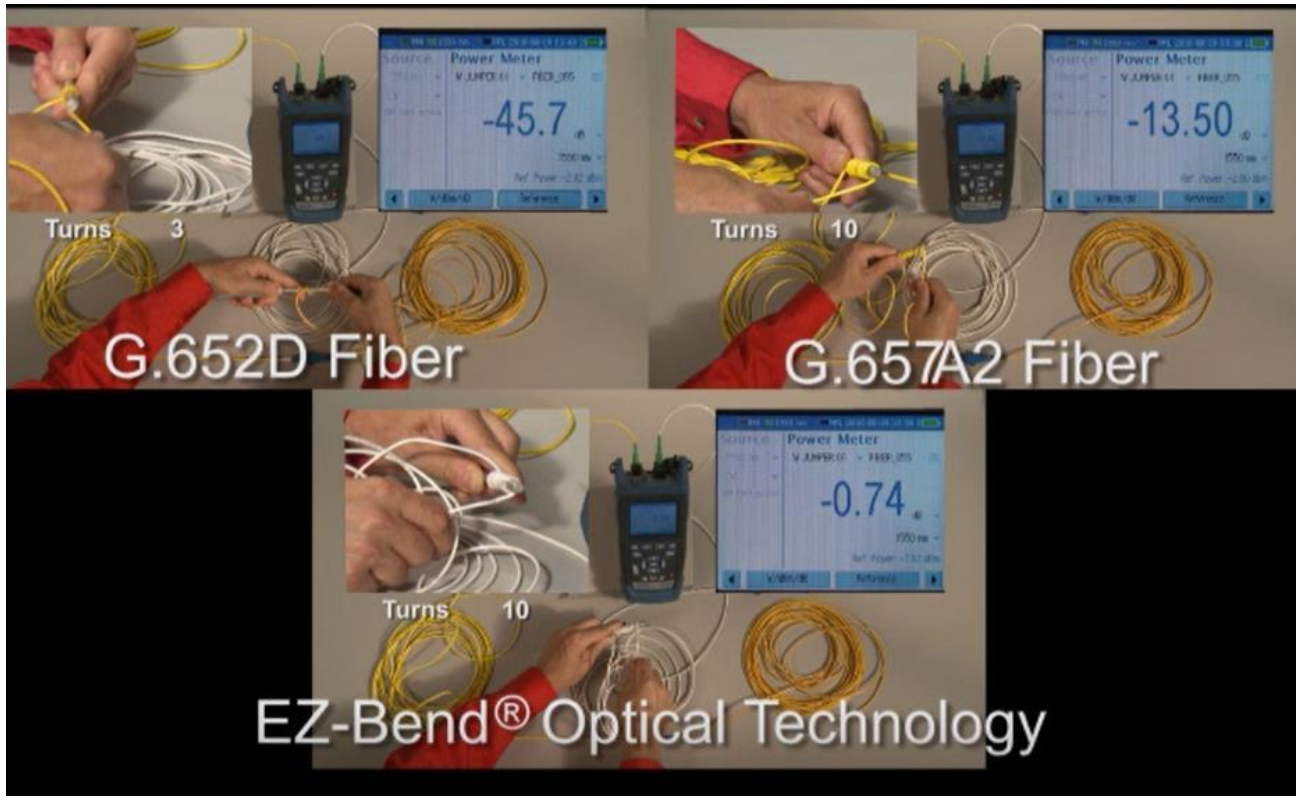



Installed cost savings of €50 - €150 per living unit possible by avoiding expensive coving or drywall cut and patch

ofs
A Furukawa Company

# Enhanced G.657.B3 Fibre Enables Negligible Corner Bend Attenuation



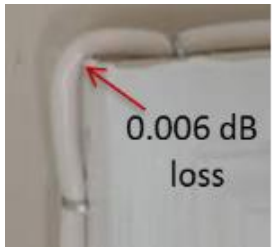

- 8mm mandrel
- 1550nm

EZ-Bend® Fibre G.657.B3+

2.5 mm bend radius

EZ-Bend® Cord


Pinch




Staple

ofs
A Furukawa Company

# Virtually Invisible Fibre in Living Units or Offices

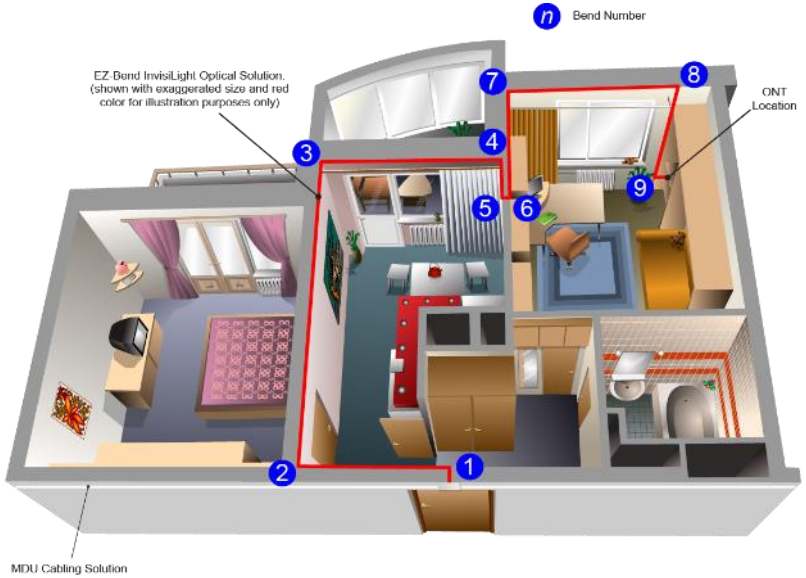

**Easy, quick install**

**Blends into décor**

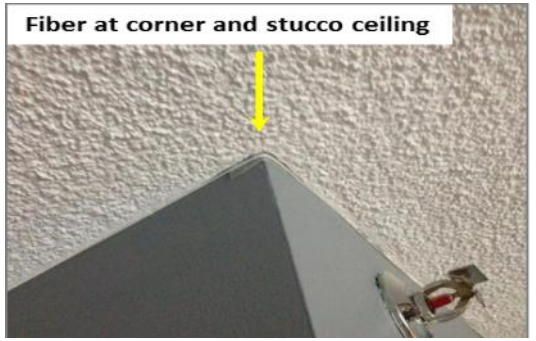
**Protected in crevices**

**Most indoor surfaces**

**50 Corners**



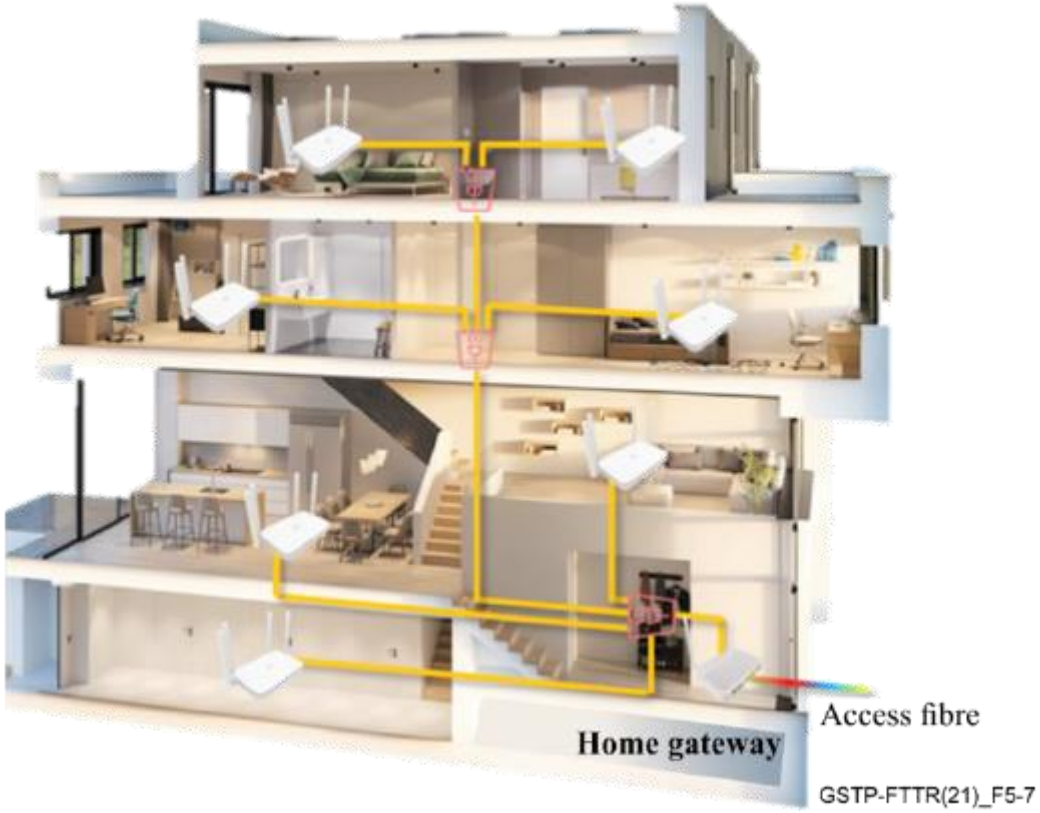


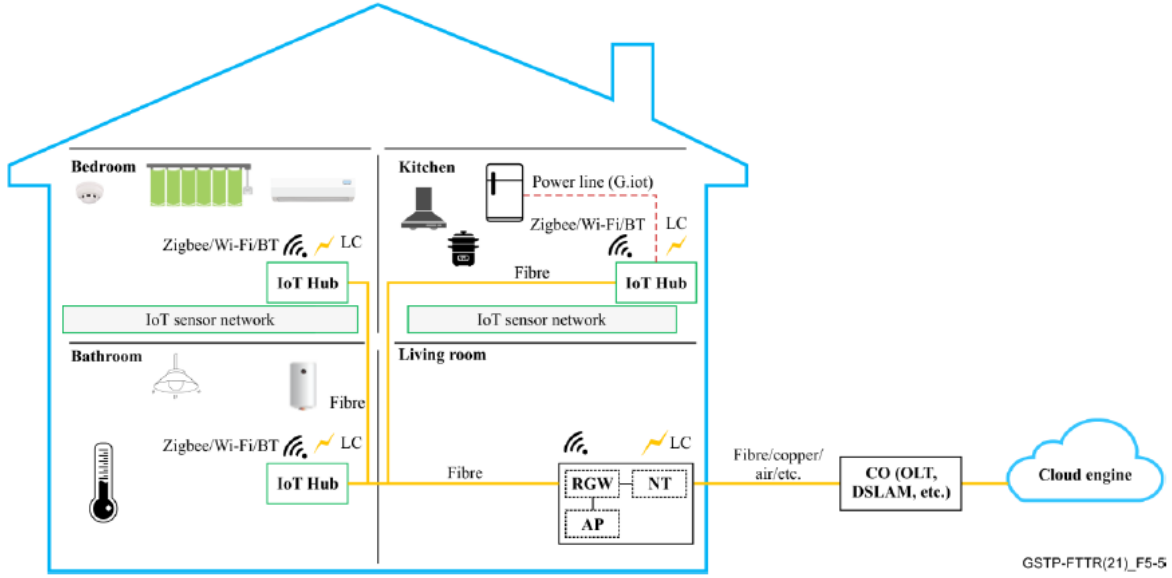


ofs
A Furukawa Company

# EZ-Bend Cables Installed in Greenfield Enable Smart Home Networks




GSTP-FTTR(21)_F5-7




GSTP-FTTR(21)_F5-5

Your Optical Fibre Solutions Partner®

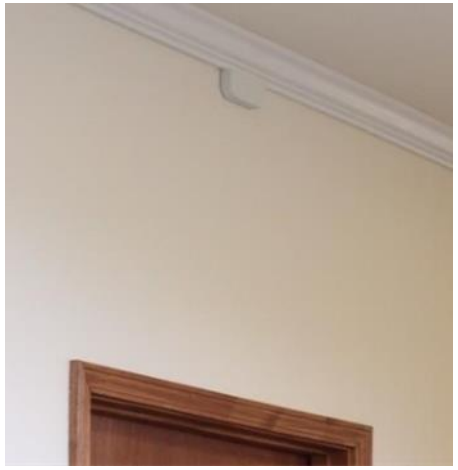
# Invisible Solutions Change the Game to Bring Fibre Inside

## ILU 900µm Solution

*Launched 2012*

1 or 2 fibres placed inside the living unit to the ONT

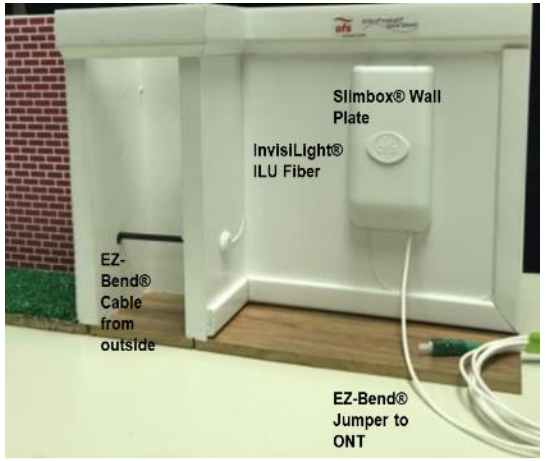
## Hallway MDU Solution



*Launched 2015*

4 to 16 fibres for hallways and risers

## Drop Solution




*Launched 2016*

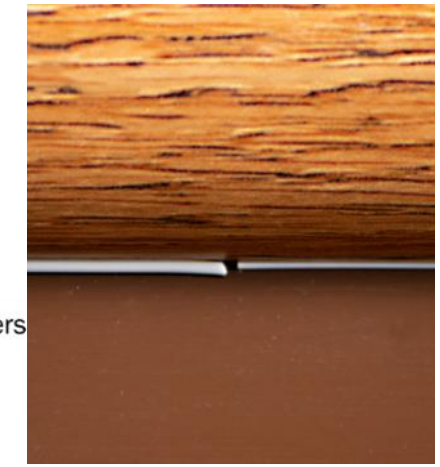
EZ-Bend® drop cables, easily stripped down to EZ-Bend® fibre inside

## Façade Solution


*Launched 2017*

12 or 24 fibres in compact virtually invisible cables

## ILU 600µm Solution



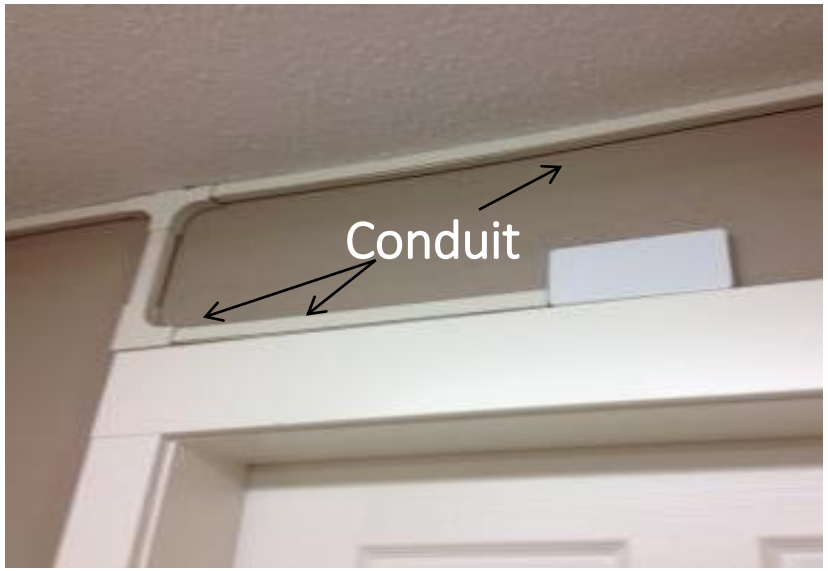
*Launched 2019*

Even less visible. Even Easier Installation

ofs
A Furukawa Company

# Solution for Hallways and Risers - Can Save €50-€150 per Door Passed

## Conventional Hallway fibre



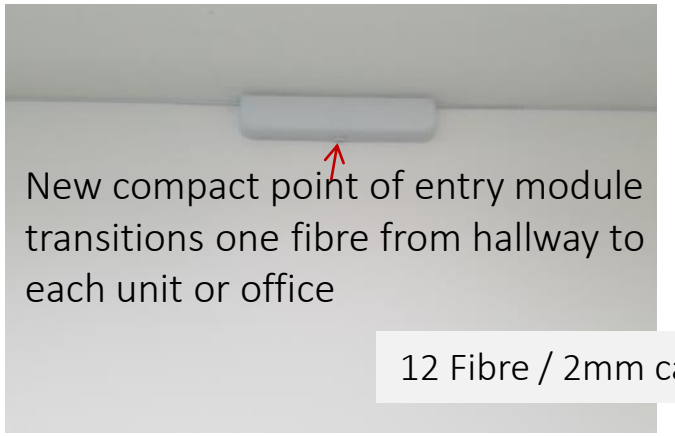

- Very visible
- Disrupts décor
- Slow installation

## InvisiLight® MDU Solution

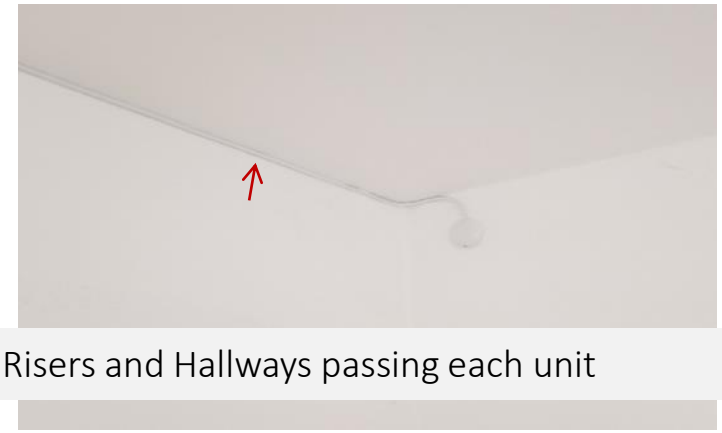

- Virtually invisible
- Preferred by building owners and tenants versus coving
- Faster and easier to install
- From MDF up the riser to each door with no intermediate floor boxes

ofs
A Furukawa Company

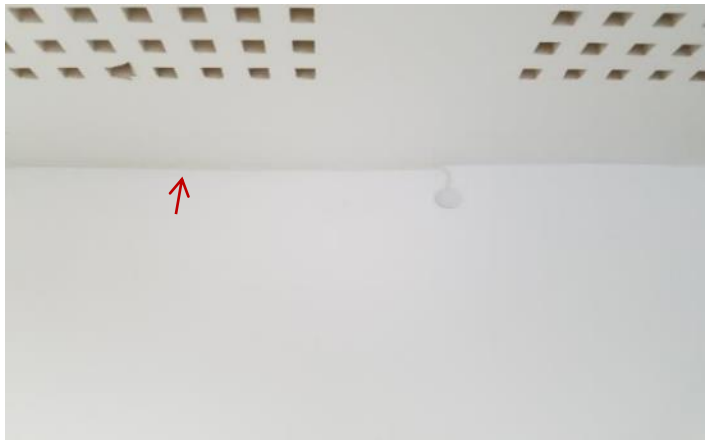
# Whole Building Installation 4 floors 60 units

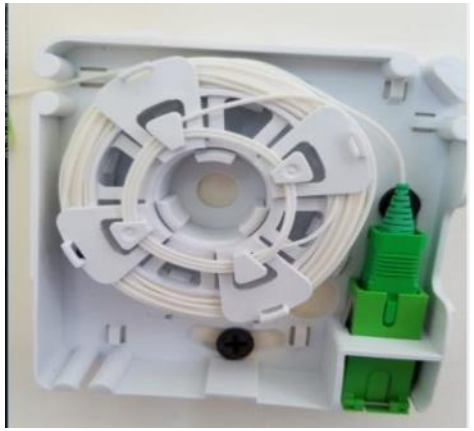


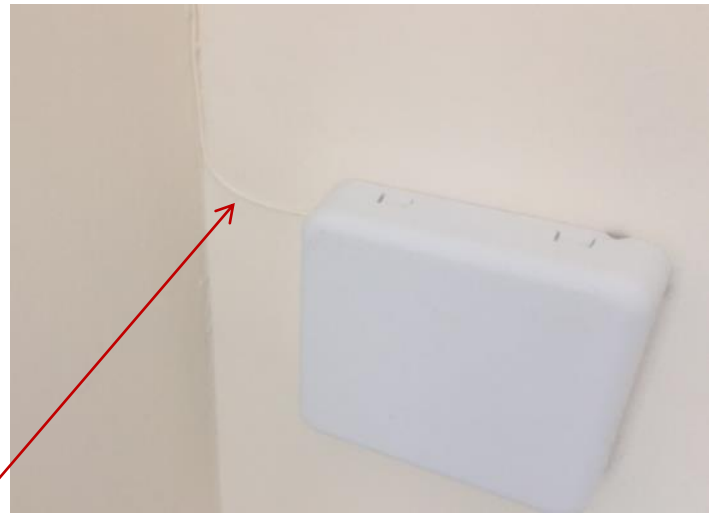
New compact point of entry module transitions one fibre from hallway to each unit or office



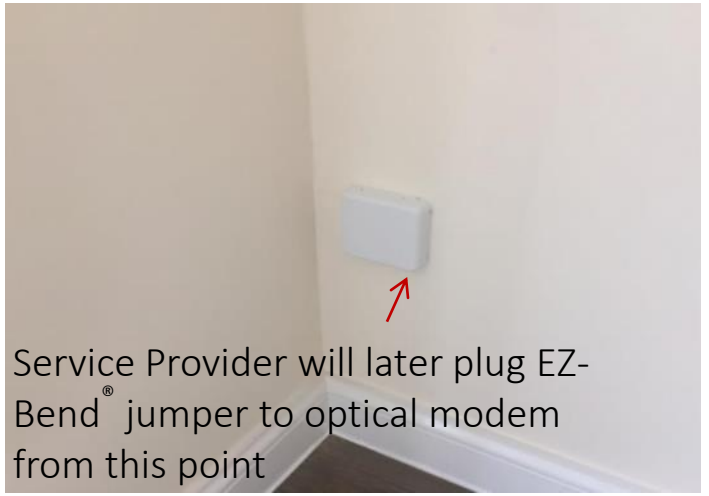
12 Fibre / 2mm cable in Risers and Hallways passing each unit







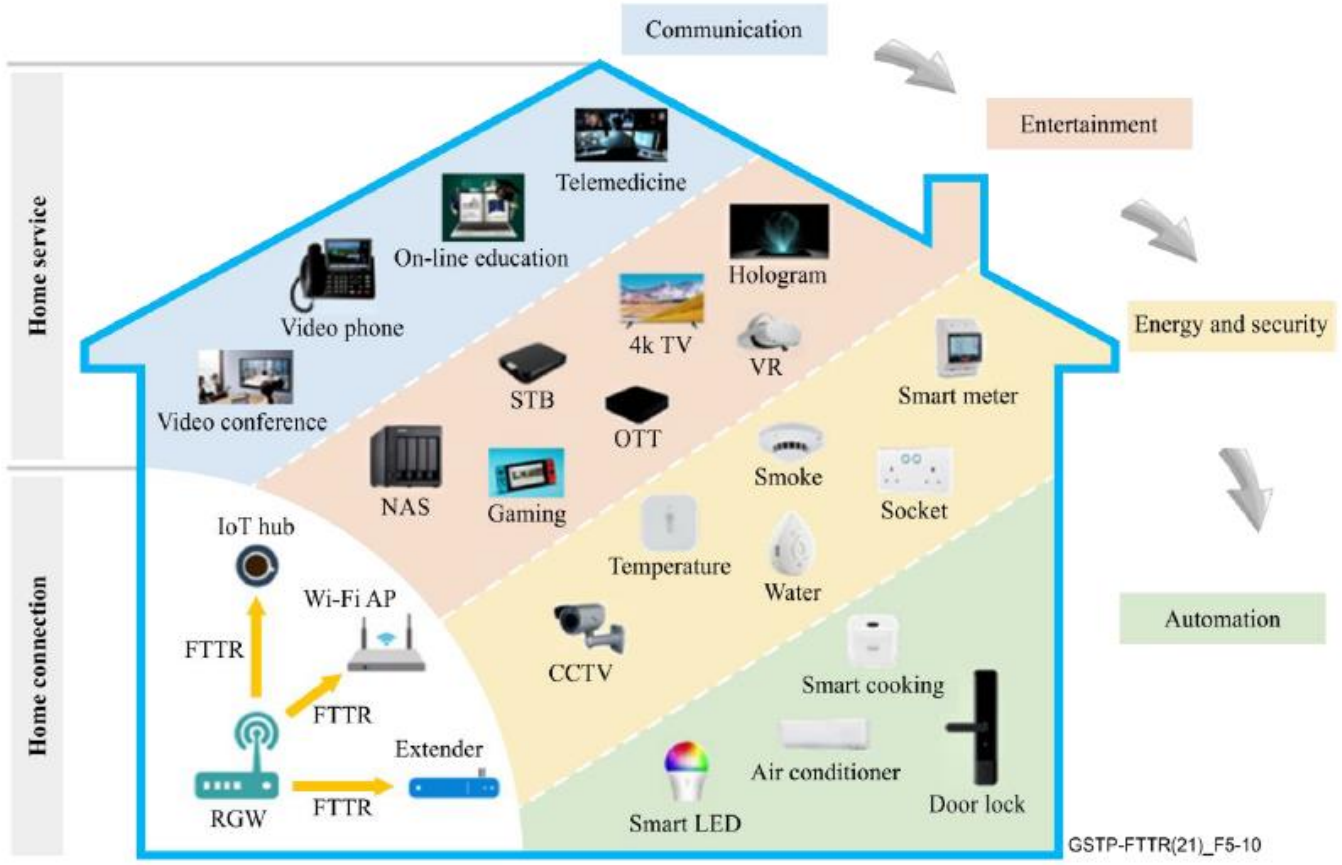
ILU 1 fibre/900µm from Hallway into each unit. Factory Terminated and Tested both ends with auto slack management spool



Service Provider will later plug EZ-Bend® jumper to optical modem from this point

ofs
A Furukawa Company

# Summary




To successfully enable our FTTR technology the fibre infrastructure needs to be flexible and robust.

- Greenfield can have the fibre infrastructure ‘built-in’ from day one.
- Brownfield, of which the majority will sit, need a range of solutions that can enable.

- This brings some of the challenges we’ve seen as major obstacles.
- However, with the intelligent use of ultra-bend insensitive fibres and cables, offices, MDU buildings and homes can be invisibly connected.
- This will give the user an enhanced experience and evolve with ever changing technology.

# Thank You

Martin Warne

mwarne@ofsoptics.com

+44 7444 117052

Your Optical Fibre Solutions Partner®