

Trade-off Management between Safety and Cybersecurity (TOMSAC)



Dr Giedre Sabaliauskaite, Coventry University
Prof Siraj Ahmed Shaikh, Coventry University
Dr Jeremy Bryans, Coventry University
Dr Farhan Ahmad, Coventry University
Dr Hesamaldin Jadidbonab, Coventry University

INTRODUCTION

The TOMSAC project investigates the trade-off management between cyber security and safety in Cyber Physical Systems (CPS) and Internet of Things (IoT). Safety and cyber security are inter-dependent, often complementing or conflicting each other. Assuring cyber security can introduce unintended safety consequences and vice versa. Trade-off management can help to determine an optimal balance between safety and cyber security measures and risks.

AIM

The aim of this research is to develop a new method TOMSAC along with a tool and an application example for managing safety and cybersecurity trade-offs in CPS/IoT systems. There are many factors involved in safety and cybersecurity trade-off management, such as safety and security risk level, costs, needs of various stakeholders, technology limitations, etc. The TOMSAC method will provide a set of relationship matrices for different phases of the system development lifecycle to inter-connect various factors and analyse their trade-offs.

WHY

The transition from human-operated systems to CPS and IoT requires new and reliable approaches to integrate safety and security analyses. Current practices, which treat safety and cyber security independently, are no longer sufficient for assuring safety and cyber security of CPS and IoT.

PROJECT TIMELINE

Start date: 1 October 2021
Finish date: 30 September 2022



Figure 1. TOMSAC aim – to bridge the gap between various teams in organization

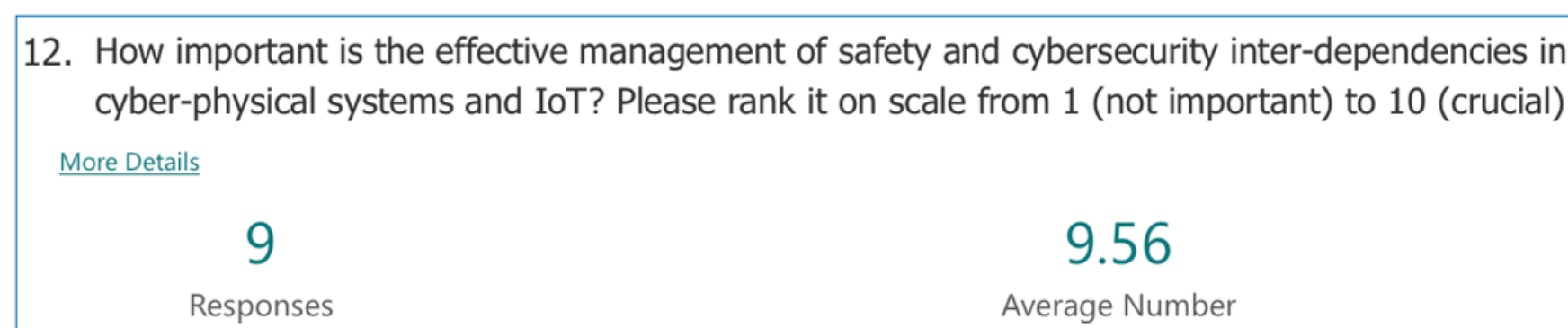


Figure 2. A snapshot of the survey results.

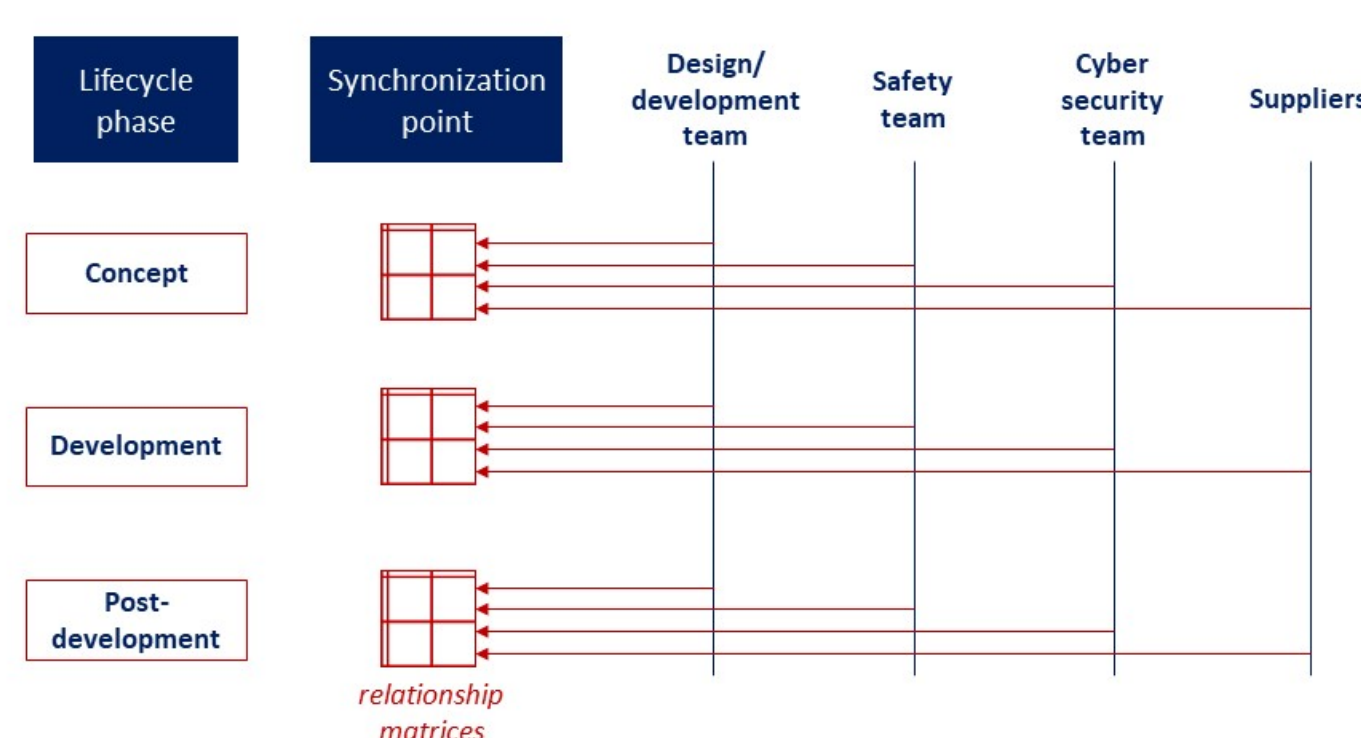
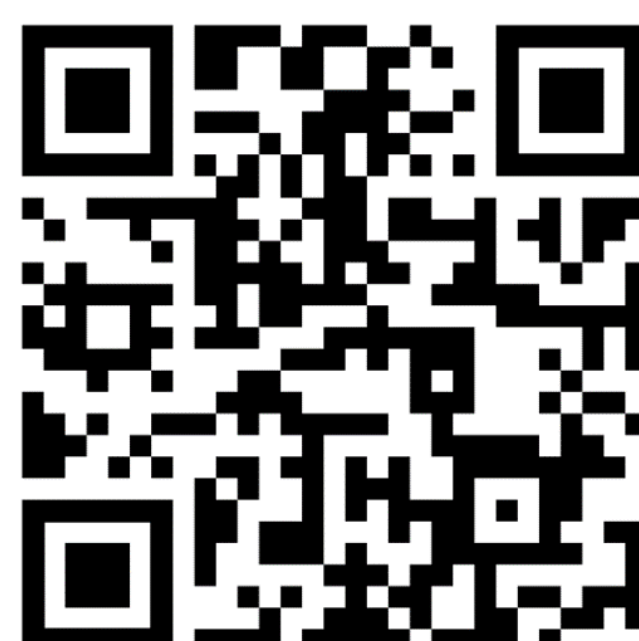


Figure 3. TOMSAC method.

MAJOR FINDINGS

We are currently performing an industry survey and developing the TOMSAC method. If you would like to contribute to our research by participating in the survey, please use the following link: <https://forms.office.com/r/ybSt0HQrKD>



METHODOLOGY

A five-step methodology was used in this project:

- 1) Literature review to explore available research in this area.
- 2) Industry survey and consultations with user partner to understand safety and cyber security challenges and needs in practice.
- 3) TOMSAC method development.
- 4) Development of a tool prototype to support implementation of the TOMSAC method.
- 5) A case study from the automotive domain to validate the TOMSAC method and tool.

EXPECTED IMPACT

The TOMSAC method will facilitate the design of safe and secure systems, while complying with available safety and security standards, saving costs due to rework and product recalls, and, eventually, improving trustworthiness and public acceptance of CPS and IoT.

KEY OUTCOMES

A method and tool for integrated analysis of safety and cyber security inter-dependencies and trade-offs in CPS/IoT systems.

USER PARTNERS

Horiba Mira

ACKNOWLEDGEMENTS

This work has been supported by the PETRAS National Centre of Excellence for IoT Systems Cybersecurity, which has been funded by the UK EPSRC under grant number EP/S035362/1