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From Our Glass To Your Networks

Packing More Internet into the Same Glass

Rethinking Capacity for the
AI-Scale Network Era



August 2026

The Modern Network Bottleneck

AI, cloud, and streaming workloads are rewriting bandwidth math. Ducts are congested, rights-of-way are slow to secure, and operators face rising energy and carbon constraints.



Adding new fibre routes is no longer the easy answer, it's the most expensive one.

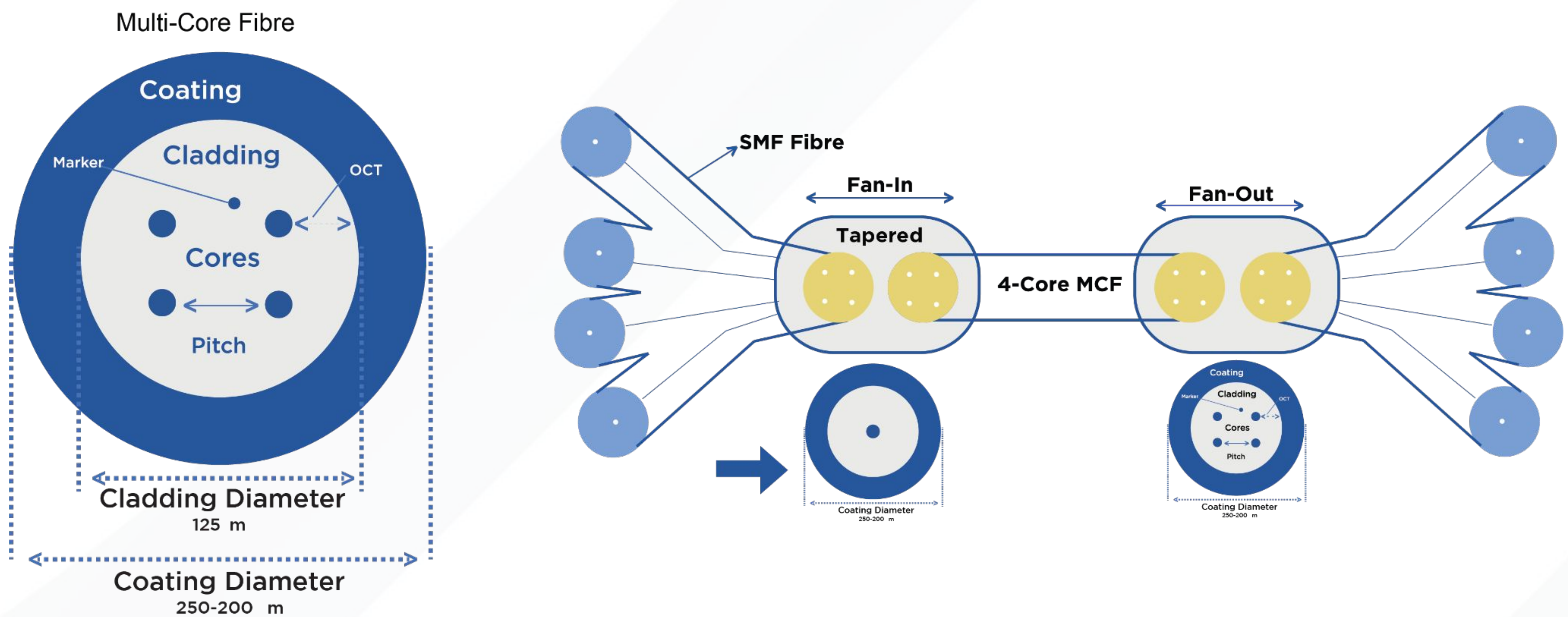
The pressure is visible across every segment of digital infrastructure:

- **Data Centers:** Intra-campus and inter-campus corridors choking on AI cluster traffic.
- **Metro Networks:** Dense conduits where civil expansion is infeasible.
- **Long-Haul Backbones:** Demand rising faster than optical spectrum efficiency.
- **Secure Communications:** Growing need for quantum-safe links with guaranteed separation.
- **Smart Infrastructure:** Sensors, rail, utilities, and defense networks demanding high-bandwidth telemetry over legacy ducts.

The industry needs a way to **multiply capacity without multiplying infrastructure.**

Introducing **Multicore Fibre** 4x Capacity Inside the Glass

STL's **Multicore Fibre (MCF)** solves the bottleneck by placing four optical cores inside a single cladding. Each core acts as an independent channel, multiplying throughput up to four times within the same 125 μm diameter.



Paired with STL's fan-in/fan-out modules, MCF integrates seamlessly with existing single-core systems, enabling capacity upgrades without new ducts, added racking, or disruptive infrastructure overhauls.

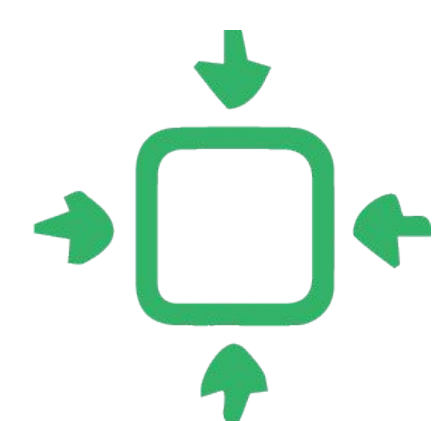
4X data capacity using existing ducts

Key **Advantages**



Improved Material Efficiency

MCF uses one cladding for multiple cores, cutting glass and coating use by up to 75%.



Compact Form Factor

Packs more cores in less space, delivering 4 $\times$ capacity without expanding footprint.



Lower Total Cost of OFC Deployment

Compact design fits smaller ducts and trenches, reducing installation effort, material, and cost



Enhanced Data Integrity

Supports Quantum Key Distribution for secure, tamper-proof, future-ready networks.



Use Cases & Industry Applications

1. Data Center Connectivity (Internal + Campus Scale)

Challenge:

Rising fibre density is constraining rack space, airflow, and cable management in AI-driven data halls.

MCF Advantage:

4 cores per fibre enable high-density interconnects without increasing cable footprint.

Impact:

- 4× capacity within existing pathways
- Reduced rack congestion and patching complexity
- Improved airflow and operational efficiency (Aligned with hyperscale and AI cluster deployments)

2. Duct & Network Capacity Optimization (Metro+Long Haul)

Challenge:

Urban ducts are saturated; civil expansion is expensive and often infeasible.

MCF Advantage:

Quadruples fibre density without increasing cable diameter.

Impact:

- 4× capacity using existing ducts
- Avoids trenching and right-of-way delays
- Significant capex and deployment savings

(Critical for metro networks, aggregation rings, and national backbones)

3. Multi-Service & Secure Networks (Quantum+Sensing)

Challenge:

Separate infrastructure for security, sensing, and traffic increases cost and complexity.

MCF Advantage:

Dedicated cores support QKD, sensing, and live data simultaneously.

Impact:

- Hybrid networks on a single fibre
- Reduced hardware dependency (no extra WDM layers)
- Future-ready, quantum-safe architecture

(Applicable across defence, critical infra, and secure enterprise networks)

4. Edge, 5G & Smart Infrastructure

Challenge:

Limited space and rising bandwidth demand at edge sites and infrastructure corridors.

MCF Advantage:

Compact, lightweight high-capacity fibre for constrained environments.

Impact:

- Dense backhaul for edge and 5G
- Reduced duct usage and power load
- Scalable infrastructure for IoT, rail, and utilities

(Supports edge compute, smart rail, and industrial networks)

How It Changes the Build?

Capex saving

Fewer parallel fibres are needed for the same throughput. Smaller outer diameters reduce raw material, drum weight, transport cost, and duct leasing. High counts can remain within the cable envelopes that fit existing ducts.

Operational gain

Fan-in and fan-out modules allow immediate interoperability with today's single-core equipment. One path equals four lanes simplifies planning, patching, and inventory, which reduces touchpoints and error risk.

Scalable benefit

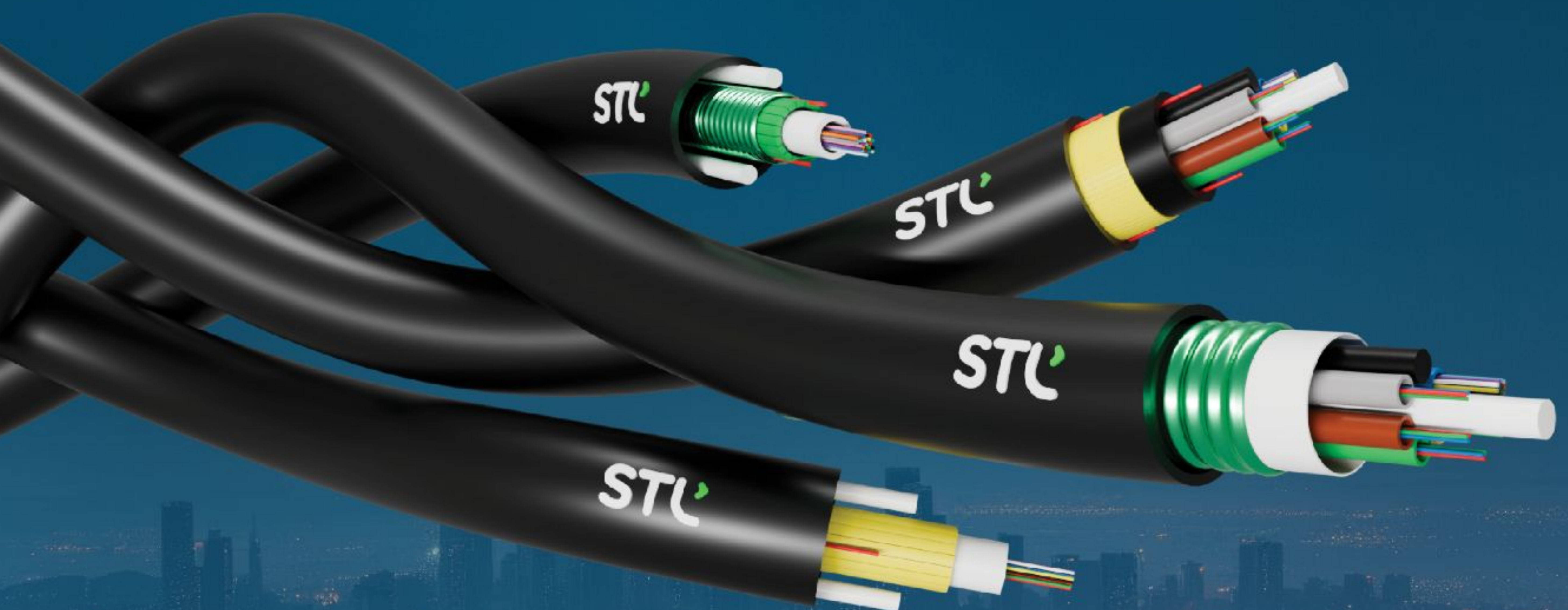
Future growth can be delivered by using spare MCF cores or by lighting additional wavelengths. Scale comes from optics, not excavators.

Sustainability gain

More bandwidth per fibre lowers physical footprint. Fewer ducts and fewer closures mean lower embodied carbon. Less cable volume within racks improves airflow and cooling efficiency.

Deployment gain

Multicore fibre enables higher route capacity within the existing duct envelope, eliminating the need for upsizing. Its low-mass, low-friction cable geometry supports longer blowing distances and higher installation velocity, reducing splice points and mechanical discontinuities. This allows operators to achieve network densification while maintaining the original duct and civil footprint.



Proven in the Field

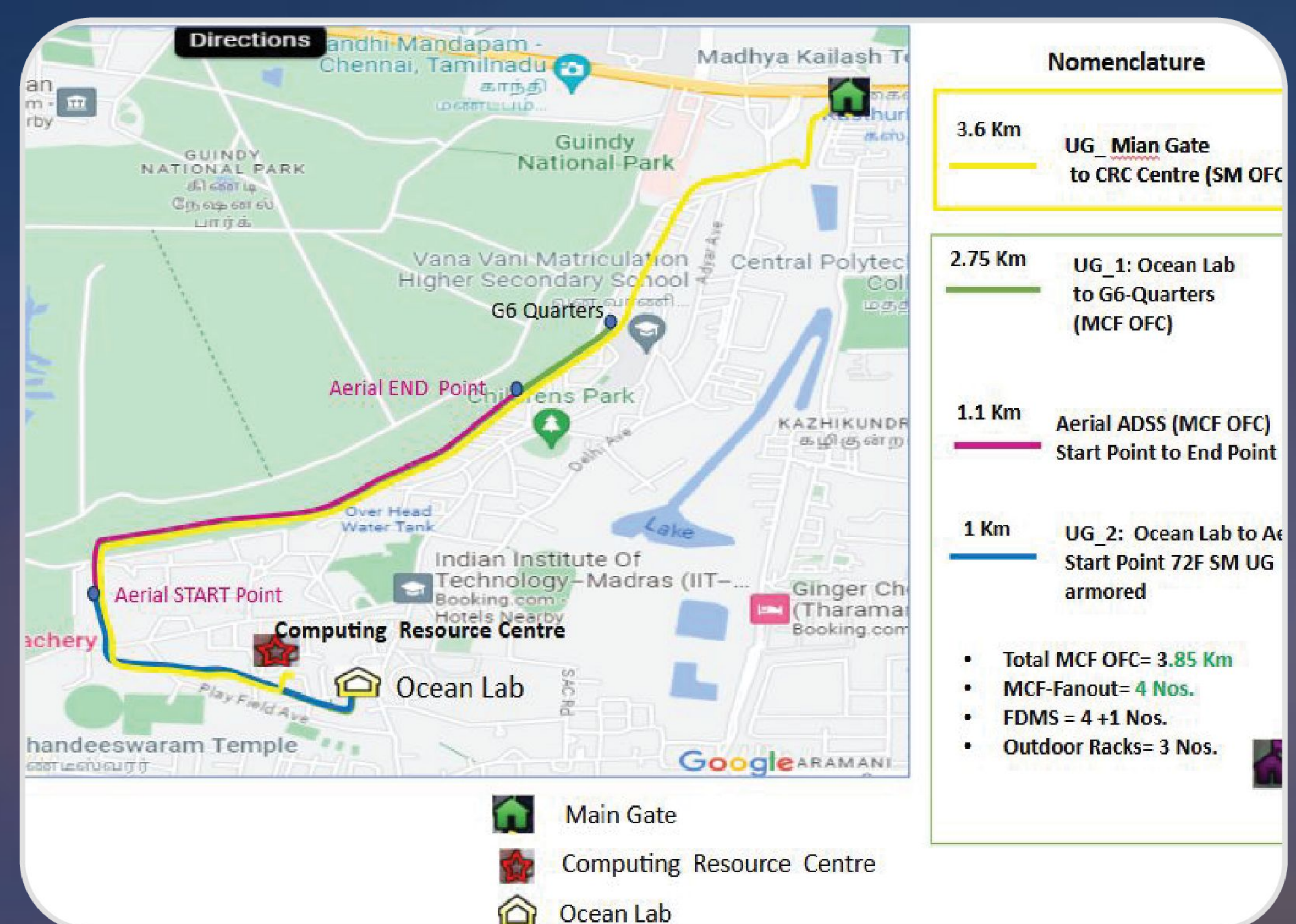


QKD over MCF with C-DOT (India 2025)

- 100 km trial carrying 200 G data + quantum keys
- Key rate ≈ 3 k/s, attenuation < 0.2 dB/km
- Error-free coexistence of quantum and classical signals

50 km Long-Haul Validation

- 80 Tb/s (4X 20 Tb/s) aggregate capacity per fibre
- Error-free transmission over live ducts
- Confirmed 4X capacity gain without civil work

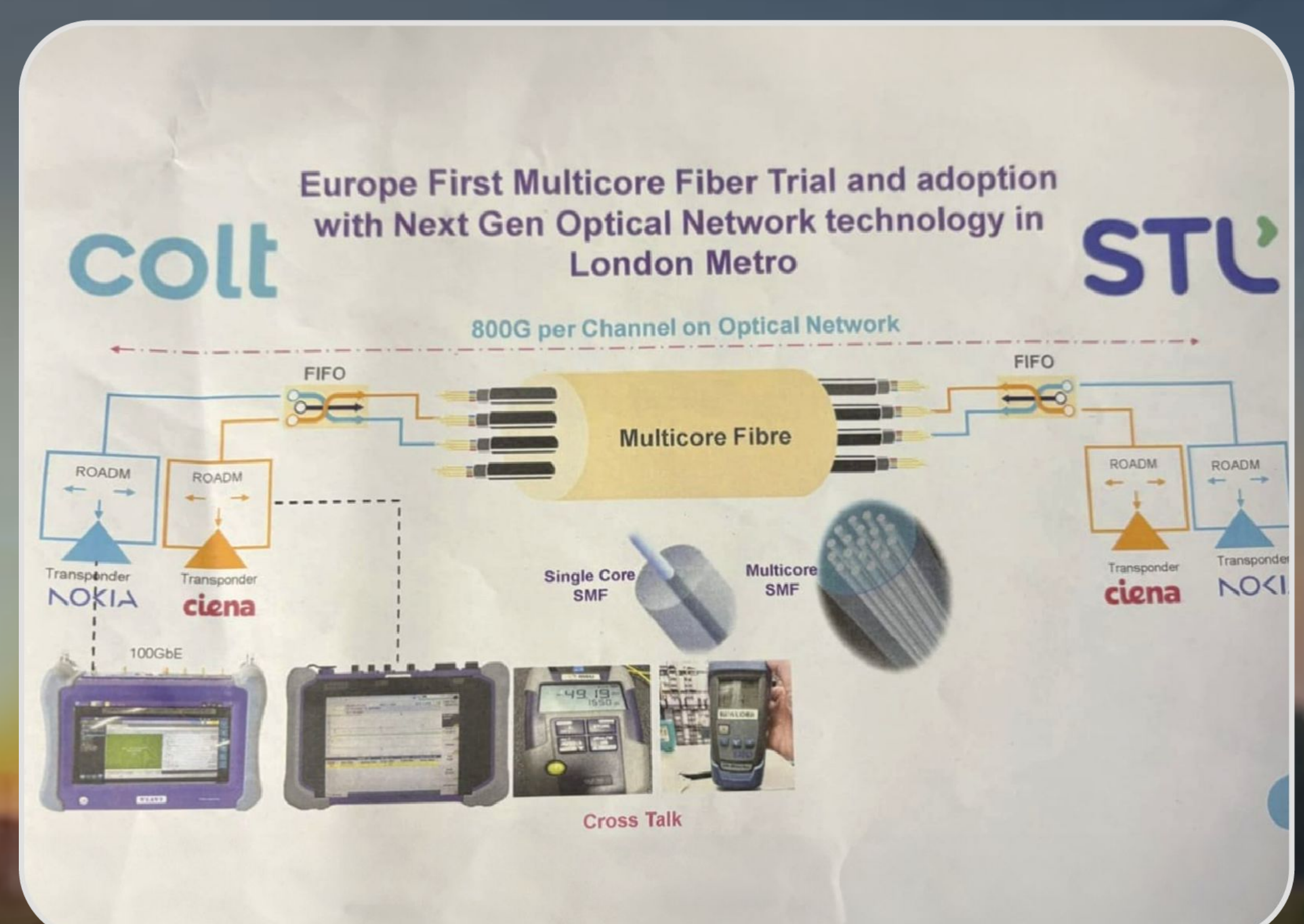


End-to-End Hybrid Build

- 12 MCF (4-core) + 12 SMF cable tested aerial and underground
- Demonstrated plug-and-play FiFo interoperability

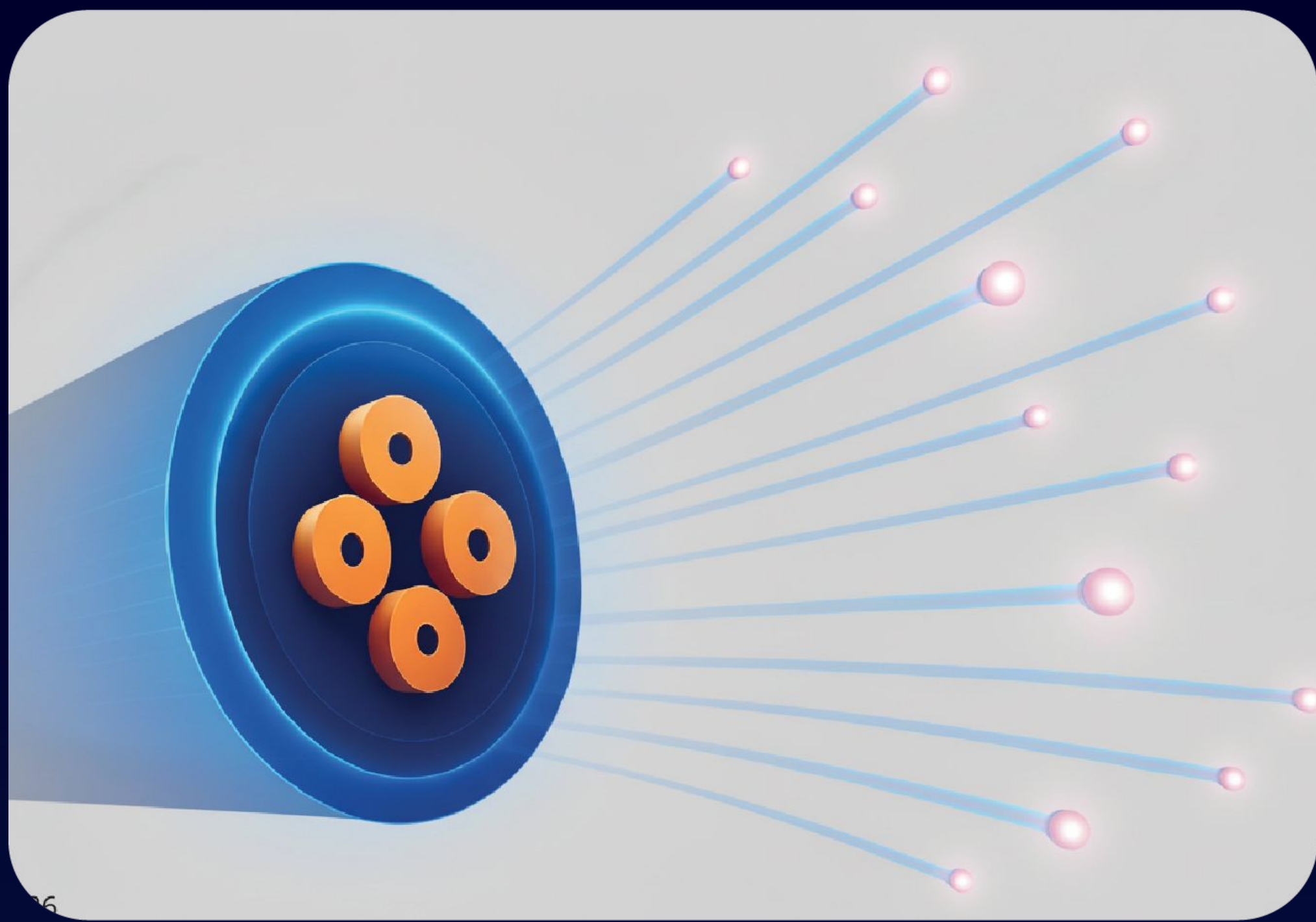
Colt MCF Field Trial (UK Network Deployment)

- ~6 km hybrid MCF + SMF link across live metro network
- ~-29 dB crosstalk, aligned with factory performance
- Seamless interoperability with existing single-core infrastructure



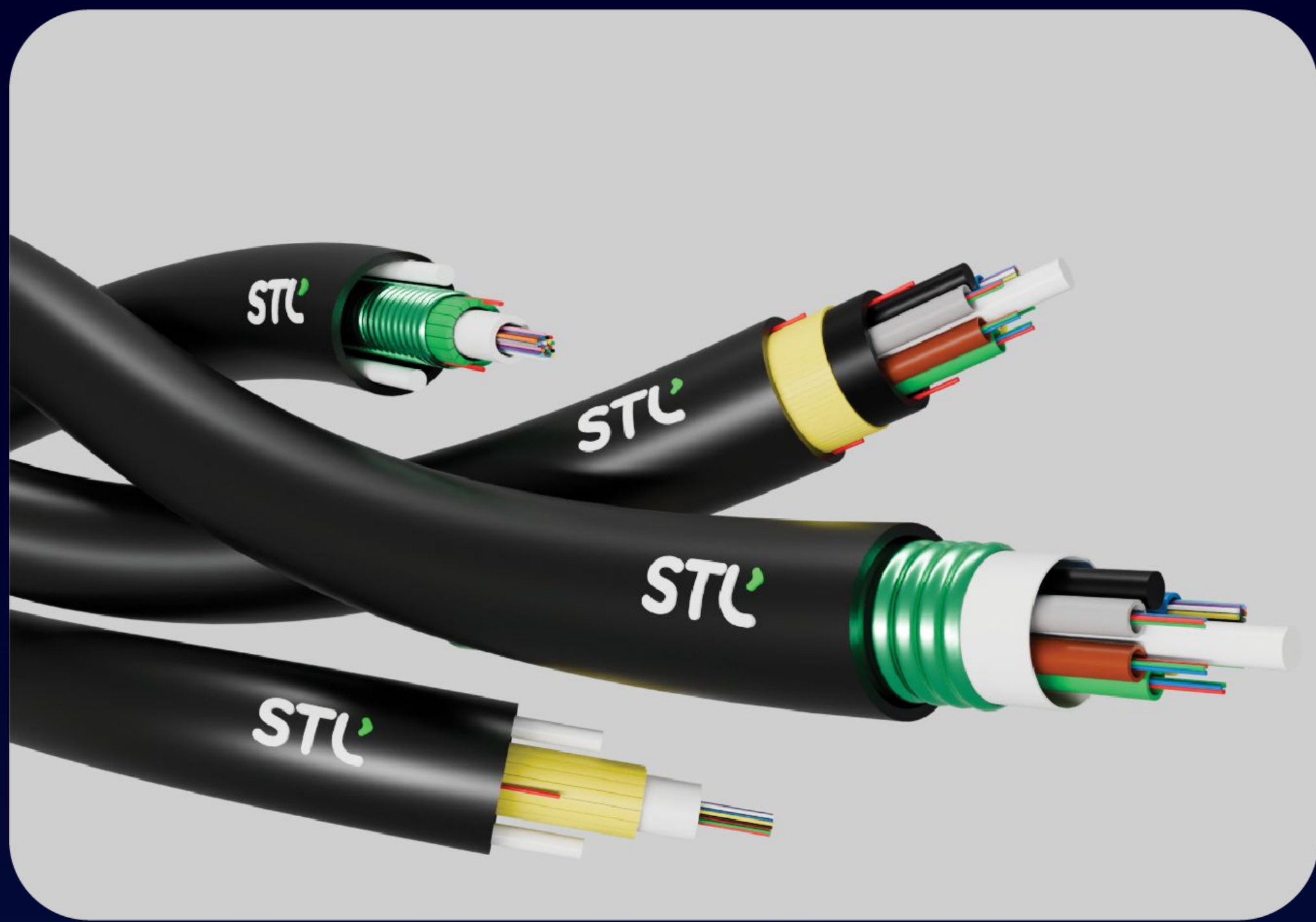
From Concept to Deployable Kit

From glass to connector, STL manufactures the complete interoperable MCF ecosystem:



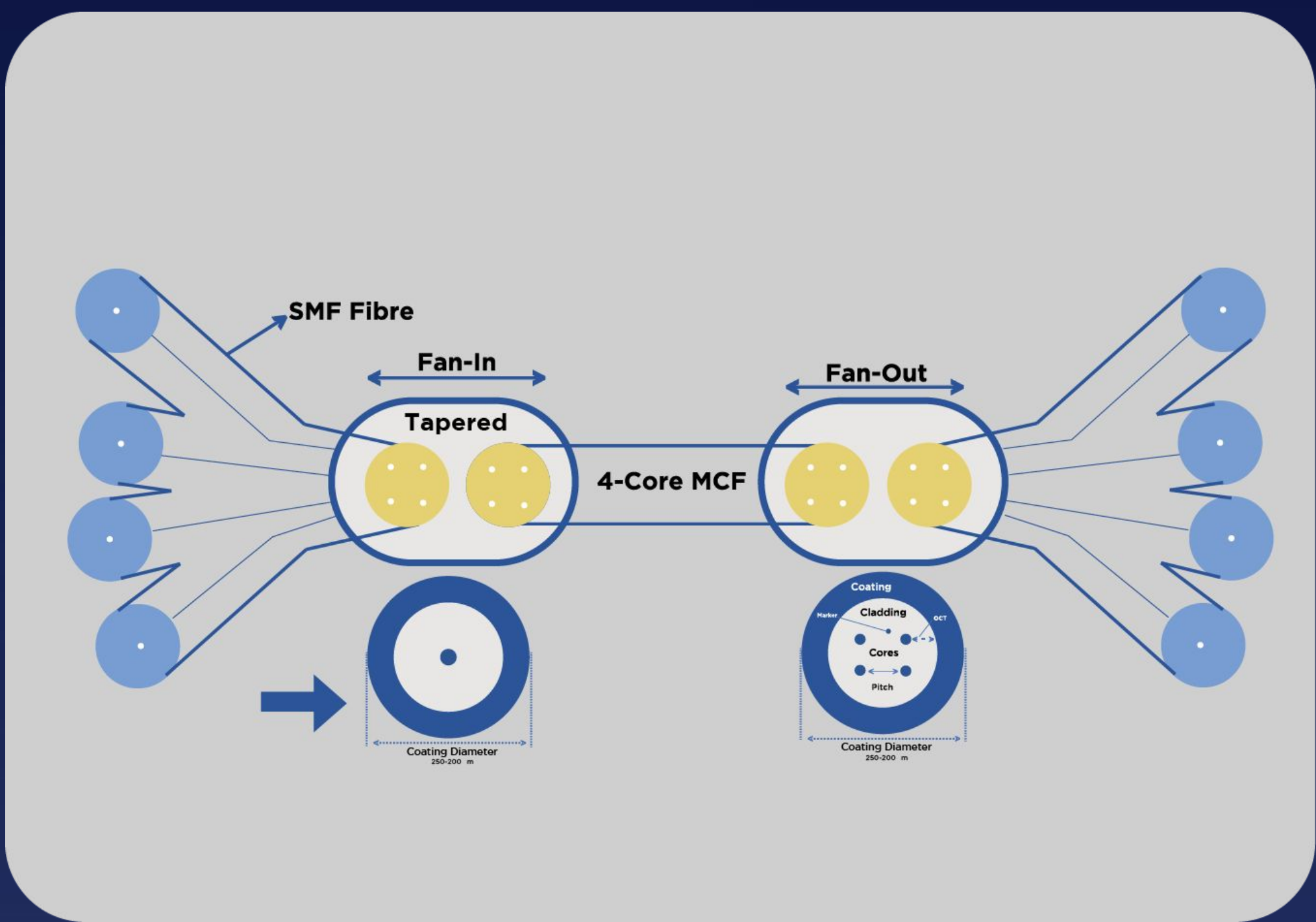
Fibre

4-core G.657A1 / G.652D compliant MCF



Cables

Armoured, ADSS, and Hybrid (MCF and SCF) cables, with unitube, aerial, and duct options.



Interconnect

Precision fan-in / fan-out assemblies ensuring < -49 dB crosstalk



Management

Dedicated splice trays and fibre-management systems for mixed SMF/MCF networks

Each component is designed for **rapid field adoption**, **material efficiency**, and **green compliance** across manufacturing and deployment.

Why It Matters?

Parameter	Gain	Impact
4 Cores / Fibre	4X bandwidth	Expand capacity without new ducts
Compact cable Ø	-26 % footprint	Lower material, transport, and duct cost
Hybrid design	Plug-and-play migration	Seamless SMF coexistence
Core isolation	Quantum-safe	Future-proof security architecture
Lightweight	Longer blow span	Faster, cheaper installation

The next wave of the internet will not be built by **Widening Trenches**.
It will be built by **increasing capacity** inside the fibre.

STL's Multicore Fibre Solution multiplies bandwidth, reduces cost, and shrinks footprint, turning networks into smarter, denser, and greener systems ready for AI-scale data.



Scan to visit
MCF webpage



beyond tomorrow