# CPS: Medium: Collaborative Research: Multi-Objective Mitigation Strategies for Viability and Performance of Cyber-Physical Systems

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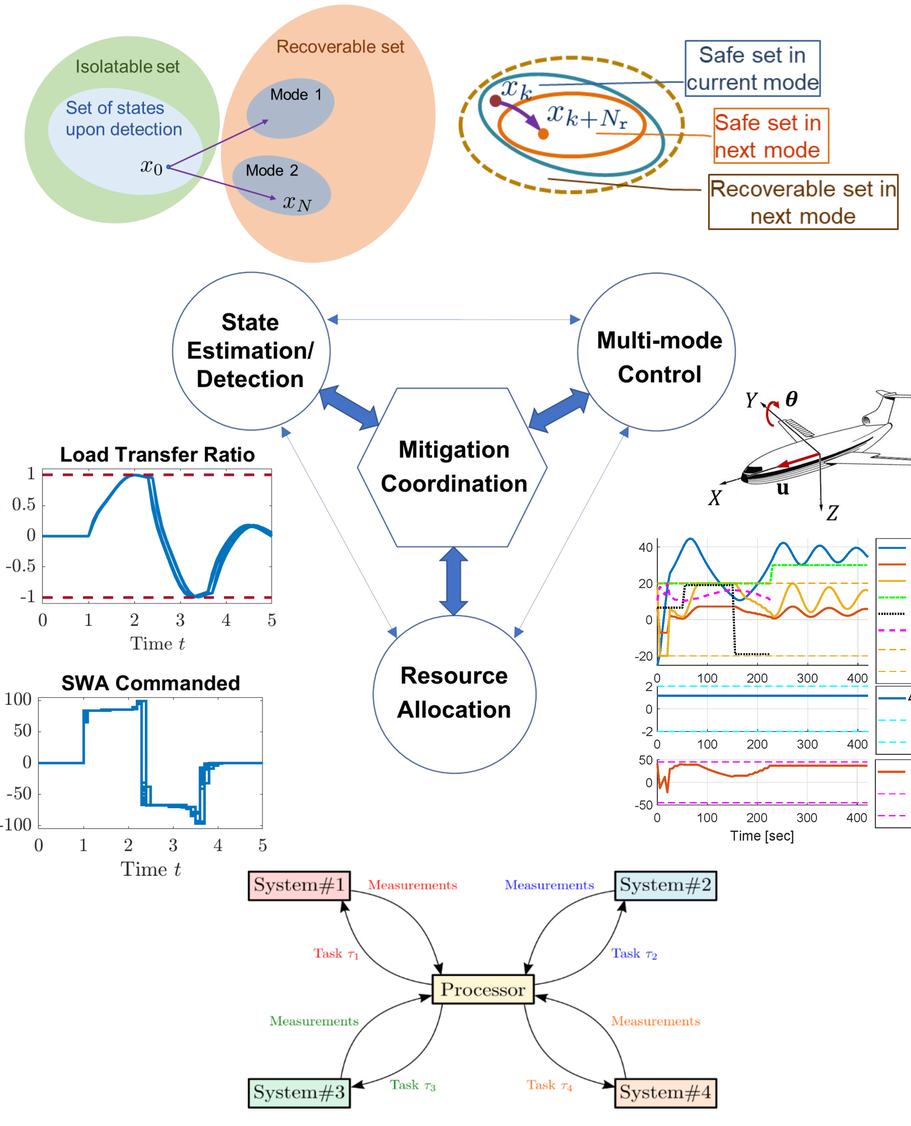
## Challenge:

- Run-time mitigation when complex CPSs operating in uncertain environments confront unanticipated viability-compromising situations.

## Solution:

- Set-theoretic and stochastic failure detection, isolation and reconfiguration multi-mode control strategies that integrate command governors and enforce safety constraints.
- Computing resource allocation strategies for optimization-based controllers executing in a shared processor.
- Robust to Early Termination algorithms for optimization-based control.
- Computationally efficient viability maximizing Model Predictive Control formulations.

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## Scientific Impact:

- Strategies for continuing operation in the face of a variety of contingencies.
- Addressing emergent problems arising from interactions of resource-allocation and optimization-based control strategies.

## Broader Impact:

- Outcomes support automotive and aerospace industries in developing safer advanced and autonomous vehicles.
- Traffic control solutions to facilitate emergency vehicle routing.
- Students and postdocs develop cross-disciplinary expertise.