



Aerosciences Evaluation and Test Capabilities Portfolio

NASA Nomad

Exploring AETC Data & Analytics

Proprietary information removed and blacked out for public view
Remaining data shown are dummy data and test values
Does NOT reflect AETC Internal numbers

Robin Simpson

Spring 2024

Who Am I

- Computer Engineering Junior/Senior? With a minor in Astrophysics At Cal Poly
- Switched too many majors, industrial engineering, aerospace, and now computer engineering – always want to learn something new/see things under a new lens.
- Attended Pasadena City College, lived next to JPL, physics professor was Erick Sturm which was mission lead for Cassini and Juno, inspired by him.
- Always wanted to be at NASA – it was kind of a life goal



Overview – Summary of Effort

- Originally assigned to assist in the development of the AirUse Management App.
- The Air Use Management App is needed to provide real time updating and alerts to Wind Tunnel Managers.
- Redelegated to act as the Python Mercenary
 - Assist other initiatives (Knowledge Capture)
 - Complete tasks outside of initiative scopes (RFP, Workforce Planning)

Initiative Overview – AirUse Management

AirApp was to be a cost saving measure.

Over 30 years, the status quo costs are **~\$11 million** while AirApp cost is only **\$632,000**.

The Air Use Management App will eliminate the need for **redundant meetings**. Wind Tunnel Facility Managers will be able to input air demands before each Wednesday. If an Air Use Demand is not input to the system, a note will be flagged.

Currently, everything is done through excel spreadsheets with **no real-time tracking, notifications, or changes**. AirApp would change that.

What happened?

- Expectations did not meet reality; **different viewpoints** on how the AirApp should function.
 - Facility Managers wanted a **simple excel style scheduler**.
 - Upper Management wanted a more appealing, stylish app with more functionality.
- Initially planned configuration with Figma, had numerous back and fourths and iterations.
- As we had more meetings with facility managers, our designs changed rapidly.
- Decided to pause the initiative until the summer due to said design changes and current priorities.

Figma Prototype

AFBS AeroFacility Booking System

Dashboard Schedule Facilities My profile

8-Foot High Temperature Tunnel

Test In Progress

Upcoming Schedule

DATE	TIME	FACILITY	TYPE	TEST	FACILITY MANAGER	LOCATION	CREATOR	STATUS	⋮
3/3	07:30 - 08:30	8ft HTT	External	A-12	Joe	1 Nasa Dr, Hampton, VA 23666		Backlog 08:30	⋮
3/3	07:30 - 08:30	8ft HTT	Internal	X-48 BWB	Joe	1 Nasa Dr, Hampton, VA 23666		Scheduled	⋮
3/3	07:30 - 08:30	8ft HTT	External	U-2	Joe	1 Nasa Dr, Hampton, VA 23666		Scheduled	⋮
3/4	07:30 - 08:30	8ft HTT	Internal	X-30	Joe	1 Nasa Dr, Hampton, VA 23666		Scheduled	⋮
3/4	07:30 - 08:30	8ft HTT	Internal	X-29 ATD	Joe	1 Nasa Dr, Hampton, VA 23666		Backlog 08:30	⋮
3/5	07:30 - 08:30	8ft HTT	Internal	XV-15 Tiltrotor	Joe	1 Nasa Dr, Hampton, VA 23666		Visited	⋮
3/5	07:30 - 08:30	8ft HTT	Internal	X-24B	Joe	1 Nasa Dr, Hampton, VA 23666		Scheduled	⋮
3/6	07:30 - 08:30	8ft HTT	Internal	X-36 Tailless	Joe	1 Nasa Dr, Hampton, VA 23666		Scheduled	⋮
07:30 - 08:30	+								⋮

Showing 10 Appointments

Hide visited Show Empty

Air Usage Trend

01 02 03 04 05 06

Current Facility Usage

Air Power

46% 15%

Functional Prototype

AUM | Air Use Management

Home Schedule Notifications Reports Settings Access

Langley Wind Tunnel Weekly Schedule

Air Priorities AG-Grid spreadsheet page!

Full Air Power Steam

Facili...	Test ...	Air	Staff	Power	A: Sat	A: Sun	A: Mon	A: Tue	A: Wed	A: Thu	A: Fri	P: Sat	P: Sun	P: Mon	P: Tue	P: W...
NTF 12...	[REDACTED]															
Unitary ...	[REDACTED]															
8 Ft. H...	[REDACTED]															
20" M ...	[REDACTED]															
DCSCT...	[REDACTED]															
GFIT 12...	[REDACTED]															
Totals	[REDACTED]															
Air Pro...	[REDACTED]															
Surplus...	[REDACTED]															

Submit Changes

What's Next? Workforce Planning



The Portfolio Office and Facilities track workforce expenses via excel spreadsheets.



Seek to simplify this process into 1 page on data inputs that allows plan editing for each facilities.



Decided to use an Ag-Grid due to its resemblance to Excel and ease of use.

Workforce Planning Wireframe

Workforce Planning

XYZ

XYZ

XYZ

XYZ

Facility ▼

Labor Type	Total Optimal Staff	Total Minimum Requirement	Center Comment/Justification
Facility Managers	FTE/WYE	FTE/WYE	
Facility Engineers			
Facility Technicians			
Data System Engineers			
Data System Technicians			
Engineering Interns			
Technician Interns/Apprentices			
Research Engineers *			
CPS/Compressor Station Engineers			
CPS/Compressor Station Technicians			
Fab Shop			
NFMTC *			
Division O/H			
Engineering O/H			
Technician O/H			
ARD Match (LaRC only)			
Other O/H *			
Total			

* Justification required if FTE/WYE is non-zero

Submit

limit input to number with 1 decimal

If FTE/WYE for this row is non zero, change the color of the box, that way it is obvious that it must be filled out.

Should be automatically calculated

Disable the button if justification is required and it is empty.

Make this editable and use the large text editor. Experiment with making this wrap if the justification is long. Tunnel Operation Status page in Analytics Catalog has word wrapping implemented.

Final Product

Select Facility *
UPWT

Instructions

1. Select Facility for which data will be input.
2. Enter the Total Optimal Staff FTE/WYE (#) and Total Minimum Req FTE/WYE (#) for each Labor Type.
3. Optional: Provide Rationale for the data entered.
4. Optional: Provide overall comments in the textbox provided.
5. If Research Engineer is non-zero, rationale in the Center Rationale column is required.
6. Click "Submit to Database" to save changes.

Labor Type	Type	Total Optimal Staff FTE/WYE (#)	Total Minimum Req FTE/WYE (#)	Center Rationale
Facility Managers	direct	1.0	1.0	Facility Manager is a Rock Star.
Facility Engineers	direct	55.5	49.5	Additional Test Engineers to allow for operational support, test closeout, test preparation, and vacation/sick coverage. Electrical Engineer, controls engineer, and Model Stress Analyst (1 deep).
Facility Technicians	direct	30.0	27.0	Additional Mechanic and 2 Electricians to support operations and succession
Data System Engineers	direct	9.0	6.0	Increase to support Test ops and provide data system expertise (Optical, PSI, etc.).
Data System Technicians	direct	0.0	0.0	
Engineering Interns	direct	0.0	0.0	
Research Engineer*	direct	4.0	3.0	UPWT Data Engineers, require additional for succession
Technician Interns/Apprentices	direct	0.0	0.0	
CPS/Compressor Station Engineers	indirect	0.0	0.0	
CPS/Compressor Station Technicians	indirect	0.0	0.0	
Fab Shop	indirect	0.0	0.0	
NFMTC	indirect	2.0	2.0	

Total Optimal Staff: 104.0 Total Minimum Requirement: 91.0

Facility Comment

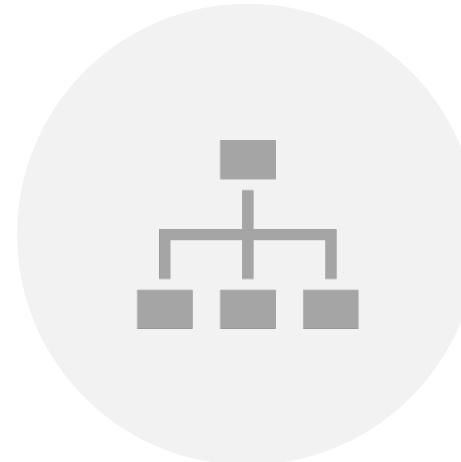
You do not have access to submit for this facility

[Submit to Database](#)

What's Next? Full Cost Planning



SAME ISSUE AS THE WORKFORCE PLANNING –
EVERYONE LOVES EXCEL SHEETS.



PORTFOLIO OFFICE AND FACILITY MANAGERS CAN
PLAN FOR LABOR, TRAVEL, AND PROCUREMENT FOR
THEIR RESPECTIVE FACILITIES IN ONE PAGE.

Full Cost Labor Wireframe

Full Cost Planning

XYZ
XYZ
XYZ
XYZ

Full Cost of Operations Planning

Facility ▾

Labor	Travel	Procurement
<input checked="" type="checkbox"/> Use Default Rate	PTE Rate 220.1	WYE Rate 198.2
Center Column Group		Portfolio Office Column Group
FTE	PTE/WYE Cost (\$K)	Center Comment/Justification
Facility Managers	PTE/WYE	Cost (\$K)
Facility Engineers		PO Disposition
Facility Technicians		Approved [checkbox]
Dates		
Data System Engineers		
Data System Technicians		
Engineering Interns		
Technician Apprentices		
Research Engineers *		
CFC/Compressor Station Engineers		
CFC/Compressor Station Technicians		
Fab Shop		
NMTR		
Division O/H		
Engineering O/H		
Technician O/H		
AIR MTR (LARC only)		
Other O/H		
WYE		
Facility Managers		
Facility Engineers		
Facility Technicians		

• Justification required if PTE/WYE is non-zero

Submit

Use DMC Tab with the three options listed.

If checked, auto calculate the cost based on number of PTE/WYE

Disabled and zero if not checked. Will need to be populated from sql table if checked

Grey should be the sum roles as is shown in the table above in revenue and consumables. There will be two top sections, PTE and WYE each with the same sub rows.

This should use ag grid check box

The same logic regarding disabling and shading boxes based on required fields that is specified in workforce planning should be adopted here.

Full Cost Travel Wireframe

Full Cost of Operations Planning

Facility ▼

Labor Travel Procurement

Travel	Amount	Justification	Approved Cost	PO Disposition	Approved (checkbox)
Travel					

Format as Dollars

Submit

Format as Text Editor with wrapping

```
graph LR; A[Full Cost Planning] --> B[XYZ]; A --> C[XYZ]; A --> D[XYZ]; A --> E[XYZ]; A --> F[XYZ]; B --- G[Travel]; G --- H[Labor]; G --- I[Procurement]; G --- J[Table]; J --- K[Travel]; J --- L[Amount]; J --- M[Justification]; J --- N[Approved Cost]; J --- O[PO Disposition]; J --- P[Approved checkbox]; K --- Q[Format as Dollars]; K --- R[Submit]; K --- S[Format as Text Editor with wrapping];
```

Full Cost Procurement Wireframe

Full Cost of Operations Planning

Facility ▼

Labor	Travel	Procurement
Procurement Center Support Systems Business Unit Funding ARM&D Overhead & Overhead Support Center Tax on Portfolio Center & Facility Security Shipping Costs Staff Radio/Travel/Vehicle Cost Other *	FY24 Costs (\$K)	Comments/Justification
IT Service & Support IT Hardware/Software IT Security Plans & Audit Software - Solidworks Software - MATLAB Software - Maximo Software - Other Infrastructure Svc/Staff Network & Computer Costs Other *		Approved Cost
Calibrations, Certifications, & Metrology Calibration, Instrumentation, Metrology & Associated Costs Recertifications (e.g., pressure systems, lifting systems) Other *		PO Disposition
Facility Operational/Recurring Maintenance Recurring/Reactive Operational Maintenance < \$10k Recurring Operational Maintenance > \$10k FARO ARM General Electronic Inventory/Hold Storage, Store Stock, Office Supplies Ovation Maintenance Agreement Renewal Personnel Physical Pressure/Temperature Measurement System Sustainment Safety Equipment Vehicle/forklift Maintenance NFMTIC Procurement Other *		Approved (checkbox)
Workforce Development Technical Development Workforce Development Other *		

* Justification required if PTE/WYE is non-zero

Submit

Functional Prototype

Select Facility *

Labor Travel Procurement

Labor Type	Center			Portfolio Office			
	FTE/WYE	(\$k) Cost	Comment and Justification	FTE/WYE	(\$k) Cost	PO Dispositi...	PO Approval
▼ FTE (3)	3.0	\$520.0	Sum of FTE	3.0	\$355.0		<input checked="" type="checkbox"/>
Facility Engineers	1.0	\$300.0	Engineering department costs	1.0	\$150.0	Approved	<input type="checkbox"/>
Facility Managers	1.0	\$120.0	Manager department costs	1.0	\$110.0	Pending	<input type="checkbox"/>
Other*	1.0	\$100.0	External	1.0	\$95.0	Rejected	<input type="checkbox"/>
▼ WYE (3)	3.0	\$450.0	Sum of WYE	3.0	\$390.0		<input checked="" type="checkbox"/>
Facility Engineers	1.0	\$250.0	Engineering department costs	1.0	\$200.0	Approved	<input type="checkbox"/>
Facility Managers	1.0	\$100.0	Manager department costs	1.0	\$95.0	Rejected	<input type="checkbox"/>

Facility Comment

PO Comment

 Submit to Database

[REDACTED] Only

Final Product

ADAPT | AETC Data & Analytics Portfolio Transformation

Home Request Data Input Analytics Catalog Demand Access

Full Cost - Labor

Full Cost - Travel

Full Cost - Procurement

Full Cost - Downtime Planning

Select Facility *

test

Instructions

1. Select Facility for which data will be input.
2. Fill out the personnel count and cost for both WYEs and FTE for each labor type.
3. Any Labor Type with an '*' requires rationale if the count/cost is non-zero.
4. If desired, put in an overall comment in the text box at the bottom.
5. Click 'Submit to Database' once complete. A success notification should appear on the lower right.
6. To view Portfolio Office comments and disposition, click on the Columns sidebar on the right and select the checkmarks for the appropriate columns of interest.

	Center	FTE	WYE		
Labor Type	Count	Cost (\$K)	Count	Cost (\$K)	Rationale
Loading...					

Search...
 Labor Type
 Center
 Portfolio Office

Columns Filters

Copy Center Data to Portfolio

Facility Comment

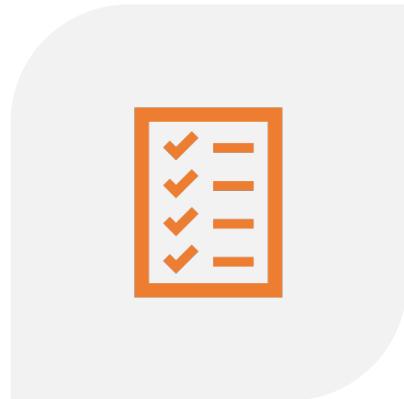
Portfolio Office Comment

Portfolio Office Comment

Submit to Database

<>

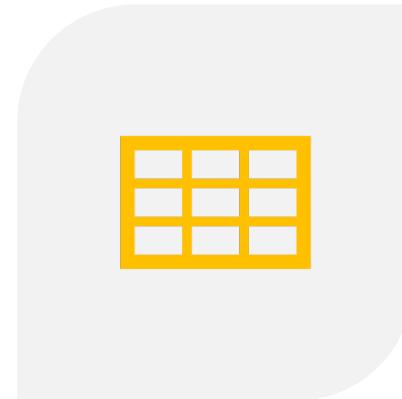
What's next? Standardization RFP



A REQUEST FOR PROPOSAL QUESTIONNAIRE
THAT SEEKS TO COLLECT PROSPECTIVE
PROPOSALS THAT WILL HAVE AN IMPACT ACROSS
THE WHOLE AETC PORTFOLIO.



5 STANDARDIZATION RUBRICS – G1 TO G5 THAT
RANGE FROM OPERATIONS TO DATA SYSTEMS.



MANY QUESTION TYPES; TEXT ANSWERS TO
NUMBER/PERCENT INPUTS TO TABLES.

Prototype Version 1

ADAPT | AETC Data & Analytics Portfolio Transformation

Home Request Data Input Analytics Catalog Demand Access

Standardization RFP

Standardization RFP TEST ALT

Will this proposal address any quality of service as reflected in customer surveys?

Yes

No

Next



Prototype Version 2

The screenshot shows a web application interface for the ADAPT | AETC Data & Analytics Portfolio Transformation. The top navigation bar includes the NASA logo, the title "ADAPT | AETC Data & Analytics Portfolio Transformation", and links for Home, Request, Data Input, Analytics Catalog, Demand, and Access. On the left, a sidebar lists "Standardization RFP" and "Standardization RFP TEST ALT". The main content area is titled "Standardization RFP" and contains fields for "Select Group Type" (set to "g1") and "Select Attribute" (set to "General"). A question box asks, "Does the proposal make AETC data assets available to all of AETC to leverage? Y or N?", with "Yes" and "No" radio buttons. A blue circular icon with a right-pointing arrow and a red notification dot (with the number 3) is located in the bottom right corner.

ADAPT | AETC Data & Analytics Portfolio Transformation

Home Request Data Input Analytics Catalog Demand Access

Standardization RFP

Standardization RFP TEST ALT

Select Group Type

g1

Select Attribute

General

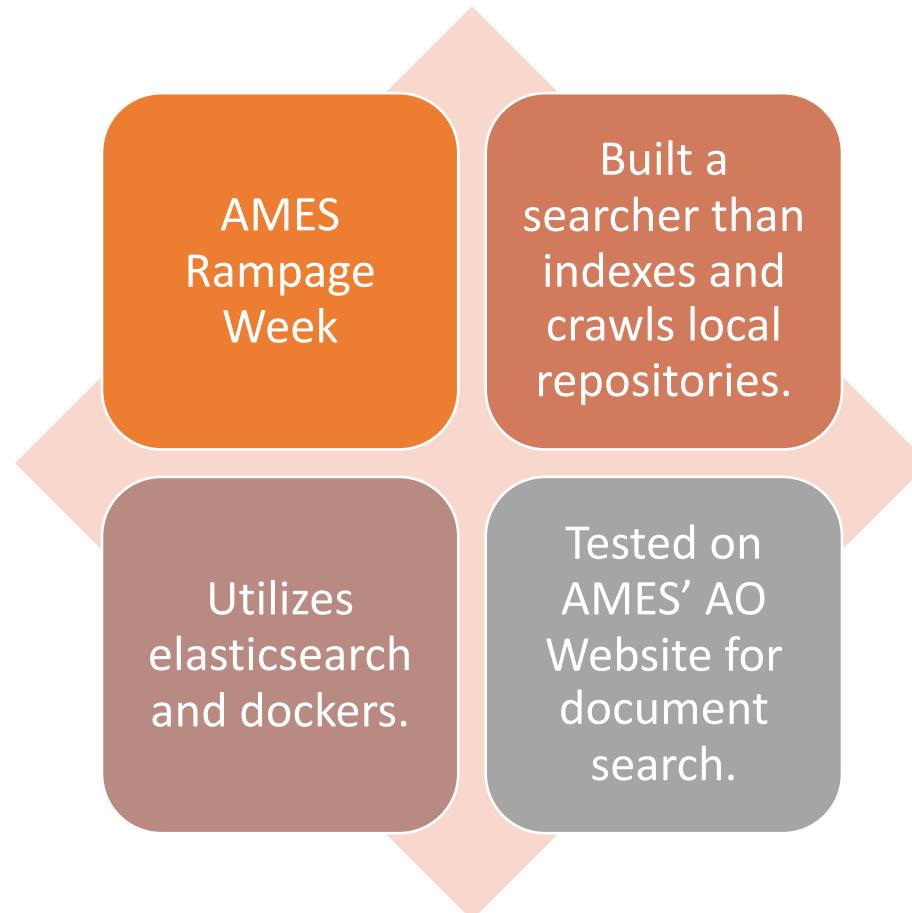
Does the proposal make AETC data assets available to all of AETC to leverage? Y or N?

Yes

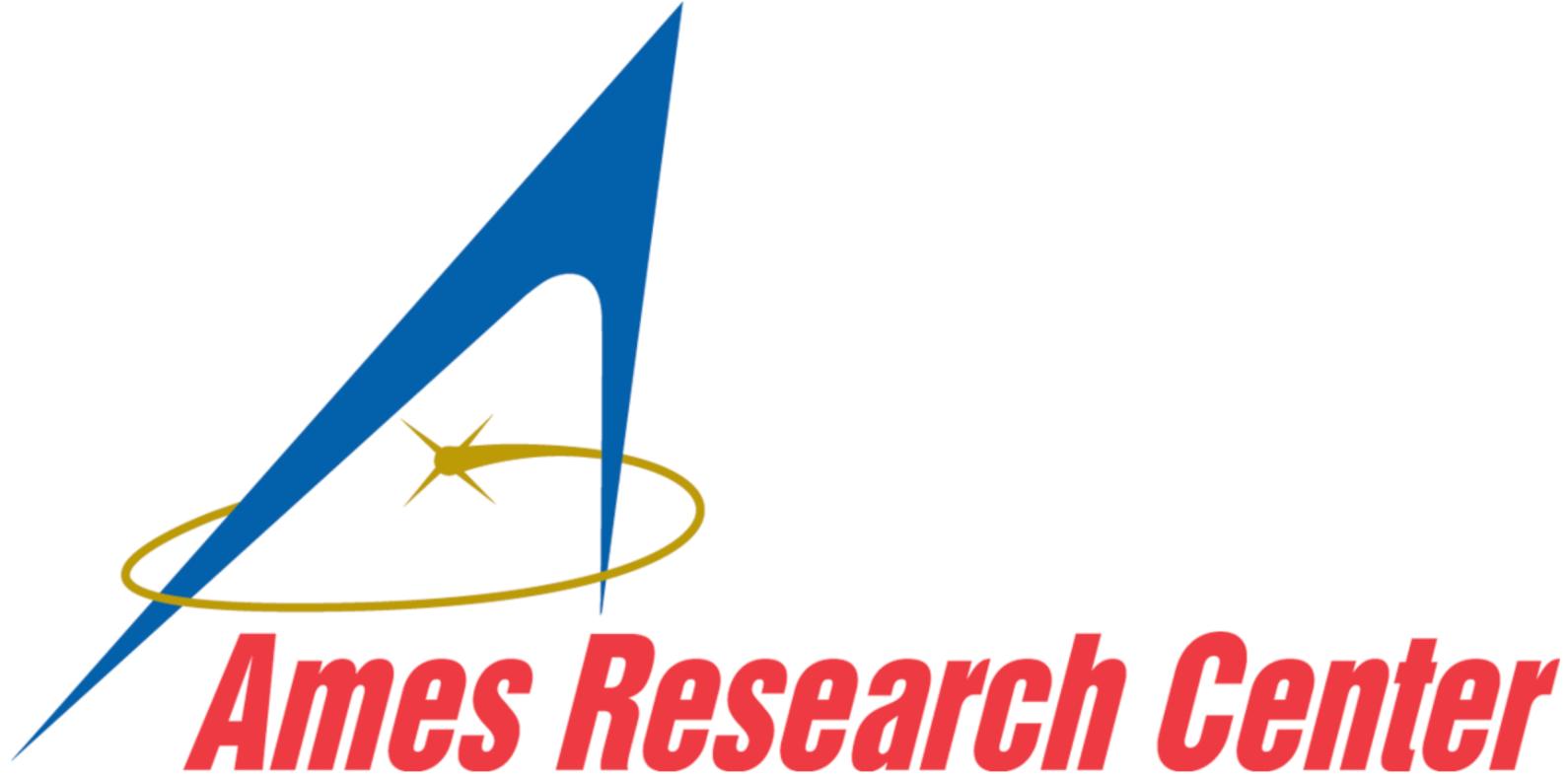
No

<>

Other Things? Knowledge Capture



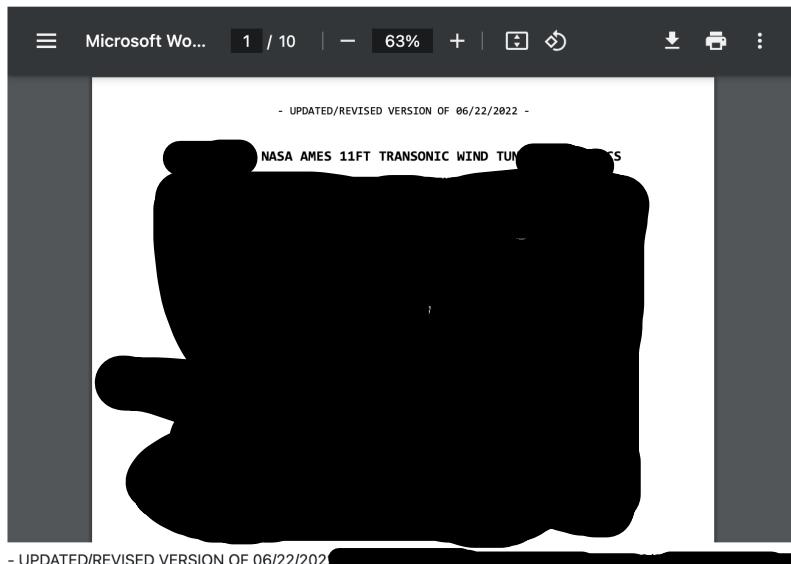
Press Enter to Search...



Searching for Keywords

AMES Engine  11ft 

Search Results

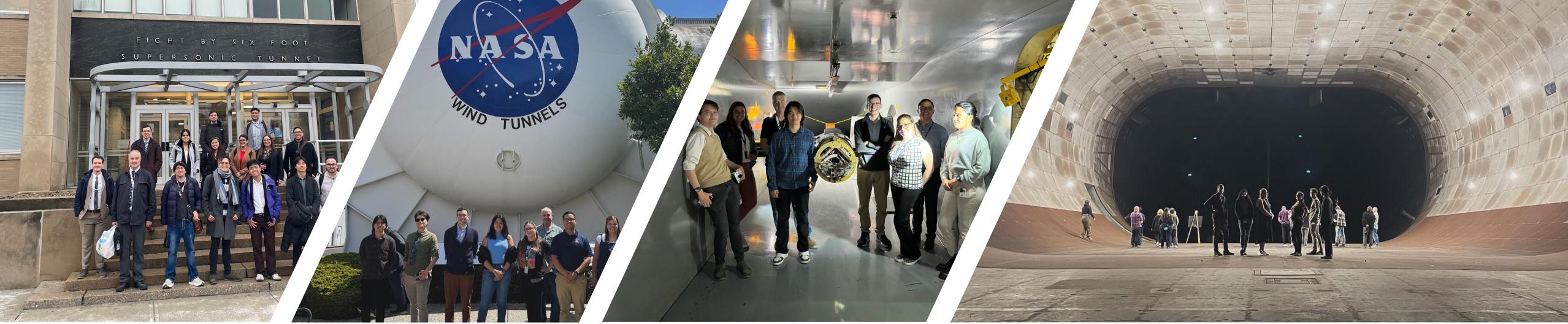


- UPDATED/REVISED VERSION OF 06/22/2021 NASA AMES 11FT TRANSONIC



Recap of My Journey in AETC D&A

- Diverse Project Exposure and involved in things that are used in real world applications.
- Collaboration, Design, Prototyping, Implementation
- New Technologies (Ag-Grid, Refreshing on Dash, Elasticsearch)
- Originally had a rough start, but once I got into my ‘environment’ and style of developing, this internship was exceptional
- Would love to come back again



Thank you for selecting me
for this spring internship at
NASA; it has been an
extraordinary opportunity to
grow and contribute.