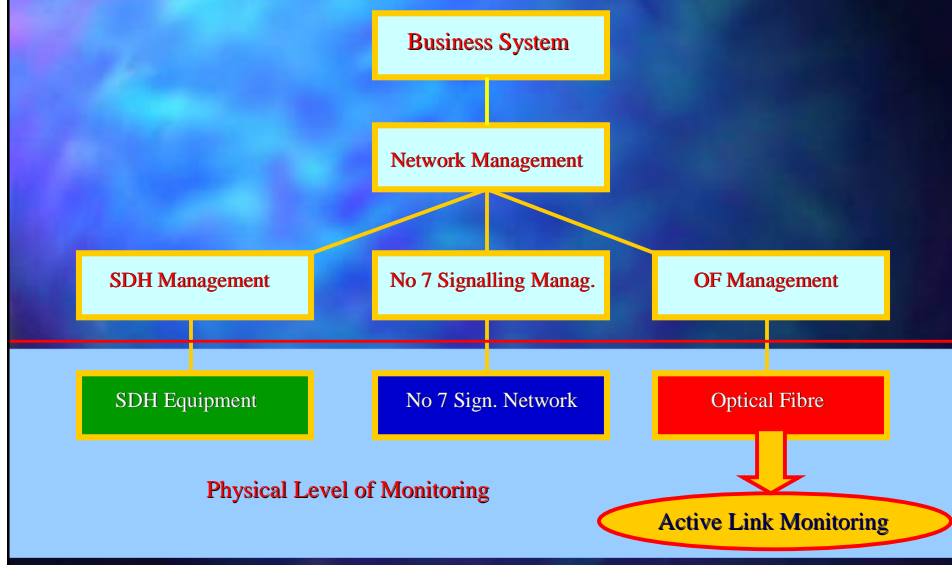


Dohledové systémy v optických sítích

Ing. Zdeněk Švitorka
Ing. Vratislav Blažek



Active Link Monitoring status Monitoring Structure Arrangement



Problems ?

FO Attenuation changes






➔

Solution !

Active Link monitoring

Optical route risk factors :

- n Mechanical long term cable stresses (installation, cable bedding)
- n Climatic and temperature loads (heat, frost, water leakage)
- n Mechanical quick or random effects (vibrations, tension or compression irregularities, random loads)
- n Fatal cable route faults (building activity, willful damage or robbery)
- n Undesirable activities by the trespassers (hackers, espionage agencies)

Reasons for Active Monitoring

Exclusive Active Monitoring functions :

- ✦ **Failure equipment/route determination**
 Only Active Monitoring can recognise and qualify transmission troubles:

EQUIPMENT

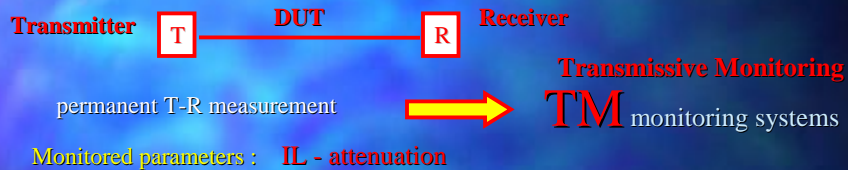
↔

ROUTE
- ✦ **Failure early recognition and warning**
 Active Monitoring is able to identify any route parameters degradation or failures before the equipment is influenced by these effects
- ✦ **Failure prediction**
 Due to use special database SW there is possible to evaluate not only route condition but also to predict something future development

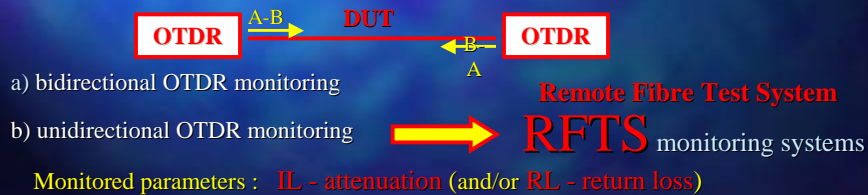
Active monitoring : IEC 61300-3-3

Monitoring principal methods :

DTR - Direct Transmission/Receiving Monitoring

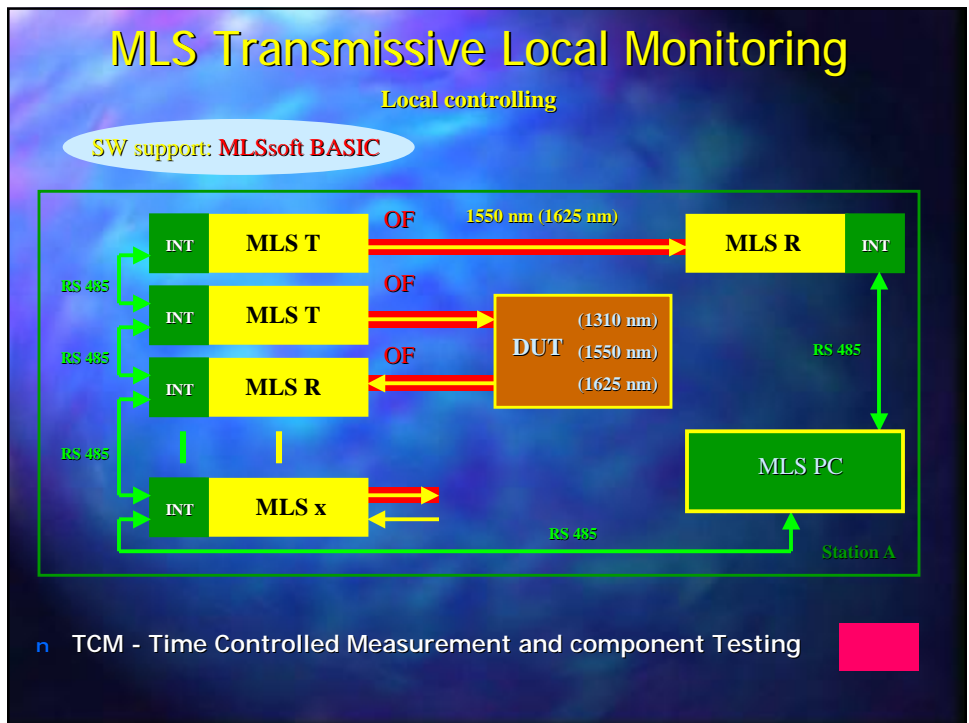
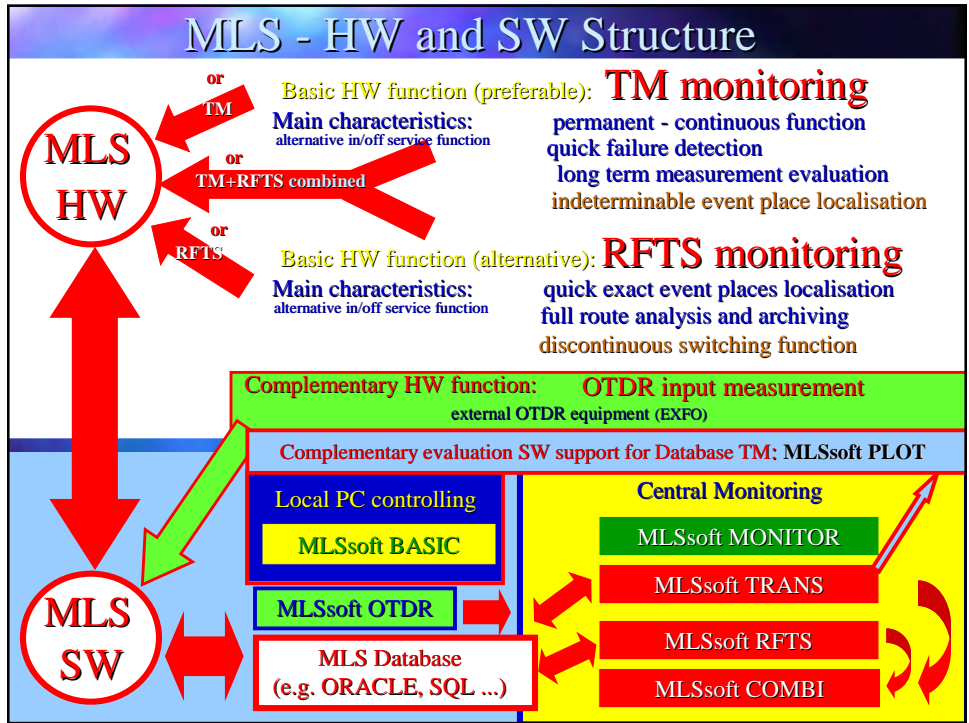


OTDR - Optical Time Domain Reflectometry Monitoring



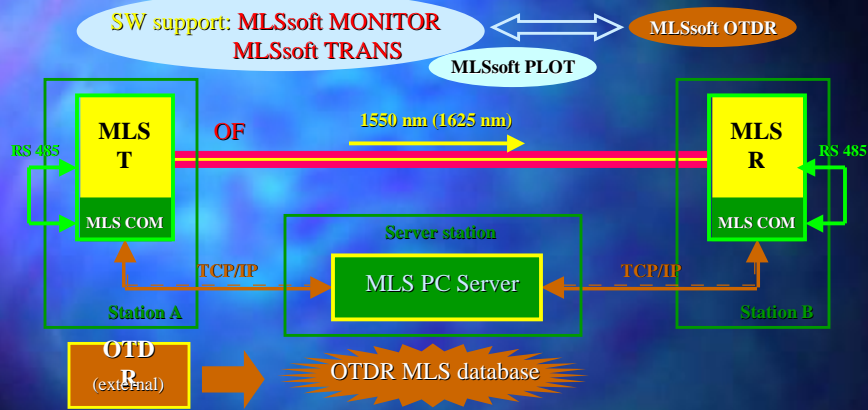
Combined active monitoring system ?

A stick figure stands next to a large yellow oval containing the text 'MLS !' with a registered trademark symbol. To the right, a starburst contains the text 'YES !'. Below this, a yellow box contains the text 'TM or/and RFTS system, fully equipped by original MLSsoft SW'. At the bottom, three ovals list 'MLS CWDM', 'MLS Ethernet', and 'MLS Sensor', with arrows pointing from the text above to them. The text '... and other extra programs !' is also present.



MLS Transmissive applications

(Remote controlling)

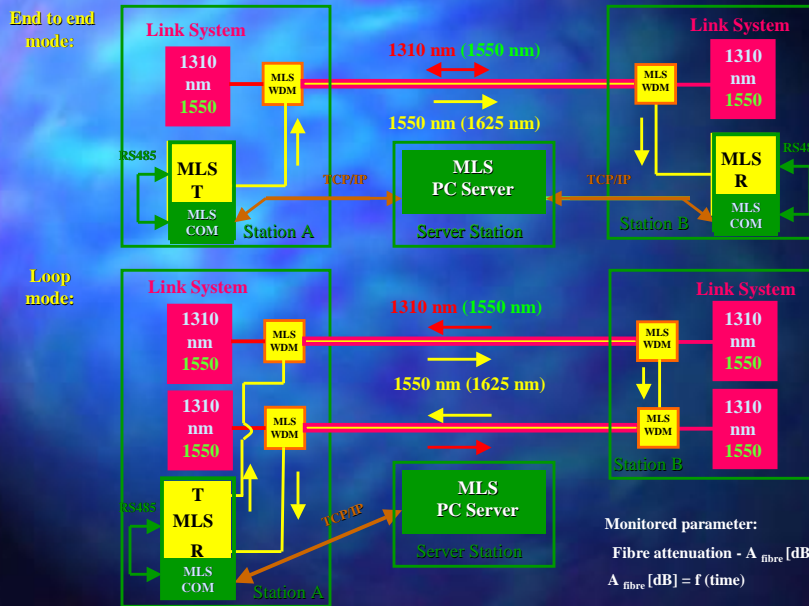


■ ISM - In Service Monitoring end to end or loop mode

■ OSM - Out of Service Monitoring end to end or loop mode

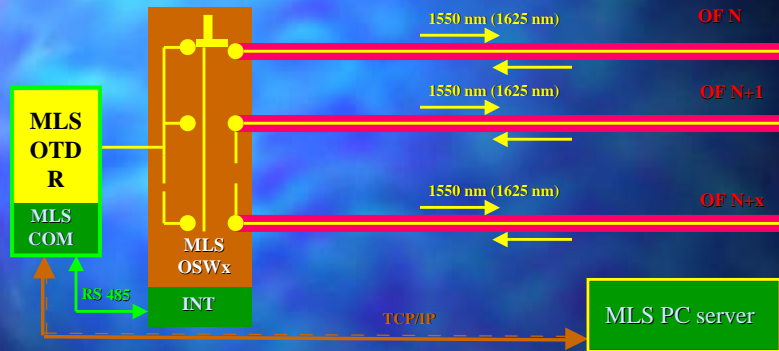
MLS - TM Transmissive Applications

Sample: ISM - In Service Monitoring - Optical fibres under load



MLS - RFTS Reflectometry applications

SW support: **MLSoft RFTS**



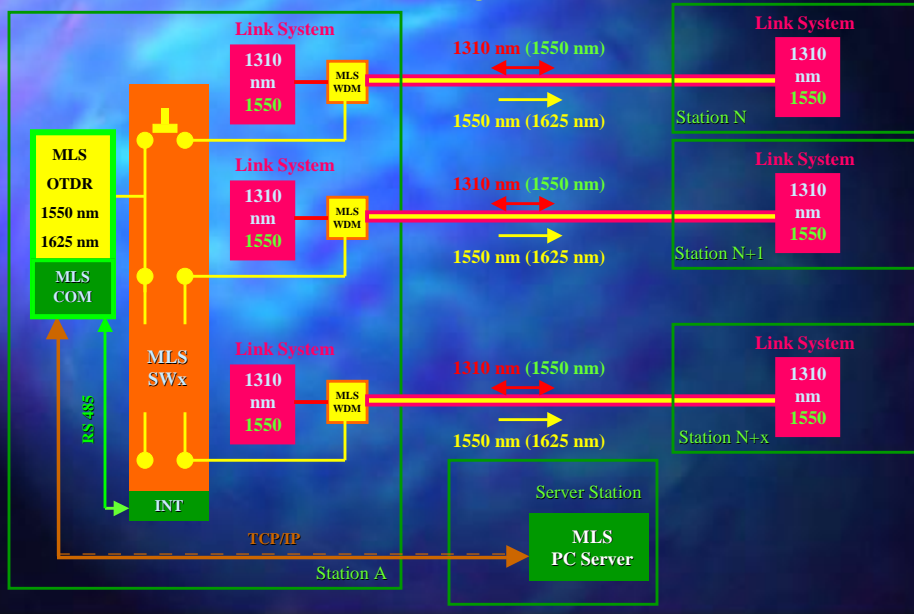
n ISM - In Service Monitoring end to end mode

n OSM - Out of Service Monitoring end to end mode



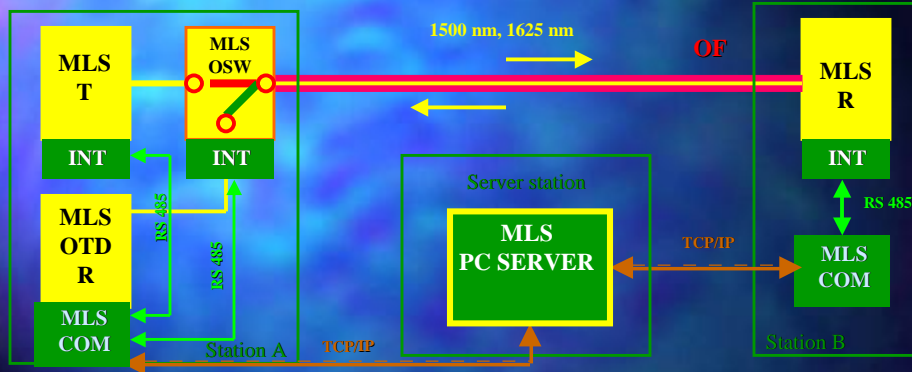
MLS - RFTS Reflectometry Application

Sample: **ISM - In Service Monitoring - Optical fibres under load**



MLS - TM/OTDR Combined Applications

SW support: **MLSoft COMBI**

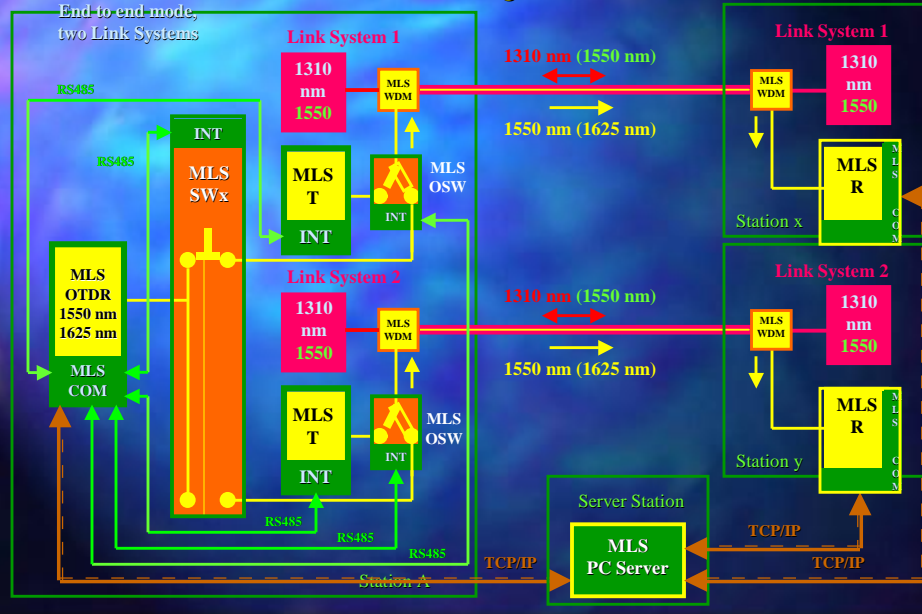


ARFTS - Advanced Remote Fibre Test System

MLS - TM/OTDR Combined Applications

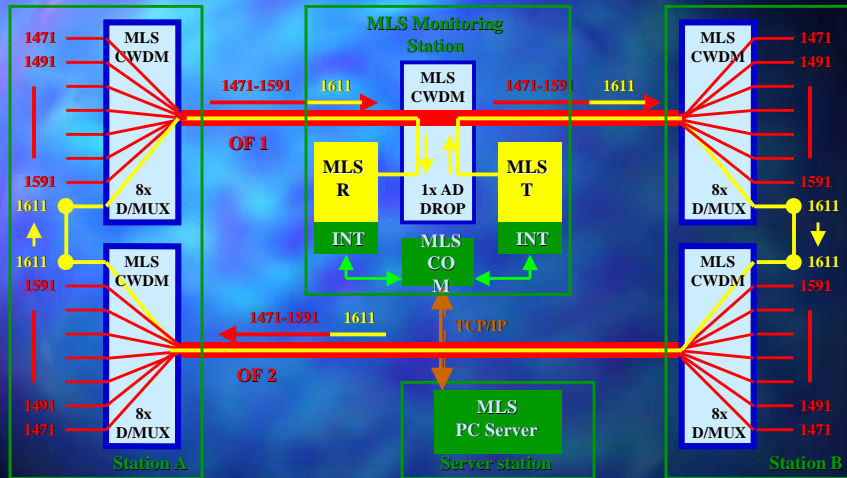
Sample: **ISM - In Service Monitoring - Optical fibres under load**

End-to-end-mode,
two Link Systems



MLS - CWDM Program

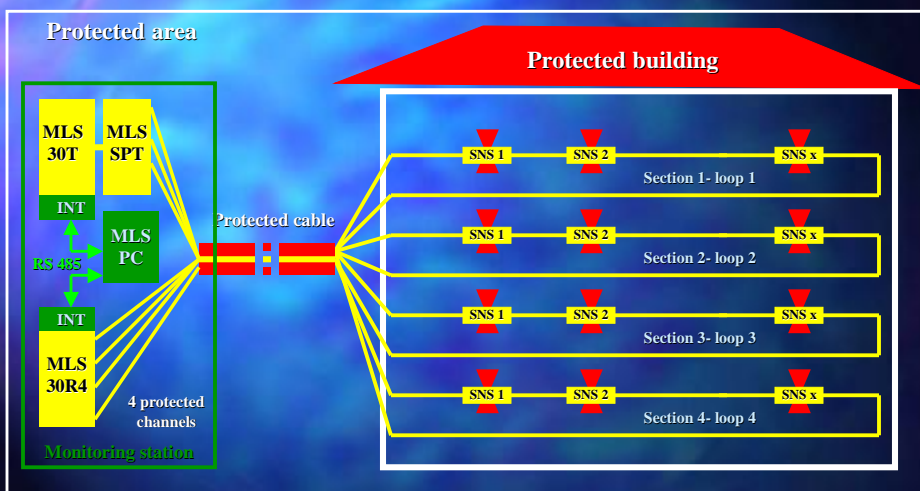
Sample: 7+1 CWDM Channels Monitoring - Ad & Drop Loop Mode



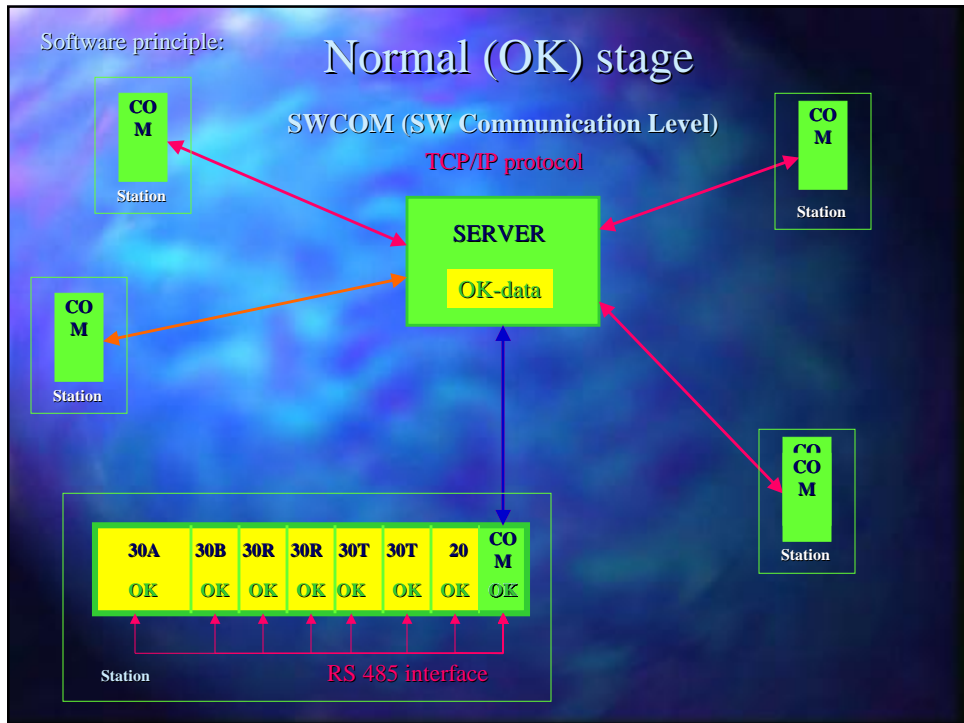
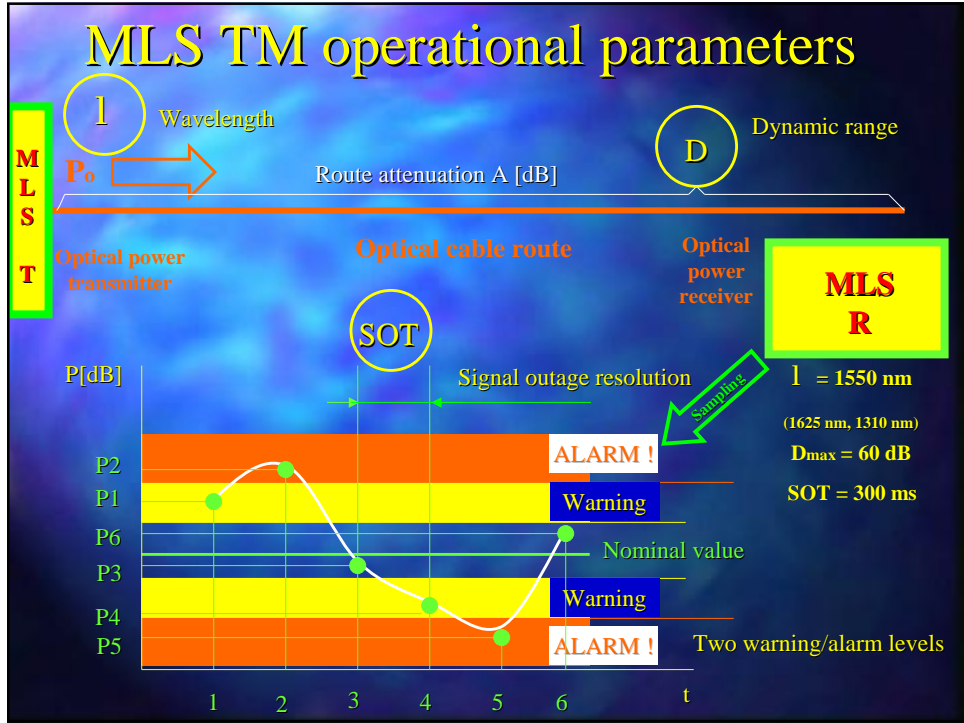
ARFTS - Advanced Remote Fibre Test System

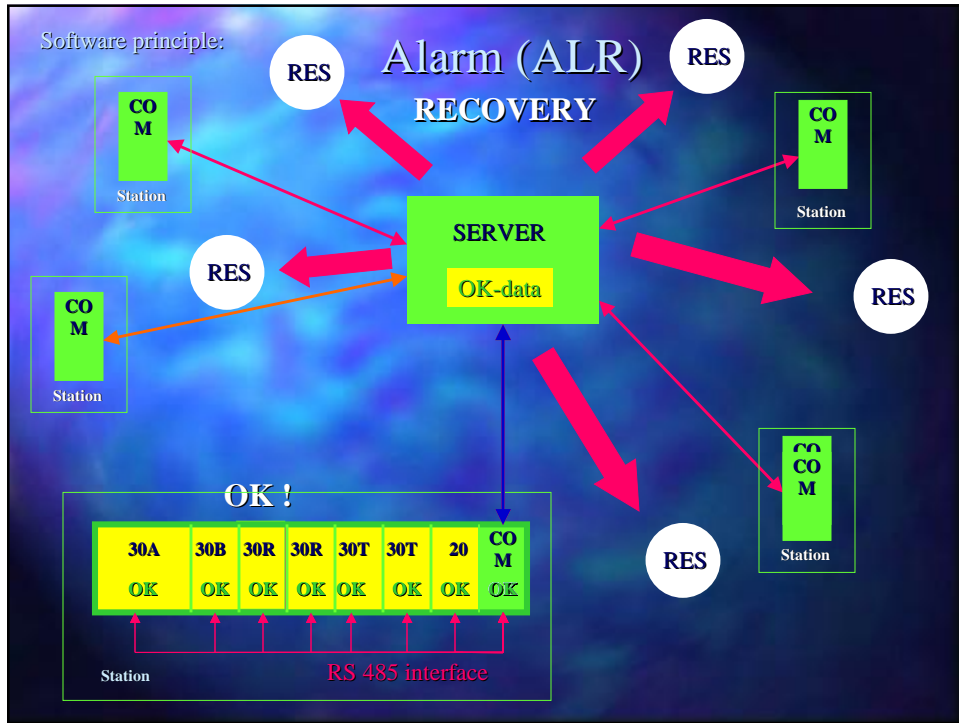
MLS - Sensor Program

Sample: MLS sensor active protection - 4 CH building configuration



FOSAP - Fibre Optic Sensor Active Protection











MLS 2006

Hardware device

Modular construction design

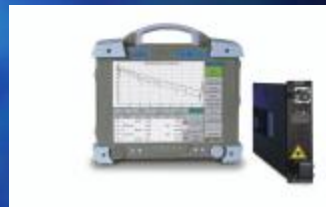
A) Operating modules - measurement units :

- n Transmitter units  or  series
- n Receiver units  or  series
- n Combined T/R units  series
- n Complex autonomous units  series

Modular construction design

A) Operating modules – OTDR measurement units :

OSP unit: EXFO FTB-400



Telco RackMounted unit: EXFO IQS-500



Modular construction design

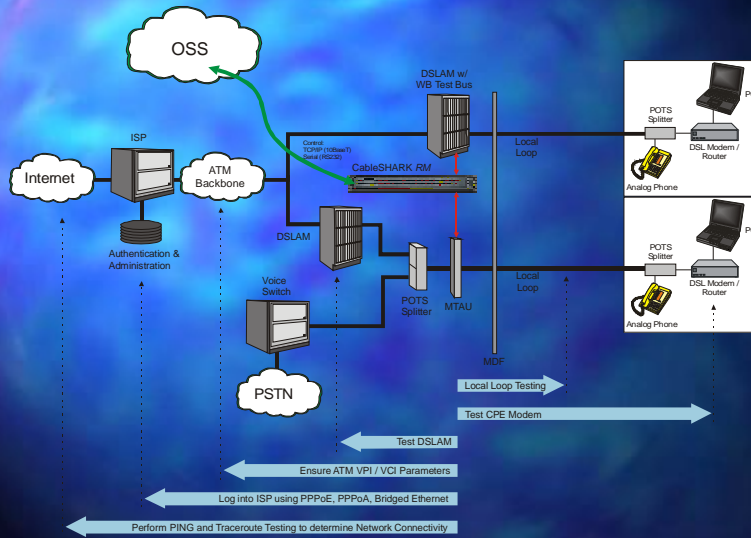
B) Service modules - units :

- n PSU Power Supply units  40 series
- n COM Control - Communication units  50 series
- n WDM and CWDM units  60 series
- n SPT Splitter units  70 series
- n RACK (19" rack) units  80 series
- n ETH Ethernet units  90 series
- n SNS MLS Sensors  100 series

Network Quality Monitoring Systems



CableSHARK RM CO/REMOTE TEST HEAD



Děkujeme za pozornost