# KR03 – Combined Threat Assessment Tool

## Module

Model Based Design and Assessment (MBDA)

Prevention

Situational Awareness

## Scope

The MBDA (Model Based Design and Assessment) tool is designed for the **prevention phase**, reducing the cognitive complexity required for modelling Systems-of-Systems (SoS). In the context of the 7SHIELD project, it is designed for modelling and assessing Ground Segment of space systems during **cyber and/or physical attacks**.

The MBDA tool has been integrated with the Authentication Mechanism to provide users a single point of access to the platform. Furthermore, it has been integrated with the Risk Assessment Tools to provide them the assets of the pilot infrastructure.

Finally, it has been integrated with the Situational Picture Generation and Update (SPGU) and with the Cyber Physical Threat Monitoring Dashboard to provide the Critical Infrastructure operators a common dashboard to have information about the infrastructure and the results of risk analysis.

## Partners

**ResilTech**
Italy

**ResilTech** is an Information and Communication Technologies (ICT) consultancy company operating in the field of electronic and information systems that are critical for **safety and security**. ResilTech has a long experience and strong know-how in modelling and analysis of critical infrastructures (power domain, transportation, etc.) mainly from safety point of view. ResilTech expertise covers all the aspects of critical systems: modelling, specification, validation and verification.

## Contribution

ResilTech has guided the design and the implementation of the MBDA, improving the functionalities of the existing Blockly4SoS prototype tool. From the functional point of view, the MBDA tool has achieved many improvements with regard to Blockly4SoS: it allows to create **ad-hoc profiles** for specific contexts of use, to model **weaknesses and vulnerabilities** of the system, assessing the risk coming from them; it allows analysis of cascading effects.

Furthermore, ResilTech completely redesigned the tool, selecting cutting-edge technologies suitable for the realization of a system based on the concept of SOA (Service-Oriented Architecture), with particular attention to security.

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**.

## Purpose

In 7SHIELD, the **Model Based Design and Assessment (MBDA)** tool aims at modelling the infrastructure of Ground Segment systems guiding the analysis of the system in order to verify security properties. The MBDA evolves Blockly4SoS, a prototype tool developed in the context of a previous project, in order to support not only the modelling of the main Systems of Systems concepts, but also to perform hazard analysis, to enable threats modelling, and to address the assessment of risk resulting from the **cascading effects**.

## Stakeholders

Both **private and public companies** might be interested in the MBDA tool. Since it allows the creation of a customized profile for any context of use, it can be used in any critical context. The tool is able to provide services at design time, to provide early identification of weaknesses and promptly perform proper modifications. It is able to identify existing vulnerabilities that need to be solved, in order to reduce the likelihood of their exploitation by malicious attackers.

Moreover, thanks to the modeling feature of the tool, which allows to model at different levels of abstraction, and thanks to the implementation of a **general methodology** of analysis of cascading effects, it is suitable to be used also in other critical infrastructures domains.

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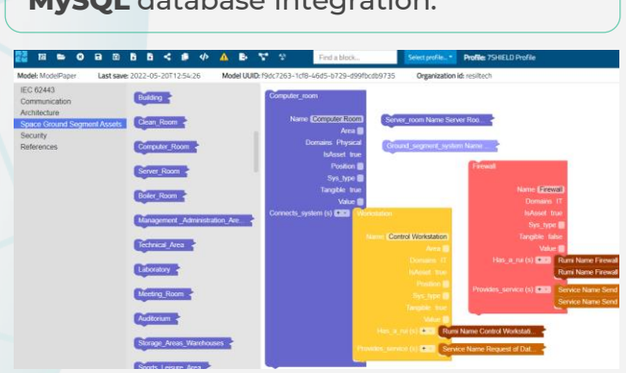
## Technology

The MBDA tool has been implemented on the basis of the concept of Service-Oriented Architecture (SOA). In the MBDA, service-oriented capabilities are expressed formally with resource-oriented REpresentational State Transfer (REST) APIs that provide the core business logic as-a-service from the backend to the frontend of the application.

The user interface has been developed relying on **Angular** framework and Typescript language, REST services have been developed in Java and data access has been entrusted to **Java** Persistence API (JPA) and **Hibernate** Object-Relational Mapping (ORM) to manage **MySQL** database integration.



## Future Improvements

The MBDA tool, also referred to as ResilBlockly, can be further improved enhancing the usability in modelling features. Regarding threats, new threats taxonomies and public catalogues can be integrated in the tool.

Furthermore, new plugins performing the **automatic generation of test cases** starting from the system model and the functional requirements allocated to the system components can be integrated in the tool.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