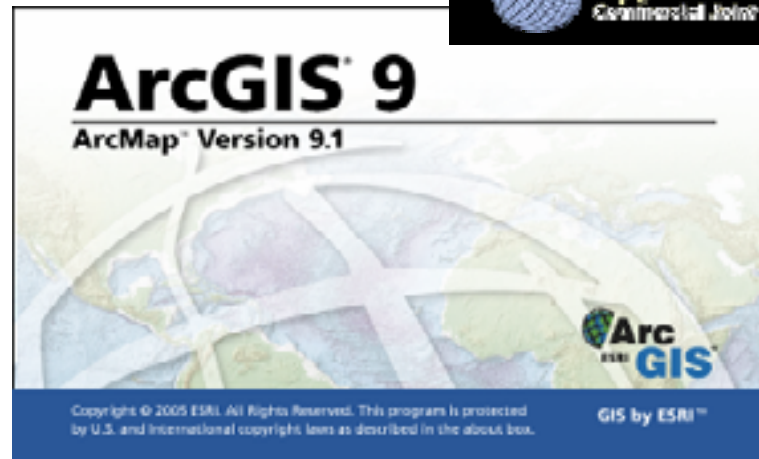


Air Force Information Operations Center

Idaho National Laboratory



RF Analysis in Asymmetric Warfare



Lothar Deil
16 Jun 07

This Briefing is:

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Overview

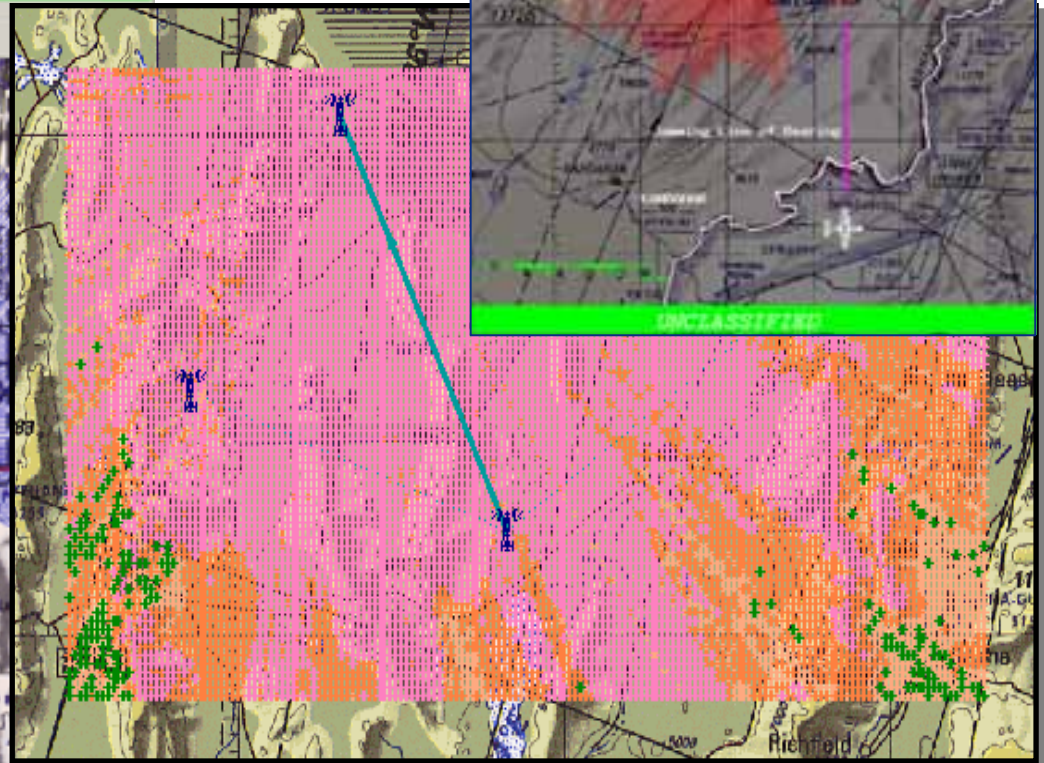
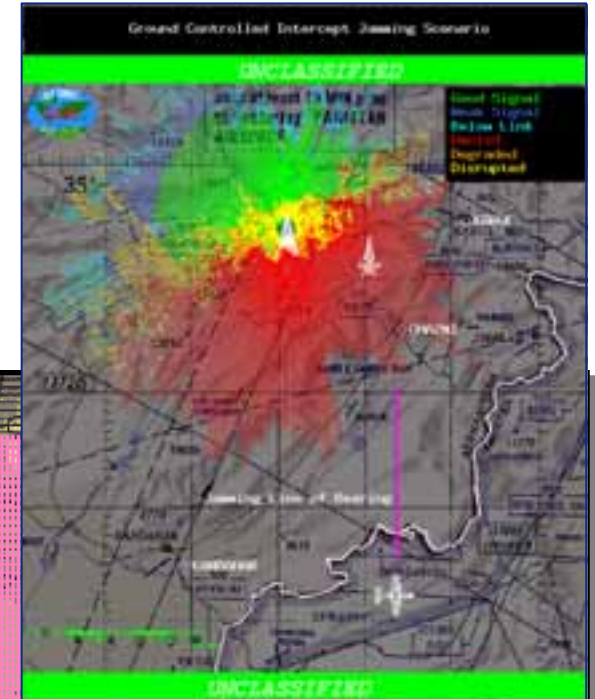
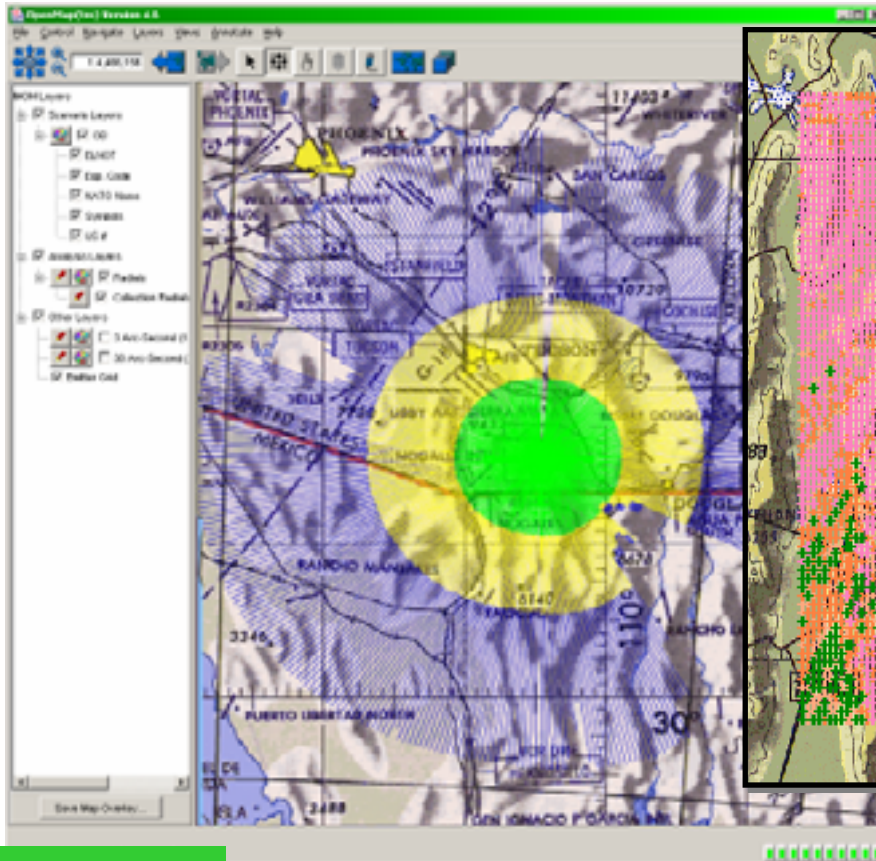
- **Traditional RF Analysis – IMOM Engineer Software**
- **Map based displays**
- **The Geospatial Leap**
- **Examples**
- **Conclusion**



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Improved Many-On-Many

- IMOM is a Tactical Decision Aid (TDA) used to predict the performance of assorted Radio Frequency devices (ES/ISR sensors, and RF Jammers, communications networks, etc.) in the Electromagnetic Battlespace



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IMOM Mapping Systems History

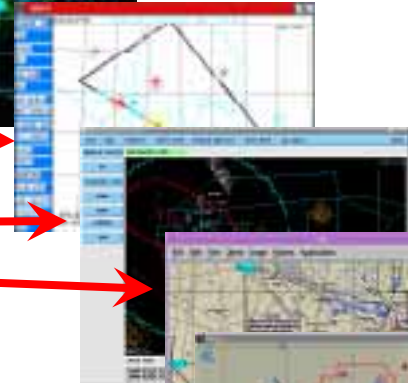
80's

- Initial Systems (circa 84-89) “Stick Figures” Tektronix display systems
- Late 80's Developed CTAPS based “stick maps”



Mid 90's

- An internal map based on X & Motif
- Integration with CIS 1.2 brought the SDT/DMS/CMTK mapping engine. CADRGs



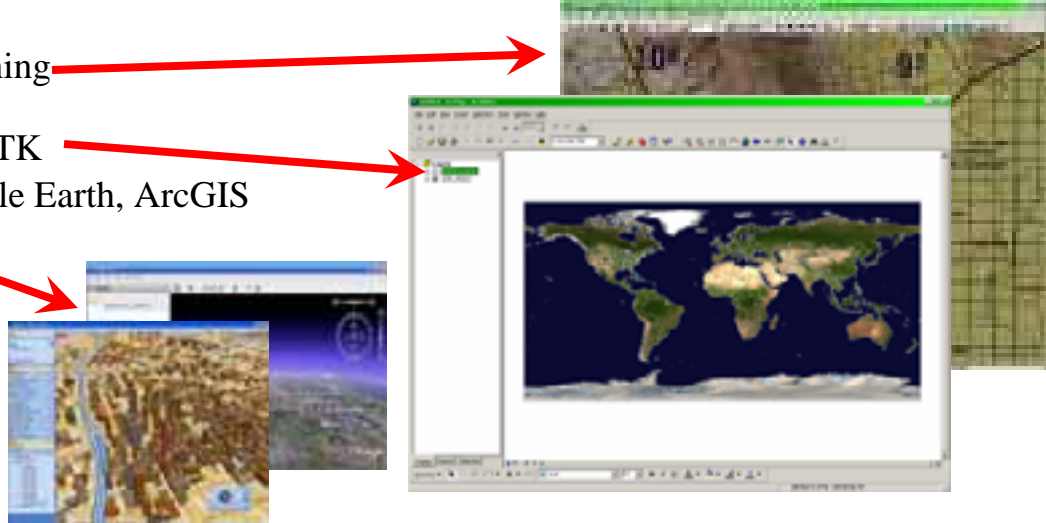
Late 90's

- Adopted JMTK, driven by TBMCS program, lost CADRG / CIB / DTED.
- Added OpenMap ~ 1998 Built in CADRG, CIB, DTED displays, integrate & display shapefiles, transparent layers, but poor annotation capabilities. No Cost to us



2000

- Added Falconview ~ 2000. Mission Planning Environment Mapping/Display system
- 2006...1-Way API to ArcMap from CJMTK
- 2006 & Beyond – ArcGIS Explorer/Google Earth, ArcGIS Server/ArcIMS Web services





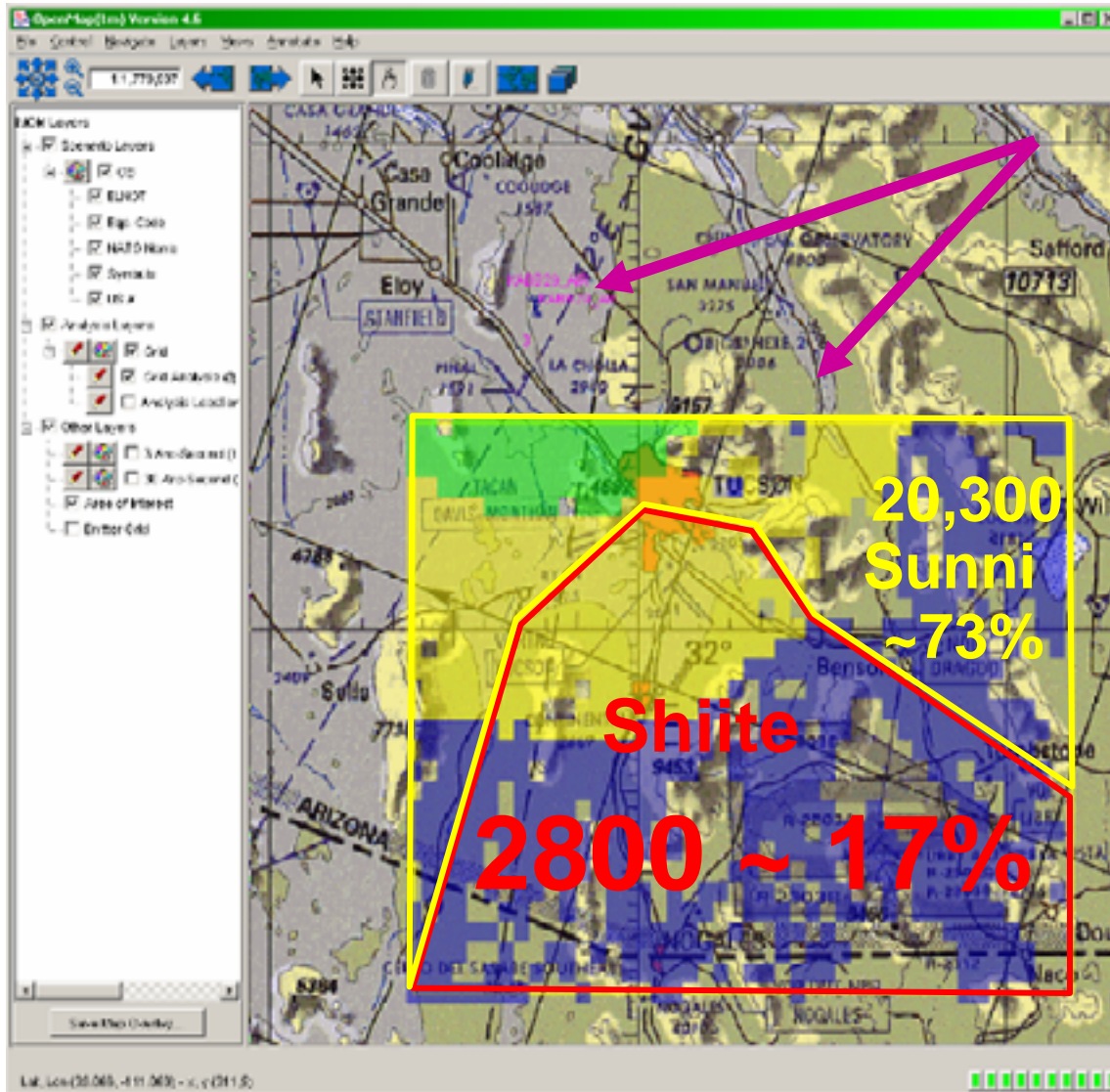
The Geospatial Leap

- **Not Just a Map (Major paradigm shift for current users)**
- **A true geospatial system provides capabilities that can lead to new insights**
 - **Combine traditional RF analysis with non-RF information**
 - **Toolbox vs. Turnkey**
- **New capabilities require new skills/perspectives**
 - **Translate geospatially oriented data and processes into information layers**
 - **Assess information layers for meaningful inter-relationships**
 - **Display results as actionable decision aids**



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Concept: Broadcast Coverage Analysis



Determine Broadcast Coverage

Overlay Ethnic Orientation

Compute %

Population Reached

- Non Technical Insight
 - What audience will we reach – tailor the message
 - Will we reach unintended audience – modify employment

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Achieved: Broadcast Analysis Tool (BAT)



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BAT Step 1

TV Broadcast
from lower
left corner
using IMOM
Analysis

Good Reception

Poor Reception

Weak Reception



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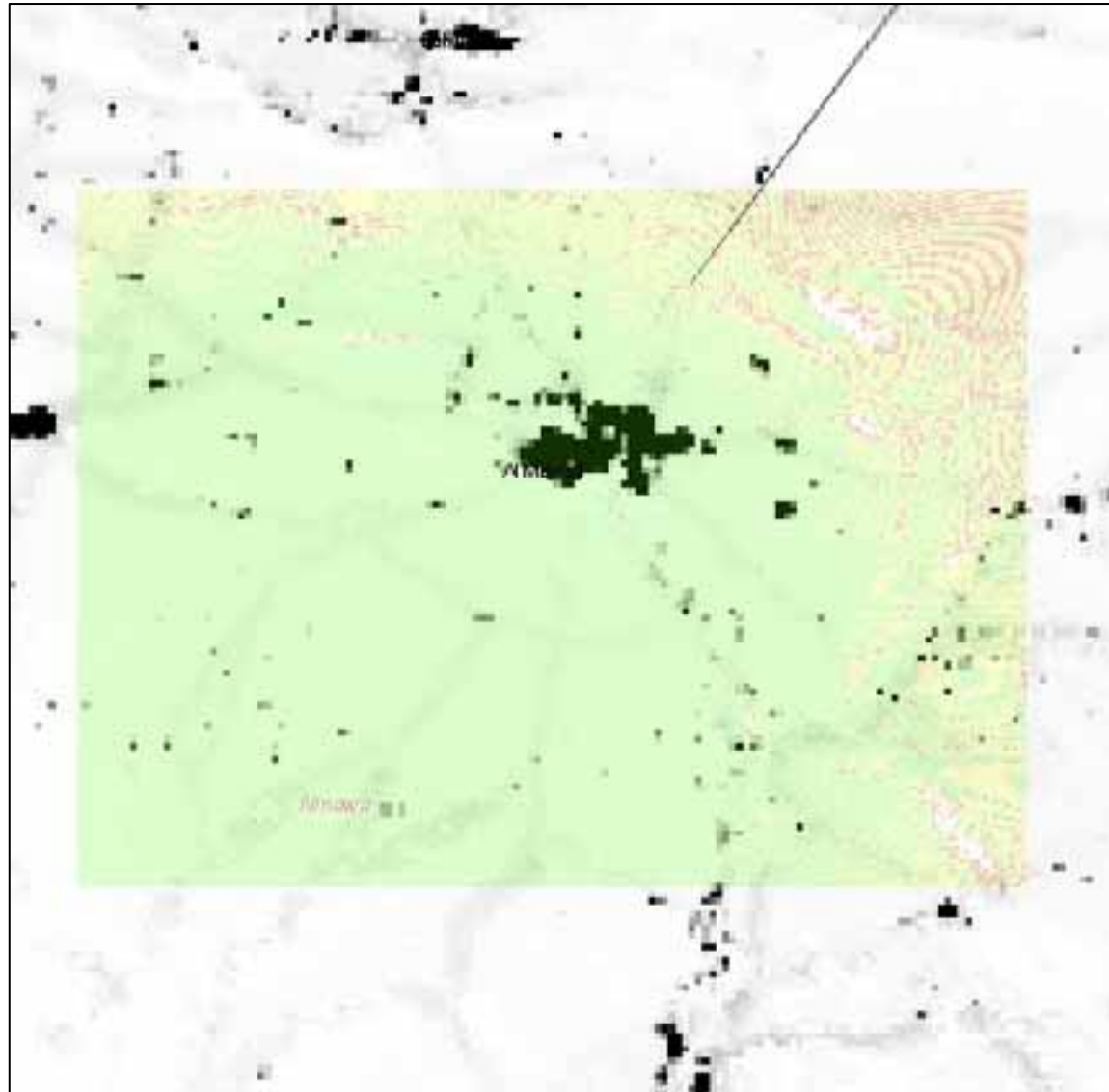


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Achieved: BAT Analysis

**Load Population
Density Raster –
Darker indicates
Higher Density**

**Create Polygon of
“Good
Reception” from
BAT then query
raster – gives
total potential
audience of
166,000**

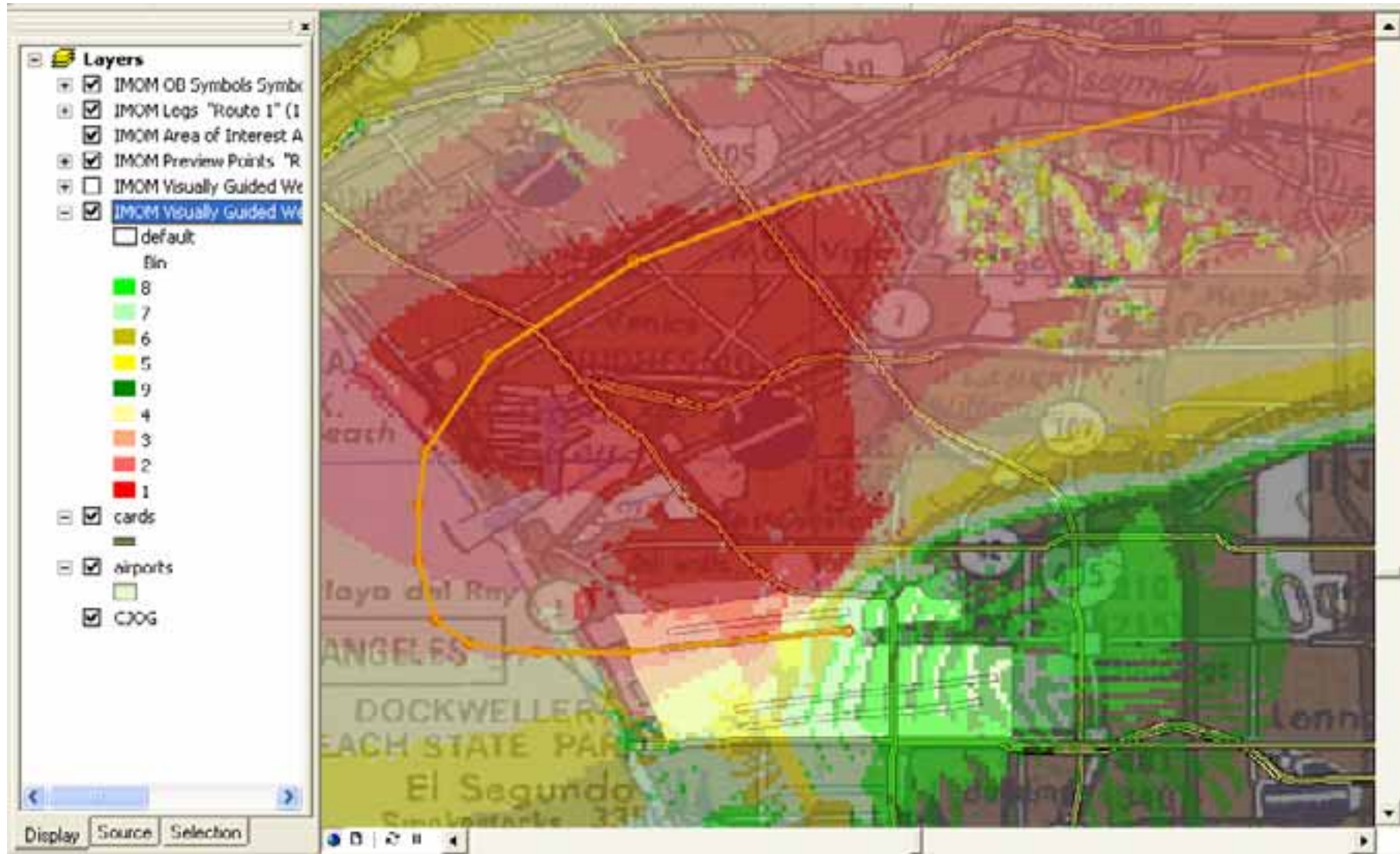


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Traditional Analysis



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Value Added – GIS

Actionable Information



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Conclusions

IMOM Engineer augmented with ArcGIS/CJMTK can provide meaningful actionable insight for the warfighter

- **Metrics are limited by available data and interpretation of tactics**
- **Metrics can be built from a innumerable datasets such as:**
 - **Infrastructure – buildings, roads, pipelines, airports, etc.**
 - **Cultural orientation or areas of influence**
 - **Demographics – male, female, age group, income etc.**
- **Analyst has opportunity to represent enemy tactics, operational limits, and environmental considerations into analysis**

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Discussion

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