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Representation of Consumption Based Logistics in an Engagement Level Warfighting Simulation

OOIDEAS - Scenario Mission Planner Tools

File Settings Config Tools Help

Scenario File: teTest.xml

Terrain Data

File: te.ele

Origin: 34 444903.0E 4662950.0N

Size: 80.0 Km X 80.0 Km Grid: 50.0 m

Auxiliary Files

Rds/Rvrs: te.rdv .ascii

Forces:

Environ:

Forces in Scenario:

- AirDefence_Platoon 4
- Threat Force
- RedRandom_Battalion 02
- RedUtility_Company 1
- AirDefence_Platoon 1
 - RTKSCT_0211_01
 - BM_0211_02
 - BM_0211_03

Unit: RedRandom_Battalion 02 Type: RedRandom Battalion

Location: 34 484303.0E 4731300.0N Formation: wedge

Waypoints: 61

Change Unit Name

Units Vehicles Weapons Sensors Engmnt Areas Movement

Define route for: RedRandom_Battalion 02

Easting	Northing	Alt	Time
484125.0	4731431.0	0.0	24.0
483687.0	4731547.0	0.0	69.0
483534.0	4731550.0	0.0	84.0
483522.0	4731550.0	0.0	85.0
483416.0	4731519.0	0.0	96.0
483316.0	4731478.0	0.0	107.0
483159.0	4731444.0	0.0	123.0

Add Points Copy Points Delete Points Insert Pt Before

Move Points Paste Points Duplicate Point Insert Pt After

Edit Waypoints on Map

Select an entity in the forces list to display route points.

Ready:

OOIDEAS - Scenario Mission Planner Terrain Map

Cursor Location:

UTM: 34 480703E 4712950N Altitude: 80050.0 m

MGRS: Zoom: 1.0x

Lat/Lon: 0.0.0N 0.0.0E

Elev: 464.0

Status:

Start Time 0.0

Unattrited Movement

End Time 1583.0

Delta T 100

1420.0

June 23, 2005



Overview



- Motivation for model
 - Engagement models
 - Simulation Overview
 - Experiment Overview
- Details of model
 - Internal functionality
 - Study specific models
- The analysis
- Possible extensions



Engagement Models



- What is an engagement model?
 - Algorithms for all critical representations
 - High Fidelity Algorithms where necessary
- Key concepts
 - Predictive performance of concept systems
 - Represent changes in performance details
 - Scrutinize each individual few-on-few engagement



Simulation Overview



- IDEEAS – Interactive Distributed Engineering Evaluation and Analysis Simulation
 - Deterministic models
 - Entity level
 - Repeatable
 - Monte Carlo Support
 - Dynamic Output support



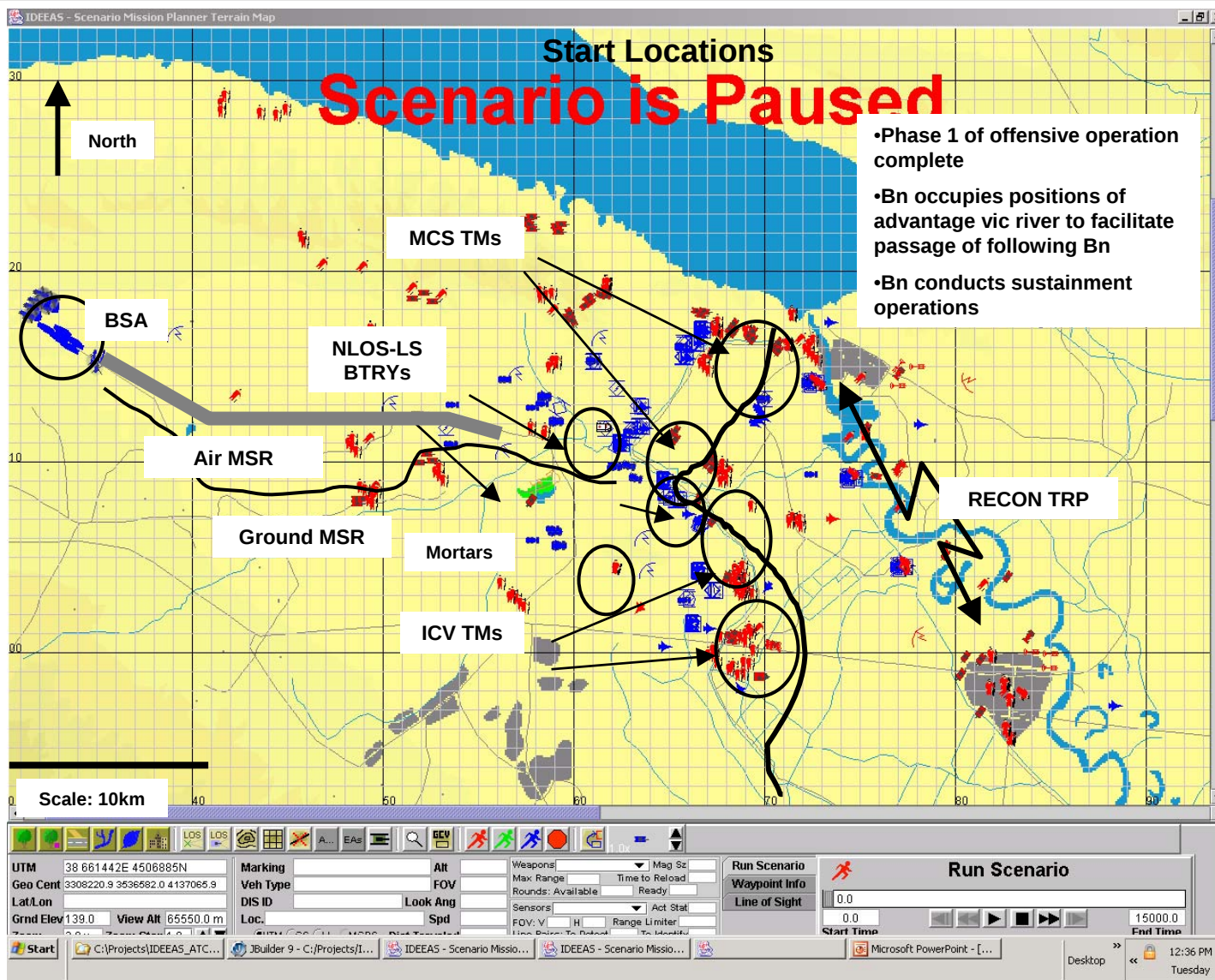
Experiment Overview



- Examine effects of conceptual AANT/WAASP logistic system on Combined Arms Battalion (+) Sustainment Operations
 - Base Case: FTTS Trucks – 16 Tons ea.
 - Alternative: AANT/WAASP –1 Ton ea.
- Analyze differences in results
 - Operating in identical vignette
 - Trucks only
 - Unmanned systems only
 - Combination



Vignette Details





Simulation Details



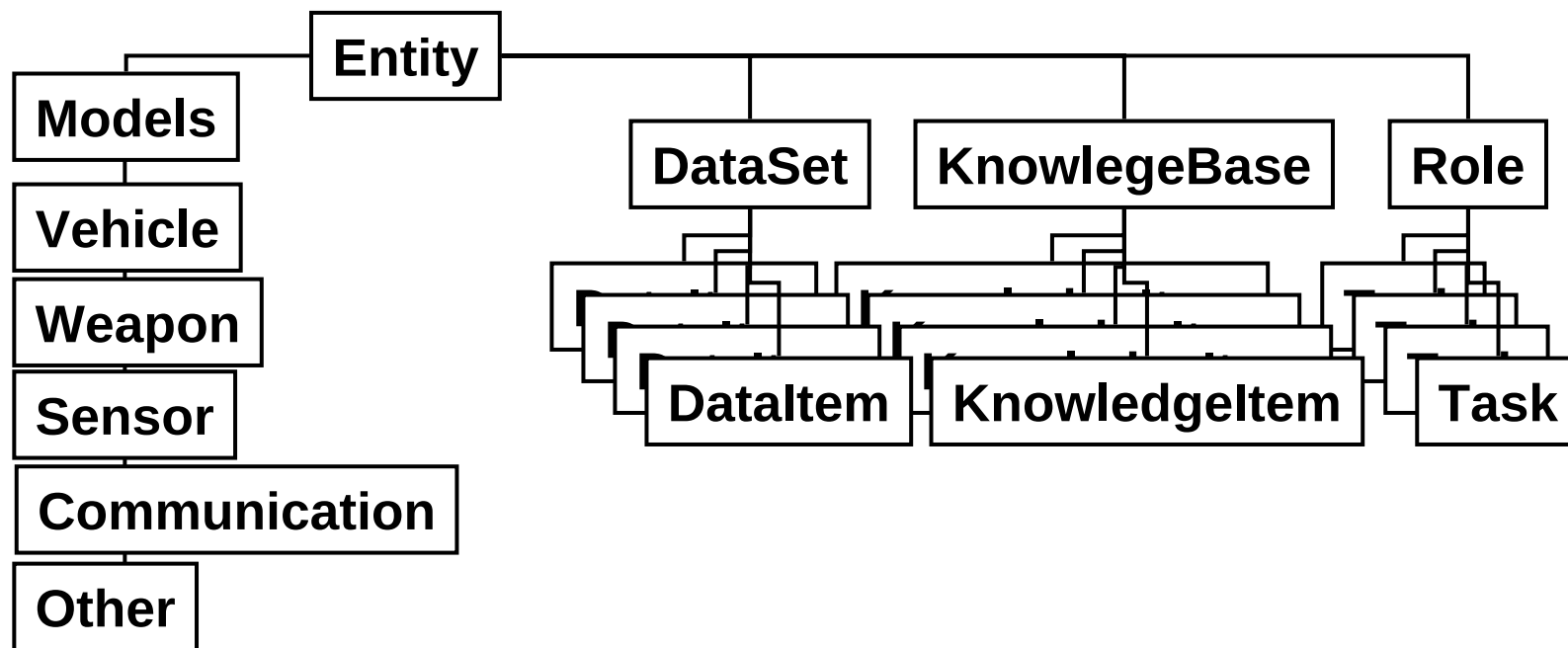
- Explicit Entity level modeling
 - Ammo consumption by weapon type
 - Fuel by vehicle type
 - Commander behavior at Platoon, Company, and BSA levels
 - Communication between vehicles
 - Supply loads and transfer rates



Internal Functionality



- Abstract Behavior Containers
- Open framework for Entity Data
- Open framework for Entity Perception

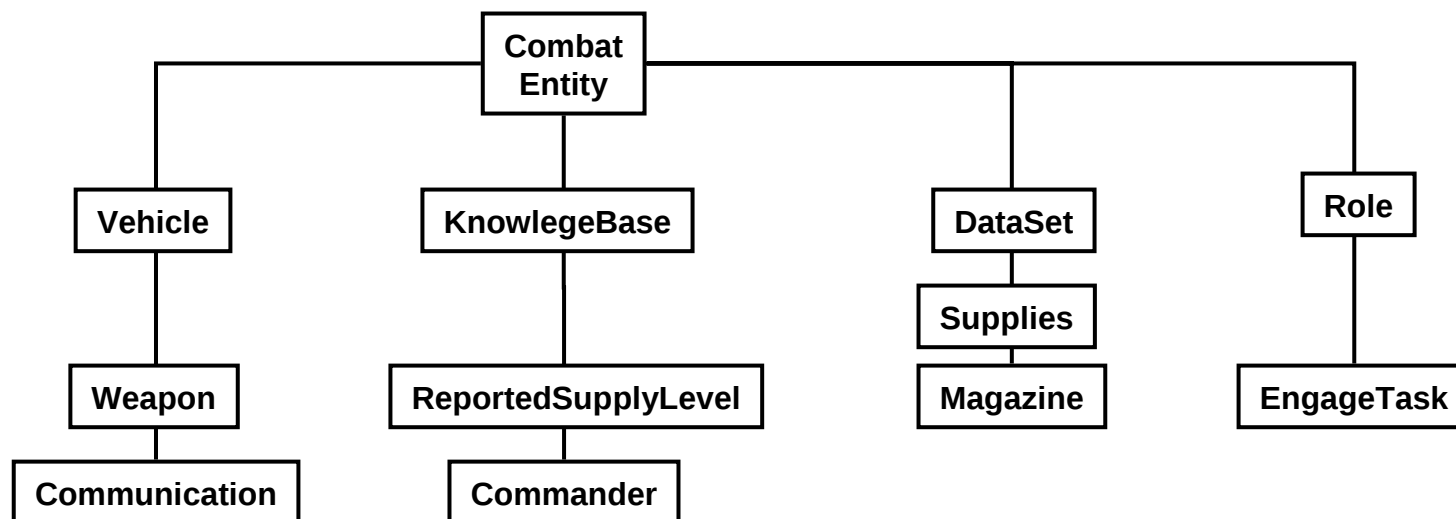




ATC Combat Entity



- Vehicle, Weapon, and Communication models establish performance
- Data managed for local supplies, and weapon magazines
- Knowledge maintained of Commander and supply level reported.
- EngageTask causes weapon fire and ammo decrement by weapon type.

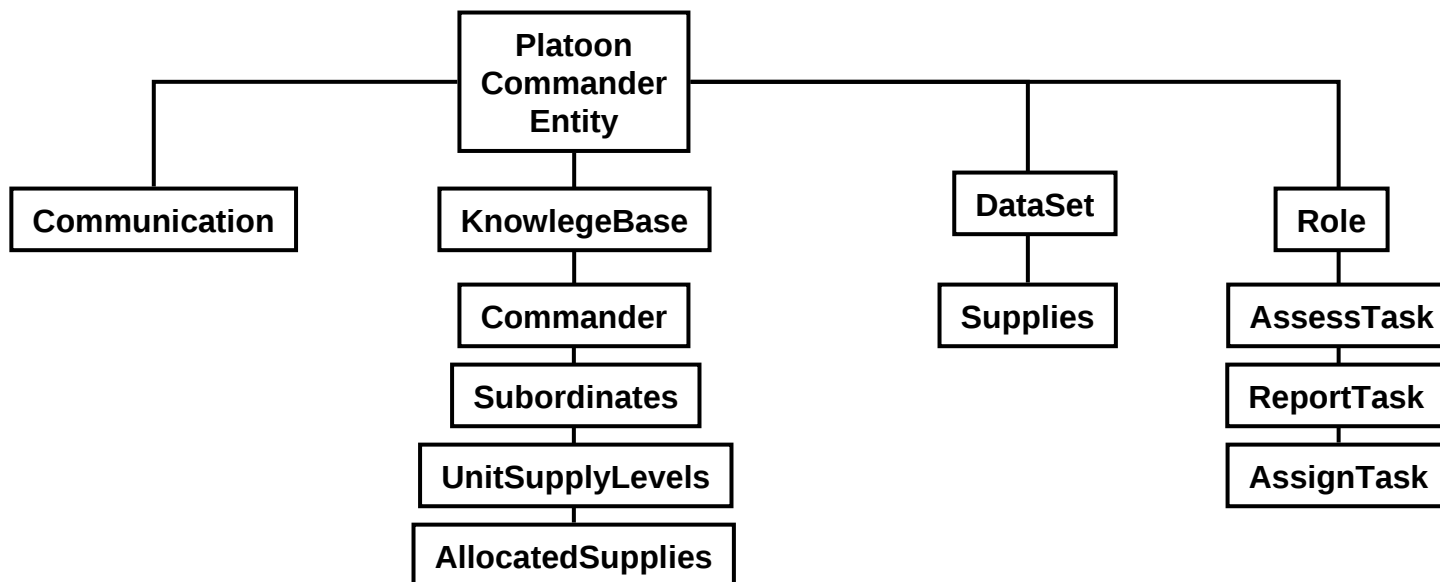




ATC Platoon Cmdr



- Receives updates from subordinates on supplies
- Maintains knowledge of every subordinates supply levels.
- Maintains aggregate unit supply level
- Reports the unit level supply to commander
- Assigns supply vehicles to subordinates
- Maintains knowledge of allocated supplies

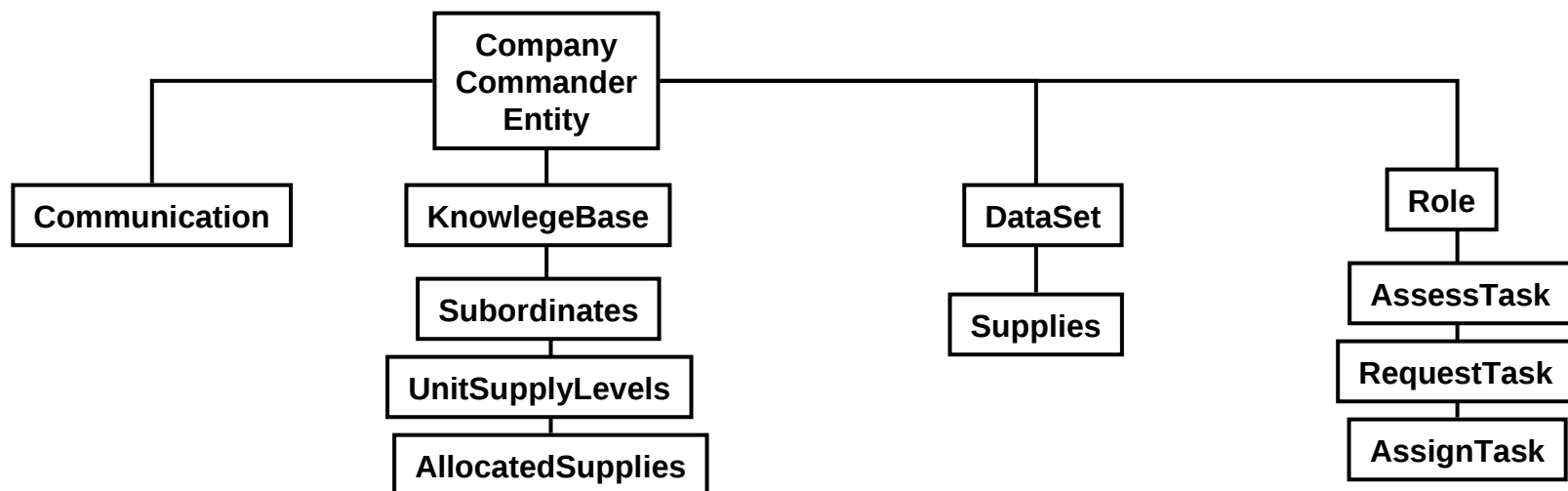




ATC Company Cmdr



- Receives updates from subordinates on supplies
- Maintains knowledge of every subordinates supply levels.
- Maintains aggregate unit supply level
- Requests Resupply from BSA
- Assigns supply vehicles to subordinates
- Maintains knowledge of allocated supplies

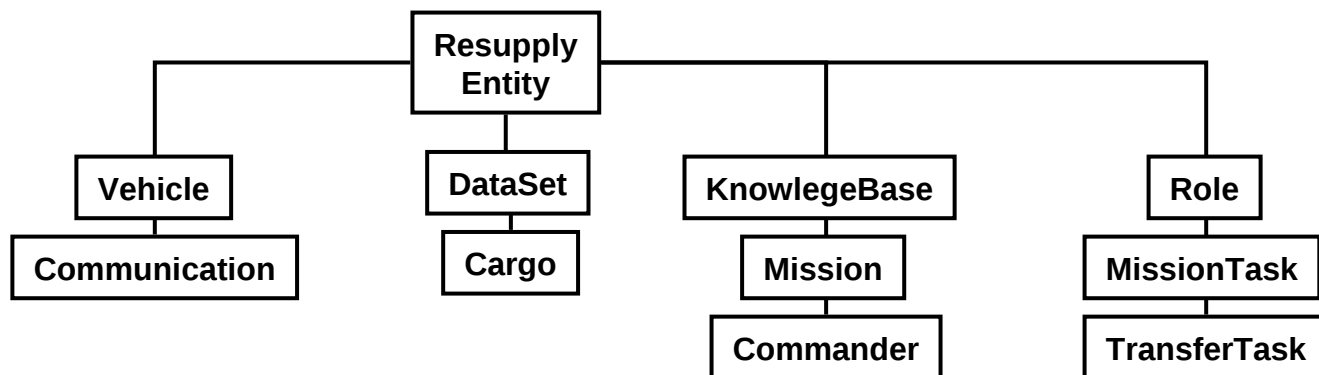




ATC Resupply Vehicle



- Receives missions from BSA Commander
- Maintains level of cargo
- Communicates with Commander and assigned mission POC
- Dynamically alters routes based on mission
- Transfers supplies to target vehicles.

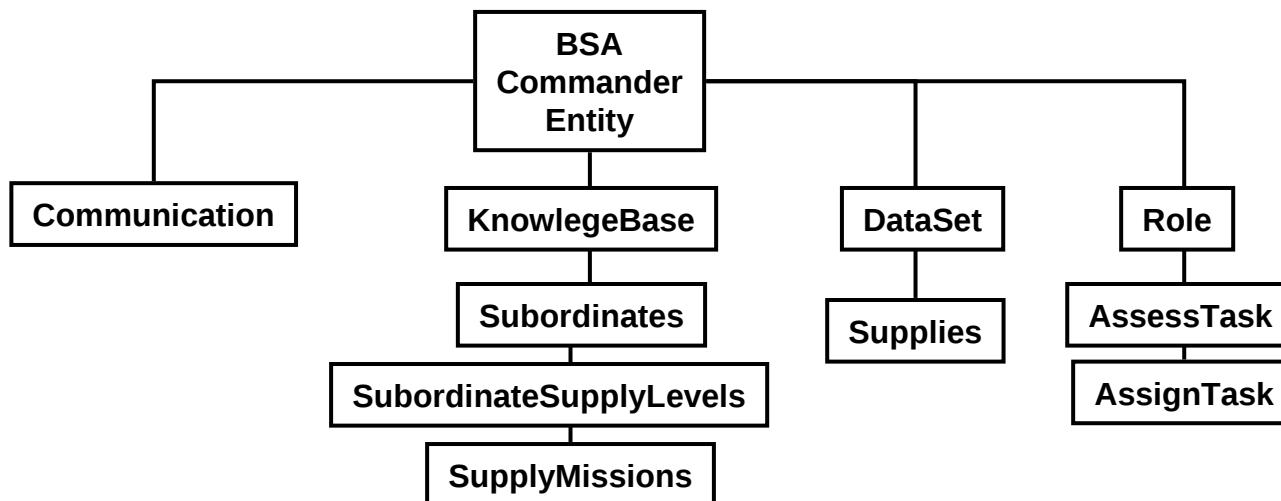




ATC BSA Cmdr



- Maintains knowledge of every subordinate:
 - Supplies carried
 - Missions assigned
 - current status
- Assigns mission based on request, supply, availability.

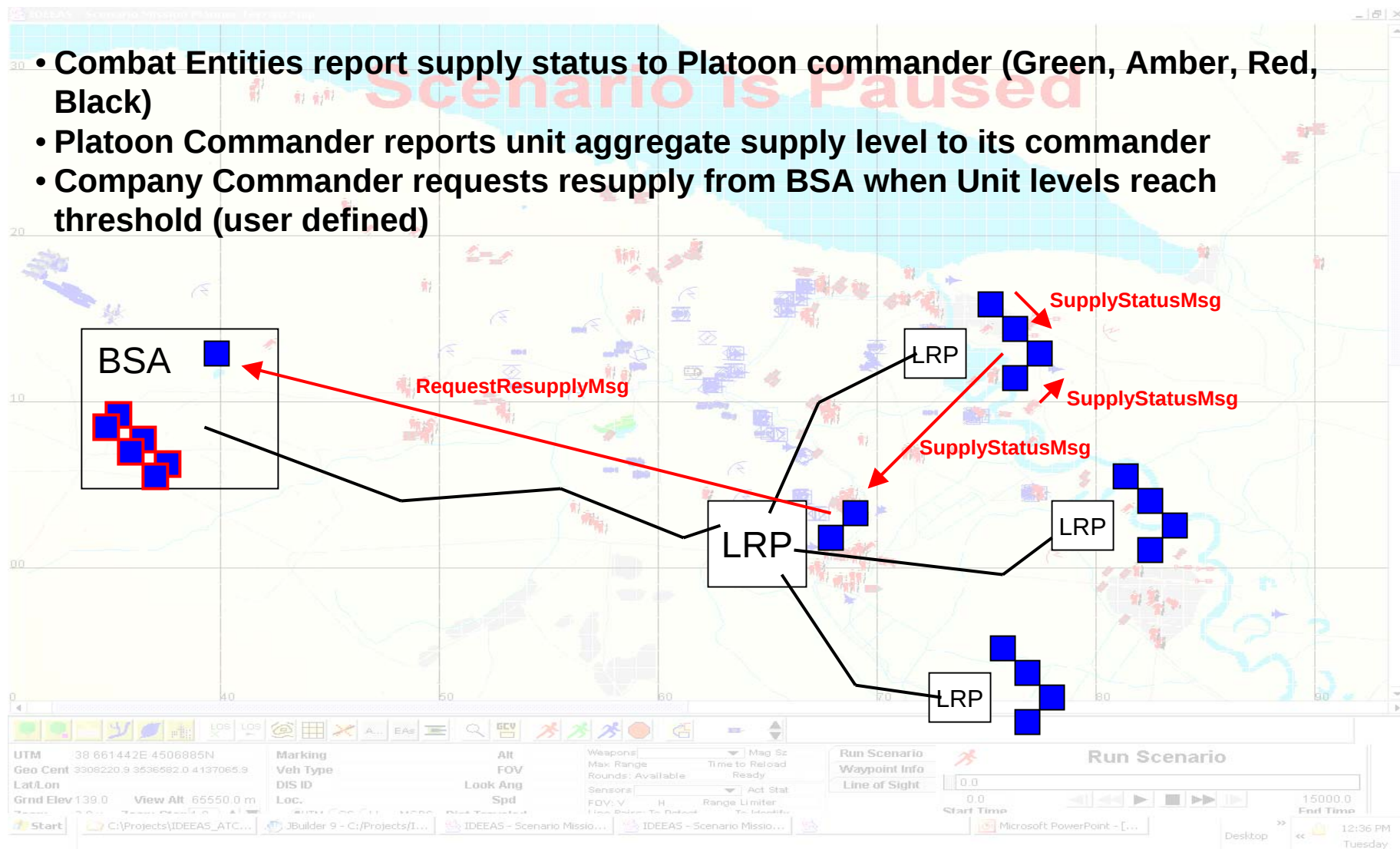




Model Overview Phase 1



- Combat Entities report supply status to Platoon commander (Green, Amber, Red, Black)
- Platoon Commander reports unit aggregate supply level to its commander
- Company Commander requests resupply from BSA when Unit levels reach threshold (user defined)



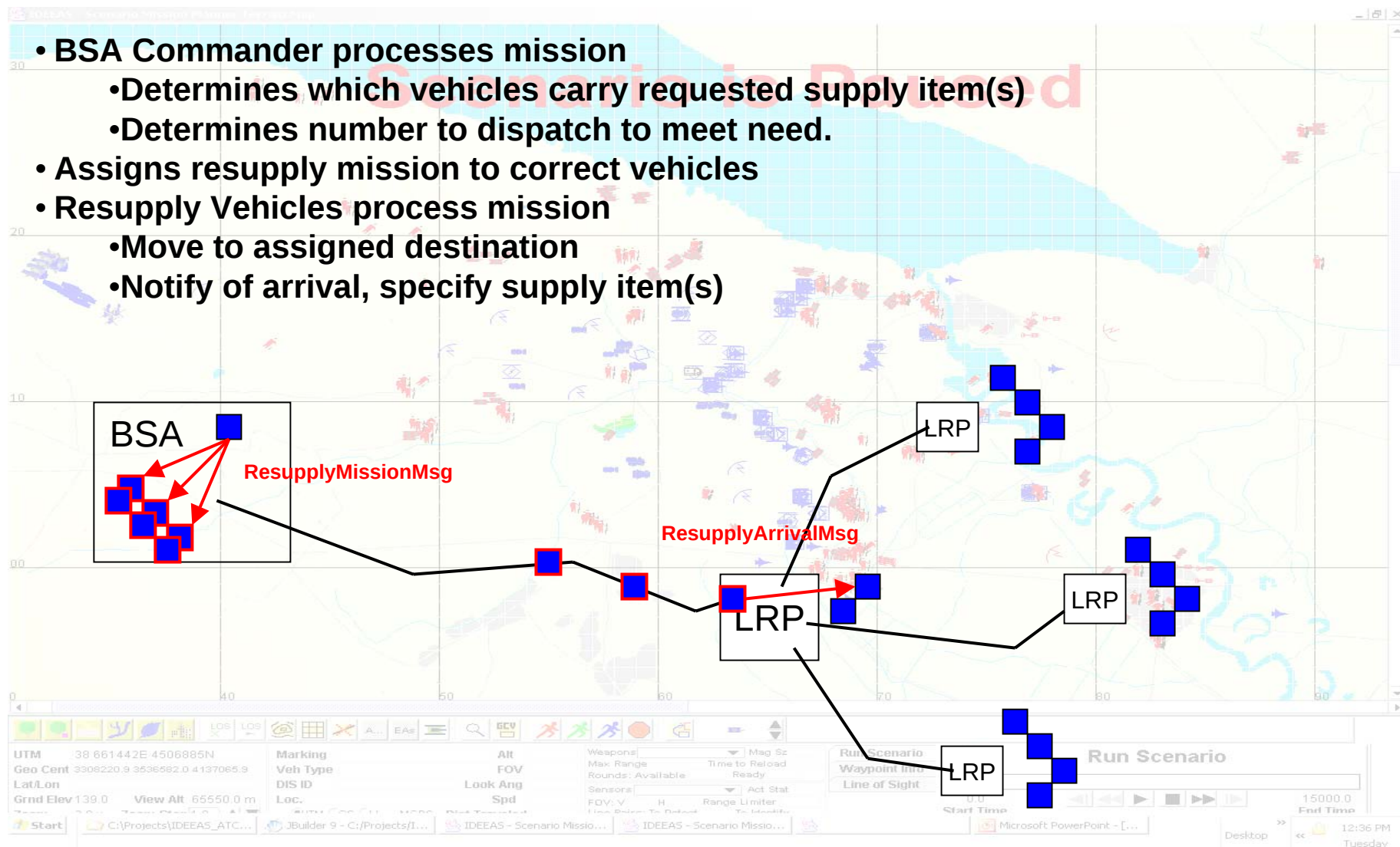


Model Overview

Phase 2



- BSA Commander processes mission
 - Determines which vehicles carry requested supply item(s)
 - Determines number to dispatch to meet need.
- Assigns resupply mission to correct vehicles
- Resupply Vehicles process mission
 - Move to assigned destination
 - Notify of arrival, specify supply item(s)

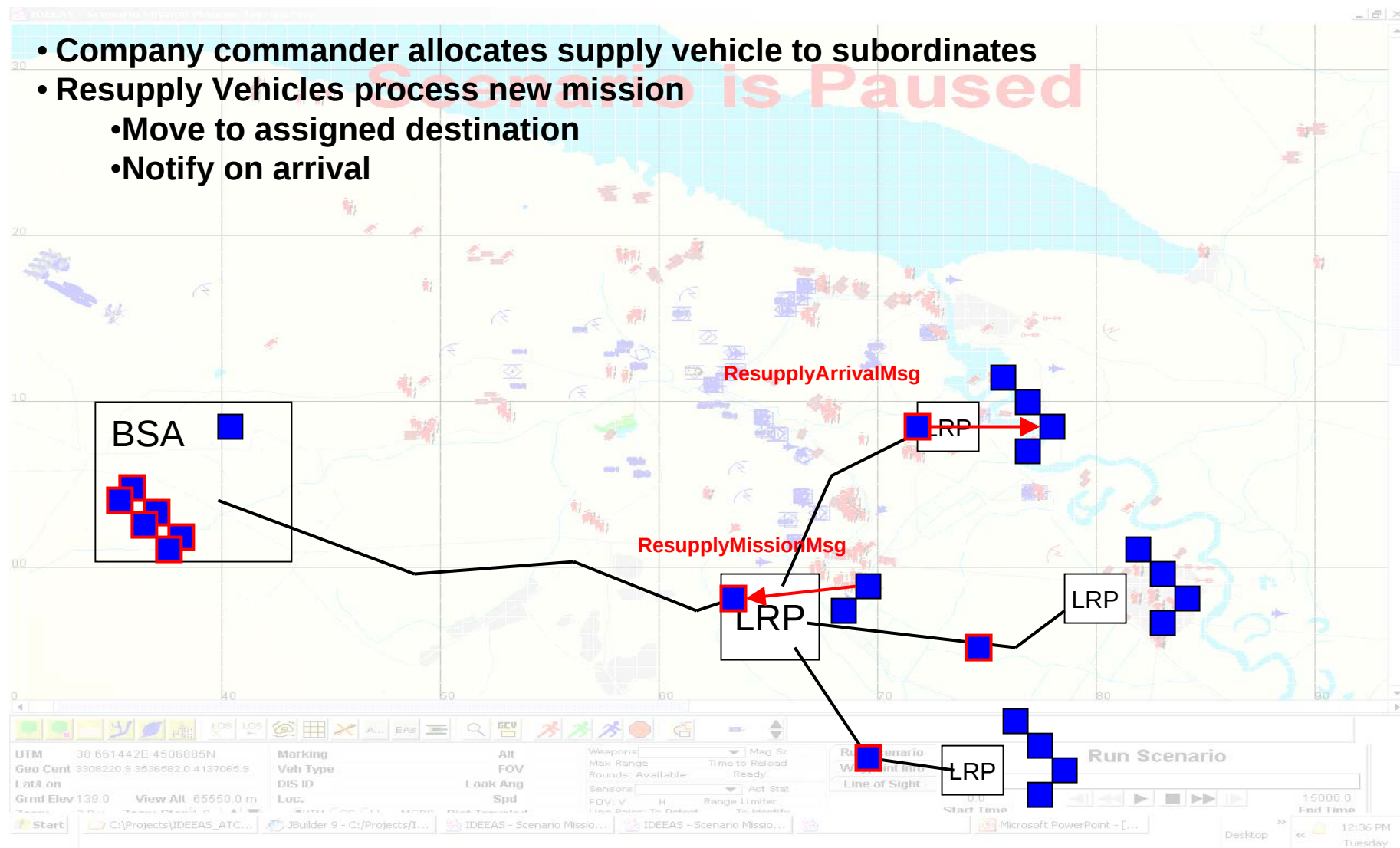




Model Overview Phase 3



- Company commander allocates supply vehicle to subordinates
- Resupply Vehicles process new mission
 - Move to assigned destination
 - Notify on arrival



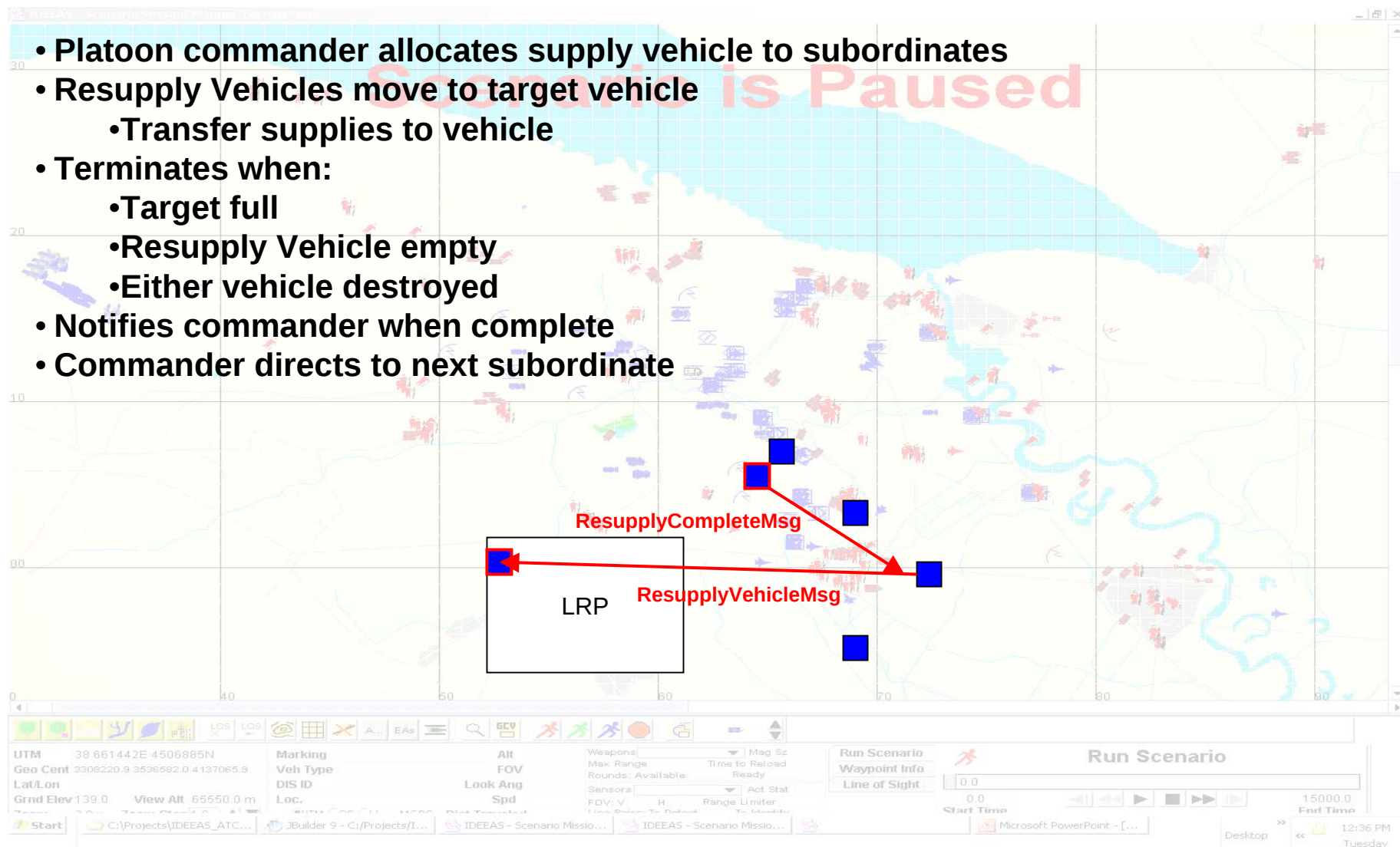


Model Overview

Phase 4



- Platoon commander allocates supply vehicle to subordinates
- Resupply Vehicles move to target vehicle
 - Transfer supplies to vehicle
- Terminates when:
 - Target full
 - Resupply Vehicle empty
 - Either vehicle destroyed
- Notifies commander when complete
- Commander directs to next subordinate

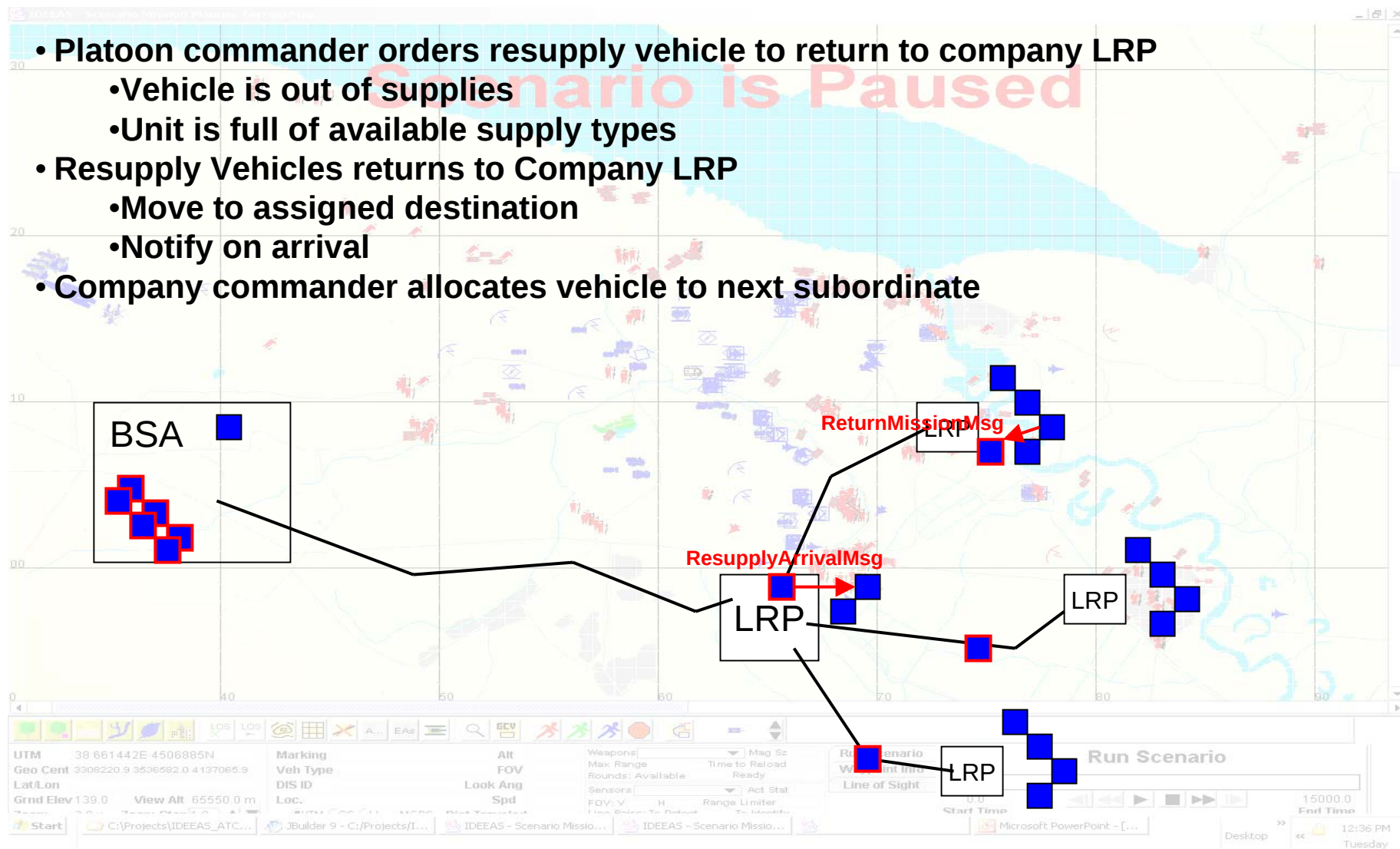




Model Overview Phase 5



- Platoon commander orders resupply vehicle to return to company LRP
 - Vehicle is out of supplies
 - Unit is full of available supply types
- Resupply Vehicles returns to Company LRP
 - Move to assigned destination
 - Notify on arrival
- Company commander allocates vehicle to next subordinate



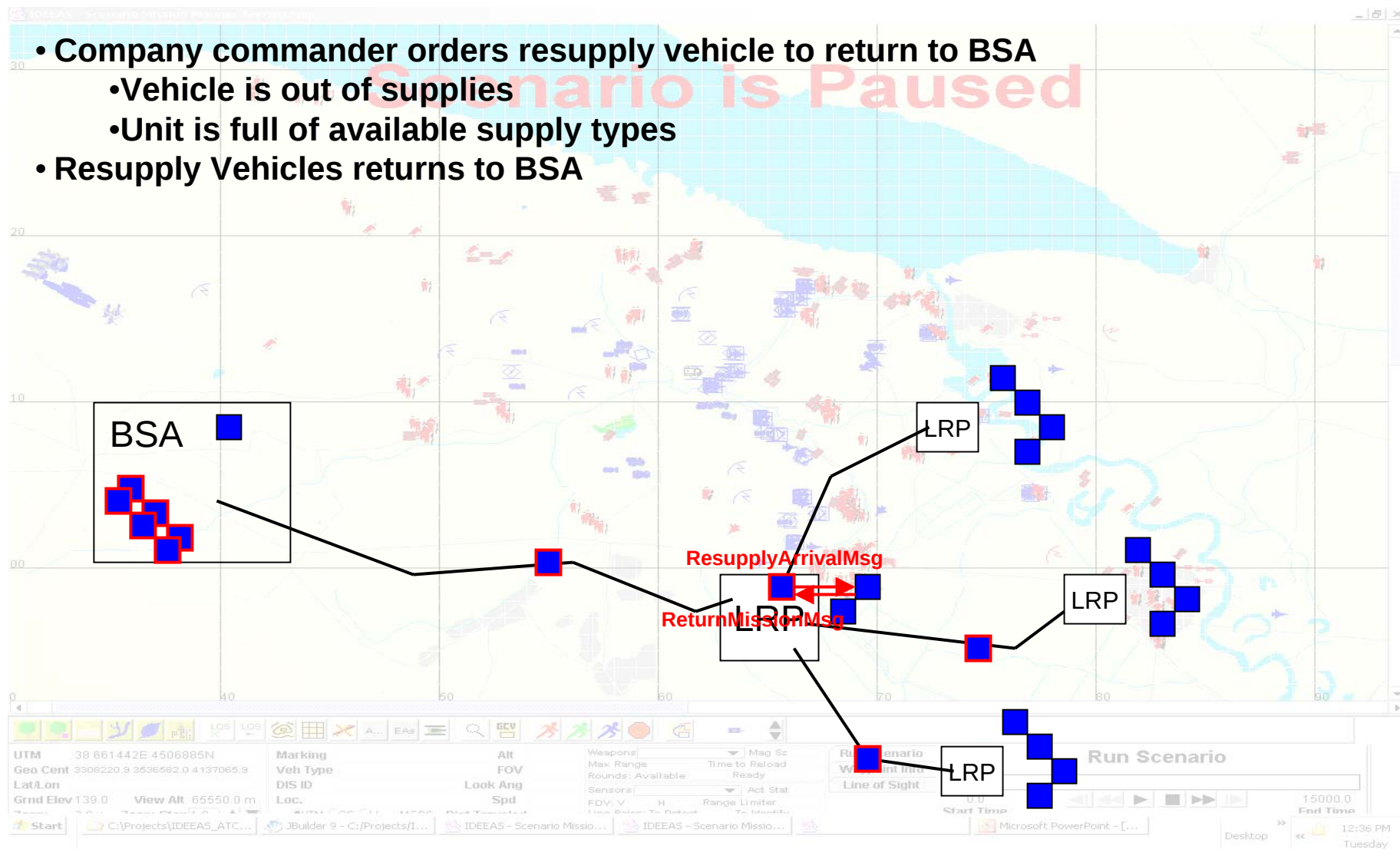


Model Overview

Phase 6

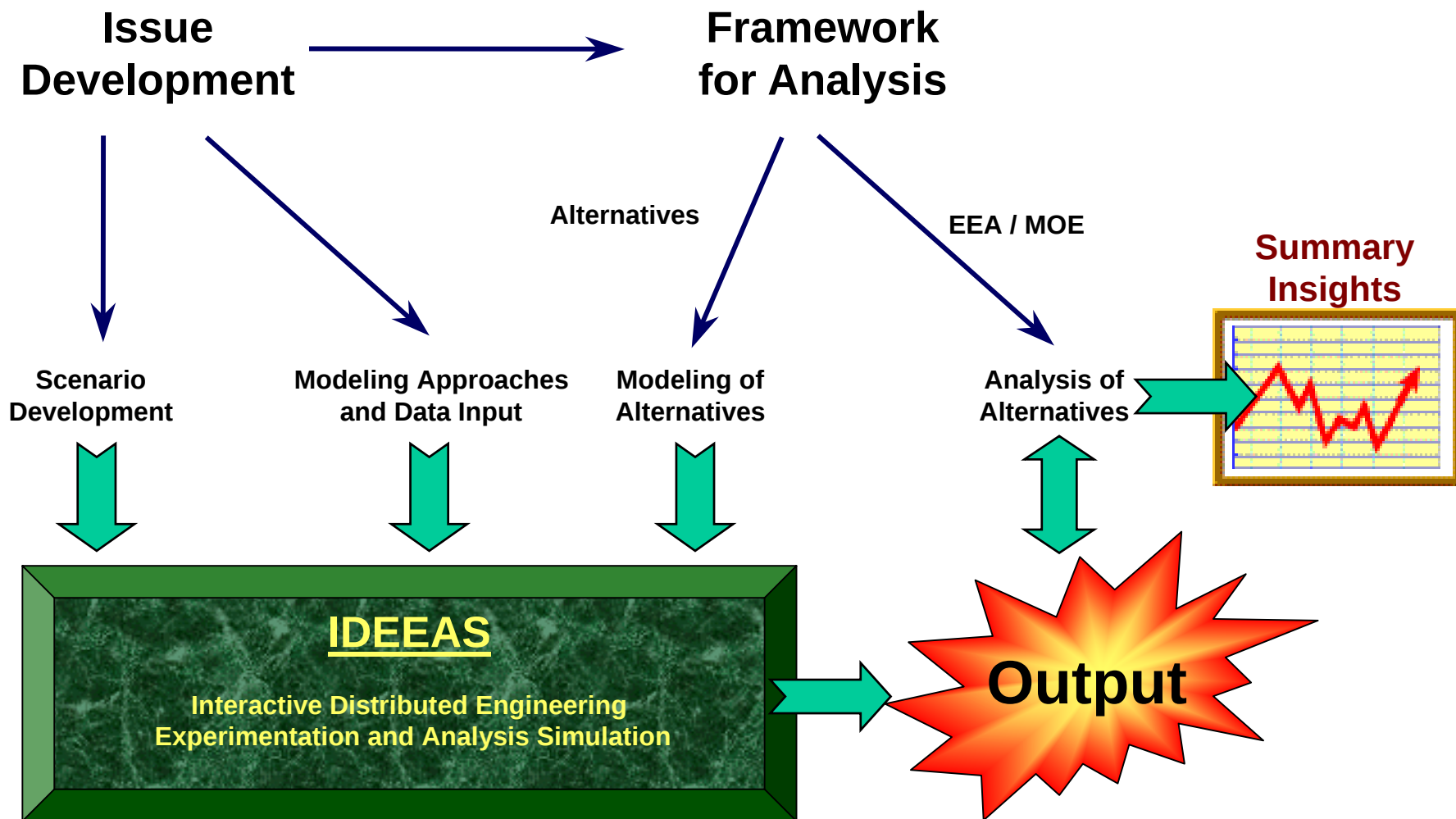


- Company commander orders resupply vehicle to return to BSA
 - Vehicle is out of supplies
 - Unit is full of available supply types
- Resupply Vehicles returns to BSA



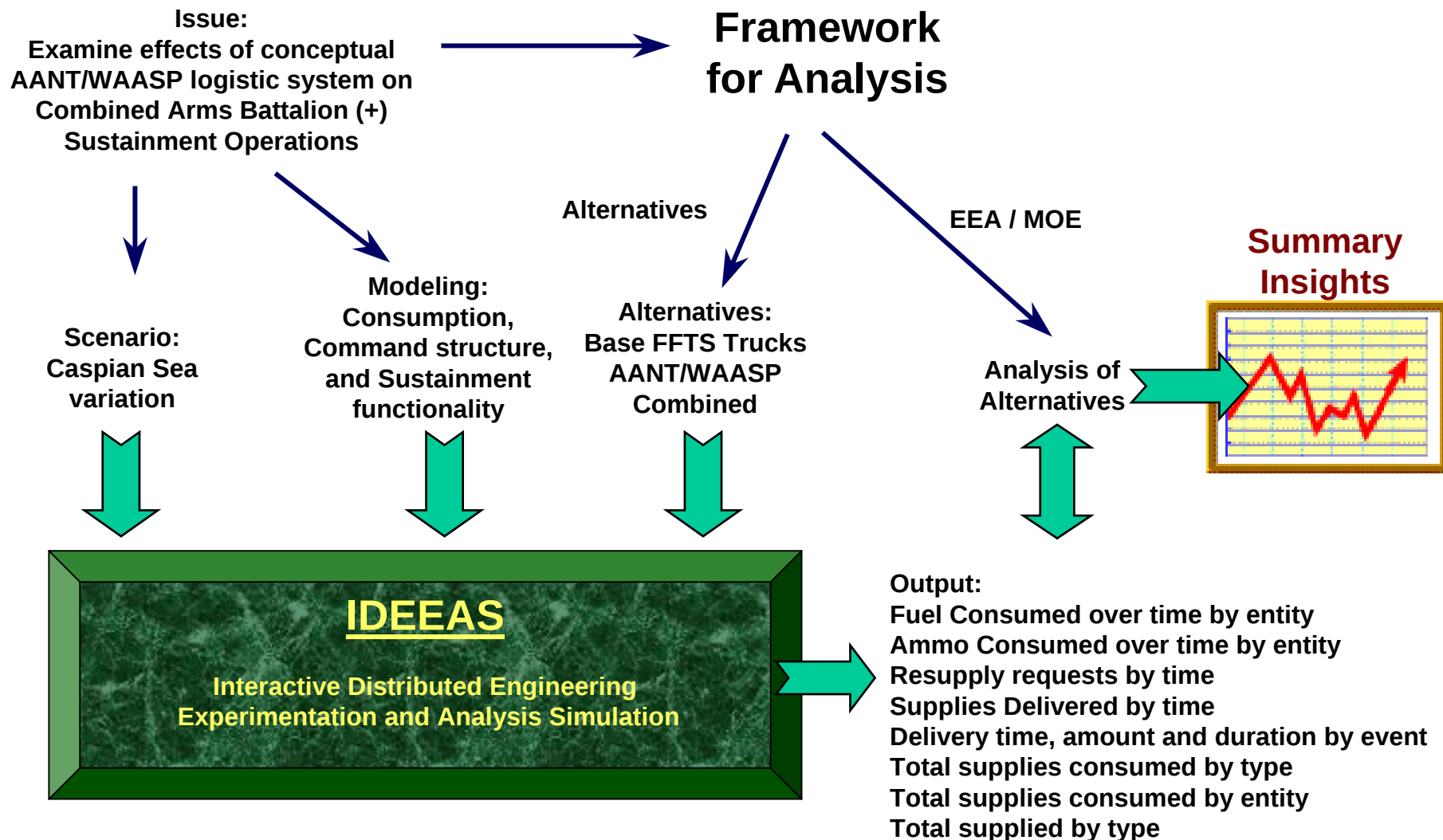


Constructive Analysis Approach





ATC Analysis Approach





Extension Possibilities



- Performance
 - Faster vehicles
 - Faster supply transfer
 - Larger vehicles
- TTP
 - Alternate delivery methods
 - Alternatives to supply requests
 - Variations on command structures

Componentized individual performance models enable open ended speculation



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