

Identification of Safety and Security Cascading Risks in Cyber-Physical Systems

Nelson H. Carreras Guzman, PhD project

Relevance

Many socio-technical systems are evolving into cyber-physical systems (CPSs), promising enhanced performance and efficiency in applications such as autonomous transportation systems, smart manufacturing and process plants, robotics, smart medical devices, among others. However, the novel features of CPSs imply new complexities and cyber security vulnerabilities that give rise to emerging risks to the safety of people, assets or the natural environment. Increasingly, both unintentional performance deviations and intentional cyber-attacks could cause cyber incidents that, in turn, could cascade into hazardous events in the physical world. Examples include vehicle collisions, industrial accidents, harm to patients using medical devices, among others. Thus, this project aims at developing a risk identification method to identify the safety and security issues in CPSs, providing useful guidance to system designers and risk analysts to mitigate the risks of physical harm.

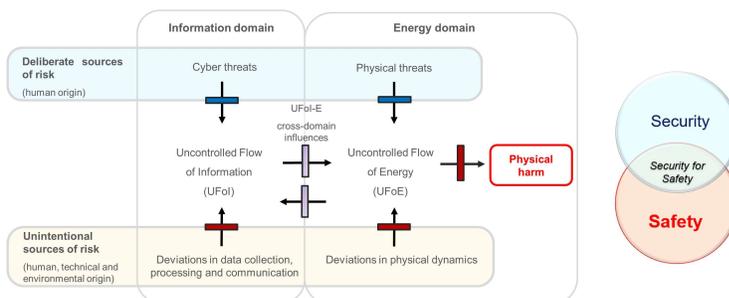


Research method

- Theory building:
 - Describe, represent and model CPS layers and environments.
 - Develop methodology for combined safety and security risk identification.
- Theory testing:
 - Discuss at conferences and workshops with experts, including project partners and industrial partners.
 - Conduct case studies to evaluate method and validate the results.

Expected results

- ✓ A CPS master diagram for trustworthy representation of system features relevant for safety and security
- ✓ An integrated safety and security risk analysis method to identify and mitigate safety and security risks
- ✓ A validated integrated approach with regard to its predictive power



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