712CD

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Report Documentation Page

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Expanding Deployment Modeling into DPO (Distribution Process Owner) Modeling

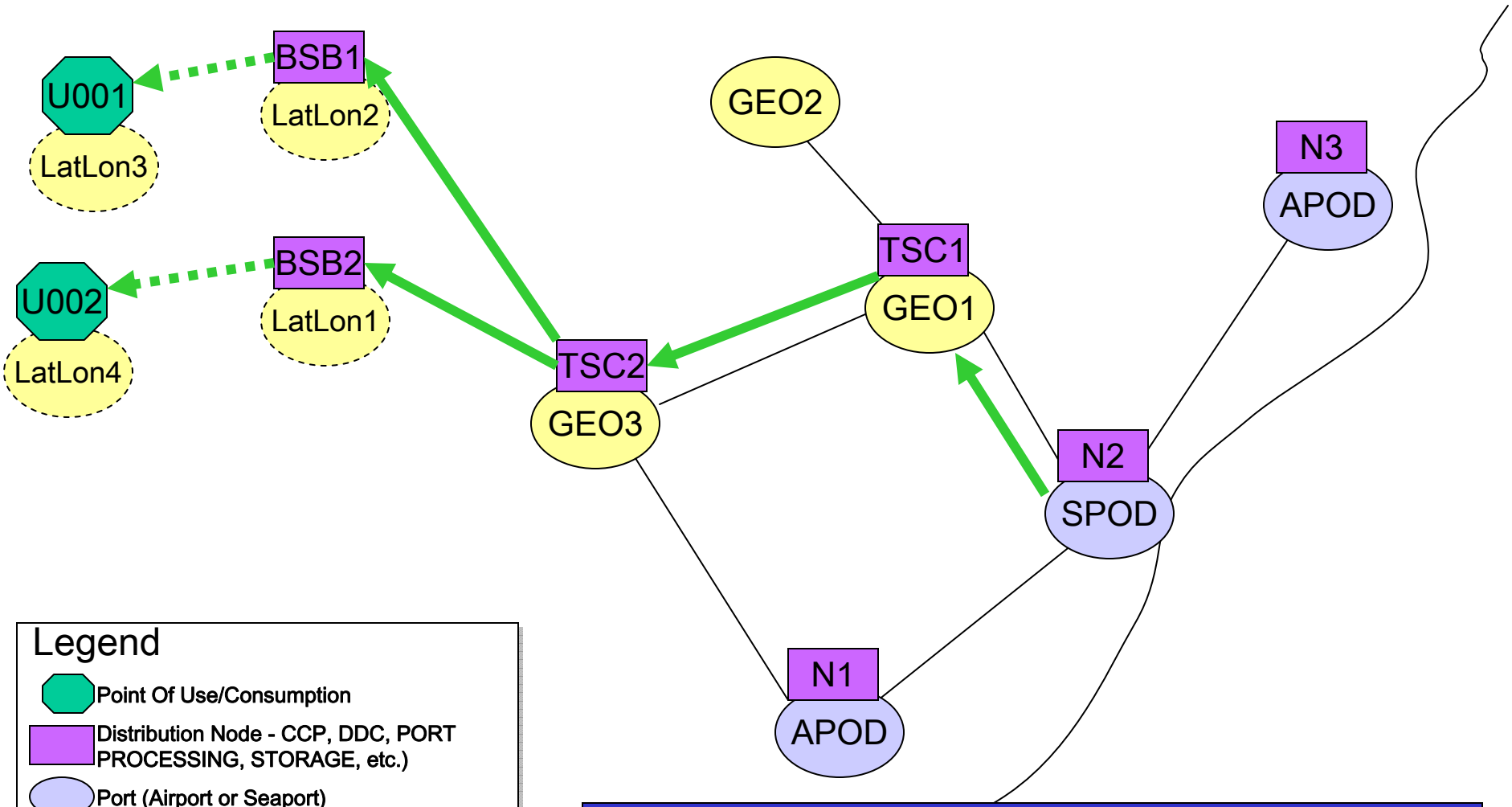
Dr. Chuck Van Groningen, Argonne National Laboratory

Dr. Soraya Stevens, BBN Technologies

Presentation Overview

- Modeling in the Analysis of Mobility Platform (AMP) Environment
- Tour of Present and Future Capabilities
- Expansion of Capabilities to Support DPO Modeling
- Summary/Q&A

Where are we going in ETED?

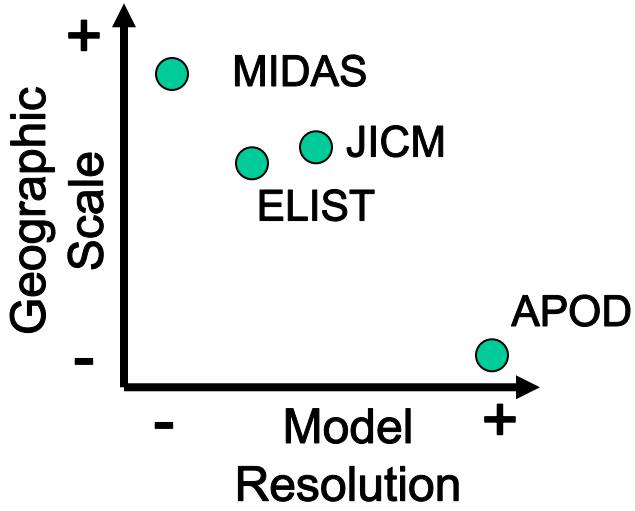


Add Distribution Process Models to a Global, End-to-End Transportation Modeling Federation

AMP Overview

AMP is an Integrated Federation of Modeling and Simulation Tools that…

- Enables collaborative Programmatic Analysis across the DoD
- Is a Federation of Models in a single application
- Merges GOTS and COTS tools in a common Open platform



- Answers infrastructure, process, systems, policy, and lift capability analysis questions
- Provides analytical comparisons air-sea tradeoff analysis
- Is expanding to include distribution concepts through the E2E Distribution Modeling R&D effort

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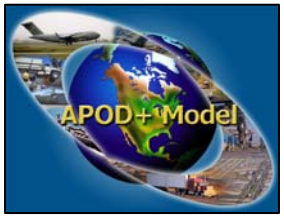

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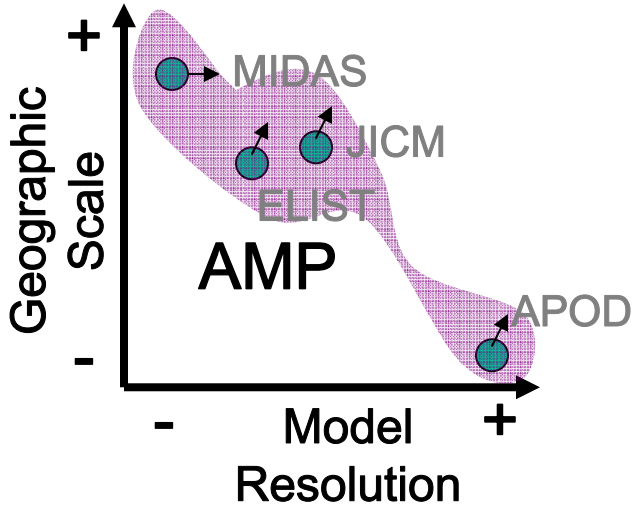

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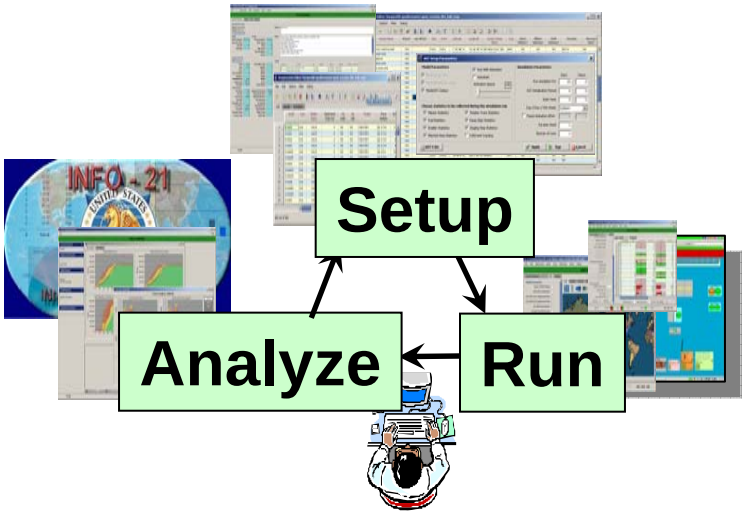

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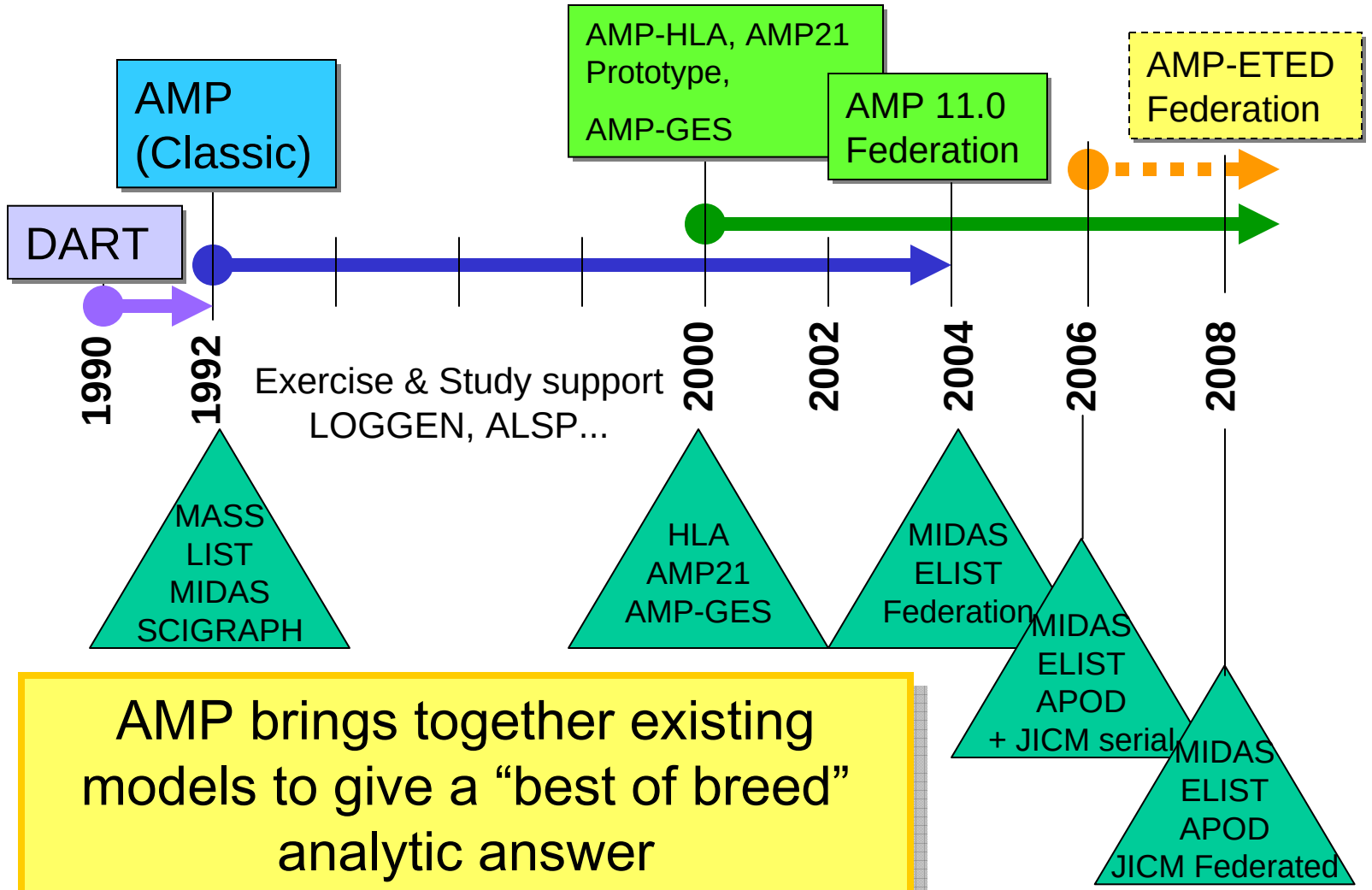
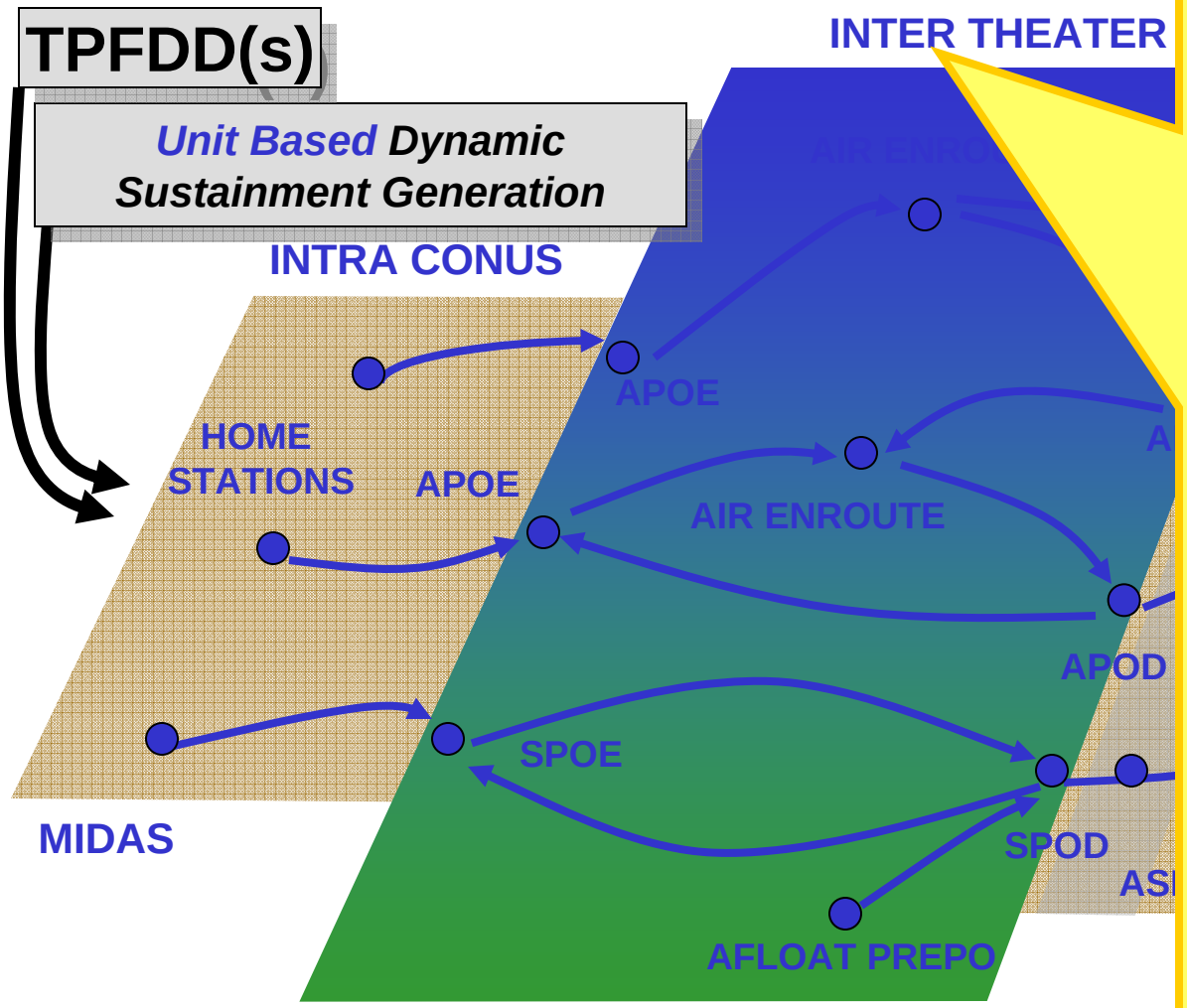
The Evolution of AMP to ETED



AMP brings together existing models to give a "best of breed" analytic answer

AMP Evolves and Adapts to Analytic Climate

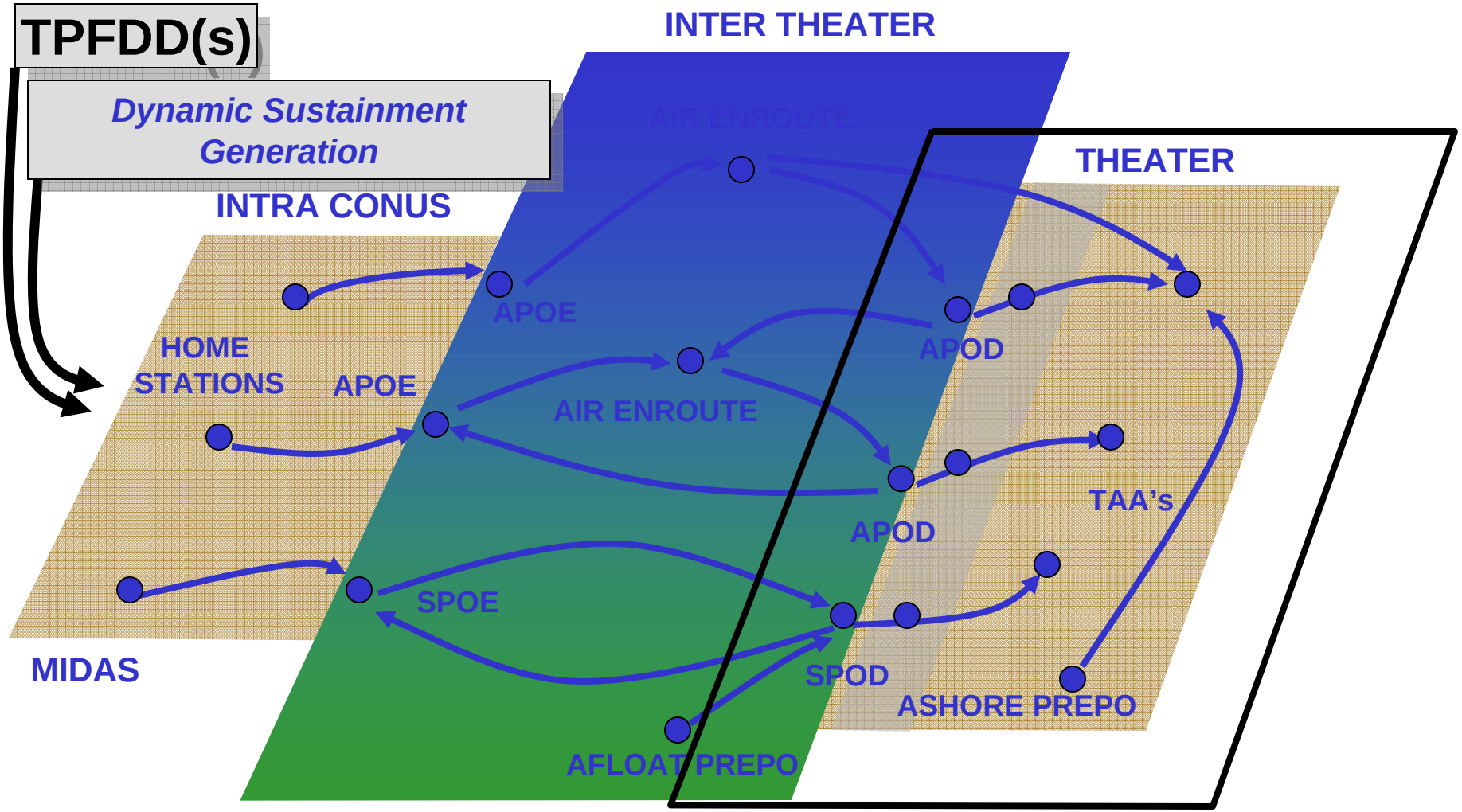
AMP Modeling Functionality - 2006



- Dynamic Mode and Port Selection Feature
- Linked Airlift and Sealift Scheduler
- Dynamic Sustainment Generation modeled at CCC
- Inventory Management
- Strategic Airlift and Sealift Simulations with exogenous and stochastic events
- Multi-Theater
- Intermodal Transload
- Channel/SAAM missions
- Sealift PAX ferries
- Aircraft diversions
- Aircraft slotting
- Working/parking MOG and Hot cargo

MIDAS: Detailed Strategic Airlift and Sealift

AMP Modeling Functionality - 2006



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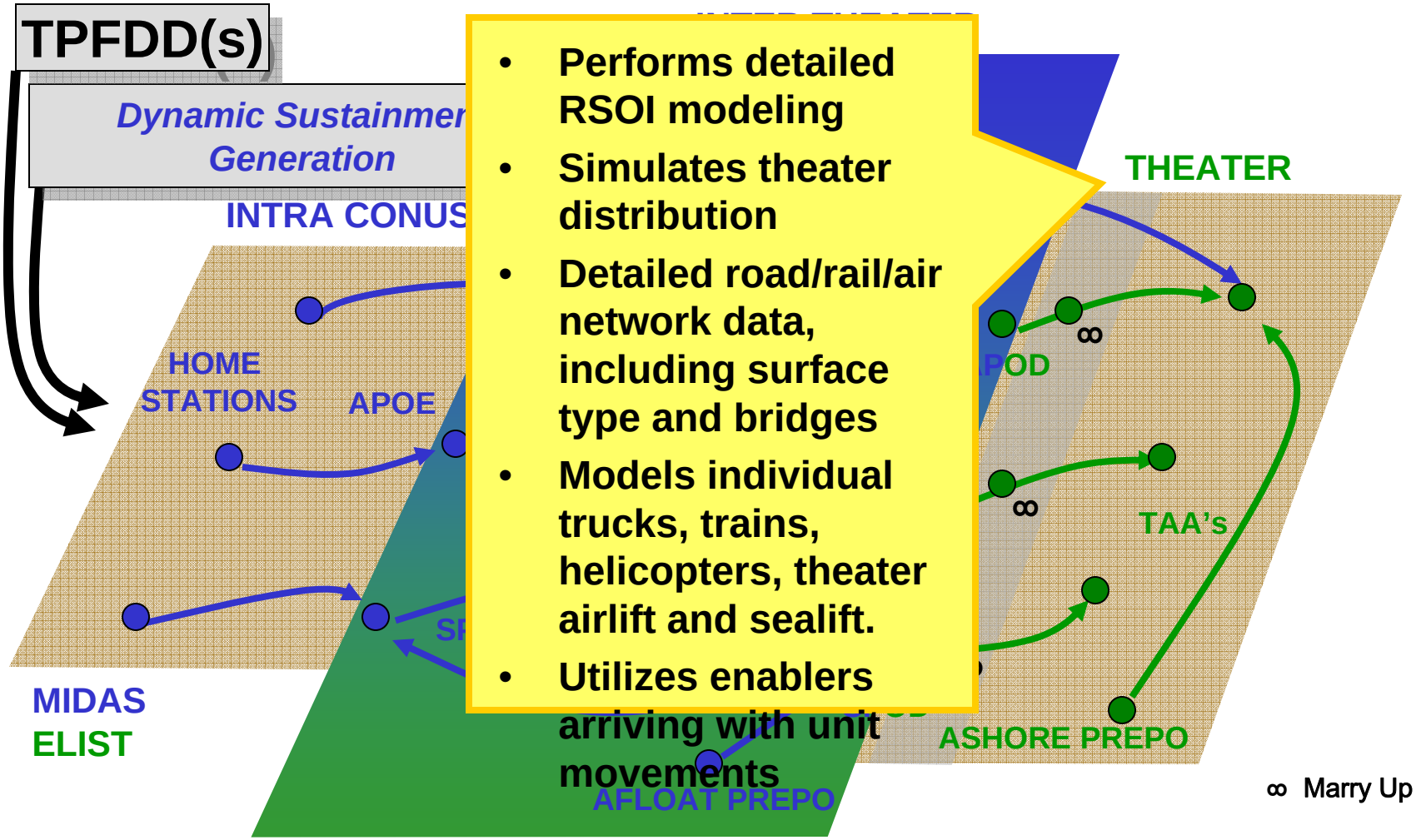
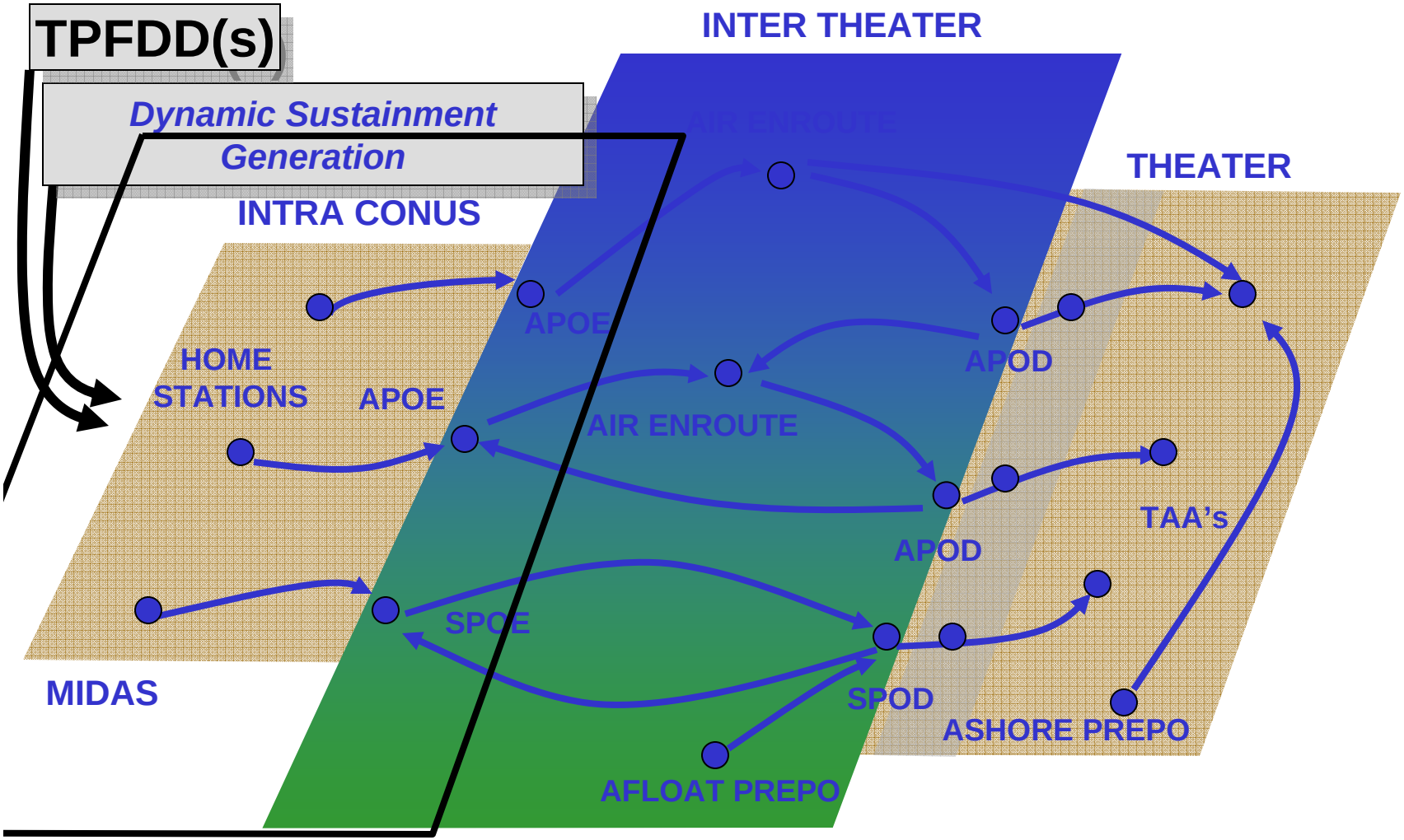


- Performs detailed RSOI modeling
- Simulates theater distribution
- Detailed road/rail/air network data, including surface type and bridges
- Models individual trucks, trains, helicopters, theater airlift and sealift.
- Utilizes enablers arriving with unit movements

ELIST: Detailed Theater Distribution Modeling

AMP Modeling Functionality - 2006



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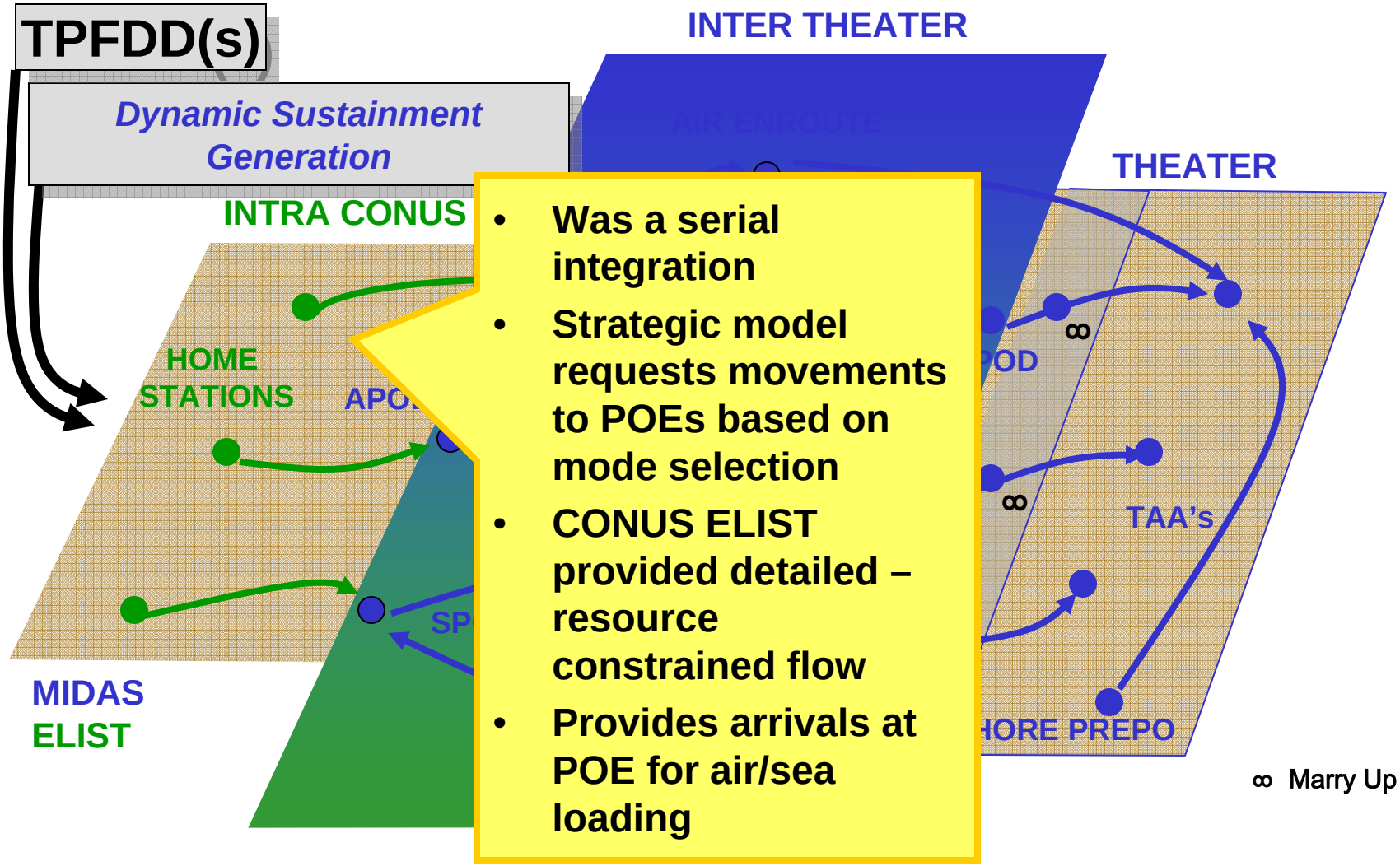
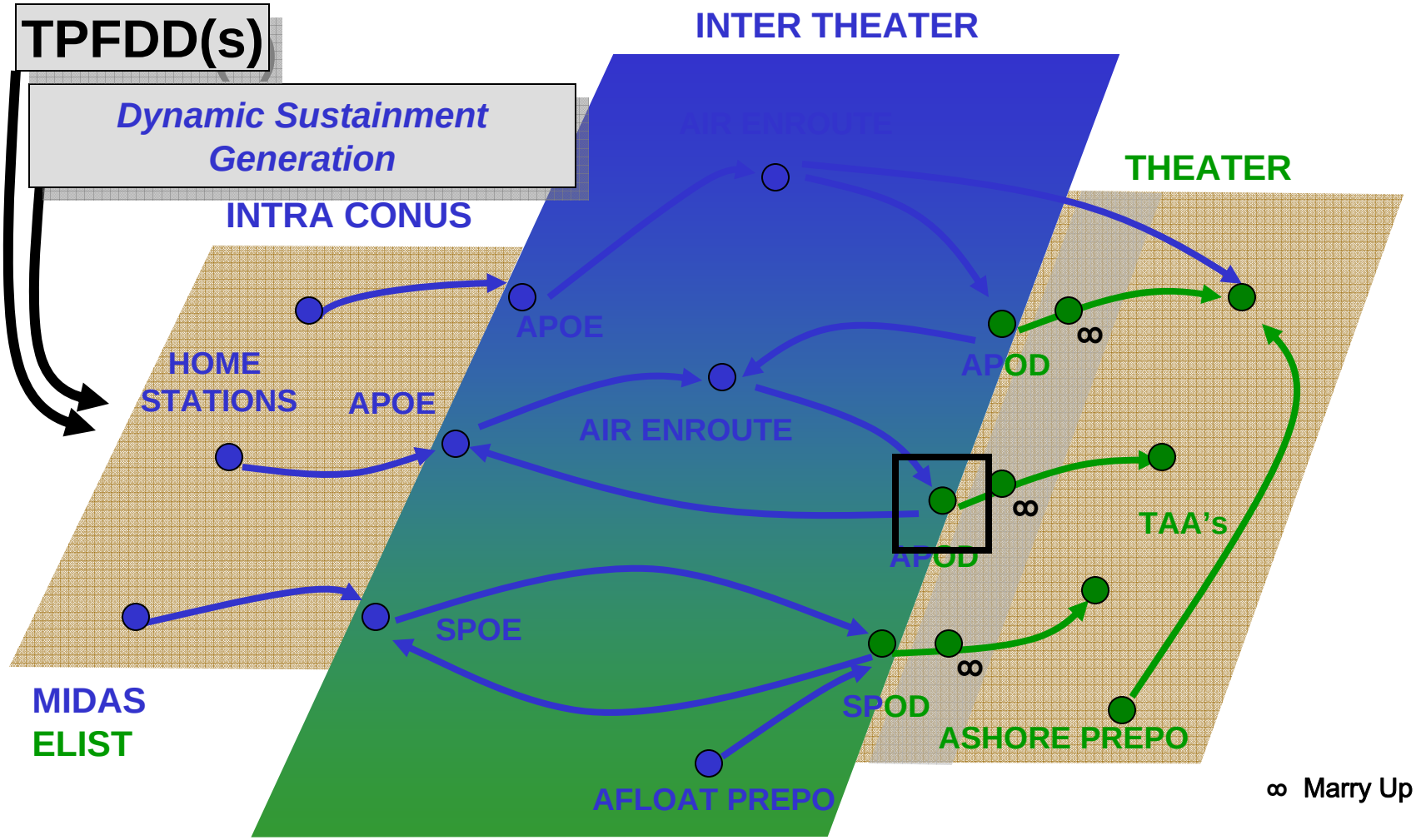


- Was a serial integration
- Strategic model requests movements to POEs based on mode selection
- CONUS ELIST provided detailed – resource constrained flow
- Provides arrivals at POE for air/sea loading

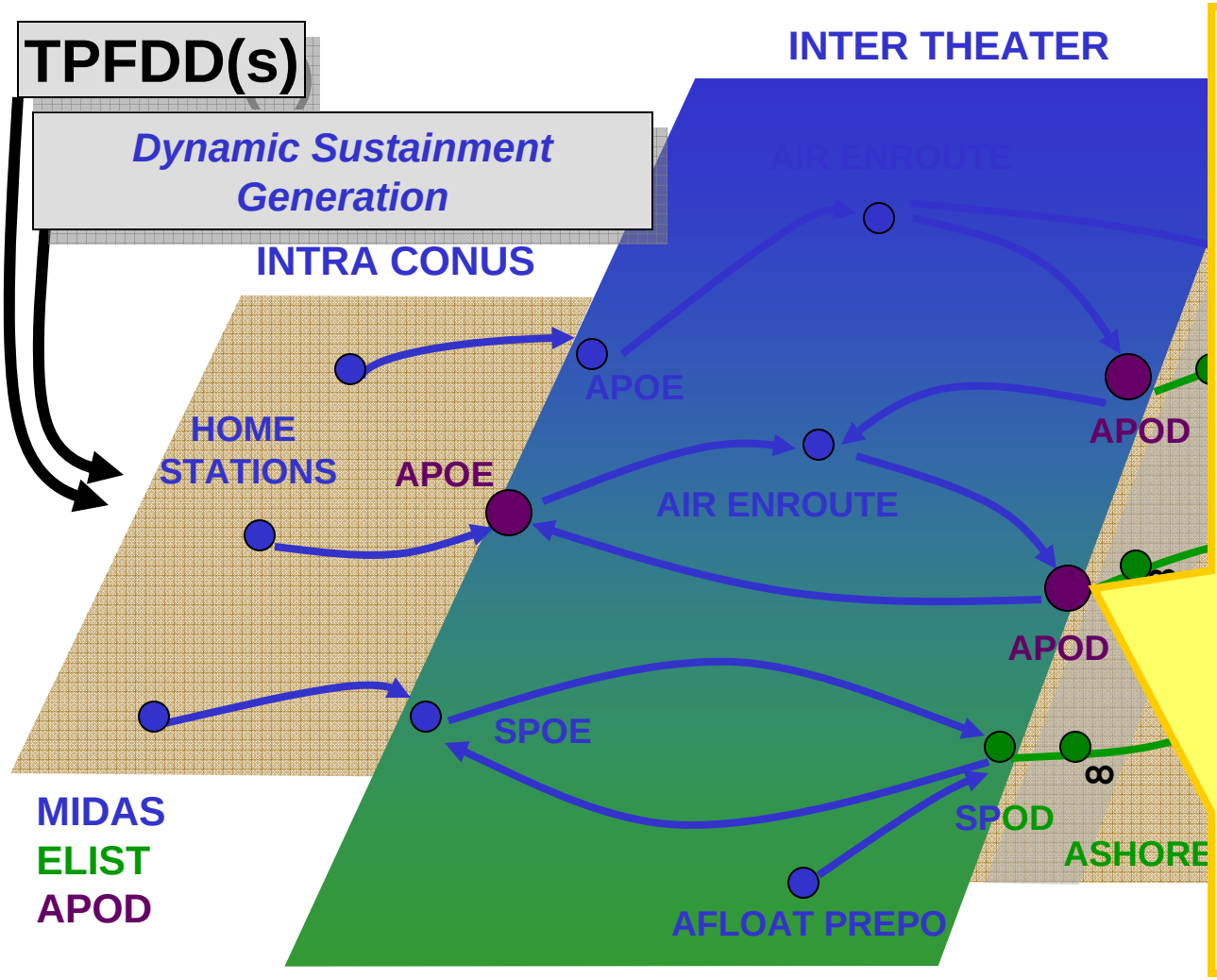
ELIST: Detailed CONUS Distribution Modeling

AMP Modeling Functionality - 2006



ELIST: Detailed Theater Distribution Modeling

AMP Modeling Functionality - 2006



QuickLook Tools

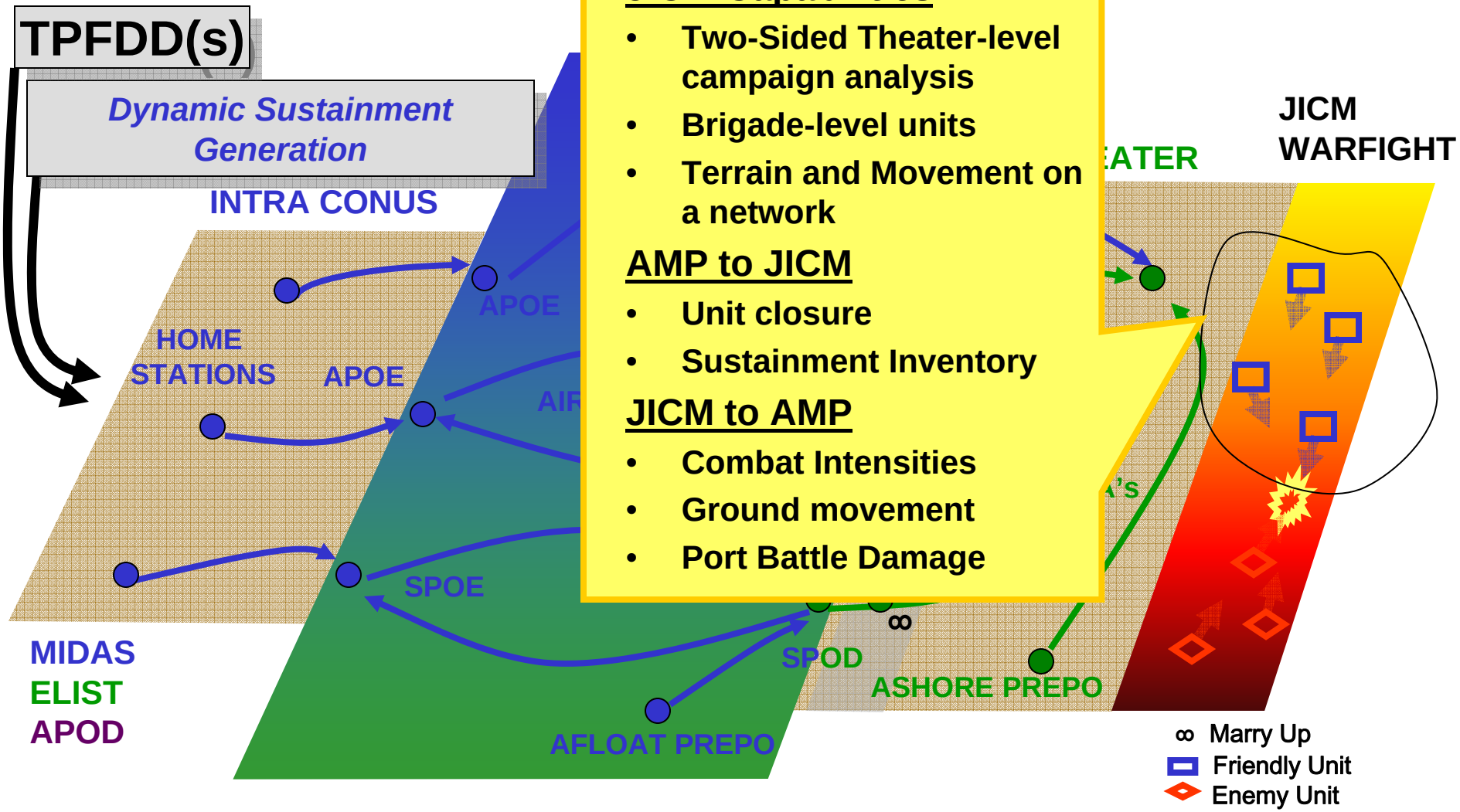
- Identify Limiting Factors for Airport Throughput
- TPFDD Requirements vs. Capabilities analysis

Detailed Simulation

- Refueling: hydrants, pipelines, fuel stands, and fuel storage
- Resource Modeling: Maintenance, Material Handling Equipment (MHE) and Personnel
- Cargo: onload/offload, cargo holds, staging areas
- Utilizes enablers arriving with unit movements
- Handoff to theater air and surface transportation

APOD: Detailed Airport Modeling

AMP Modeling Functionality - 2007



JICM Capabilities

- Two-Sided Theater-level campaign analysis
- Brigade-level units
- Terrain and Movement on a network

AMP to JICM

- Unit closure
- Sustainment Inventory

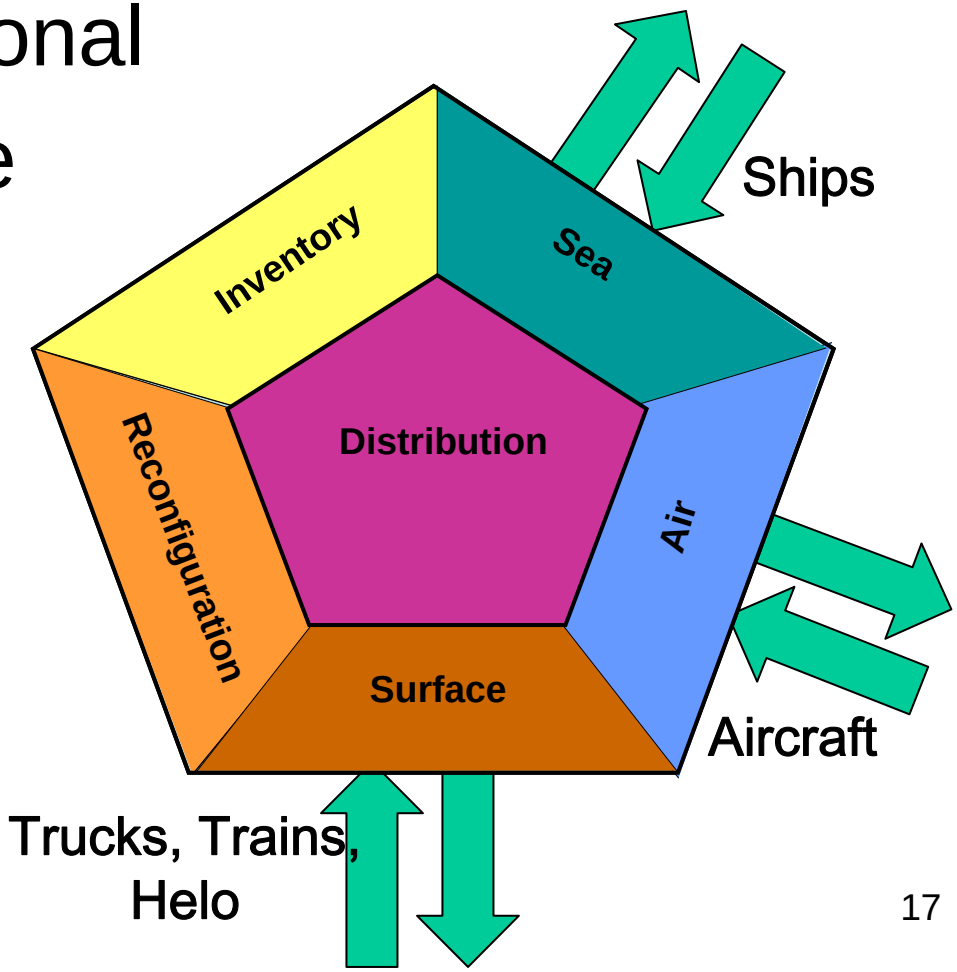
JICM to AMP

- Combat Intensities
- Ground movement
- Port Battle Damage

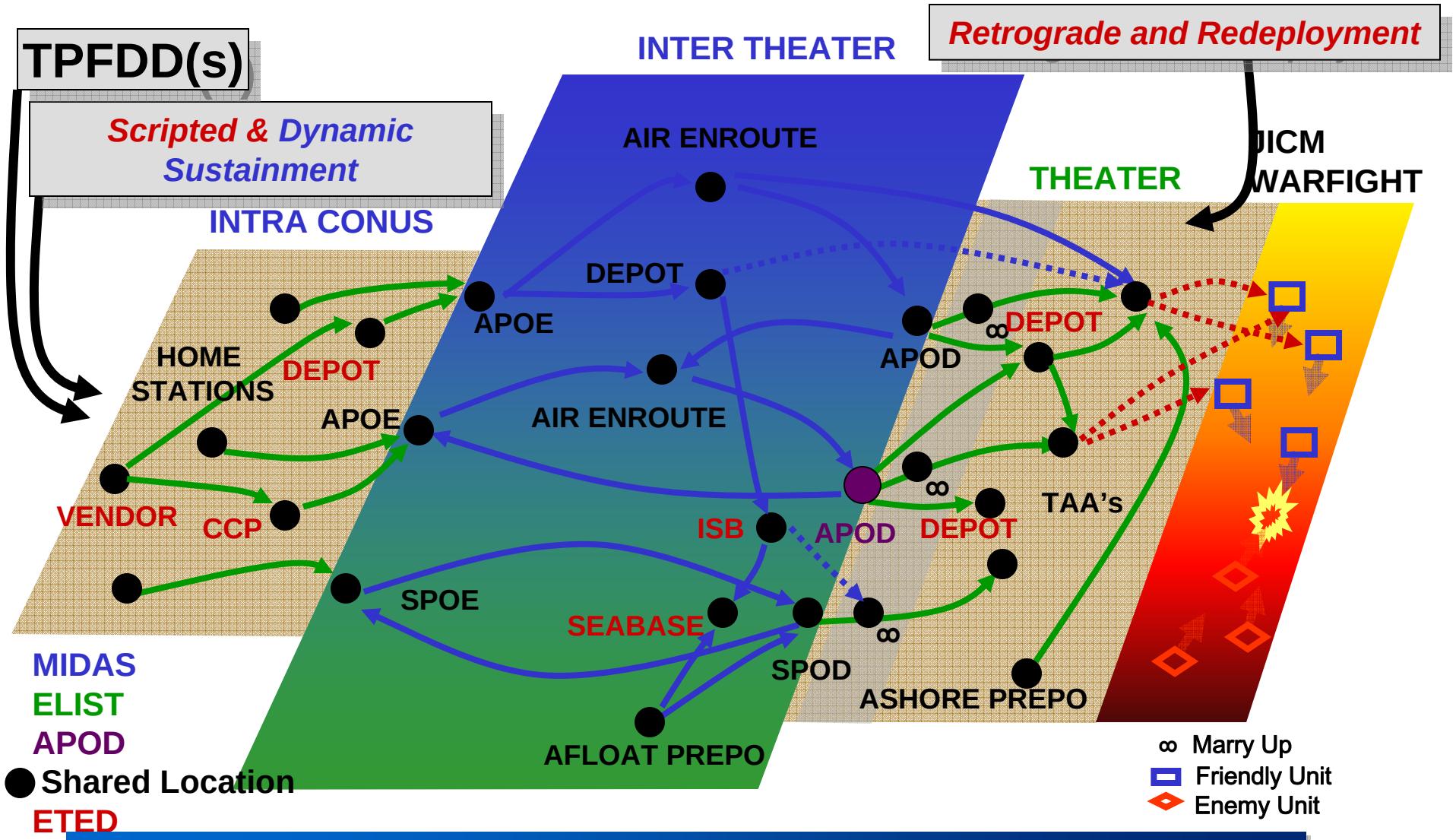
Dynamic Feedback from the JICM Warfight Model

ETED Configurable Location Models

- Node comprised of various functions
- Each part is optional
- Each part can be at various levels of aggregation

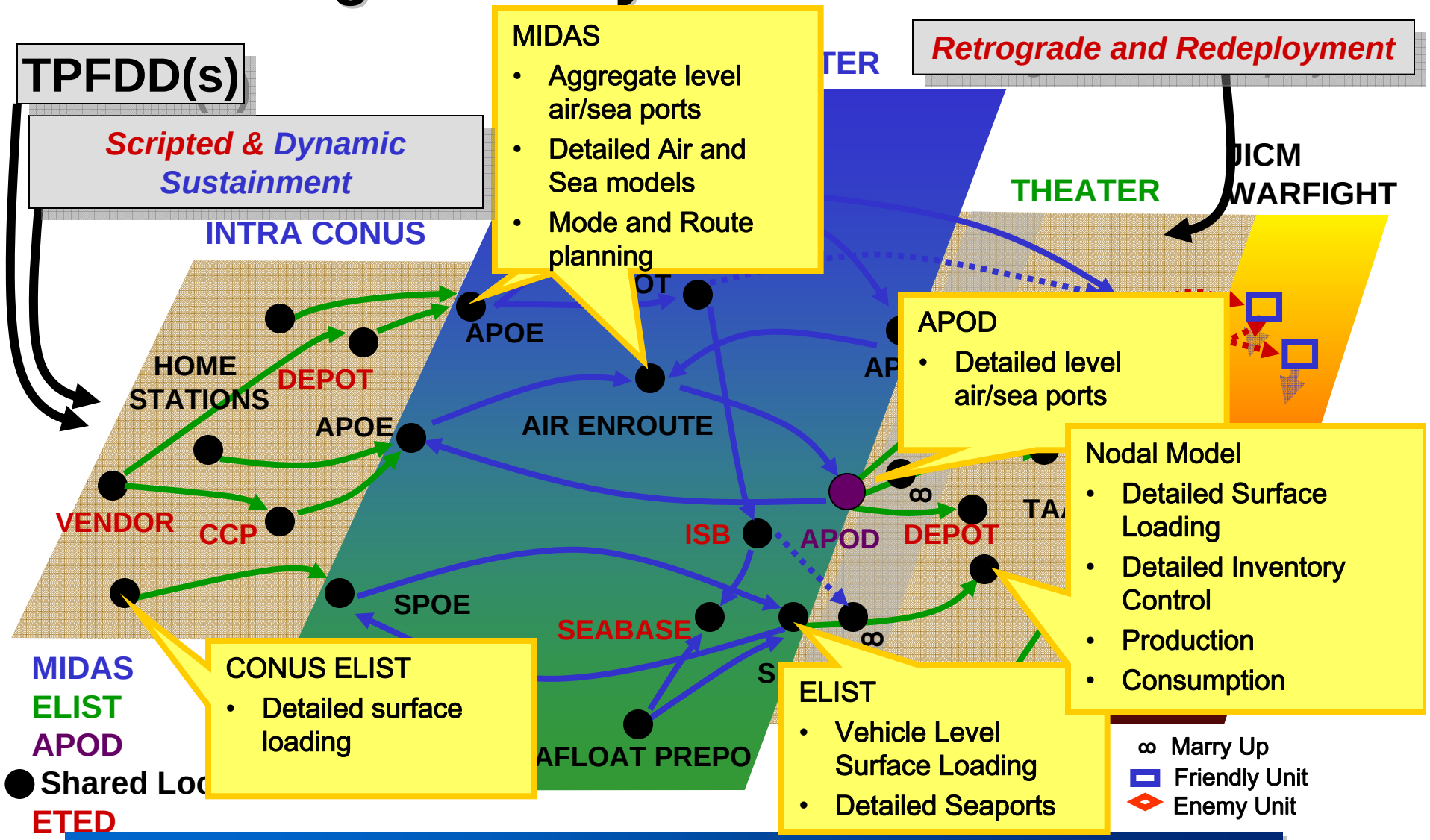


End-to-End Distribution Functionality 2007-2008



ETED Federation: Models Distribution Concepts

End-to-End Distribution Plug and Play – Levels of Detail



ETED Federation: Model Granularity

ETED Transformation of Models

Deployment | Transportation | Distribution

- Expanding the Modeling Fidelity in Three areas to include DPO Concepts
- Expand the modularity of the Composite Federated Model to accommodate new process-focused models

ETED Transformation of Models

Deployment | Transportation | Distribution

- TPFDD-based deployment
  - Use of Multiple-TUCHA's to specify configuration alternatives for Air and Sea
    - Basic load on organic vehicles
    - Loaded containers (sea) and pallets (air)
  - Extended movement schedule beyond TPFDD Destination (RSOI)
- Non-Unit cargo requirements
- Simulate movement at Level 4

ETED Transformation of Models

Deployment | Transportation | Distribution

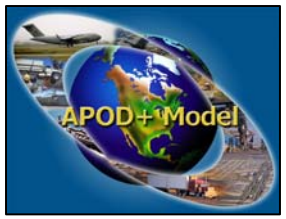
- Configuration Effects:
  - Surface loads are restricted by cargo dimensionality
  - Loading of airlift and sealift to include dimensionality constraints
- Platform modeling
  - E.g. pallet, container, JMIC, JMIP
  - Limited availability and retrograde flow

ETED Transformation of Models

Deployment | Transportation | Distribution

- Unit-based Multi-Echelon Sustainment
  - Production and Consumption are modeled at the units
  - Units are not stationary during the run
- Resupply Configuration
  - Configurations defined for transportation
  - Re-configuration constraints modeled at nodes
- Inventory Management
- Stochastic Sourcing

Summary



- AMP Integrated Analysis Environment
  - Used by:
    - USTRANSCOM J5/4, JDPAC
    - SDDC-TEA
    - OSD
    - Joint Staff J4, J8
    - CAA
- E2E Distribution Modeling R&D Effort is expanding the modeling scope to DPO
  - Agile development
  - Modular and plug-and-play architecture for the Editing, Modeling, and Analysis tools.
  - E2E Distribution Model will be ready to adapt to future JDDE M&S needs.

Designed for Productivity, Flexibility, and Scalability