Panacea

People-centric cybersecurity in healthcare

PANACEA Project focus on User Requirements

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WORKSHOP ON CYBER SECURITY SITUATION AWARENESS FOR HEALTH ORGANIZATIONS
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Scope

- Project coordinator is Universita' Cattolica del Sacro Cuore – Sabina Magalini
- PANACEA will deliver a **suite of technological and organizational tools** which help users to assess and reduce the vulnerability to cyberattacks of their "system in scope"
- Systems in scope include
  - **Healthcare providers** (single Hospital, Group of Hospitals, Healthcare region)
  - **Medical Device lifecycle**
- PANACEA delivers nine tools, clustered in two integrated toolkits :
  - the **Solution Toolkit: four technical tools, three organizational tools**
  - the **Delivery Toolkit: two tools**

PANACEA Solution Toolkit

- The **Solution Toolkit** comprises
  - **four technical tools** for

    I-dynamic risk assessment & mitigation,

    II-secure information sharing,

    III-security-by-design & certification,

    IV-identification & authentication
  - **three organisational tools** for

    V-training & education,

    VI-resilience governance,

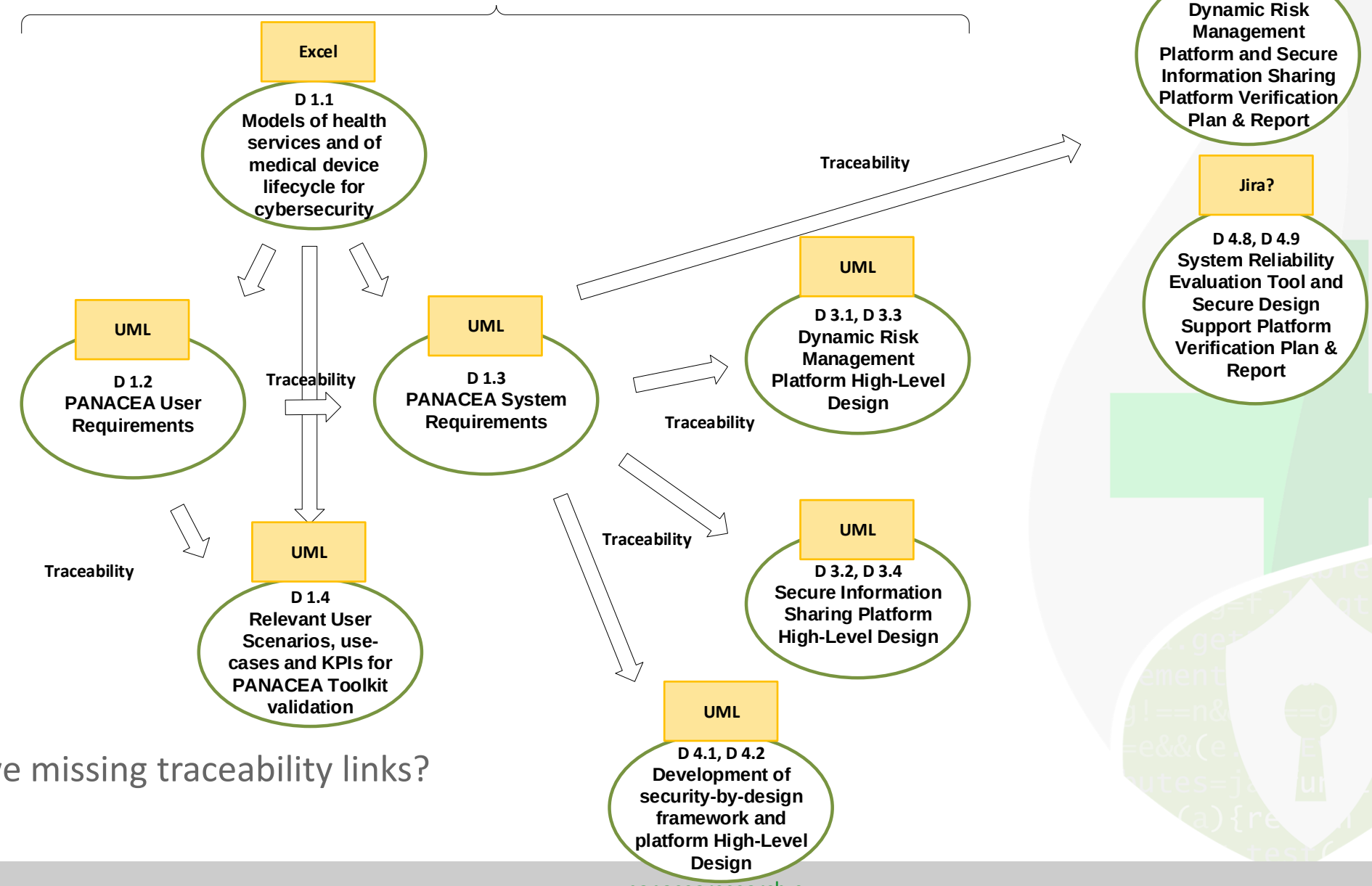
    VII-secure behaviours nudging

PANACEA Requirements, Design

- A single Model Based System Engineering approach is adopted for managing
  - Models (for example, WP 1.1)
  - Requirements (User and System requirements)
  - Software design of the four technological platforms
  - Overall traceability (System Requirements must *cover* User Requirements, Design must *realize* System Requirements)

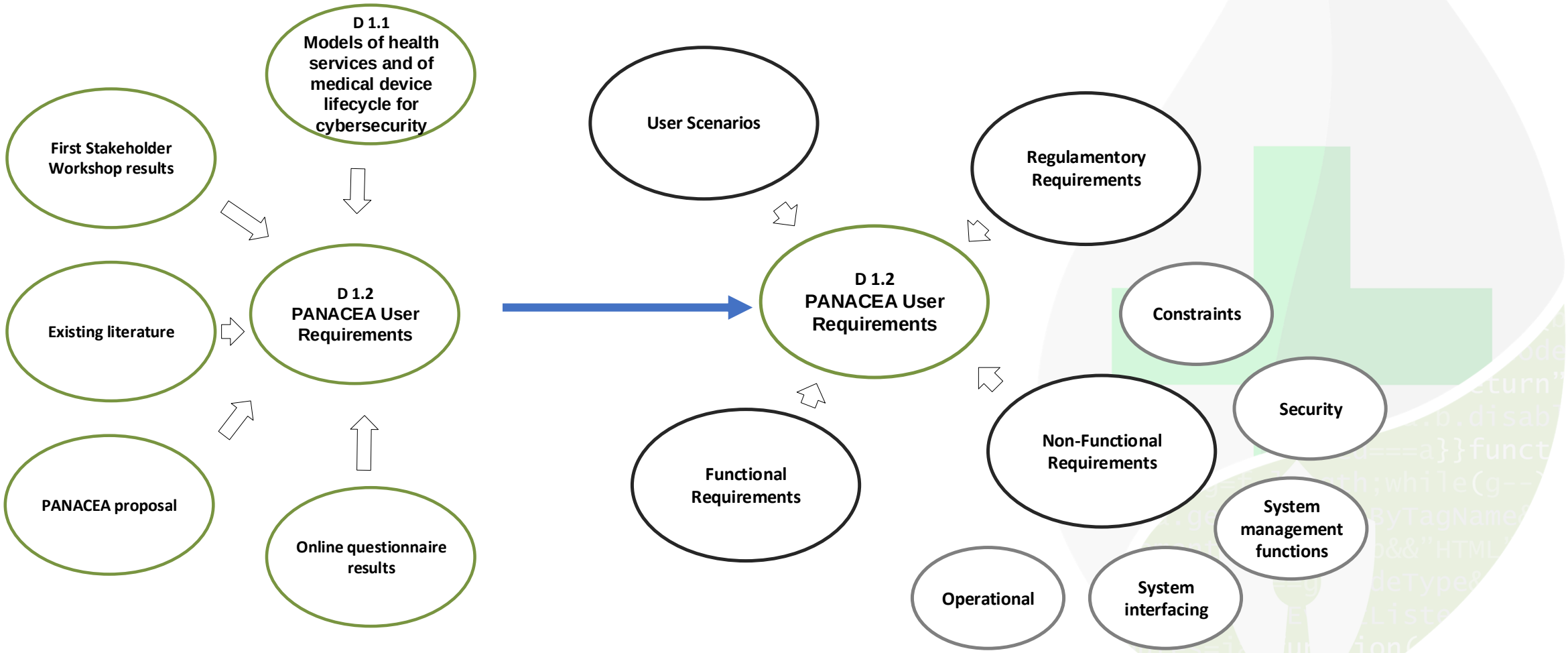
Models, Requirements, Design

Single modelling project

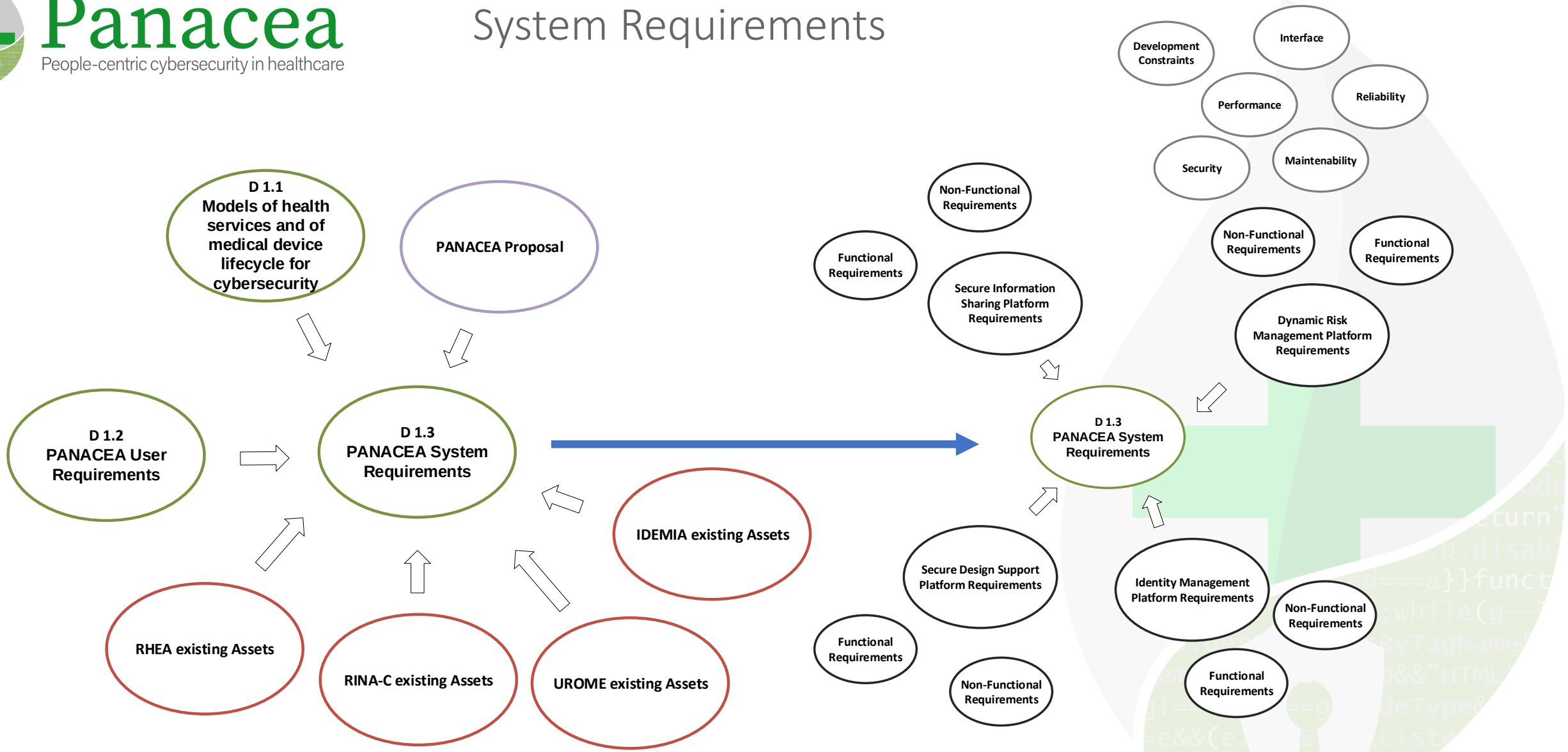


- Are we missing traceability links?

PANACEA User Requirements



System Requirements



User Requirements, sources

- PANACEA End Users
  - Fondazione Policlinico Universitario Agostino Gemelli
  - 7th Health Region Crete
  - Irish Centre for Emergency Management
  - Innovation Sprint Sprl
- PANACEA users workshop (28-29 May, Rome)
  - 55 attendees
    - PANACEA end users
    - HC H2020 projects (Sphinx, Curex, SecureHospitals, ECHO)
    - ECSO WG 3.6 (healthcare) members
    - Various hospitals representatives (IT teams, HC personnel including management)
- PANACEA proposal
- Online survey – coming soon on www.panacearesearch.eu

User Requirements, sources

- Scenario elicitation
  - Attack scenarios
  - Behaviours driven scenarios
  - Regulatory driven scenarios

User Requirements, risk scenarios

- Among the scenarios
  - Social engineering attacks
  - Phishing attacks
  - Ransomware attacks
  - Attacks against critical medical systems
  - Attacks against connected medical devices
  - Attacks against HC IT infrastructure
  - Distributed denial-of-service attacks
  - Loss or theft of equipment
  - Insider, accidental or intentional data loss
  - Lack of security-by-design good practices for medical devices, HC IT infrastructure or critical medical devices
  - Misconfiguration of identification means (including biometrics)

User Requirements, main highlights

- ~200 User Requirements are being collected (actually in refinement) in different areas
  - General
  - Risk Assessment and mitigation
  - Information sharing
  - Security-by-design
  - Identification & Authentication
  - Governance
  - Human factor
  - Value assessment
  - Implementation guidelines

User Requirements, main highlights

- From the elicitation, some main highlights
  - The perception of the importance of cyber-security in HC is increasing, but it is still seen mainly as a technical issue
  - The perception of the importance of the human behavior (of patients and HC personnel) is still limited
  - One of the main worries is the perception of the invasiveness of cyber-security solutions and trainings
  - The cyber-security awareness divide across EU is evident
    - While the technology divide seems less evident
    - Technology excellence does not proceed in parallel with cyber security excellence

User Requirements, main highlights

- From the elicitation, some main highlights
  - In the elicited cases, almost no business impact analysis is performed regularly
    - Lack of updated awareness of the criticality of the processes
    - Lack of awareness of the dependencies between IT infrastructure, human behavior and critical processes (from HC IT teams and HC personnel)
  - Lack of cyber-security training and training curricula is evident
    - We divided the HC personnel in different categories in order to start identifying ad-hoc training curricula
    - It is evident that cyber sec trainings need to be tailored to the HC domain, encompassing all HC personnel (from simple awareness to complex cyber-range exercises)

User Requirements, main highlights

- From the elicitation, some main highlights
  - Security-by-design for HC systems and medical devices is listed as a priority by HC IT teams or HC personnel
    - But in practice, there is not much investment or QA
    - It is evident a lack of basic awareness and training
    - The impact of IoT is not clearly understood or perceived
    - Need for a EU-wide certification scheme for medical devices is perceived

User Requirements, main highlights

- From the elicitation, some main highlights
  - Identification and authorization are perceived topics (in particular by the HC IT teams), in particular for what regards physical security
    - Need for lightweight and simple identification mechanisms is evident, because rules are usually broken
    - M2M and H2M identification and authorization are not perceived as a major issue
  - From both HC IT Teams and HC personnel, it has been highlighted the need of tailored governance schemes for HC organizations
    - Existing governance frameworks does not seem to be perfectly applicable in the HC sector
    - The perception of a disconnection between cyber-security needs and its necessary procedures and the HC organization is evident
    - The need of a specific separate process for managing cyber security governance has been raised
    - The perception of the value and ROI of cyber-security is not clear

PANACEA Solution Toolkit

- The **Solution Toolkit** comprises
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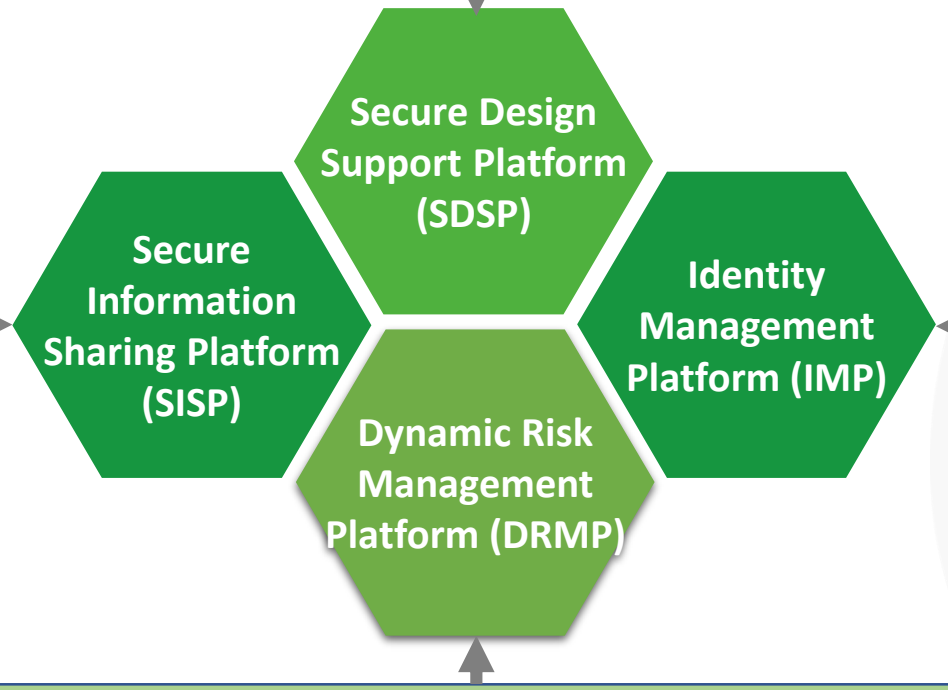
Solution Toolkit *Technical Tools* – TRL 6

Risk assessment over system/software in development in order to embed security from the beginning of system/medical device engineering life-cycle

Healthcare information secure sharing, cross-border and multitenant. Shared persistency possibly based on private blockchain



A digital signature technique leveraging on digital IDs, enabling non-repudiation capabilities and integrated within the other technical tools

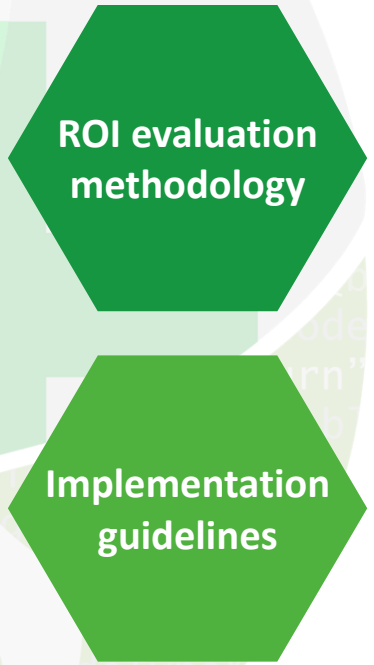
Multidimensional threat modelling, dynamic risk assessment with business impact dynamic computation, technical and organisational response for complex infrastructure

Solution Toolkit *Organizational tools*

- **Training and education for cybersecurity**: organized **activity and packages** aimed at imparting information and/or instructions to help the recipient to **attain a required level of knowledge or skill** with regard to appropriate **secure behaviours, targeted on HCOs**
- **Resilience governance:** set of organizational arrangements (**roles, responsibilities, policies, plans, procedures**) ensuring the capability to **identify** cyber risk, **prevent** and **detect** cyber-attacks, **recover** after a cyber-attack, **tailored on HCOs**
- **Secure behaviour nudging**: set of **interventions, in addition to the training**, aimed at influencing the behaviours of the **HCO staff and patients and other staff involved in the medical device lifecycle**

Delivery Toolkit

- The **Delivery Toolkit**, will specifically **support the adoption of the solution toolkit or similar cybersecurity solutions**. It includes **two tools.**
  - **ROI evaluation methodology:** a **structured process** for evaluating the return of investing in cybersecurity solutions (such as the PANACEA toolkit or parts of it). Its purpose is **to support the HCO decision makers** in taking the investment decision. It considers both **economic and non-economic returns**.
  - **Implementation guidelines:** consist in **procedures, check-lists, methods, project organization models** do be used during the adoption process. Their purpose is to **ensure that the solution fits with the needs and the context of the HCO, are implemented effectively and efficiently, produce the expected results**.



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Thank you for your attention! *Questions?*

Website: www.panacearesearch.eu

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