Rapid Airfield Construction Decision Support Toolset

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Introduction

- One of the greatest challenges to the U.S. Army's Rapid Deployment concept is how to get large amounts of equipment on the ground in a short period of time

Really Quick!

JRAC Mission

- To meet the goal of rapid deployment as well as improve existing Army's airfields, the U.S. Army Corps of Engineers, Engineer Research & Development Center (ERDC) spearheaded the creation of the Joint Rapid Airfield Construction (JRAC) mission to "Deploy anytime, anywhere"

JRAC Research Pillars

Site Selection

Enhanced Construction

Rapid Stabilization

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Rapid Airfield Construction Decision Support Toolset

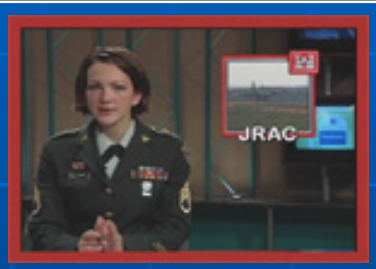
Develop a ArcGIS tool to rapidly assess site potential for contingency airfields using geo-referenced remotely sensed data employed in a DoD common operation environment.

JRAC

Joint Rapid Airfield Construction

Contingency Airfield Engineering Solutions

JRAC News | Project Spotlight | Links & Downloads



The JRAC program was recently featured on the Armed Forces Television Network's *Army Engineer Update* segment. View video.

"Four Days To Touchdown" is the *Site Prep Magazine* article featuring the JRAC 2004 Demonstration. View article.

"Technology In Construction" is the name of the article featured in Construction Magazine. View article.

Dr. Gary Anderton Project Manager for JRAC wrote an article for The Society of American Military Engineers (SAME). View article.

JRAC in the Outback 2007 - The JRAC team is working on plans for the 2007 final demonstration exercise currently scheduled to take place at the Bradshaw Field Training Area in Australia's rugged Northern Territory. More details coming soon.

The RAVEN or Rapid Assessment Vehicle Engineer is a powerful JRAC product that provides numerous capabilities. View fact sheet.

2005 Researchers Meeting Presentations have been posted. Click here for presentations

Download the JRAC Marketing Video

The new JRAC work unit plan for FY06 has been posted. Click here to view the work unit plan

The JRAC Overview presentation gives the overall mission for JRAC. Click here to view the PDF file

View the JRAC archives for previous year web postings Click here to view the JRAC archives

View the JRAC products page to see reports and other documents. Click here to view the JRAC products

Updated JRAC Web Site
https://jrac.erdc.usace.army.mil

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RACDST Applications

- **Area Suitability Assessment**

  Designed to assist a user during the planning process to determine the best candidate sites for the development of a single airfield template.

- **Airfield Construction Analysis**

  Evaluate candidate sites by positioning a airfield template and determining which sites provide the best results that minimize cut-fill requirements.

- **Engineer Operations (ENOPs)**

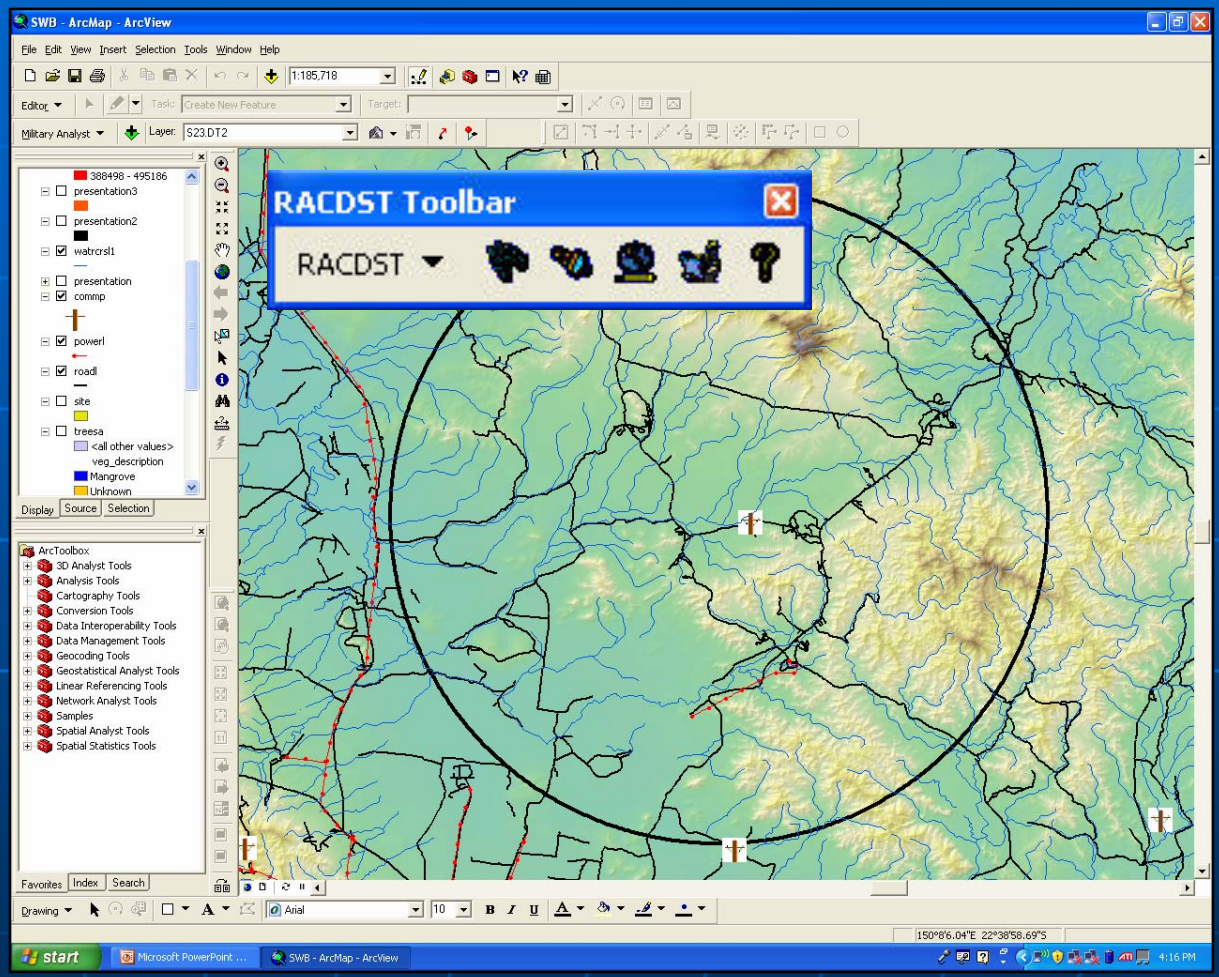
  Designed to provide a first order estimation of operation effort of airfield construction/upgrade/repair.

Software Requirements

- ArcGIS 9.2 sp2
- ArcView Level License
- Spatial Analysis
- .Net 1.1 Framework
- Java Runtime Environment Version 5.0

Area Suitability Assessment

RACDST is designed to work as an extension to ArcGIS Version 9.2, Service Pack 2. It is launched from a toolbar within ArcMap.



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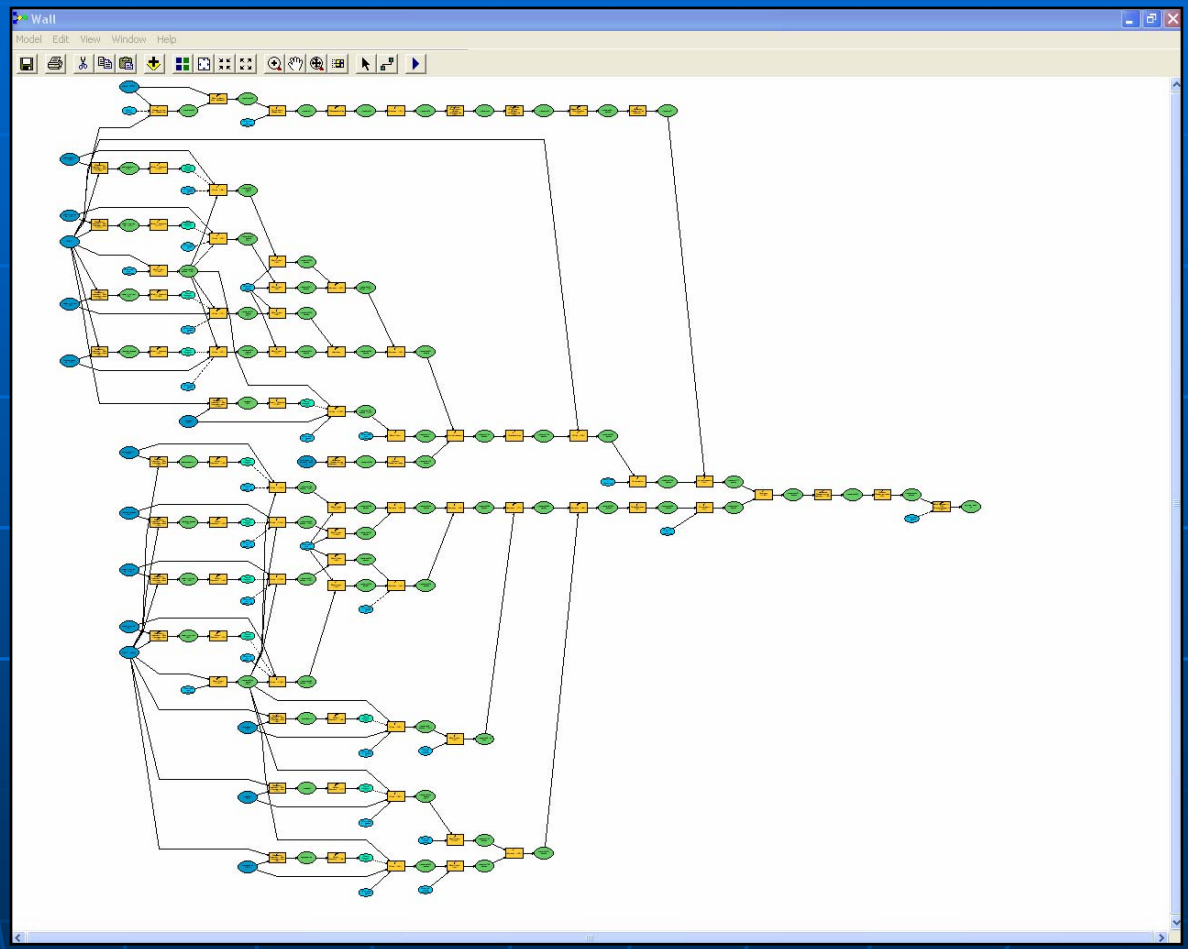
ArcMap Model Builder

ModelBuilder interface provides a graphical modeling framework for designing and implementing geoprocessing models that can include tools, scripts, and data. Models are data flow diagrams that link together a series of tools and data to create advanced procedures and workflows.



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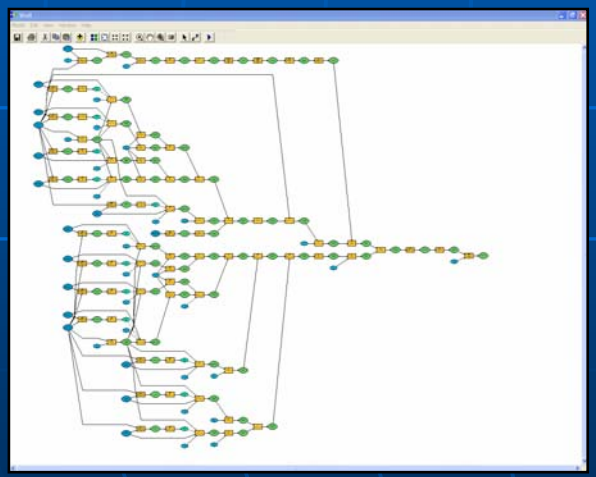
RACDST Script

- Completed model exported as a Visual Basic or Python Script.



final - Notepad

File Edit Format View Help

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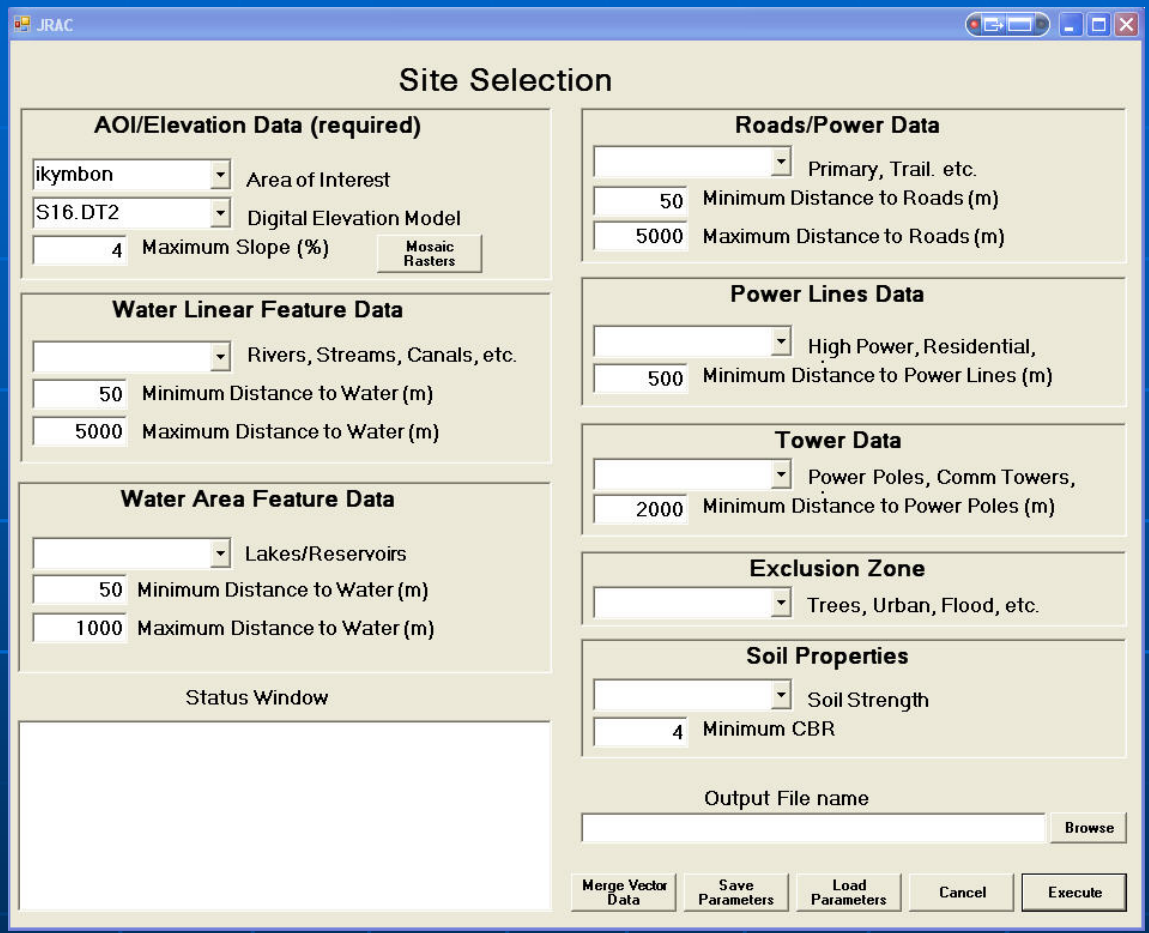
```

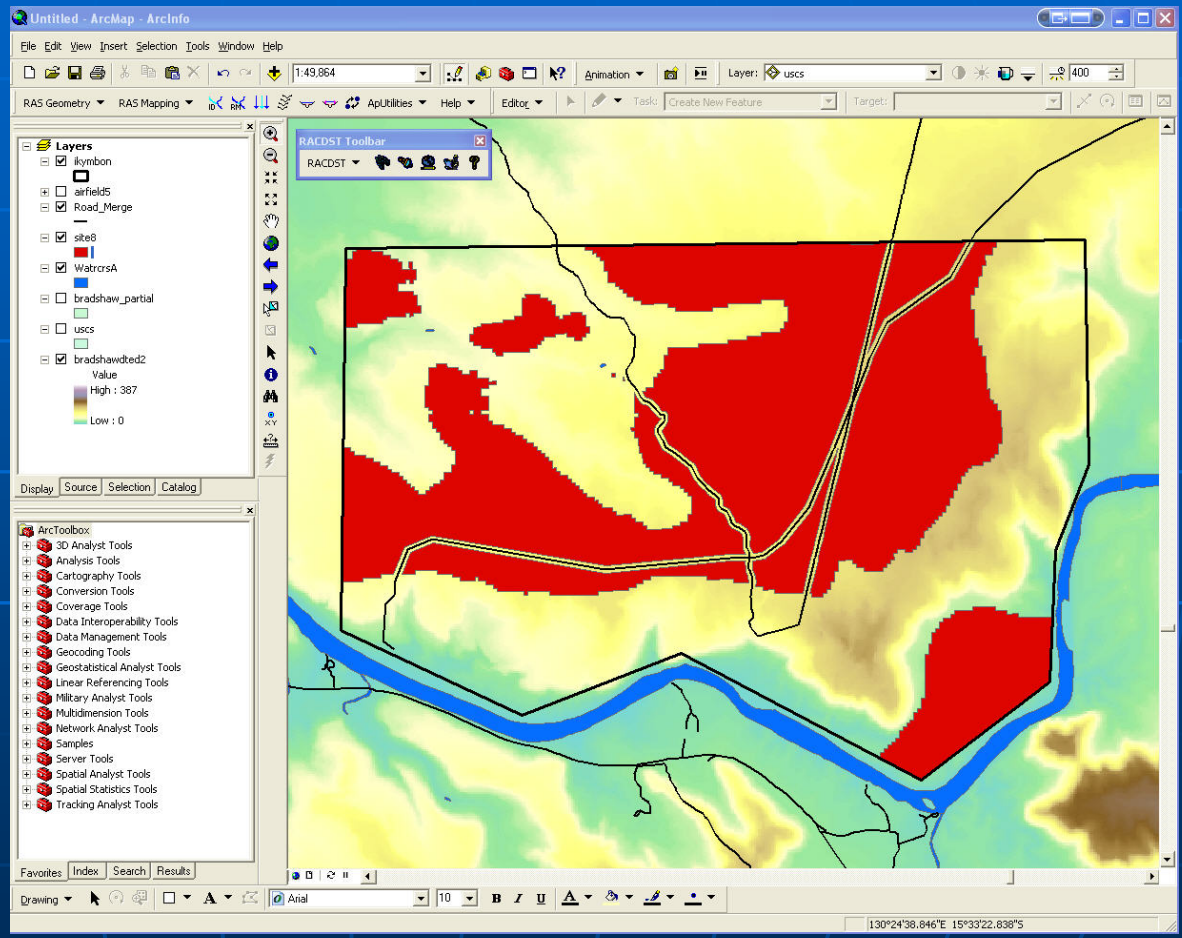
Area Suitability Assessment(GUI)

Exporting the model to a VB script allows for more flexibility to be added to the site selection module. The site selection GUI is launched from the RACDST toolbar.



Area Suitability Assessment Results

- 3% slope
- 4 km proximity to roads
- Void of trees
- 5Km away from power lines and towers



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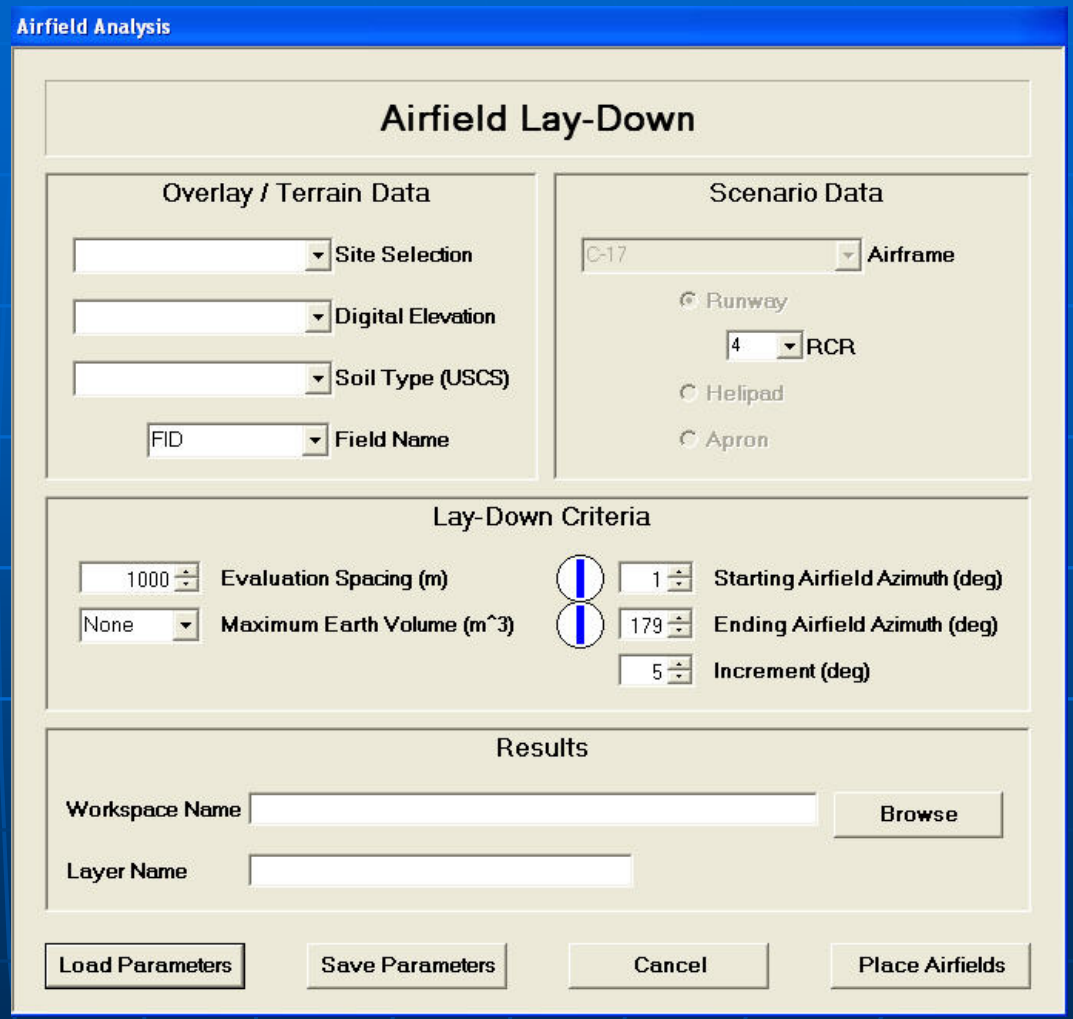
Airfield Laydown

A three dimensional analysis is performed of the cut-fill earth volume and area required to emplace a runway feature.

Airfield Laydown GUI

- Site Selection Data
  Output from Site Selection Component or other polygon layer
- Elevation Data
  Higher Resolution DEM
- Airfield Spacing
- Airfield Azimuth
- Runway Construction Rating
- Maximum Volume



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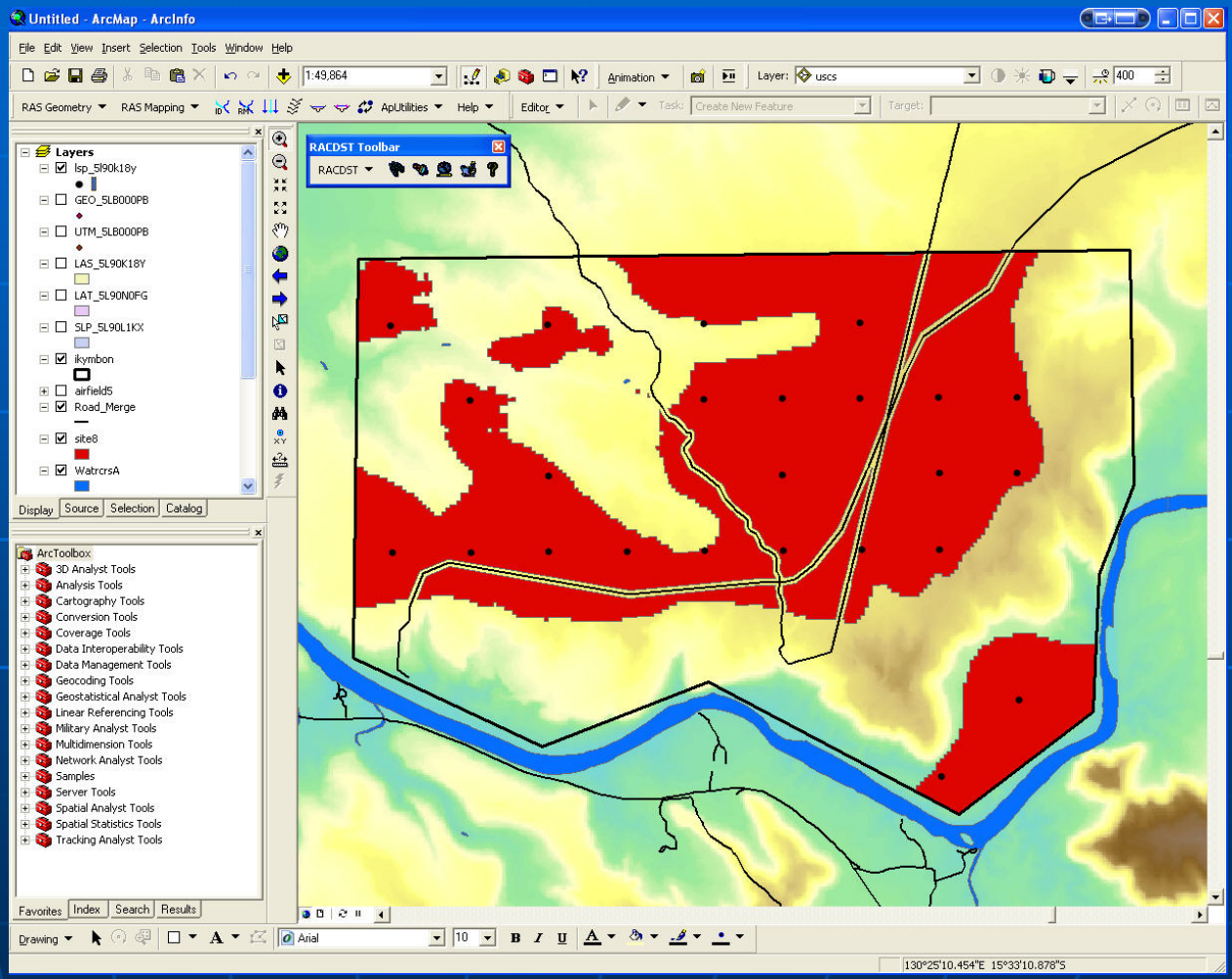
Locate Airfield Sites

- 1000 meter spacing of potential airfield sites



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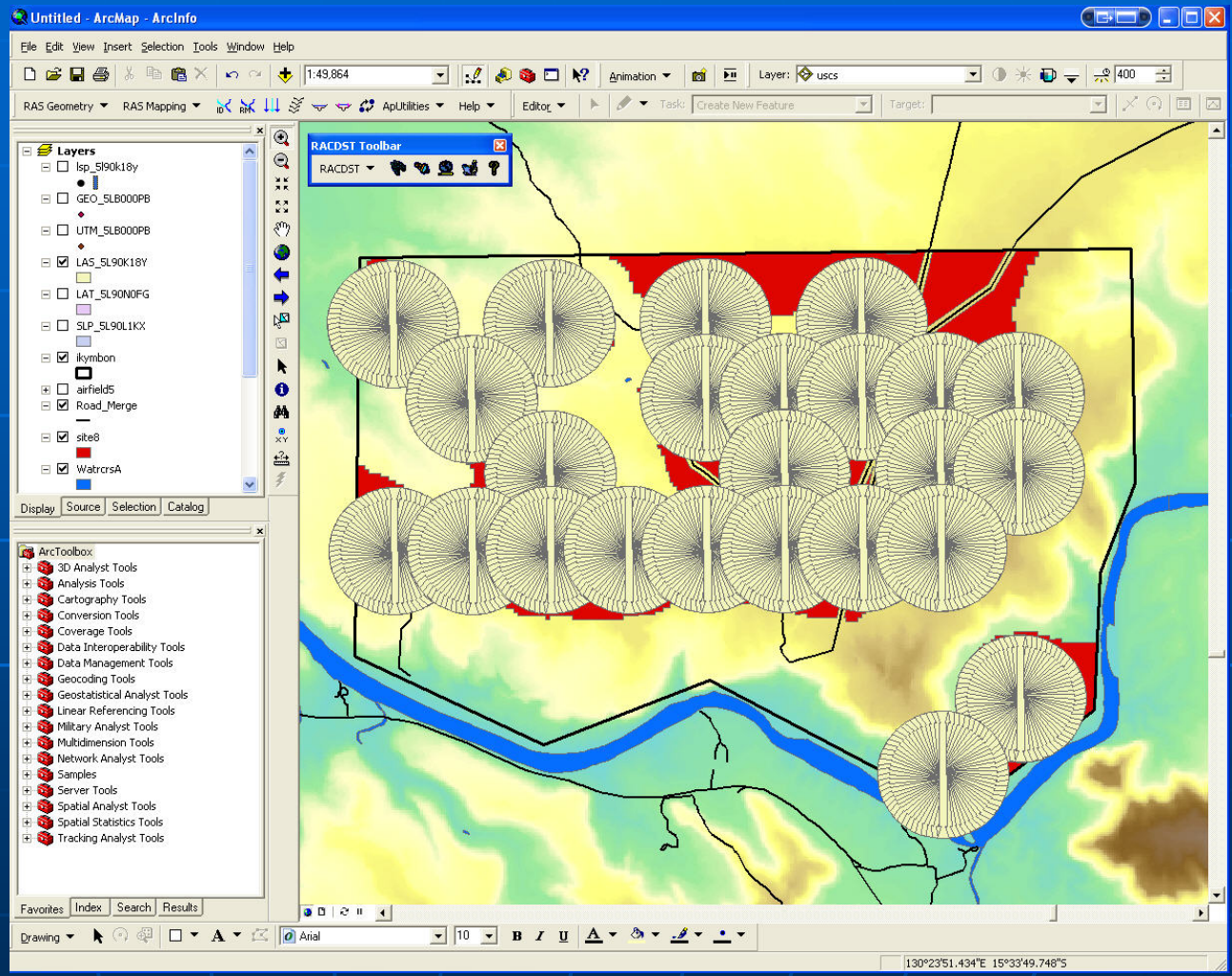
Build Airfields

- Starting Azimuth 0
- Ending Azimuth 179
- Increment 5 Degrees
- RCR 4



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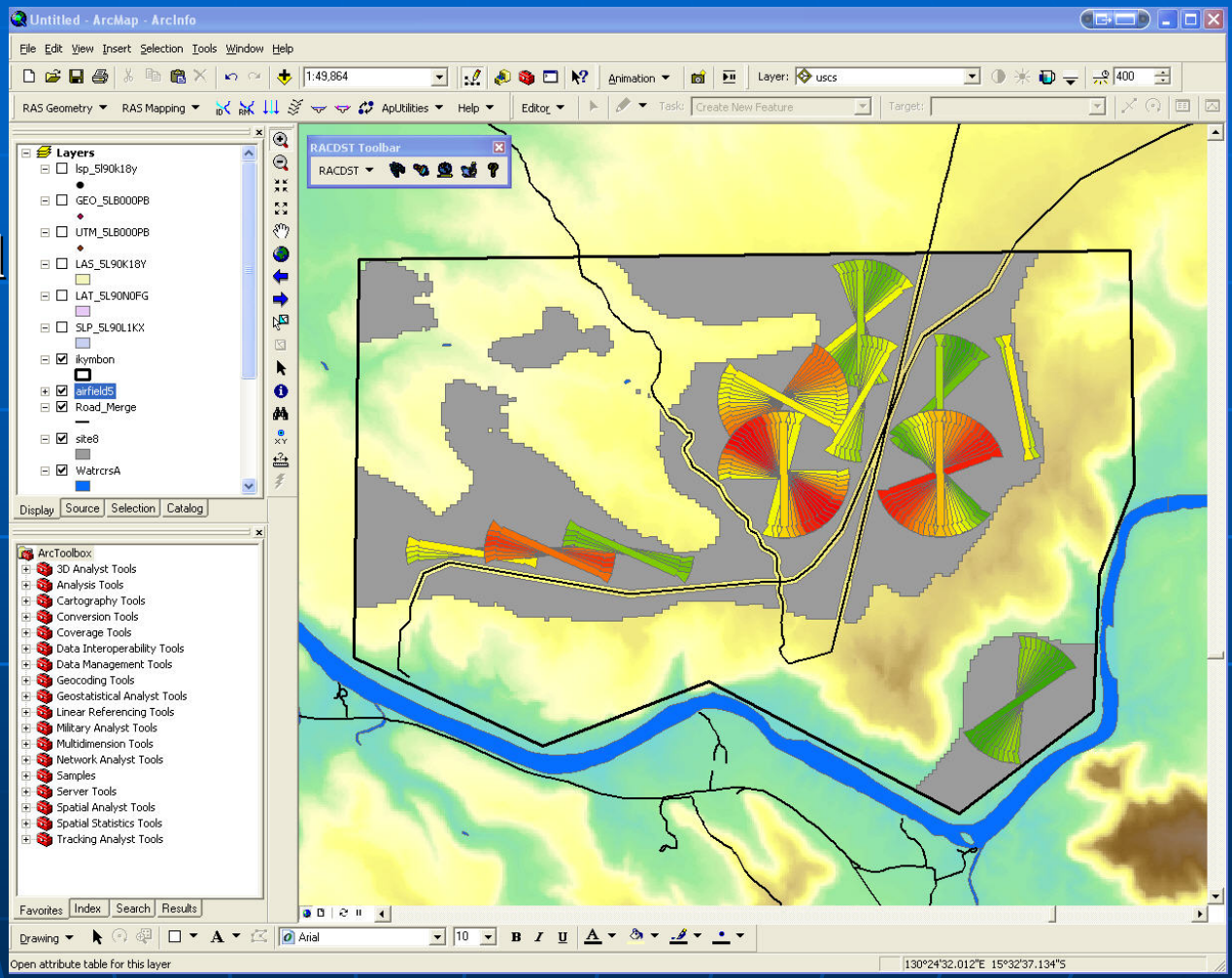
Airfield Sites

- 127 sites
- Airfield contained within site layer
- Cut/Fill requirements less than 500,000 cubic yards



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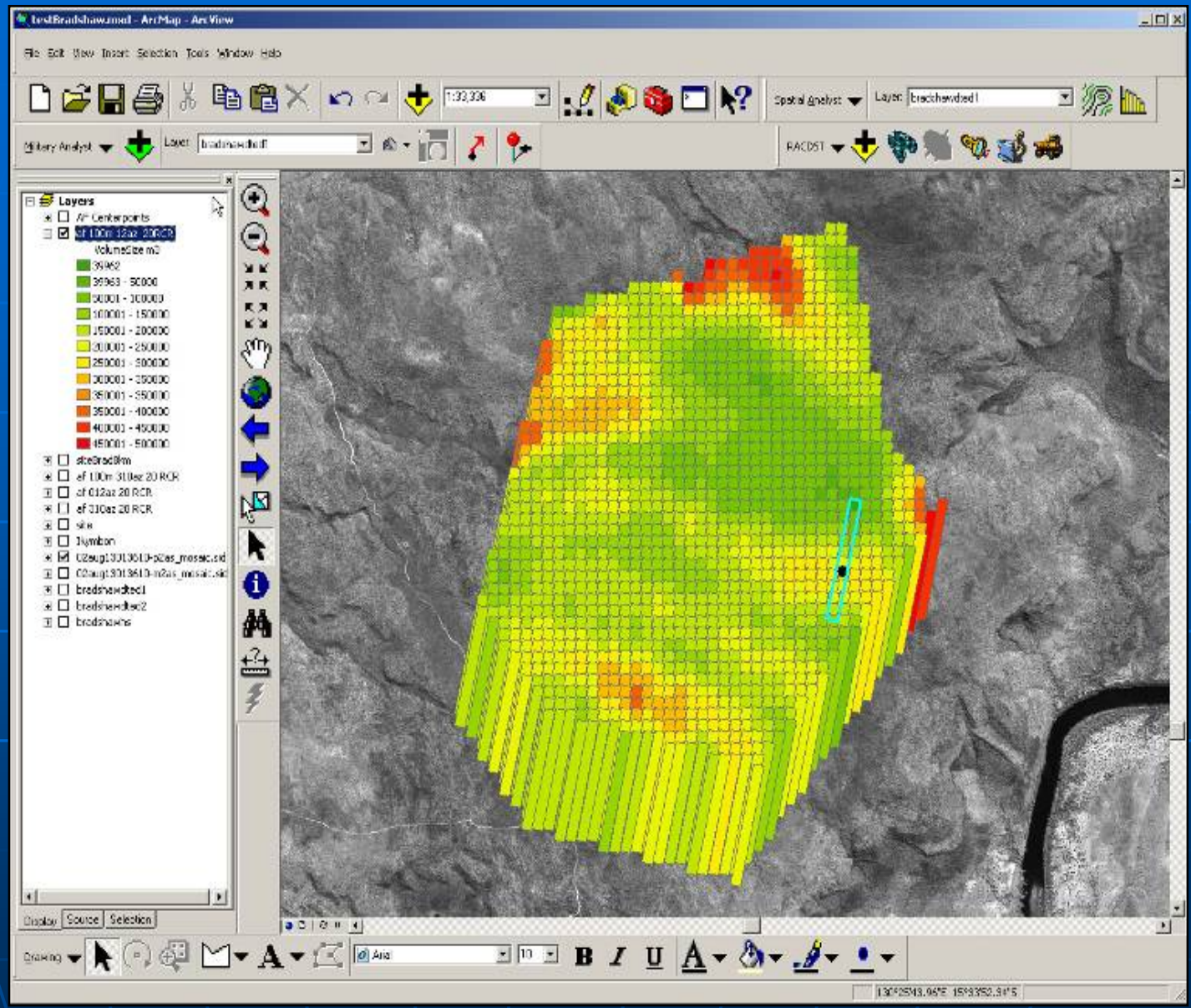
1. 100 Meter Separation
2. 12 Degree Azimuth
3. RCR = 8
4. Maximum Volume 1,000,000



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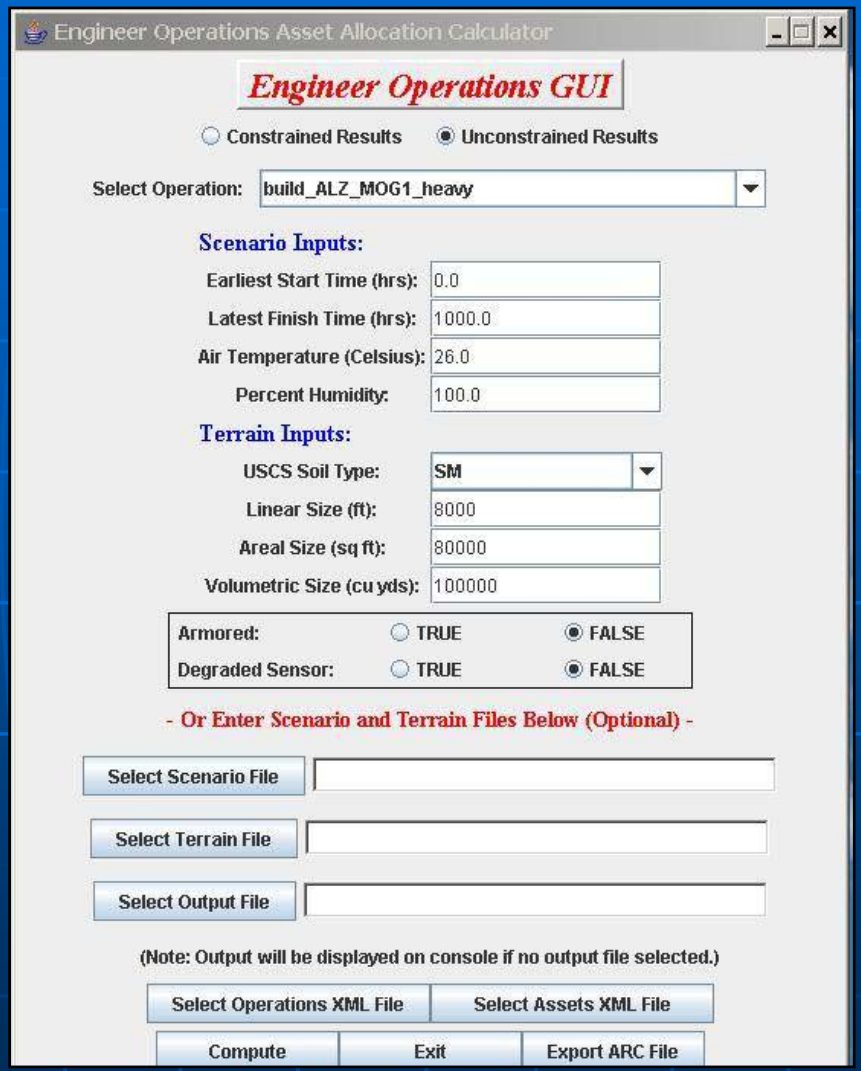
Engineer Operations (ENOPs)

- Uses outputs from Construction Analysis Application to determine the estimation of operation effort to build the airfield.

ENOPs GUI



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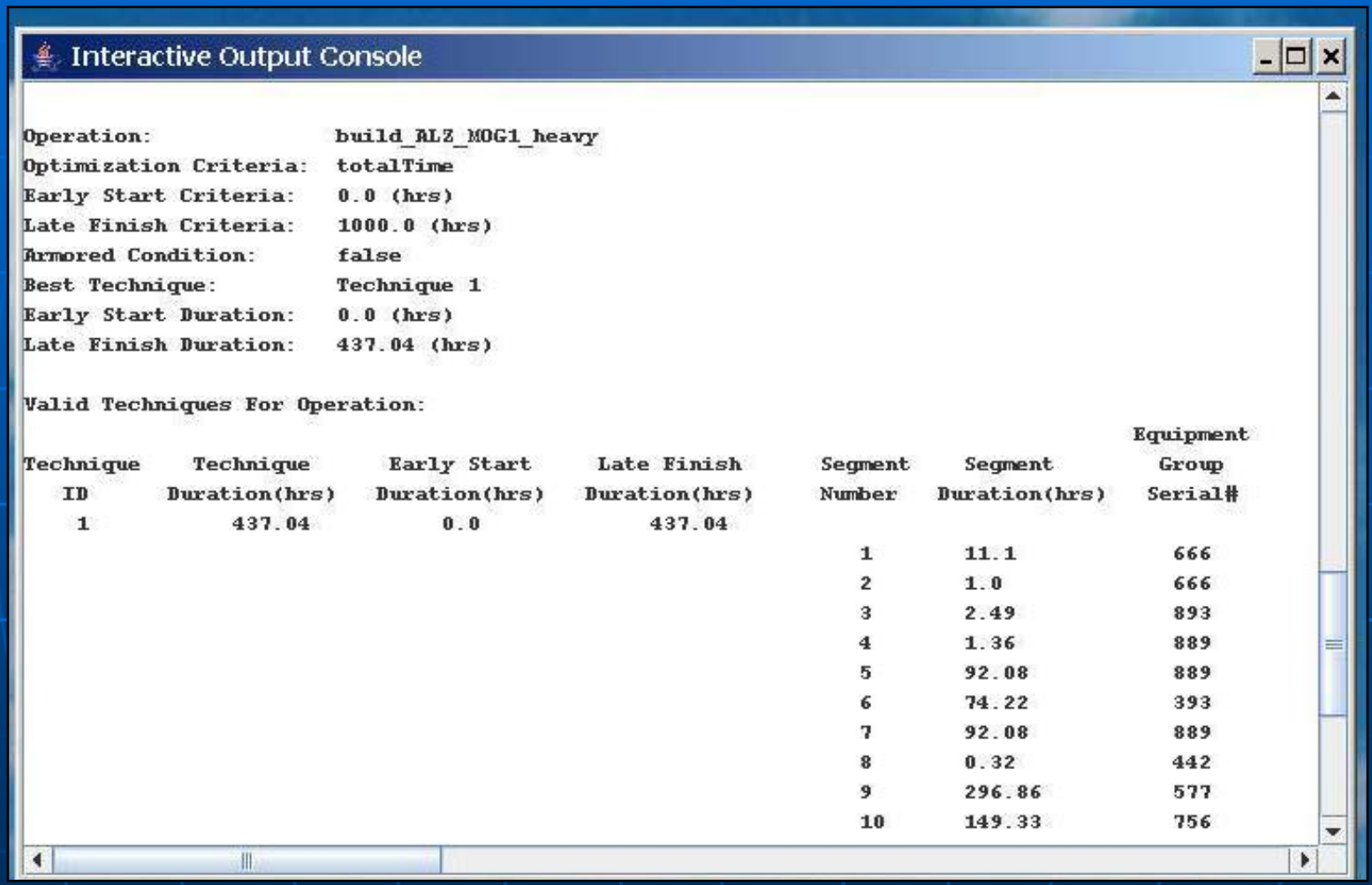
ENOPs Report



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Benefits

- Easy to use.
- Track your geoprocessing tasks.
- Not tied to a specific data set.
- Reduces the number of potential sites.

Questions?

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