



SCOPE

The Crisis Classification (CRCL) module is designed to assess the **severity level** of an ongoing physical and/or cyber attack in critical satellite ground segments. In the 7SHIELD framework, CRCL is **constantly receiving information** from the Situational Picture Generation and Update (SPGU) module **about the current situational picture of the ground segment** and **calculates the possible risk of the ongoing event** or group of events that might be present for the critical infrastructure. The severity level is afterwards communicated back to the SPGU module, in order to **update the situational picture** in the ground segment.

PURPOSE

The purpose of the Crisis Classification module is to enhance the decision-making processes, by **assessing in real-time the severity of an ongoing physical and/or cyber (P/C) attack in critical satellite and ground segments**. The module incorporates multi-level fusion techniques in order to analyze **multiple types of data and classify crisis events** utilizing Machine Learning (ML) techniques. Severity level is estimated by combining the available sources of data and the outcomes of the detection technologies for physical and cyber threats.

PARTNERS



CERTH
Greece

The **Centre for Research and Technology-Hellas (CERTH)**, founded in 2000, is the largest Research Centre in Northern Greece. It is governed by private law, while it has a non-profit status and it's supervised by the General Secretariat for Research and Innovation (GSRI) of the Greek Ministry of Development & Investments.

Besides other institutes, it contains the **Information Technologies Institute (ITI)**, which is the largest institute of CERTH. ITI is one of the leading Institutions of Greece in the fields of Informatics, Telematics and Telecommunications. ITI's research teams show their remarkable scientific work through a number of publications, and their extensively experience in multidiscipline via their participation in more than 70 EU and 85 National projects.

The **Multimedia, Knowledge and Social Media Analytics Lab (MKLab)** is one of the research units of ITI institute. The MKLab has active involvement in numerous Horizon 2020, FP7 and National projects. The **Multimodal Data Fusion and Analytics (M4D)** group is part of the MKLab.

All the modules developed in the frame of 7SHIELD have been designed with the consultancy of identified external stakeholders, first responders and following the **requirements** provided by the partners working in the space sector acting as Pilots, who provided the Critical Infrastructures for **testing and demonstration**.



Response



High-level
Analytics



Situational
Awareness

CONTRIBUTION

M4D, part of CERTH, is a group intensively involved in miscellaneous European Projects, starting from 7 Framework Programme (FP7) and more extensively in H2020 projects.

It focuses mainly in the areas of computer vision, semantic multimedia analysis and retrieval, web data mining, **multimodal analytics and decision support, crisis management**, fight crime and terrorism, border surveillance and digital security, Earth Observation and Migration and applies these technologies mainly in the health, and **security domain**. M4D focuses on developing cutting-edge technologies and solutions to be applied to real problems.

TECHNOLOGY

The CRCL module uses ML algorithms in order to assess the severity level of an ongoing event in real-time. During the development of the module, a web application was used in order to **create annotated datasets**, specifically created for the needs of the 7SHIELD project. The end users of 7SHIELD, which are the operators of the ground segments, contributed to the creation of annotated datasets that were employed to **train ML models to enable assessing the severity level** of an ongoing P/C attack. CRCL runs in a Docker container as a back-end process, making it **easy to deploy and operate** on any platform.

STAKEHOLDERS

A **real-time severity assessment** of the current situation in any **critical infrastructure** can help with the response and mitigation of ongoing attacks or critical events and can be applied by both private and public sector.

FUTURE IMPROVEMENTS

The Crisis Classification module can be further improved by **enriching the existing annotated datasets**, based on the needs and requirements of each ground segment operator.

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