Provably-safe interventions for Human-Cyber-Physical Systems (HCPS)

Award #1565529 (April 1, 2016) to **Sam Burden**, University of Washington, Seattle

Challenge:

- humans increasingly use CPS to interact with the world, e.g. cars help drivers, planes help pilots, robots help surgeons

- must engineer *safe* interactions in the resulting human-cyber-physical system (HCPS)

Solution:

- interaction between a human and CPS gives rise to a *game*

- bridging theories of games, CPS, and human motor control, we propose a framework for engineering safe HCPS

In **robot teleoperation,** a human operator interacts in closed-loop with a remote robot while the robot adapts to the human

safe interventions in robot teleoperation require predictive models for closed-loop interaction
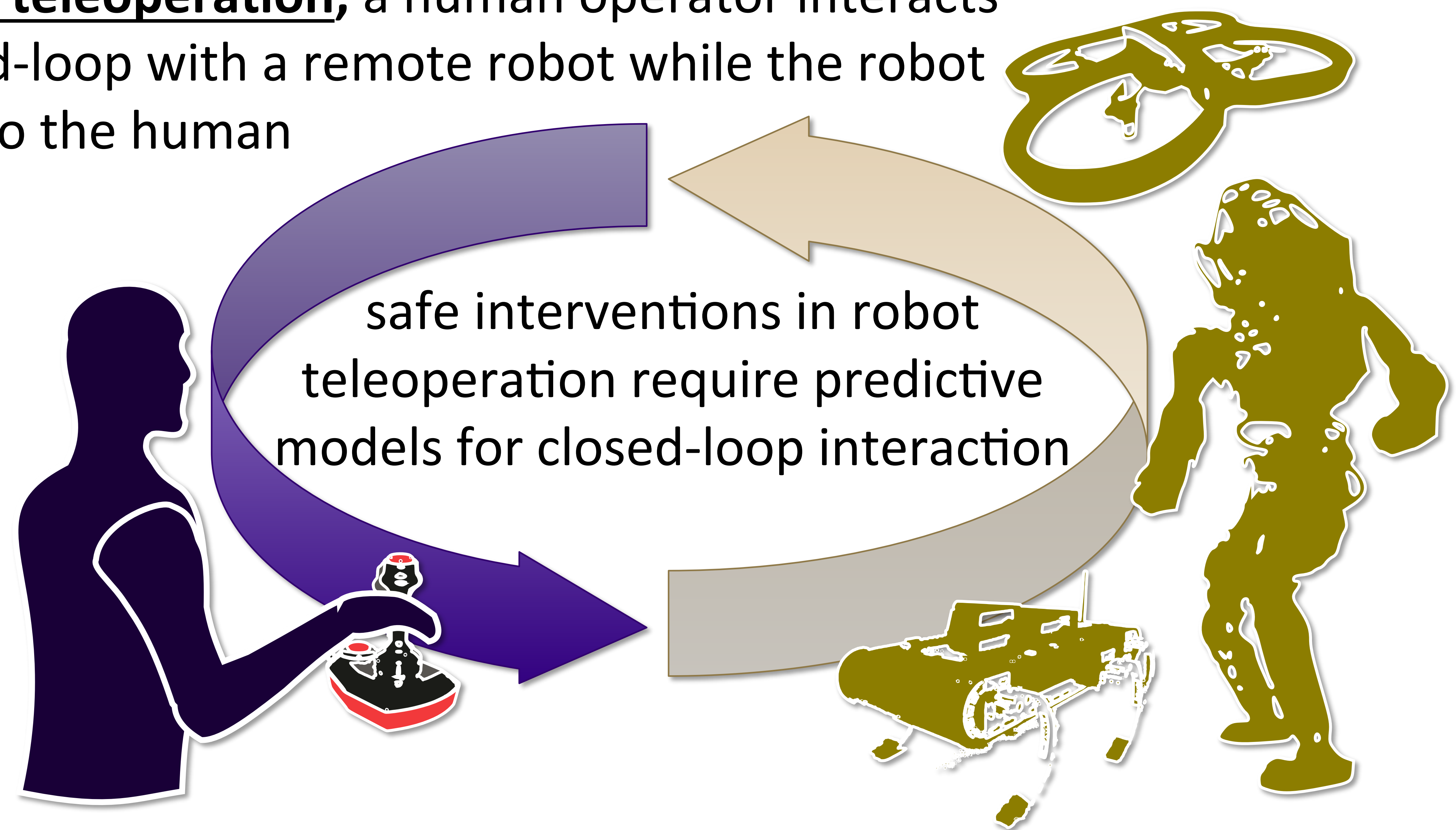
Scientific Impact:

- design principles for robot teleoperation interfaces

- paradigm for provably-safe closed-loop interactions in HCPS

Broader Impacts:

- provably-safe enhanced safety features in semi-autonomous cars

- dynamic and dexterous robot proxies for first responders

- brain-computer interface for assistive orthotics / exoskeletons

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