INTEGRATING RISK, SITUATIONAL AWARENESS AND RESILIENCE: APPROACH AND ACHIEVEMENTS OF THE INFRASTRESS PROJECT

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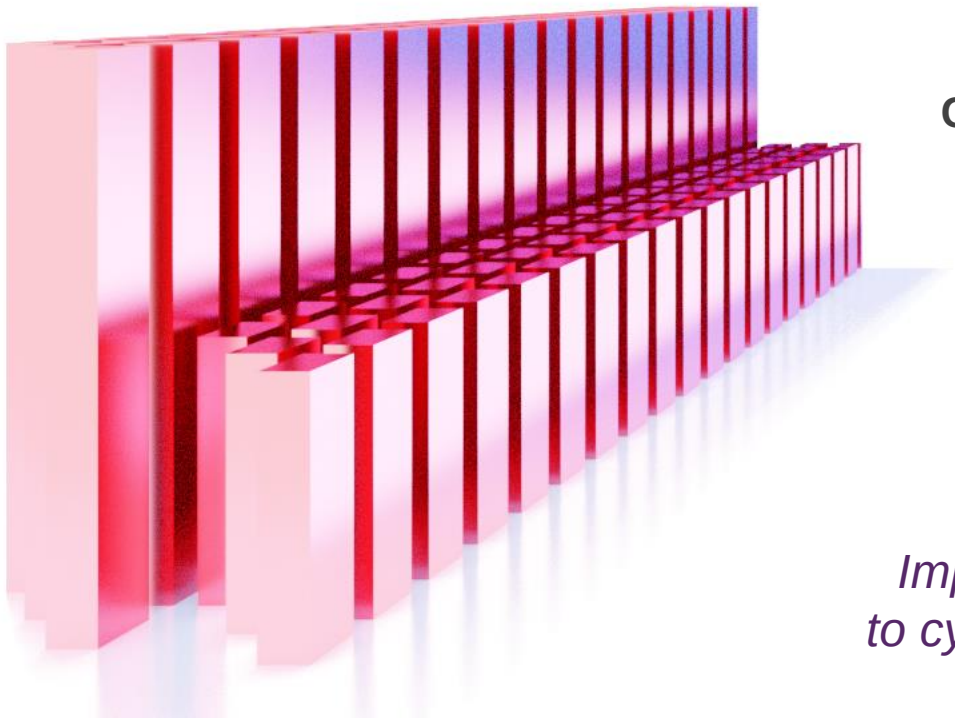


COMMUNITY OF EUROPEAN RESEARCH AND INNOVATION FOR SECURITY (CERIS)
DISASTER RESILIENT SOCIETIES (DRS)
STATE-OF-PLAY: RESILIENCE ASSESSMENT AND INSURANCE
07-10TH NOVEMBER 2022

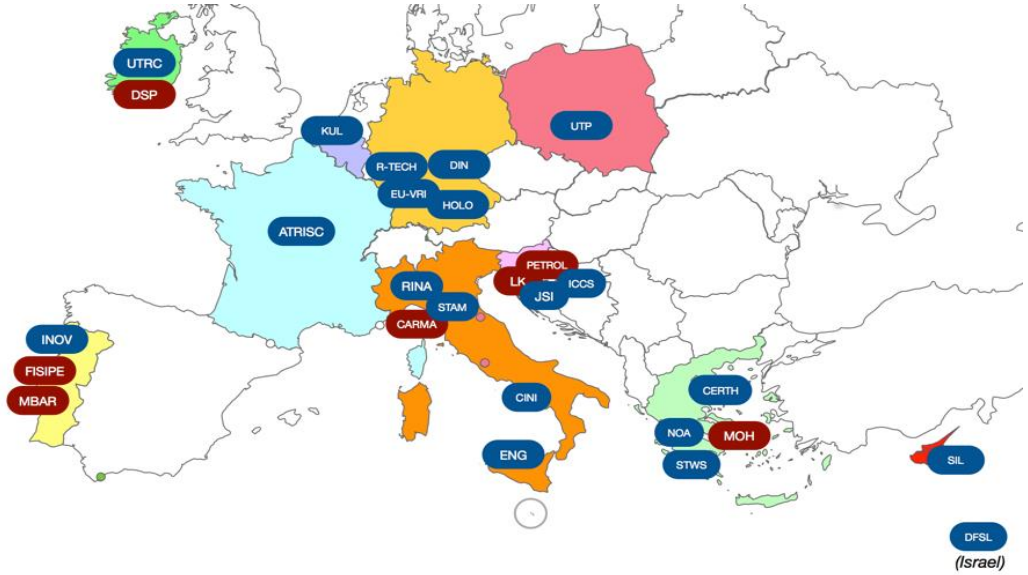
INFRA STRESS

Improving resilience of sensitive industrial plants & infrastructures exposed to cyber-physical threats by means of an open testbed stress-testing system

Project overview

- Call for proposals: H2020-SU-INFRA-2018
- Topic: **Prevention**, **detection**, **response** and **mitigation** of combined **physical** and **cyber** threats to critical infrastructure in Europe
- InfraStress has focused on **Sensitive Industrial Plants and Sites (SIPS)**
- Start date: June 1st 2019 – End date: September 30th 2021 (30 months)
- EU contribution: € 7 999 623

- InfraStress brings together **27 partners** of excellence from **11 countries**



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Project scenario

- InfraStress has focused on **Sensitive Industrial Plants and Sites (SIPS)**
- In last decades, **high levels of industrial safety** have achieved due to industry and legislative actions (the current EU Directive 2012/18/EU aka ‘Seveso III’)
- However, since **security breaches** in **SIPS** may result in safety incidents (the so-called “**security-induced safety cases**” phenomenon), there is a need to advance traditional approaches in order to enable an accurate analysis of the **interdependencies** between **security vulnerabilities** – both in the cyber and in the physical world – and **safety properties** of the infrastructure being protected
- Up to now **cyber** and **physical** security have often been addressed as **separate / unrelated areas** but especially the move into **‘digital everywhere’** era must consider them in **a holistic manner**

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InfraStress mission & main challenges

- Improve the **resilience** and the **protection** capabilities of **Sensitive Industrial Plants and Sites** (**SIPS**) exposed to large-scale, combined, cyber-physical threats and hazards

» **Provide adaptive, flexible, and customizable set of innovative and configurable security measures and tools**

- Guarantee continuity of **operations**, while minimizing cascading effects in the infrastructure itself, the environment, other Critical Infrastructures, and the citizens in vicinity, at reasonable cost

» **Enable effective collaboration among SIPS operators**

- InfraStress deals with **security** of both sensitive industrial production plants and sensitive storage sites, along with ICT infrastructures supporting them

» **Deliver an open Framework that allows future evolution to easily integrate (1) detection technologies, (2) data feeds, (3) analysis and decision support services, and (4) existing solutions already deployed at the SIPS CI side.**

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Methodology and expected outcomes

- The InfraStress **methodology** is based on a set of composite indicators of SIPS security and resilience, which will be embedded into the new risk and resilience ISO and CEN standards, and into education and training programs
- The **methodology** and **indicators** seek to yield innovation and the benefits/savings to be achieved by the project were assessed by users (i.e. Pilots) and advisory groups
- InfraStress started with TRL4+ results from relevant **past and current projects** or products in current partners' **portfolios**, developing its own new approach, by evolving and integrating them, in particular adapting them to SIPS needs

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TECHNICAL AND INNOVATION RESULTS

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Key achievements in a nutshell

- All components successfully integrated

40+ components developed by the project +

25+ selected COTS technologies

- Validation done in five **substantial** pilots:
  - Refinery: Motor Oil – Petrolch[illegible]cals (Greece);
  - Medical manufacturing Irelan[illegible]thopaedics): DePuy Synthes (franchise of Johnson & Johnson).
  - Chemical storage site: Carma[illegible]ni (Italy);
  - Municipality including chemic[illegible]ant, with involvement of public authority/civil society: Fisipe + Barreiro (PT)
  - Port including a storage site: [illegible]l chemical storage + Luka Koper (Slovenia)

They make a GOOD SPEC

- They successfully capture the diversity and complementarity of the requirements which must be satisfied by a platform enabling true convergence of cyber and physical security

They make a GOOD TESTBENCH

- They collectively cover a variety of high-impact threat scenarios to SIPS CIs, ranging from natural disasters to direct cyber-physical attacks to critical assets

They make a GOOD SHOWCASE

- They provide concrete examples of the threats and attacks for which InfraStress delivers efficient support

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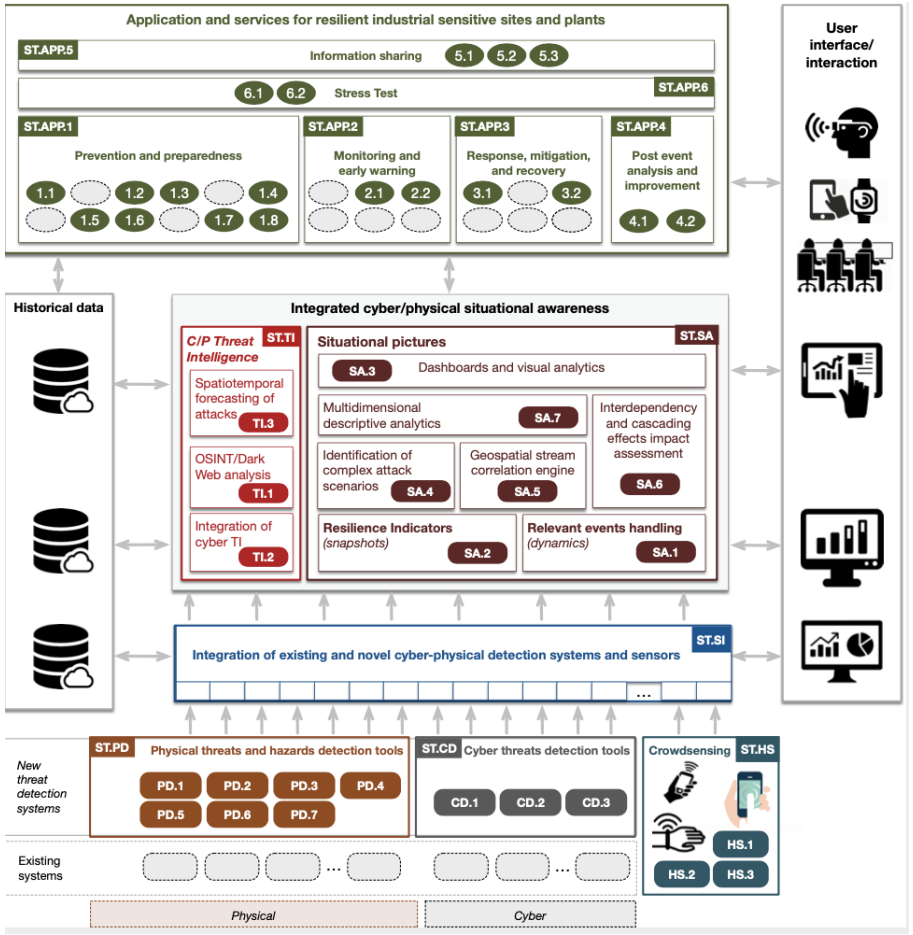
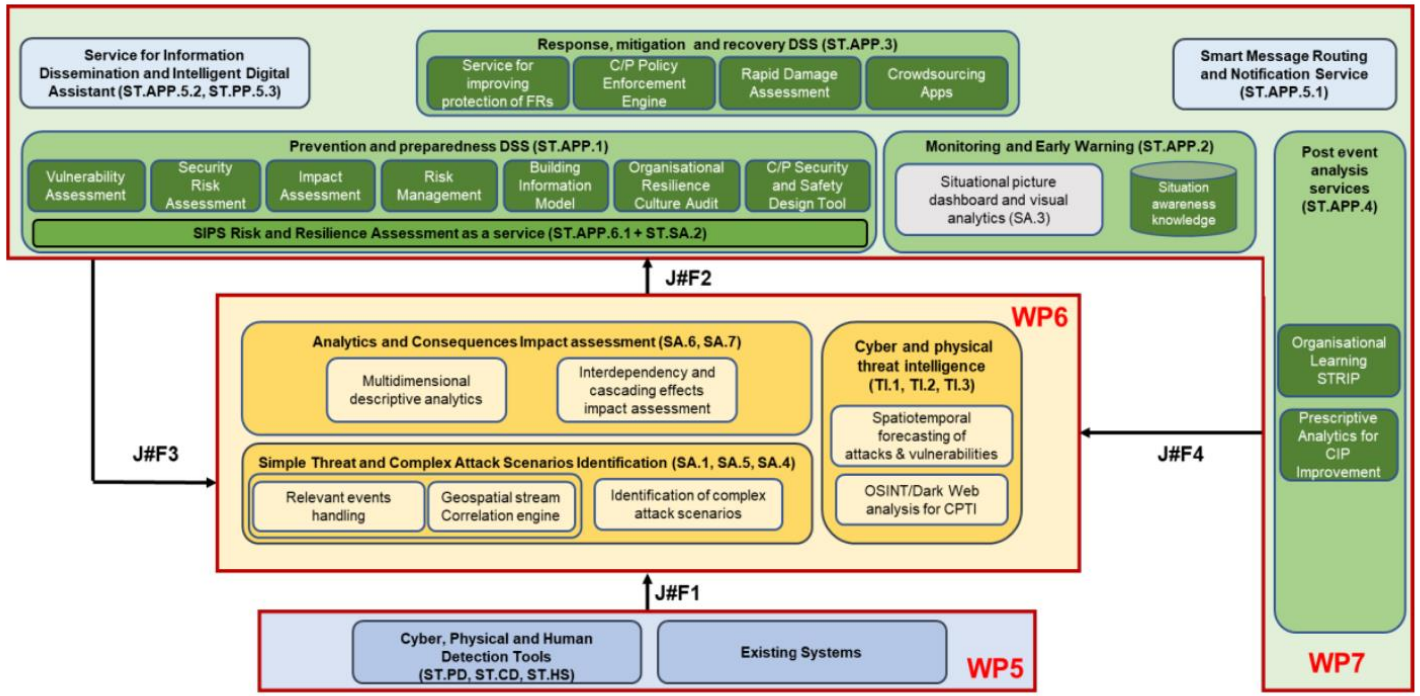
InfraStress Framework Architecture

From a LOGICAL to a CONCRETE view





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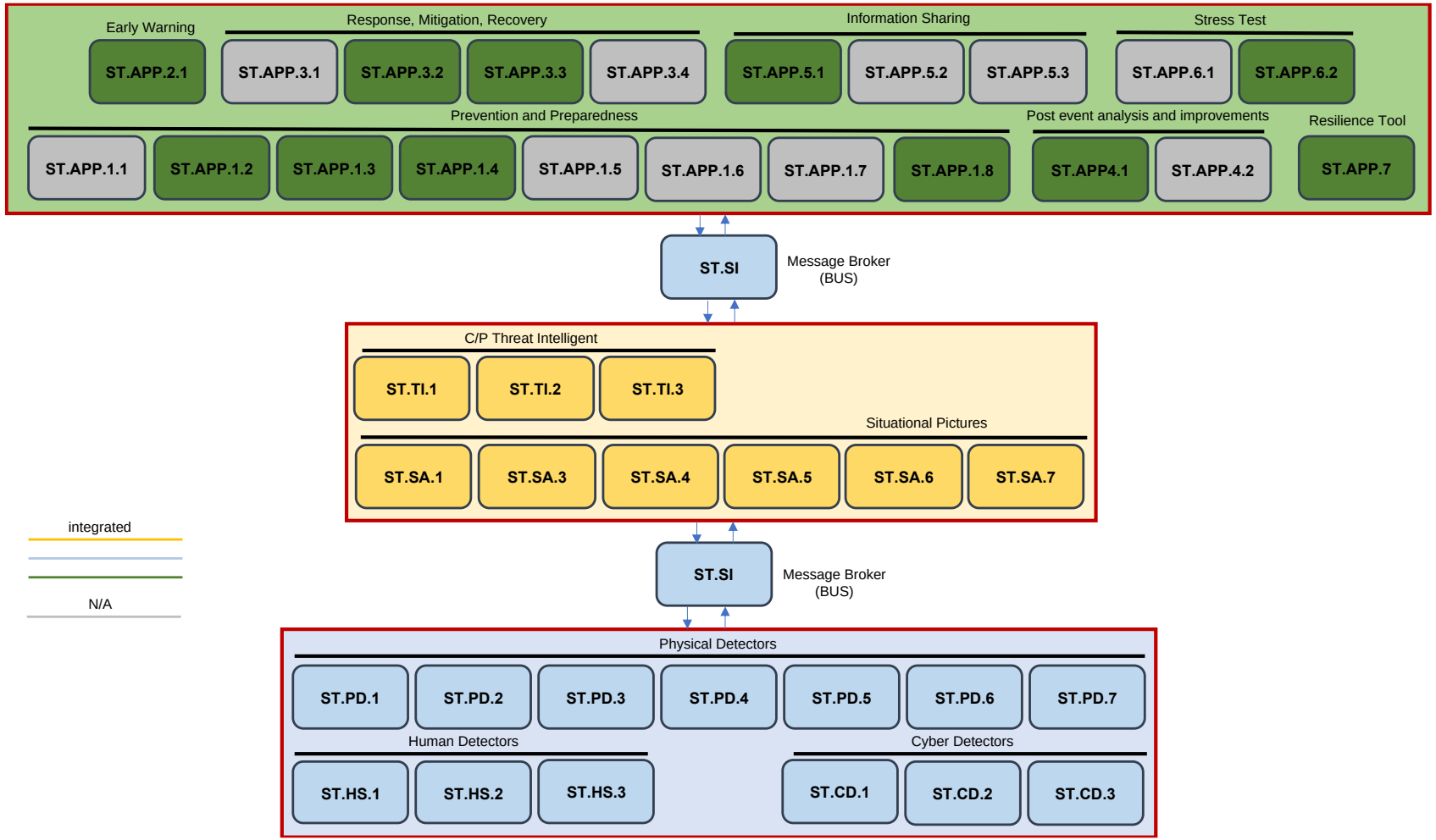
Integrated InfraStress Framework



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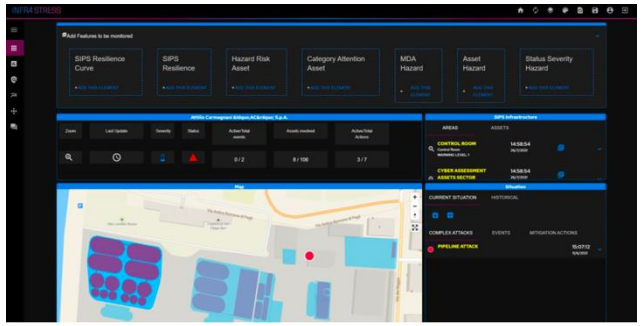
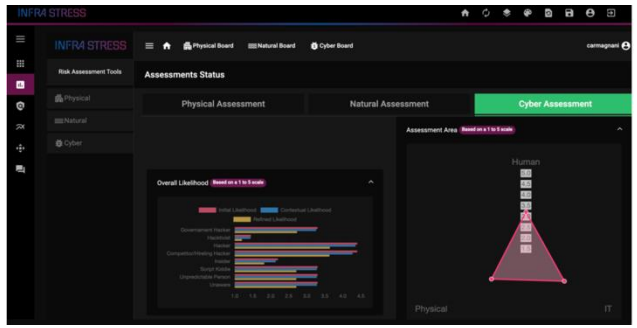
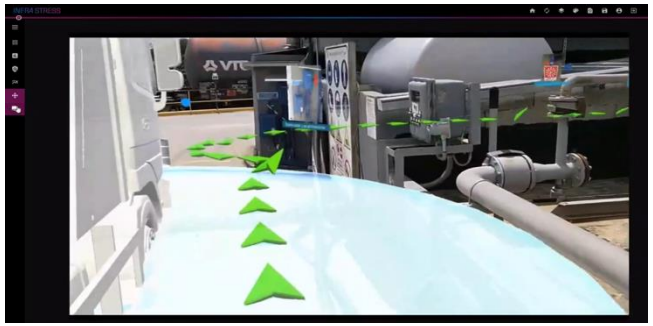
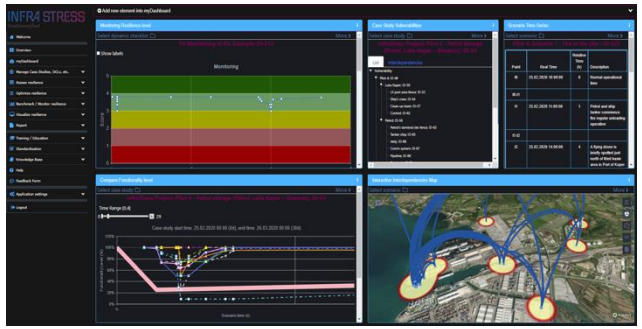
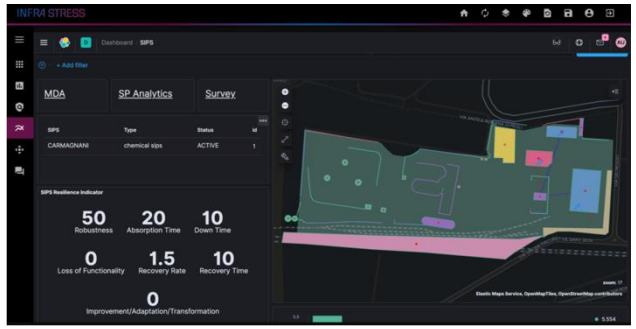
InfraStress Global Dashboard

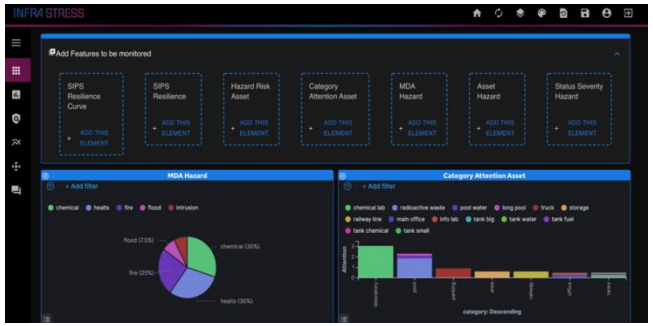


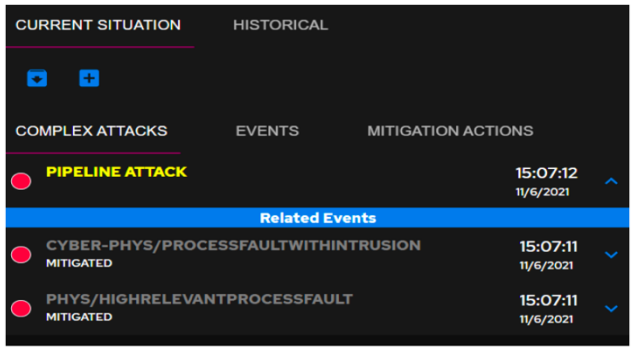


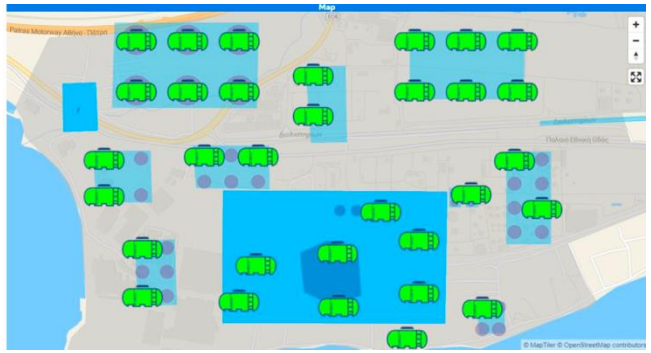












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Pilot 1: Motor Oil Hellas - Greece

Refiniery – Petrolchemicals

Main threats in scenario: natural hazards (earthquake), cyber-physical coordinated attack

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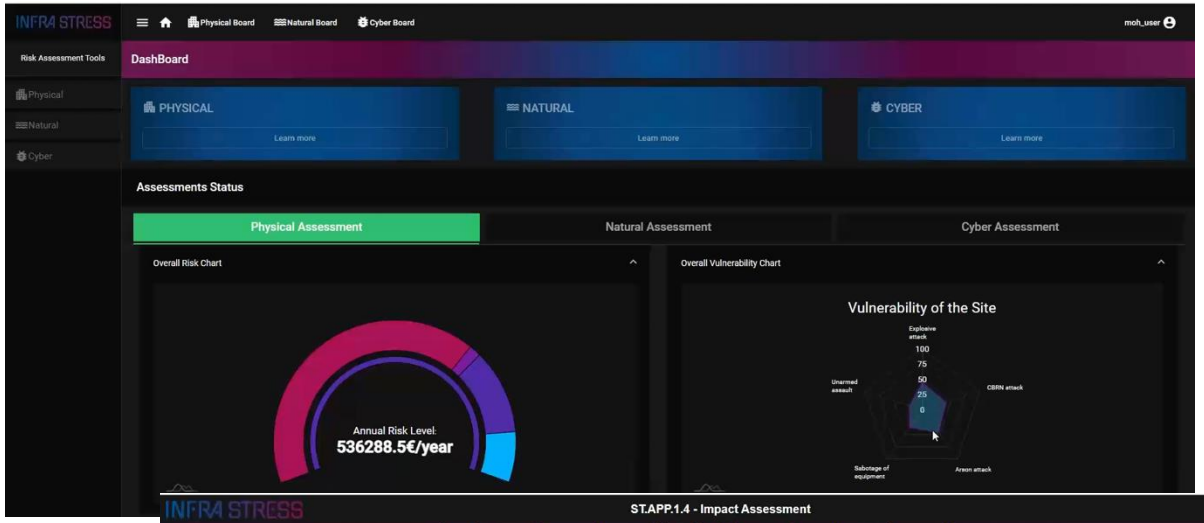
Pilot 1: Motor Oil Hellas - Greece



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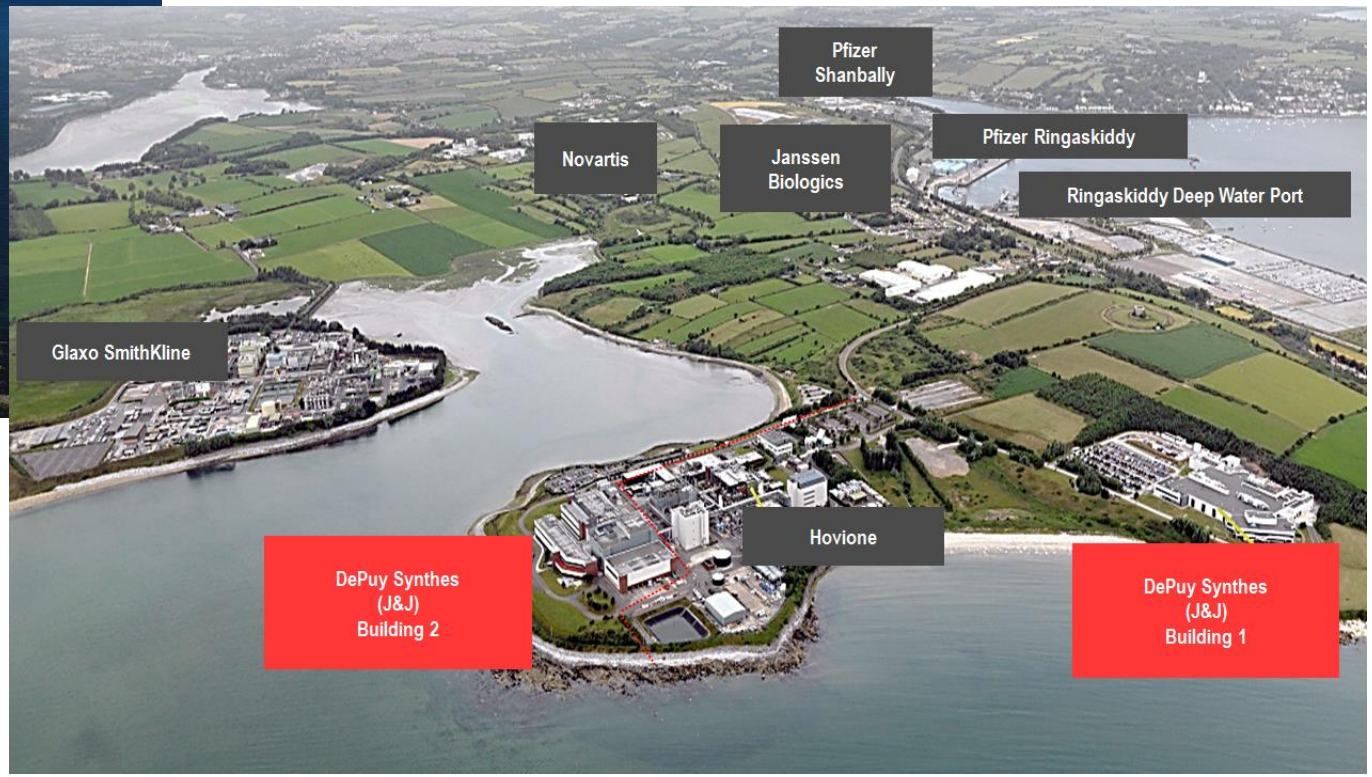
Pilot 2: DePuy Synthes, Cork - Ireland

Medical manufacturing plant (orthopaedics)

Main threats in scenario:
complex cyber-physical coordinated attacks



DePuy is a franchise of Johnson & Johnson

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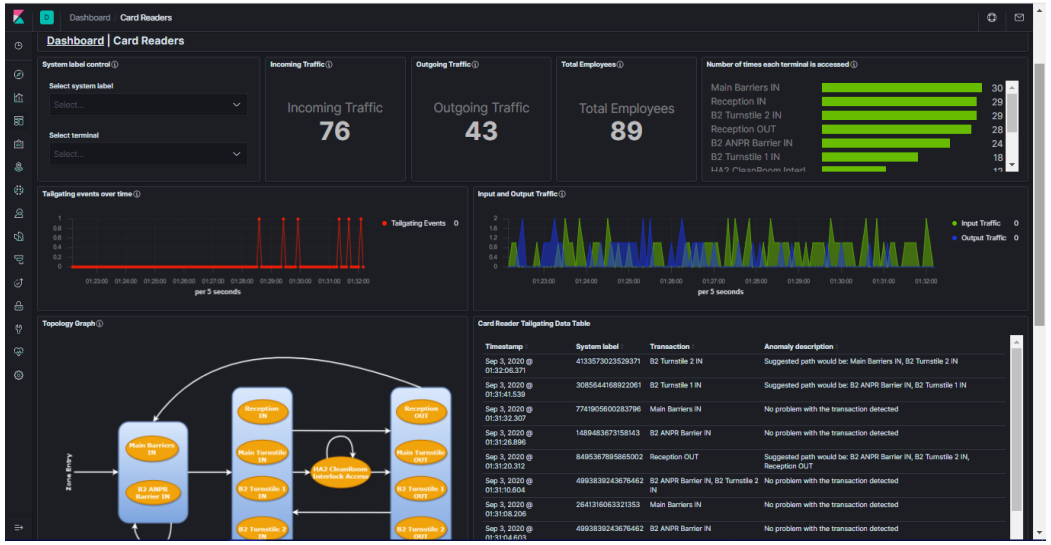
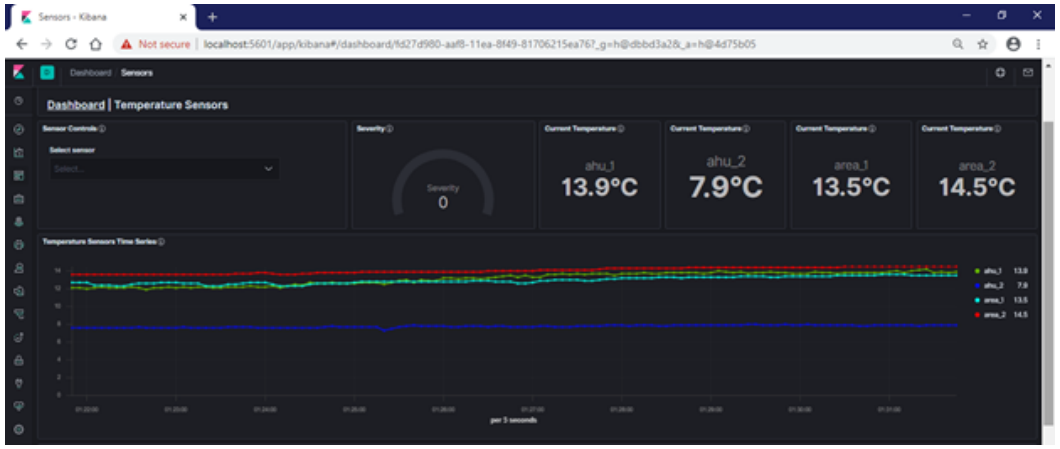
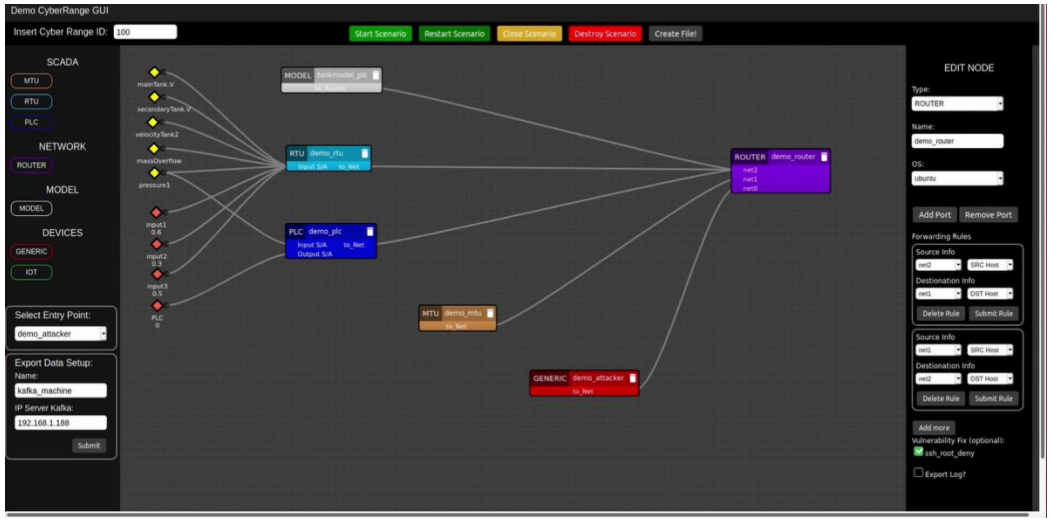
Pilot 2: DePuy Synthes, Cork - Ireland







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Pilot 3: Carmagnani, Genoa - Italy

Chemical storage site and terminal

Main threats in scenario:
Unauthorized physical / cyber access to plant IT/OT facilities

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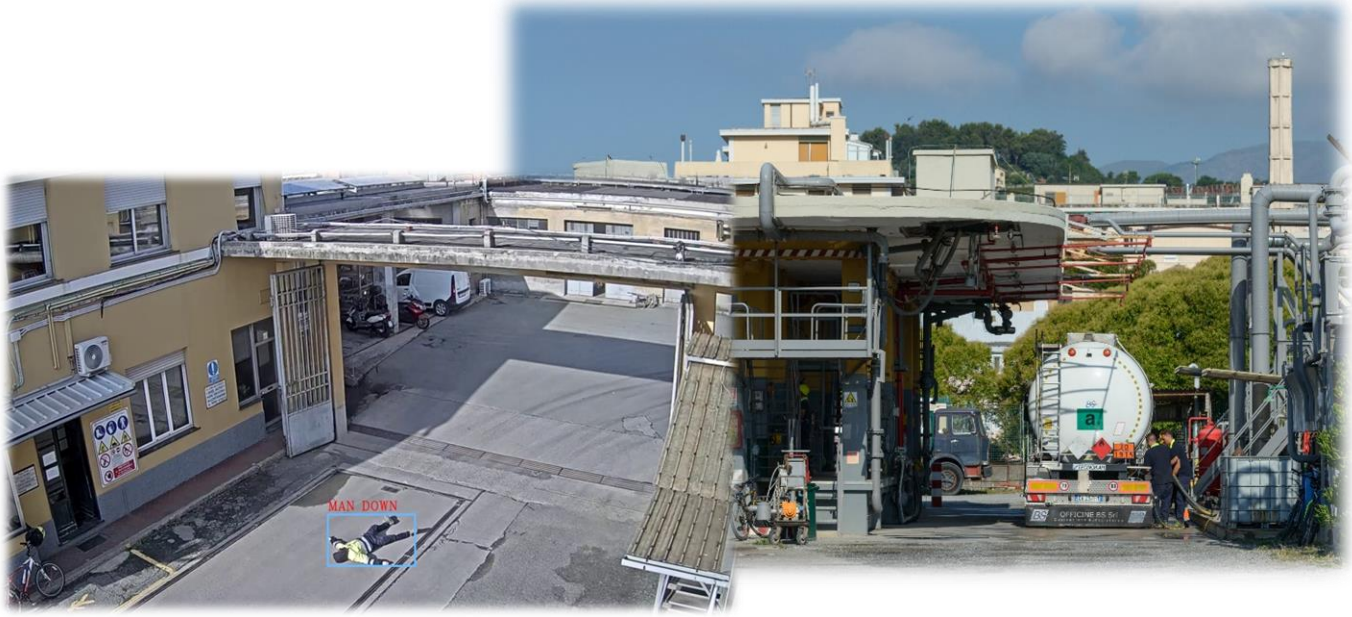
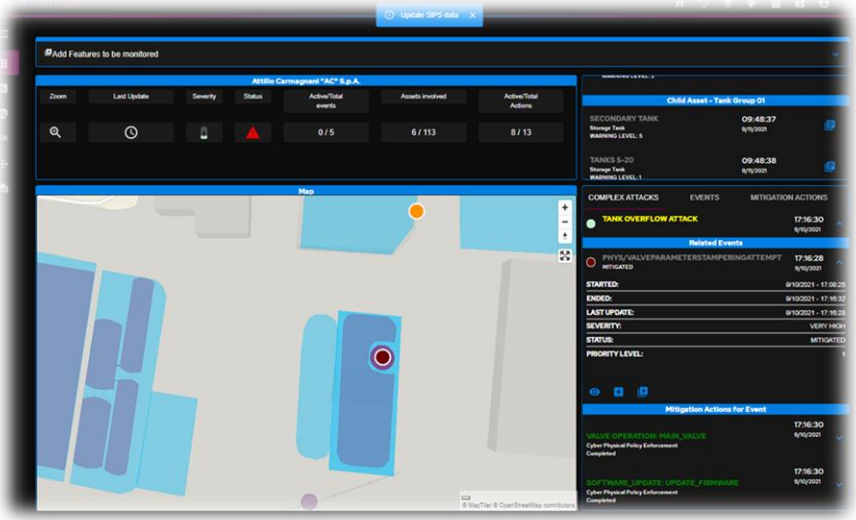
Pilot 3: Carmagnani, Genoa - Italy





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Pilot 4: Petrol + Port of Koper - Slovenia

Petrol *infrastructure for storing and transport of fuel and* ***Port of Koper*** *terminal*

Main threats in scenario: cyber/physical attack with technological major accident

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Pilot 4: Petrol + Port of Koper - Slovenia

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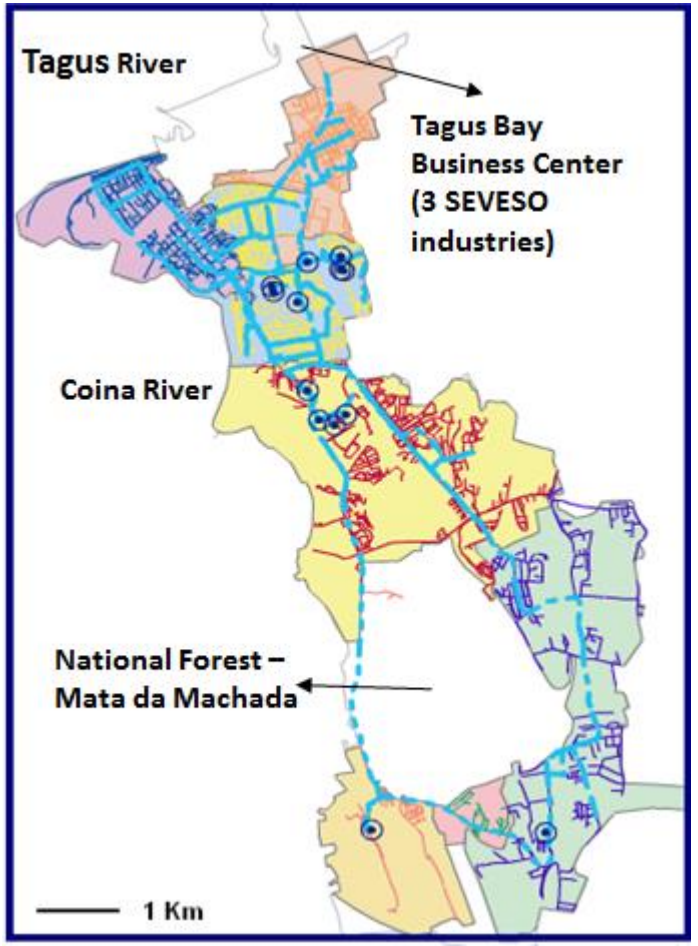
Pilot 5: Municipality of Barreiro + SGL



***SGL** industrial facilities and*
***Barreiro municipality** critical infrastructure*

Main threats in scenario:
natural hazard, cyber/physical attack (industrial and fake news)

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Pilot 5: Municipality of Barreiro + SGL

Film
“The Day Barreiro shook”

First Responder

Citizen

Crisis manager

Municipality authorities

Municipality CI operators

Civil protection authorities

SIPS operator

Media agents

Hacker

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Scientific Achievements and Impact beyond the project

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“Big 7” of InfraStress project…

1. NEW methodology
   (resilience + situational awareness + stress-testing) sci
2. INTEGRATED tools tech
3. DASHBOARD tech
4. ALL VERIFIED IN 5+1 REALISTIC PILOTS tech
5. COIP platform tech
6. DIN SPEC 91461 STANDARD sci
7. REALISTIC EXPLOITATION PLANS & INFRASTRUCTURE tech

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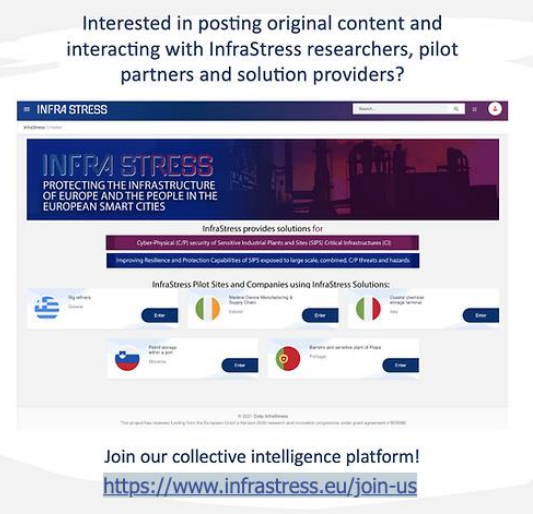
Impact Beyond the Project: The bidirectional dissemination & COIP



The InfraStress dissemination was:

- *Bidirectional*
  meaning that the results of the project were not only “sent to others”, but also because the feedback of the addressees were actively searched for and implemented into the R&D work
- *Dynamic (COIP)*
  The COIP system was developed as a live system constantly allowing the users from “both sides” (project internal and outside external) to see the current state and results of the interaction/dialogue

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Impact Beyond the Project: Exploitation as “Assessment-as-a-Service”

Apart from the usual “list of exploitable deliverables”, the project has proposed to have

- The whole system usable for “Assessment-as-a-Service””- i.e. the people can access the system, register and use it for
  - Assessment done by themselves
  - Assessment done by themselves and verified by the external experts
  - Assessment done by external experts

This was implemented through the ERRA-concept and infrastructure resulting from the project (ERRA – European Risk & Resilience Assessment for “Assessment-as-a-Service” – with approx. 50 members registered)

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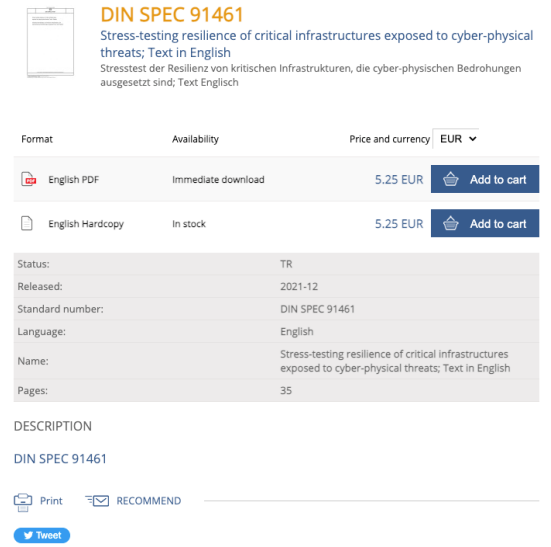
Impact Beyond the Project: Full-scale standardization


DIN SPEC 91461
Stress-testing resilience of critical infrastructures exposed to cyber-physical threats; Text in English
Stresstest der Resilienz von kritischen Infrastrukturen, die cyber-physischen Bedrohungen ausgesetzt sind; Text Englisch

Format	Availability	Price and currency EUR
English PDF	Immediate download	5.25 EUR Add to cart
English Hardcopy	In stock	5.25 EUR Add to cart

Status:	TR
Released:	2021-12
Standard number:	DIN SPEC 91461
Language:	English
Name:	Stress-testing resilience of critical infrastructures exposed to cyber-physical threats; Text in English
Pages:	35

DESCRIPTION
DIN SPEC 91461
Print RECOMMEND
Tweet

Many projects use to produce the standardization drafts, usually the limited duration (3 years) documents such as EN-CWAs and usually not brought to the published stage during the project.

InfraStress has :

- Produced and brought to final (published) stage one national standardization document, the DIN SPEC 91461 “Stress testing resilience of SIPS and other critical infrastructures”
  - ➢ The doc was produced with participation of all project partners and
  - ➢ Participation of the Italian and French NSBs (UNI and AFNOR)
- The basic concept of InfraStress was anchored in ISO 31050 “Enhancing management of emerging risks for enhanced resilience”; the ISO standard is now at the CD (Committee Draft) stage and has been developed by the Joint Working group of TWO ISO committees: The “risk” one (TC262) and the “resilience” one (TC 292)

https://www.en-standard.eu/din-spec-91461-stress-testing-resilience-of-critical-infrastructures-exposed-to-cyber-physical-threats-text-in-english/

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Impact Beyond the Project: Continuous participation in the EU P4P – “Projects-to-policies” activities

The new EU P4P – “Projects-to-policies” is a mechanism ensuring that the EU project results are embedded into current and the new EU policies – e.g. the Directives.
The results and experiences from InfraStress have been continuously considered in the discussions about NIS2 and CER Directives (cyber & critical infrastructures directives, respectively) and this was done through

- Forwarding the reports to the Directive developers
- Discussion on the dedicated events (e.g. CERIS) and
- Informal contacts and discussions related to single issues: e.g. the issue of standardization in CER-Directive – treated differently than in the NIS2 Directive.

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THANK YOU!

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Improving resilience of sensitive industrial plants & infrastructures exposed to cyber-physical threats by means of an open testbed stress-testing system