

MORPHOSENSE

Make it Efficient !

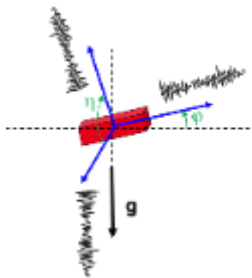
Real time Structural Health Monitoring System
RAILROAD applications

Morphosense is
a start-up from



MORPHOSENSE offers an efficient Structural Health Monitoring system based on high tech sensors network

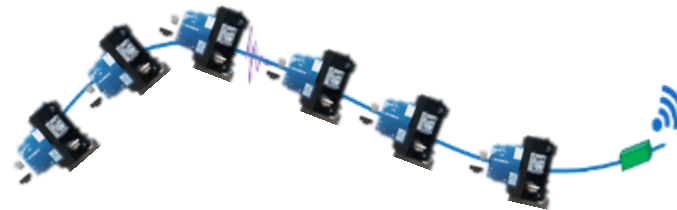
*MEMS
sensor*



*Elementary Node
Electronic*



*Sensors Network
Algorithms*



*Sensor network from
a few meters to several hundred
with constant performances*

**DEFORMATIONS
+
VIBRATIONS
=
RISK MANAGEMENT
&
INDICATORS FOR
PREDICTIVE
MAINTENANCE**

MORPHOSENSE offers a **Unique, Patented** and **Qualified** Solution

System's **Characterization**
in **lab environment**



Environmental **Qualification**
in **harsh industrial**



EXPERTISE

10 years of CEA know-how

IP

3 international patents

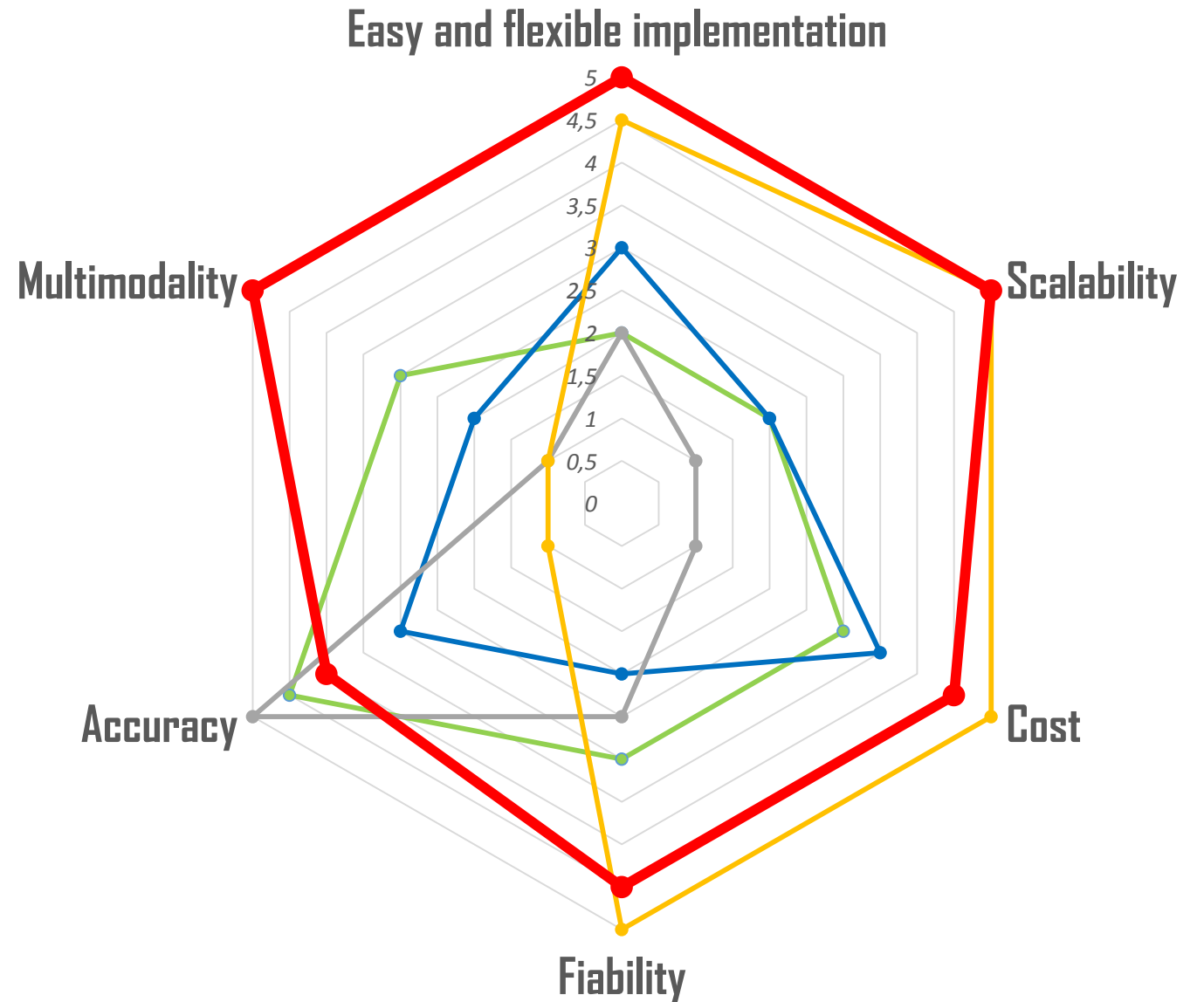
REFERENCES

SNCF - COLAS - EGIS

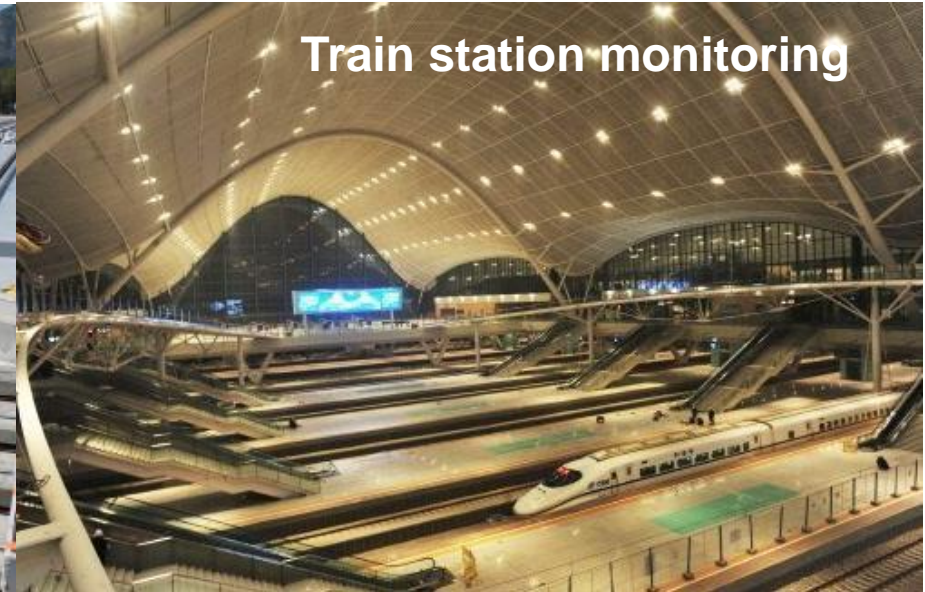
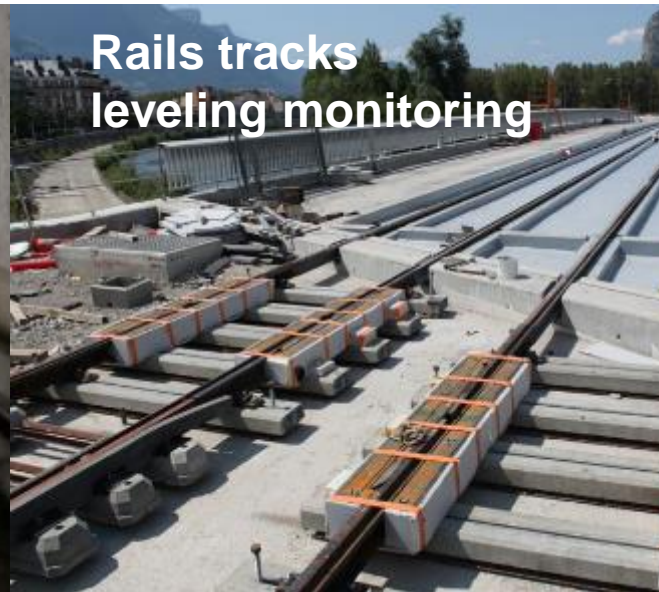
TECHNIP, ANDRA

MORPHOSENSE vs competing technologies

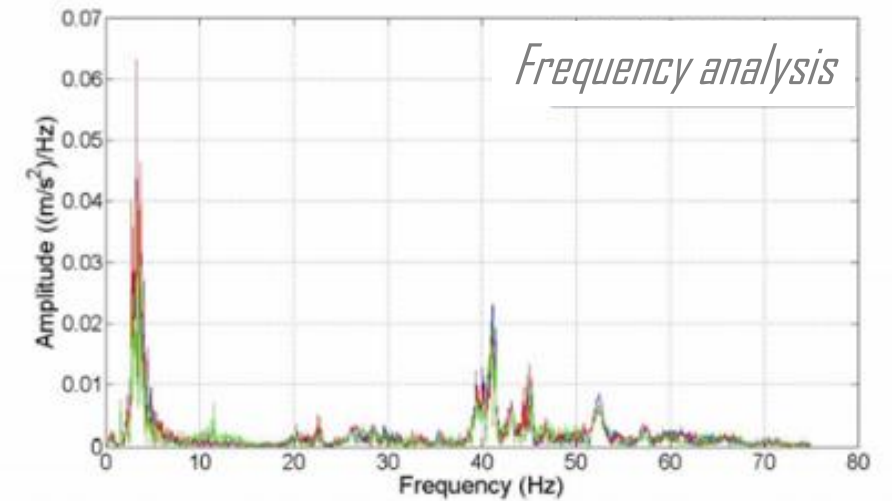
- Optical fiber sensors /Bragg network
- 3D vidéo / Drones
- Theodolites / Topometry
- GPS
- **MORPHOSENSE**



- Geometric deformation is an efficient indicator of **the static behavior** of the structure that allows
 - ❑ The detection of a **critical threshold crossing**, defined by design
 - ❑ **Structural fatigue calculation / mechanical breath acquisition** of the structure during its lifetime



- Vibrations are the **answer to a dynamic excitation** that allows
 - A **modal & spectral analysis** of the structure (*ambient vibrations*)
 - An **elastic model reversal** of the structure (*controlled vibrations*)



❑ Infrastructures monitoring

Need to monitor the bridges, tunnels in real-time in order to insure a high maintenance level and to optimize budget versus aging of infrastructures.

❑ Rail track monitoring

Continuous monitoring of rail track deformation at strategic positions (rail to bridges or tunnels transition for example) on the rail network in order to warranty the traffic optimization within full security conditions.

❑ Catenary brackets monitoring

Maintenance optimization via monitoring of aging strategic equipment's on high speed rail Network : catenary bracket for example.

❑ And the future ?

Hyperloop monitoring in order to maintain and monitor alignment of the tube (requirements are few mm over 100m)





Linear structures



☐ Measurements

- ✓ Simultaneous vibrations & deformations
- ✓ Deflection
- ✓ Torsion



➔ All sizes of structures

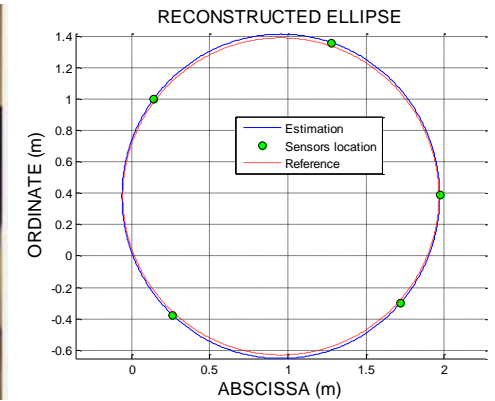
➔ Accuracy, real-time & continuous measurements

Circular structures




☐ Measurements

- ✓ Simultaneous vibrations & deformations
- ✓ Ovalization of the structure
- ✓ 3D longi. & transv. deformation





- 
- Rapid & accurate diagnosis
 - Monitoring
 - Multimodal analysis : deformations / vibrations
 - Cost / risk objectivities
 - Indicators for predictive maintenance

 - Long term instrumentation (several years...)

- **3 international patents**
- **Know-how exclusive license**
- **10 years of CEA R&D background**



Alexandre PAELOGUE
CEO



Mikael CARMONA
CTO



Pierre-Damien BERGER
CSMO



Matthieu BOSQUET
CPO

More than **60 years of cumulative experience**
Technology, Strategic Marketing, Business Development & Trades !



Guy LAUVERGEON
Expert financier



Philippe GOTTELAND
Expert BTP



Jean-Louis LACDUME
Expert scientifique



Christophe DESRUMAUX
Fond investissement CEA-i

Strategic Committee

4 board members with international experience in key domains



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Alexandre PALEOLOGUE

CEO

+33 6 30 88 37 10

alexandre.paleologue@morphosense.com

Mikael CARMONA

CTO

+33 6 07 05 41 73

mikael.carmona@morphosense.com

Pierre-Damien BERGER

CSMO

+33 6 84 20 88 67

pierre-damien.berger@morphosense.com

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