

**SAFE CARE**

*Integrated cyber-physical security for health services*



**Hôpitaux  
Universitaires  
de Marseille** | **ap.  
hm**

# THE 3S CLUSTERING EVENT (SATIE, SAFECARE, SecureGas) SAFECARE PRESENTATION

*2021-10-12/13, 2021*

*Philippe Tourron - Coordinator*

# Context reminder

## Challenge for health systems managers

- 3 perimeters that overlap and collaborate :
  - Medical devices
  - Building management
  - Medical data and software
- Polymorphic, agile, and combined threats : today and tomorrow, a strong attraction for cybercriminals and potentially terrorists
- A strong dependence between assets and complex impact chains... that can affect the lives of patients and staff
- A Paradox : A lot of information in specialized supervision systems without communication or integration

Share data and  
infrastructure



Need for a global view in anticipation, protection, and  
crisis management

# Addressing the challenge...

SAFECARE aims to:

- Provide high-quality, innovative, and cost-effective solutions that will improve physical and cyber security; and
- Enhance threat prevention, threat detection, incident response, and mitigation of impact in healthcare infrastructures, through the creation of a global protection system.

*Over the course of 36(39) months, SAFECARE will design, test, validate and demonstrate 13 innovative elements optimizing the protection of critical infrastructure under operational conditions*



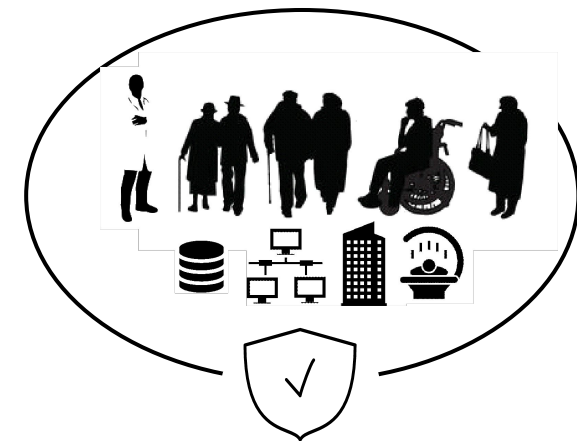
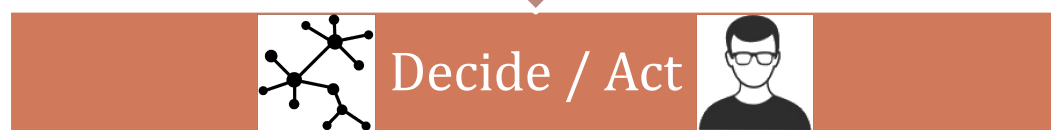
# Project Identity

<b>GA Number</b>	<b>787002</b>
Starting date	01/09/2018
Duration in months	39
Topic	CIP-01-2016-2017
Consortium	21 partners - 10 EU countries Technical providers, hospitals, national public health agencies and security bodies
Project Coordinator:	Philippe Tourron, Marseille Public University Hospital (AP-HM)
Technical coordinator:	David Lancelin, Airbus CyberSecurity (CCS)
Scientific coordinator:	Isabel Praça, Instituto Superior de Engenharia do Porto (ISEP)



# Four steps to manage the security

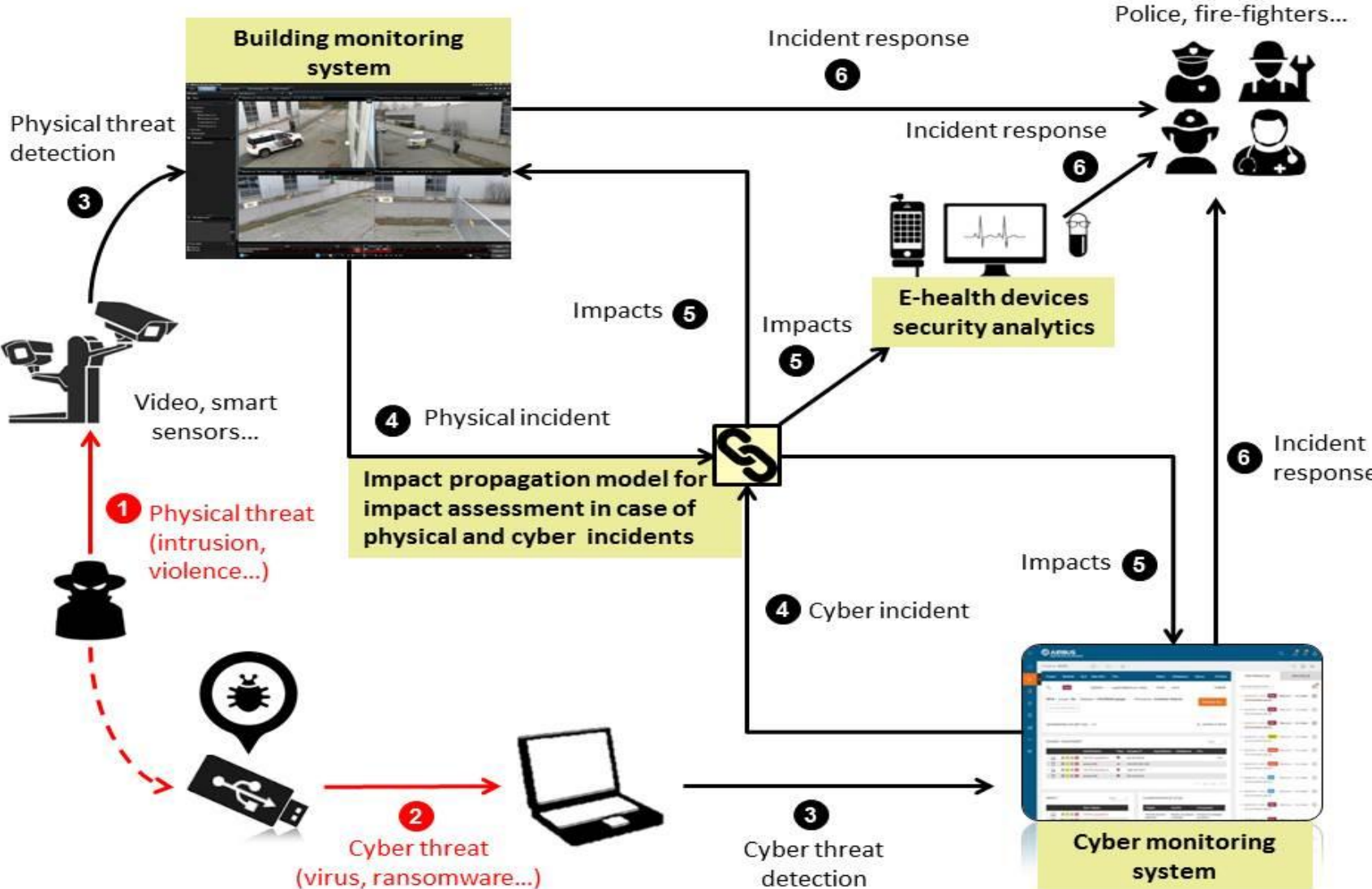
Physical   Cyber



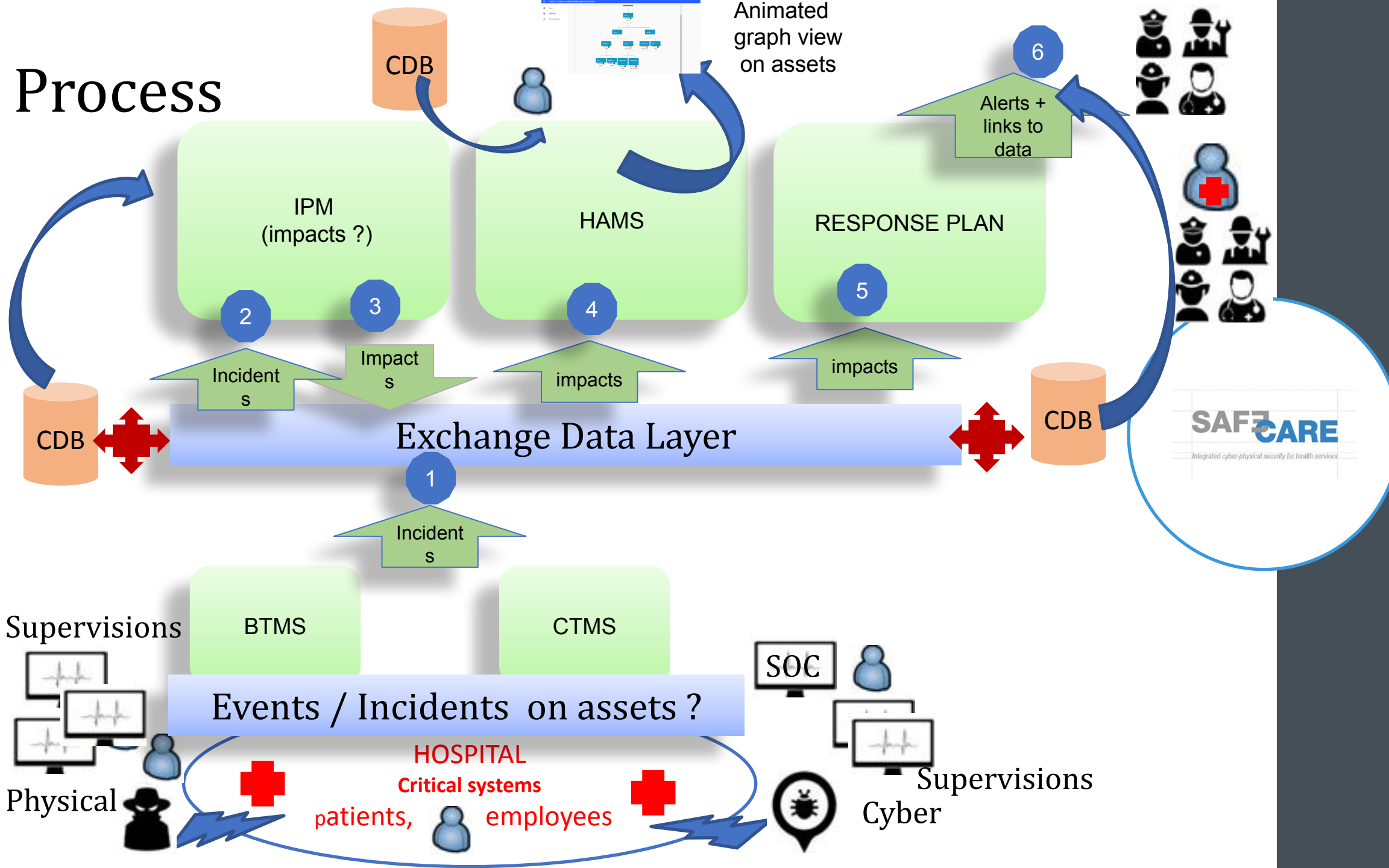
Patients, employees, assets, and services to protect



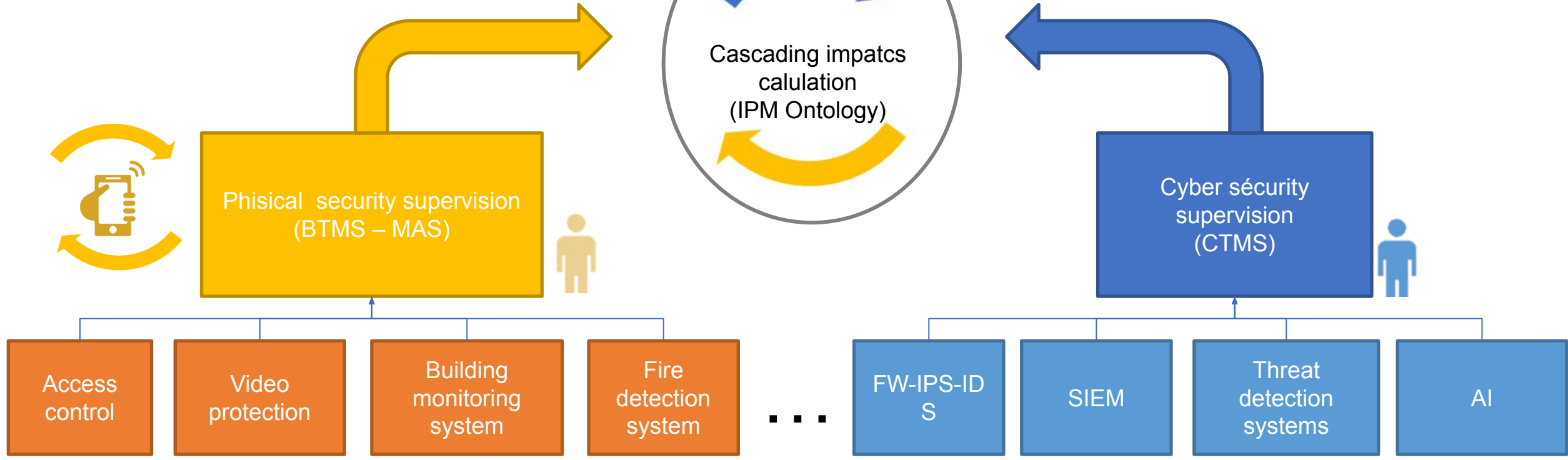
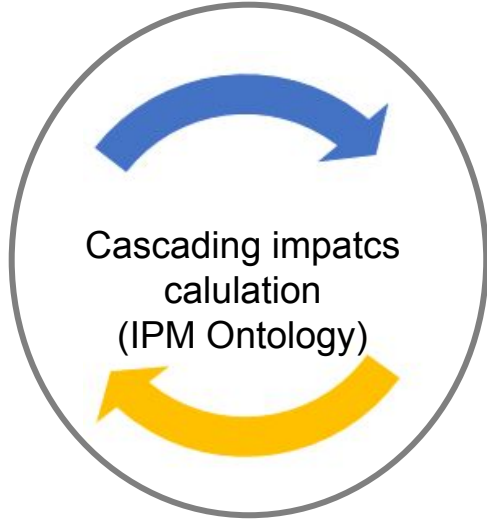
# Overall concept



# Process

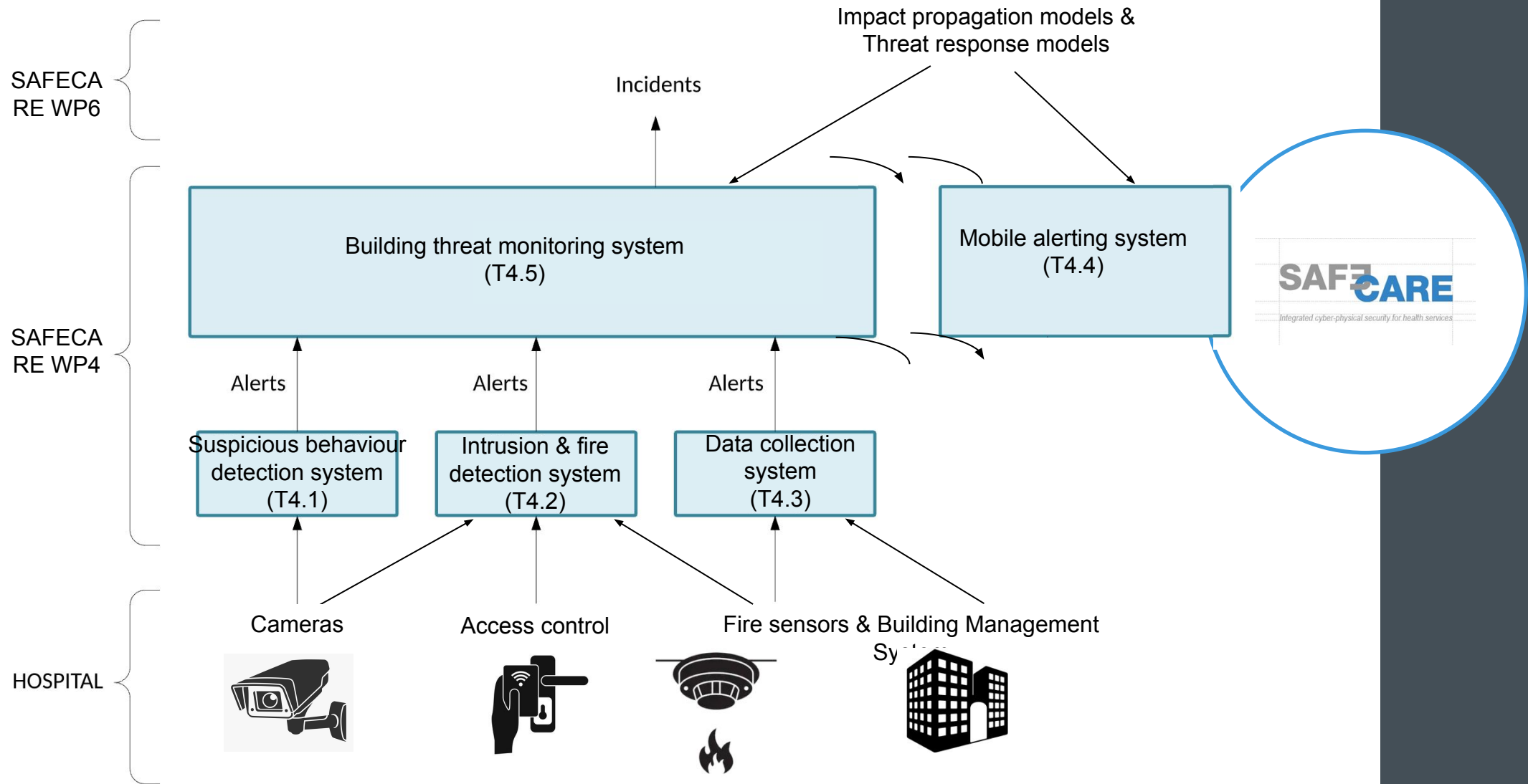


# Four tools for End Users

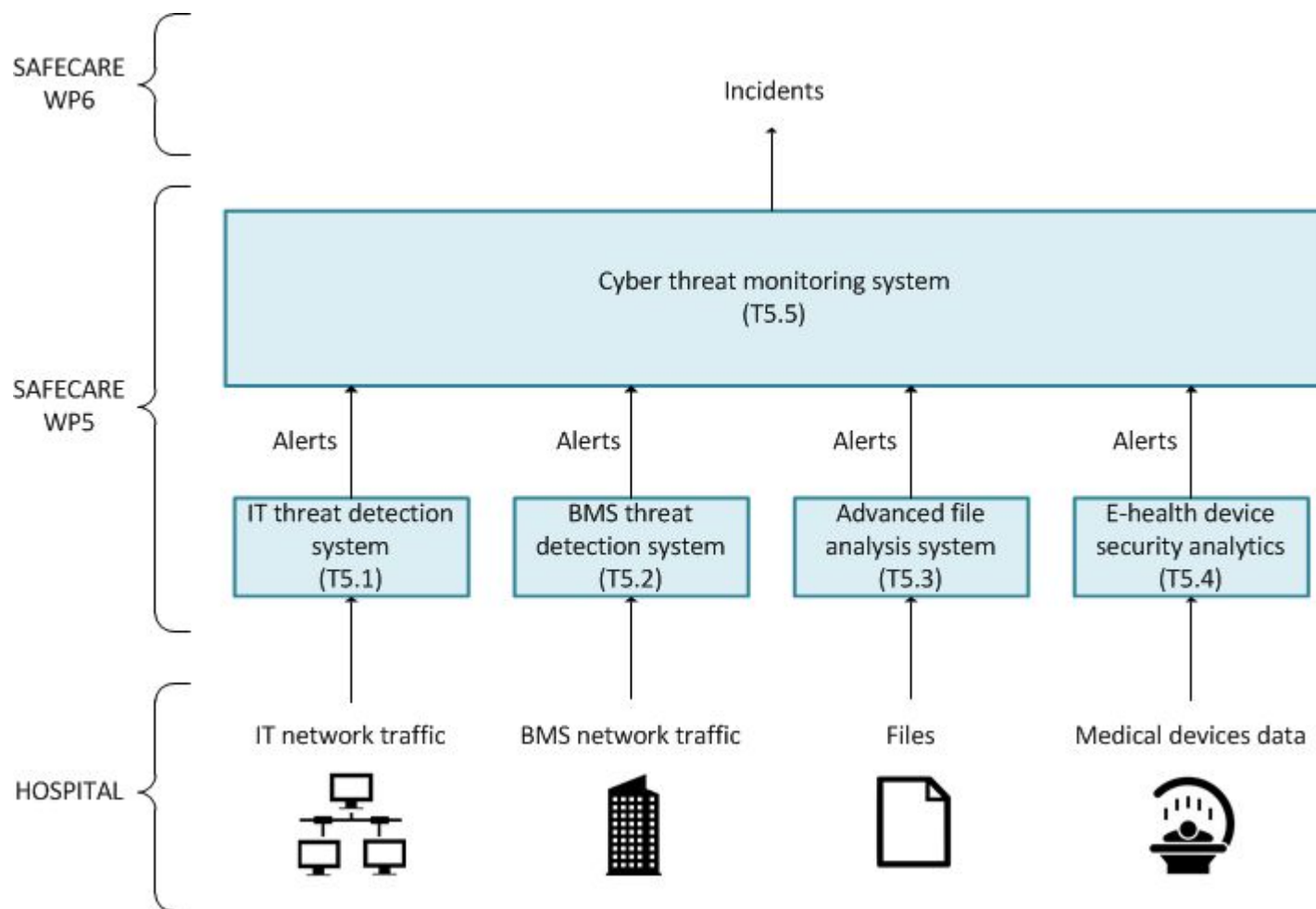




# BTMS Overview



# CTMS Overview

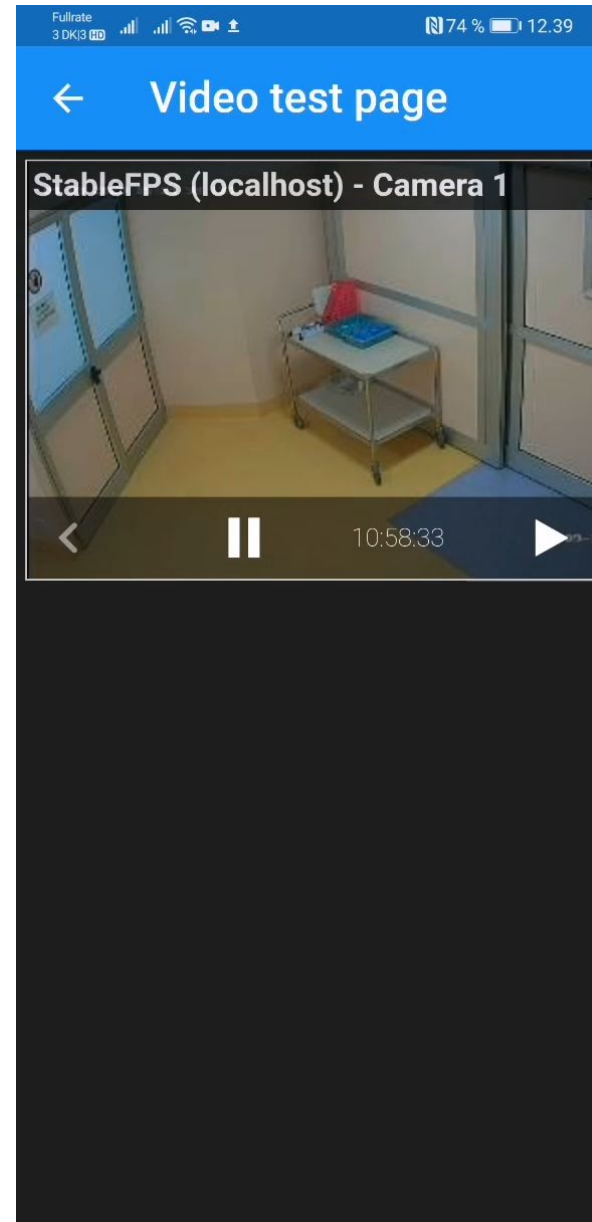
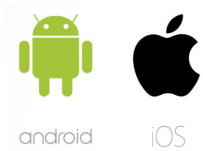


# Physical Security Solutions

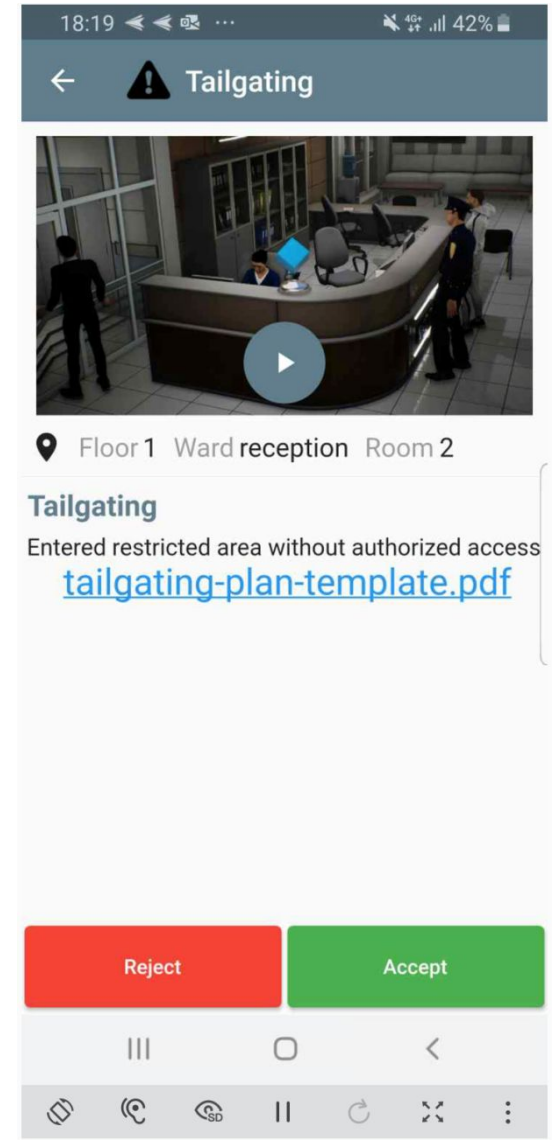
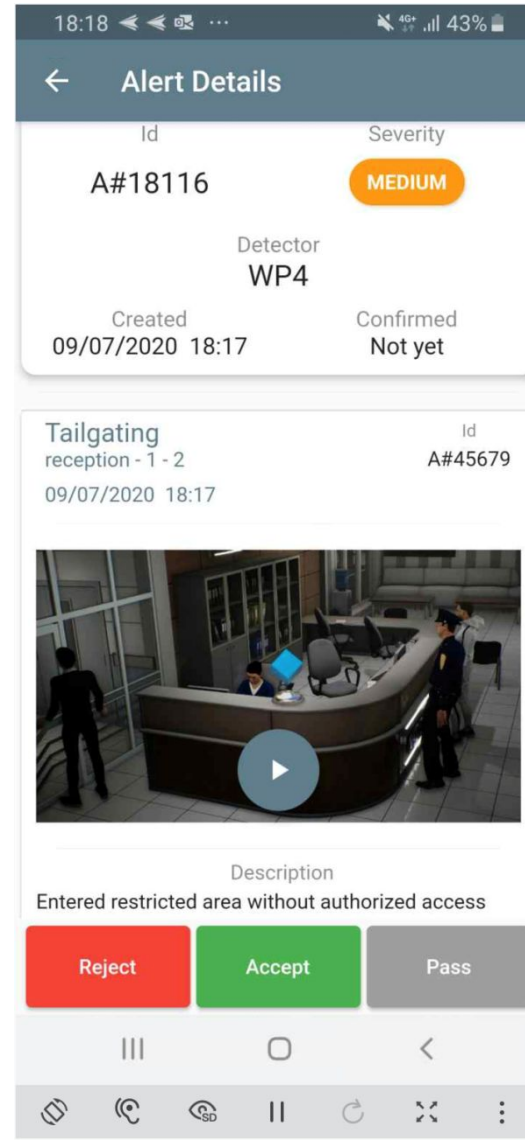
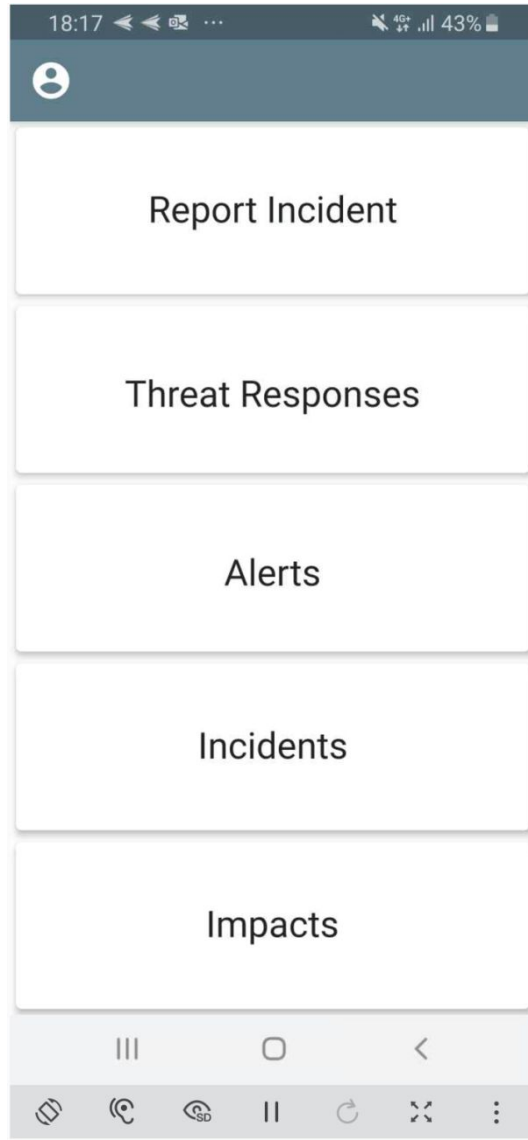
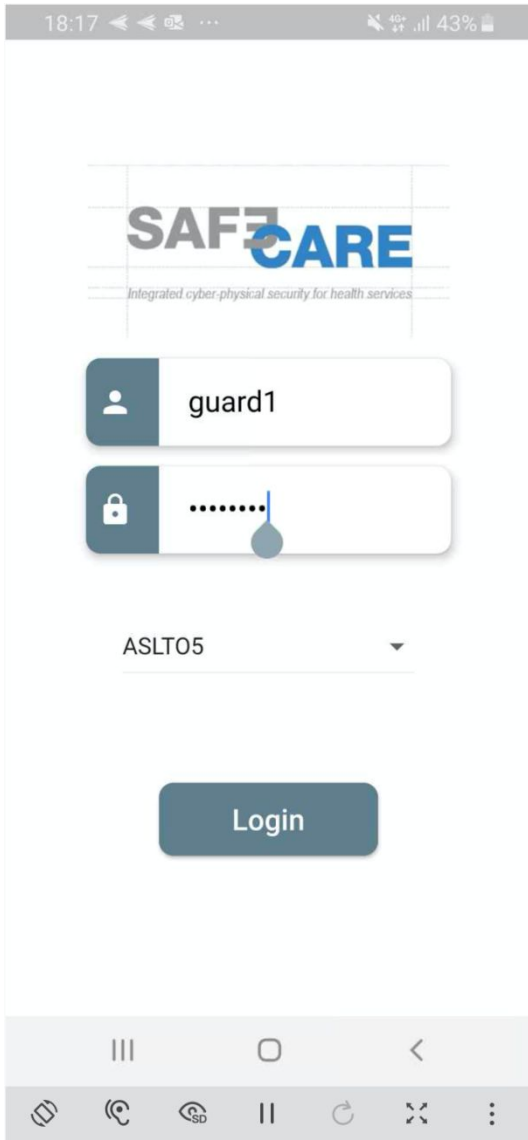


# Physical Security Solutions

Integrated mobile alerting system



# Alert and Mobility (MAS)



# IPM impacts ... to decide

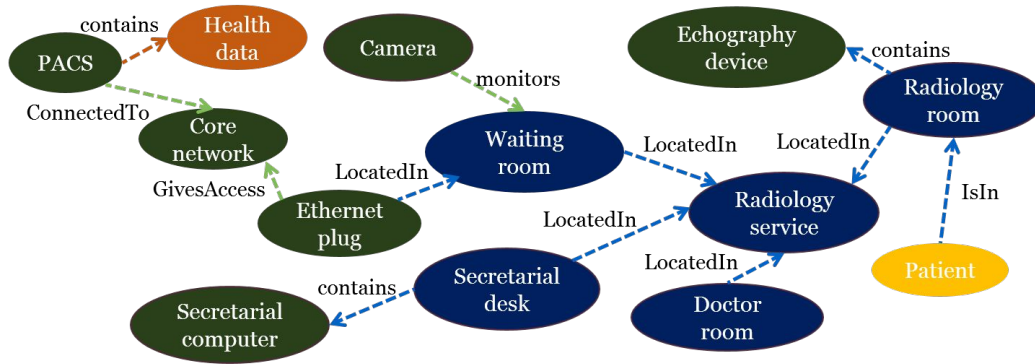


Figure 4 Assets relationships extracted from cyber and physical architectures

## Formula

$$\text{impactScore}_{th1}(a_t) = \begin{cases} 0 & \text{if } \exists a_i \in \text{Path}(a_s, a_t) \text{ s.t. } \text{impactScore}_{th2}(a_i) = 0 \\ 1 - \sum_{j=1}^p \text{protectionDegree}_{th1}^j(a_t), & \text{otherwise} \end{cases}$$

Where  $\text{Parh}(a_s, a_t)$  is the set of all the assets in the path connecting the asset  $a_s$  to the asset  $a_t$ .

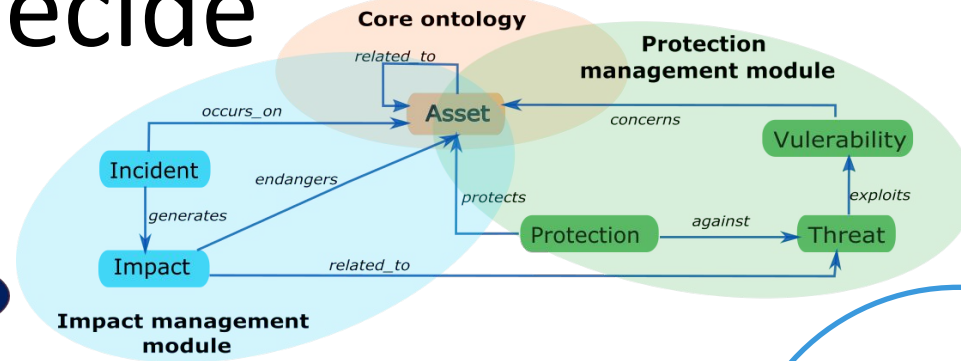


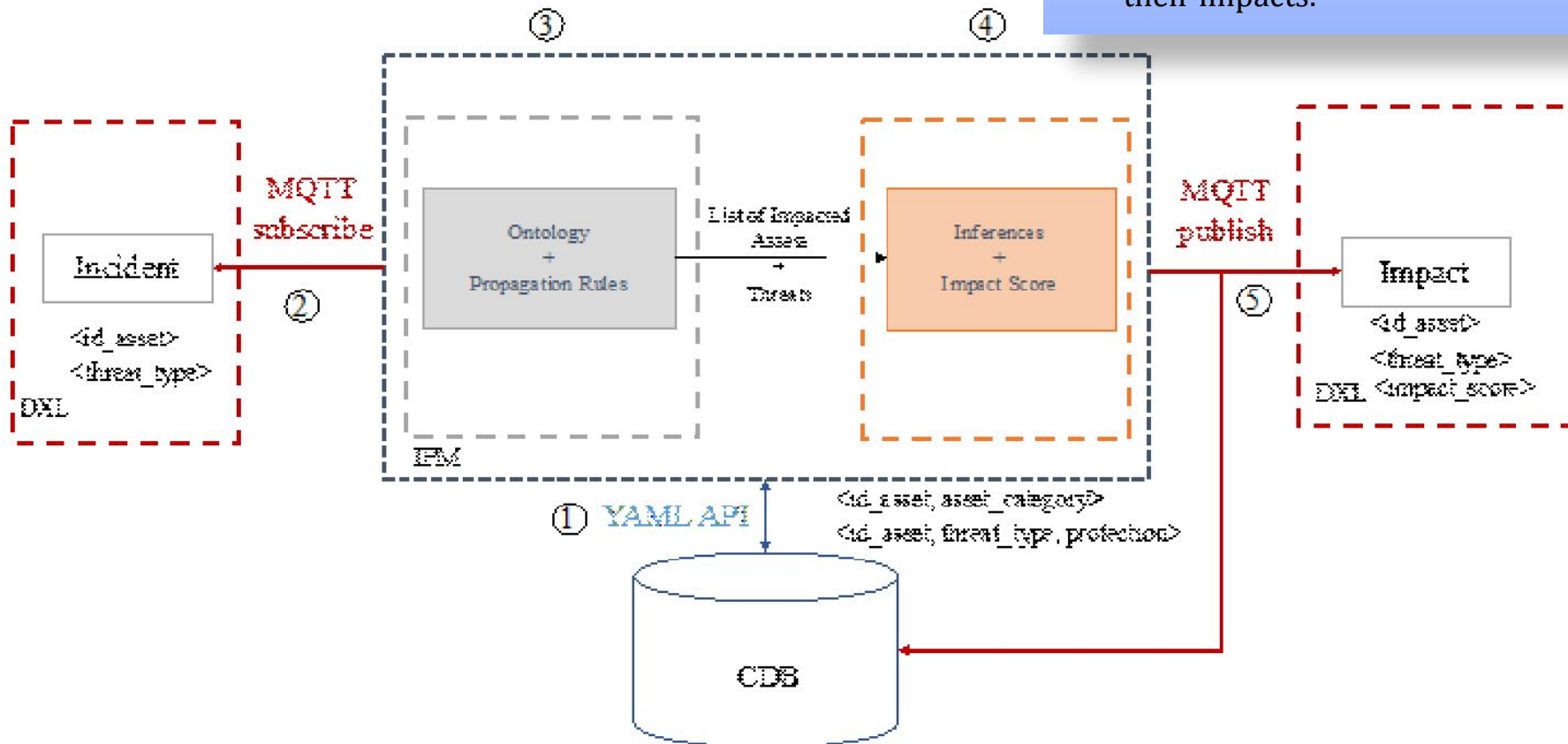
Figure 5 The Modular Structure of the SafecareOnto



# Impact Propagation Module

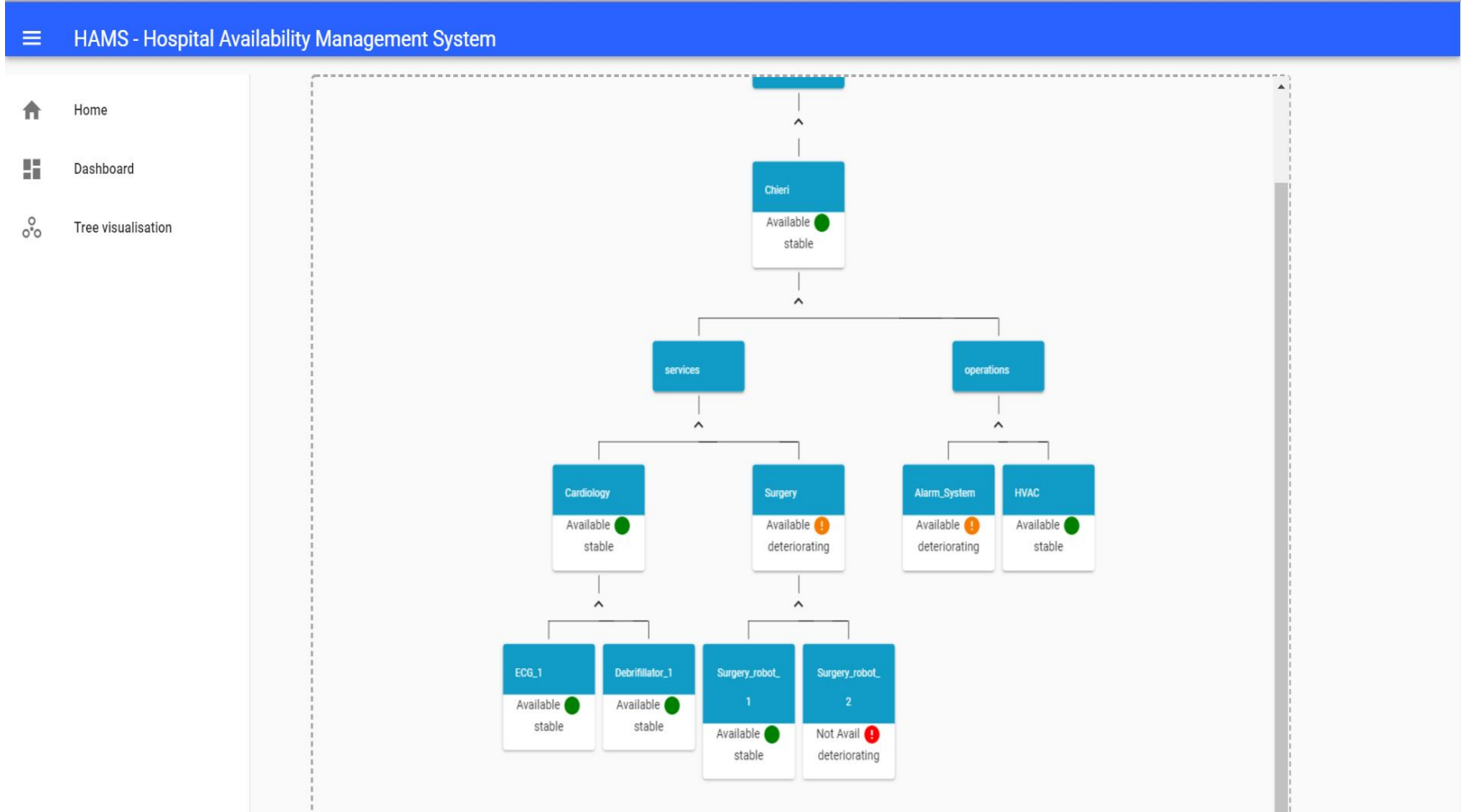
For an effective anticipation, the following knowledge must be acquired:

- Cyber and physical architectures to identify critical assets exposed to threats (scope of damage),
- Risks engendered by the attacker's actions,
- Protecting measures implemented to stop potential attacks or reduce their impacts.



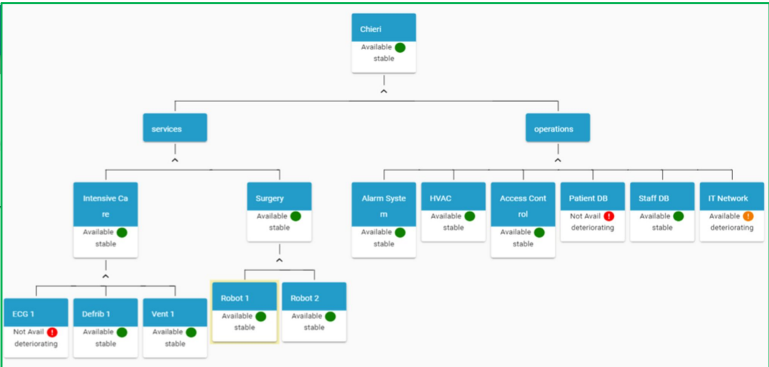
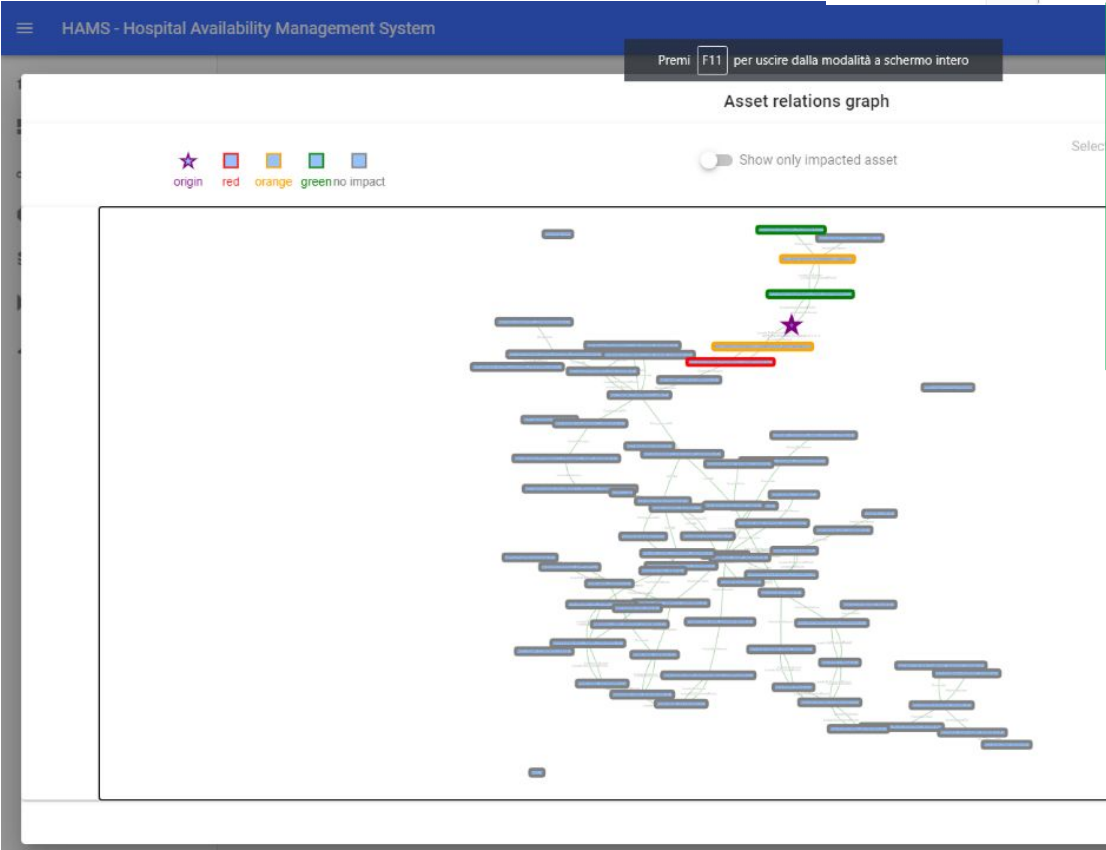
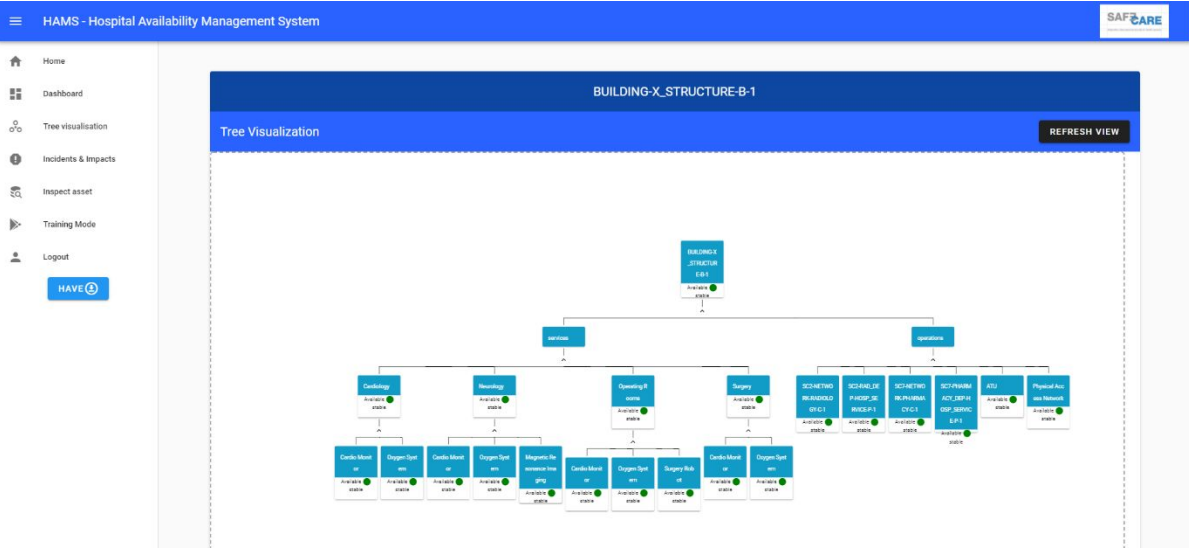
# Interfaces for crisis management

## Hospital availability management system





# HAMS interface for incidents and impacts



- Hams Impact graph



# Tests and Demonstration

## Test Platform



## Cyber Range



## Pilots

Hôpitaux  
Universitaires  
de Marseille



Marseille

A.S.L. TO5  
Azienda Sanitaria Locale  
di Chieri, Carmagnola, Moncalieri e Nichelino



Turin

amc  
Academisch Medisch Centrum  
Universiteit van Amsterdam



Amsterdam

# Scientific activities



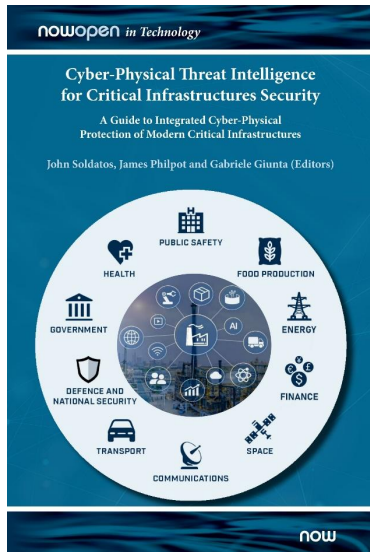
Focus events organised.

## Cyber-Physical Security for Critical Infrastructures Protection

Co-located with [ESORICS 2020](#)

Workshop organised in September 2020

4 chapters written for ECSCI book;  
7 open access publications and extra conference proceedings.



## European Cluster for Securing Critical Infrastructures - ECSCI



## Security Incidents in Healthcare Infrastructure during COVID-19 Crisis

Posted on 18 November, 2020 by James Philpot



Website traffic growth.

# Thank you

More details available on:

- Our website: <https://www.safecare-project.eu/>
- Twitter: @SafecareP
- LinkedIn: SAFECARE Project

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