



# SUCCESS STORY

## Asset tracking

Monitoring of sediments in a river

# ELA Innovation and CIPAM support the CNRS and ENS in the monitoring and analysis of sediment flows.

The CNRS and ENS have entrusted CIPAM and ELA Innovation for their project of **monitoring sediments in rivers**. The analysis of sediment flows allows the study of accumulation phenomena that can lead to flood risks, but also to optimise the management of hydroelectric facilities to extend their life span and have a better understanding the links between ecology and sediment dynamics.

The innovative tracking solution that was implemented made it possible to equip very dynamic rivers with very intense sediment transport (volume and transport distance). Indeed, the research team and its partner GeoPeka compensated for the size constraint of the transponders by creating artificial pebbles, identical to those found in these rivers, both in terms of weight and visual appearance, in order to insert a tag in each one. **In total, some fifteen sites** have been equipped in the Auvergne-Rhône-Alpes region, covering areas of up to **90 hectares**.

*« The current developments within the framework of a Pack Ambition Research project attest to the good results already obtained and to our confidence in this solution for our future studies. »*

*M. Cassel - Post-Doctorant en géomorphologie fluviale - À l'EVS*

## LES ACTEURS DU PROJET



End users

## THE CLIENT'S NEEDS

- Easily and quickly detect and geolocate buried individual particles spread over large and areas.
- Be able to equip particles of the smallest possible size.

## EQUIPMENT

- 100 COIN ID<sup>1</sup>
- 3 SLENDER III<sup>2</sup>
- 3 Sciel READER RU<sup>3</sup>

1



2



3



## HOW IT WORKS

In terms of technical operation, this solution is based on a set of artificial pebbles incorporating COIN ID active RFID tags. These are introduced and geolocated in the bed of a river. During floods, the pebbles are transported in the riverbed bed by the flow. Once the floods have passed, the researchers go into the field to **geolocate the pebbles using a detection system consisting of an antenna and an RFID reader**. Three different detection techniques are used:

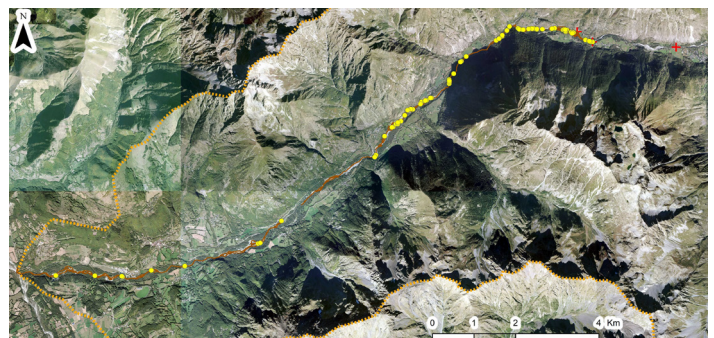
- Either by a fixed station that time-stamps the passage of the pebbles.
- Or by teams of 2 to 3 people on foot.
- Or by drone equipped with a Slender antenna and a GPS to geolocate in clear spaces.



Artificial pebbles with active RFID tags



Fixed tag detection station (antenna + RFID reader)



GPS mapping of artificial pebbles after field surveys

## THE BENEFITS

- **Detection distance** (80 metres in open field and 2.60 metres underwater)
- The possibility of **detecting several particles simultaneously**
- Precise location **to the nearest metre** thanks to the spatialization of the RSSI signal.

## THE RESULTS

- **High return rates** compared to previous similar studies (Nb objects found / Nb objects deployed)
- **Possibility to study very dynamic rivers**, with very large sediment transport distances