Simulation and Modeling for the Optimal Allocation of Military Lands

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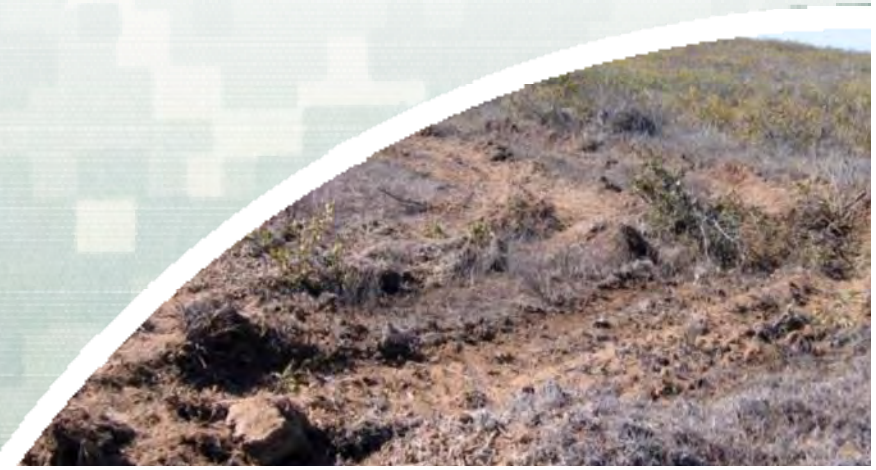

US Army Corps of Engineers

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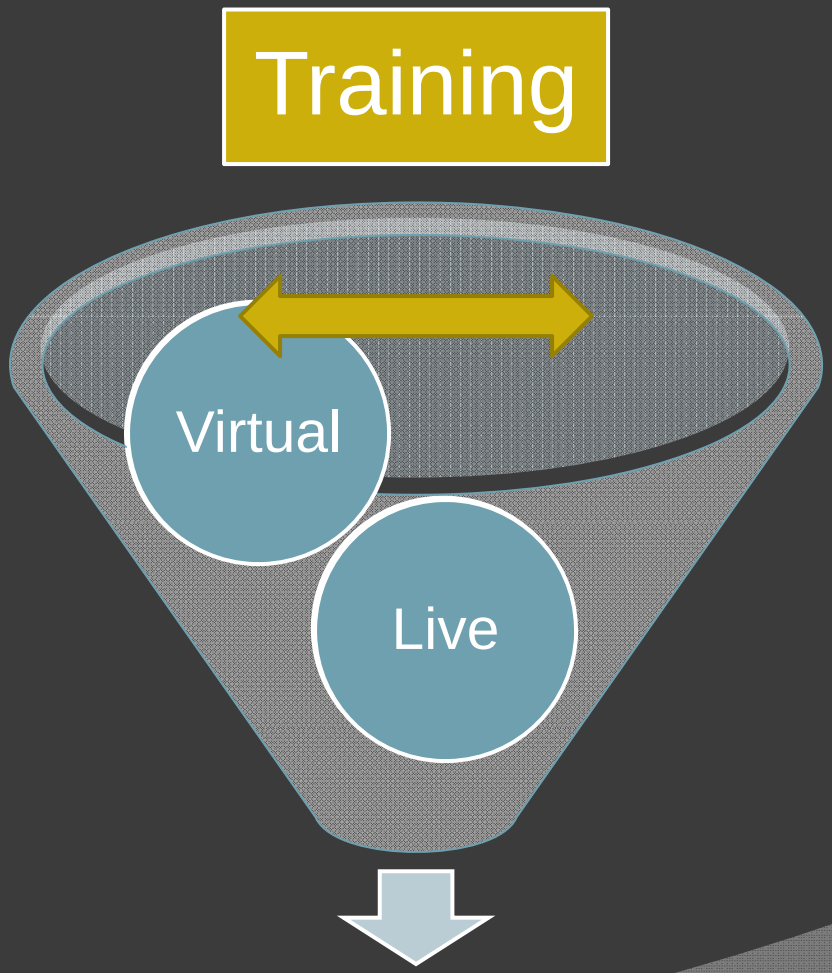
Issues

- Expanding Training Footprint
- Encroachment
- Environmental Constraints
- Conflicting Land Uses
- Threatened and Endangered Species

Objective

Develop a methodology to determine land use impacts of military from Army Virtual Training Simulations based on Army Training and Tracking Systems (ATTS).

Background



Background

Army manages around 6 M Ha

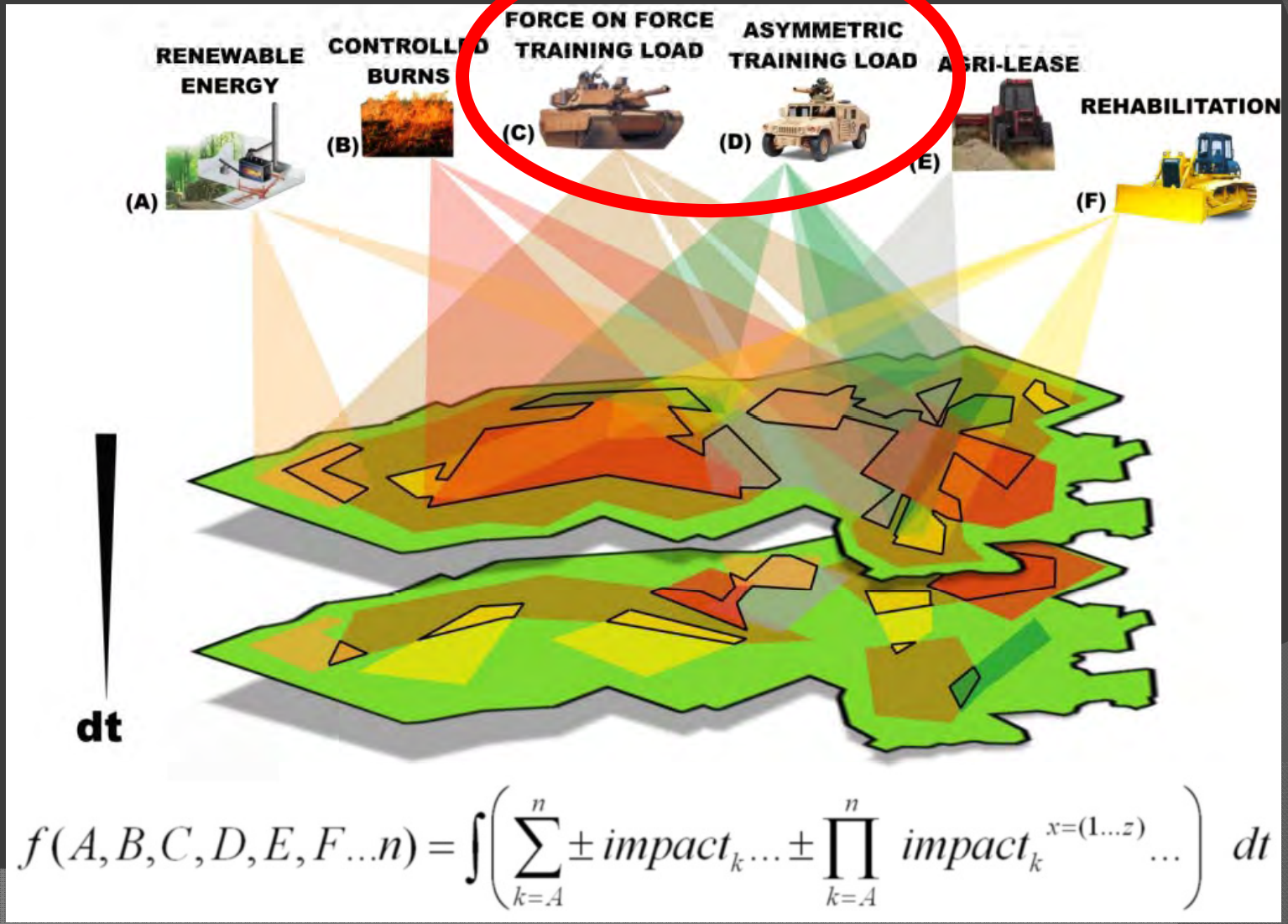
Intensely used training spaces due to troop re-stationing, installation realignment, and expanding training footprint

Changes in mission mean changes in landuse patterns

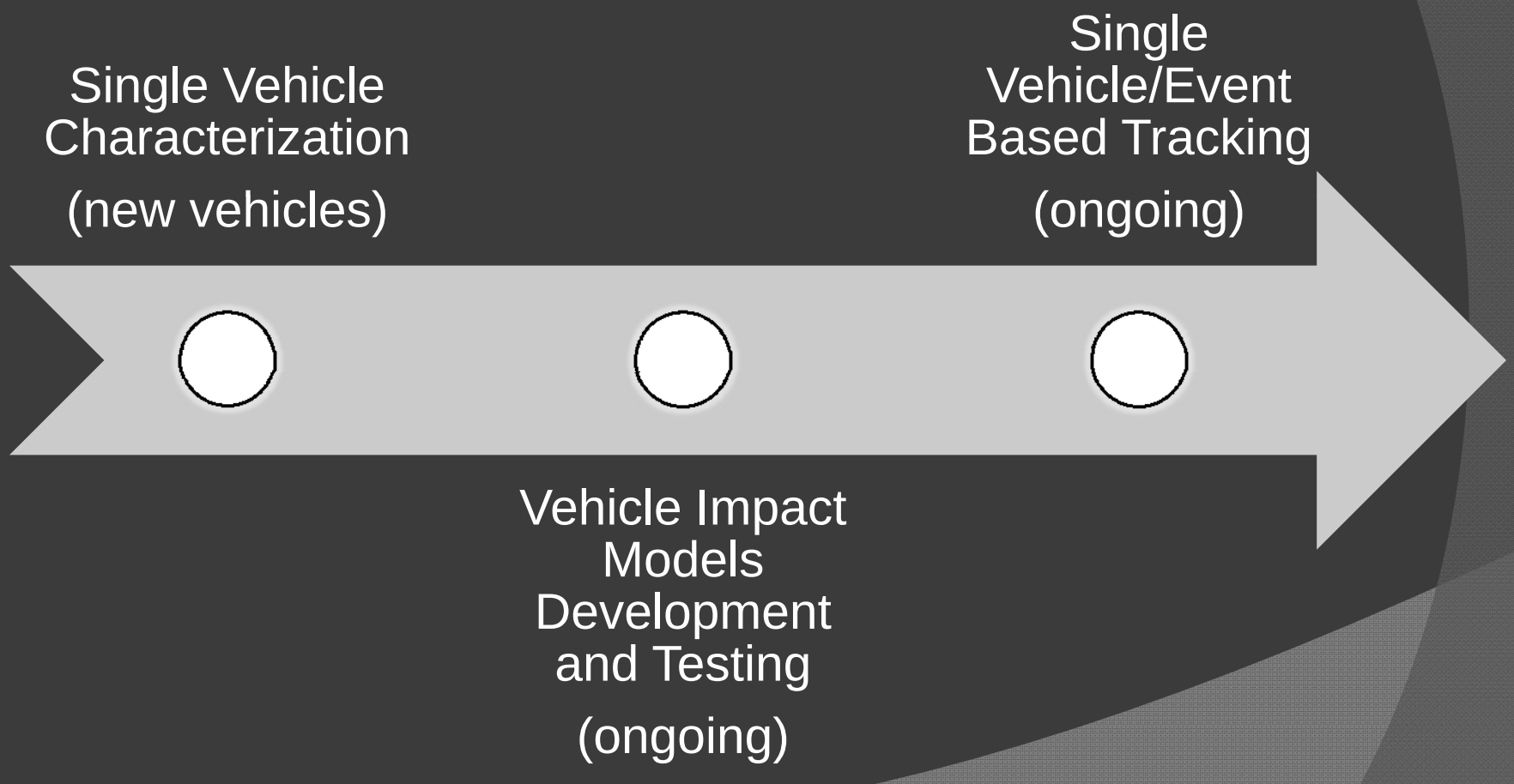
Management practices need to become more proactive

Evaluating Future Land Impacts

Vehicle Training



Past Vehicle Impact Studies



Recent Studies

Vehicle Tracking Studies

- Individual Vehicle Impacts
- On and off road vehicle use
- Total vehicle mileage

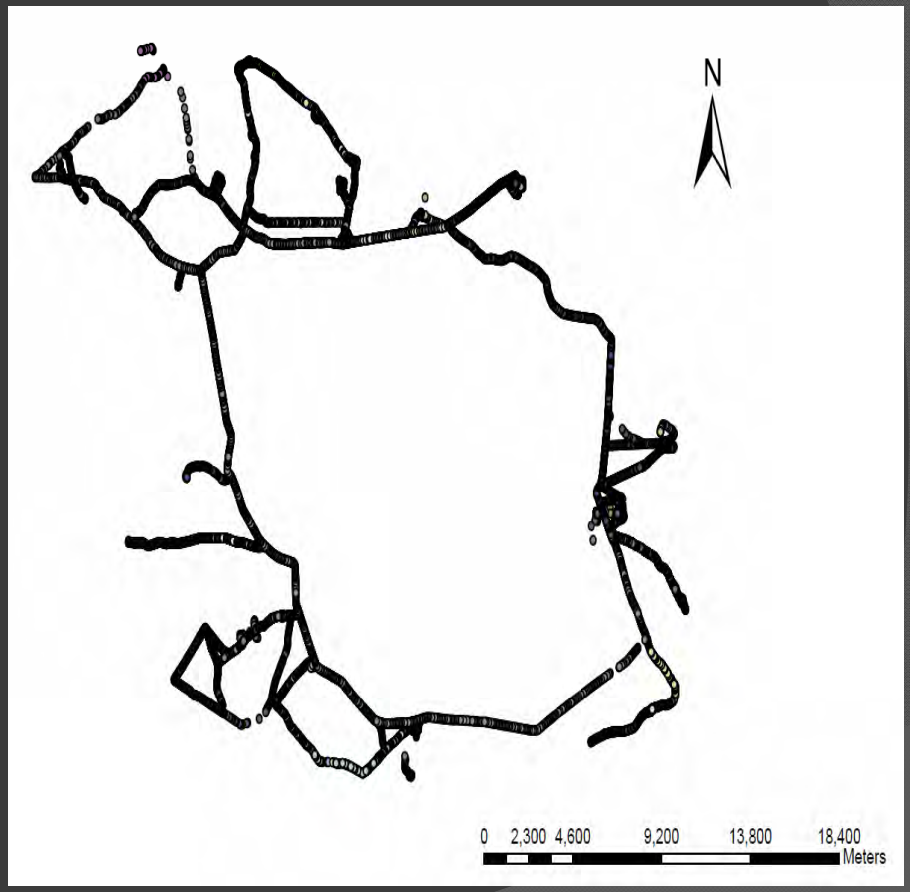
Tracking Systems

- Tracking system types
  - Detached
  - Integrated
- Detached systems (VTS) used to capture the position, velocity, acceleration, turning radius
- Integrated systems (ATTS) used for Army training but information can be used by others.

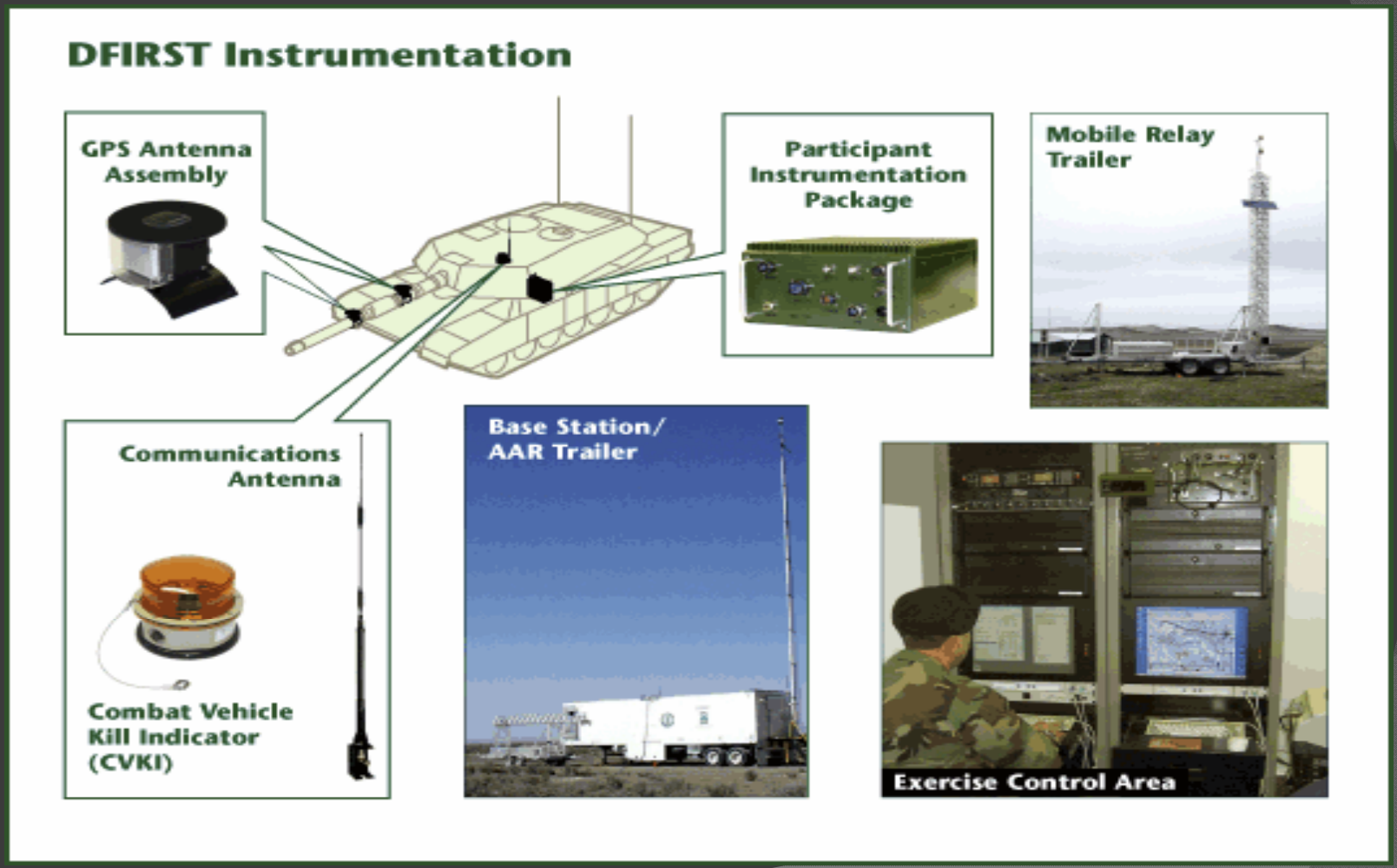
Current Approach

ATTS vs. VTS

- Data comparison
- ATTS reliably
- ATTS archived retrieved for analysis by when needed



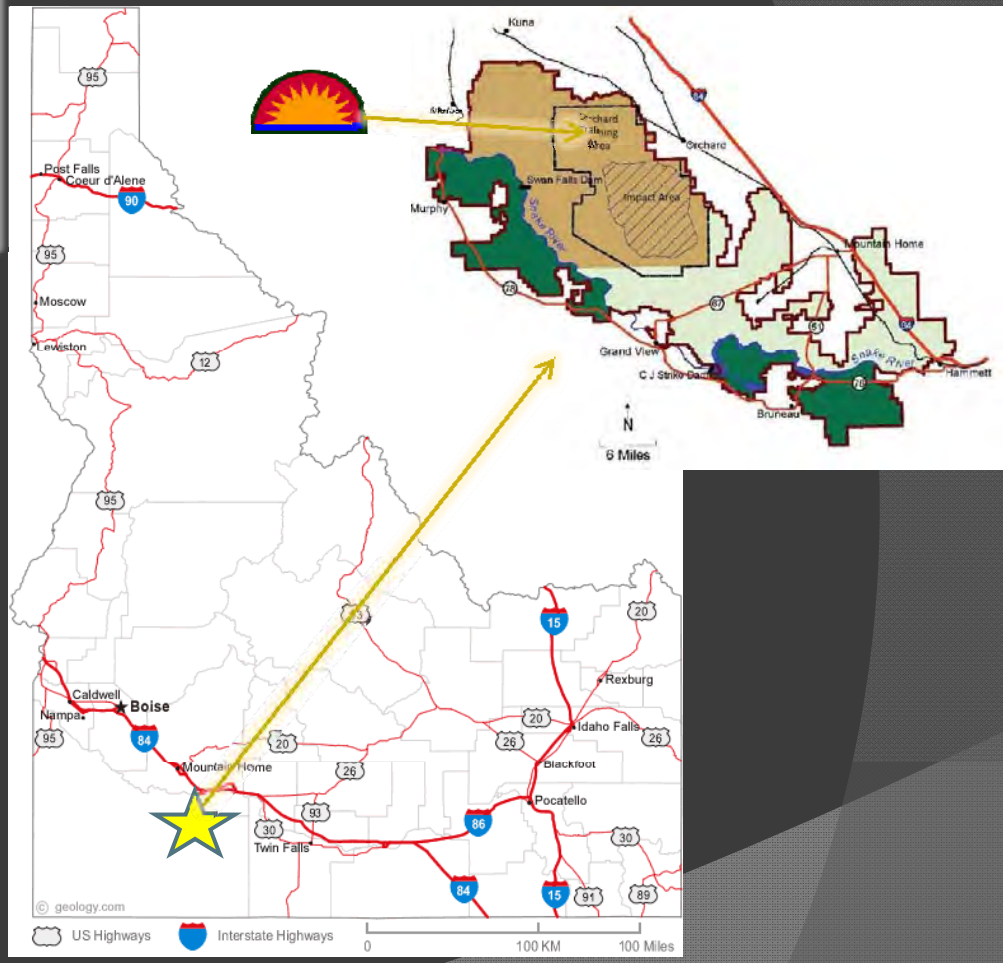
Integrated Tracking Systems



Study Area

Orchard Training Area

- OTA is located in Ada and Elmore counties, Idaho, south of Interstate 84. It is situated approximately 14 miles south of the city of Boise.
- 138,051 ac (55,846 ha).
- ~73,000 ac (29 542 ha) is available for maneuvering



Vehicles Tracked

M966
Tow
Carrier
HMMWV

M998
Cargo
Troop
HMMWV

M1025
7.62MM
Armored
HMMWV

M1026
Grenade
Launcher
Armored
HMMWV

M1151
Up
Armored
HMMWV

Initial Analysis

Tracking Data collected in August 2008

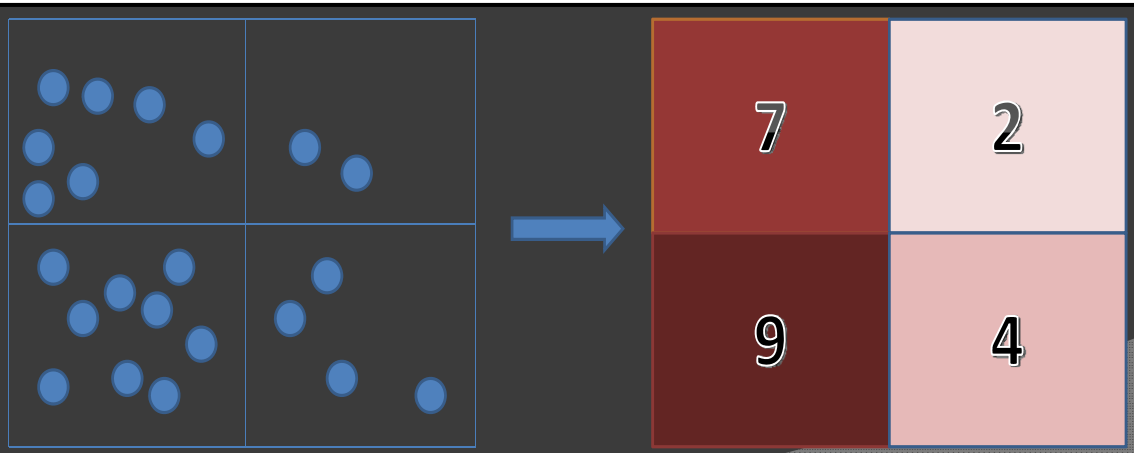
Zero velocity data excluded

Plotted in ArcGIS

Training Distribution

Determine the level of training occurring within a given area

Grid size of 1 Ha utilized (minimum mobilization resolution for Land Rehabilitation efforts)



Vehicle Impact Indicator

For Landuse Planning, Training Land Allocation, and Budgeting

- the Army's has adopted the Maneuver Impact Mile (MIM)

Vehicle impacts have been correlated to the MIM

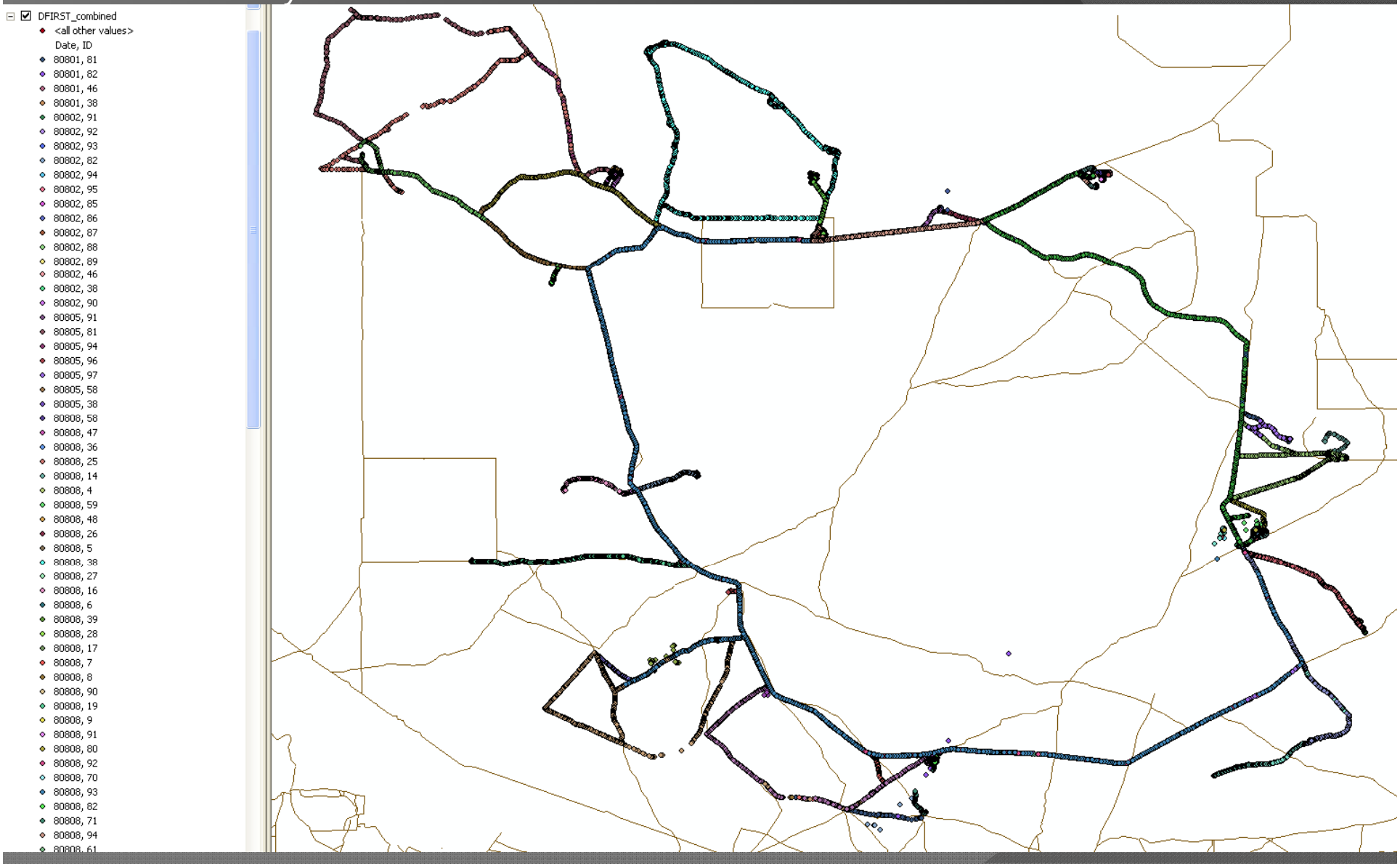
- A HMMWV impact is 0.3 MIMs equal to 0.2 Ha of ground disturbance

Other Vehicle Impact Indicator

- This approach can be translated to other types of indicators

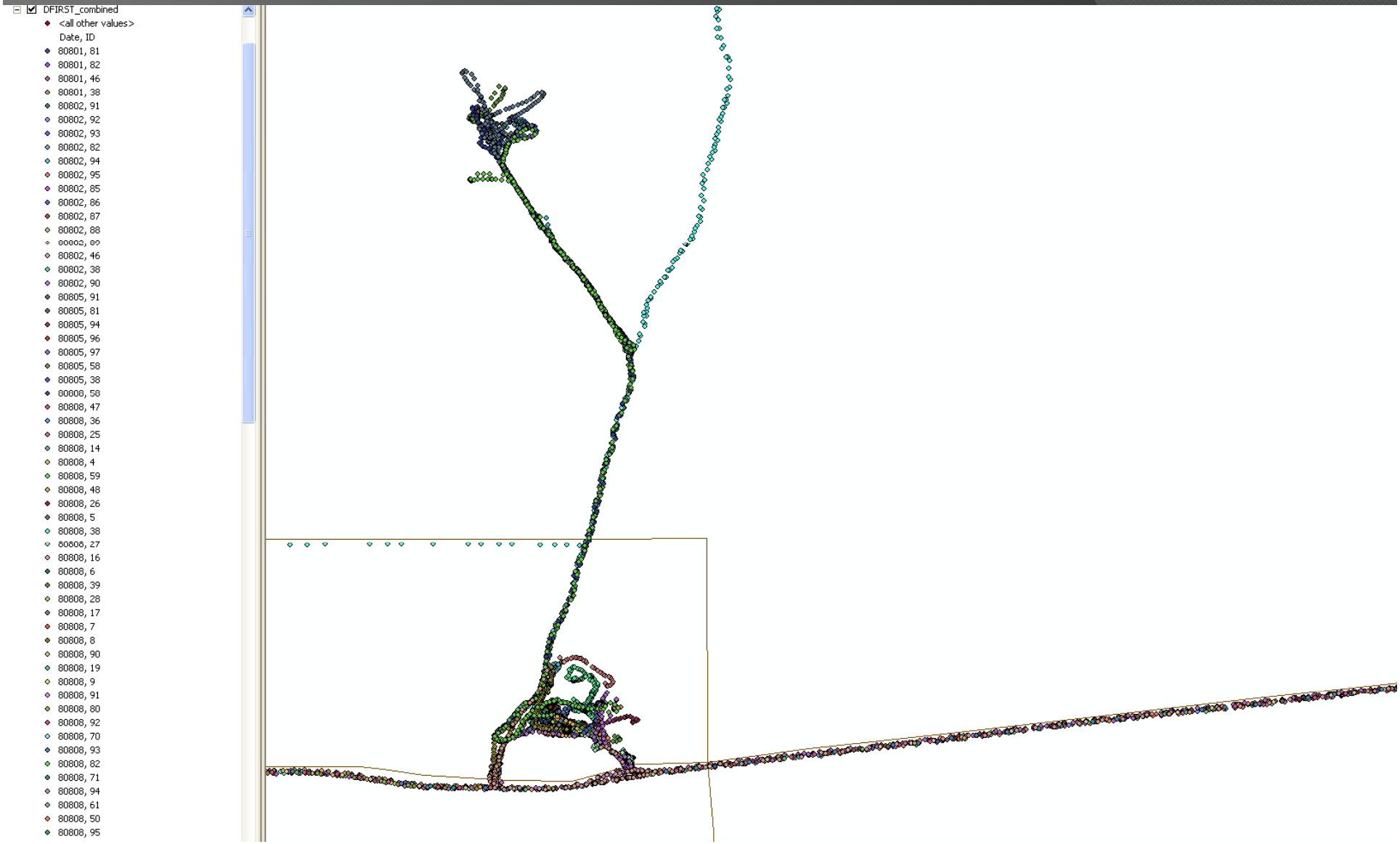
Training Distribution

OTA_DFIRST Data
1-8 Aug 2008, 97 vehicles
Each color represents a different vehicle on a different day



OTA_DFIRST Data (close-up)
1-8 Aug 2008, 97 vehicles

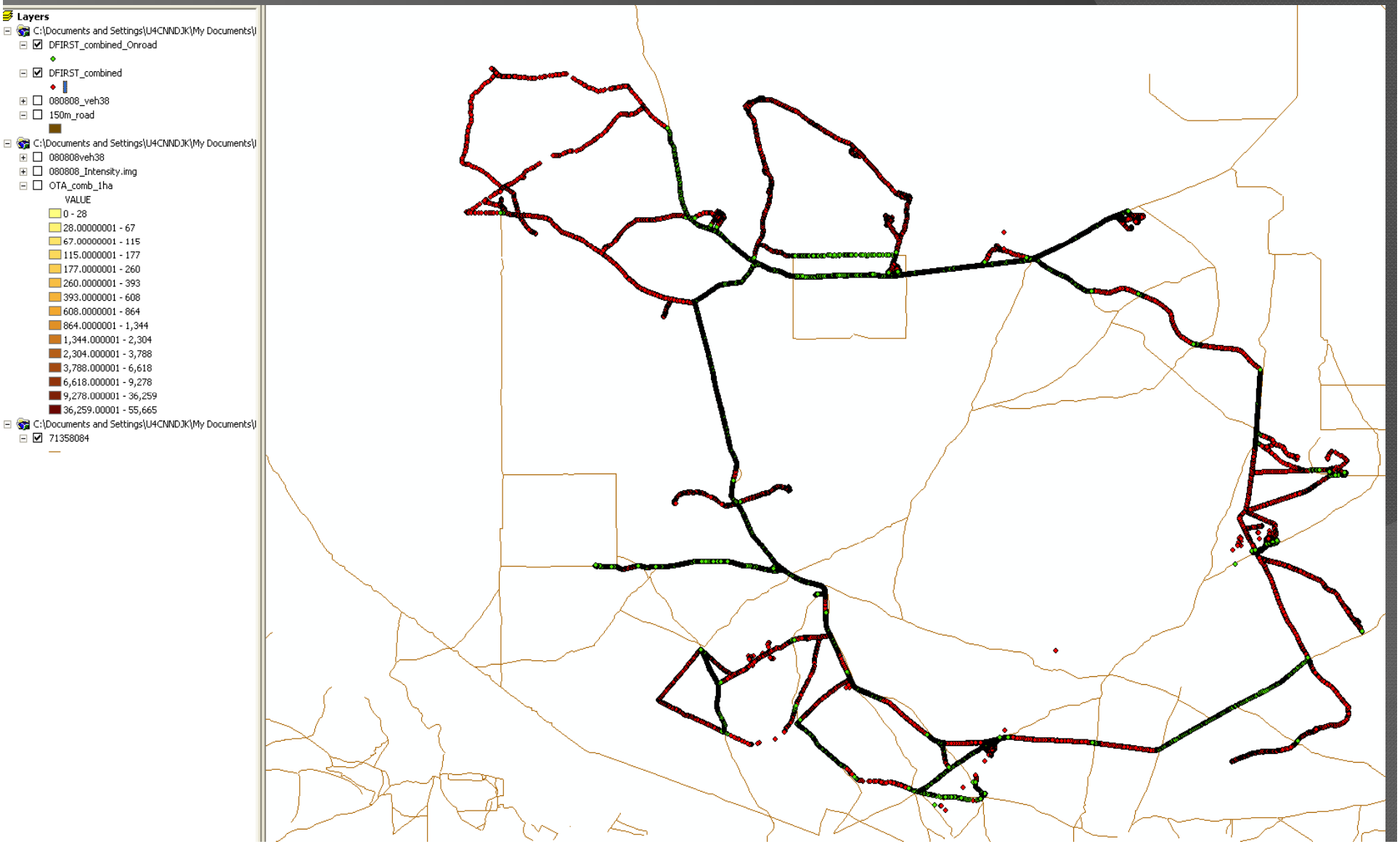
Each color represents a different vehicle on a different day



On vs Off Road Data based on 150m buffer

(2002 U.S. Dept Transportation BTS_Roads Map)

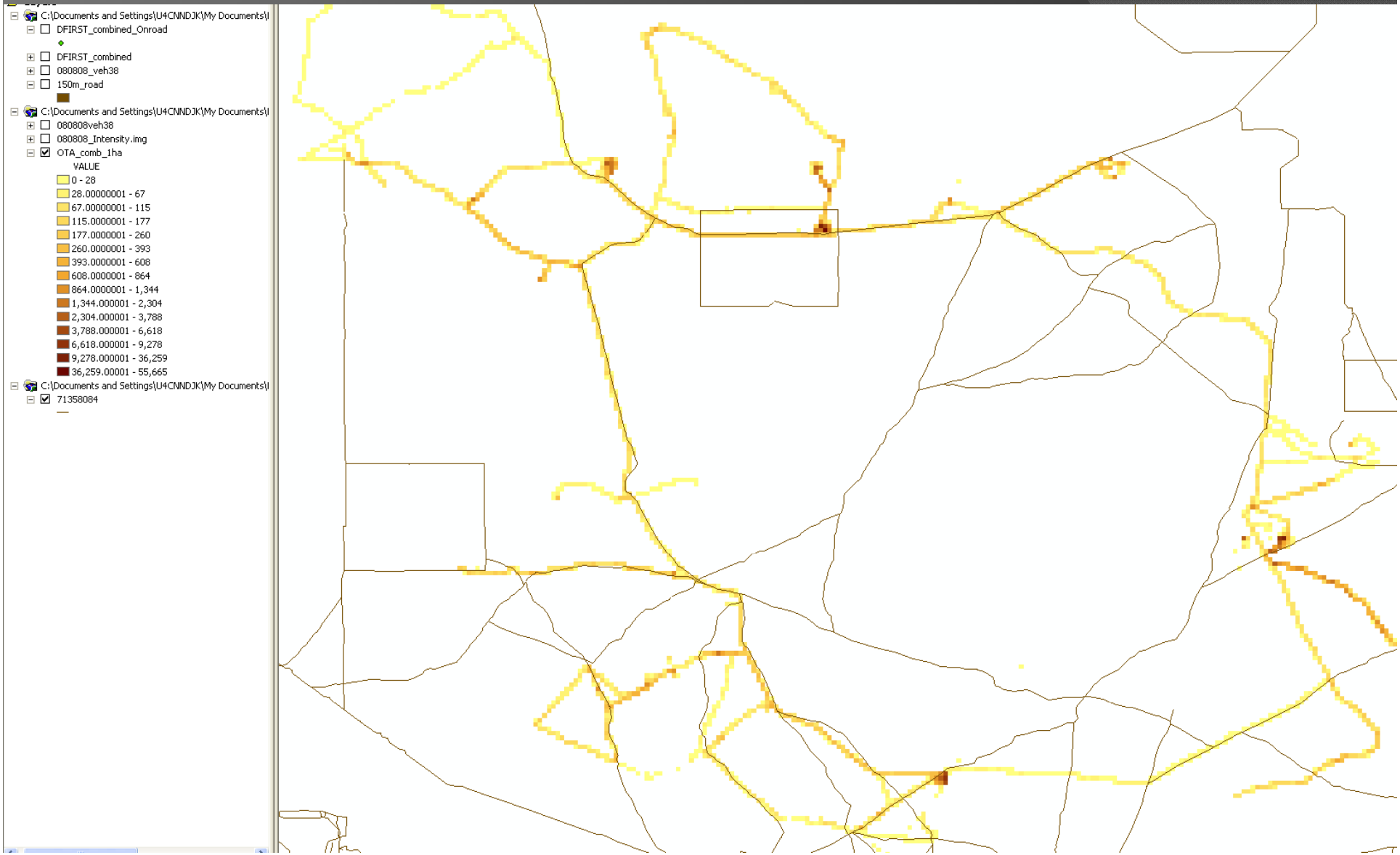
- On road in green (44.7% of moving data)
- Off road in red (55.3% of moving data)



OTA_DFIRST Data

Training Intensity (# moving data points/ha)

Ranges from 0 – 55665 points/ha, darker colors signify higher training intensity



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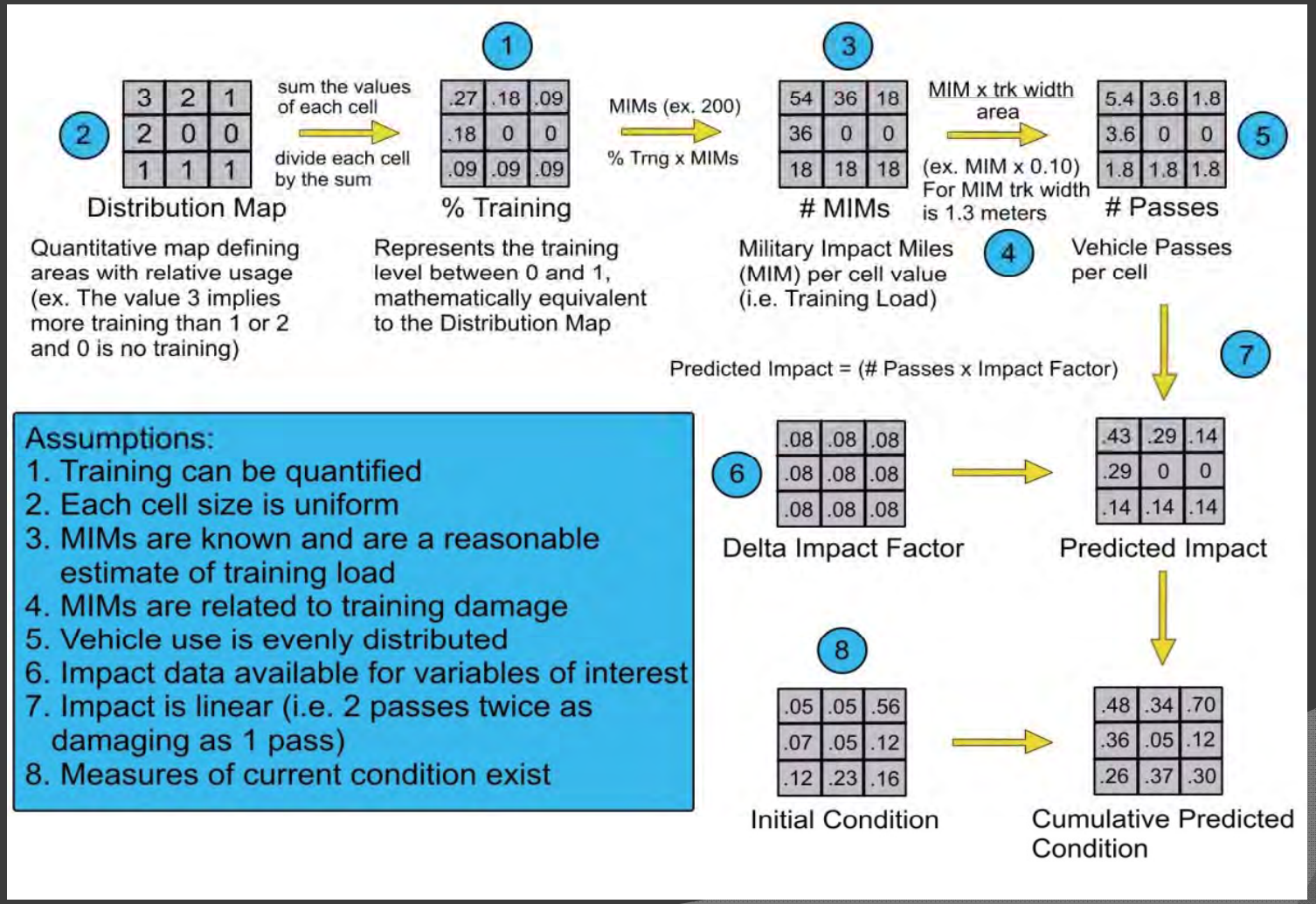
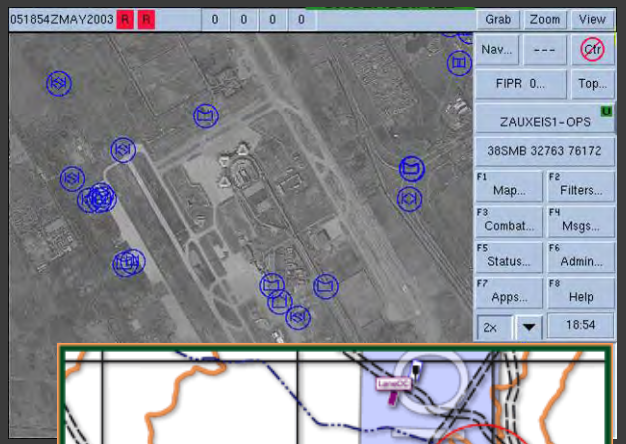
Training Intensity Calculations

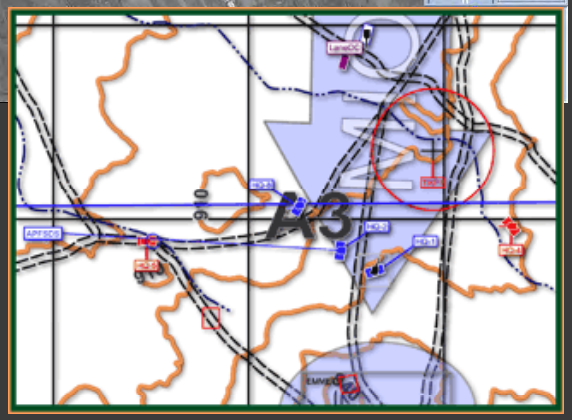


Future Goals

BFT



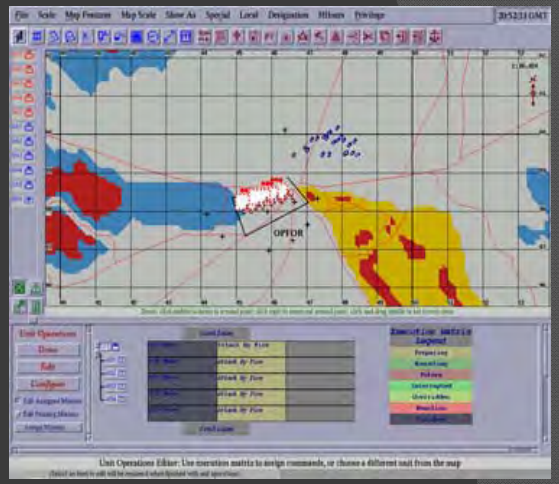
DFIRST



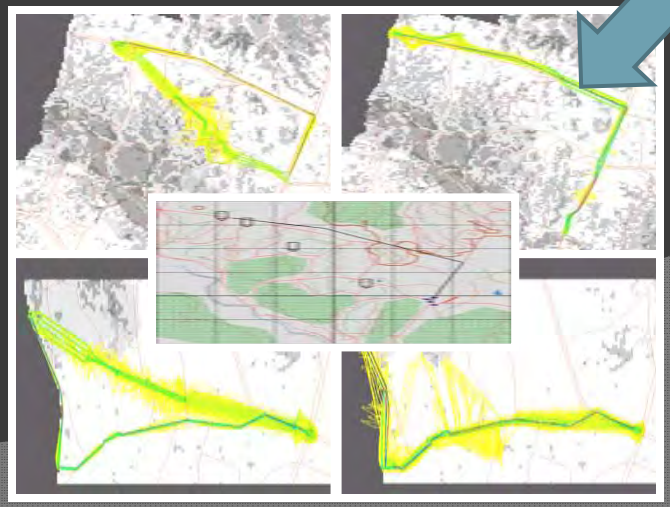
Simulations run comparing actual training, training simulations, doctrinal based training to determine training land use

Tracking/Training Systems Capture Movement

Movement is logged and ported to simulation system (e.g. OneSAF)



Develop scenarios



Questions