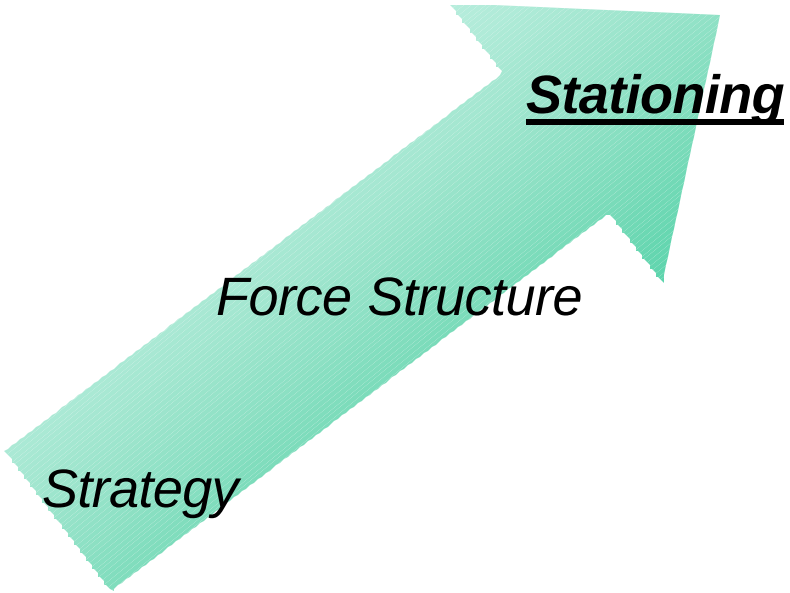
DCN: 10281

The Optimal Stationing of Army Forces Model (OSAF)



TABS

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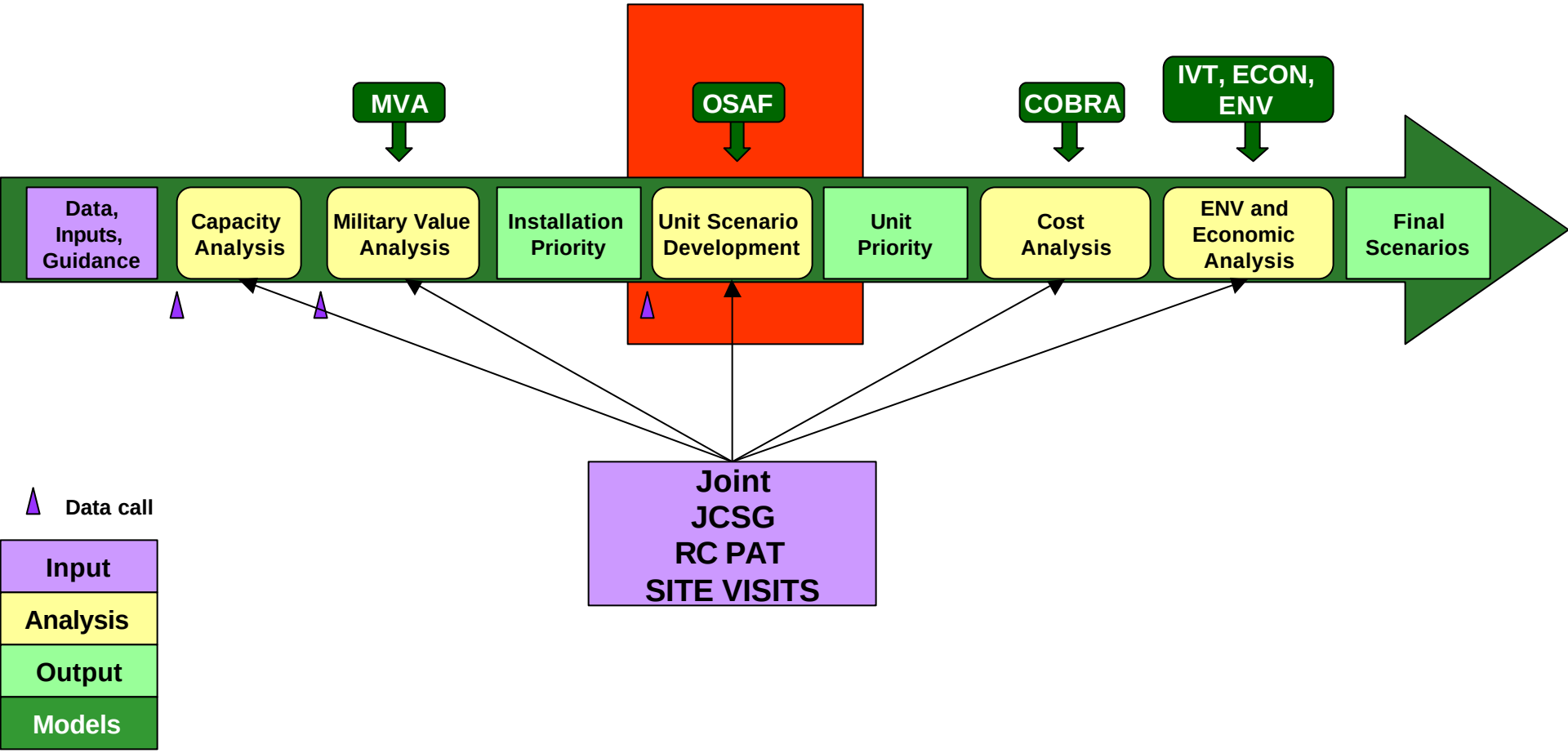
The Army Basing Study Group Plan

Preparation → **Analysis** → Support



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OSAF Model

- Integer linear program
- Typical instance
  - 3000 binary variables
  - 45,000 constraints
  - 70,000 variables
  - < 5 minutes solution time (GAMS generated CPLEX solved)
- MS ACCESS interface with reporting capability

Stationing Model

OSAF OBJ and Constraints

- **The constraints force the model to:**
  - Meet Army requirements
  - Apply stationing restrictions
  - Determine feasible locations
  - Determine costs
- **Constraint sets:**
  - Facility space and condition requirements
  - Range and km^2 Days requirements
  - Unit Stationing restrictions
  - Implementation Cost restrictions

- **Objective**: Minimize NPV (20 years)
  - Variable Costs
  - Fixed Costs
  - Implementation Costs

- **Based on the objective and constraints the model:**
  - Determines the best unit–installation mix, assigns units to installations.

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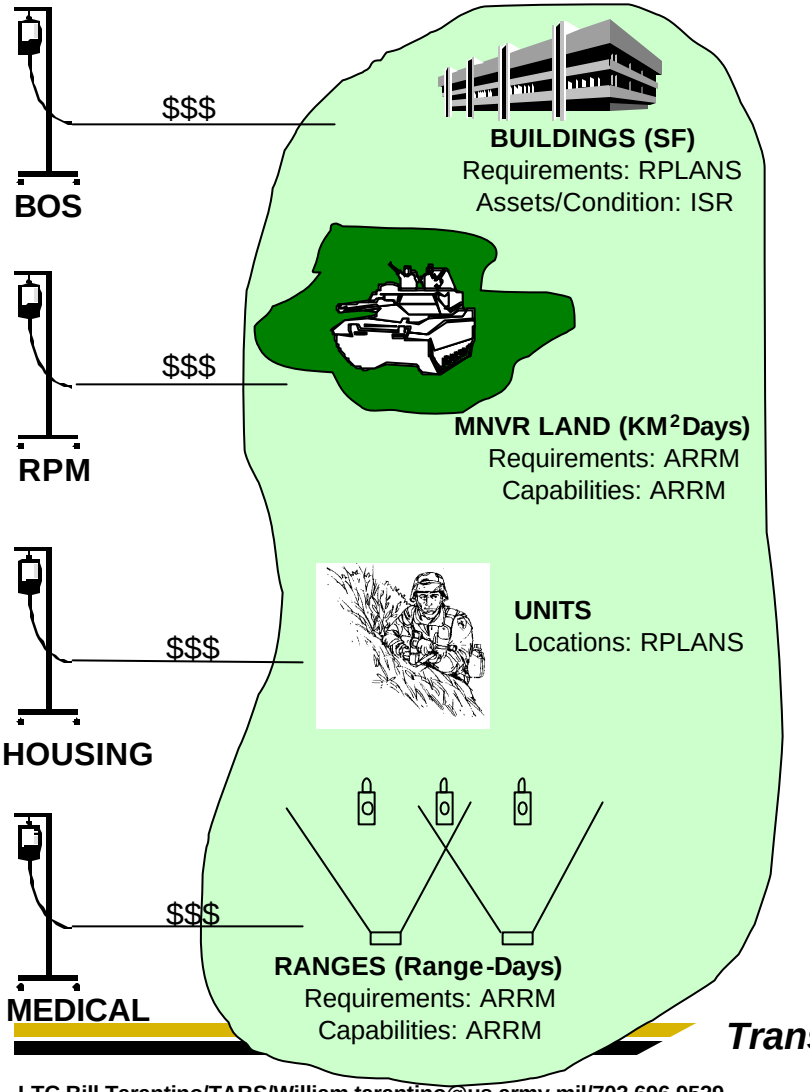
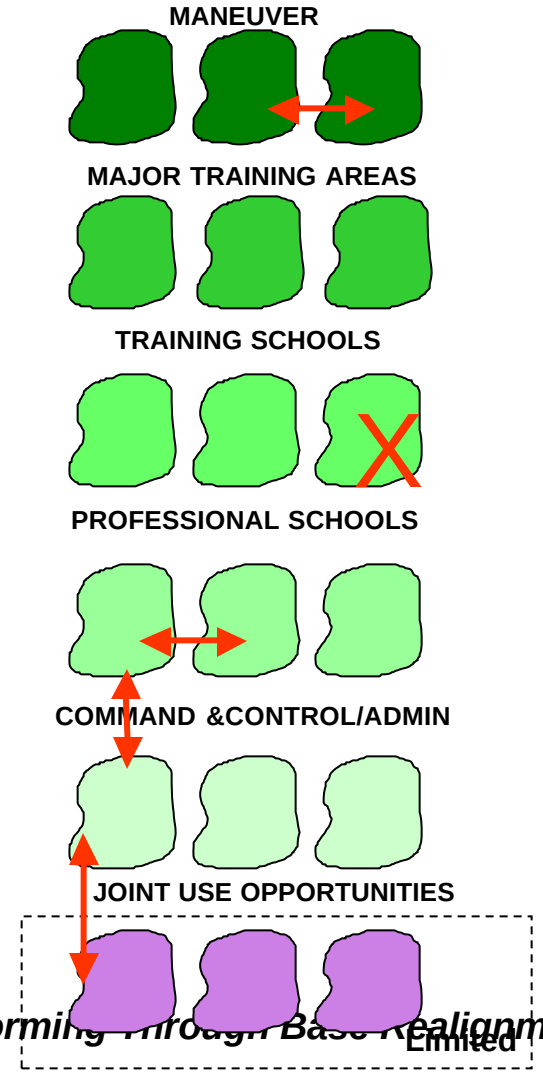
Inputs and Outputs

An Installation



Installation Types



IMPLEMENTATION COSTS
MILCON
Management
Transportation

Unit stationing

Net present value of an alternative's stationing costs (smaller is better)

Capacity utilization factors

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Current Assumptions

- Policy
  - Environmental cleanup costs are not considered.
  - Relocated units have their housing requirements met by the local market or privatized housing projects.
- Modeling
  - Facility requirements can be aggregated into larger categories.
  - Relocated units will have their facility requirements fully satisfied by buildings in "green" condition.
  - Km^2days and range days adequately represent range and training land requirements.

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Current Limitations

- Analysis does not capture all stationing details.
- National Guard and Reserve forces maintain installation assignments.
- Data related
  - Data availability limits Joint analysis and the measurement of efficiencies when combining units.
  - Force structure limitations.
  - Limited knowledge of Major Army Command initiatives

Influences implementation, feasibility, and estimated costs.

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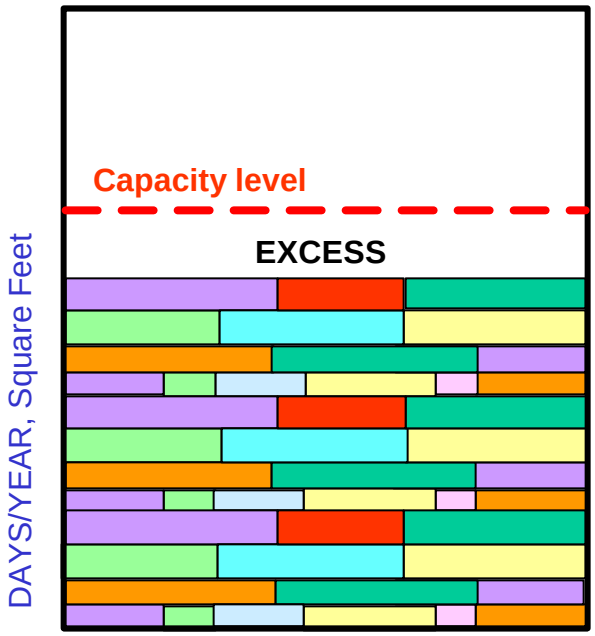
Linear Constraints

Typical Analytical View

(Land, Ranges, and facilities)



Linear approach

- Analysis follows a "linear" approach.
- Inherent assumption is that if the Army has "excess" it can be used to fill other requirements.
- All Army institutional databases supports such use.
- Simple reviews using such a linear model provides an "excess" estimate and also builds expectations for the amount of excess the Army can discard.

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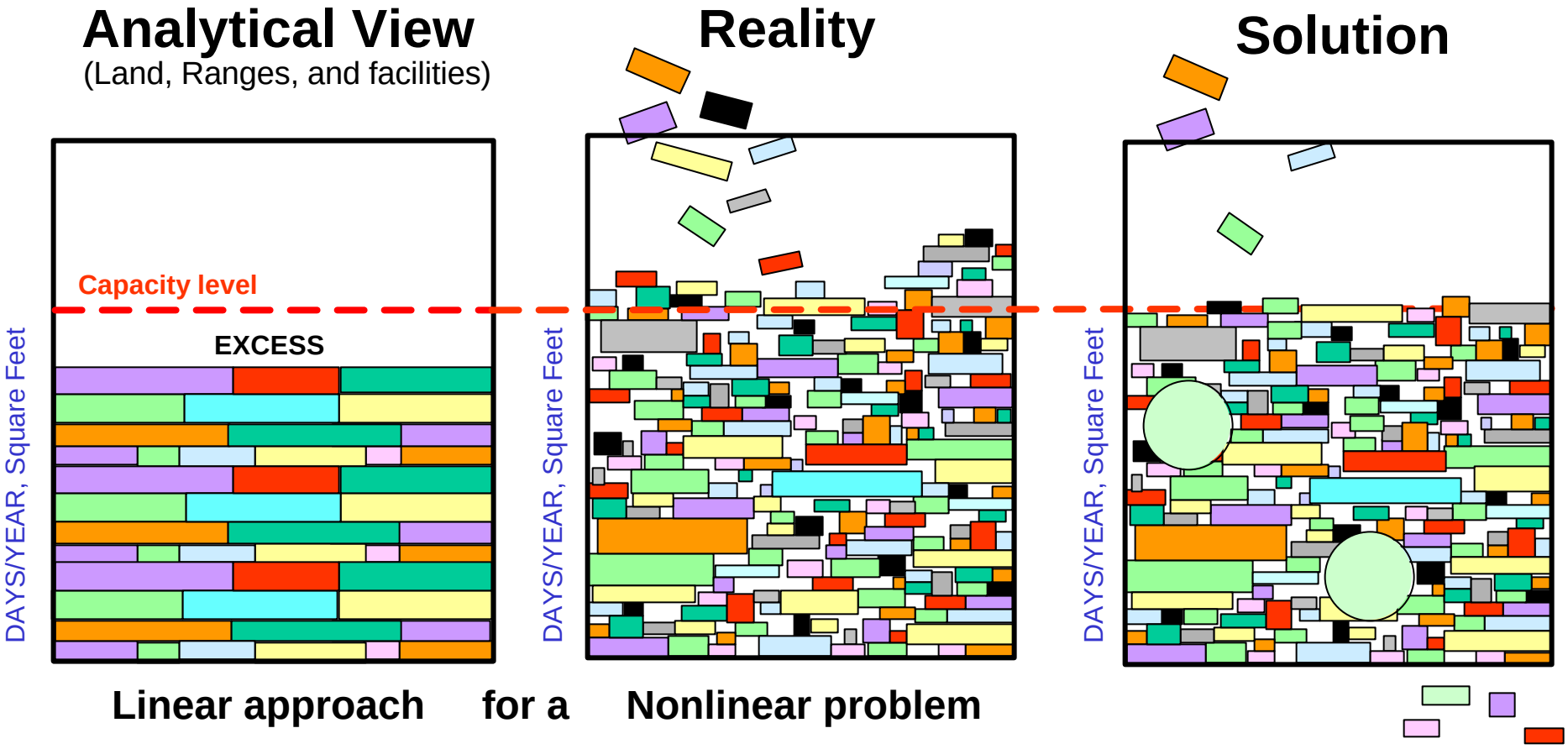
The world isn't linear



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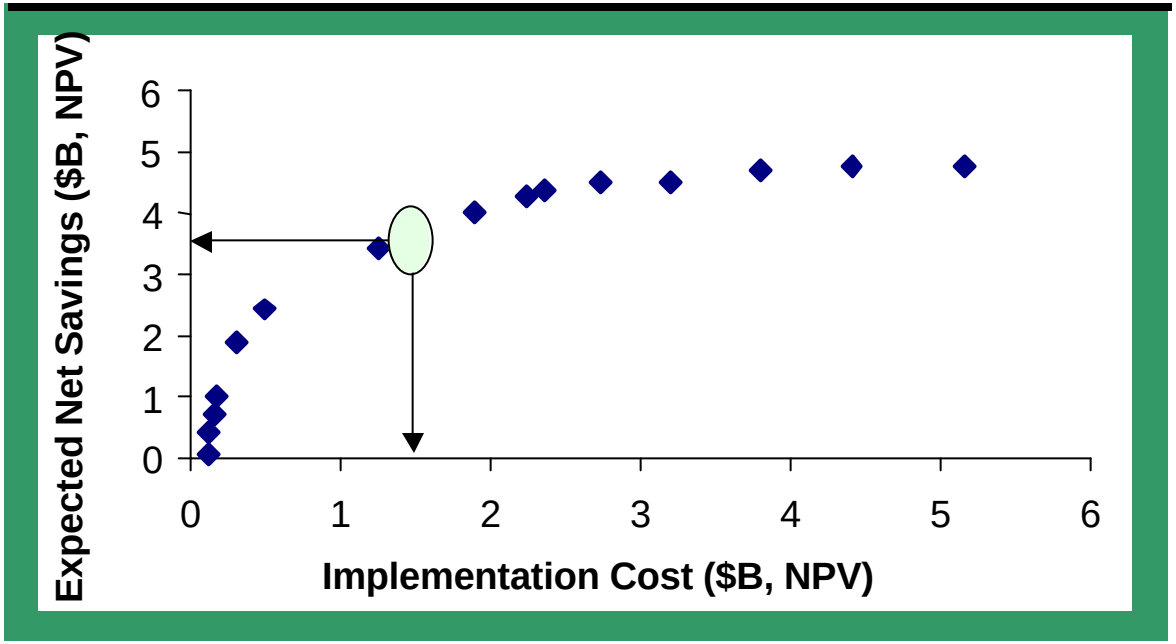
Example Solutions

Course of Action Comparison

Net savings after investment recovery over 20 years for 15 COAs
(Each point is a COA)



1. We take all inputs and run OSAF.
2. We determine expected savings in NPV (Y-axis) at a given implementation cost (X-axis).
3. We find the "optimal" stationing COA at a given implementation cost (each point provides a potential COA).
4. For each COA, we calculate savings per year.
5. We then conduct an impact assessment.

(Example solutions – numbers are notional to illustrate method)

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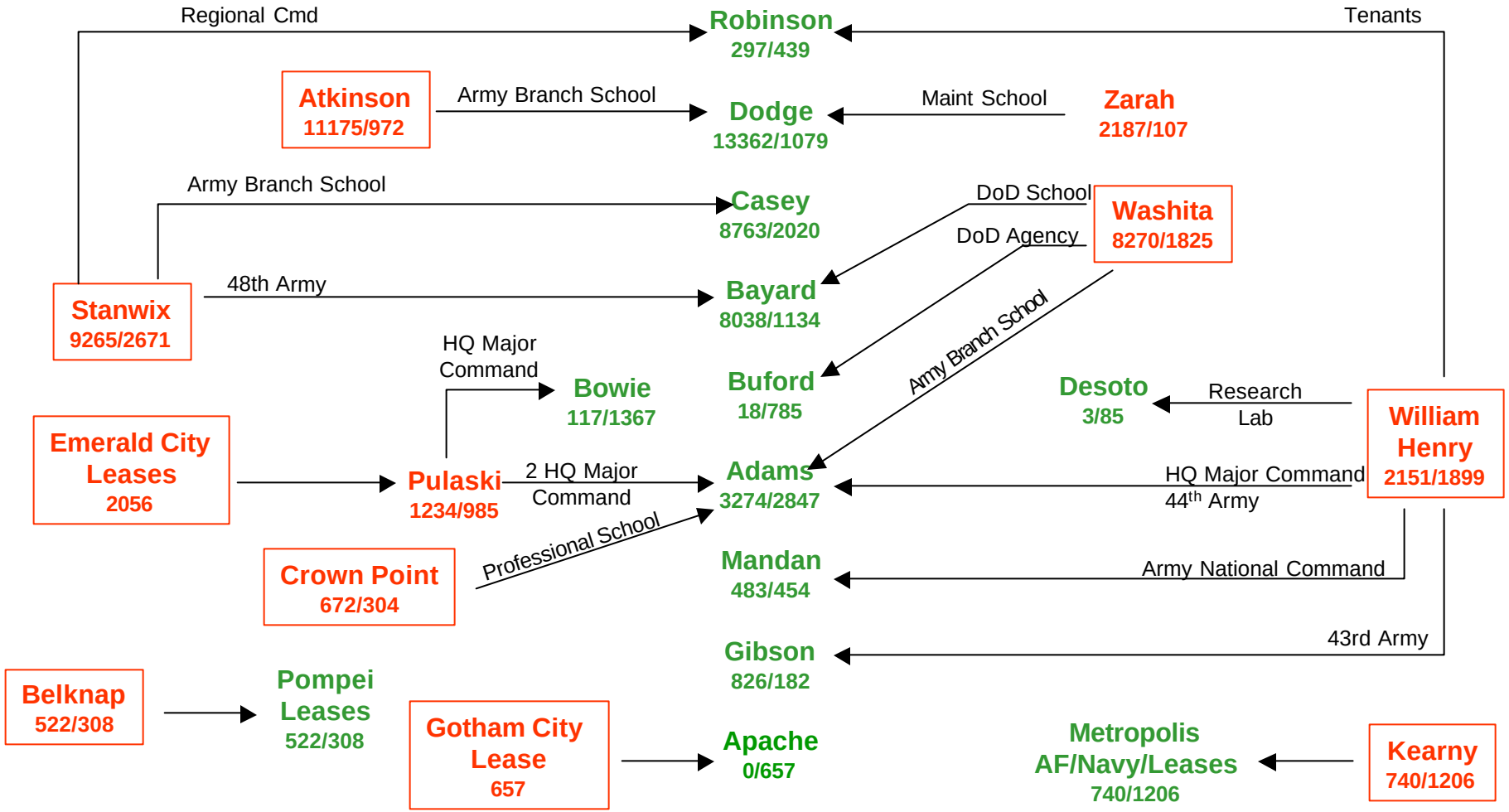
Methodology

Notional COA $3.0B Implementation Cost



Transforming Through Base Realignment and Closure

Green – Gaining Installation Red – Losing Installation Red w/Box – Inactivated Installation Numbers – Military gained or lost / Civilians gained or lost