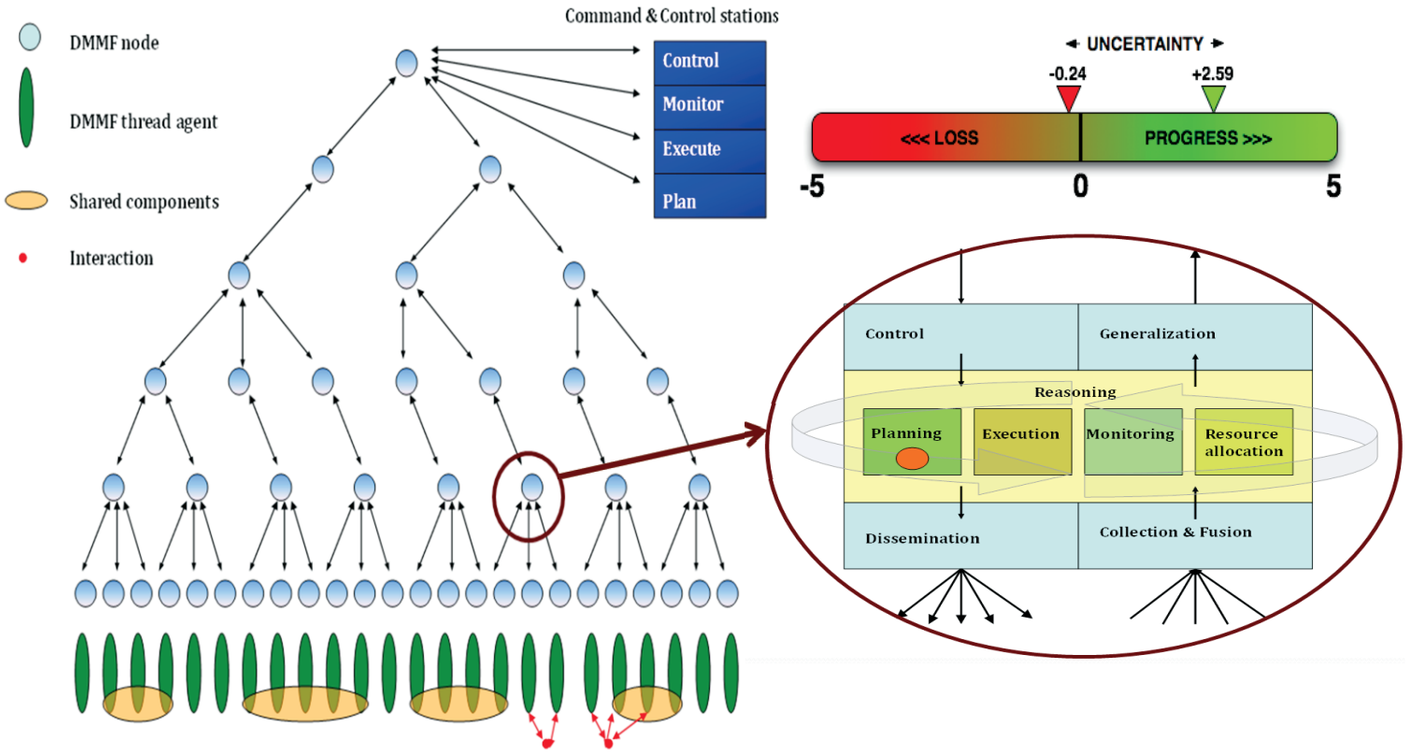
Distributed Missions and Means Framework (DMMF)



Project Overview

Military missions planning and execution occurs in a highly complex and dynamic environment where new constraints and conditions frequently arise at all levels of operation from theater level planning to individual unit tasking and execution. GCAS is designing a Distributed Missions and Means Framework (DMMF) with the key objective to develop an autonomous agent based modeling and simulation system that will facilitate distributed missions planning and execution in complex dynamic environments. DMMF will help ease the burden of decision-making. DMMF lays the foundations for retrieving, analyzing, synthesizing, and disseminating information to military commanders and also provides linkage from low-level state changes to mission success.

Focus areas include:

- Acquiring and refining data from many sources that man have partial or contradictory information
- Qualitative or common-sense reasoning for robust and rapid reasoning with uncertain information
- Planning in situations with limited and/or incomplete information about the environment
- Decentralized planning, plan recognition and framework that allow efficient and seamless integration of planning, reasoning and other processes for real-time decision-making

A critical issue that has prevented the deployment of autonomous agent based systems is the lack of trust in their performance. Hence GCAS aims to develop methods and modules that can provide performance estimates and seamless integration of building blocks of intelligence.

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Capabilities

- Facilitate commanders/decision makers to retrieve, analyze and disseminate information at different levels
- Shared understanding of capabilities and limitations of other military agencies and how each contributes to successful military efforts
- Established coordination means to pass observations and insights and improve interoperability amongst agencies
- Integrate top-down planning with a bottom-up employment that learns to locally combine actions
- Conduct analysis and establish clear interdependencies between task outputs and the mission goals

Applications

DMMF technology can be leveraged in several areas, such as multiplayer modeling and simulation, integrating top-down planning with bottom-up execution, System of Systems (SoS) evaluation and intelligent resource allocation. All the four areas have the same foundation of technology, but different application areas. Our initial focus is for the army, but will put our efforts during the Phase II and beyond into the area that has the best commercial opportunity. Multiple areas will be pursued if viable. Other potential application areas include Socio-cultural Modeling, both military & commercial, and stabilization & reconstruction operations.

Vision

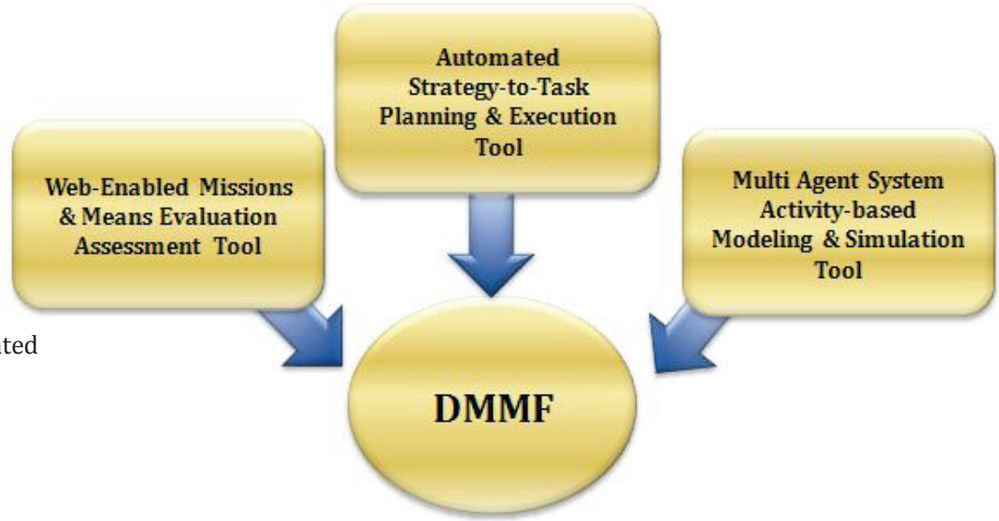
Increase the speed of response to new C2 requirements and reduce latency by accessing mission-relevant data from sensors, human sources, and databases.

Target

To provide missions & means based planning & execution capability for use by stake holders in the development and implementation of sustainable solutions for complex C2 operations.

Strategy

Mission-centric approach to planning, and hierarchical planning and execution. Reusability of technology components.



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