Executive Summary

Thousands of infrastructures all over the world do not have any monitoring system implemented. Nowadays, when damage in an infrastructure is detected, it is usually very late and/or expensive to repair it, such as the collapse of Morandi Bridge (Genoa, Italy) in August 2018.

In other places, such as Mexico, Yakarta or Manila, the infrastructure stability worsens due to the continuous dependence on the aquifer's water, generating continuous subsidence that affects and collapses urban structures. Also in Spain we have the largest subsidence rate in Europe, 2m in 20 year, affecting infrastructures.

The aging and deterioration of materials, the effect of extreme events exacerbated by climate change, subsidence of the ground or earthquakes and other phenomena stress infrastructures. It generates large economic losses due to the lack of preventive maintenance and early detection of failures that, ultimately, can cause the loss of human life. It is not feasible to monitor all urban or non-urban infrastructures with traditional systems of instrumentation on the ground. Therefore, new monitoring tools are needed to create more resilient infrastructures.

Detektia has developed EyeRADAR, a low-cost infrastructure monitoring tool that integrates three key technologies: satellite RADAR, Artificial Intelligence (AI) and Data Management Platforms.

DInSAR (Differential Interferometry Synthetic Aperture Radar) technology offers up-to-date and historical deformation of the terrain and infrastructures at any point of the planet with millimetre accuracy and without the need of in situ instrumentation, being able to make historical studies of the last 25 years.

The web solution EyeRADAR calculates a dense point cloud (or virtual sensors) that describes the deformation and the status of the assets through time. The incorporation of AI algorithms within the DInSAR results allows early detection of anomalies and the creation of indices that support the decision-making. This high-value information is easily integrated via API into the management system of the infrastructure managers.

The integration of these three technologies (DInSAR, AI, Data Management Platform) in EyeRADAR together with other technologies such as cloud computing and online interactive data analysis and visualization to early detect anomalies increases: i) Security and reduction of incidents through the improvement of an early warning systems, ii) Exploitation efficiency and preventive maintenance of the infrastructure, iii) Infrastructure profitability due to the reduction of in-situ control instrumentation costs, iv) Maintenance efficiency in all the phases of the infrastructure.

Moreover, scaling up the web solution EyeRADAR is feasible through: i) automated workflows, ii) cloud computing, iii) processing of very large areas and iv) no need of ground instrumentation.

The so-called new space is growing exponentially transforming many sectors. In civil engineering there will be a migration from traditional solutions to solutions based on satellites. This change has not occurred yet and there will be an opportunity in the upcoming years. There are few DInSAR specialists worldwide in the Market, and they have mainly focused on Oil & Gas and Mining with traditional consulting business models. We consider that there is an opportunity in the infrastructure sector and we want to take advantage of it.

Our target market is the infrastructure sector. The estimated investment in this sector in 2025 reaches 3.000.000 M$ (Global Infrastructure Hub, 2020). Investment in long-term infrastructures is considered a global megatrend by 2030, according to the World Economic Forum. EyeRADAR is marketed as SaaS (Software as a Service) with the intention of lowering the prices while scaling the service. Our competitors are selling infrastructure monitoring as a traditional consultancy business. EyeRADAR stands out for its low-cost, management of large volumes of information and innovative analysis that cannot be achieved using traditional surveying methods. Marketed as Saas, EyeRADAR provides a new style in monitoring infrastructures and entire cities at an unimaginable cost until now. Open data policies, DInSAR processing automation and cloud computing make this paradigm shift possible.

Detektia was created in November 2019 and since then, we are incubated by the European Space Agency (ESA), Top10 of ESA Startup Competition and have participated in EIT Climate-KIC, PARSEC and STARTUP3 European accelerators. We have tested our solution EyeRADAR (TRL 7-8) in different case studies (tunnelling, dams, ports, urban highways, stability of slopes…). Within the first 15 months we have accomplished 3 contracts and five pilot projects. Our first clients are large construction companies operating in Mexico, Colombia and Spain. Our roadmap for 2021 aims the complete deployment of the early warning system in EyeRADAR, together with the creation of a sales team. Winning the InfraChallenge 2021 competition would give us a boost to achieve our objective for 2025: obtaining the deployment of EyeRADAR over 1000 infrastructures worldwide. The InfraChallenge 2021 competition is the best platform to give visibility to DInSAR technology globally while growing and expanding our network. We would dedicate the award funds to communicate, through real use cases, the ability of our solution to revolutionize the civil engineering sector, helping to create more durable and resilient infrastructures. It would bring great value by knowing first-hand the global challenges that the key actors in the sector face dealing when building and maintaining large engineering assets.

Detektia is a spin-off of the Topography and Geomatics Laboratory of the Civil Engineering School of Polytechnic University of Madrid(Spain) formed by a team of three MSc and four doctors that masters DInSAR technology and AI techniques. Detektia has systematized the experience of more than 20 years of applied research in the auscultation of the terrain and infrastructures to create a web solution adaptable to different infrastructures that allows analyzing the results of the integration of DInSAR processing with AI in a visual and dynamic way, facilitating interpretation and decision-making.

Detektia collaborates with the Civil Engineering School of the Polytechnic University of Madrid and the Data Engineering Unit of the Telecommunication School of the University of Valladolid in the development of basic research that allows advancing in the integration of satellite RADAR technology and AI in multiple dimensions of engineering and society.We have more than 35 years of experience between university and the private sector and a broad vision of the energy, environment, water and civil engineering sectors.

We aspire to increase the worldwide resilience of infrastructures and the security of all the planet inhabitants; no uncontrolled infrastructures any longer. From detektia we contribute to a paradigm shift in the infrastructure sector by bringing satellite data into decision-making.