...umění optické komunikace

Fiber optics monitoring

- physical layer

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PROFiber NETWORKING

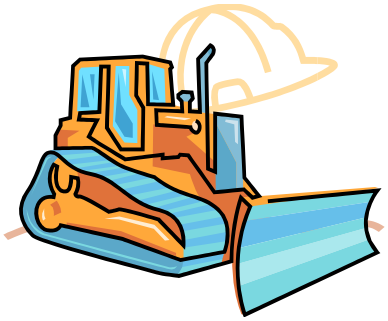
1. Bugging detection
2. Fiber optics monitoring and basic principle – OTDR & TM
3. Live fiber monitoring
4. Passive mechanical detectors connected via optical fiber

Fiber optics monitoring motivation

Ageing

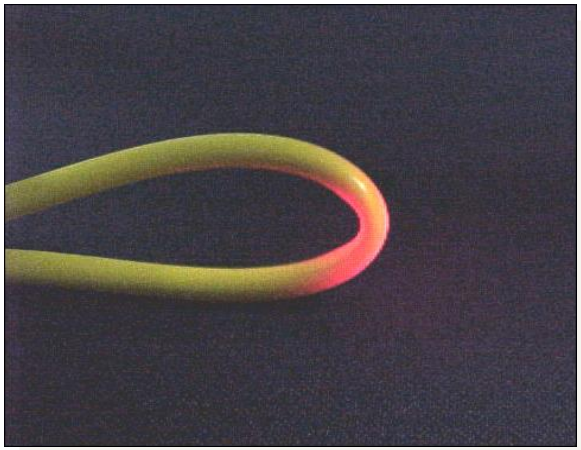
External influence

- weather
- construction
- thief
- security

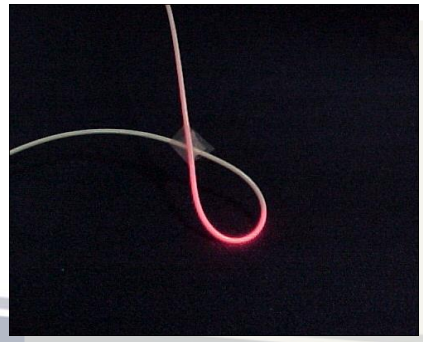


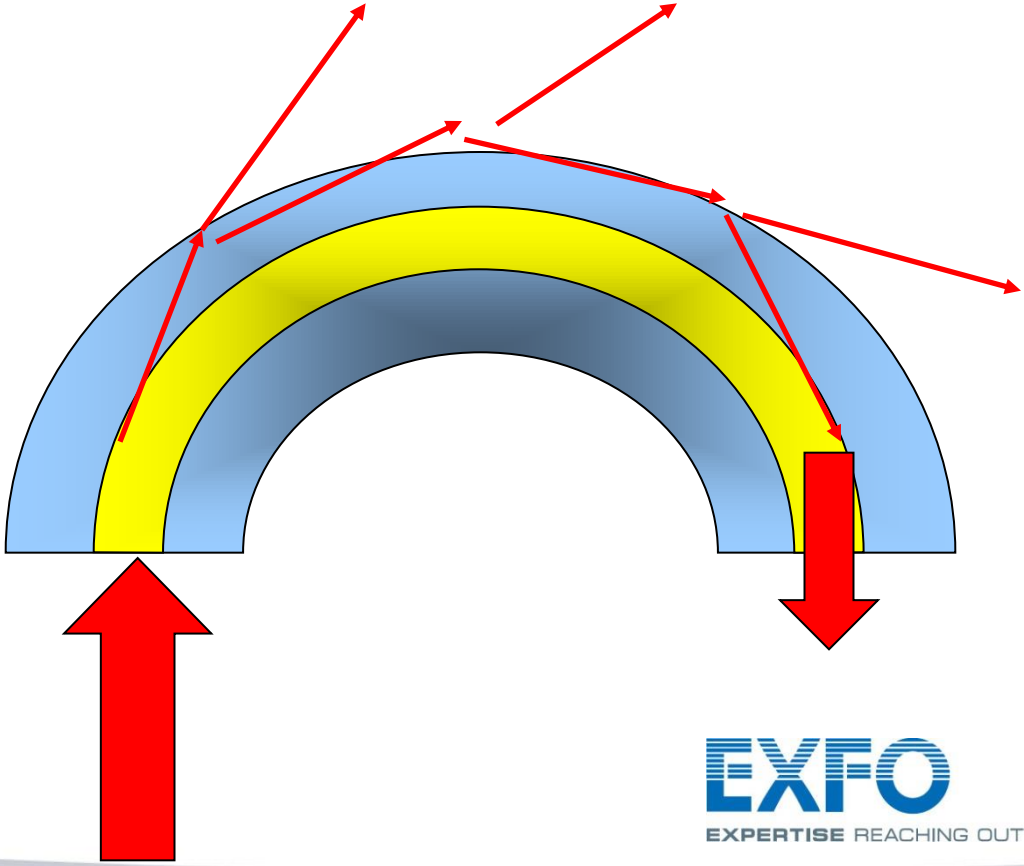
PROFiber NETWORKING

Macro bend – bugging the fiber



Minimal allowed diameter for SM fiber is 6 cm



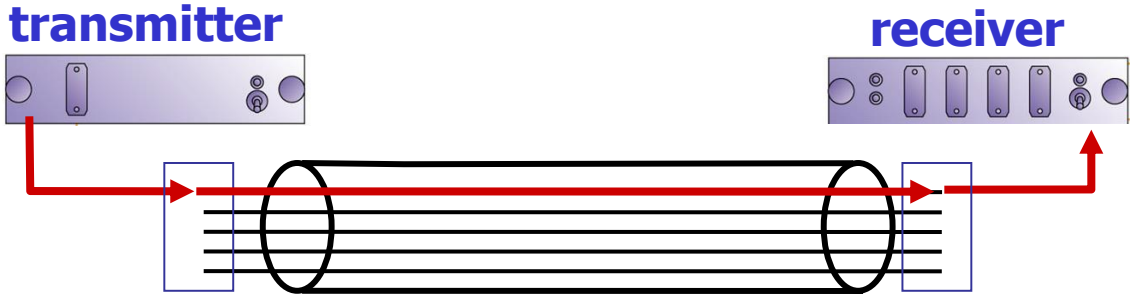


EXFO
EXPERTISE REACHING OUT

Macro bend – bugging the fiber

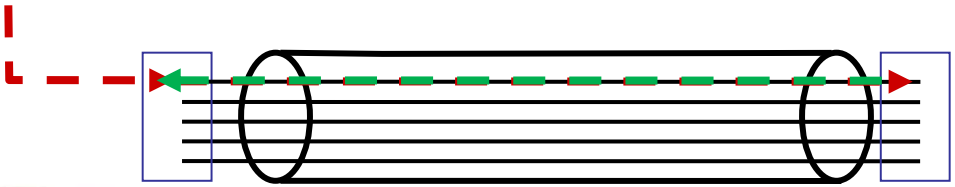
- Live fiber detection clip
- Power level detection
- Different modulation detection CW/ 270Hz/ 1kHz/ 2 kHz
- Direction of live signal
- Adapters for different buffers

Monitoring – transmission vs. OTDR



- Continuous monitoring
- The best sensitivity
- Speed of detection

OTDR

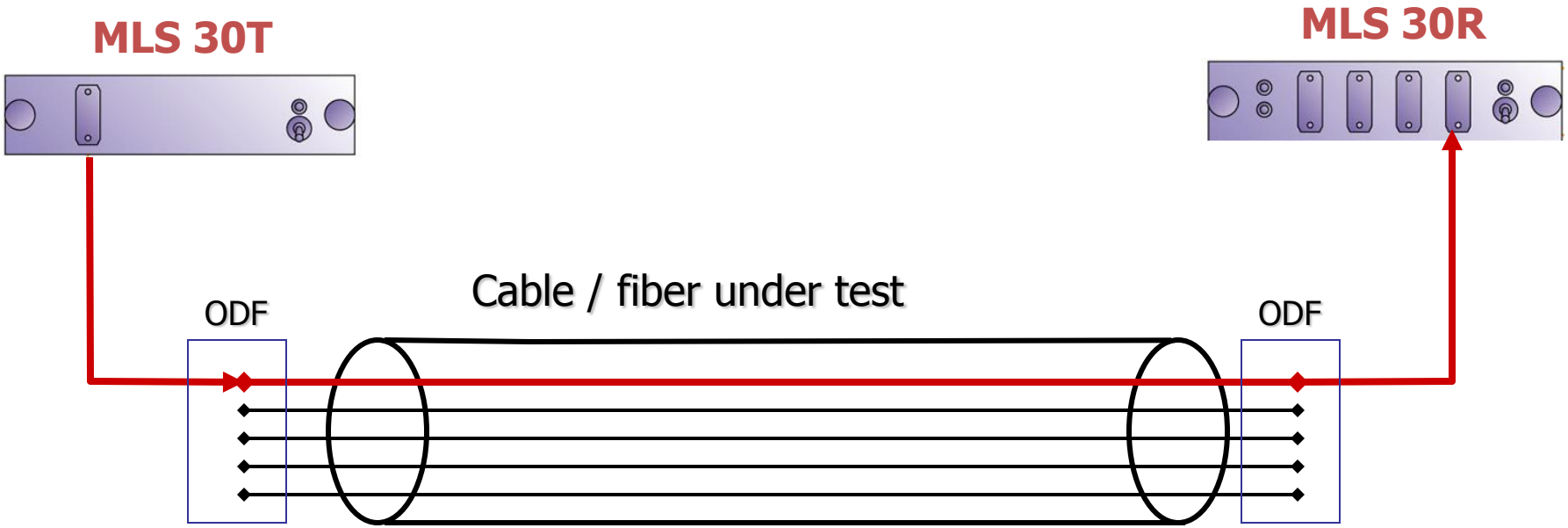


- Distance to fault
- Single end
- Geographical localization

Zdroj: EXFO, SQS

Transmission method

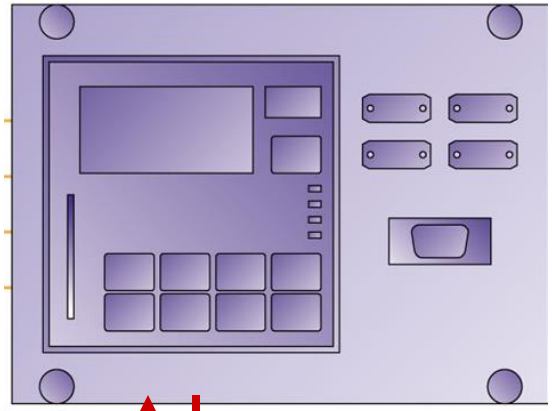
Dark fiber monitoring



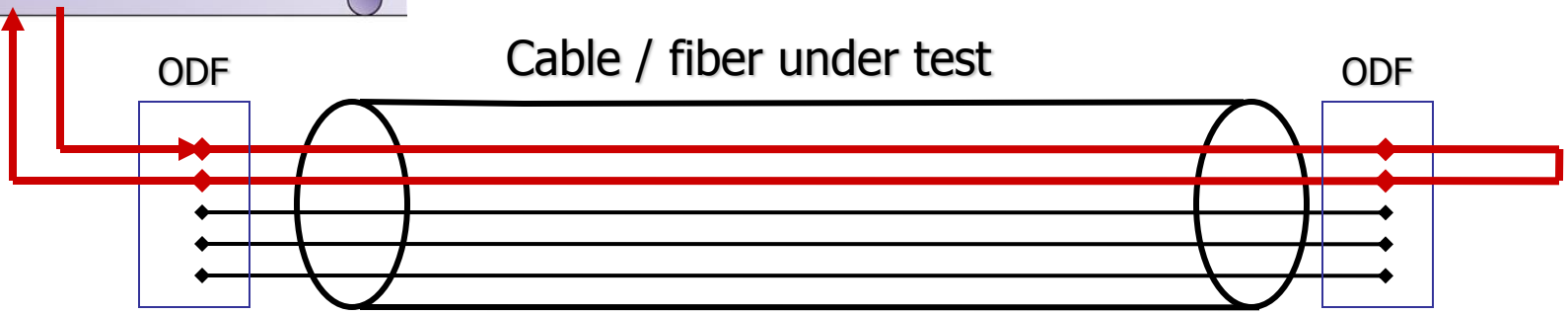
Zdroj: SQS

Transmission method

Dark fiber monitoring – loop back



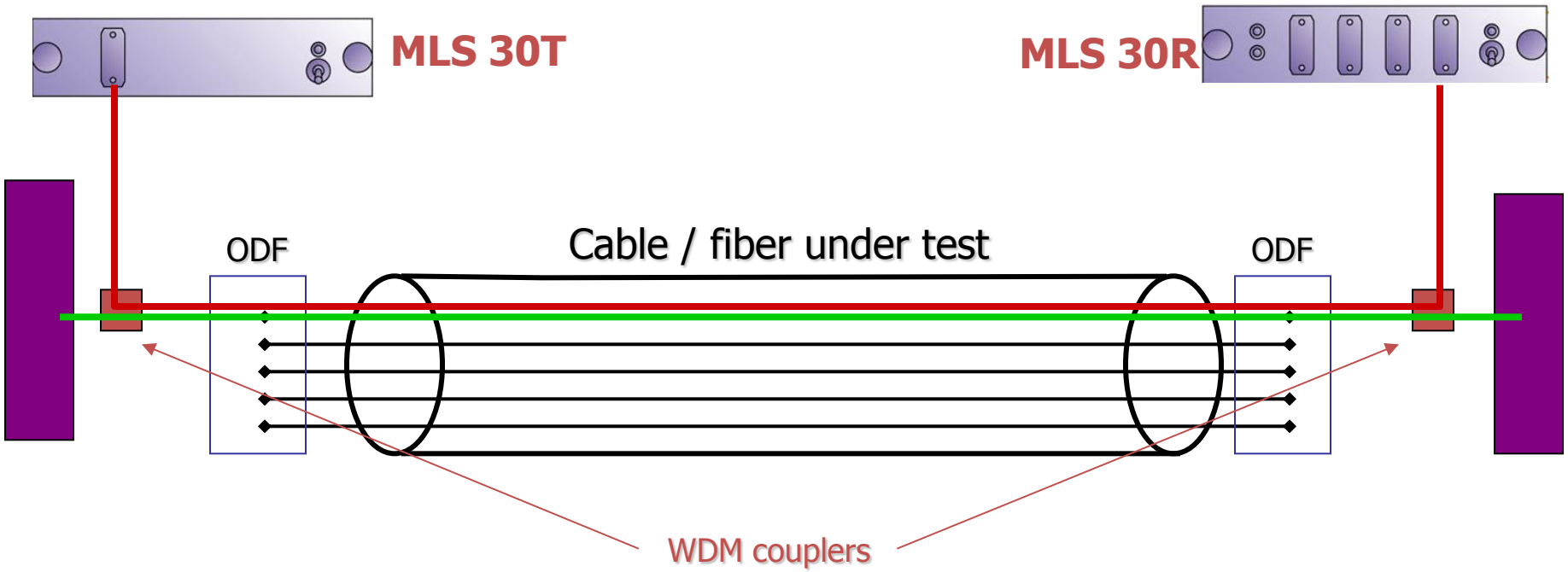
Combine unit



Zdroj: SQS

Transmission method

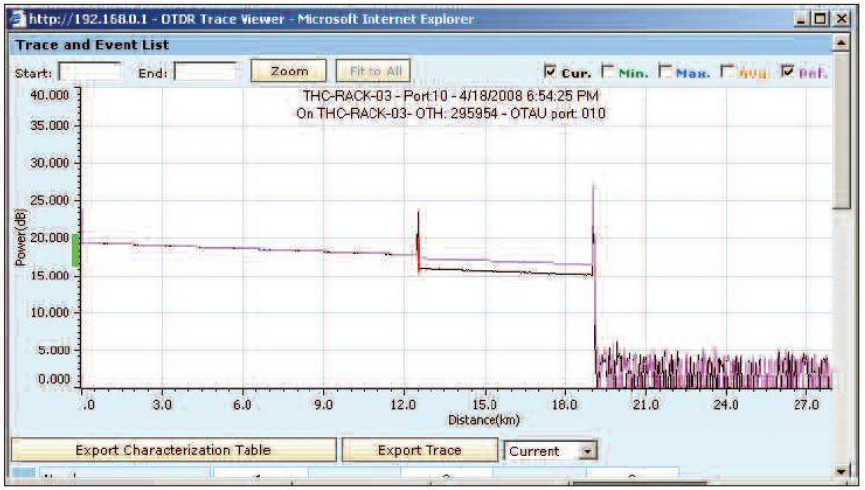
Live fiber monitoring

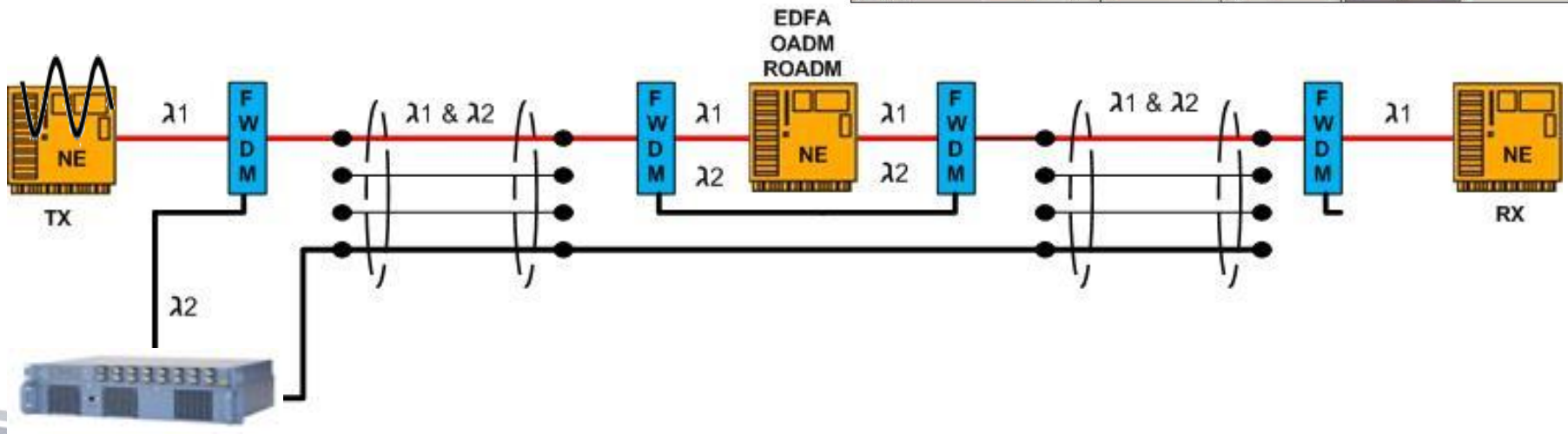


Zdroj: SQS

OTDR method

- **Dark fiber monitoring**
- **Live fiber monitoring**

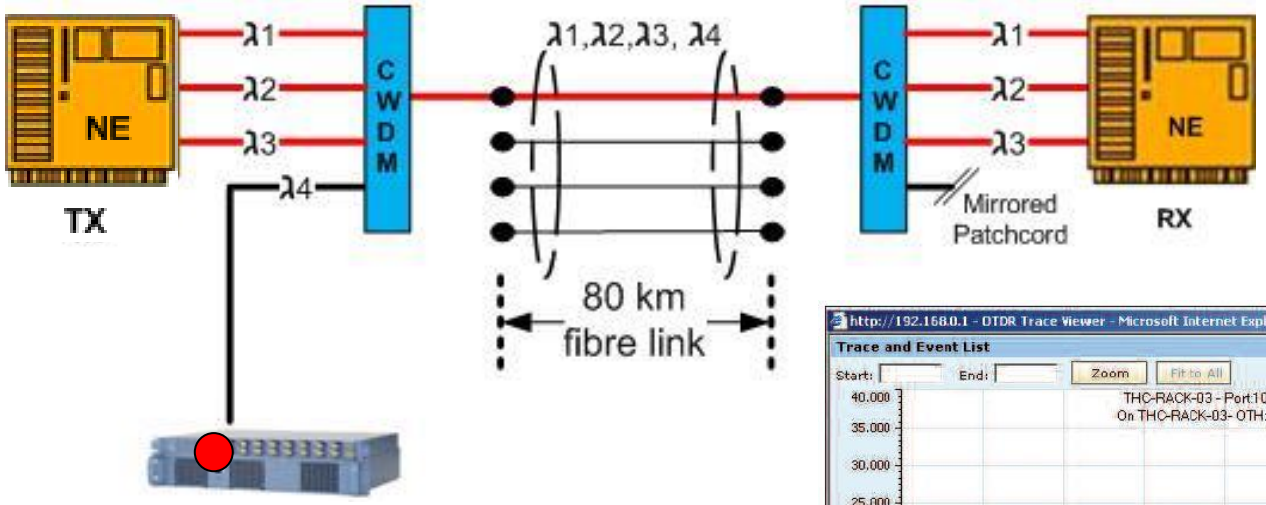


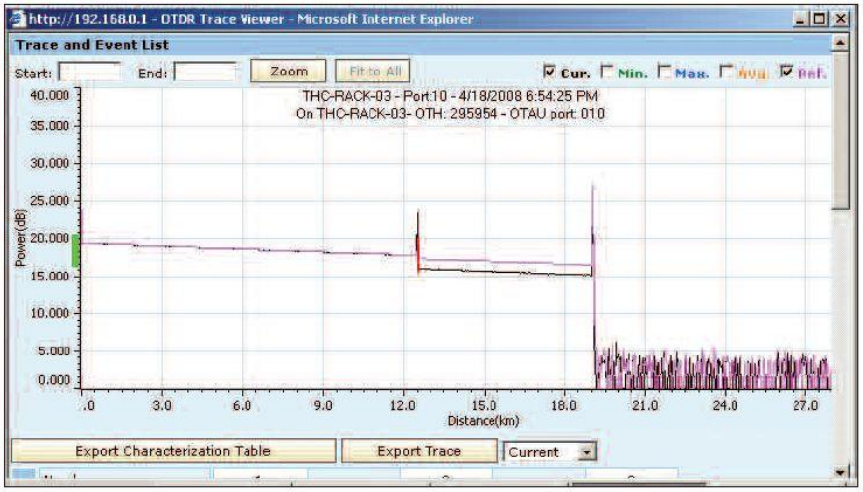


Zdroj: EXFO

OTDR method

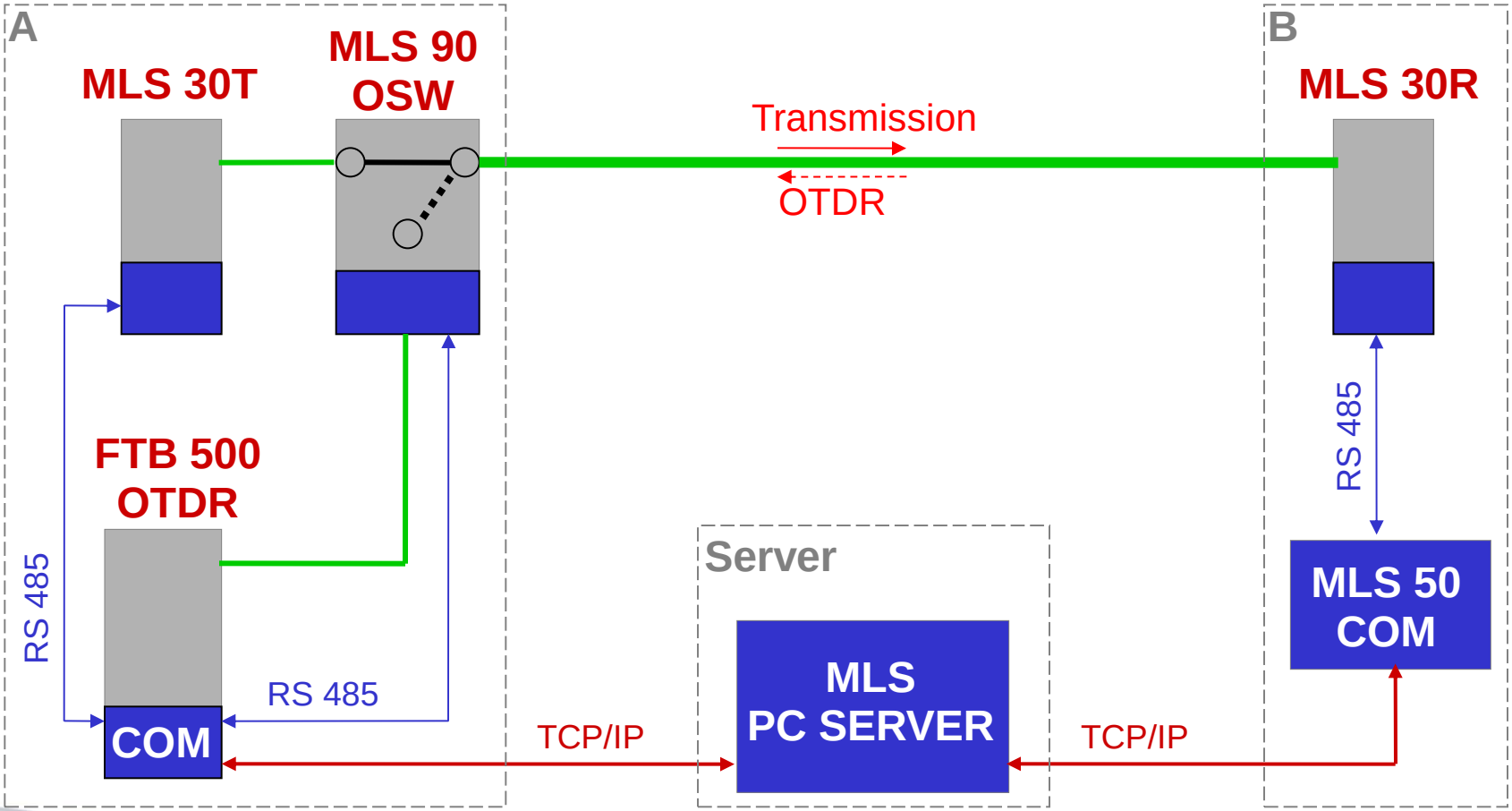
- **CWDM system monitoring – in channel**





Zdroj: EXFO

Advanced RFTS – OTDR + transmission



Zdroj: SQS

Monitoring solution

EXFO
EXPERTISE REACHING OUT

SQS
VLÁKNOVÁ OPTIKA

EXFO NQMS*fiber*

NQMS*fiber*
NETWORK QUALITY MONITORING SYSTEMS

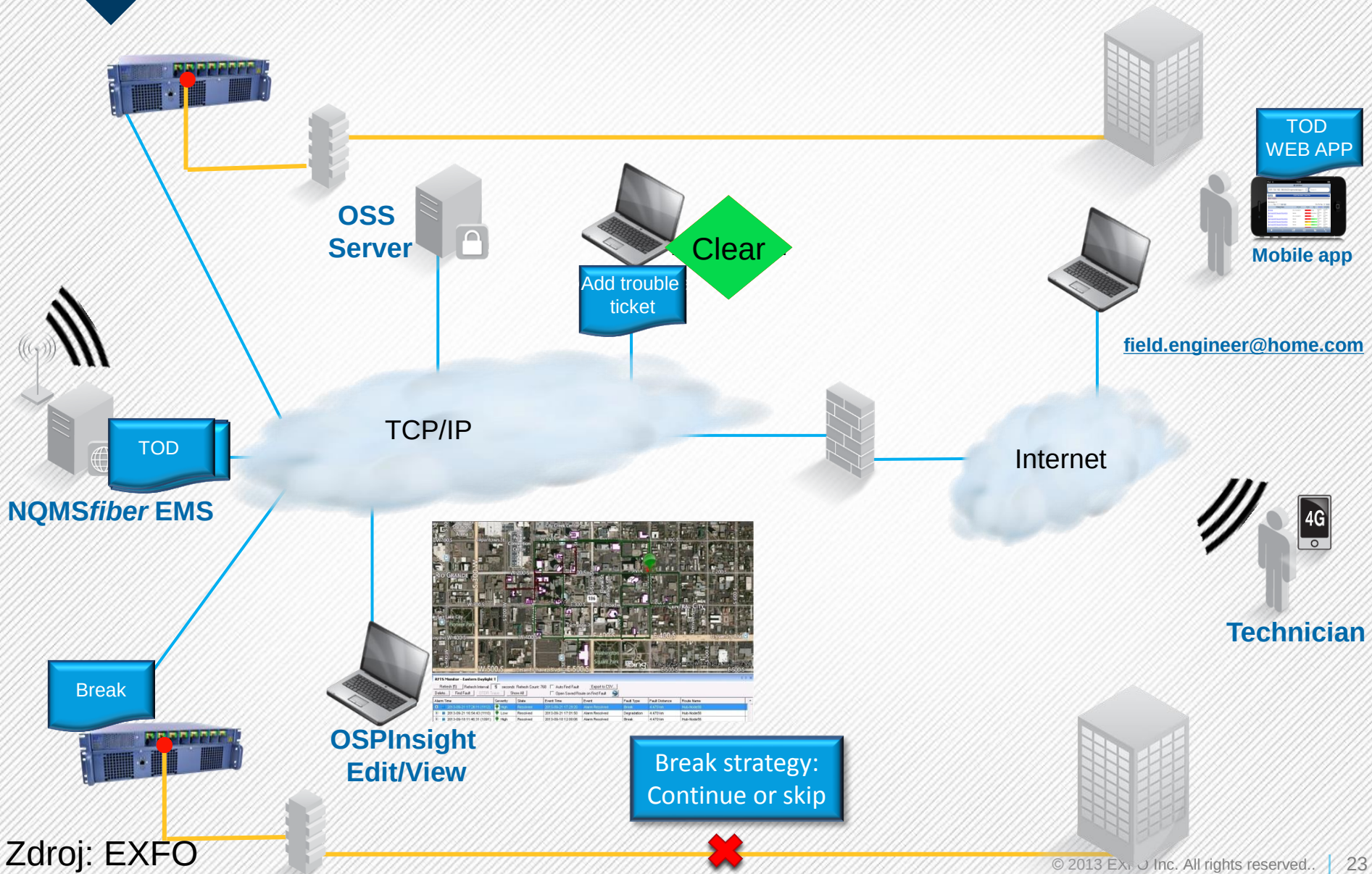
Monitoring Line System

MLS

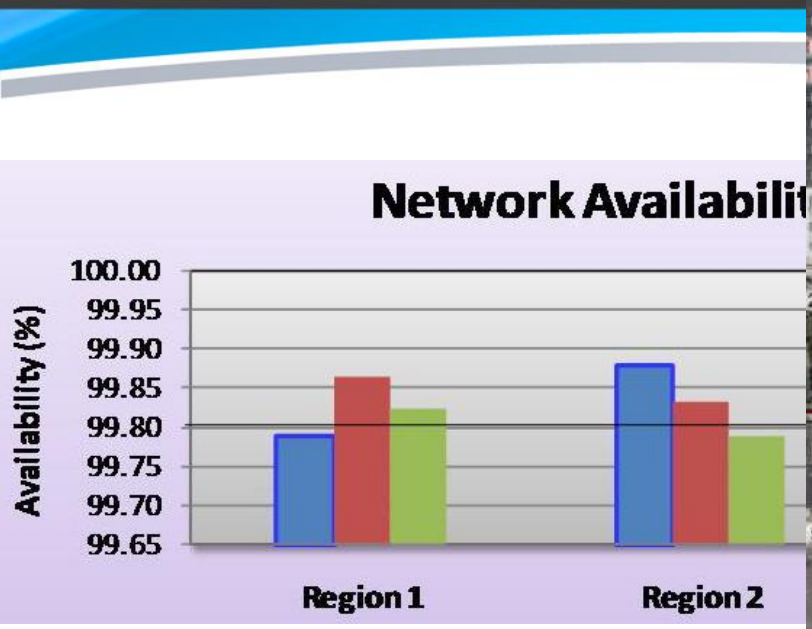
PROFiber NETWORKING

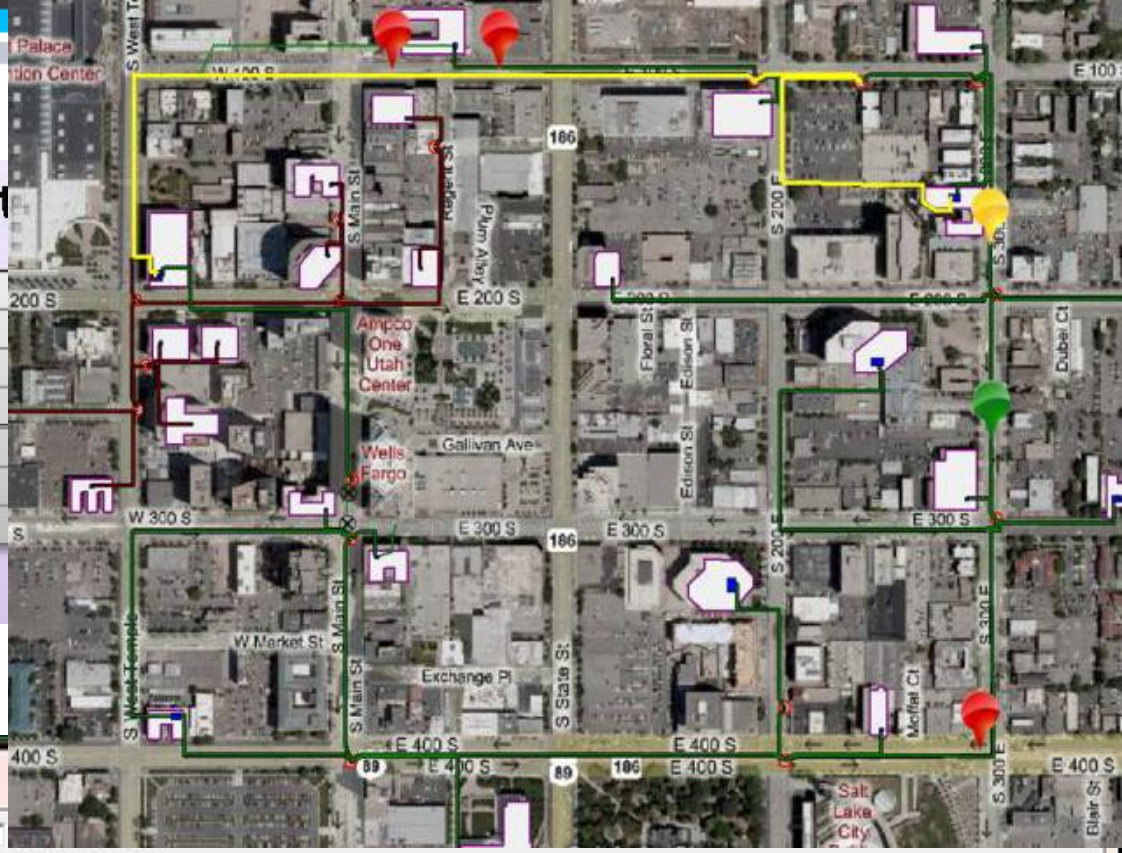
NQMS*fiber*

How does it work?



Zdroj: EXFO





RFTS Monitor - Mountain Daylight Time

Refresh (7) | Refresh Interval: 15 seconds | Refresh Count: 6

Delete...

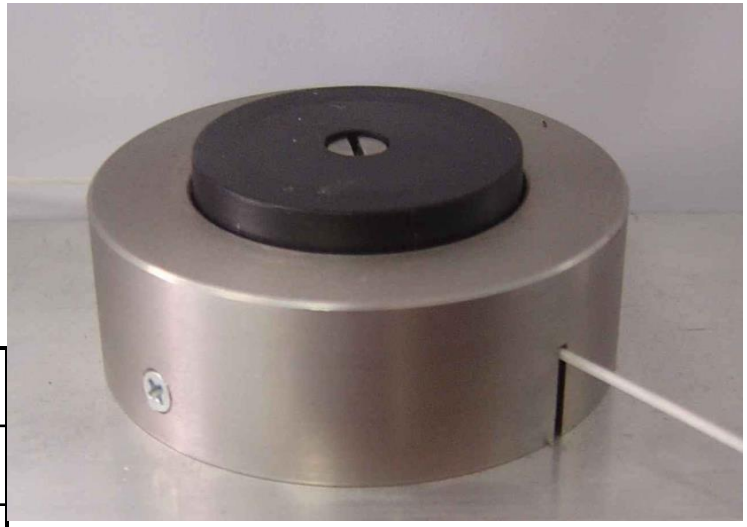
Alarm Time							
2008-08-10 08:1...	High	Pending	2008-08-10 08:12:21	Alarm Acknowledged	Break	.6 km	4
2008-07-30 14:1...	Low	Pending	2008-07-30 23:52:41	Alarm Acknowledged	Break	1.508 km	101-A: 6
	Med	Pending	2008-07-30 15:58:32	Alarm Created	Break		
	High	Pending	2008-07-30 14:20:23	Alarm Created	Break		
	High	Pending	2008-07-30 14:18:48	Alarm Created	Break		
2008-03-03 12:2...	High	Pending	2008-03-03 12:22:31	Alarm Acknowledged	Break	.5 km	4

Mapové podklady off-line, on-line (Google Maps, Bing Maps, Open Street)

Zdroj: EXFO

Sensor

Pressure switch



Type	-	mechanical optical fiber sensor
Amax operation range (1550 nm)	dB	0.1 to 9.00
Repeatability	dB	± 0.05
Operating temperature	°C	from -25 to 60 *)
Structural materials	-	plastic, stainless steel
Weigh (functional base)	kg	0.15

Sensor

Humidity switch

Attenuation increase at 100 % rel. humidity and surveying wave length of 1625 nm	0.8 dB +0.3 / -0.2
Response time	5 min.
Min. bending radius of the fiber	20 mm
Dimensions (L x W x H)	46.5 x 36.0 x 6.5 mm

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Thank you for attention

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