

PANOPTIS

Development of a Decision Support System for increasing the Resilience of Road Infrastructure based on combined use of terrestrial and airborne sensors and advanced modelling tools

One of the greatest challenges facing transport operators and engineers today is the fast and efficient inspection, assessment, maintenance and safe operation of existing infrastructures including highways and the overall Road Infrastructure (RI) network. Due to factors such as ageing, Climate Change (CC), extreme weather conditions or other natural and manmade hazards, increased traffic demands, change in use, inadequate maintenance and deferred repairs, the Transport Infrastructures (TI) – including also railways, marine infrastructure, etc.- are progressively deteriorating and become more vulnerable, urgently needing inspection, assessment and repair work. According to the EC, the weather stresses alone represent from 30% to 50% of current road maintenance costs in the EU (8 to 13 billion €/year). More frequent extreme precipitations and floods (river floods and pluvial floods) as expected in different regions in Europe are projected to result in an extra annual cost for TI of 50-192 million €/year, for the period 2040-2100. At the same time, while routine monitoring can have a focus that is limited to the actual corridor and its immediate surroundings, the complexity of any critical incident necessitates a more synoptic coverage, whereby air- and space-borne instruments work in synergy with ground-based sensors. The UN Sendai Framework for Disaster Risk Reduction 2015-2030, by taking into account the experience gained from the implementation of the Hyogo Framework for Action, the lessons learnt, gaps identified and future challenges, highlights certain priorities for action at local, national and global scale. Current preparedness plans hardly take into consideration regional CC predictions, while other disaster risk governance and operational tools for the end- to-end management (preparedness, protection, early warning, response and recovery) are quite fragmented, leading to a non-unified and inconsistent crisis confrontation. Hence, the resilience of RI/TI based on risk understanding and multi-modal data analysis falls short.

PANOPTIS mission is to leverage existing tools and services (e.g., climate models, modelling of extreme events and their impacts, Early Warning Systems (EWS), Structural Health (SH) / environmental monitoring sensors and EU services, such as Copernicus) as well as novel technologies (terrestrial and satellite imaging for RI inspection, advanced machine learning and data fusion techniques, etc.) in view of delivering an integrated platform that can be applied to RI, addressing multi-hazard risk understanding, smart prevention and preparedness, faster, adapted and efficient response. Our proposed new integrated system to support operational and strategic decisions, by better absorbing and efficiently recovering from damages respectively, aims to increase the resilience of RI/TI.

PANOPTIS is being developed by a multi-disciplinary team, coordinated by AIRBUS DS SAS, in the EU's Horizon 2020 framework. The project launched in June 2018 and will run for three and a half years (forty-two months), to allow enough time for the development and validation of the technology.

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(Greece), **ACCIONA CONSTRUCCION SA**, **Hydrometeorological Innovative Solutions** (Spain), **Future Intelligence Ltd**, **C4controls Ltd** (United Kingdom), the **University of Twente** (Netherlands), **ILMATIETEEN LAITOS** (Finland), **Confederation of Organisations in Road Transport Enforcement** (Belgium) and the **Board Of Trustees Of The University Of Illinois** (United States of America).



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Notes for editors:

1. Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.

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