

Analysis Support Tool (AST)

Role: Data Analyst — Enterprise Analytics Team, U.S. Air Force Acquisition

Tech Stack: Python, openpyxl, Jupyter Notebook

Impact: Reduced quarterly portfolio analysis time from **weeks to seconds**

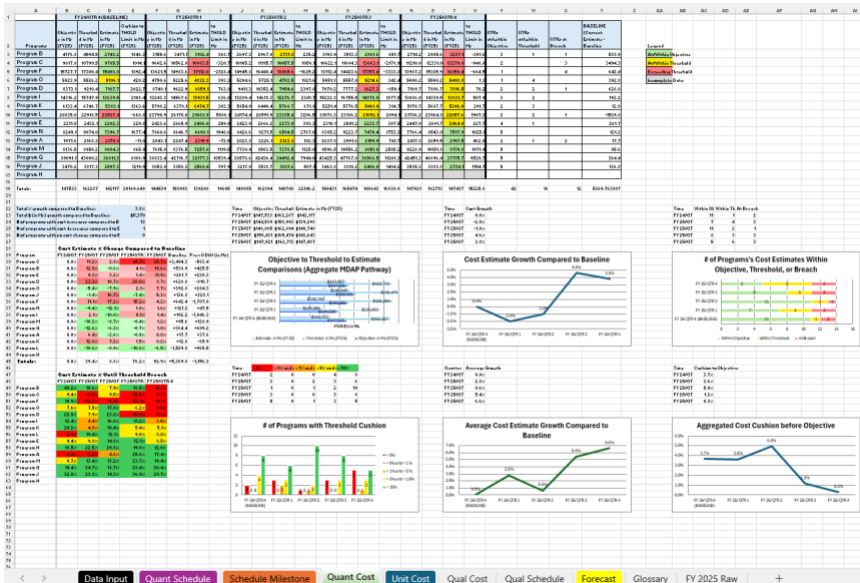
Overview

The **Analysis Support Tool (AST)** is an automated data analysis and visualization pipeline I developed to support acquisition oversight across the U.S. Air Force program portfolio.

AST ingests quarterly program data across **schedule, cost, and unit cost metrics**, performs hundreds of automated calculations, and generates a **fully formatted Excel analysis workbook** containing heat maps, charts, summary tables, and a predictive concern forecast.

Before AST, the analyst team spent **weeks each quarter manually calculating metrics, formatting spreadsheets, and building charts**. AST consolidates that entire workflow into a single automated process that runs in seconds, allowing the analyst team to focus on interpretation and strategic insights rather than manual data processing.

Sample Output



Sample output from the Quant Cost analysis sheet (dummy data). A single sheet includes conditionally formatted program tables sorted by risk, gradient heat maps tracking estimate growth, aggregated comparison charts, trend lines, threshold cushion breakdowns, and summary statistics — all generated automatically.

Core Functionality

Automated Multi-Sheet Data Pipeline

AST reads program-level data from a master **Data Input** sheet and automatically distributes relevant fields across five interconnected analysis sheets:

- Quantitative Schedule
- Schedule Milestone
- Quantitative Cost
- Unit Cost (PAUC)
- Forecast

Each sheet dynamically pulls only the columns relevant to its analysis and links programs by name to maintain consistency across the entire workbook.

Schedule Analysis

For each acquisition program, AST evaluates schedule performance by comparing **Final Milestone Estimates** against **Objective and Threshold milestone targets**.

The tool automatically:

- Calculates months-from-milestone variance
- Computes cushion-to-threshold metrics
- Flags program status using conditional formatting
 - **Green:** within objective
 - **Yellow:** within threshold
 - **Red:** threshold breach
- Tracks quarter-over-quarter estimate changes

Gradient heat maps highlight shifts in schedule estimates, while automatically generated charts compare objectives, thresholds, and estimates across quarters.

Cost Analysis

Cost data from each reporting quarter is normalized to **constant FY2025 dollars** using deflator conversion factors.

AST then calculates:

- Threshold values (10% above objective)
- Cushion percentages
- Baseline-to-current growth rates

The tool generates trend charts, stacked status charts, and heat maps to visualize cost growth and identify programs approaching cost thresholds.

Unit Cost (PAUC) Analysis

Program Acquisition Unit Cost metrics are analyzed using the same automated framework.

AST calculates variance from objective cost targets, ranks programs by severity of deviation, and visualizes quarter-over-quarter unit cost changes in heat maps and summary dashboards.

Predictive Forecast Engine

The **Forecast** module synthesizes signals from both quantitative metrics and qualitative analyst assessments.

For each program, AST evaluates indicators such as:

- Increasing schedule estimates from baseline
- Quarter-over-quarter schedule growth
- Threshold breaches
- Negative qualitative outlook assessments

These indicators are weighted and combined into **composite cost and schedule concern scores**, which flag programs requiring attention.

The results are summarized through visual dashboards showing the proportion of programs exhibiting **cost concern, schedule concern, or both**.

Dynamic Quarter Detection

AST automatically detects which quarters contain data and dynamically adjusts:

- Calculations
- Table layouts
- Chart ranges
- Summary statistics

This allows the same codebase to run seamlessly across reporting periods without manual updates.

Technical Highlights

- **Automated conditional formatting**
Gradient heat maps scale color intensity based on deviation magnitude, providing immediate visual insight into portfolio health.
 - **Constant-year normalization**
Cost data is converted using fiscal-year deflators to ensure that cross-quarter comparisons reflect real growth rather than inflation.
 - **Risk-based sorting**
Programs are automatically ranked by their most recent cushion or variance values to surface the highest-risk programs.
 - **Programmatic chart generation**
The tool generates **20+ charts** (bar charts, stacked bars, line graphs, and pie charts) with customized formatting and labels.
 - **Data integrity handling**
Programs with incomplete data are visually flagged and excluded from aggregated metrics to prevent skewed analysis.
 - **Cross-sheet forecast integration**
The forecasting module pulls signals from multiple quantitative and qualitative sheets to produce a unified program risk assessment.
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Impact

Before AST, quarterly portfolio analysis required analysts to manually update formulas, color hundreds of cells, rebuild charts, and cross-reference data across worksheets — a process that often took **weeks to complete** and introduced opportunities for human error.

AST fully automates this workflow, enabling the team to generate **presentation-ready portfolio analysis within seconds of receiving updated data**.

This shift allowed analysts to focus on **interpreting trends and supporting leadership decision-making**, rather than performing repetitive spreadsheet operations.