Fulmar Sàrl
échos

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Nb 6

Monitoring of a double railway track in the station of F-59526 Saint-Amand-les-Eaux

A COLLABORATION BETWEEN SNCF RÉSEAU BOUYGUES TRAVAUX PUBLICS HYP-ARC

PROJECT DESCRIPTION

The SNCF has decided to build a new underpass for people with reduced mobility in Saint-Amand-les-Eaux station (North). For the realization of the works which must be realized during 2021, it called upon the company BOUYGUES TP RF. In addition, the latter must ensure a surveillance of the stability of the tracks during the whole phase of the works. To carry out this mission, the company HYP-ARC SA, based in Archamps in the Haute-Savoie region of France, specializing in this field, has been mandated.

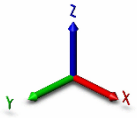
On March 22, 2021, HYP-ARC SA supported by Fulmar Sàrl installed the following device:

1 HAPPY BASE

2 ROVER HAPPY COLIBRI
1 on each lane.

42 Clinometers including 20 on each track and 2 on 2 catenaries.

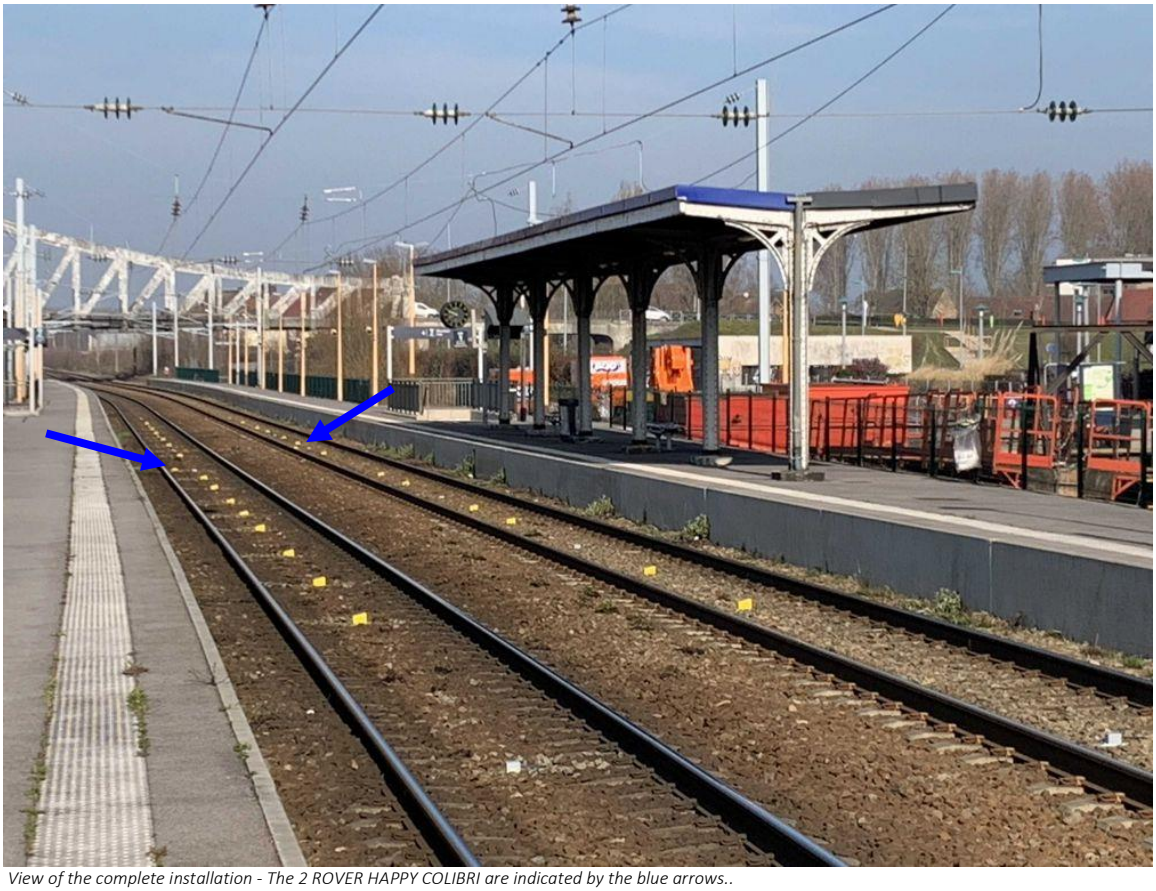
ACCURACY REQUIRED/DAY



X ±3 mm
Y ±3 mm
Z ±1 mm

SATELLITE AVERAGE

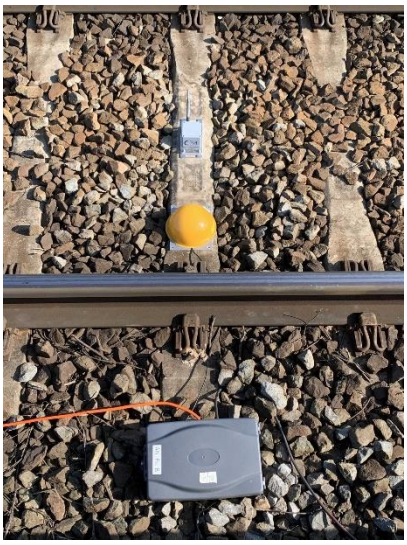
Positioning of the sensors on the rails



View of the complete installation - The 2 ROVER HAPPY COLIBRI are indicated by the blue arrows..

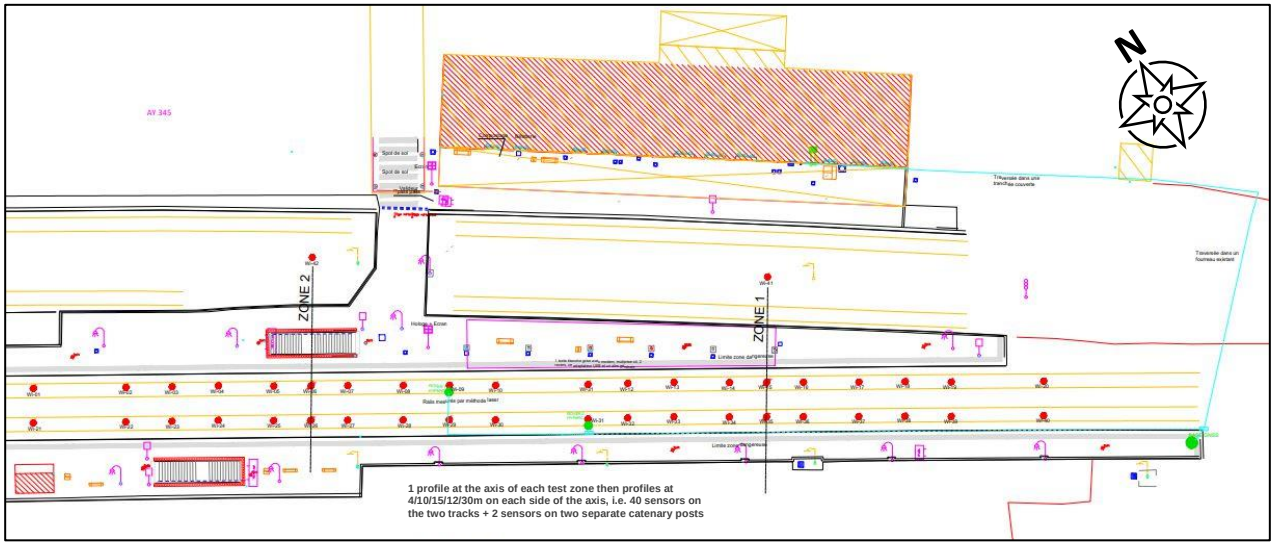
Location of the HAPPY BASE


HAPPY COLIBRI – On the North track


HAPPY COLIBRI – On the South track

SITUATION

The distance between the HAPPY BASE and the ROVER is 80m.



View of the complete system

WHY HAPPY MONITORING ?

The factors that contributed to the integration of HAPPY MONITORING sensors by HYP-ARC SA to realize this monitoring are the following:

- ✓ Similar experience of HAPPY MONITORING Sàgl on the German ICE high-speed train lines.
- ✓ Insensitivity of the sensors to the strong magnetic fields induced by the locomotives during the passage of the trains.
- ✓ Auto-start system of the sensors after the passage or the stop of a train at the station.
- ✓ Proven accuracy of measurements in all 3 axes.
- ✓ All-weather and fully autonomous performance.
- ✓ No post-processing required.
- ✓ Integration of HAPPY MONITORING sensor data via FTP file (every 3 hours) directly into the HYP-ARC portal with compilation of data from the 42 clinometers.
- ✓ Control of the entire system and its components via the cloud.
- ✓ Real-time tracking of movements on your cell phone and/or computer.

- ✓ Customizable SMS/e-mail alert system. Three adjustable levels for each sensor.
- ✓ The sensors do not require periodic maintenance.

REALIZATION

The complete installation of the system on the tracks was carried out at night in 6 hours. The start-up and the functional checks were carried out the next day.

WHAT SHOULD BE MEASURED?

In order to verify the absence of defects on the railway platform that can be caused by different types of works, SNCF generally requires an automated and continuous monitoring of the track levelling (before, during and after works) of the railway platform, with personalized and automatic alerts when predefined thresholds are exceeded.

The implementation of HYP-ARC's VIGILE system, composed of GNSS-RTK HAPPY MONITORING sensors, clinometers and total stations, consists in proposing the control program allowing to guarantee the security of the SNCF patrimony as well as the operating security of the network.

The nature of the objects to be monitored is very varied: engineering structures, landslides, railway tracks, paved roads …

Within the framework of a railway follow-up, we can follow the absolute settlement of the track, the variations of superelevation, lefts and longitudinal levelling but also the movements of the catenary posts.

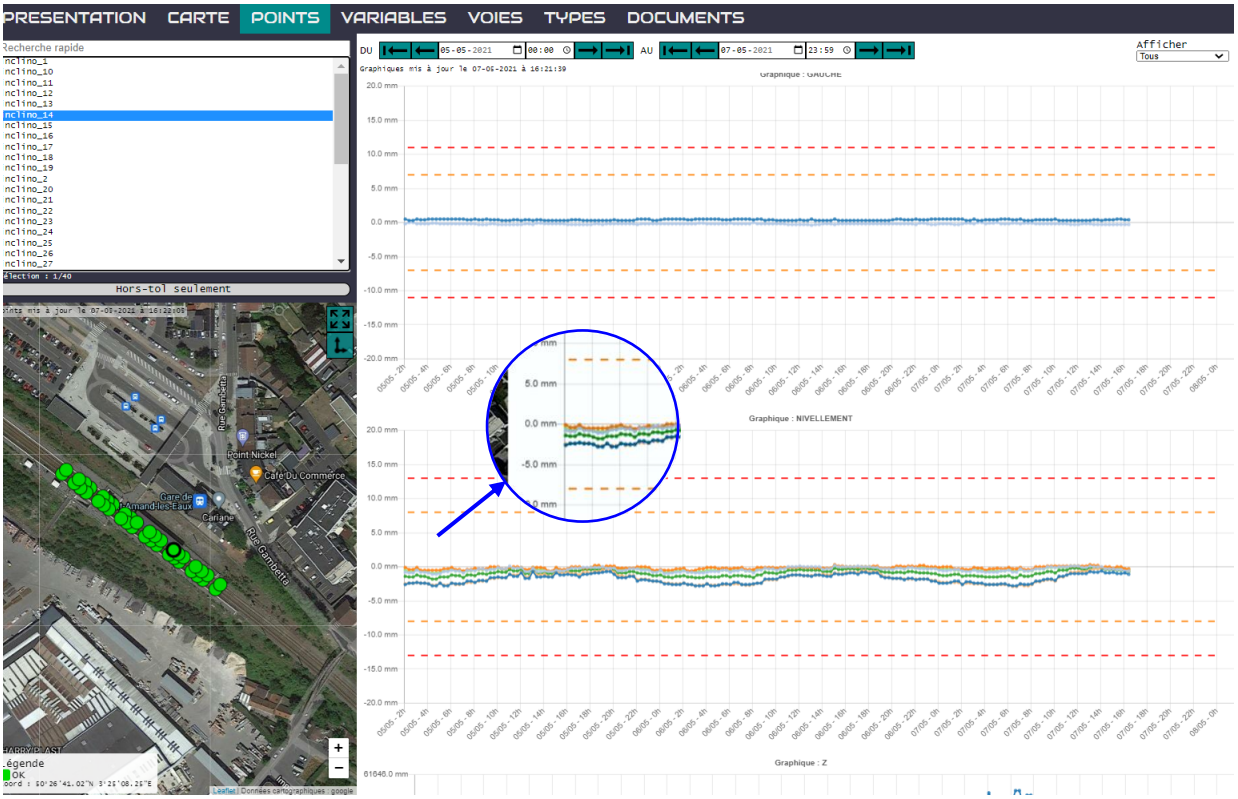
FTP FILE STRUCTURE (Defined by the end user, in its structure and in its sending rhythm)

DATE AND TIME ID SENSOR EAST COORD NORTH COORD HEIGHT

20210518134426;522fd9;9249380.7867;1729746.1397;61.638 20210518134426;522fdc;.....

1st sensor 2nd sensor

RESULTS ON THE HYP-ARC PORTAL



Results graph view

Thanks to the HAPPY MONITORING system, HYP-ARC SA was able to develop its VIGILE solution by compensating the clinometric drift of the WISEN.

Indeed, because of the thermal effects, the sensors and the rails tend to expand and transmit erroneous data.

On a sample of about 8,000 data recorded per sensor, a polynomial correction of order 1 to 3 was applied to limit the effects of temperature.

The HAPPY MONITORING sensors made it possible to control the reliability of the results because they determine the exact position of the various sensors placed on the chain of clinometers.

CONCLUSION

The combination of clinometers with high-precision HAPPY MONITORING GNSS RTK sensors makes it possible to capture data calculating the deformations of both lines during the work period.

This example of dual track monitoring can be used for other types of monitoring. Wherever the sky is clear and the minimum 3G phone network coverage is ensured, HAPPY MONITORING is the most powerful GNSS solution currently on the market.

We remain at your disposal for any further information. See you soon!

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