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Process Documentation and Execution:

Introducing A Tool to Support Analysis of Alternatives

Thomas A. Dufresne and Robert L. Turner

Presented to the Military Operations Society Symposium

CG C Joint Warfare, WG 17 Joint Campaign Analysis

23 June 2005

US Military Academy

West Point, NY

Problem Statement

Develop software tools to support analytical data preparation processes:

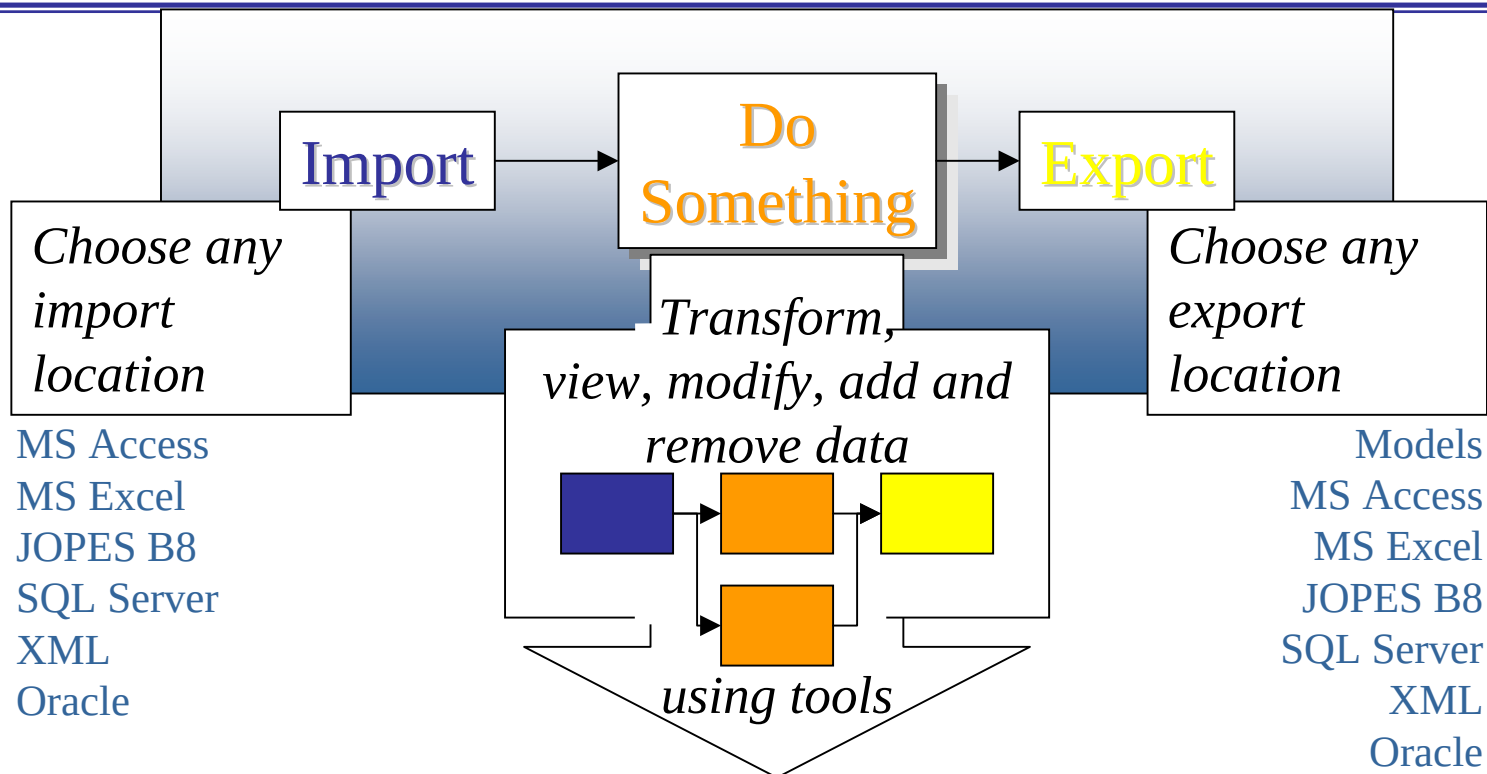
- Populate authoritative databases
- Prepare data for analysis
- Post-process model output

What features would you like to see in these tools?

- Usability
- Reliability
- Flexibility
- Transparency
- Repeatability

Introducing...

Process Execution Tool

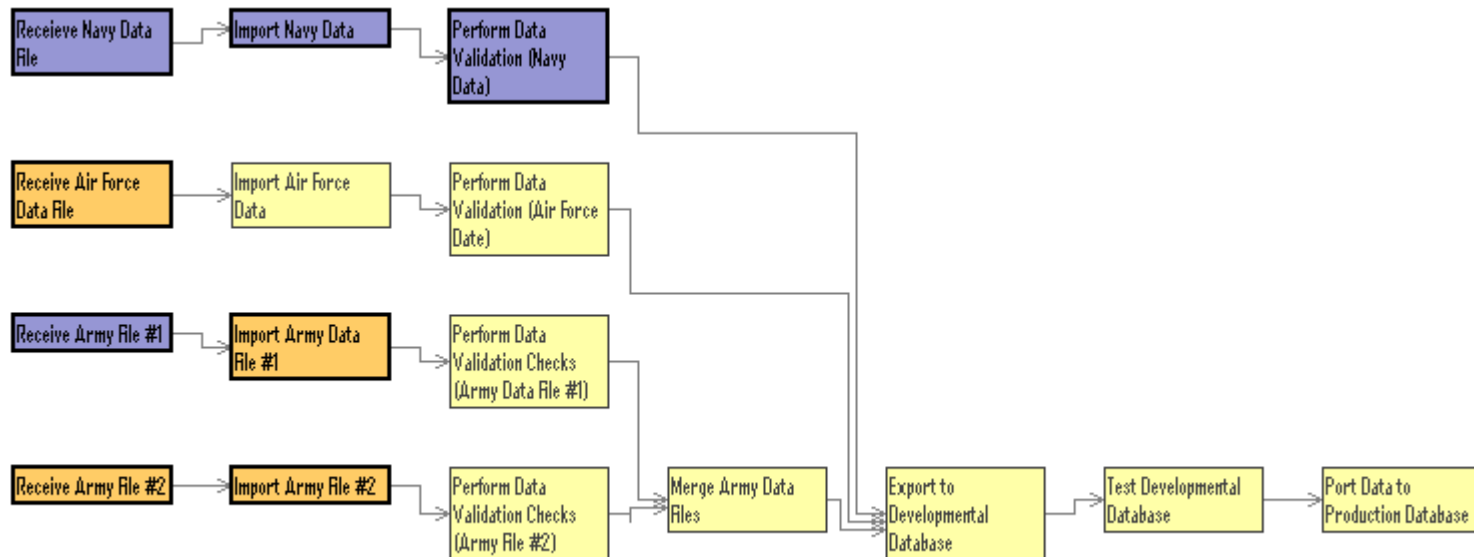


Order Of Battle - Unit - Transform - Surrogation – GeoDataViewer - TPFDD



Process Execution Tool (PET)

- PET is analogous to Microsoft Project.
 - A graphical display of the tasks/steps in a data preparation process.
- PET goes a step further than MS Project by supporting the execution of process steps.
- Process steps are assigned tools (Step Tools), which complete or support the completion of the step.

[illegible]

Step Tools

Step Tools come in three flavors:

- Generic data manipulation tools
 - To import data: **Data Mapper**
 - To filter, merge, modify, and export data: **Transform Tool**
 - To create translation tables: **Surrogation Tool**
- Entity specific data editors
 - To create and edit units: **Unit Tool**
 - To create and edit Orders of Battle: **OOB Tool**
 - To view and edit entity locations: **GeoData Viewer**
 - To view, edit, and convert TPFDs: **TPFD Generator**
- External applications
 - **COTS / GOTS software**
 - **Your own custom built applications**

Process Execution Tool (PET)

PET should be useful for projects or processes with:

- Many complexly sequenced steps (JWARS TFPD)
- Multiple data sources (CFDB)
- Multiple data output formats (JICM)
- Multiple analysts (MCS)
- Extended Duration (Analytical Baseline)
- Changing requirements

Just about everything we do.

PET Functionality

Three Levels of Functionality: Process Administrator, Analyst, Observer

- Administrator Functionality:
 - Create Process - Adding and Sequencing Steps
 - Assign Step Tools
 - Assign Step Validation Rules
 - Designate Automatic Steps
 - Establish Connections to Source Data
 - Define Transformations
 - Assign Analysts to Steps
 - Monitor Execution and Inspect Intermediate Data Products
 - Add / Modify / Delete Steps During Execution
- Analyst Functionality:
 - Inspect Intermediate Data Products and Data Validation Results
 - Work on Assigned Steps
 - Enter Step Execution Comments
- Observer Functionality: Monitor Process

Benefits of Using PET

To Populate Authoritative Databases:

1. Provide visibility into process completion.
2. Automate data consistency checks.
3. Improve process efficiency.
4. Document the process.

Benefits of Using PET

To Post-Process Model Output:

1. Facilitates correlation of output data elements within a run.
2. Facilitates comparison of output data between runs.
3. Provides framework for automating MOE calculation and chart generation.
4. Document the Process

Benefits of Using PET

To Prepare Data for Analysis:

1. Facilitates controlled modifications for analysis of alternatives.
2. Facilitates extending analysis using consistent common data
3. Document the process.

Example Data Preparation Process

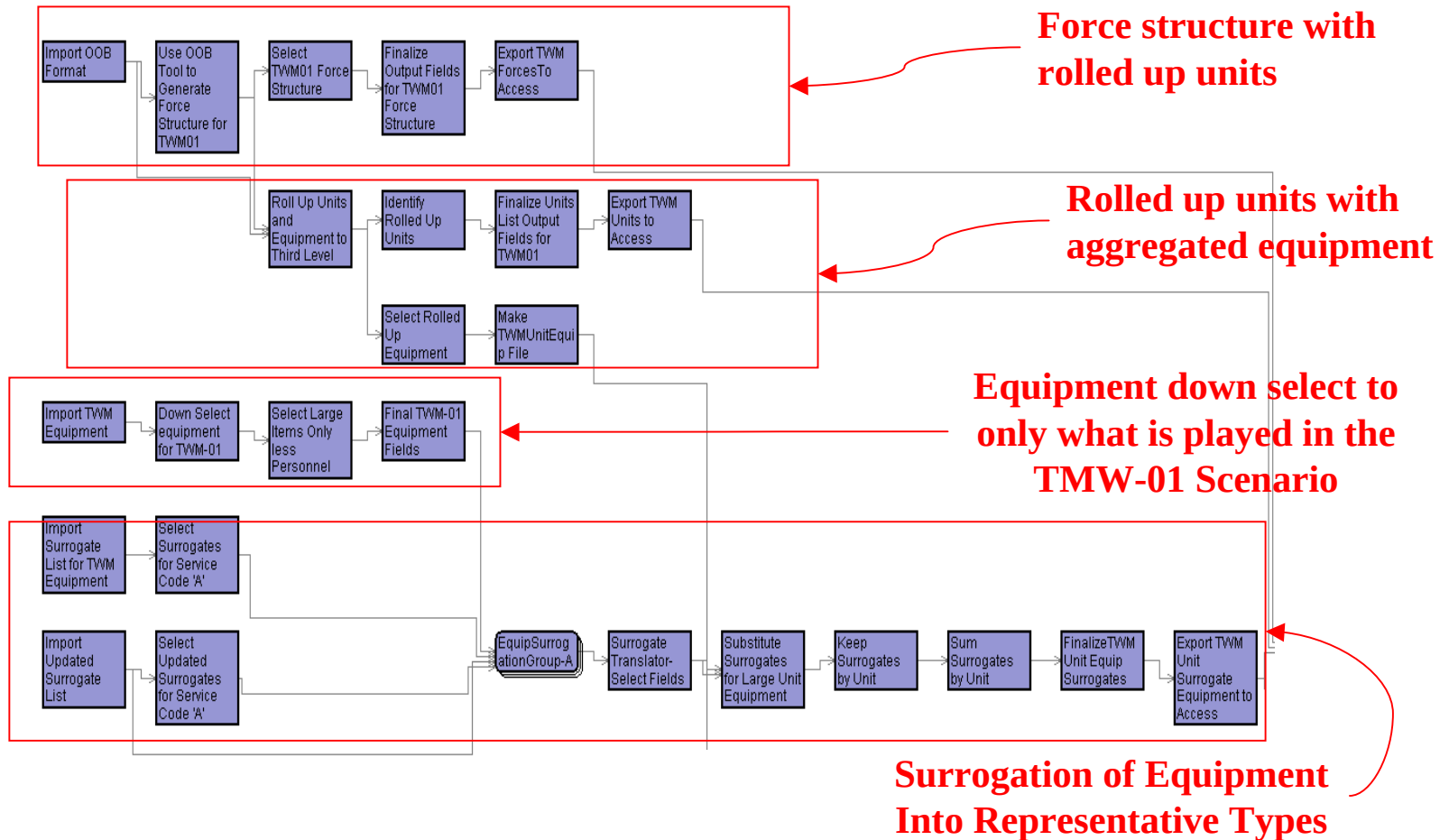
Tidal Wave Mitigation (TWM) A Case Study using the Process Execution Tool

The Case Study and the sample data is available
on the provided CD

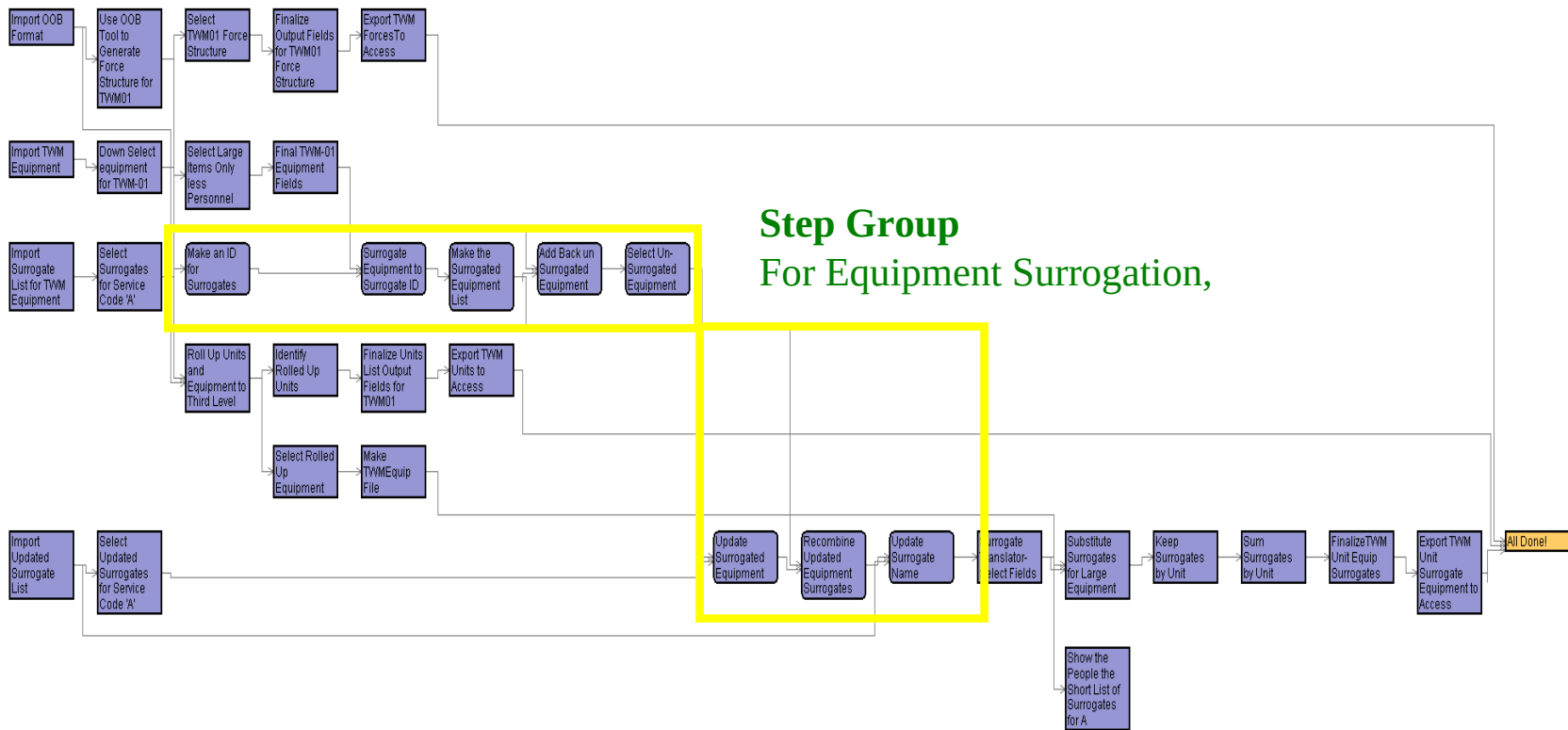
The Case Study ...

- Demonstrates the overall use of PET from data import to data export.
- Demonstrates the benefits of using PET for managing the development of analysis datasets.
- Is based on an entirely fictional and unclassified scenario and unclassified data.
- Consists of a few...

...simple steps...

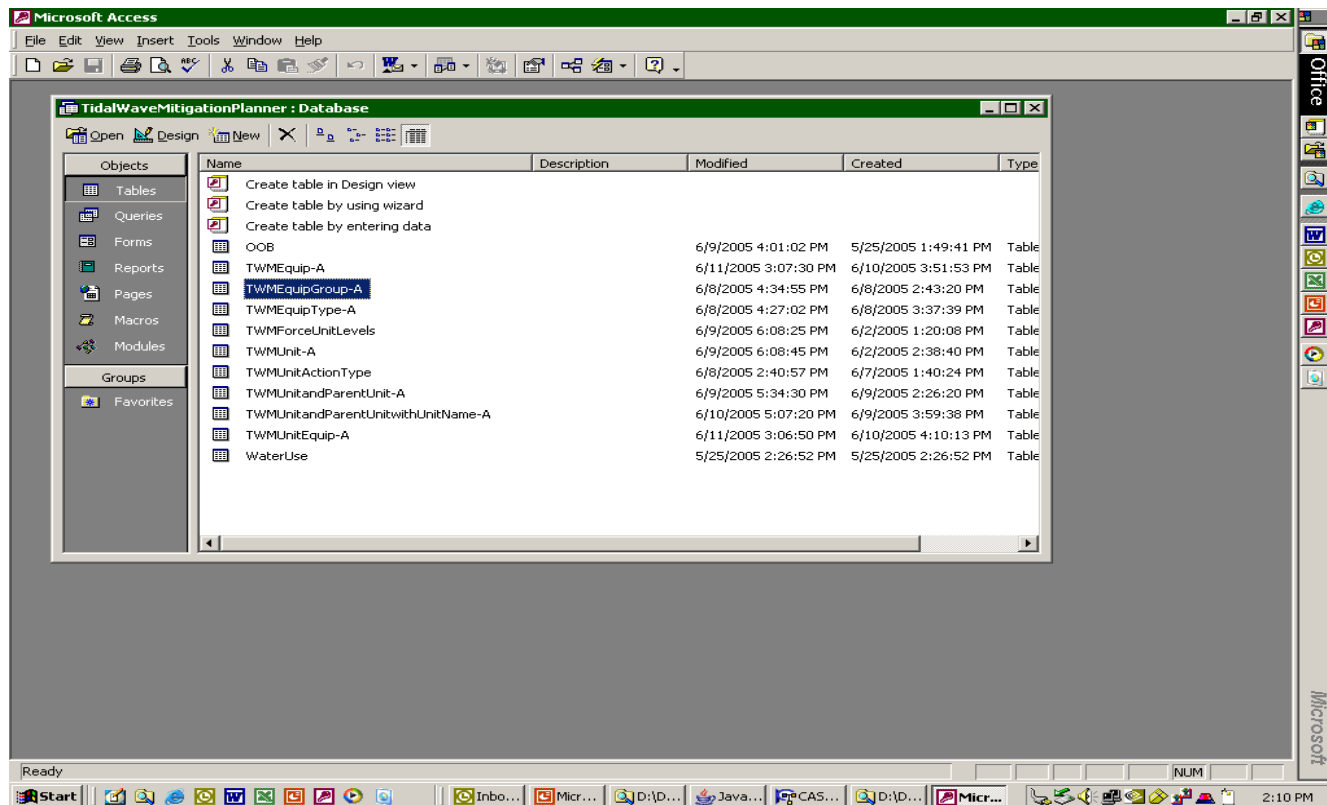


...plus a few more...



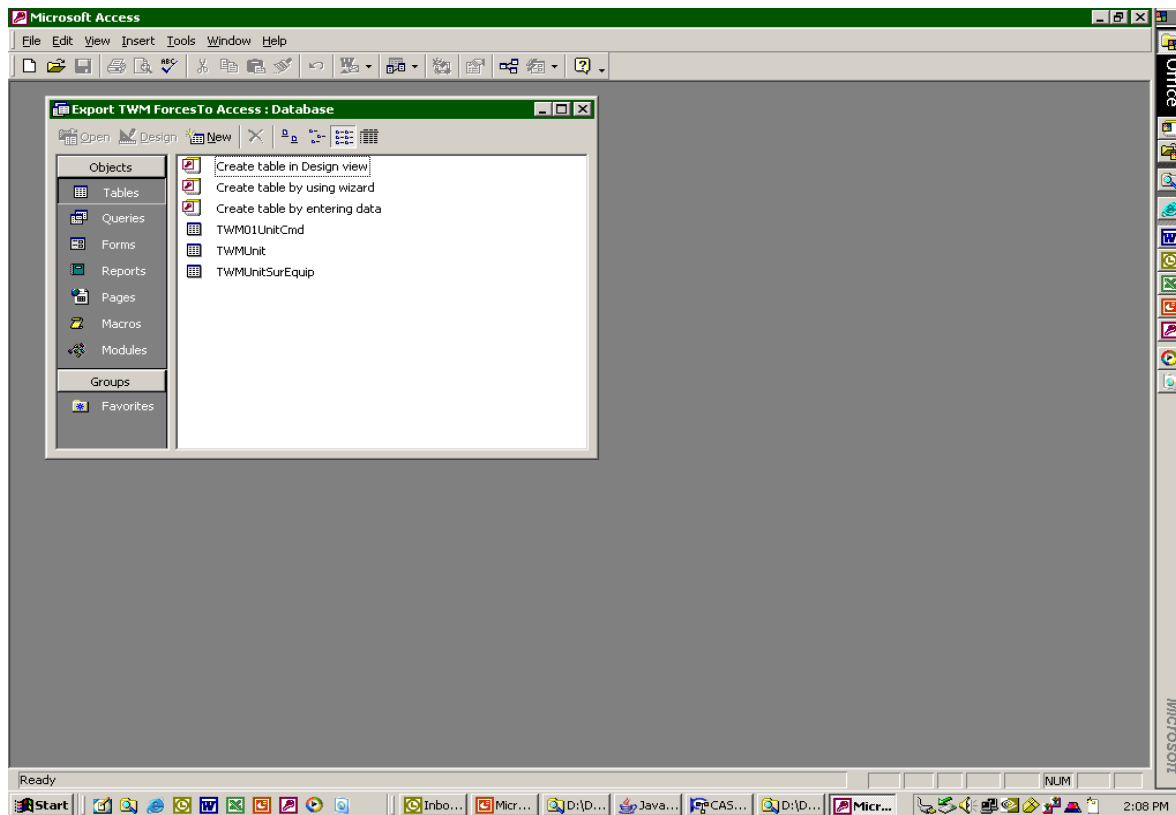
Initial Data

Force List, Tables of Equipment, Equipment Characteristics



Output Data

Playable units and equipment



Case Study “Results”

- Build the process:
 - 1-2 days to build 34 step process.
- Execute the process – build the base case:
 - Less than 2 hours
- Generate excursion data set:
 - Duration depends on the extent and location of changes
 - Assertion – can be done faster and more reliably with PET

Questions?

Updates and Feedback

- SourceShare: <https://sourceshare.pae.osd.mil>
collaborative software development site (registration required)
- Send Comments to:
 - Thomas.Dufresne@osd.mil