

Incorporating Ethical Decision Making into Course of Action Generation and Analysis

In his Autonomy NDS Roadmap 2020 briefing, Wayne Nickols (Assistant Director for Autonomy, OUSD(R&E)) defined autonomy as, “*The freedom to select a course of action to achieve a higher authority's objective(s) in a given environment.*” This talk will explain how platform autonomy, capable of selecting courses of action in diverse environments/missions, is technically realized in AFRL with a *Problem Solving as SAT paradigm*. During the talk, I will explain how Answer Set Programming (ASP) is used in the *Cognitively Enhanced Complex Event Processing* (CECEP) autonomy development and deployment framework to computationally realize knowledge representation and reasoning capabilities enabling legal/ethical problem solving and action selection. The talk will describe how CECEP agents being developed in the US Navy-led AI Strategic Challenge use ASP to: a) formally model problem environments in probabilistic first-order structures; b) represent goals, constraints, and preferences reflecting intent, ROEs, and legal/ethical frameworks in these models; c) incorporate intent, ROEs, laws, and ethics into multi-criteria decision analysis; d) use decision analysis to select likely effective, ethically acceptable COA.