EUROPEAN DEFENCE AGENCY

Fact sheet

www.eda.europa.eu

Situation Awareness System for Systemic Decision Support for Defence Energy Infrastructures

Background Description

The critical (energy) infrastructure 'system-of-systems' is very fragmented. It has a large number and variety of assets, resources, actors, owners, etc. Therefore, it requires a situational awareness watchdog system that can integrate various information flows, as a backdrop to decision-making, separated from the command and control system of the individual asset controllers. A close example of this is the war room of the armed forces, where decision-makers collect and interpret data before making decisions.

There are already benefits from having numerous types of sensors (in-situ, in space) and of remote sensing techniques. Developing such application is very challenging as it allows the simultaneous management of different data systems and data format and possibilities to involve various actors.

The system can become a component of one which is also predicated on control, but it can also be used by non-controlling stakeholders (like defence sector energy users) to foresee problems with civilian systems and coordinate responses adequately.

Project Analysis

Situational awareness systems already exist for individual asset owners, but not for systemic stakeholders, whose security profile requires them to maintain awareness of an entire system's functioning. Defence sector requires such a system to support adequate energy security governance for their own assets (bases, etc.). ***Not having such a system opens the defence sector to hybrid warfare operations aimed at civilian energy infrastructures on which defence is critically dependent and hinders the militaries' future efforts at ameliorating this vulnerability.***

Given the need to define an inventory of systems and components (e.g. resources, networks, etc.), by applying existing techniques, it is also necessary to determine which standards will be used for the integration and security of data flows.

Another delicate aspect to manage concerns the use of data provided by third parties. *The question is how we make them share such important data on a continuous basis, e.g. authority, financial incentive, threat of punishment, and convincing them of the*

importance. How would we position the actual user of the project platform within an organisation? This is important to indicate from the perspective of the decision-making flow.

The **project** ultimately proposes a **geographic information system (GIS)** linking **multiple data streams** and with **analysis capabilities** based on the latest technologies related to artificial intelligence (AI) and **machine learning.** The **thematic clusters** presented towards the end of the document underscore these features.

Objectives

The **project** will enable *real-time* **data flow integration.** It must provide for an increasing level of (pre)-processing of data through the use of artificial intelligence (AI) and machine learning to provide valuable inputs for decision-makers. This makes it possible to automatically activate, even in the absence of direct control, security actions concerning various devices, systems and procedures.

The data flow will eventually allow for coherent and rich data visualisation techniques, including GIS. Digital twinning is also an important element for the system topology that enables the creation of added value for the end user.

By integrating relationships with important suppliers, such as Earth observation data providers the platform will also be usable for ***simulation, training and scenario development,*** which are vital in the rapidly shifting security environment to stay ahead of potential adversaries targeting civilian systems to erode defence sector capabilities.

Impact – Expected Outcomes

Firstly, such a platform provides the capability to **identify** and **prevent** cascading disruptions in critical infrastructures, especially energy-related. The project will also lead to the harmonisation of risk communication between companies and regulators and between authorities within the EU, if widespread adoption of its components takes place in a sector.

The project will **increase resilience** and **security** because it supports the objectives and purposes of the existing reference documents, such as the Council Directive 114/2008 "*on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection*".

Although, due to integration, it is necessary to prevent and mitigate possible physical or IT attacks, the platform **enables better decision-making** to take place, when compared to information sharing through points of contact, without real-time data feeds, through the situational awareness and the lower time for reception of feedback. The system, as envisioned here, does not presuppose the existence of asset control on the part of the user, though it is possible for integration within such capabilities.

The platform offers the possibility of **better communication** with the general public and the political class, through the use of products like screenshots, videos, time lapses and reports. Thus, it becomes a public communication tool for the defence sector, including with other institutional stakeholders, keeping in mind the need to maintain operational and informational security, including the sensitivity of highlighted security problems.

Opportunities

The project must set adaptable objectives to the dynamism of the regulatory scenario (e.g. potential revision of directive 114/2008), and provide for harmonising platforms already in use by different actors as there is a transversal nature

of beneficiaries that concerns beyond the military sector.

The project contributes to the ***development of other projects dependent on complex situational awareness capabilities,*** by providing a key capability for integration in a command and control system, or one dedicated to other types of system governance activities (training, research, etc.).

Based on an initial assessment, this project idea could be eligible for potential funding at the European level, for instance, through the Structural Reform Support Programme (SRSP).

Risks/Challenges

Financial uncertainty is one of the main challenges, given the unknowns of developing a usable product. It is essential for a minimal viable product to be defined and built, leaving it to beneficiaries to decide future avenues of development and new features. Therefore, the product needs to be defined with a realistic list of features and elements to ensure completion and delivery according to the need of the main envisaged stakeholder.

There are also various potential legal constraints – data protection, data confidentiality, proprietary data from companies in the area of situational awareness, etc. There is the possibility of information overload, which is why there is a need to rely on AI and machine learning.

The difference between this platform and other war room applications, mostly at single asset level, is that, as the number of assets and relationships grow, there is a domino effect to be managed. This generates challenges in making sense of the data, identifying the changes in the security environment and prioritising actions over others. Without the application of new systems, the war room platforms can only encompass systems at the level of complexity, detail and size which is still intelligible and provides actional intel to users.

Member States would have to commit to some level of utilisation of this product. This may be complicated due to the fact that regulators and many companies already use and maintain geographic information systems in their activities, though the current proposal exceeds their capabilities and complexity. It should be also taken into account the general unwillingness to share data and to cooperate not only between states, but also at the level of infrastructure owners/operators. While the system is applicable at a national level, the challenges of its use across borders needs to be considered, since energy networks do not stop at borders, so neither do the risks and threats which will become increasingly relevant through the ongoing Europeanisation of the energy system of systems.

Methodologies

Application-oriented project. The proposed tasks include:

- Integration of existing solutions;
- Use of data analytics, advanced AI and machine learning to generate added value through analysis (example, selection by AI of most relevant information and most pressing threats, with machine learning used to increase accuracy of decisions);
- The integration of feedback from potential users;
- The analysis of existing war room and situational awareness platforms to identify capability gaps and also existing solutions which would be integrated off the shelf;

- Use of rapid prototyping and of scenario testing to improve platform without wasted resources;

- Aiming for the maximum technology readiness level (TRL): 5-6, and use of a minimum viable product philosophy.

The ***project will be structured*** along the following thematic clusters:

- security environment analysis with an all-hazards approach;

- analysis of the state of the art;

- data sourcing analysis;

- prototyping data stream integration and visualisation;

- prototyping use of AI and machine learning in data selection and synthetic indicator;

- pilot testing;

- feedback, assessment and recommendations integration;

- product development – outreach, standardisation, manuals, training support, etc.; and,

- management.

Deliverables will include war room product with manuals, custom design capabilities and support.

Way Ahead

Firstly, a willing lead nation needs to be identified, whose Ministry of Defence (MoD) would also co-ordinate with some key partners from academia and the private or public sector. Then, the project ambition needs to be pared down until it is achievable by a limited number of actors.

The funding must also be considered an issue, with some actors being able to make in-kind contributions. This means it is necessary to identify the actors who have the competencies to be involved and to actually contribute to a sustainable initial financial framework. This implies also outreach to promote the project and, to ensure future funding success, one should pursue signed agreements with companies and authorities willing to test the platform, to provide data and facilitate access for testing, or even to implement it in pilot form.

Ultimately, maximisation of benefits and revenue from the project will be achieved depending on a strategy for its development into a commercially viable product.

European Defence Energy Network

EUROPEAN DEFENCE AGENCY

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 789231