PULSE

Pervasive Ubiquitous Lightwave SEnsor

Funded by European Union under H2020 GA 737801

EU FUNDING PROPOSAL

H2020 CALL: Fast Track to Innovation FTIPilot-01-2016

Scope: projects **from the demonstration stage through to market uptake**, including piloting, test-beds, systems validation in real world/working conditions, validation of business models, pre-normative research, and standard-setting.

Requirements:

- **max 5 project partners and min 3 different EU countries**
- **60% budget to industry or industrial partners > research partners**
- **€ 3M max EU contribution**
- **business plan must be included**
- **max 3year (suggested 2.5) duration**

Funding scheme: actual funding = 87.5% of costs sustained for

- **company personnel involved in the project**
- **travel & living for meetings, conferences, etc.**
- **consumables, services, components for prototypes and validators**

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Project objective: *optimize and industrialize a* ***new cost-effective solution for Brillouin distributed optical fibre sensing***

1) NEW COST-EFFECTIVE TECHNOLOGY FOR BRILLOUIN INTERROGATOR EQUIPMENT

- Immediate 50% price reduction
- Two differentiated models
- Perspective 80% proce reduction

2) NEW EASY-TO-APPLY STRAIN SENSING CABLE

- 50% cheaper even in small quantity
- "Magic" loose to tight fibre coupling
- Better accuracy on cracked concrete

3) NEW OPEN-ACCESS TOOLS FOR SUPPORTING UPTAKE

- Web repository of sensor products
- Open standards for interfacing
- Open-source postprocessing software
- Open guidelines for standardisation

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Project outcomes:

Oil & Gas	*Well integrity* *Shale retorting* *Leak detection*	Reduction of fugitive greenhouse gas Reduction of contamination of aquifers Improved safety, disaster prevention
Energy	*Dynamic thermal rating* *Generator condition monitoring* *Sensing in concentrated solar power*	Improved efficiency & safety Reduction of CO2 emission Reduction of failures' social costs
Soil management	*Landslide, erosion monitoring* *Smart soil retaining barriers* *Leak detection from waste disposal*	Disaster prevention Preservation of the non-renewable soil Resilience to climate change
Waterworks	*Settlement, Fire monitoring,* *Leaks for ore wash basins*	Accident prevention Pollution prevention (illegal discharges)
mining	*Landslide, erosion monitoring* *Smart soil retaining barriers* *Leak detection from waste disposal*	Disaster prevention Pollution prevention
Infra-structures	*Structural Helath Monitoring*	Disaster prevention Reduction of social costs
Railway	*Ballast settlements, obstacles and lost wagons*	Accident prevention Resilience to climate changes
Smart composites	*Smart lightweight components and pressure fuel tanks for aerospace, automotive*	Accident prevention Reduction of CO2 emission

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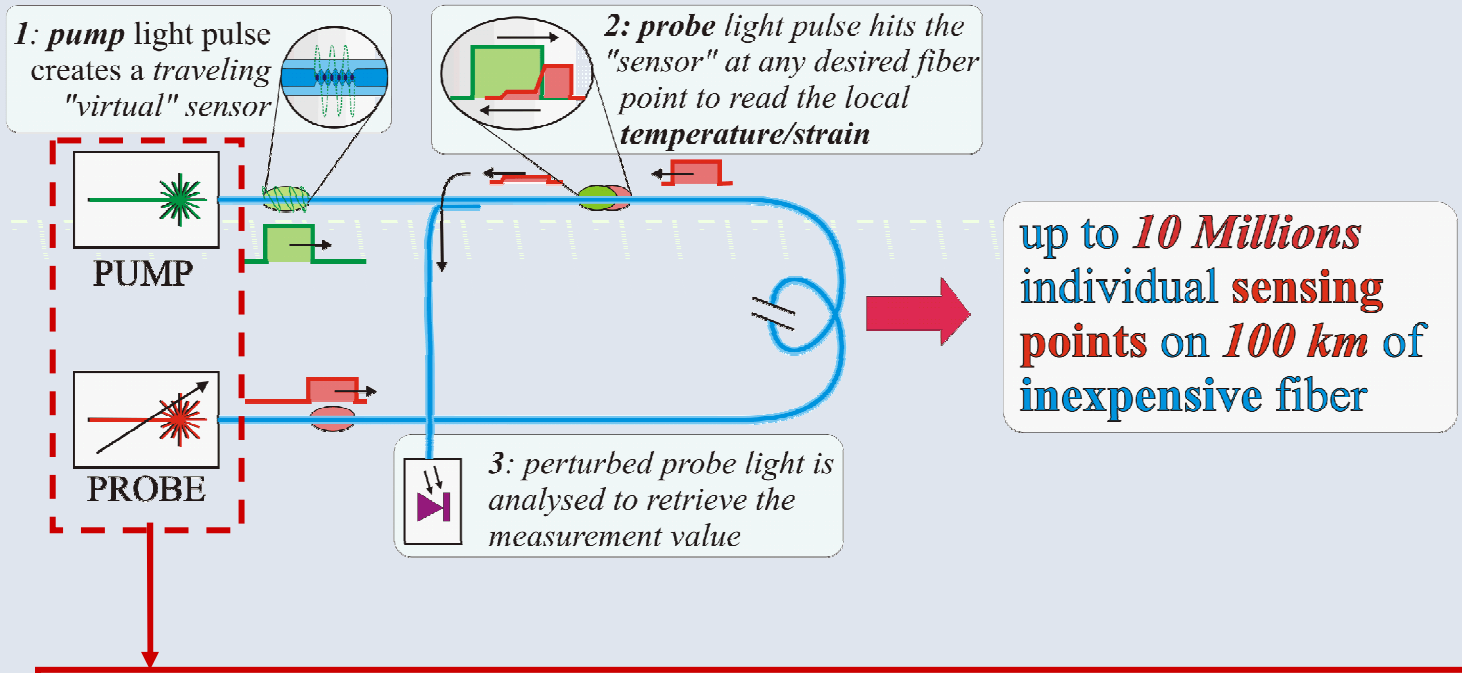
Approach: 1) BRILLOUIN INTERROGATOR EQUIPMENT



A special source for pump and probe lightwave is required, accounting for 75% hardware cost in commercial equipment

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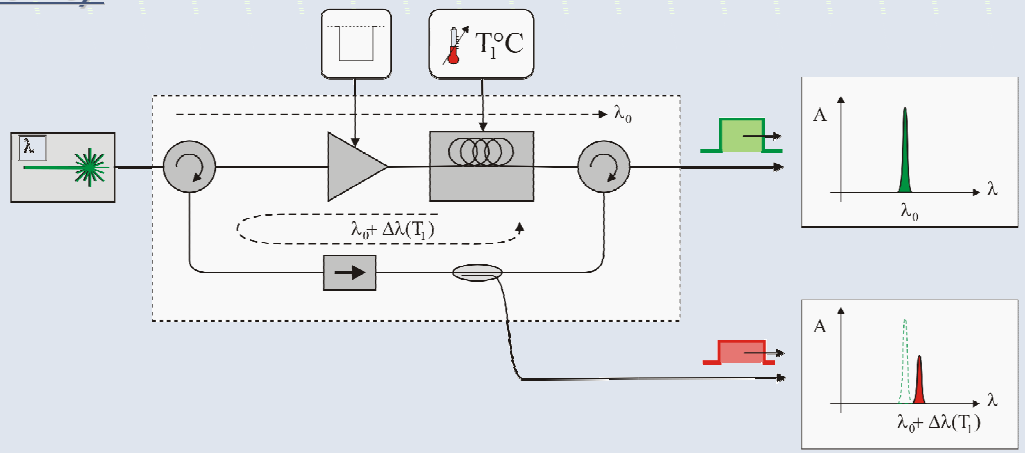
Approach: 1) BRILLOUIN INTERROGATOR EQUIPMENT

PULSe introduces a new type of lightwave source
(patent PCT2014IT000075 Brillouin ring laser)

- *cost-effective*
- *self-calibrated*
- *long term stability*



advantages :

- ✓ ***performances :*** *+50%*
- ✓ ***cost-effectiveness:*** *10 times*

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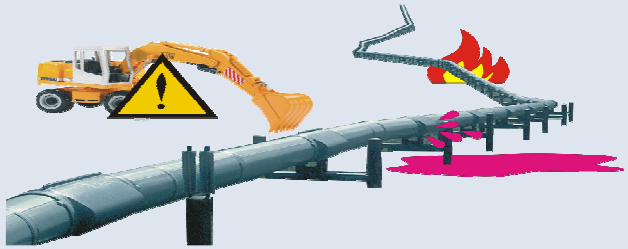
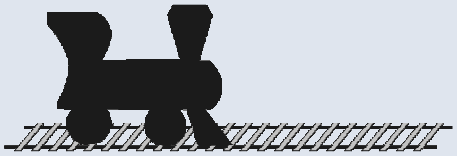
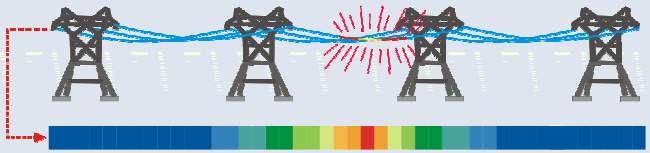
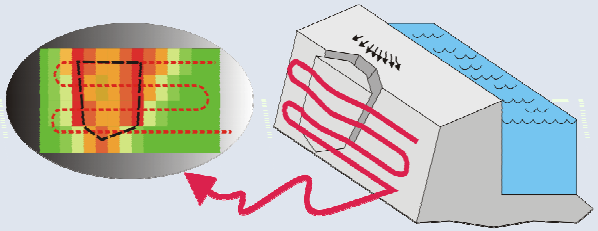
Approach: 3) MARKET SUPPORT TOOLS









In any industrial application the equipment must be integrated in a wider systems (SCADA, etc.) but this brings additional costs because:

- **interfacing protocols are propietary and strictly confidential**
- **data processing know-how is too concentrated in the hands of manufacturers**
- **details for sensor installation, cost and labour needed are not provided**
- **there is no standardisation**

Open-access web tools for supporting the market uptake:

- **Repository of sensor products with costs and application examples**
- **open-source communication protocols and interfaces**
- **open guidelines for standardisation**

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Partners and value chain:

ELMAT
DOSTAWCA TELEINFORMATYKI

ZIEBEL

Sesto Sensor
What are we sensing tomorrow?

amsTECHNOLOGIES
where technologies meet solutions

INTERROGATOR EQUIPMENT → **SENSING CABLES** → **MARKET SOLUTIONS** → **APPLICATIONS**

National Research Council of Italy

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Contact

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