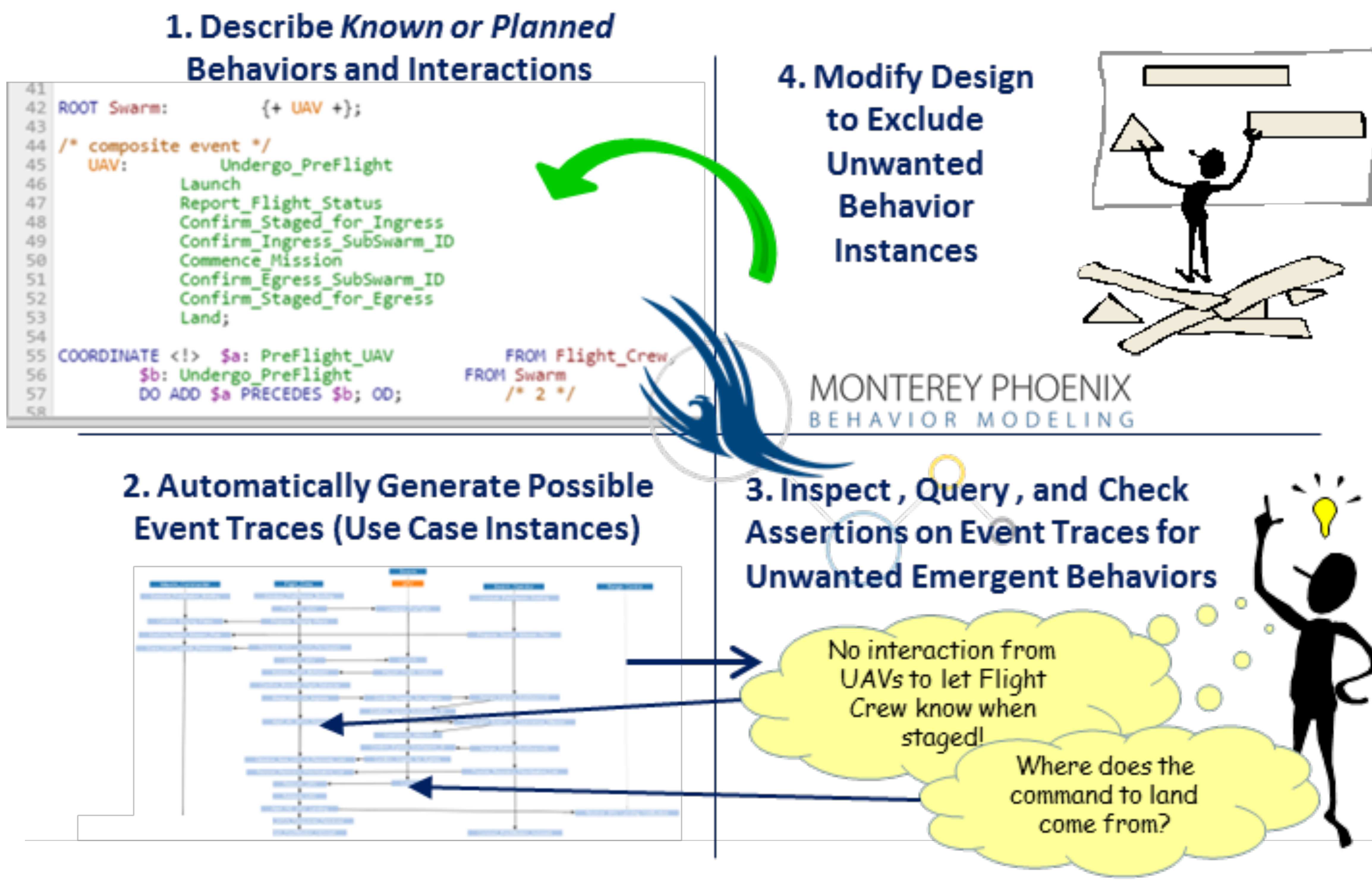
Modeling Swarm Failsafe Behaviors with Monterey Phoenix (FY15)

Naval Postgraduate School



- MP is capable of modeling a system's architecture of behavior for all actors and entities in a problem space, including those in the environment, and all of the possible interactions among those actors and entities exhaustively up to a scope limit.
- Executable MP code is developed for a UAV swarm and its environment
- A case study analysis of automatically generated scenarios is performed (seeking known or previously unknown swarm-level failure modes)
- Failsafe behavior specifications for failure modes are written into the model as constraints

- The objective of this project is to expose and incorporate swarm failsafe behaviors into a design through the creation of Monterey Phoenix (MP) models of unmanned/robotic agents interacting, as individuals or as a swarm, with each other and with humans providing command and control as well as other types of swarm-human interaction
- This objective is supported by the development of a tool that implements the MP approach and language
- Website: https://wiki.nps.edu/display/MP

- MP exposes component interactions that result in unwanted, hazardous, incorrect or otherwise undesirable behaviors before operational use
- MP makes models more flexible, manageable, reusable, and multi-dimensional with interacting and overlapping phases, states, and actors
- MP automates many error-prone tasks currently done manually, such as use case generation and verification
- This automation allows human designers and analysts to spend a larger portion of their time on analysis tasks (e.g., identifying inefficient use of resources, design errors, failure modes, safety hazards, behavior patterns, etc.)

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