



4DBloc

GNSS-based deformation sensor

YOUR CHALLENGES

- Have an **accurate** and **robust tool** at your disposal to follow the **behaviour** of **soil** and **structures**.
- Accurately **understand ground** and **structure deformation** in real-time.



OUR SOLUTION



4DBloc has been developed and tested in co-operation with the French National Institute of Geographic and Forest Information (IGN) with the aim of creating a **GNSS-based position measurement system** that is simple, to deploy, robust, autonomous and accurate.

The 4DBloc records its **position** in X, Y and Z.

Completely automated, and connected to the Geoscope web platform, 4DBloc records and transmits in real-time its 3-D coordinates, and therefore structure, surfaces or sub-surface deformations.

THE BENEFITS

- A **robust** system, **simple** to install
- Sensors require **neither calibration, nor special maintenance**
- **Very low energy consumption**: can be powered by a single solar panel
- Ideal for the **long-term monitoring** of locations where **access** is **difficult**
- The best **GNSS-based deformation system** on the market
- Unrivalled **value for money**



Sixense's

• Our reputation for excellence is built on our client's satisfaction.

• The worldwide specialists in accurate and useful measurements.

• Expertise in geotechnical and structural measurements + competence in site interventions + culture of innovation: Our teams understand your requirements and can develop optimised solutions for your project.

CONTACT US

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4DBloc

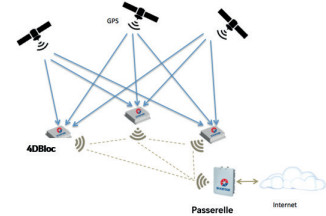
GNSS-based deformation sensor

TECHNICAL PRINCIPLES

Each 4DBloc sensor communicates with a gateway station using a radio transmission. The gateway station transfers the data in real-time automatically via the internet.

The millimetric position is possible utilising two parameters:

- Differential positioning: the position of each 4DBloc is calculated in reference to the 4Blocs within the network that are considered stable.
- A powerful calculation algorithm developed with IGN



APPLICATIONS



4DBloc applications include:

- Transport infrastructure: bridges, rails, roads, etc.
- Hydraulic infrastructure: dams, dykes, harbours, etc.
- Landslides
- Reclamation works, mines etc.

SPECIFICATIONS & LIMITATIONS

General parameters	Type	Min	Max
Protection rating	IP69		
Shock resistance	IK7		
Storage temperature range		-40°C	80°C
Supply voltage	DC	3.5 V	14.5 V
Energy consumption / active mode			0.27 W
Energy consumption / standby mode			0.004 W
Radio frequency			2.4 Ghz
Radio coverage (acc. site conditions)			200 m
Accuracy (dry weather)	Real-time	Average (24h)	
Horizontal	2 mm/2 ppm	1 mm/2 ppm	
Vertical	4 mm/4 ppm	1 mm/2 ppm	

Operating conditions	Type	Min	Max
Operational temperature range		-40°C	65°C
Number of 4DBlocs in a network (min. 1 ref.)		2	>500
Frequency of measurements	Rinex	10 Sec	60 Sec
Positional dilution of precision, PDOP : <i>Visibility index from the sky and satellites.</i>			5
Stability zone around each 4DBloc		5 m	
Angle of potential masks above the ground			15°
Distance between reference and mobile points: <i>Maximum recommended value.</i> <i>It is possible to enhance distance but accuracy will be affected.</i>			2 km
Internet Connection: Active			

ASSOCIATED TOOLS AND SERVICES

- The **3D evolution** of all 4DBloc devices' positions and the alarms are available on mobile devices.
- A **turnkey service** from installation to provision of **pre-processed data** in an accessible webspace.
- **Data quality control** and monitoring optimised through **proactive maintenance**.



REFERENCES

- Hong Kong Airport C3206 Project « Main Reclamation Works »
- Grand Paris Express - Lot GC01
- EOLE La Défense
- Hampton Roads Bridge Tunnel Project, USA
- Pattullo Bridge, Canada

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