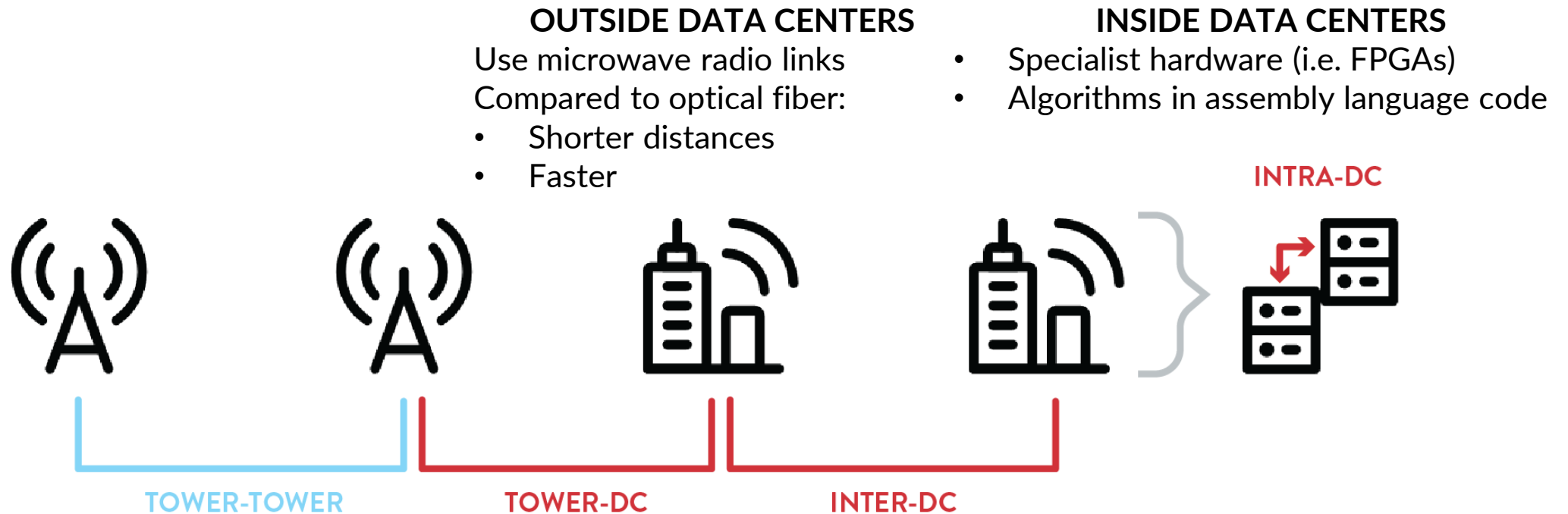


AccuCore HCF™ (Hollow-Core Fiber) Delivers Low- Latency Optical Transmission

DARYL INNISS
OFS Fitel, LLC

Hollow-Core Fiber can Trim Time by Replacing Glass-Core Fiber

Shaving Microseconds can Mean Substantive Advantages and Monetary Gains



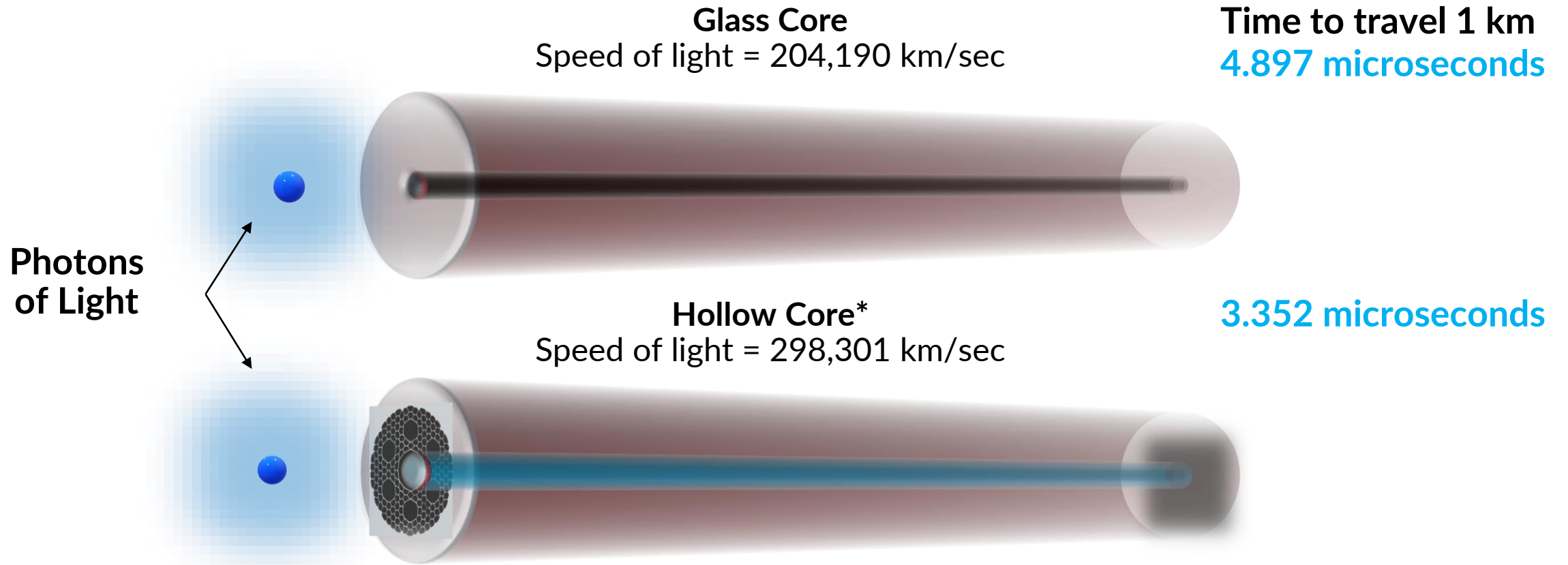
But Tower to DC and Intra-DC use glass-core fiber

Acronyms: DC = data center, FPGA = field-programmable gate array



Light Travels Faster in Hollow-Core Fiber than in a Conventional Glass Fiber

1.5 Microseconds per Kilometer (km) Latency Improvement



*Hollow core—transmit light in air core

The Challenge: to realize the latency improvement in field deployed networks because the fiber (i.e., hollow core) is intrinsically sensitive to external stress.



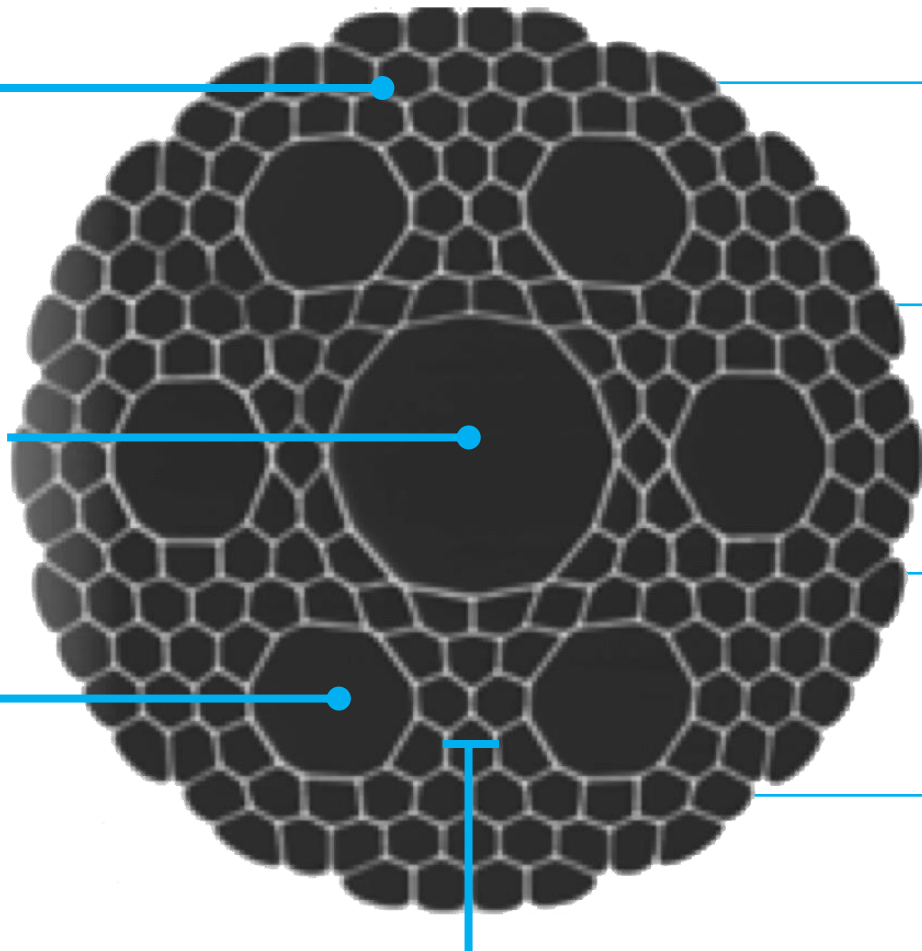
AccuCore HCF (Hollow-Core Fiber) Cables Operational Today in Real Networks

The Low-Latency Transmission is Driven by OFS' Patented Technology and Know-How

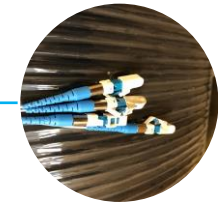
Period Air/Silica Cladding
Photonic Bandgap Fiber: For Low-Loss Confinement at Desired Wavelength

Hollow (air) Core

Shunt
OFS technology to improve signal purity



Cable
Indoor/Outdoor



Termination
Factory and Field



Installation
OFS Service



Component Selection
Passive and Active



Generation 1 AccuCore Provides Numerous Benefits

*It's a Cable Assembly with Transmission Wavelength Range of 1550 ± 5 nm
Supporting Lengths up to 2 km*

FEATURE

- Hollow-core fiber
- 4-fibers per Cable
- Standard SMF Connectors
- WDM Transmission
- Cable Manufactured with Plenum Rated Material

BENEFIT

- >30% Latency Improvement
- 2 HCF + 2 SMF or 4 HCF
- Ease of Use
- High Capacity
- For Indoor/Outdoor Use

Acronyms: WDM is wavelength division multiplexing; HCF is hollow core fiber; SMF is single mode fiber (i.e., glass core); nm is nanometer; km is kilometer

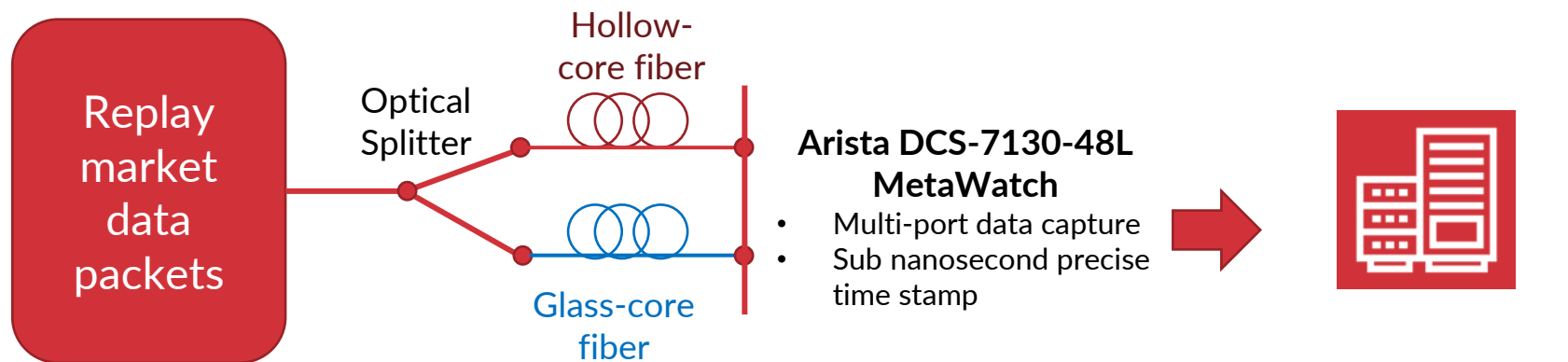


Key Result

AccuCore HCF fiber optic cable was
1.6 nanoseconds faster per meter
compared to AllWave[®] FLEX Max Optical Fiber
(i.e., standard glass-core single mode fiber)

<https://stacresearch.com/OFS210430>

Test Setup to Measure Time Difference: Hollow vs. Glass Core



Time Measurement

Compare data arrival time for cables of same length (100, 10, and 3 meters)

- cable containing hollow-core fiber
- cable containing glass-core fiber

STAC Benchmark Test Setup

<https://stacresearch.com/OFS210430>



Time Difference: AccuCore HCF faster than glass-core fiber

- 1.6 nanoseconds per meter latency improvement
- Latency improvement is independent of length

Cable Length (m)	Benchmark Measured Latency* (nanoseconds)	Typical datacenter connections
100	165.4**	Tower to “meet me” room or cage to cage
10	16.6	Rack to rack
3	4.7	Intra rack

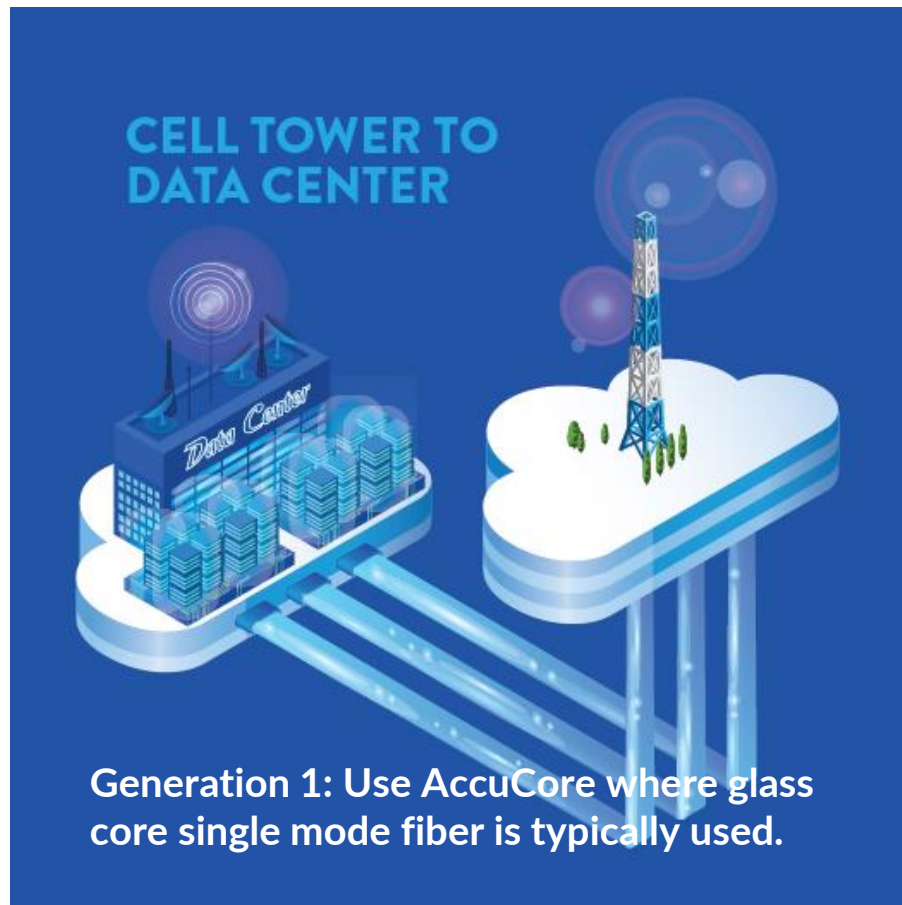
*Median arrival delta

**Estimated measurement uncertainty 0 to -0.08

<https://stacresearch.com/OFS210430>



AccuCore Trims Transmission Time



Key Benchmark Accomplishments

- Delivers 1.6 nanoseconds per meter latency improvement
- Deterministic—traffic independent
- No packets dropped in any test run
- Link lengths from 3 meters are supported

Generation 2 Under Development
1310 nm transmission window
Longer lengths and Amplified systems

OFS is happy to discuss user needs



Thank You

Any Questions?

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A Furukawa Company