# NASA Schedule Analysis Tool

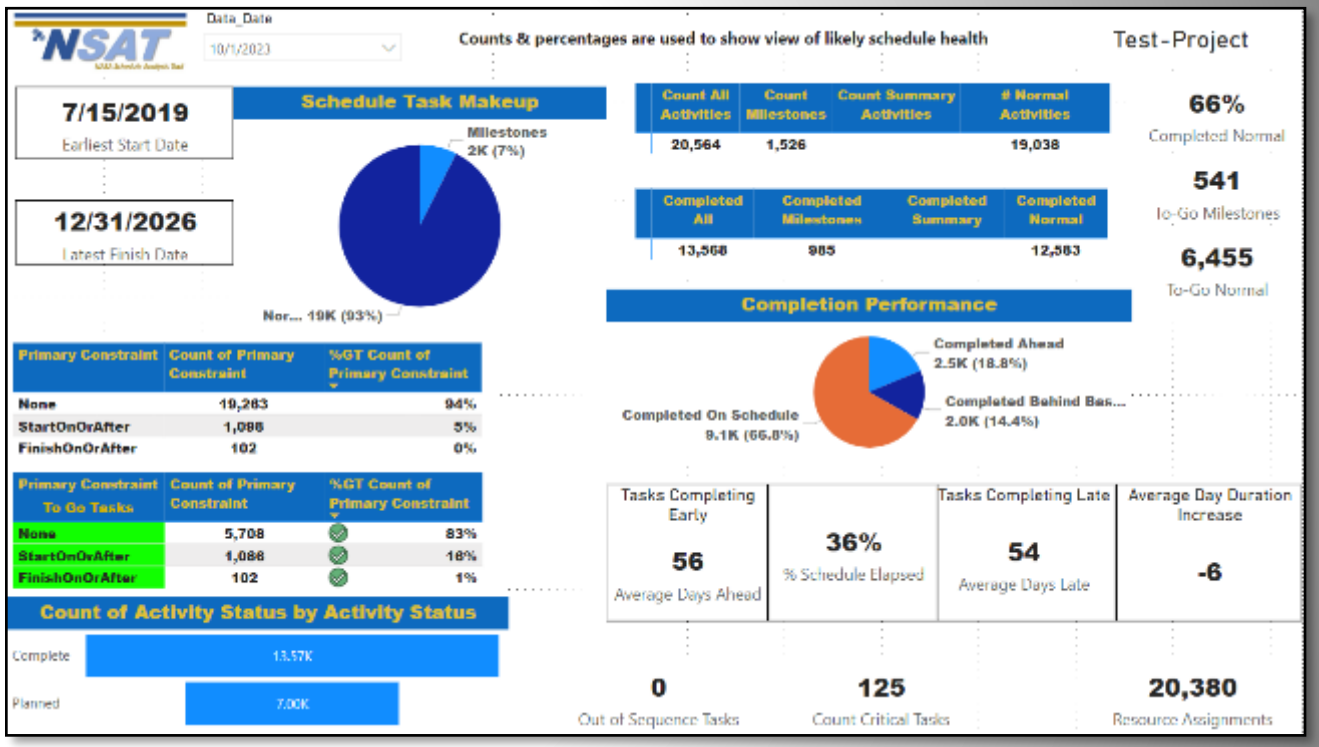
(NSAT)

# NSAT
# (NASA Schedule Analysis Tool)

NSAT aims to streamline process of repetitive schedule analysis by leveraging capabilities of Power BI.

Analysis has been developed with support of scheduling community, agency experts & AI.

- **Goals:**
  - **Rapidly deployable analysis**
  - **Easily understandable by analysist/project management**
  - **Expandible**
  - **Tailorable**



Making Everything Easier

# Schedule Analysis FOR DUMMIES®

How to quickly & easily assess project performance

If you aren't Robin or Michelle

NSAT was developed from a series of simplified schedule analysis techniques developed by Glenn Butts for the 2021 Cost & Schedule Symposium.

A Reference for the Rest of Us!®

FREE eTips at dummies.com®

# Why?


- **Saving analysis time**
  - Decrease rework
  - Allows analyst to focus on discrete tasks
- **Saving Project Management time**
  - Better confidence in analysis
  - Decreased time for decisions
  - Data backed decision making
- **Increasing speed to insight**
  - New schedules can be loaded in less than 10 minutes
- **Showing numerical trends visually**

# What?

## It is:

- A tool to support analysis
- One-Size-Fits-Most
- Rapidly deployable
- A repeatable solution
- Customizable
- Scalable

## It is not:

- A system
- An end-to-end tool with every analysis preloaded
- Guarantee of success
- Substitute for strategy
- Replacement for human judgment

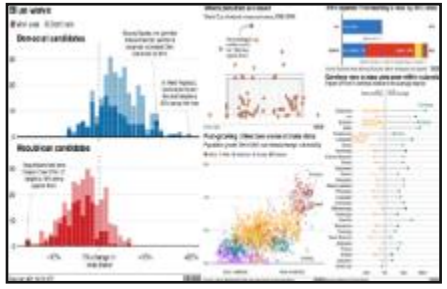
# Key Features

Deployability

Standardized Analysis

Schedule Monitoring

Customization



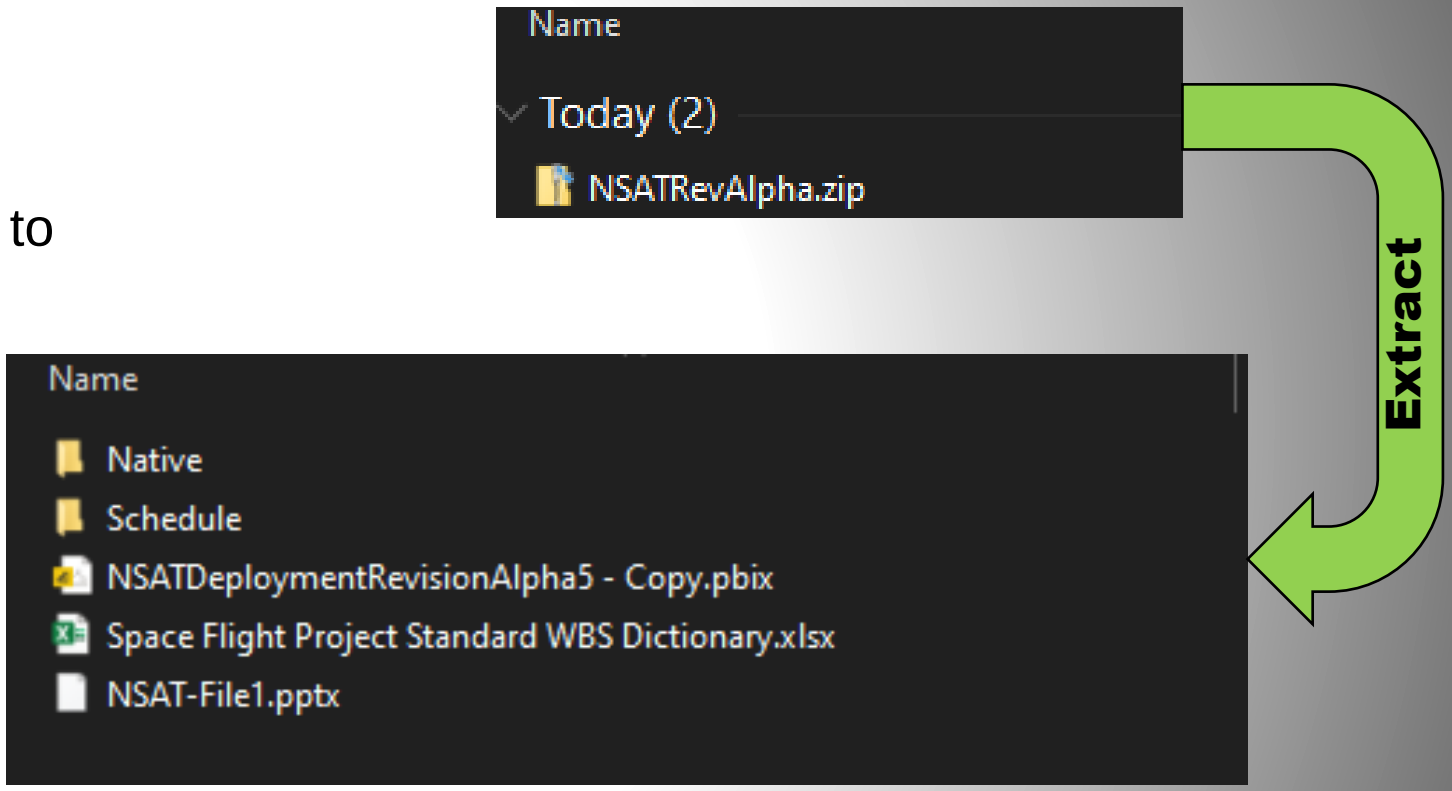
Data Visualization

Predictive Analytics

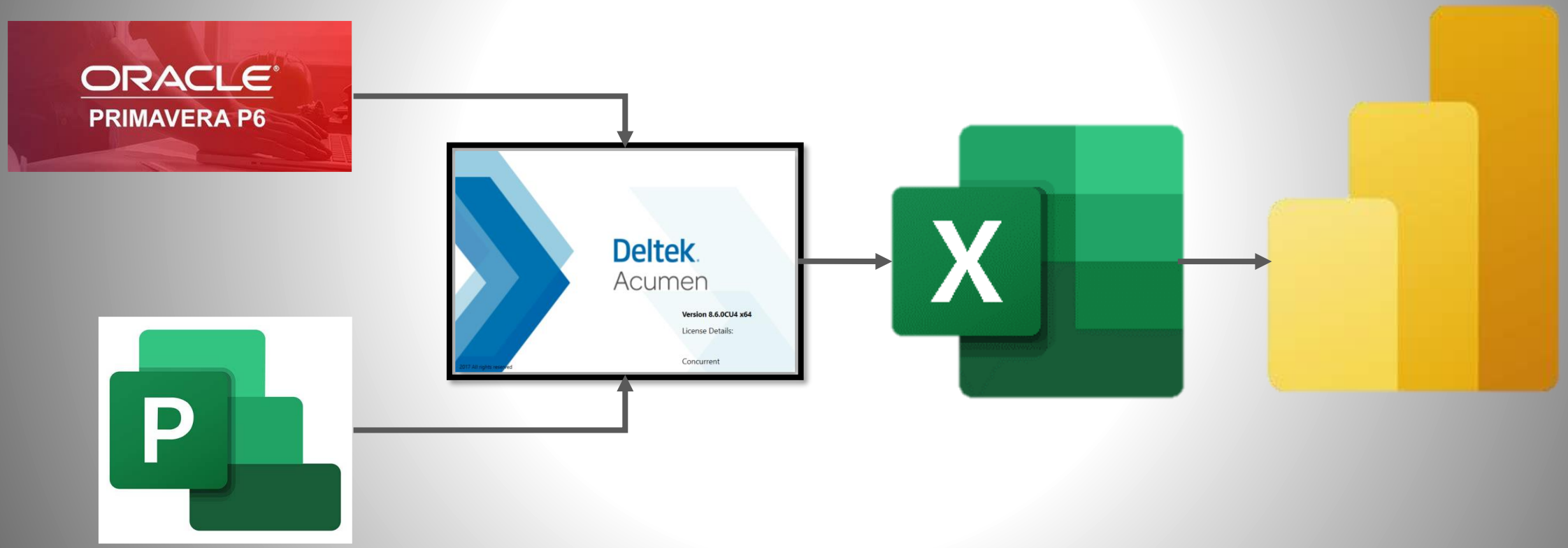
# Deployability

Rapid Deployment- NSAT was developed to be quickly deployable to all types of projects

- Efficient Collaboration
- Mobile Accessibility
- Data Integration
- Scalability
- Security/Compliance
- Ease of Adoption

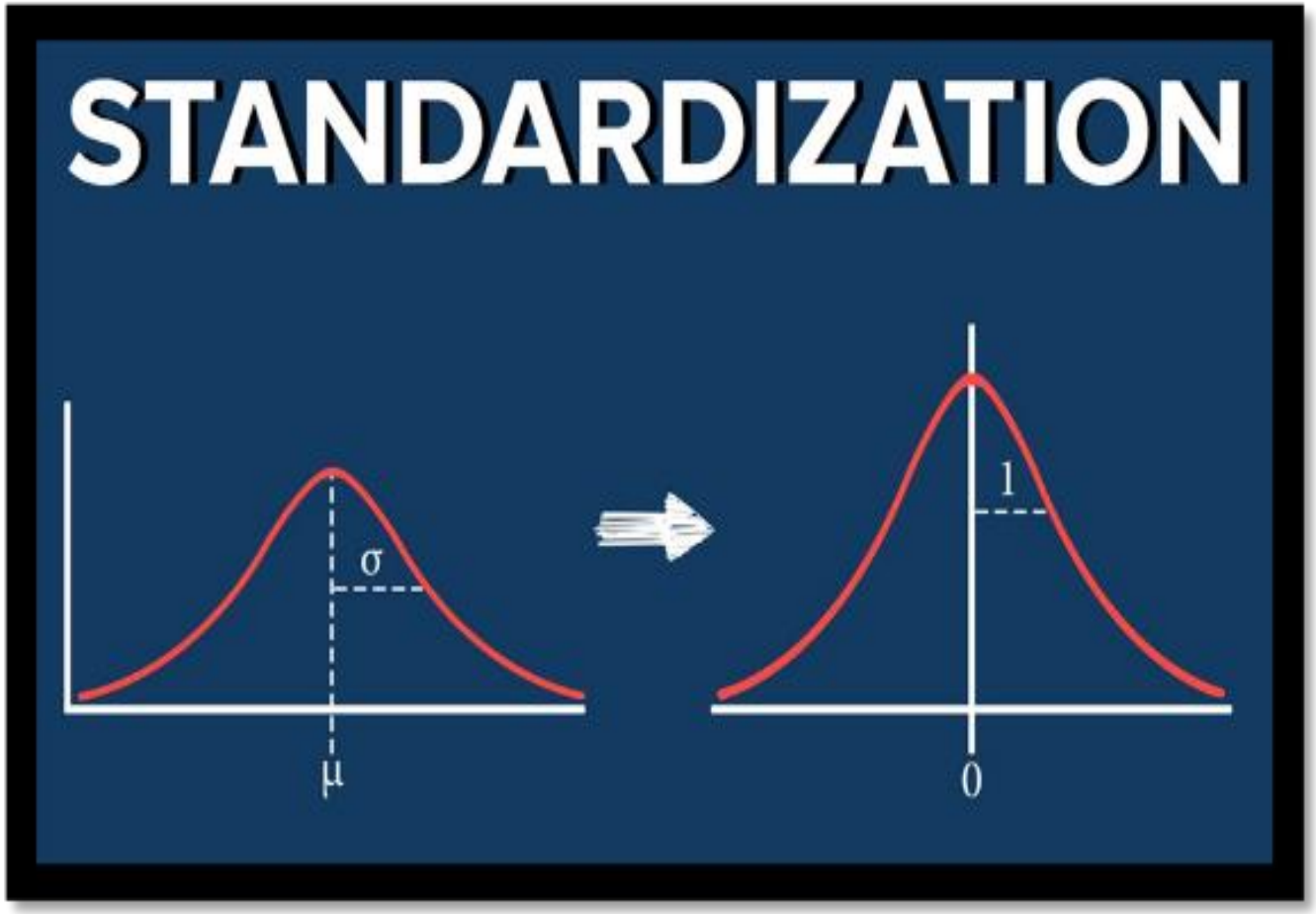


# How does it work?



# Standardized Analysis

- Consistency
- Efficiency
- Accuracy
- Clear Communication.
- Improved Decision-Making
- Risk Management
- Enhanced Accountability
- Cost Savings



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Data_Date
10/1/2023

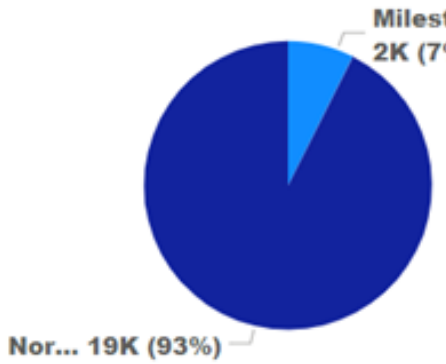
Counts & percentages are used to show view of likely schedule health

# Test-Project

**7/15/2019**
Earliest Start Date

**12/31/2026**
Latest Finish Date

## Schedule Task Makeup




| Count All Activities | Count Milestones | Count Summary Activities | # Normal Activities |
|---|---|---|---|
| 20,564 | 1,526 | | 19,038 |

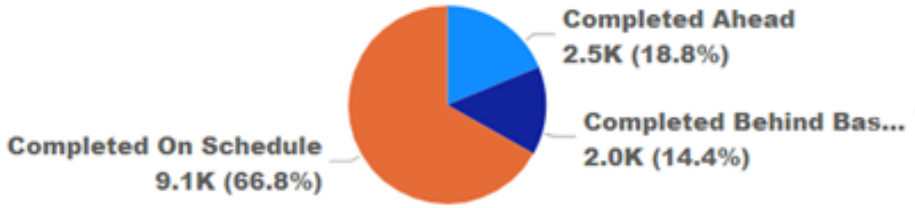
| Completed All | Completed Milestones | Completed Summary | Completed Normal |
|---|---|---|---|
| 13,568 | 985 | | 12,583 |

**66%**
Completed Normal

**541**
To-Go Milestones

**6,455**
To-Go Normal

## Completion Performance

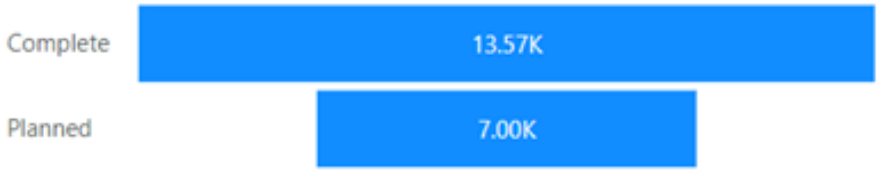



| Primary Constraint | Count of Primary Constraint | %GT Count of Primary Constraint |
|---|---|---|
| None | 19,263 | 94% |
| StartOnOrAfter | 1,098 | 5% |
| FinishOnOrAfter | 102 | 0% |

| Primary Constraint To Go Tasks | Count of Primary Constraint | %GT Count of Primary Constraint |
|---|---|---|
| None | 5,708 | 83% |
| StartOnOrAfter | 1,086 | 16% |
| FinishOnOrAfter | 102 | 1% |

| Tasks Completing Early | | Tasks Completing Late | Average Day Duration Increase |
|---|---|---|---|
| **56** Average Days Ahead | **36%** % Schedule Elapsed | **54** Average Days Late | **-6** |

## Count of Activity Status by Activity Status




**0**
Out of Sequence Tasks

**125**
Count Critical Tasks

**20,380**
Resource Assignments

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Data_Date
4/1/2024

Project

# Performance Indices

| 3.9 | 1.8 | 1.5 | 1.4 | 0.9 | 2.7 |
|---|---|---|---|---|---|
| BEI | CEI | EPI | MEI | SPI | Start to Finish Ratio |

**Baseline Execution Index (BEI)**
Whether project is ahead of schedule (BEI > 1.0), on schedule (BEI = 1.0), or behind schedule (BEI < 1.0).

BEI=#Planned Activities (Baseline Finish)/ #Completed Activities (Actual Finish)

**Current Execution Index (CEI)**
If project ahead of schedule (CEI > 1.0), on schedule (CEI = 1.0), or behind schedule (CEI < 1.0).

CEI=#Planned Activities
CEI calculated by comparing total work or tasks completed according to baseline schedule (Baseline Finish) to total work or tasks completed in actual schedule (Actual Finish) up to selected data date.

**Execution Performance Index (EPI)** Schedule efficiency. Overly Efficient (EPI > 1.0), Properly executing (EPI = 1.0), or Poor Execution (EPI < 1.0).

EPI= #Activities Planed to Be Started/ Completed # Activities Started & Completed

**Milestone Performance Index (MPI)** Schedule efficiency. Overly Efficient (EPI > 1.0), Properly executing (EPI = 1.0), or Poor Execution (EPI < 1.0).

MPI= #Activities Planed to Be Started/ Completed # Activities Started & Completed

**Schedule Performance Index (SPI)**
SPI > 1.0: More achieved than original plan
SPI = 1.0: All planned achieved
SPI < 1.0: Fewer achieved than original plan

SPI=#Planned Tasks/ #Completed

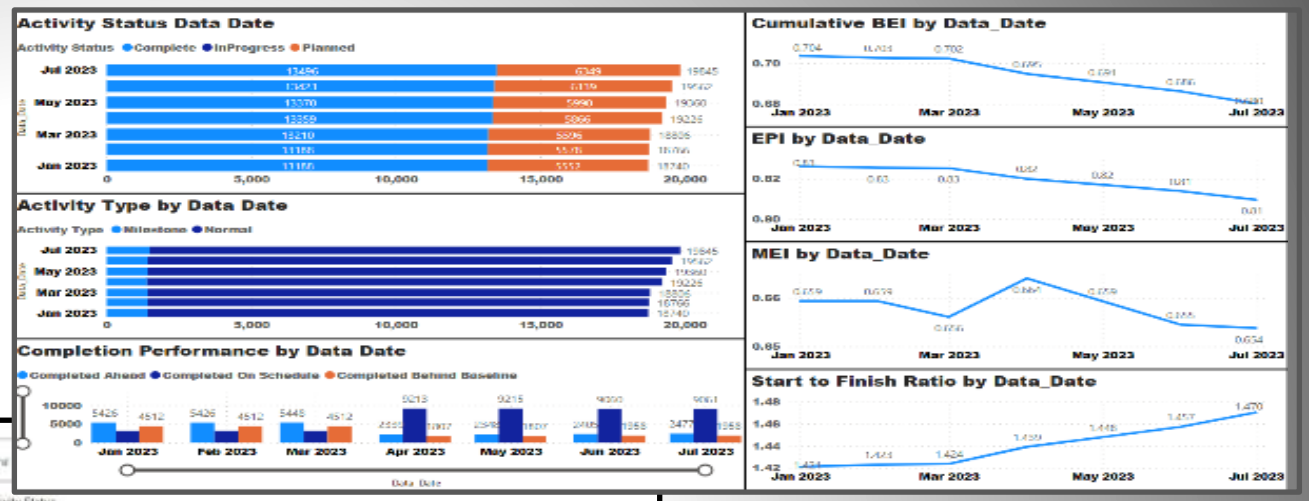
**Completion Ratio**
Start Finish Ratio (SF):
High SF Ratio (greater than 1.0): Indicates that more activities have started relative to those that have finished. It suggests that the project is actively initiating new tasks but may not be completing them at same pace. This could be an early warning sign of potential bottlenecks or resource allocation issues that need attention.

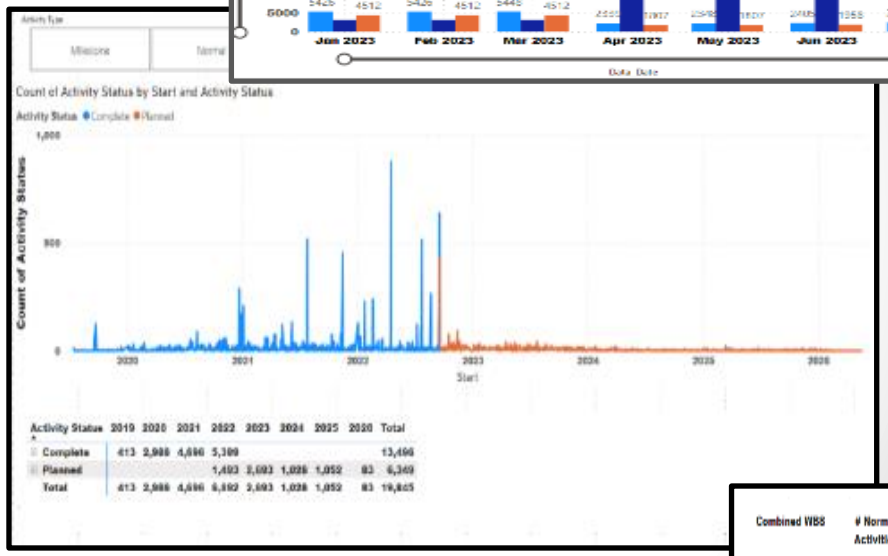
Low SF Ratio (less than 1.0): Suggests more activities have been completed compared to those that have started. It implies project is effectively finishing tasks, but there may be slowdown in starting new ones. This could be due to lack of resources or dependencies causing delays.

- **BEI** Evaluates schedule performance at specific points in time against original schedule baseline.
- **CEI** Current Execution Index, Performance metric used in project management to assess the progress of project or schedule at specific point in time, typically based on selected data date.
- **EPI** is focused on project's overall schedule efficiency & if on track to meet goals
- **MEI** monitors progress of critical project milestones execution.
- **SPI** monitors progress of task execution.

# Schedule Monitoring

- Oversight
- Early Issue Detection
- Proactive Measures
- Resource Optimization
- Improved Communicationa
- Data-Driven Decisions
- Risk Mitigation
- Enhanced Performance

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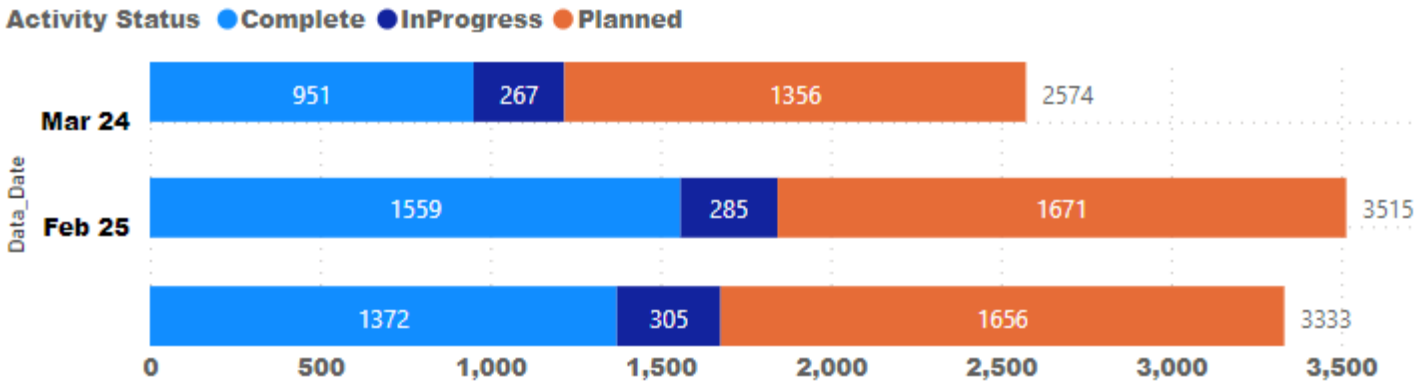
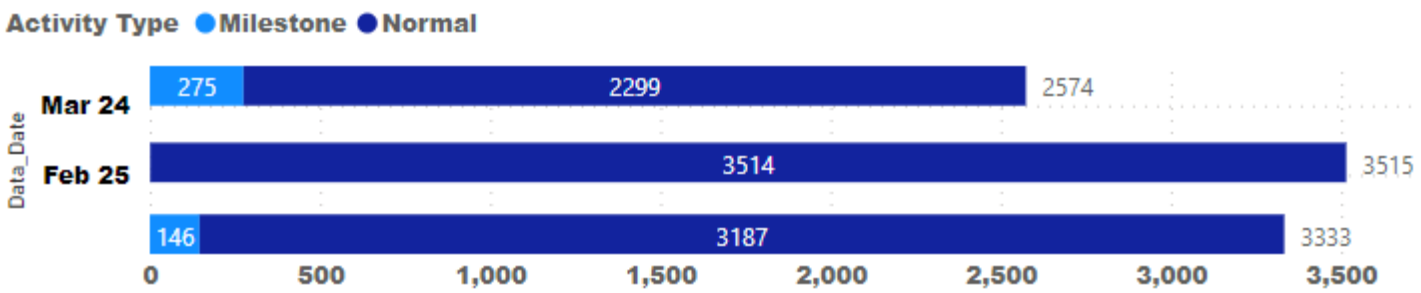
| Combined WBS | # Normal Activities | % Normal Tasks | To Go Tasks | %To Go Tasks | Completed Tasks | %Completed Tasks | Average Days Ahead | Average Days Late | Average Completion Variance | Activities Longer Than Planned | % Activities Longer Than Planned | Activities Shorter Than Baseline |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07-Mission Operations | 34,602 | 27.8% | 10,160 | 27.0% | 24,514 | 28.3% | 82.3 | 46 | 20 | 8,868 | 42.7% | 26,376 |
| 02-Systems Engineering | 33,730 | 26.7% | 10,037 | 26.0% | 24,793 | 28.6% | 70.7 | 48 | 23 | 8,372 | 38.7% | 26,706 |
| 05-Payload(s) | 36,883 | 29.0% | 11,159 | 29.6% | 24,928 | 28.8% | 37.7 | 99 | 6 | 5,724 | 17.6% | 28,793 |
| 08-Spacecraft | 17,824 | 14.3% | 5,306 | 14.3% | 12,428 | 14.3% | 32.6 | 56 | 3 | 1,786 | 8.6% | 13,350 |
| Total | 124,310 | 100.0% | 37,656 | 100.0% | 86,663 | 100.0% | 66.0 | 49 | 21 | 30,750 | 100.0% | 93,234 |

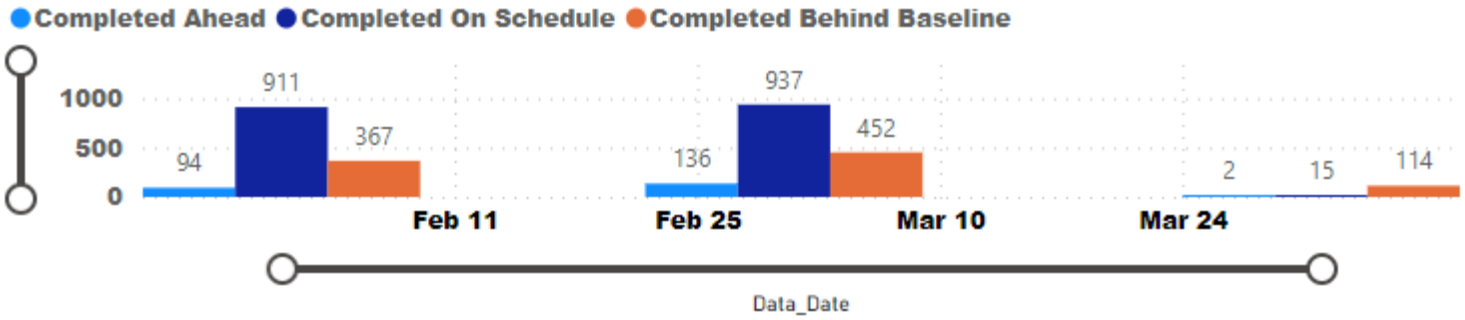
## Activity Status Data Date



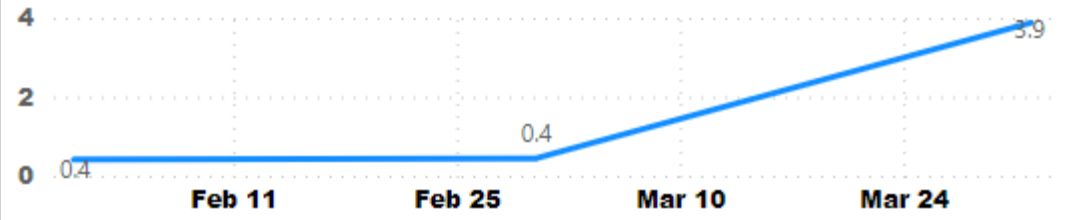

## Activity Type by Data Date



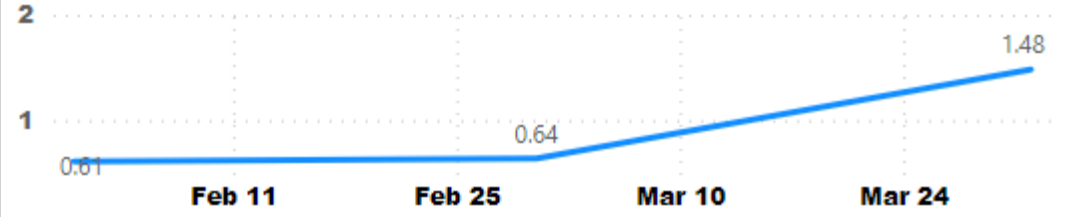

## Completion Performance by Data Date



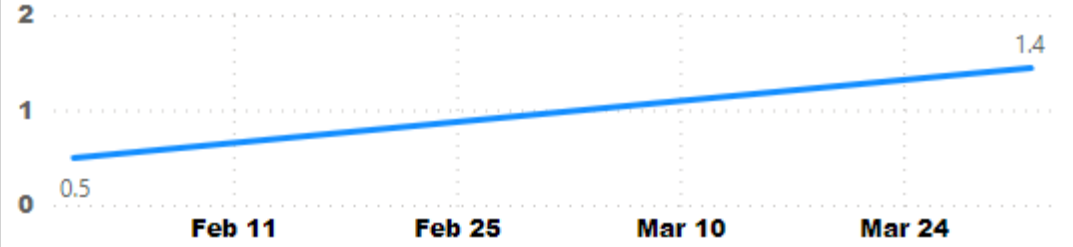

## Cumulative BEI by Data_Date



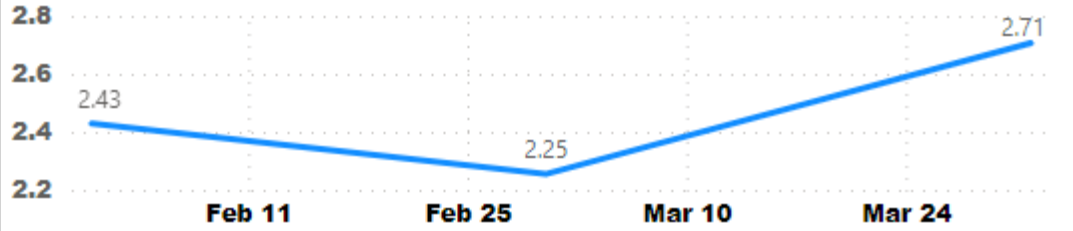

## EPI by Data_Date




## MEI by Data_Date




## Start to Finish Ratio by Data_Date



# Customization

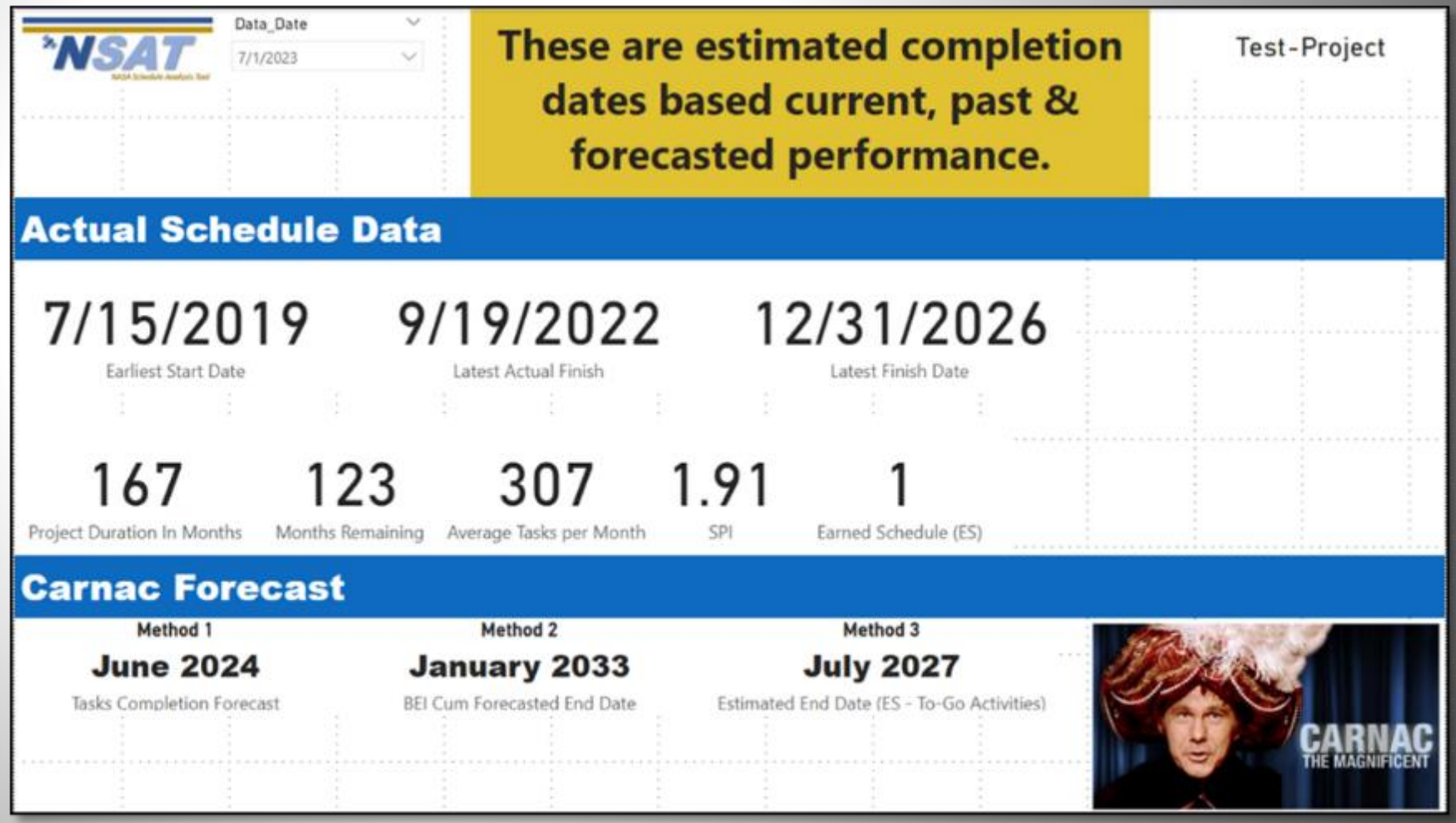
- NSAT has “out of the box” functionality
- Existing functionality can be modified
- New Calculations or Methods of Measure can be quickly added
- New or different visuals can be added

# Data Visualization

- Identifying Patterns
- Comparing Performance
- Enhancing Communication

# Predictive Analysis (CARNAC)

- **Anticipatory Insights:** Provides predictive forecasts for project schedules.
- **Risk Anticipation:** Forecasts potential schedule deviations risks.
- **Preventive Measures:** Allows proactive planning to prevent delays.
- **Strategic Planning:** Supports long-term planning & decision-making.
- **Efficiency Improvement:** Helps in streamlining operations & workflows.
- **Continuous Improvement:** Enables ongoing refinement of project strategies.
- **Mission Success:** Contributes to achieving mission objectives on time & within budget.



# Current ⇨ Future Development

**Current Version:**

- Schedule makeup metrics
- Performance metrics
- Schedule versus activities
- Cross file comparison
- Float analysis
- Finish analysis
- Completion metrics
- Slippage
- Finish forecast

**Future Development:**

- Current Period & Cumulative Performance Metrics
- New Schedule Calculations
- New Visuals
- New Carnac Forecast
- New Carnac visual
- Task drift chart


BUT

WAIT

THERE'S

EVEN

MORE

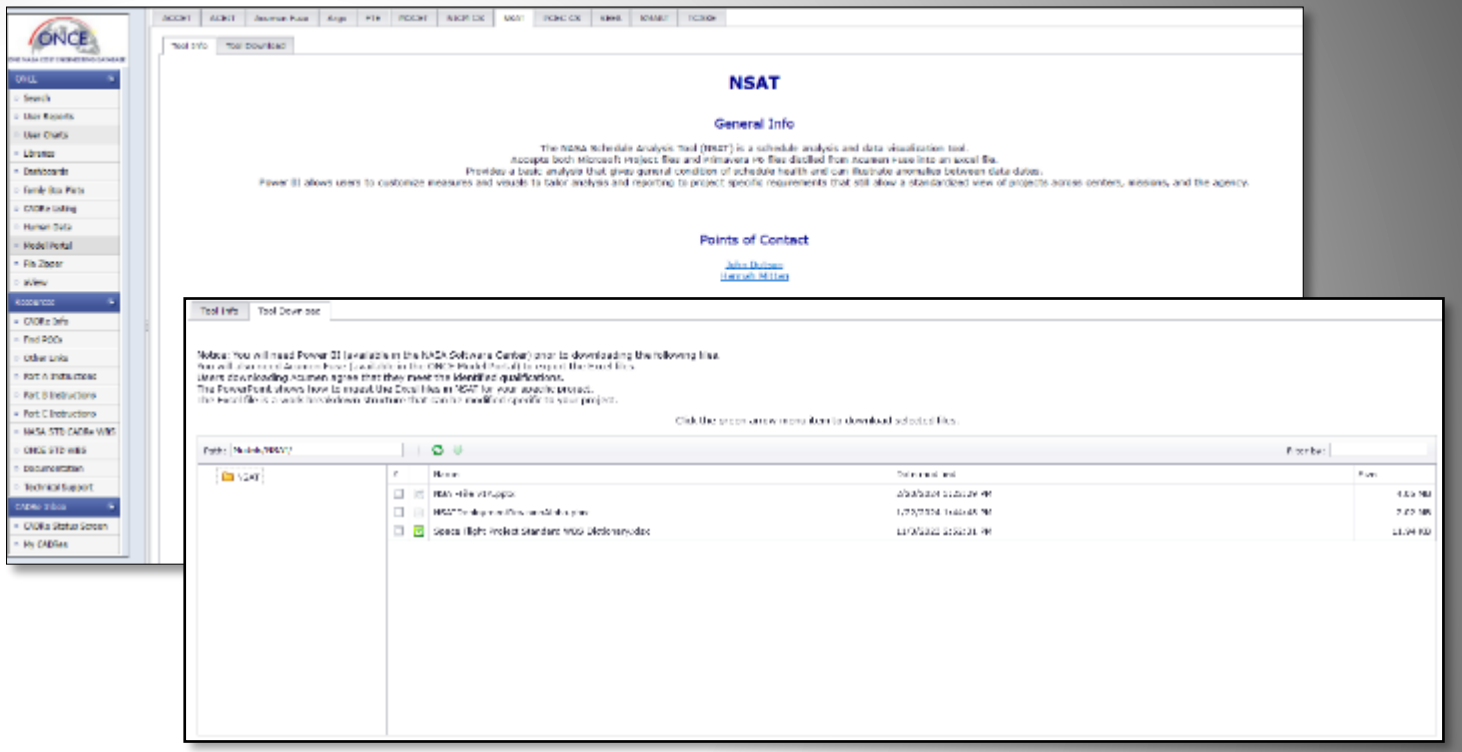


AS SEEN ON TEAMS

IT'S FREE!

# Where to get it?

NSAT can be downloaded for free on ONCE under model portal



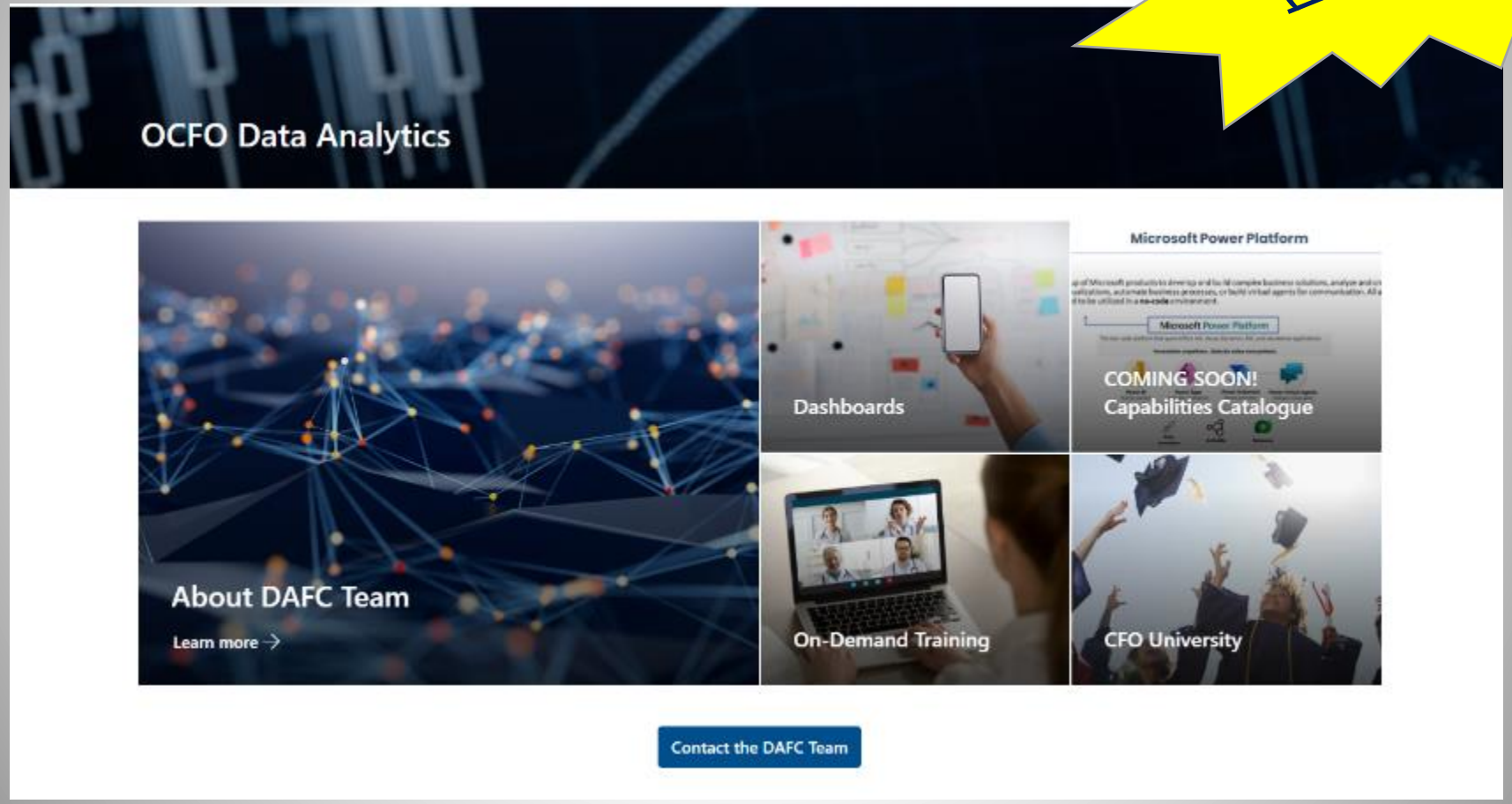

https://oncedata.hq.nasa.gov/frmMainSplit.aspx

# Summary

NSAT can revolutionize current methods of schedule analysis through, efficentic, data analysis, & visualization resulting in effective communication.

# Shameless plug!

OCFO Data Analytics (sharepoint.com)



# Many Thanks!

Glenn Butts, Hannah Mittan, Aamir Ahmad, Gaby Ballesteros, Michele King, Jeff Slade and many more.

# John C. Dotson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