



I N T E R N E T O F F A S T E N E R S

the origin



Founded in 1950, Poggipolini S.p.A. is a leading Italian company, expert in designing and manufacturing **critical** and **structural** fasteners & precision parts, plus systems for the Aerospace, Space, Defence and Automotive industries (hyper cars and F1).

We provide advanced engineered fastening solutions.

In 2020 Poggipolini founded **Sens-In Srl**, a Poggipolini spin-off.

mission

Sens-In® is an innovative Start-Up focused on developing Internet of Fasteners systems.

Fully digitise mechanics by **extracting data** from where it has **never been extracted** before, through robust, industry ready, easy-to-apply, intelligent bolts.

applications view

Reduce machine downtime

on high added value processes, both planned and unplanned, and optimise maintenance effectiveness through migration from a preventive maintenance approach to a prescriptive one

Structural Health Monitoring

for critical structures in aerospace & construction (bridges and tunnels) markets. KEY FOR SPACE.

Easily set the correct preload during bolt installation

instead of controlling only the tightening torque, thus obtaining the correct bolted joint tension. For critical and expensive applications

Self-loosening - Lost function Alert

real time alerting of bolts losing their nominal pre-load or increased vibration levels, which can be early stage clues for damages or malfunctions that have direct impact on product quality

Correct retooling

quickly and neatly check a production line has been correctly retooled for new part types, thanks to wireless tag bolts

Tampering prevention

ensure a bolt gets never unlocked without permission!

Indirect measurement of fluid pressure

Through measurement of the correlated force: perfect if pressure gauges cannot be used

main markets

**Perfect
for
retrofits!**



Automotive

Engine, powertrain, brakes, suspension & chassis.



Helicopters & Aircraft

Rotor, engine, transmission, structure & landing gear.



Naval Industry

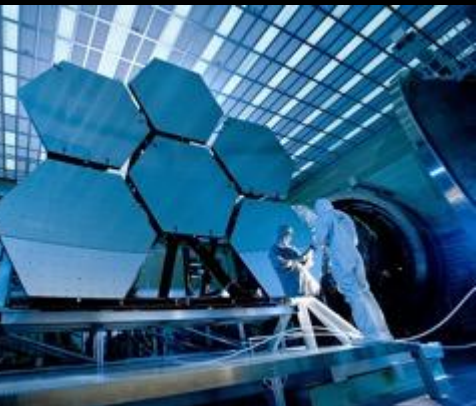
Yachts, large vessels.

Oil & Gas

Flanges & pipings, compressors, valves.

Automation & Manufacturing Industry

Automatic machines, machine tools, presses, gear boxes.

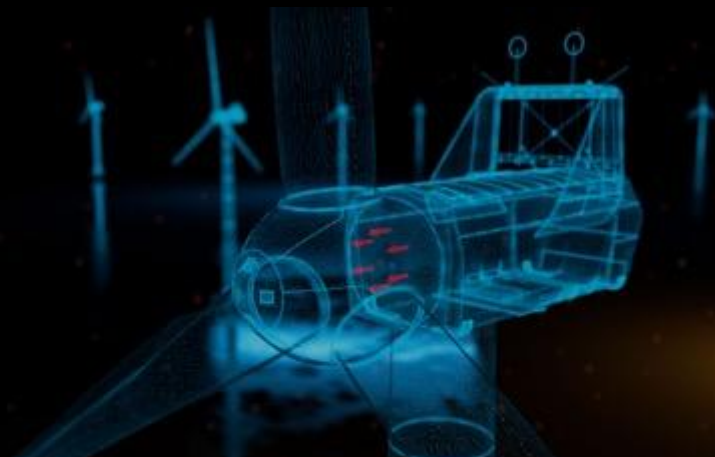


Constructions

Bridges, rail ways & structures in general.

Energy

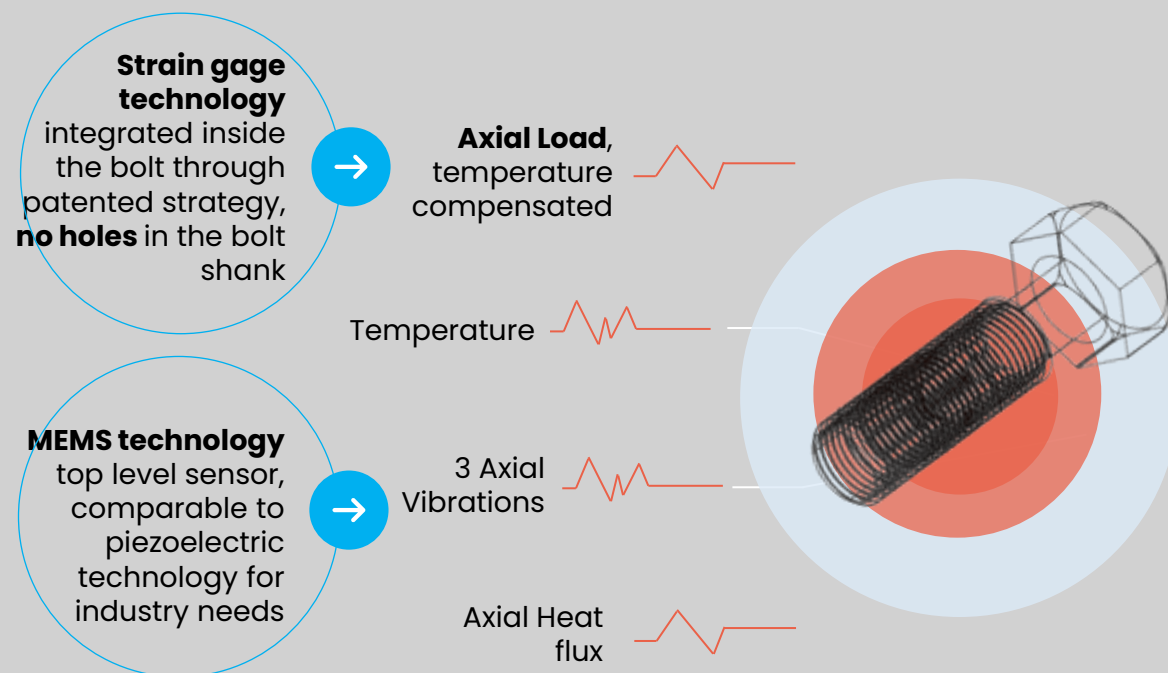
Wind turbines, gas turbines, tidal waves turbines, hydro turbines.



Sens-In® technology overview

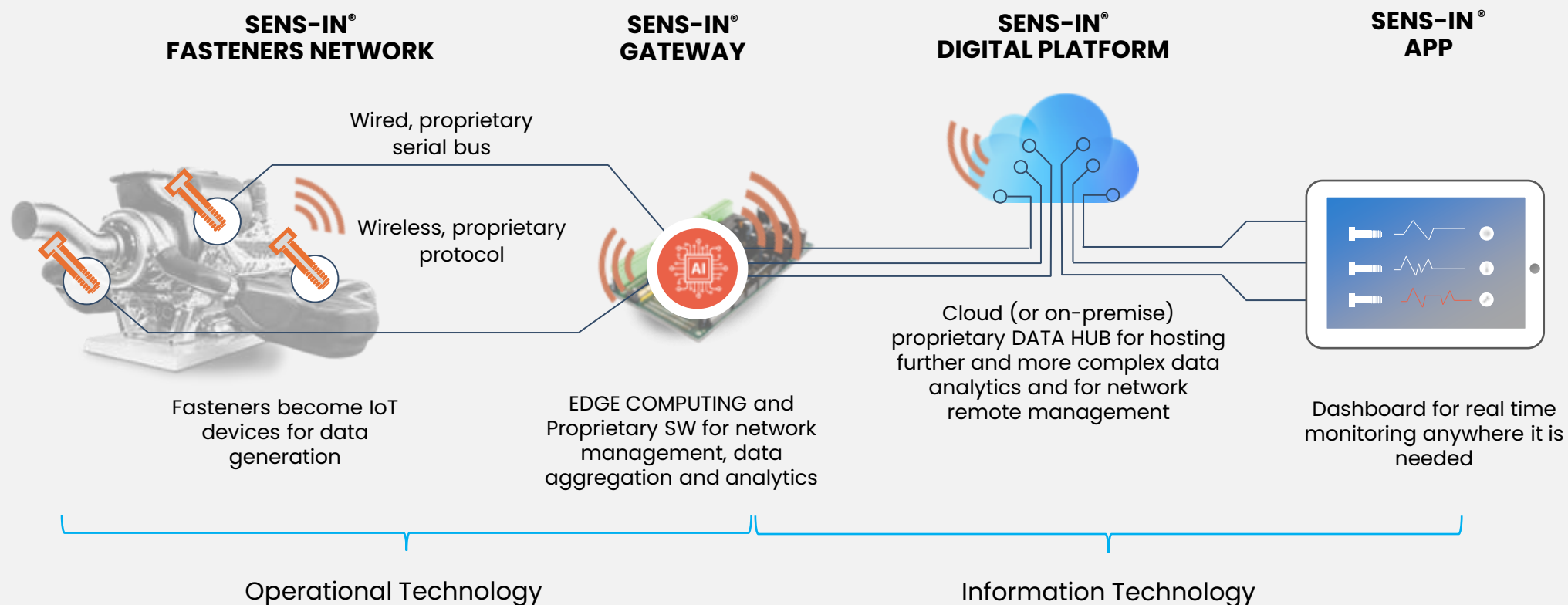
sensing solutions that provide **data in streaming for continuous monitoring**, and **digital output** directly from the fastener: all sensors and relevant electronics are embedded inside the fastener.

Main Technical Features, to be customised to the specific need:



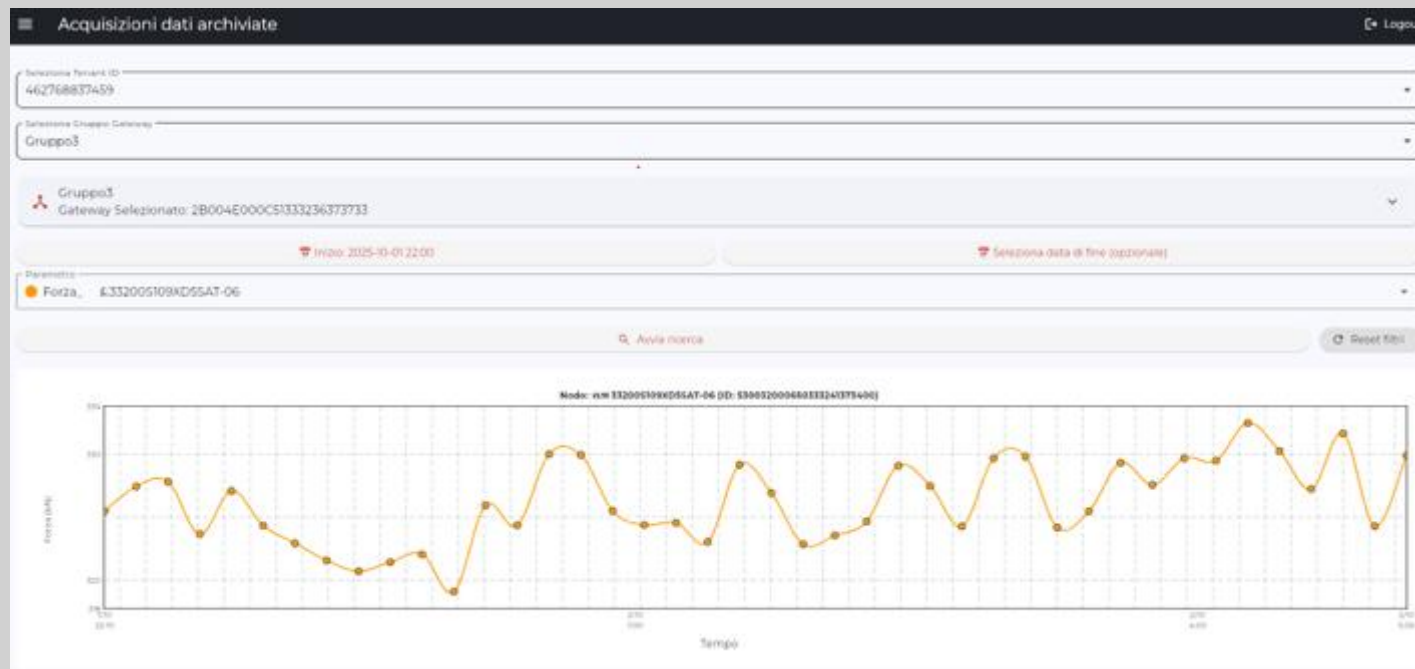
- **System Layout is customizable on request**
- **Sensors fusion:** all declared physical dimensions are measured within the same fastener
- **Digital output from smart bolt:** high immunity to electromagnetic fields, long distance transmission, operative Bolt Temperature range -40°C (-60°F) ÷ $+60^{\circ}\text{C}$ ($+140^{\circ}\text{F}$)
- **Analog output from smart bolt:** high temperature possible applications up to 250°C ($\sim 480^{\circ}\text{F}$) depending on sensors type
- **Connectivity:** wired with axial connector & **wireless**
- **Mechanics:** Dimensions from M6 ($\frac{1}{4}$ ") thread up, custom materials and geometries, corrosion proof design
- **IP67** Ingress Protection

Sens-In® system layout:



Sens-In® technology overview




The Cloud Platform

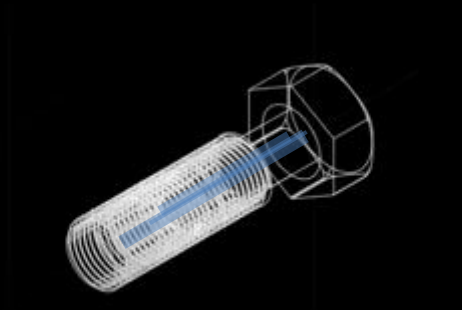


Featuring

- Web-based
- Historical data visualization
- Historical data download on .csv
- Threshold alarms setting
- Different levels for labelling several Sens-In® systems
- 3 Levels of User Privileges
- Acquisition parameters of the single bolt re-setting from remote
- Over-The-Air firmware updates for Gateway and Bolts firmware

Sens-In® Case History

Undisclosed customer	Undisclosed customer	Undisclosed customer			
Oil & Gas	Wind energy	Automotive - Supercars	Automatic machines – presses	Heavy Duty transmissions	Oil & Gas Nuclear Chemical
Validation of Tightening procedure on ASME flanged joints	Remote wear monitoring of nacelle internal components	R&D study of precise preload on engine bolts	Real time production process force monitoring for predictive maintenance	Gear box vibration monitoring for predictive maintenance	Heavy duty valve pressure measurement



www.sensin.it