Developments: Threat Evaluation and Countermeasure Allocation

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TECA is a decision-support system that is run prior to mission commencement using intelligence gathered about the mission area. It develops both a countermeasure strategy and an associated passive countermeasure load-out for the platform, with the aim to optimise: its probability of survival, emissions levels, and mission cost. Previous systems and potential approaches to the problem were either too slow or too simplistic for this task.

The system began as a simple active jamming allocation system before passive countermeasures were added. The latest addition is to include the effects of the platform’s RCS and antenna gain patterns. This allows for more accurate modelling of the effects of platform manoeuvres, and the effects of jamming and illumination. Further, this allows for potential integration with route optimisation systems.

This work has applications in general decision support and countermeasure strategy development. Further, it has applications in training, where it can be used as an visual and interactive system capable of immediate, quantitative feedback.
Threat Evaluation & Countermeasure Allocation

• Decision-support system
  • Run prior to mission
  • Optimises
    • Mission EW strategy
    • Cartridge load-out
  • Goal: maximise probability of platform survival

• Applications
  • Cartridge load-out optimisation
  • Strategy optimisation & development
  • Training
TECA: History

• Two approaches in the past:
  • High level – too slow
    • SEWES, SADM etc.
  • Low level – too simplistic
    • Resource allocation systems

• TECA history
  • Initial active RF jamming system
  • Passive countermeasures
  • System modified: small time intervals & jamming effect
  • RCS & antenna gain patterns
Radar Cross Section

• Platform RCS
  • Programmable
    • Platform RCS
    • Platform manoeuvres
  • Danger value of threats
    • Adjusted accordingly

• Purpose
  • More accurately models scenarios & manoeuvres
  • Danger values more accurate
  • Potential for route optimisation
Antenna Gain Patterns

• Each channel
  • Programmable antenna gain pattern
  • Optimised antenna direction
  • Multiplicative effect on jamming factor

• Purpose
  • More accurately models
    • Channel interactions
    • Illumination
    • Simultaneous effects