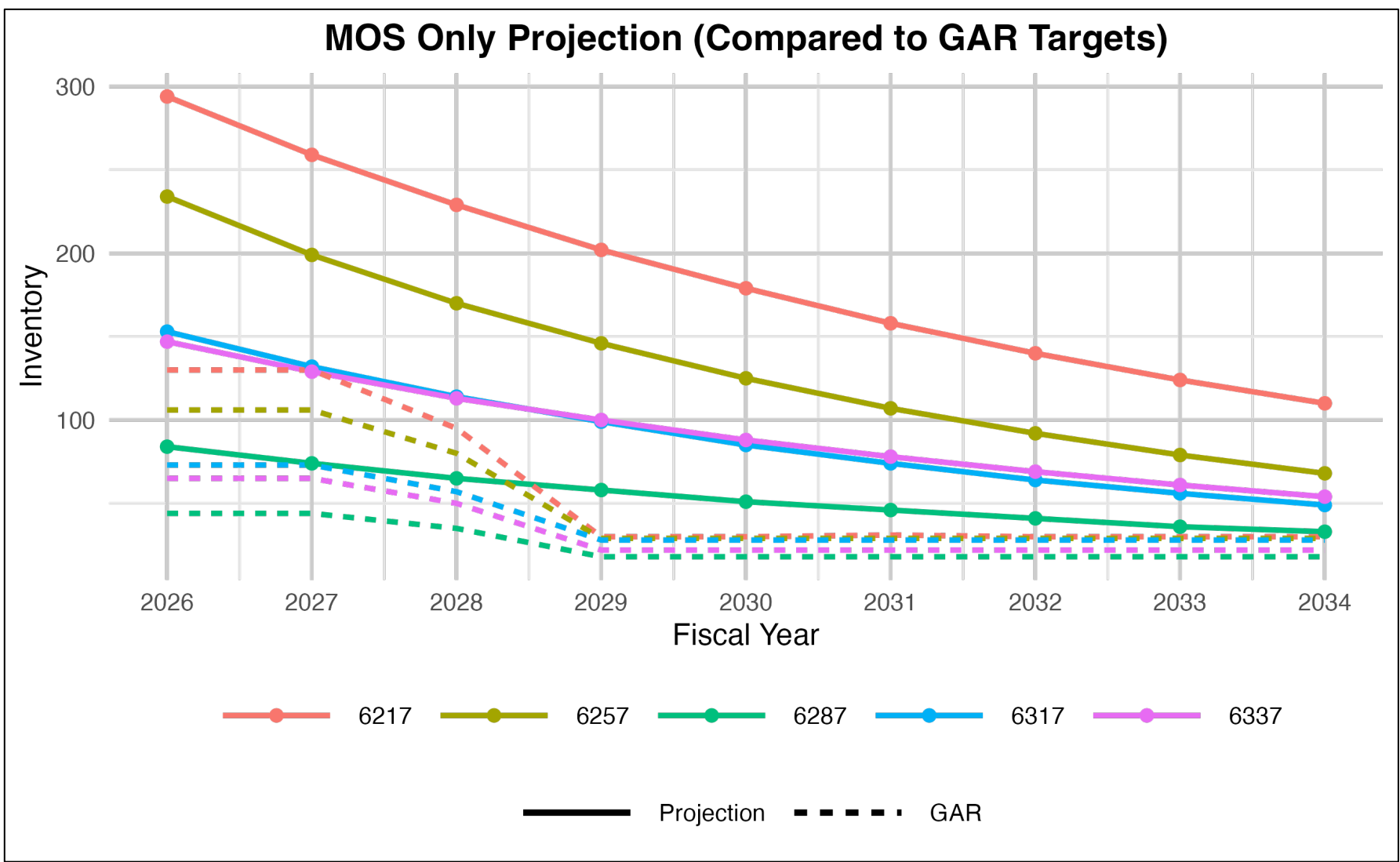


Abstract

- This study examines how enlisted aviation manpower inventories evolve during the Marine Corps F/A-18 divestment. Using Marine Corps Total Force System data from FY2009–FY2025, Markov transition models were developed to forecast personnel flows across five F/A-18 maintenance MOSs. Multiple model structures and training windows were evaluated using Weighted Absolute Percentage Error (WAPE) and bias metrics. The best-performing model was a six-month MOS transition model with a four-span training window. Results indicate that personnel inventories decline more slowly than planning targets assume.

Methods

- Extracted personnel data for FY2009-FY2025 for F/A-18 MOSs: 6217, 6257, 6287, 6317, and 6337.
- Built Markov transition models to estimate personnel movement across MOS and rank states.
- Tested annual and six-month transition intervals using MOS and MOS-by-rank state structures.
- Used rolling training windows to estimate transition probabilities.
- Evaluated model performance using Weighted Absolute Percentage Error and aggregate bias to select the best model for projection.



Observed and Expected Transitions				
MOSR Model Validation Example (Span 4)				
Origin State	Next State	Observed	Expected	Absolute Error
6217 E3	6217 E3	68	91.91	23.91
6217 E3	6217 E4	60	36.32	23.68
6217 E3	6217 E1-E2	4	2.51	1.49
6217 E3	6257 E3	0	0.28	0.28
6217 E3	EAS	6	6.98	0.98

Results & Impact

- Six month model with a four-span training window produced the lowest error.
- Shorter transition intervals captured manpower changes during divestment more accurately than annual models
- Personnel inventories decline more gradually than institute planning targets assume.
- Most grades experience overages, while E-5 inventories show potential shortages.

Future Research

- Examine cross-platform manpower effects as aviation communities transition to new aircraft and personnel redistribute across MOSs.
- Incorporate restraints such as lateral transfer opportunities, promotion availability and B-Billet availability
- Use a combined Markov-optimization framework to generate actionable manpower redistribution strategies during unit/platform divestment.