SOLIFOS
FIBER OPTIC SYSTEMS

Distributed Fiber Optic Sensing

Innovative Solutions to many Applications

Distributed Fiber Optic Sensing Applications

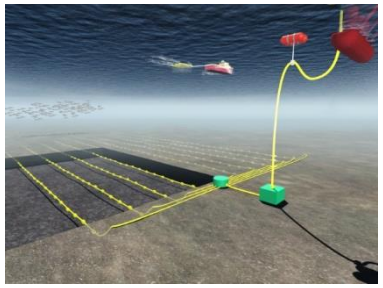
Geotechnics

Environment

Industry

Security

Structural Health Monitoring



Oil & Gas

Energy

Geothermals

Safety

Transportation

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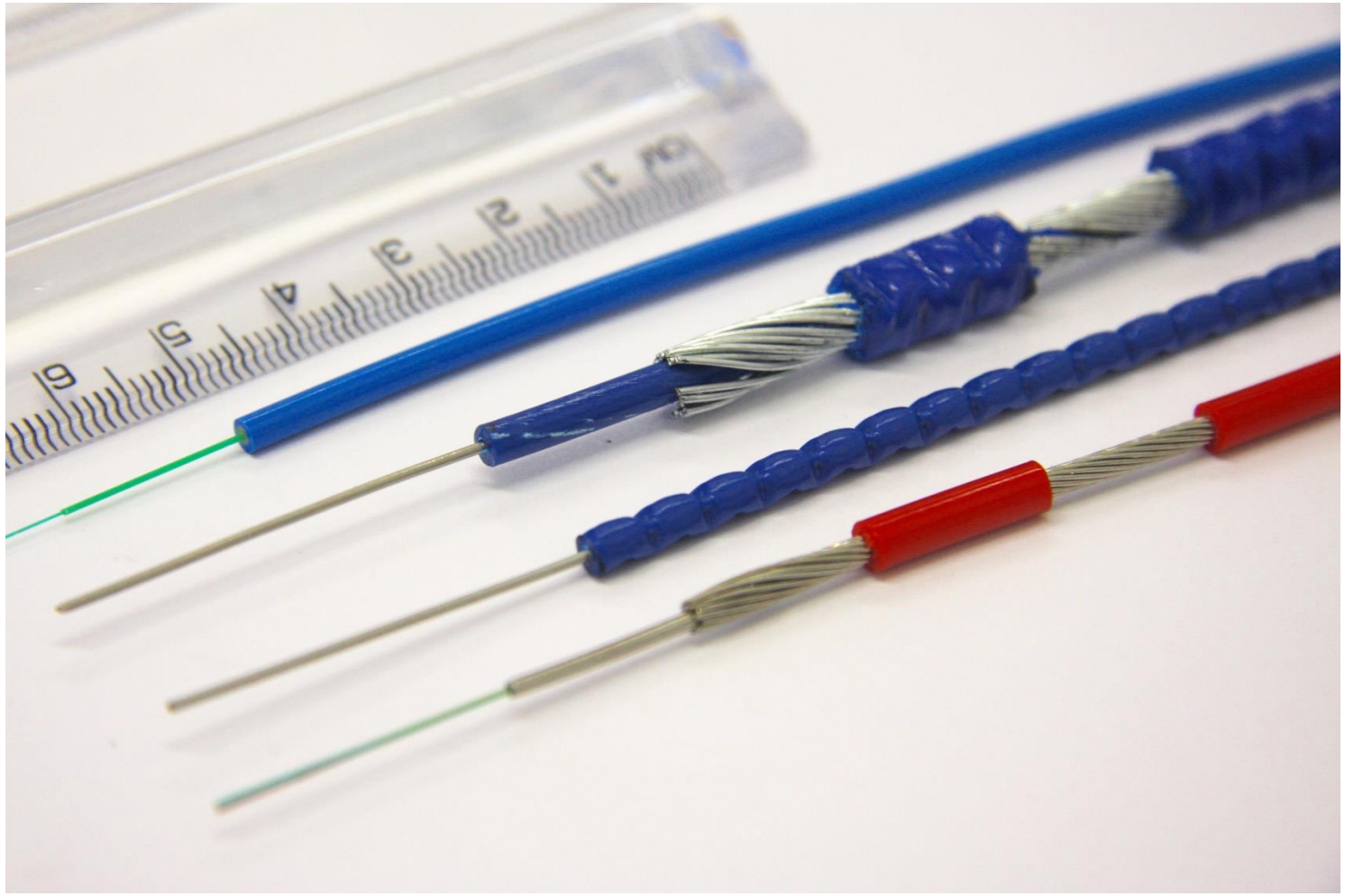
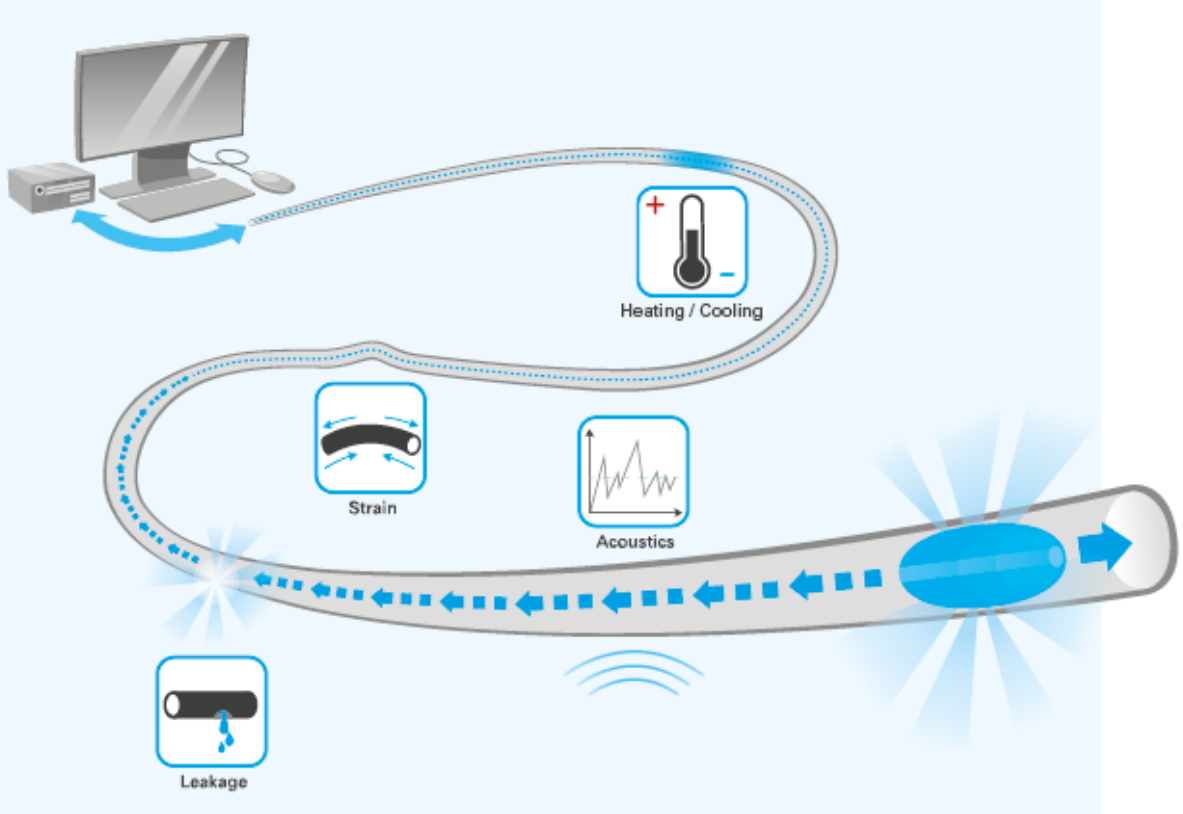
Purpose-designed DFOS cables



The optical fiber is the sensor



- The optical fiber is sensitive to:
  - Temperature
  - Strain
  - Acoustic signals
- Spatially distributed measurements
  - Up to 50km range with 1m resolution
  - ➔ 50’000 equivalent sensors !
- Monitoring of large structures
- Real-time

Examples of DFOS applications

DTS Temperature	DSS Strain	DVS Vibration	DAS Acoustic	Pressure	Chemical
– Asset integrity – Water infiltration – Moisture – Fire detection – Flow assurance – Process control – Power cable surveillance – Environment monitoring	– Tension – Compression – Structural Health Monitoring (SHM) – Curvature – Shape – Fatigue – Pressure	– Third Party Intrusion (TPI) – Plant management	– TPI – Perimeter security – Leak detection – SHM – Monitoring flow regime – Seismic reservoir monitoring – Wells monitoring – Fracking	– Leak detection – Process control – Flow assurance	– Leak detection – Humidity monitoring

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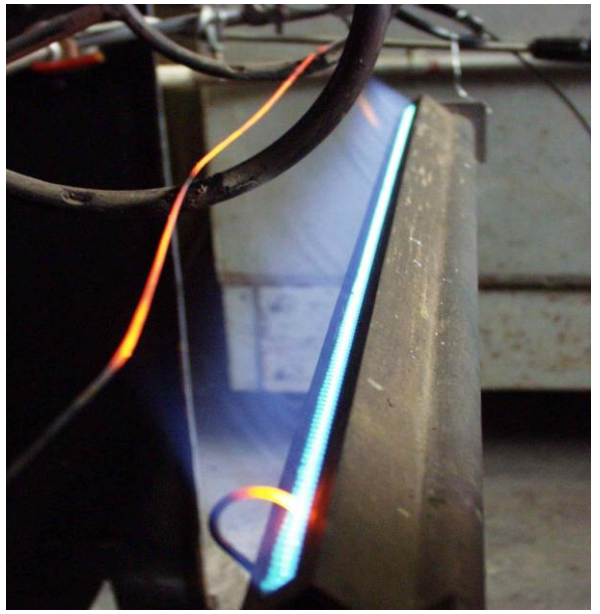
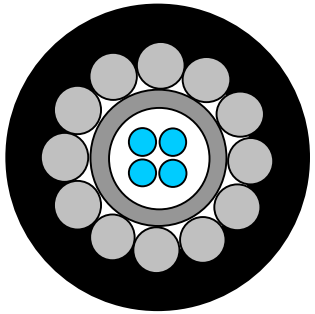
Linear Heat Detection

- Requirements
  - No flame propagation
  - No harmful smoke
  - Operation for over two hours at 750°C
- Cable design
  - Flame-resistant, non-corrosive outer sheath
  - May be either metallic or dielectric





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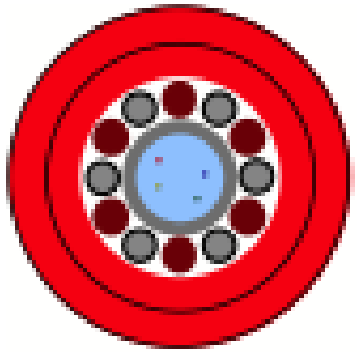
Actively Heated Fiber Optic DTS

- Fiber-optic cable with copper wires
- Applications
  - Detection of moisture
  - Water infiltration in structures and soil
  - Surveillance of dams, levees, embankments



Picture: Courtesy of EDF

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Detection of ground movements using soil-embedded distributed fiber optic sensors

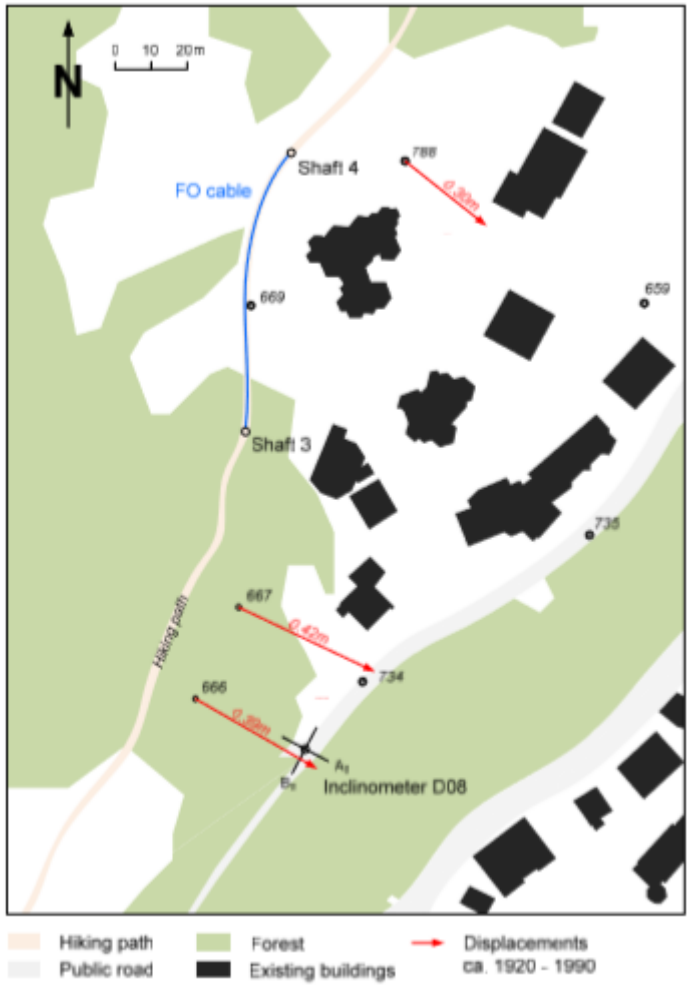

Figure 7. Site map

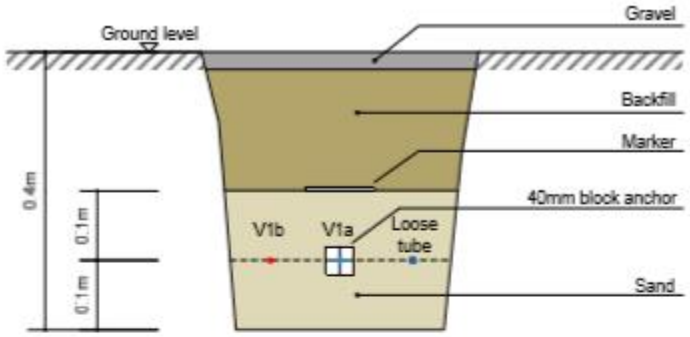

Figure 8. Cross section of the trench

Figure 9. Trench with fiber optic cables installed

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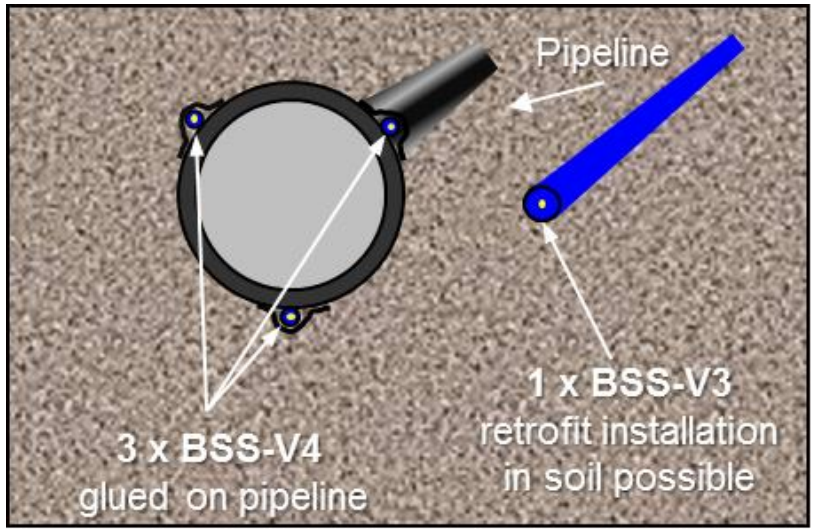
Structural Health Monitoring of pipeline

- Russian Sakhalin-Vladivostok pipeline
- 100 km
- Environment
  - Swamps
  - Permafrost
  - Tectonic active region
- Monitoring
  - Soil displacement
  - 3D-shape of the pipeline



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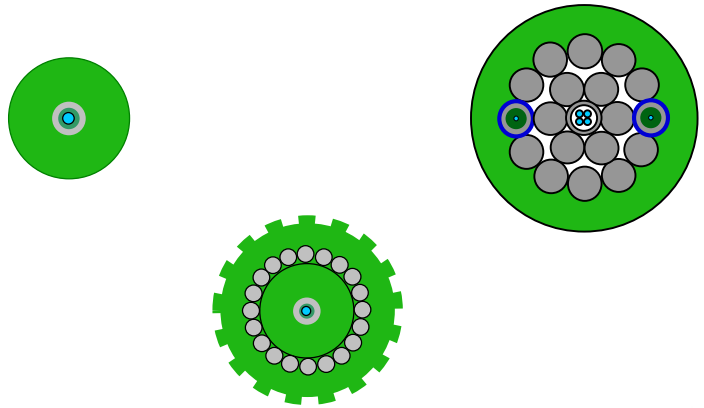
Distributed Acoustic Sensing

Application	Features
– Leak detection – Perimeter monitoring, TPI – Pricess control – PIG tracking in pipelines – …	– Robust – Rodent protection – Abrasion resistant – Compact, flexible – Hermetic, water-tight – Corrosion resistance – Acoustic signal transfer function – …



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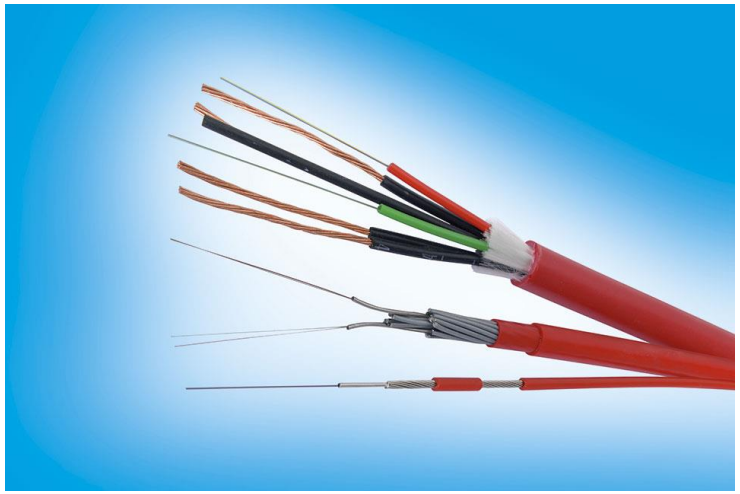
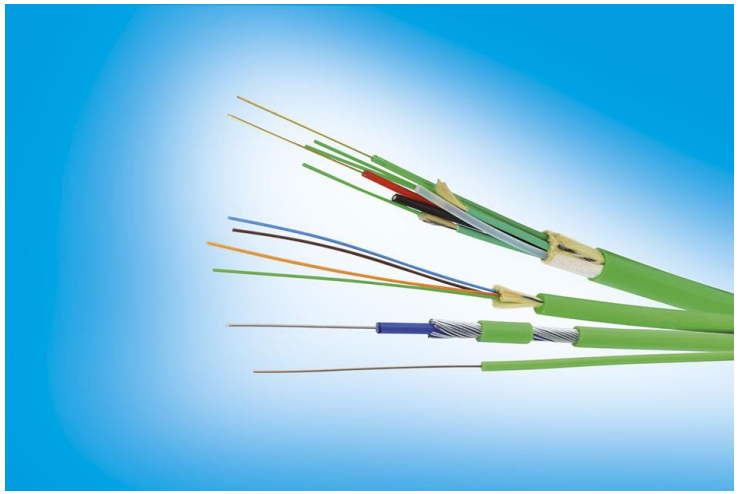
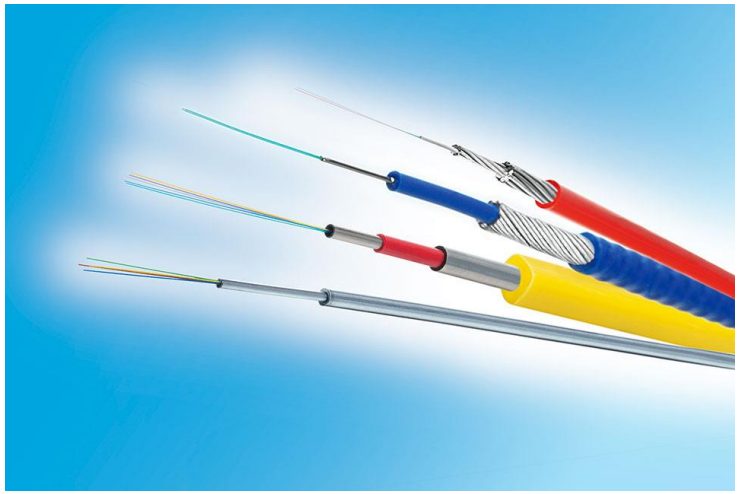
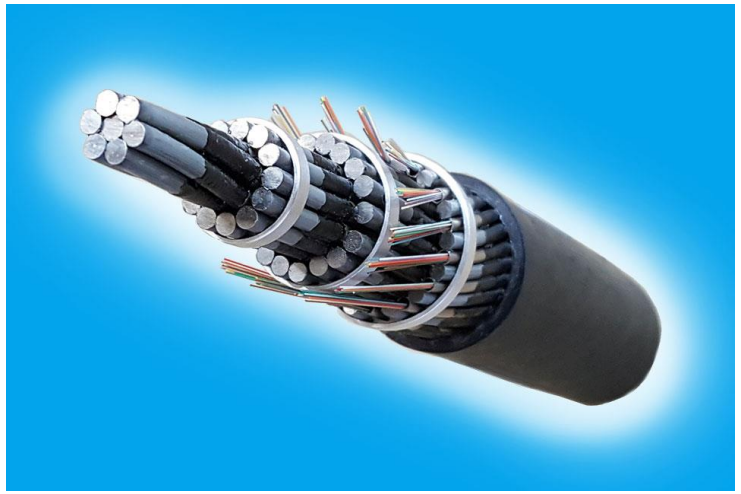
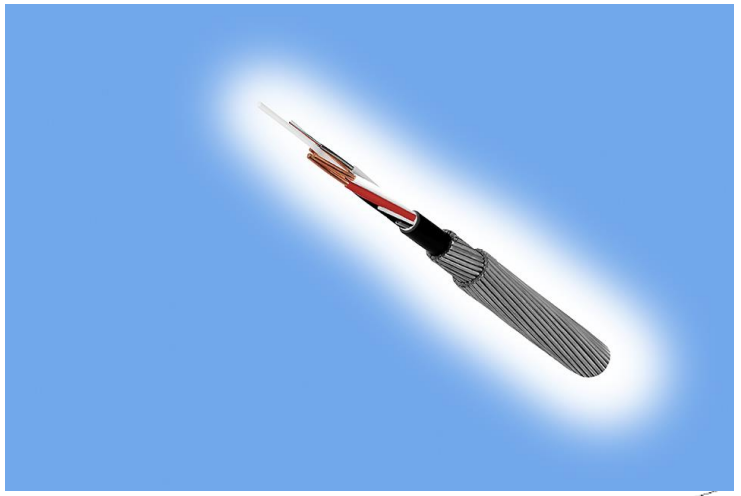
Application- and custom-specific DFOS cables



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Solifos AG, Fiber Optic Systems
Klosterzelgstrasse 41
CH-5210 Windisch, Switzerland
Tel +41 56 461 80 00
Web www.solifos.com
E-catalogue http://solifos.nubosys.com/