Supporting Technologies

Assurance	Name	Formal	Search-based
Adaptation	Avida-MDE	Spin	Avida
	Plato Suite	Utility functions, exec spec	GA, MOO
	Hermes	State-based modeling	GP
Verification	Marple	Spec patterns, Spin	Avida, GP
	AMOEBA	Modular Model checking	
	AMOEBA-RT	Run-time model checking	
Validation	Athena	Utility functions, exec spec	
Testing	Veritas	Adaptive parameters for functional testing	GA, 1+1 Online EA,
	Proteus	Adaptive Test plans	GA
	Loki/Enki	Utility functions, exec spec	GA, novelty search
	Fenrir	Instrumented code	GA, novelty search
Specification	Adapt-LTL	Extend LTL with adapt operator	
	RELAX	Logic spec language, fuzzy logic semantics	
	AutoRELAX	RELAX, exec spec	GA

Cyber-Physical Systems Assurance Technologies

Objective	Name	Formal	Search-based
Requirements Completeness [SSBSE2017, M@RT17,MODELS2016]	Ares, Ares-EC, Lykus	Z3 SMT solver; Athena utility functions	GA+SA
Feature Interaction [SEAMS2018,QRS2018, SEAMS2019,MODELS2019]	Phorcys, Phorcys-EC Phorcys-RT,Soter	Z3 SMT solver; Athena utility functions	GA+SA
Mode Boundary Discovery [SSCI2016]	EvoMODE	Model-free controller	Loki and EC novelty search
Validation platform [GECCO2018]	Evo-ROS	ROS, Ardupilot	EC, Enki
Robustness of Autonomous Systems [SEAMS2019]	Evo-ROS and Enki	ROS, PID Controller	Environmental uncertainty; controller robustness
Test and Improve ML wrt uncertainty [ICAC2019]	Enki		EC, novelty search
Confidence assessment for Assurance Cases [NIER2018]		GSN	Dempster-Schafer theory, GVSM
Adapting Security Assurance Case Framework [SPS2019]	MAPE-SAC	GSN	Enki