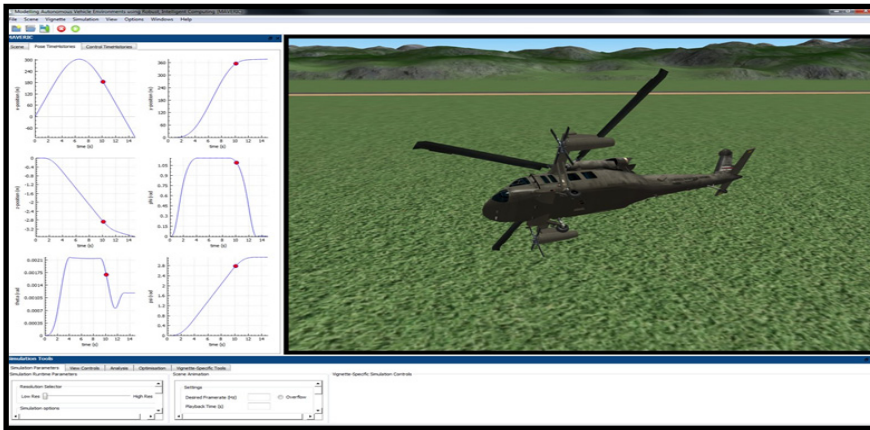


# MAVERIC: Modelling of Autonomous Vehicles using Robust, Intelligent Computing



## The Challenge

In the design of multifaceted engineering products such as future autonomous vehicles, systems engineering is the key technical discipline responsible for managing complexity throughout the lifecycle. As consumer expectation increases, so must system complexity to meet this demand. For the design of autonomous vehicles this means more sensor integration, complex decision-making algorithms, system interoperability and novel platform designs to allow operational flexibility.

Current systems engineering design tools capture the project management aspect of systems engineering, but the systems designers have had to make do with toolsets created to service the needs of the traditional disciplines. What is required is a system-level design tool that can be used throughout the entire design lifecycle. Such a tool would contain a library of component and sub-system models at various levels of fidelity to facilitate preliminary design trade-off studies in the conceptual design/requirement capture phase, but also support detailed design by building upon existing models.

## How is it solved?

In response to this deficiency in the autonomous systems engineers' toolset we are researching a new systems design and simulation engine. Entitled MAVERIC (Modelling of Autonomous Vehicles using Robust, Intelligent Computing), the function of this simulation engine is to present the systems engineer with an integrated simulation design environment that may

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be used to store models of increasing complexity of the same entity as the design process matures. It is also used to evaluate the efficacy of the system under design in realistic operational scenarios - especially scenarios with multiple interacting heterogeneous systems and entities. Using distributed artificial intelligence methods (agent theory), the MAVERIC simulation engine can be configured to perform any type of simulation from operational analysis through to simulation for supporting detailed engineering design.

## Why it is important?

The development of MAVERIC represents a new paradigm for systems engineering design tools, one which is applicable beyond the field of autonomous systems. MAVERIC will facilitate the design process and reduce model errors between design phases, reducing project risk and development costs which will, in turn, lead to a more competitive product. Integrating operations research with detailed engineering simulation will also stimulate and encourage innovation in new concepts - such as hybrid vehicles and/or heterogeneous cooperation between vehicles. This integration will also assist in proving operational compliance with regulatory standards and so reducing the amount of expensive testing required.

The MAVERIC simulation engine has been applied to simulating helicopter evasive manoeuvre effectiveness to RPG attack and is currently being expanded significantly to support a helicopter operational analysis contract with Australia's Defence Science & Technology Organisation (DSTO).

## Partner organisations:

- Leonardo UK
- Defence Science & Technology Laboratory (DSTL)
- Defence Science and Technology Organisation (DSTO)
- Agency for Defence Development (ADD), South Korea
- U.S. Army

## Applications

- Aerospace & Defence
- Autonomous Systems Design
- Operations Research
- Simulation
- Systems Engineering

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