

Maximizing U.S. Army's Future Contribution to Global Security using the Capability Portfolio Analysis Tool (CPAT)



Edelman Competition Presentation

Overall Classification of the brief is: **UNCLASSIFIED**

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release: distribution unlimited.**

18-Apr-15

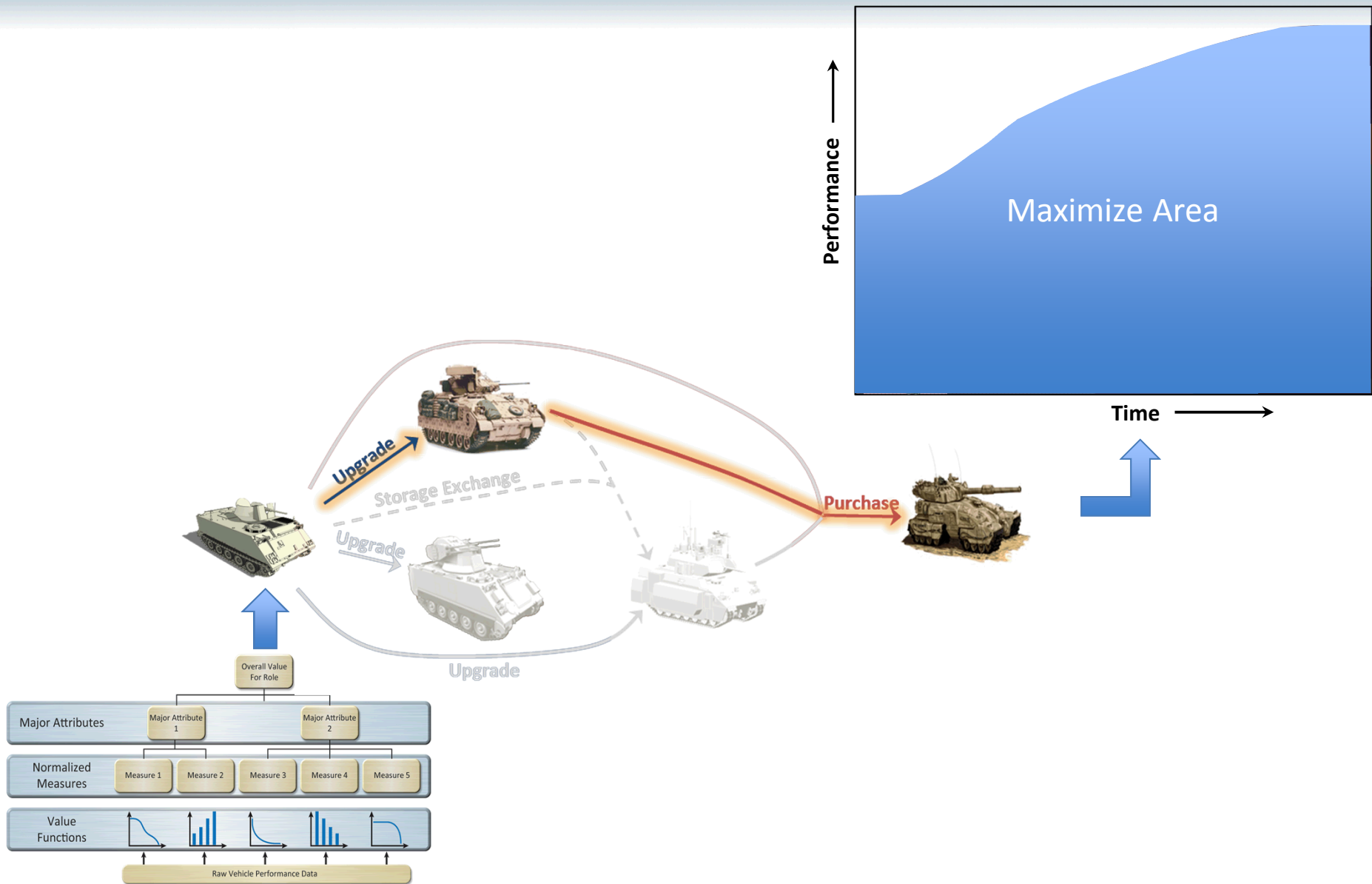


Placeholder for video testimonial from Dr. Hommert





Modeling Approach





Modeling Approach

- More than 40 unique business rules governing the PEO GCS portfolio were captured and formulated
- Model complexity was mitigated via rigorous testing, variable \ constraint reformulations, and extensive tuning
- $x \in \Omega$
 - 70,000 constraints
 - 8,000 integer variables
 - 2,000 binary variables
 - 2,000 continuous variables

$$\sum_{\substack{p,t^*,t^{**}: \\ t^* \leq MLY \\ t+t^*-\beta_{p,i} < t^{**} \leq t+t^*+LT_{p,i}}} PLRIP_{p,i,t^*} \cdot b_{p,i,t^{**}}^5$$
$$VPB_m \cdot \left(nbim_{i,m,t} - \sum_i (u_{j,i,m,t} + s_{j,i,m,t}) - \sum_{\substack{j,t^*: \\ t < t^* \leq t+UPT_{i,j}}} u_{i,j,m,t^*} \right) \geq 0$$
$$BMLY_m \cdot b_{i,m,t}^9 \geq \sum_j s_{j,i,m,t}$$
$$b_{j,t}^3 \leq 1 - b_{i,t^*}^3$$
$$\beta_i^1 + \beta_{p,t}^3 - 1 \leq b_{p,i,t}^3 \leq \frac{\beta_i^1}{\beta_{p,t}^3}$$



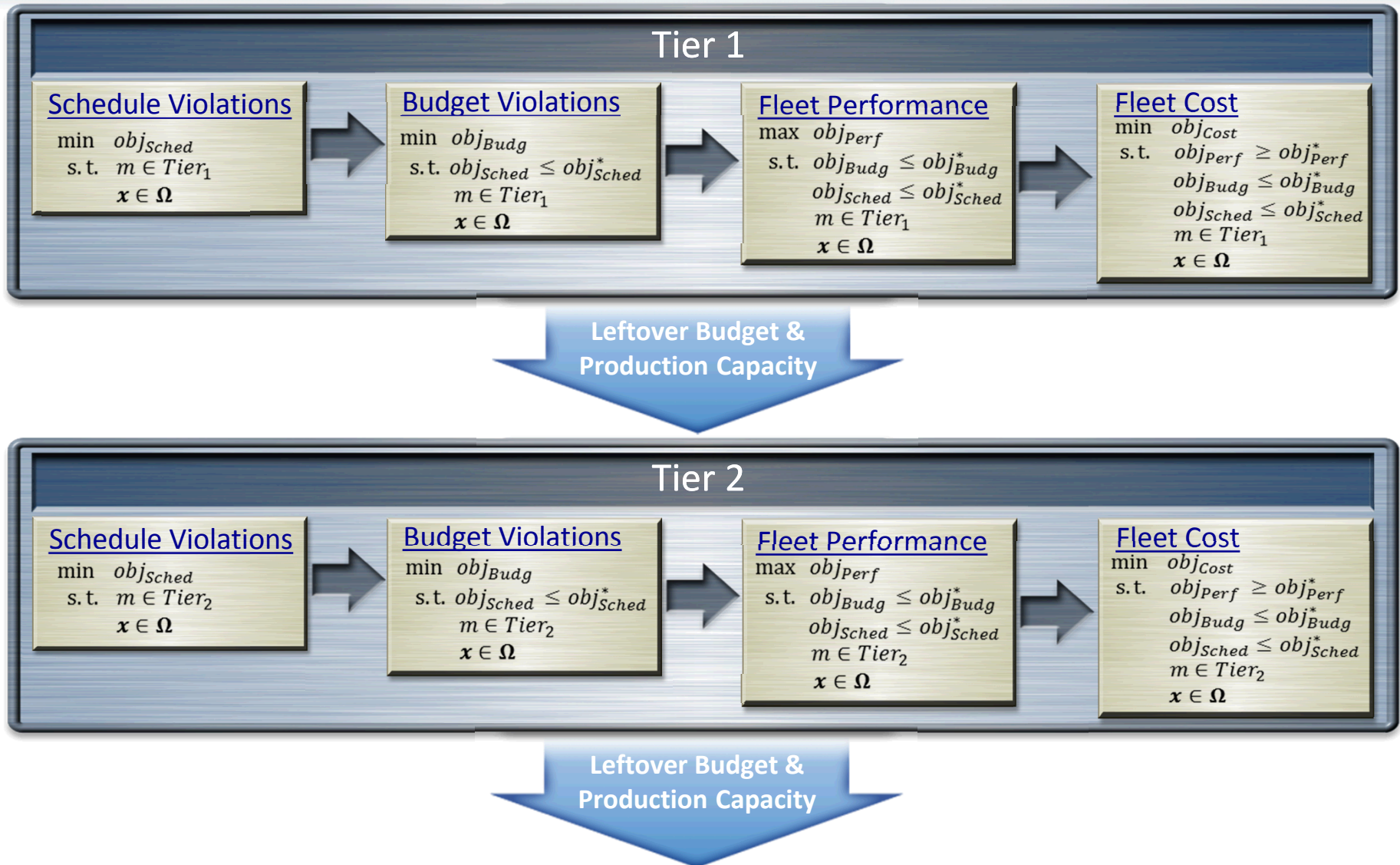


Formulation



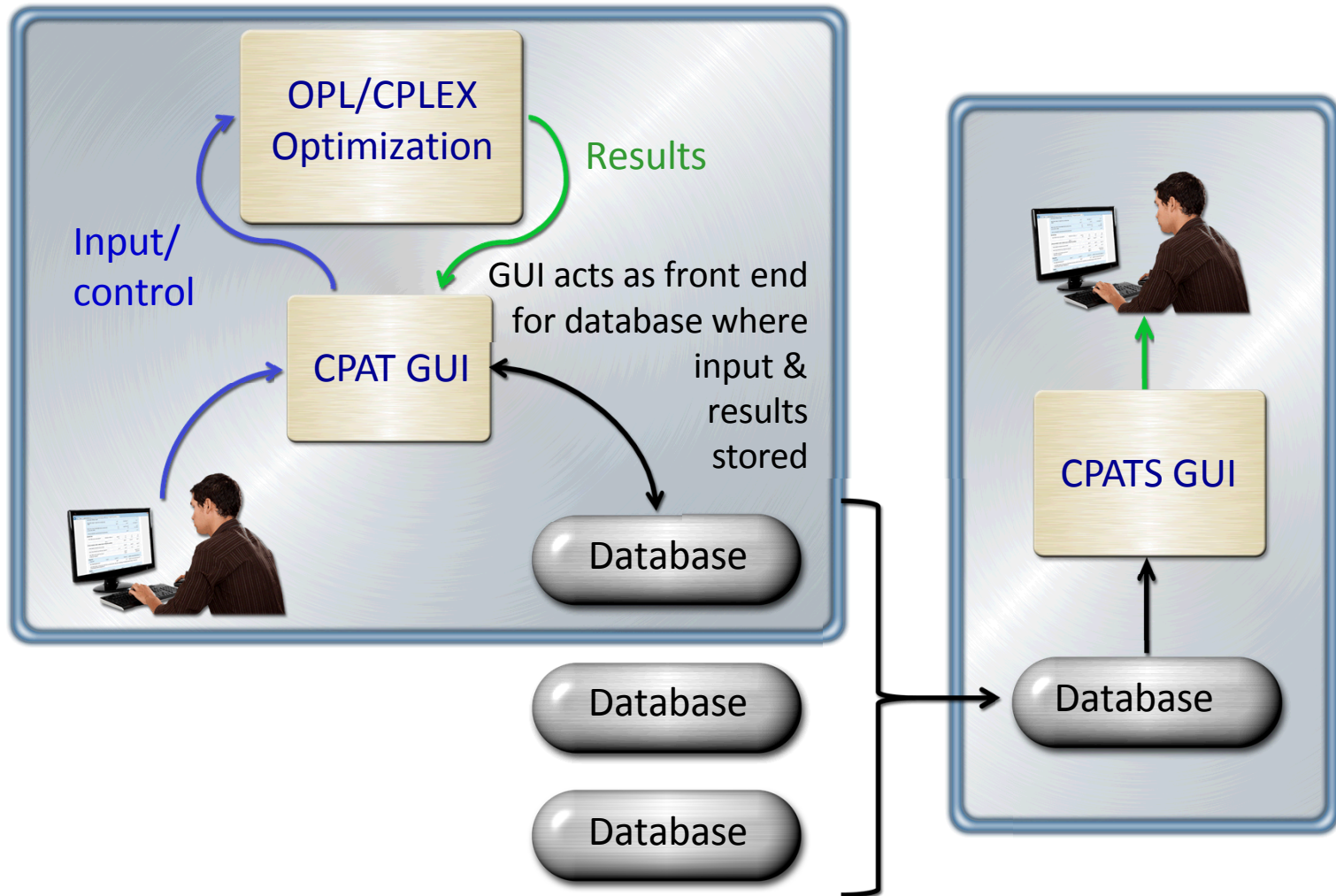


Formulation



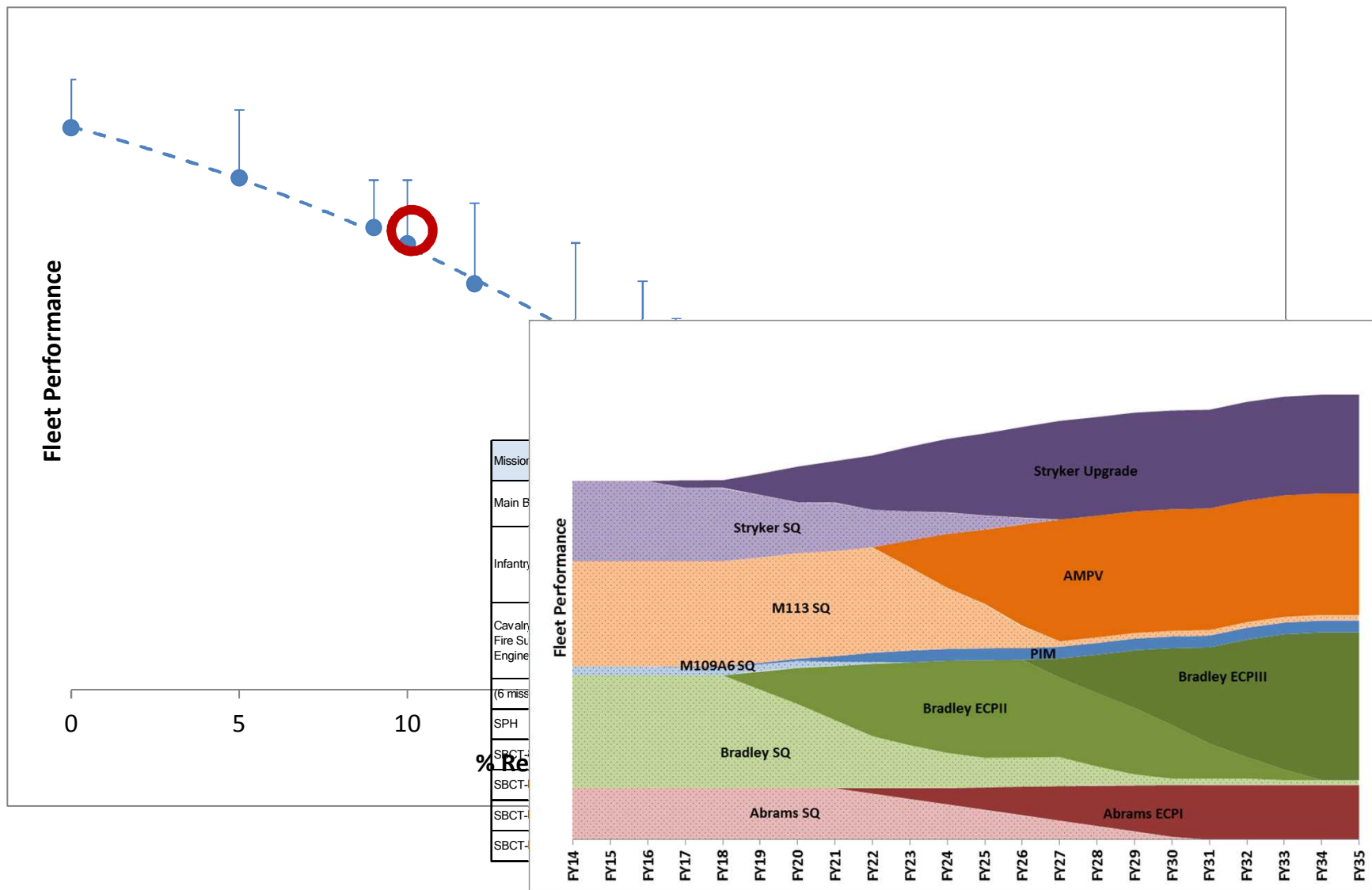


Software



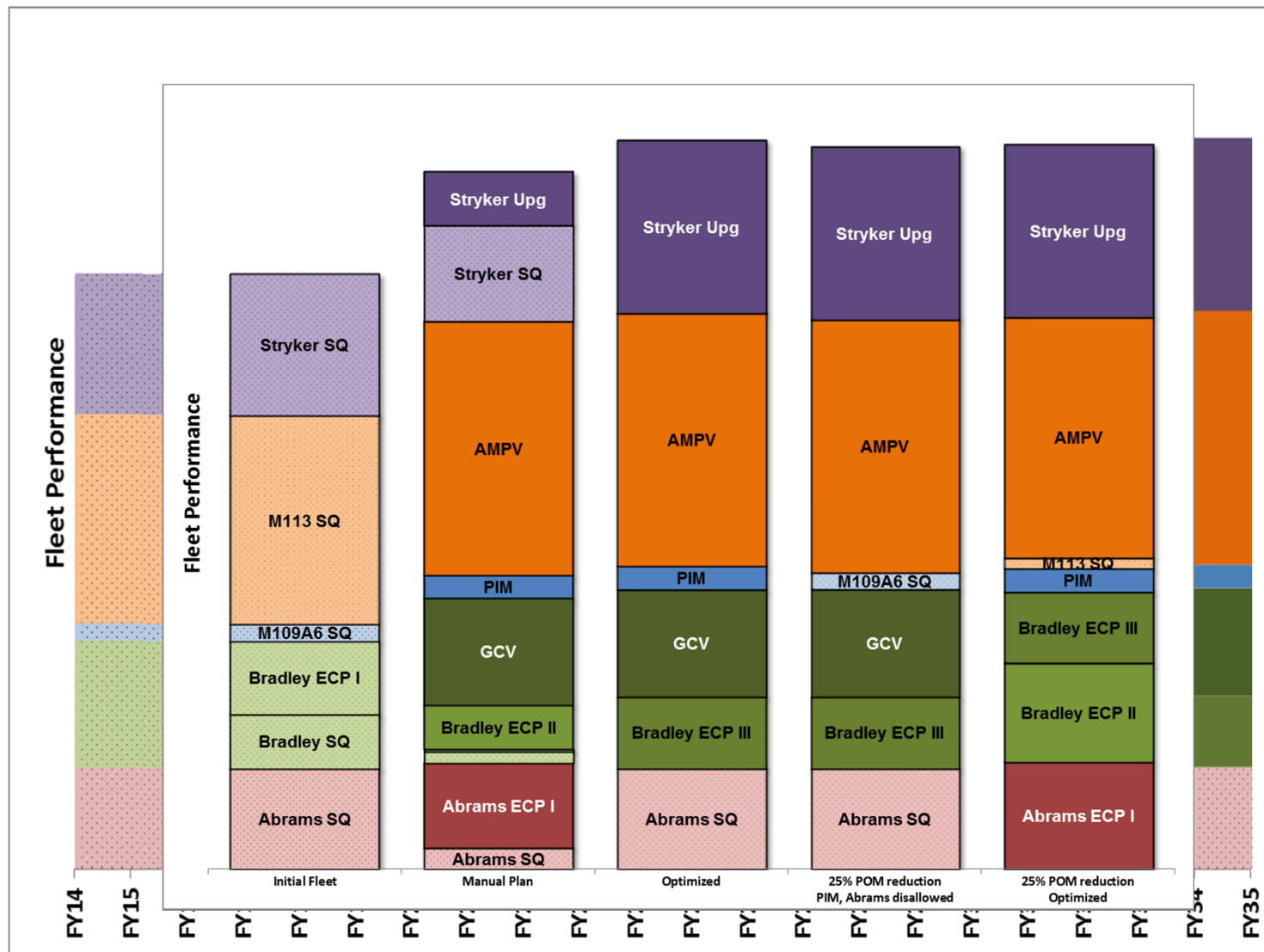


Key Results





Analysis Insights





Key Impacts

Insight/Recommendation	Implemented
Prioritize Stryker modernization	✓
Prioritize/accelerate AMPV modernization	✓
Commit to timely interim modernization such as Bradley ECP II	✓
If FY15-FY18 budgets cut more than 20%, discontinue GCV	✓



- Up to \$5 billion cost avoidance
- Up to 30% greater performance improvement per dollar