2006 CCRTS
Scenario Generation to Support Mission Planning

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The Changing Nature of Mission Planning

- Speed of Military Operations has Changed Dramatically
- Adversaries No Longer Limit Themselves to Doctrine Based Warfare
- Mission Planners Must Prepare for a Broad Range Of Adversaries
  - Traditional Large Uniformed Militaries
  - Small Local Militia Groups
  - Agile Non-state and Non-military Actors
- Warfighters Expected to Conduct Pre Through Post Conflict Operations
  - Broad Range of Environments
  - Traditional, Urban, Cyberspace and Space.
- Transition from Attrition to Effects Based

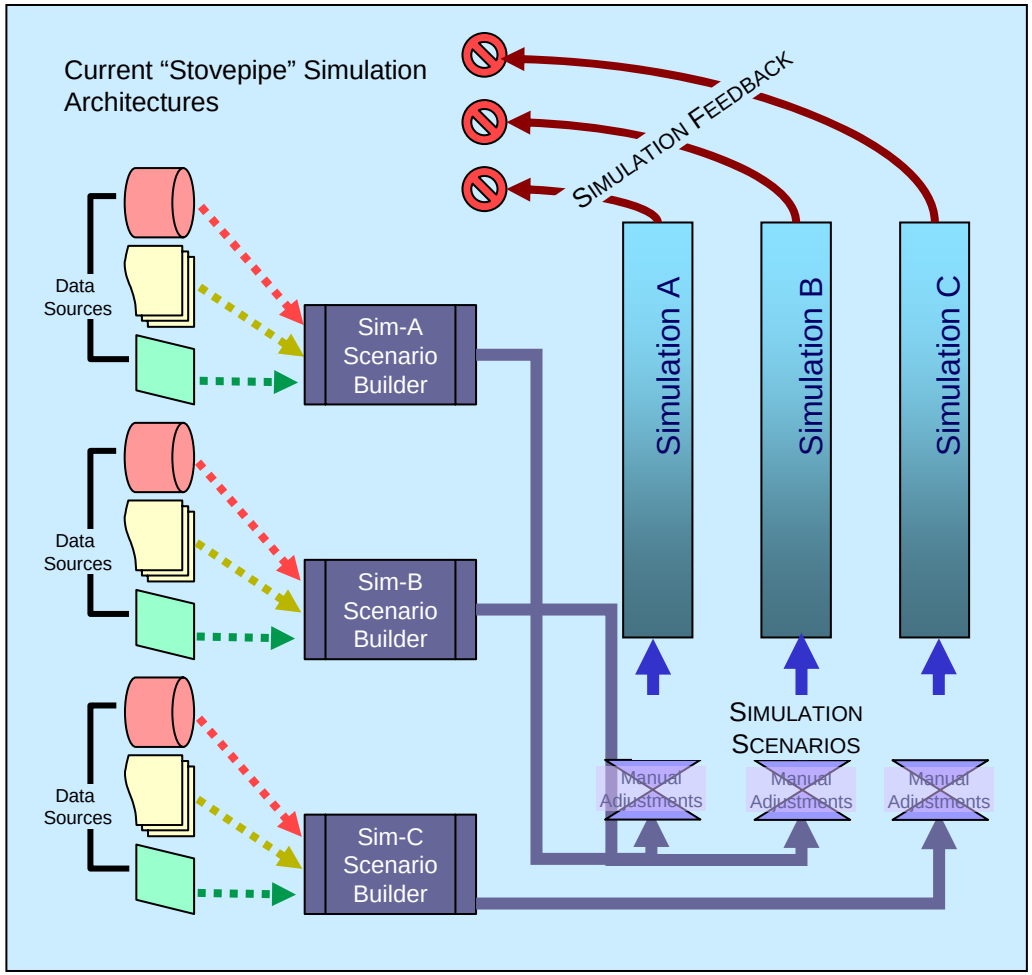
Predictive Battlespace Awareness

- Rolling Horizon
- Anticipate the Evolution of the Battlespace
- Pre-empt, Influence, and Decisively Defeat the Adversary
- PBA Would Lead to Proactive Decisions and Resultant Actions
- Moving the Adversary Towards the Desired End State.
- Provide Decision Makers the Ability to Foresee the Battlespace
- Influencing or Shaping the Battlespace
- Get Inside the Adversary's Decision Loop
- Generate Plans that Ultimately Lead to Dominance in the Battlespace
- Planning Process Depends Upon Anticipation and Response in Real-Time

COA Development

- Rapidly Produce and Analyze Courses Of Action (COAs).
- Current COA Development Process is Predominantly Manual
- COA Analysis is “What If” Analysis Of Actions And Reactions
- Designed to Visualize The Flow Of The Battle
- Due To The Dynamic Nature Of Military Campaigns COAs Must be
  - Continuously Generated
  - Developed
  - Analyzed Prior To Execution
- Current COA Analysis Process is Extremely Manpower Intensive
- Generally Accomplished Utilizing Teams (Friendly / Adversary Forces)

Current Simulation Environment



- Current Data-centric Approaches are Primarily Manual
- Focus on Specific Simulations & Their Data Requirements.
- "Stovepipe" Architecture
- Scenario Centric Approach Focuses on Scenarios that Drive the Simulation

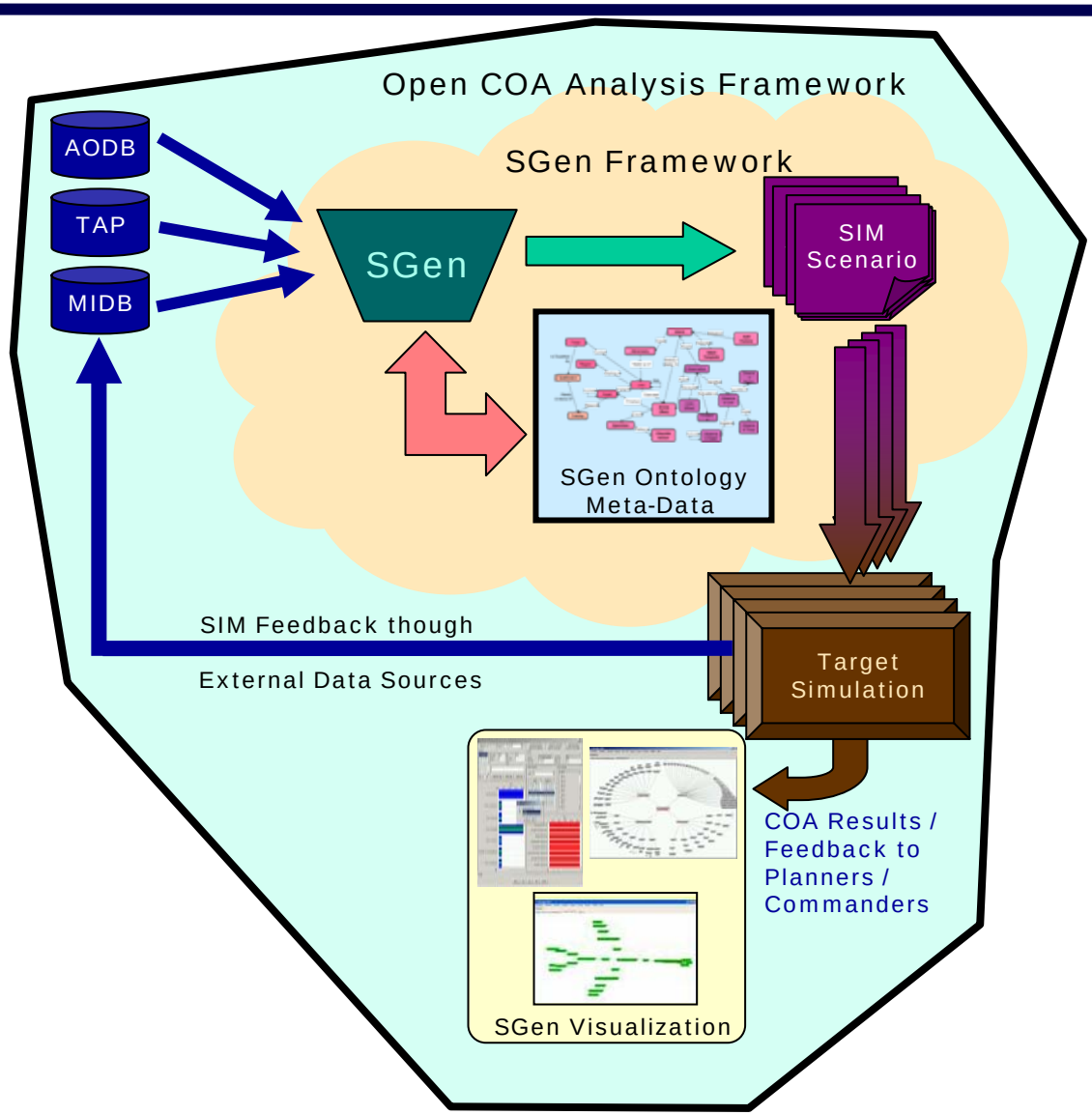
The Changing Planning Paradigm and SGen

- Changes in the tempo of war, Effects-based planning, and the emergence of asymmetric adversaries has created an environment that limits analysts understanding of the adversary. This makes meaningful qualitative analysis difficult, if not impossible. To support this shift in the mission planning paradigm, analysts need new techniques to provide quantitative data that can be used to compare a wide range of outcomes during the COA selection process.
- The ability to compare a wide range of actions becomes critical to the success of the mission.
- emerging paradigm shift in mission planning has placed new demands on the use of simulation technology to support evaluation of alternative war plans; effects based operations and response to asymmetric adversary threats
- SGen technology supports development of scenarios that can be run on a range of simulations.

SGen Overview

- EBO SGen Toolset is an Innovative Approach to
  - Automated Creation of Complete Scenarios
  - For Mission Planning Simulation
- The EBO-Scenario Generation Toolset
  - Breaks the Current Stovepipe Architecture
  - Robust Ontological Data Model
  - Ties Mission-planning Tools and Data Resources Directly to the Open Course of Action (COA) Analysis Framework

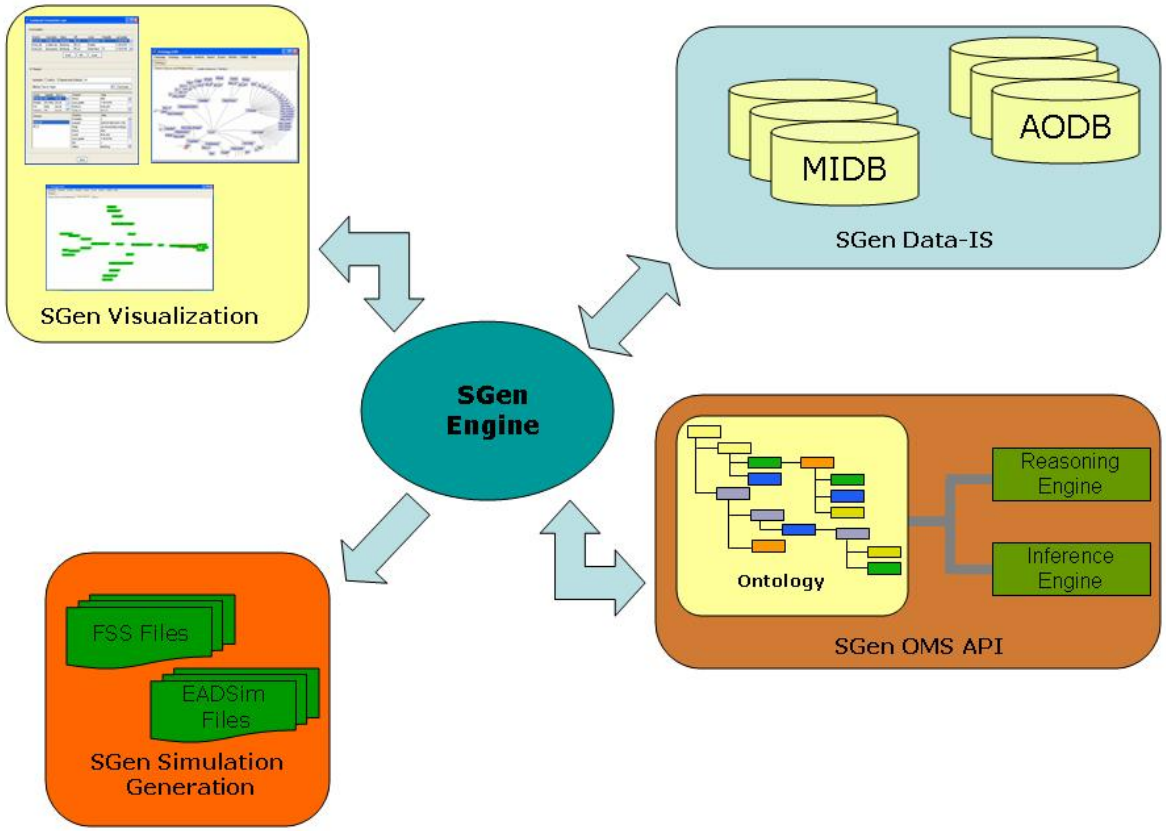
SGen Toolset



The Science of SGen

- SGen is Built Around the Concept Of Data Integration And Analysis
  - Ontological Formalization
  - Reasoning
  - Inference Capabilities
- SGen Uses an Ontological-based Approach

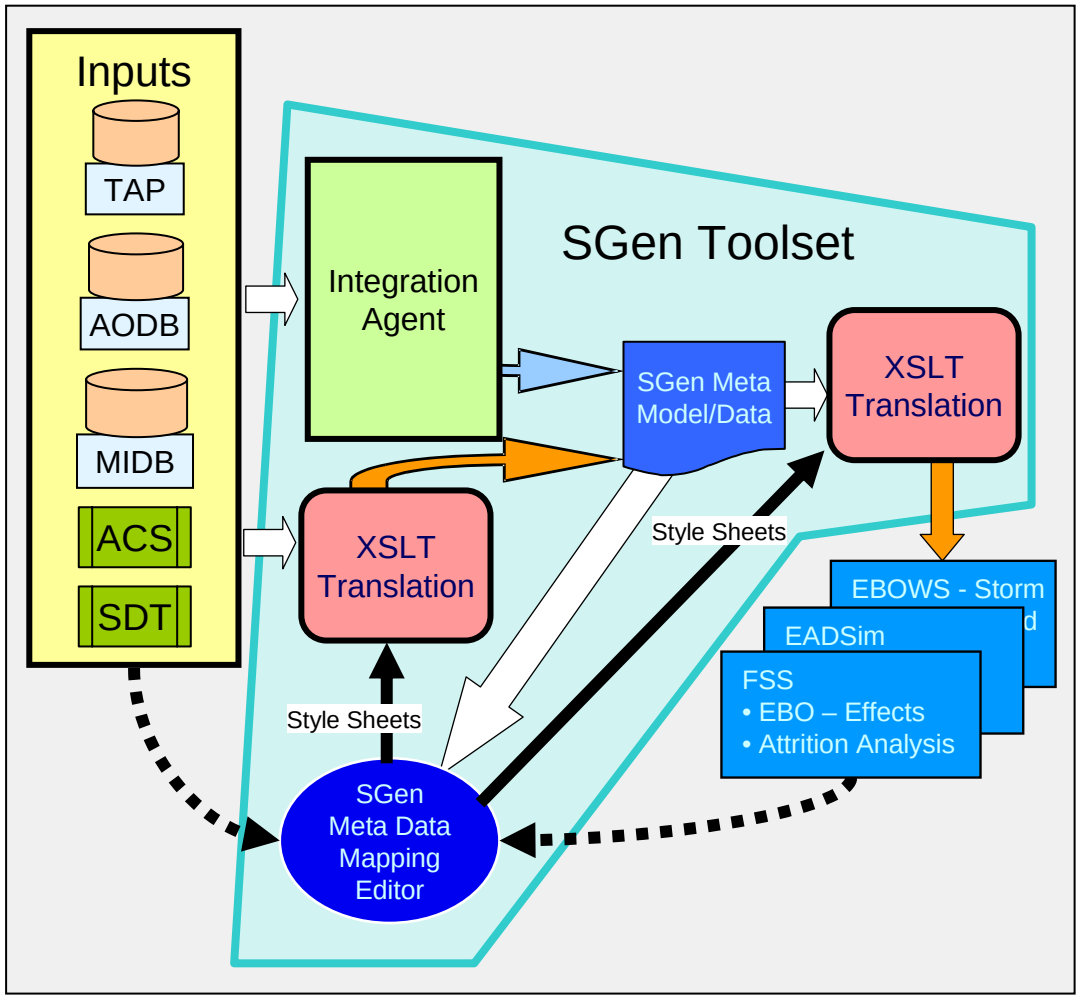
SGen Components and Layering



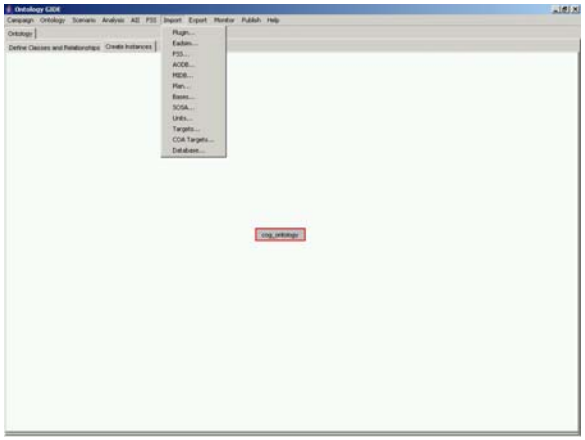
SGen Demo

- An Expanded Proof-of-concept Prototype was Constructed.
- Platform Demonstrated Important Concepts and Technical Approaches
- SGen Tool Support for “What If” Analysis to Create Multiple Scenarios for Simulation.
- The Proof-of-concept Platform Demonstrated:
  - User Import of a Variety Of Battlespace Information
  - Organize Information in the Context of Scenarios, Missions, COAs, and ATOs
  - Allowed the User to Modify and Manipulate Scenario Data
  - Creation of Simulation Files from Scenario Data to Execute and Analyze Results
- Demonstration Platform Validated The SGen Approach

The SGen Proof of Concept Toolset



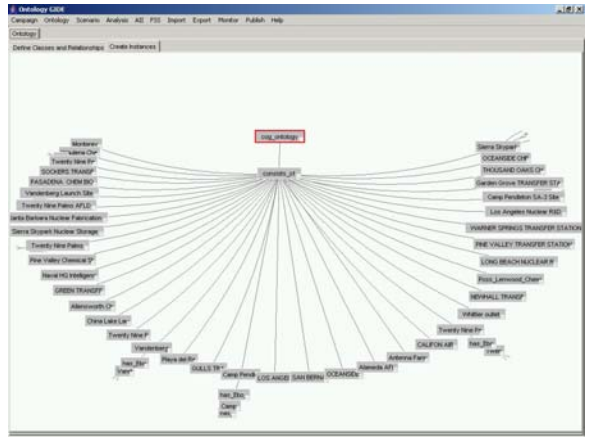
The SGen Proof of Concept Demo



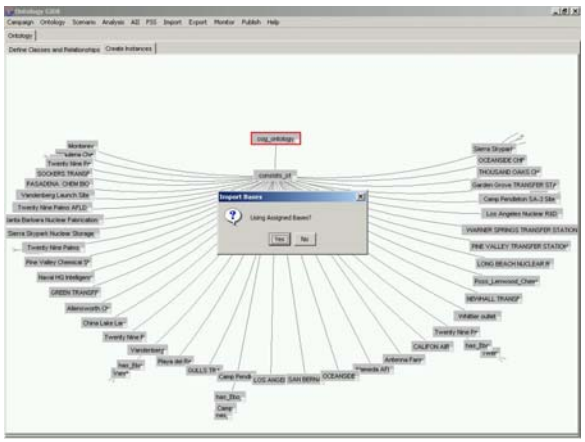
SGen Import Menu Item

1 2

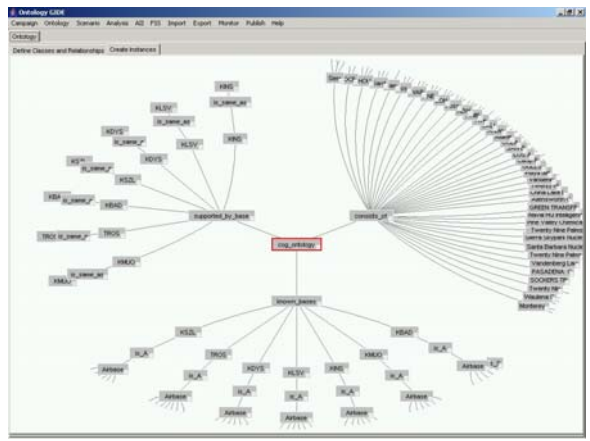
3 4



SGen Instance Panel after SOSA Import

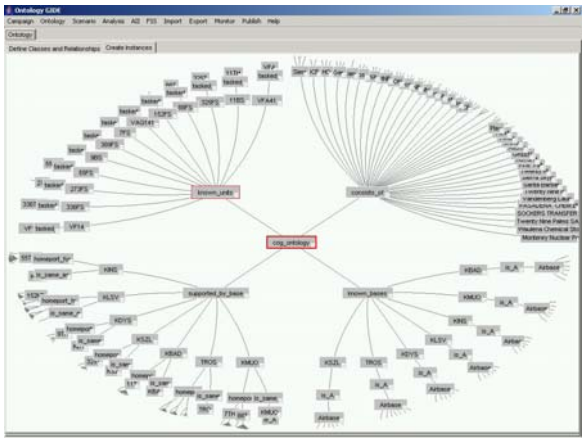


Using Assigned Bases Prompt

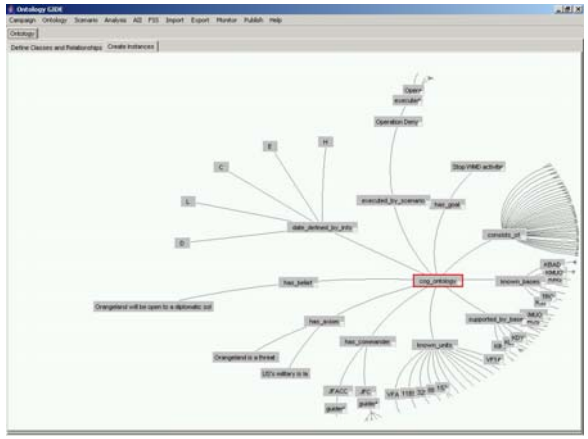


Ontology Instance Panel after Bases Import

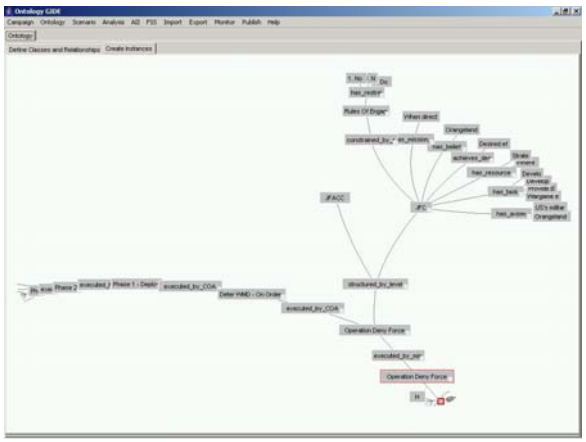
The SGen Proof of Concept Demo continued …



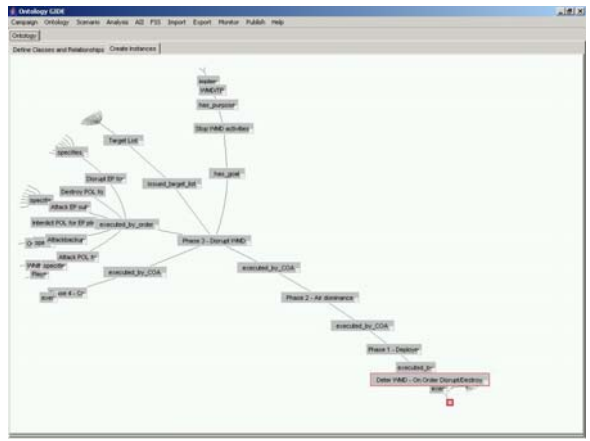
Ontology Instance Panel after Units Import



Ontology Instance Panel after Plan Import

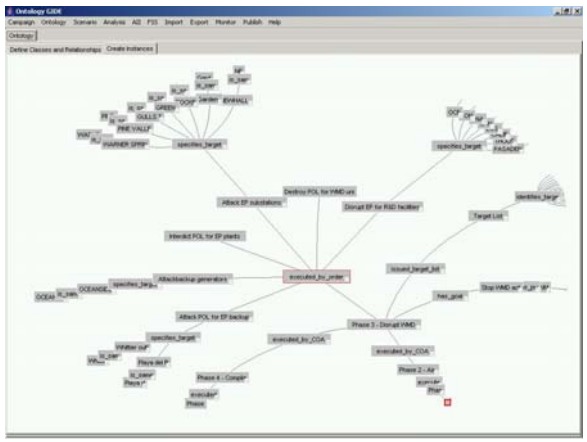


Ontology Instance Panel Showing COAs and Levels

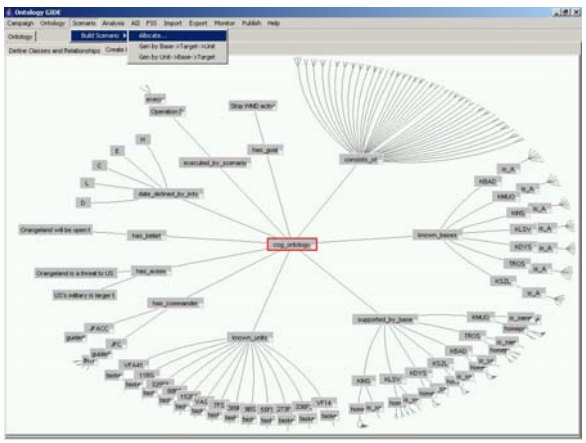


Ontology Instance Panel Showing Orders

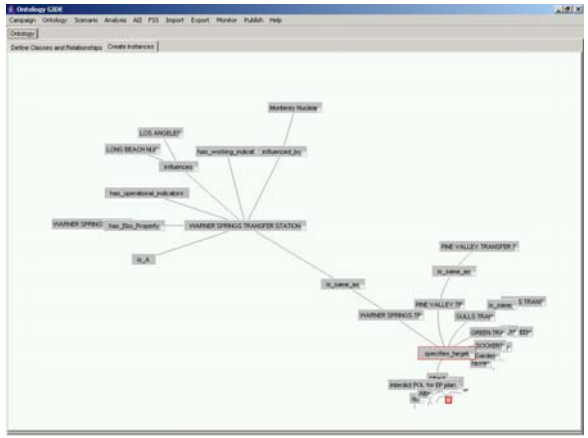
The SGen Proof of Concept Demo continued …



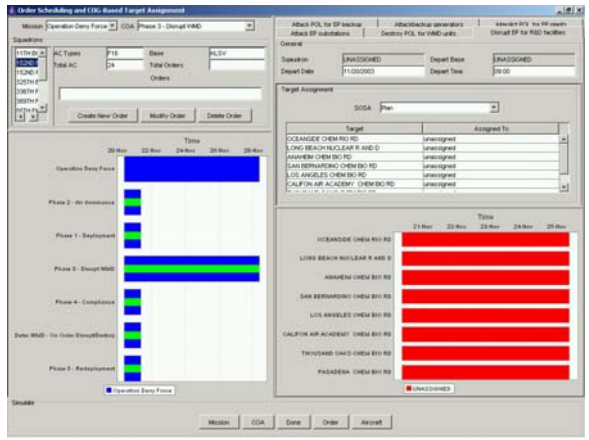
Ontology Instance Panel Showing Details of Order



Invoking Order Scheduling Application

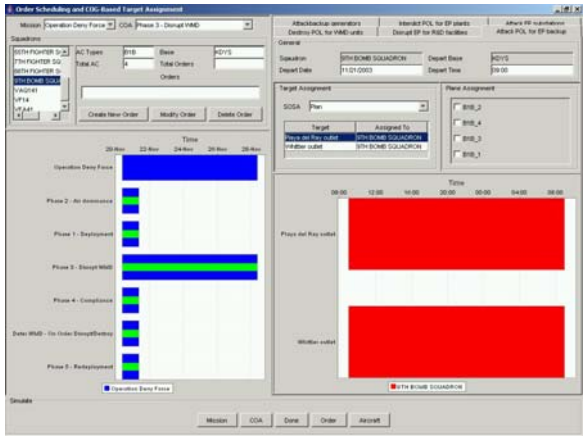


Ontology Instance Panel Showing Target SOSA Relationships

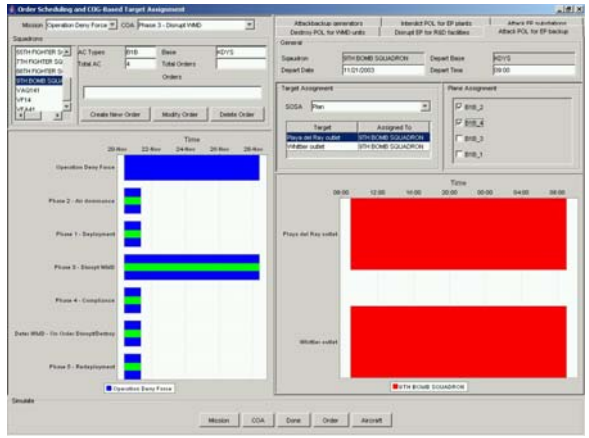


15 Invoking Order Scheduling Window

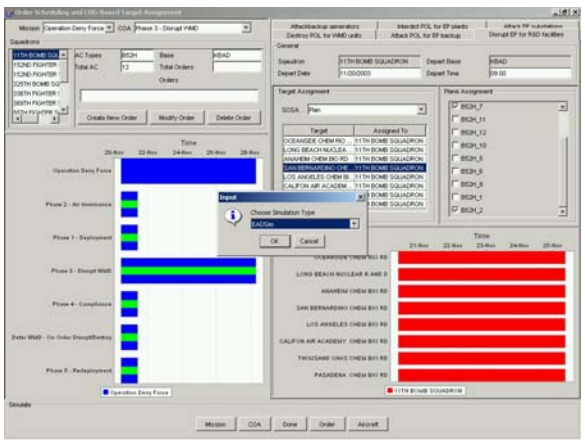
The SGen Proof of Concept Demo continued …



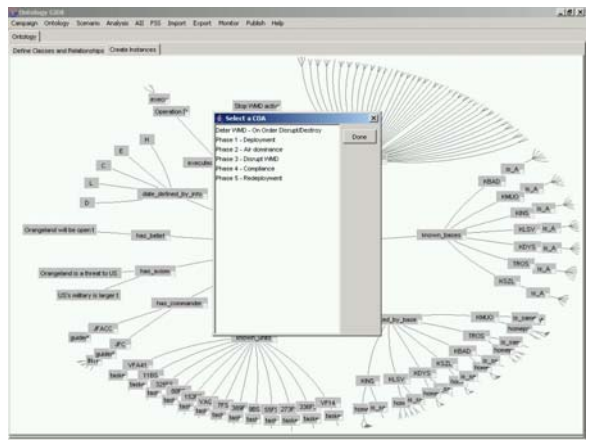
Assigning Squadron to Order



Assigning Aircraft to Target

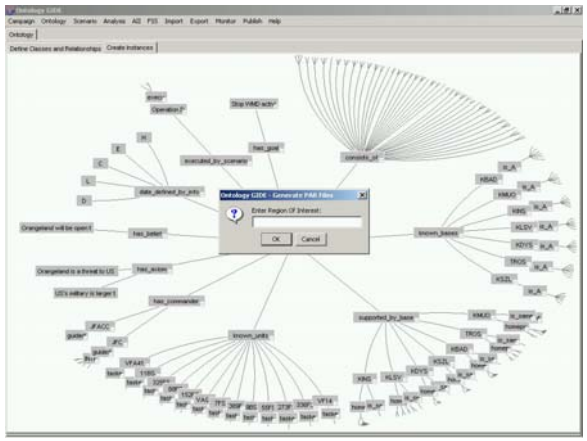


Choosing Simulation File Type

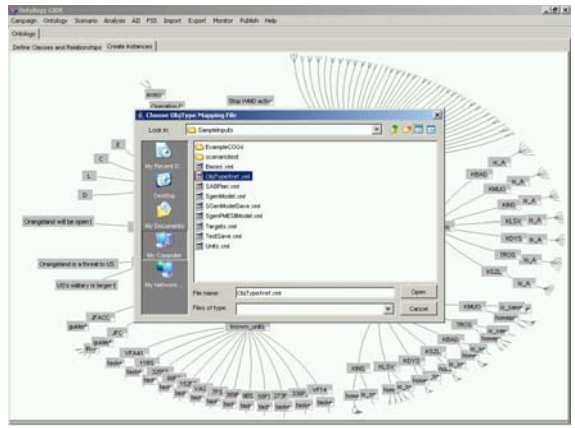


Choosing COA to Simulate

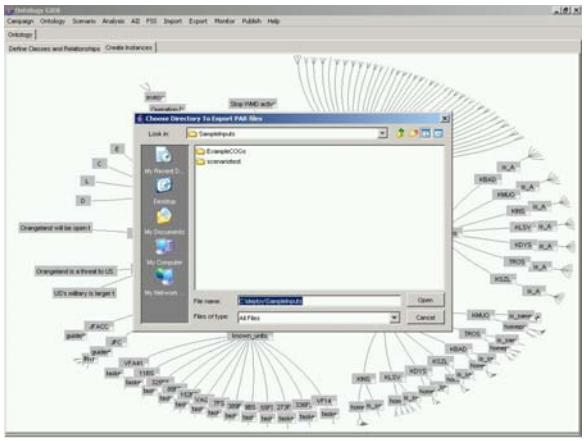
The SGen Proof of Concept Demo continued …



Entering FSS Region of Interest



Choosing the FSS Object Type Cross Reference File



Choosing the Directory for Generating the Simulation Files

Conclusion

- EBO Scenario Generation Has Demonstrated Important Results
  - SGen Technology can Extend the Useable Life of Existing Stovepipe Simulations
  - Support for New And Emerging Planning Methods (Effects Based Operations)
- Transition from Data-centered Scenario Development to Scenario-centered Development
- Breaking the Scenario to Simulation Link
- The Support for “What-if” Analysis is Significantly Improved
- SGen Supports Newer, Larger Scope Simulations
- SGen Technology Has Significantly Advanced the State Of Technology

Acknowledgements

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