



# Smart Projects And Reviews with Transformative Analytics - SPARTA

## Cost and Schedule Symposium

*Jim Price*

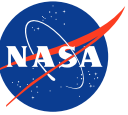
*Matt Dosberg*

*Sharon Straka*

*Tara Dulaney*

**04 May 2023**

# Smart Projects And Reviews with Transformative Analytics (SPARTA)



- Project Manager: Jim Price (LaRC); Deputy: Sharon Straka (GSFC), DT/OCIO Support: Matt Dosberg (GSFC)

*“Transforming NASA’s project reviews by automating review processes and increasing access to & analysis of technical and programmatic project performance data.”*

**CHALLENGE**  
**Program/Project reviews are time/resource intensive & documentation heavy; visibility on issues is difficult**

**SOLUTION**  
 Pilot an automated, customizable project/portfolio and engineering dashboard with integrated analytics

**LEVERAGES**  
 Partial prototypes at OCFO, OSMA, STMD GCD, OCFO, OCIO PM solns., ARMD, SID

**PLAN**

- **FY22:** Benchmark prototypes, develop systems architecture; Risk, Schedule, Financial MVP;
- **FY23:** Pilot via center use cases, add additional functionality & refine; start lifecycle reviews
- **FY24:** Scale, deploy, additional functionality; continue lifecycle reviews

**SPARTA**  
 SMART PROJECTS AND REVIEWS WITH TRANSFORMATIVE ANALYTICS

**Dashboard for Monitoring Project Performance**

General	Programmatic	Cost	Schedule	Technical
<ul style="list-style-type: none"> <li>• Overall project background</li> <li>• Science goals</li> <li>• Project description</li> <li>• Mission partners</li> <li>• Key contributors</li> <li>• Prime contractors</li> <li>• Project development phase and other key information</li> <li>• Pictures, graphics, and videos</li> <li>• Key project requirements</li> <li>• Lessons learned</li> <li>• Accomplishments</li> <li>• Contact Information</li> </ul>	<ul style="list-style-type: none"> <li>• Organization charts</li> <li>• Risks/Issues/Concerns</li> <li>• Weekly status reports</li> <li>• Major contracts</li> <li>• Management Agreements &amp; Agency Baseline Commitments</li> <li>• Earned Value Management</li> <li>• Safety and Mission Assurance parameters</li> <li>• Contract information and performance metrics</li> <li>• Key lifecycle review readiness</li> </ul>	<ul style="list-style-type: none"> <li>• Mission budget</li> <li>• Yearly budget</li> <li>• Funding profiles and phasing</li> <li>• Commitments, obligations, costing</li> <li>• Reserves</li> <li>• Liens</li> <li>• Work Breakdown Structure</li> <li>• Funding sources</li> <li>• Manpower</li> </ul>	<ul style="list-style-type: none"> <li>• Integrated Master Schedule (IMS)</li> <li>• Top level schedule</li> <li>• Critical Paths</li> <li>• Schedule margin</li> <li>• Major lifecycle milestones</li> <li>• Key deliverables</li> <li>• Milestone tracking and burn down</li> </ul>	<ul style="list-style-type: none"> <li>• Technical Authority</li> <li>• Project technical information</li> <li>• Technical status</li> <li>• Technology development metrics</li> <li>• Key engineering and technical performance</li> <li>• Mass and power margins</li> <li>• Technical risks/issues</li> <li>• Ground system development metrics</li> </ul>

**POSSIBLE FUTURE BENEFITS**

- ✓ Transparency of project performance
- ✓ Quicker access to up-to-date Program/Project data
- ✓ Streamlines/shortens review prep
- ✓ Drill-down insights through pre-defined visuals / Q&A into issues → **faster decision making with less rework, from weeks to hours**
- ✓ Forecast readiness for KDP gates

**ROI**

- ✓ End of Pilot: TBD
- ✓ If scaled, after 10 years: TBD
- ✓ Intangible: Transparency, Culture Shift, PM Efficiency, Time Savings

**PARTNERS:**

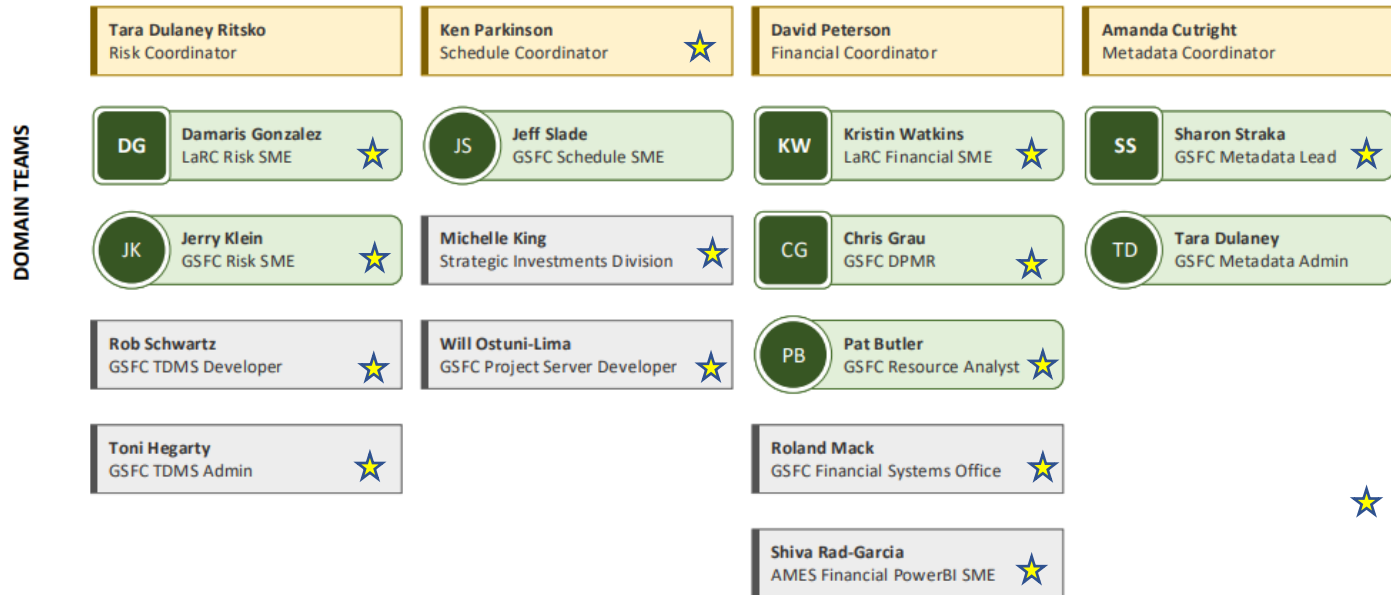
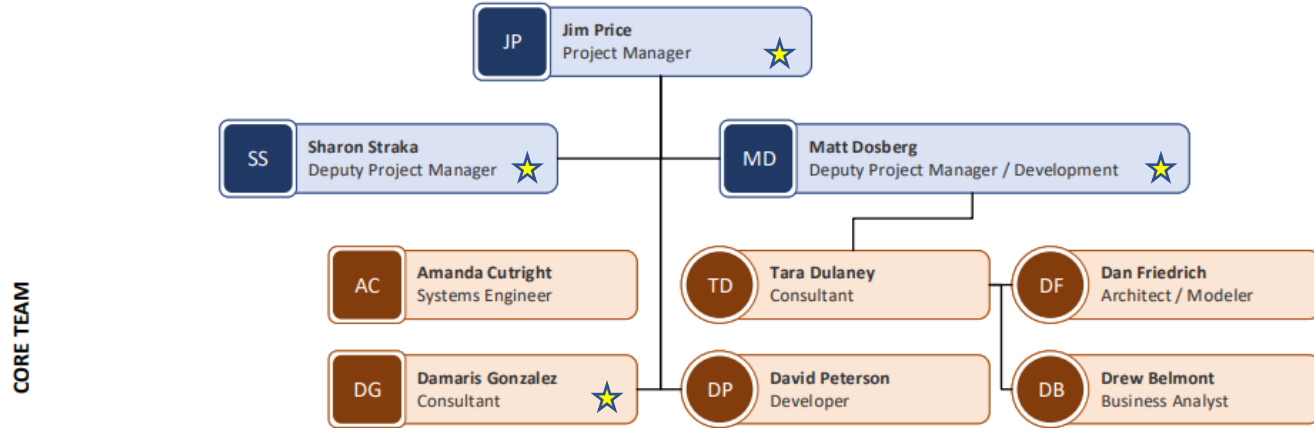
FY22	FY23	FY24
Digital Transformation (DT) GSFC LaRC	Digital Transformation (DT) GSFC LaRC	Organizational/Project Sponsors Digital Transformation (DT) GSFC LaRC

**EXECUTIVE SPONSORS:** CPMO, LaRC DT, GSFC DT

ROI % = { [ Net Value (\$) to mission (real savings + productivity or effectiveness gains) / Total Investment (\$) } - 1 } \* 100.

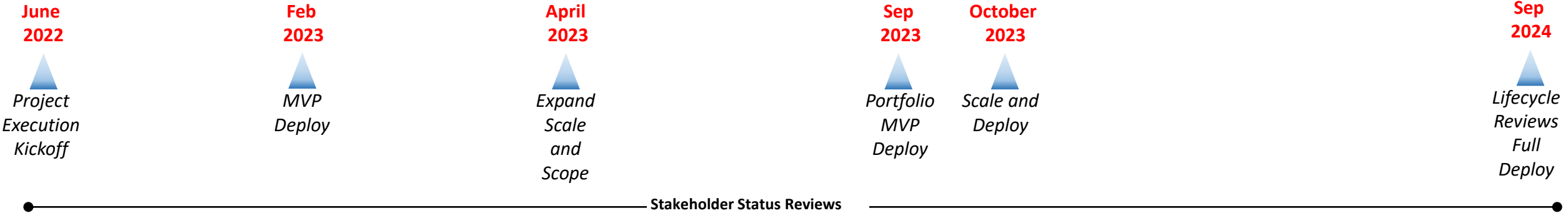
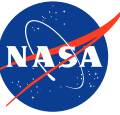


# Organization Chart

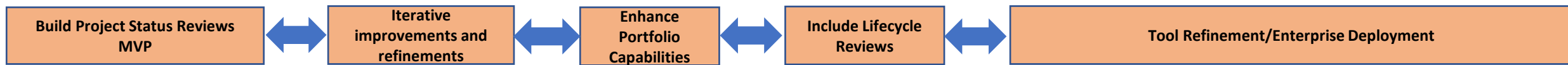


★ - In-Kind FTE or WYE

# SPARTA Implementation Timeline:



## FY22 – Execution      FY23 – Pilot and Expand Scope      FY24 – Scale and Deploy

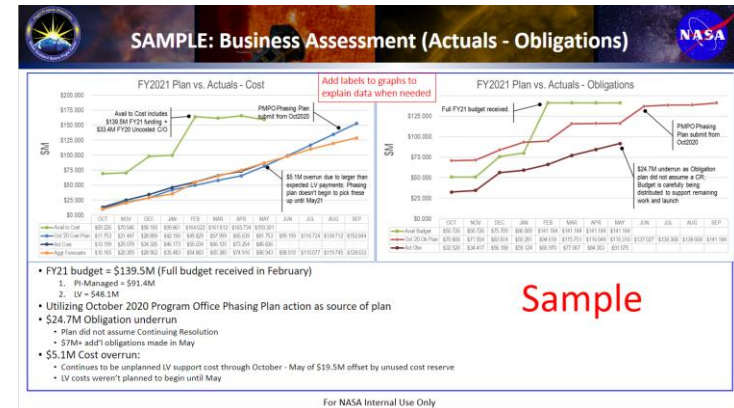
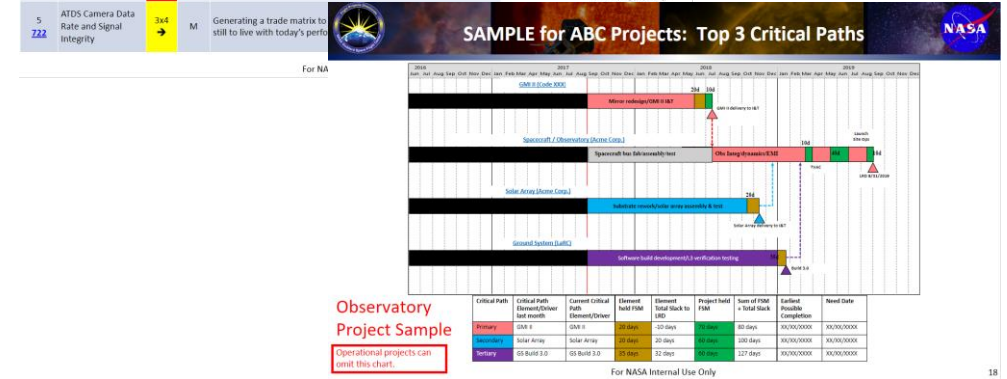
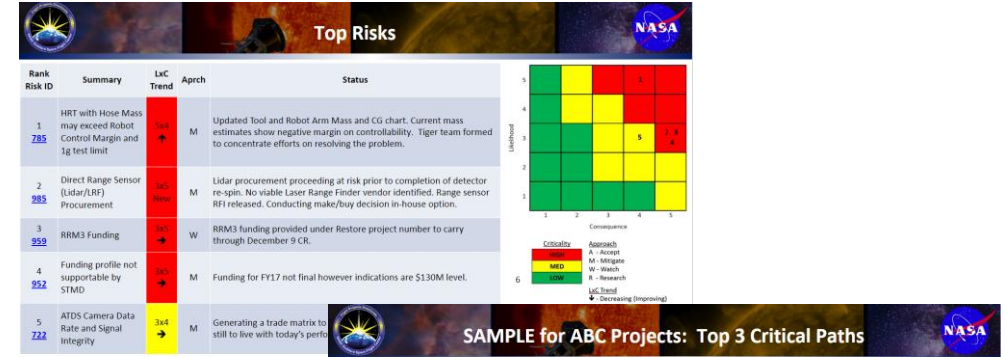
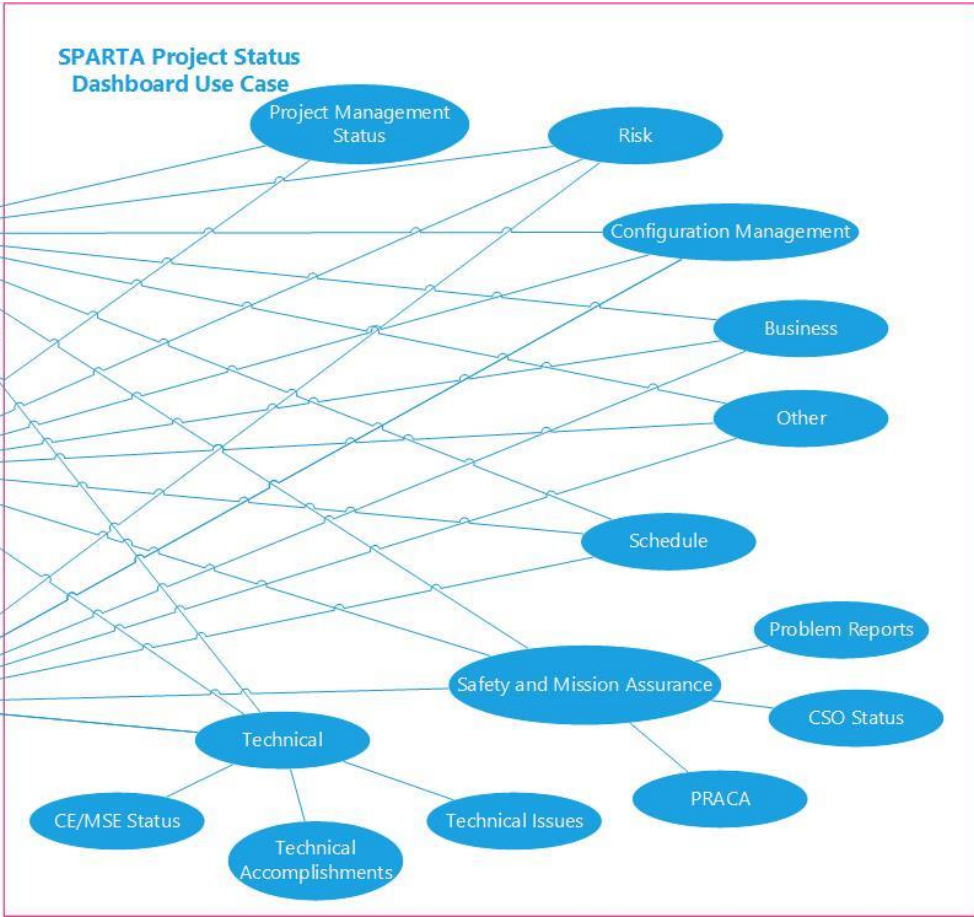


- Build Project Status Reviews MVP**
  - Assemble Development Team
  - Establish Systems Architecture
  - Define Permissions/Accessibility
  - Define Pilot Projects
  - Acquire Data
  - Assemble Focus Group
  - Iterative deployments
  - Stakeholder Feedback
  - On-going Benchmarking
  - Collaboration with DT Projects/Prototypes
- Iterative improvements and refinements**
  - Deliver Risk/Schedule/Business MVP
  - Pilot MVP with existing projects
  - Feedback from Focus Group
  - Iterative improvements to MVP
  - Additional PM/PPC Functionality
  - On-board NPR 7120.7 governance
  - Re-engage EDP
  - On-going Benchmarking
  - Stakeholder Involvement
- Enhance Portfolio Capabilities**
  - On-board additional projects
  - Socialize to Portfolio Stakeholders
  - Expand customer base
  - Target Agency Senior Management Support (APMC, PPMC, CPMO, Mission and Center Directorates, etc.)
  - Stakeholder Involvement
- Include Lifecycle Reviews**
  - Define ConOps/Storyboard
  - Pilot additional Use Cases (Lifecycle Reviews and KDP's)
  - Iterative product refinement
  - On-going Benchmarking
  - Stakeholder Involvement
- Tool Refinement/Enterprise Deployment**
  - Define Sustainability strategy – development vs. maintenance
  - Add Lifecycle Reviews
  - Scale for Enterprise deployment
  - Iterative product enhancements
  - Add Agency reviews (KDP's, BPR, etc)
  - Expand engagement with Agency assets
  - IT Security
  - Stakeholder Ownership

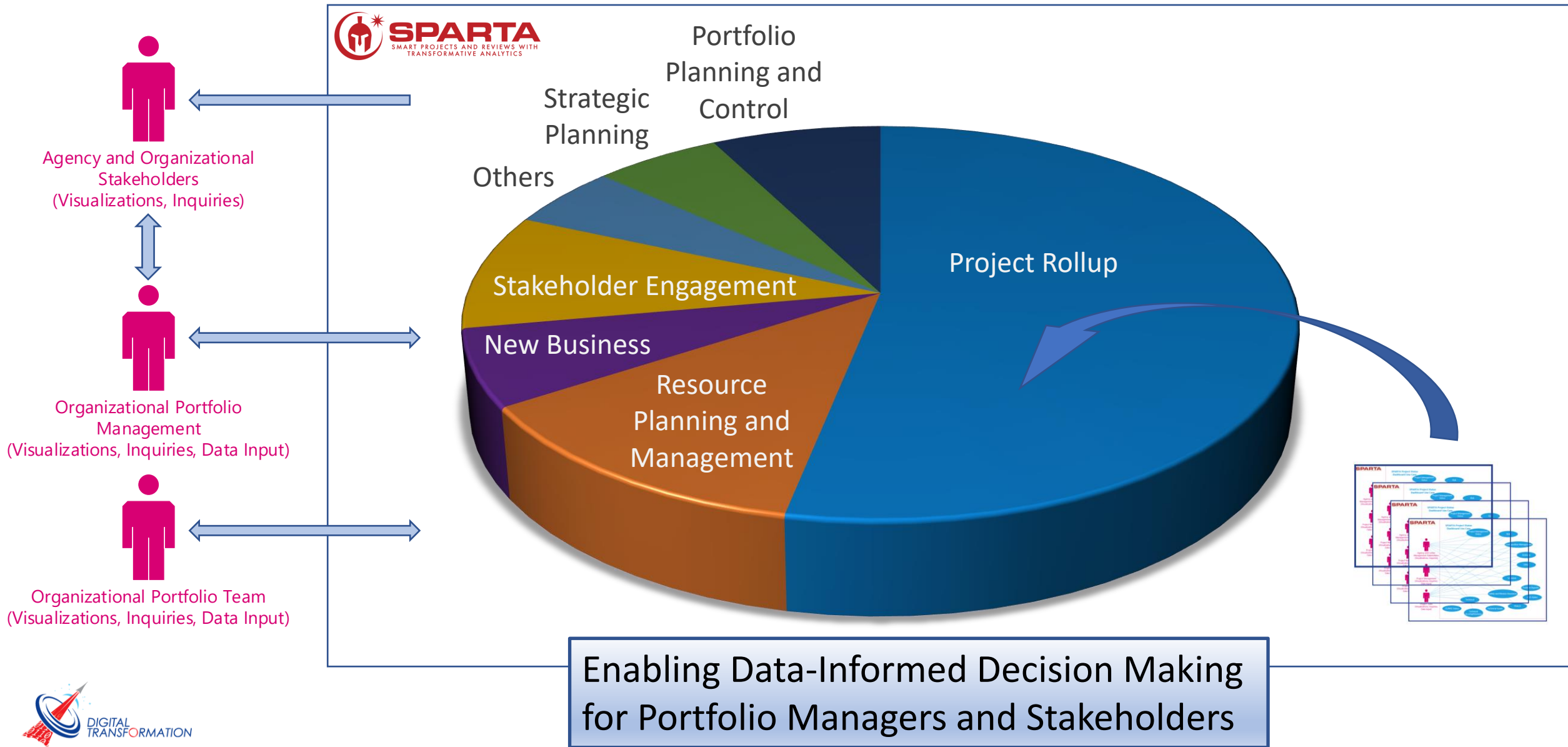


Pilot an automated, customizable **project/portfolio and engineering dashboard** with integrated analytics

# SPARTA Use Case 1



# SPARTA Portfolio Management Use Case



# SPARTA Demo



### MISSION OVERVIEW

Mission Lead Center: Mission: Mission Directorate: Mission Category: 6 31

Mission Status: Mission NPO Guidance: Mission JTP Year: Mission Launch Year: Mission Focus:

The left table shows Missions with Project Files (Snapshots) published to Project Server. Some Missions have multiple published Project Files (i.e., multiple Submission Periods). Activity Count is across all files for a given Mission.

#### PUBLISHED PROJECT FILES BY MISSION

Mission Name	Mission Directorate	Mission Count	Snapshot Count	Activity Count
DCI	SMD	1	8	39306
PACE	SMD	1	6	39204
CLARREO	SMD	1	8	32375
TESS	SMD	1	3	8212
ICM	SMD	1	2	7899
TEMPO	SMD	1	2	5028
<b>Total</b>		<b>6</b>	<b>31</b>	<b>228111</b>

#### MISSION & THUMBNAILS

Topographic Emission Monitoring of Pollution (TEMPO) - [https://www.nasa.gov/pubs/20180401main\\_tempo\\_18\\_001.pdf](https://www.nasa.gov/pubs/20180401main_tempo_18_001.pdf)

Transiting Exoplanet Survey Satellite (TESS) - [https://www.nasa.gov/pubs/20180401main\\_tess\\_18\\_001.pdf](https://www.nasa.gov/pubs/20180401main_tess_18_001.pdf)

Interplanetary Communication Explorer - [https://www.nasa.gov/pubs/20180401main\\_ice\\_18\\_001.pdf](https://www.nasa.gov/pubs/20180401main_ice_18_001.pdf)

Platonic, Aeneas, Clew, ocean Ecosystem (PLATE) - [https://www.nasa.gov/pubs/20180401main\\_plate\\_18\\_001.pdf](https://www.nasa.gov/pubs/20180401main_plate_18_001.pdf)

SPARTA logo and footer: SPARTA SMART PROJECTS AND REVIEWS WITH TRANSFORMATIVE ANALYTICS. Version: 1.0-2022. For NASA Internal Use Only.

### KEY MILESTONES

Mission Lead Center: Mission: Schedule Data As Of: Common WBS: Milestone Type

Activity Type:  Select all  Detail  Milestone

Critical:  Select all  Critical  Not Critical

Mission: August 2022

CLARREO

12/27/2022: 16 T Start

10/28/2023: Delivery

12/11/2023: Launch

2/13/2024: PLAR

### TOP PROJECT RISKS

Mission Lead Center: Mission: Risk Data As Of: Ranks

Rank	Score	Category	Approach	Risk ID	Title
5	21	Cost	Schedule	CPF-063	Schedule to Launch
4	20	Technical	R	CPF-LASP-064	Increased Axial Random Vibration Loads on HPSC PCBs
3	19	Technical	R	CPF-LASP-066	Structural Verification Test Shows Higher Random vibration Input to Star Tracker
2	18	Cost	Schedule	CPF-LASP-063	SpX CRS2 IRD V6.0 Removal of 85% Modal Effective Mass Exception
1	15	Schedule	M	CPF-LASP-053	Ball Facilities Availability For Force Limited Vibrations Tests
	15	Schedule	R	CPF-LASP-065	SpX CRS2 V6.0 IRD Change - Mechanical Shock Verification
	14	Technical	W	CPF-LASP-067	FM2 EFA Testing Without FM1 Failure Foot Cause Identification
	9	Technical	R	CPF-068	Dragon-2 Contamination Environment
	6	Technical	M	CPF-058	Independent Calibration Schedule Conflict
	3	Schedule	M	CPF-071	EPA Fastener Running Torque

Risk Likelihood: 5 Very High, 4 High, 3 Moderate, 2 Low, 1 Very Low

Risk Consequence: 5 Very High, 4 High, 3 Moderate, 2 Low, 1 Very Low

Risk Trend: No Change, Worsening, Improving

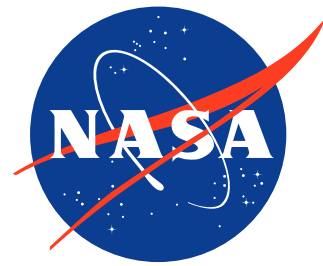
Risk Category: C - Cost, R - Research, S - Schedule, W - Watch

Risk Approach: M - Mitigate, R - Research, W - Watch

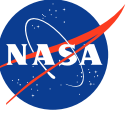
Risk Status: Open

SPARTA logo and footer: SPARTA SMART PROJECTS AND REVIEWS WITH TRANSFORMATIVE ANALYTICS. Version: 1.0-2022. For NASA Internal Use Only.





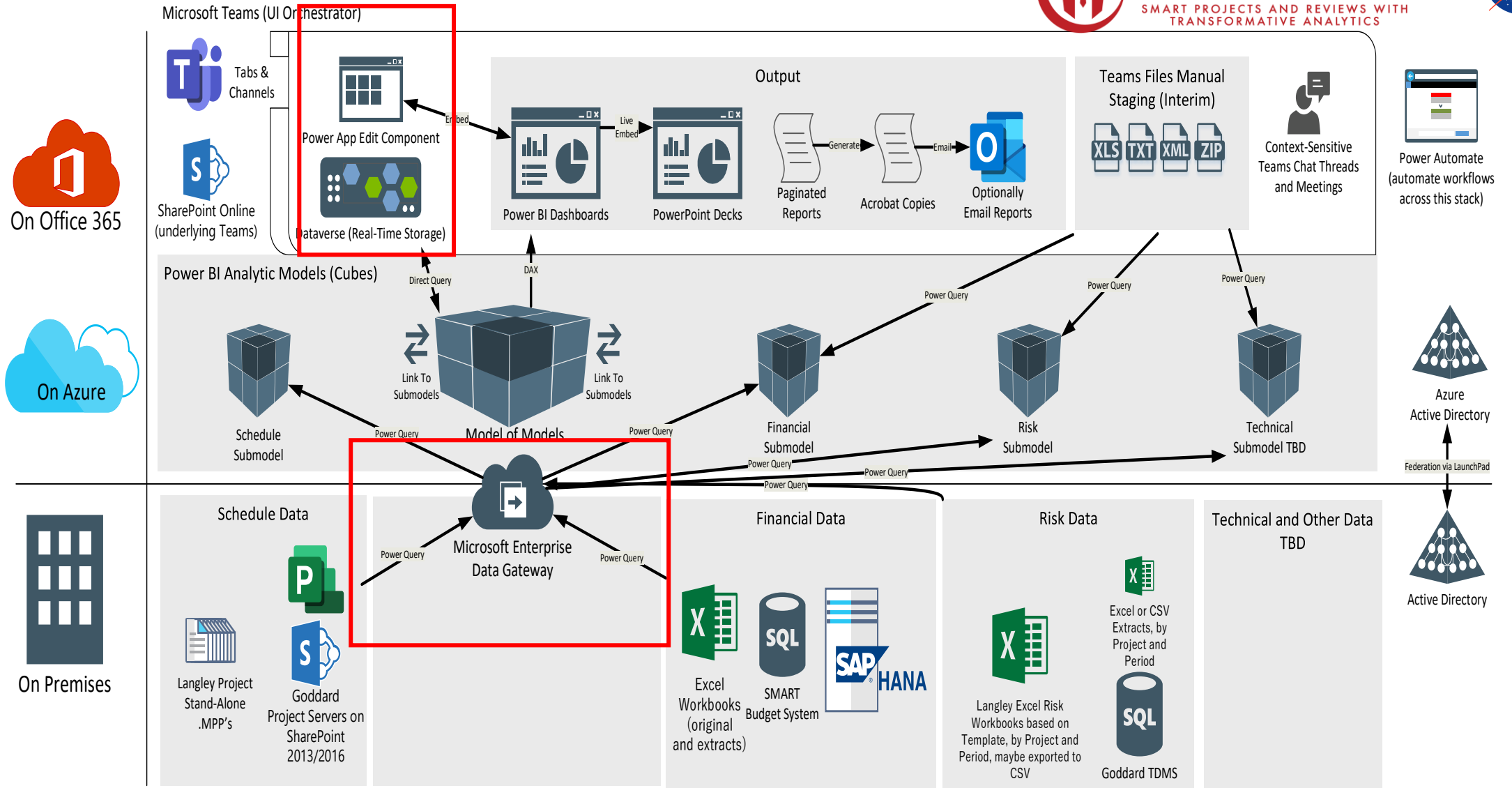




# Back-Up

# NASA SPARTA – Information Architecture

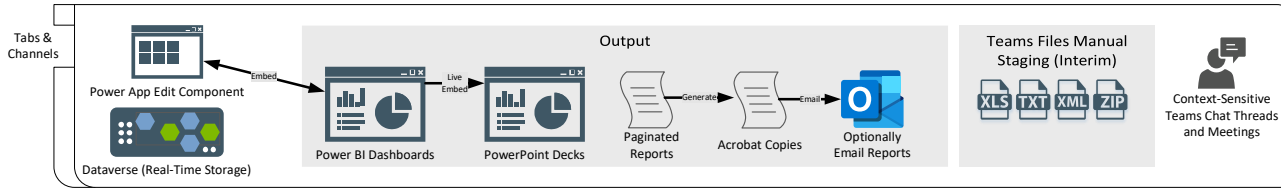
Last revised July 18, 2022, by Dan Friedrich



Copyright © 2022, All Rights Reserved. Friedrich, Klatt and Associates.

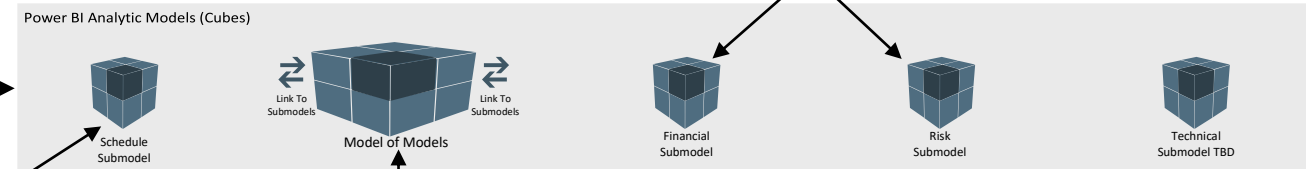


# SPARTA Systems Architecture Highlights



This design uses Microsoft Teams as the User Interface (UI) orchestrator for the SPARTA solution. As such, its components are organized into a Teams Site, which in turn is organized into Teams Channels, each of which has Tabs. The "Teams Files Manual Staging (Interim)" uses the Teams File library feature (which in turn ride on the underlying SharePoint Document Libraries).

The Financial and Risk Sub-models will borrow from existing modeling efforts of similar source systems by NASA Game Changing Development.



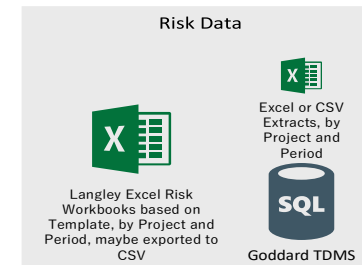
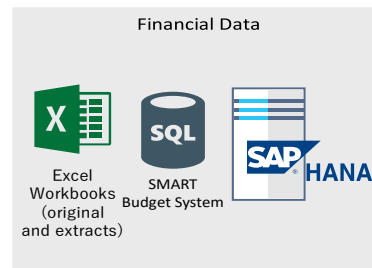
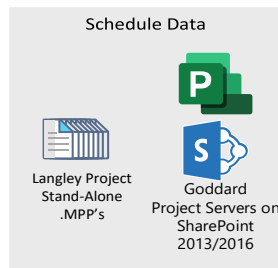
The Analytic Models implement a complete Tier in the solution, which means that they collectively encapsulate all the data, sourcing entirely from lower Tier(s) and providing the only source that Presentation Tier applications use.

The Schedule Sub-model will share a Power BI model design with the one adopted by the NASA Schedule Database, now in Phase 4

The Model of Models Cube references all the Sub-models and links them together on their common dimensions (such as Project), so that they can be consumed as a single unified virtual model when necessary. This allows the solution to scale out and down while still performing well.

SPARTA will initially target three domains for our MVP: Schedule, Financial, and Risk, as well as expand in the future to EVM, Technical and other domains.

SPARTA will ride on the existing NASA Schedule Database schedule submittal process, and spin up a sandbox Microsoft Project Online instance, to hold the consolidated IMS snapshots for its four projects. This permits maximum loose coupling while both the SPARTA and Schedule Database projects are in development phases. Ultimately, SPARTA will depend on the Schedule Database to not only encompass the design artifacts, Dashboards, and data submittal processes, but also literally connect to a Schedule Database Model instance.

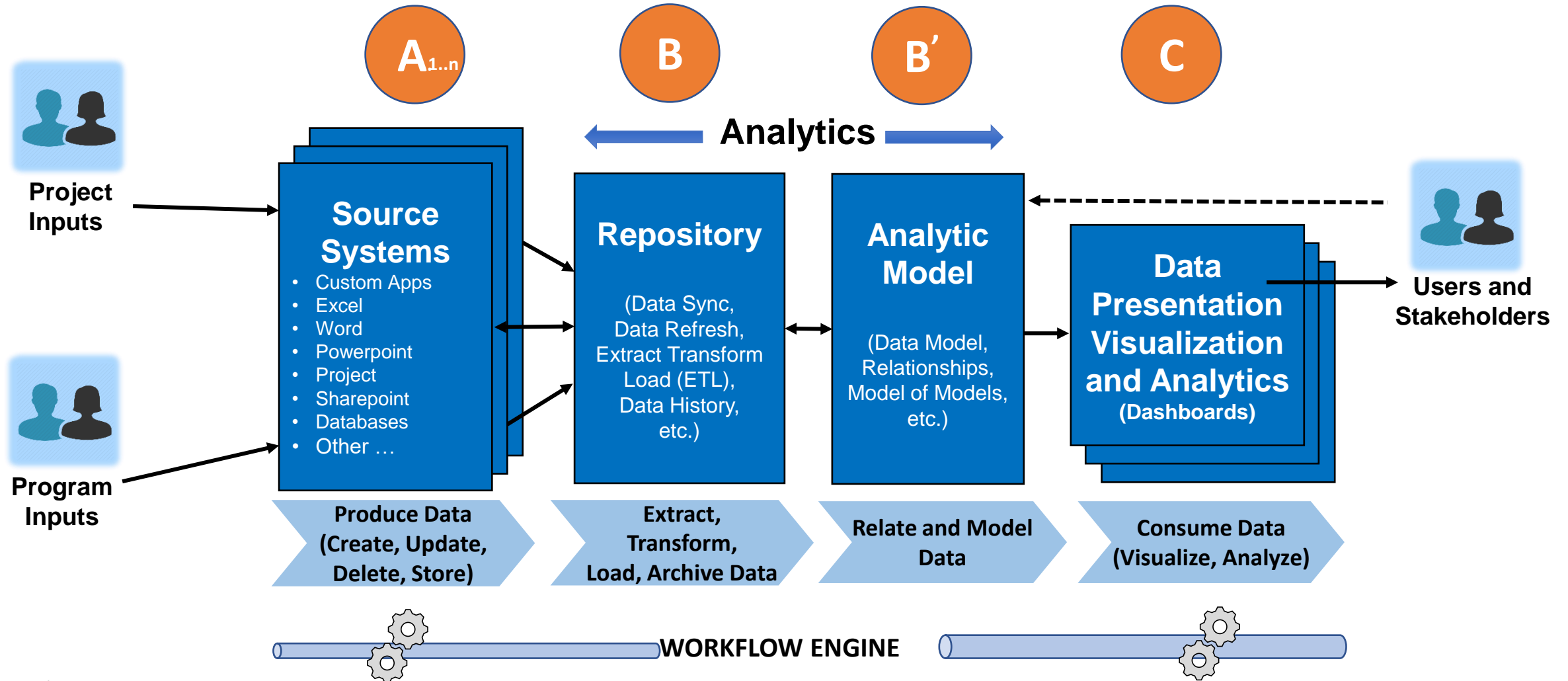


Risk data will be input in much the same way as Financial. Until an api is developed by GSFC's TDMS system, SPARTA will receive .csv files for the specified projects. Langley's projects either use TDMS or an Excel-based Risk Registry from which .csv's can be exported and uploaded.

The Financial Data information domain is perhaps the most centralized across the agency, with SAP as the key source system for actuals. (SMART also is a central system whose scope we must determine.) Initially, SPARTA will develop a UI to ingest project financial data in .csv or from Excel



# Dashboard Architecture



Source: Modified from GCD DOT Functional Architecture Presentation

# SPARTA Use Case 2

