

Air Force Installation & Mission Support Center



AI in Civil Engineer Business Processes

On behalf of Gerald J. O'Brien
AFCEC/CFT
San Antonio, TX
27 October 2025

UNCLASSIFIED

Your Success is Our Mission!

Classification

The classification of this brief is UNCLASSIFIED and the discussion can go up to UNCLASSIFIED

Your Success is Our Mission!

UNCLASSIFIED



Under Manned

Under Funded

Managing Increasingly Aged Infrastructure

How then do we improve scope, schedule and cost in Built Infrastructure while also managing potential manpower cuts, a plus up of sustainment funding while preparing for AFFORGEN?

Answer:

Bolster our already robust Planning, Programming, Budgeting, and Execution (PPBE) tools with Artificial Intelligence Capability

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We Have a Problem



- **48% of projects for DoD in the last decade have experienced cost overruns¹**
- **>\$500B in cost overruns²**
- **These issues occur at the expense of:**
 - **Overtasked contracting and construction personnel**
 - **Altered budgets**
 - **Impact the ability to award future projects**



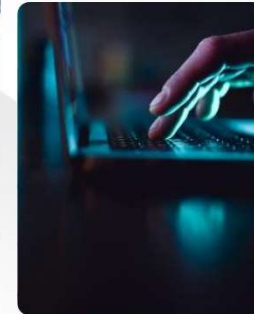
1-2 Source: Dicks, E., Molenaar, K. R., and Gibson, G. E. (2017). "Scope Definition of Air Force Design and Construction Projects." *Journal of Management in Engineering*, American Society of Civil Engineers (ASCE), 33(5).

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AI-Driven Cost Estimation for Enhanced Mission Readiness

27 October 2025



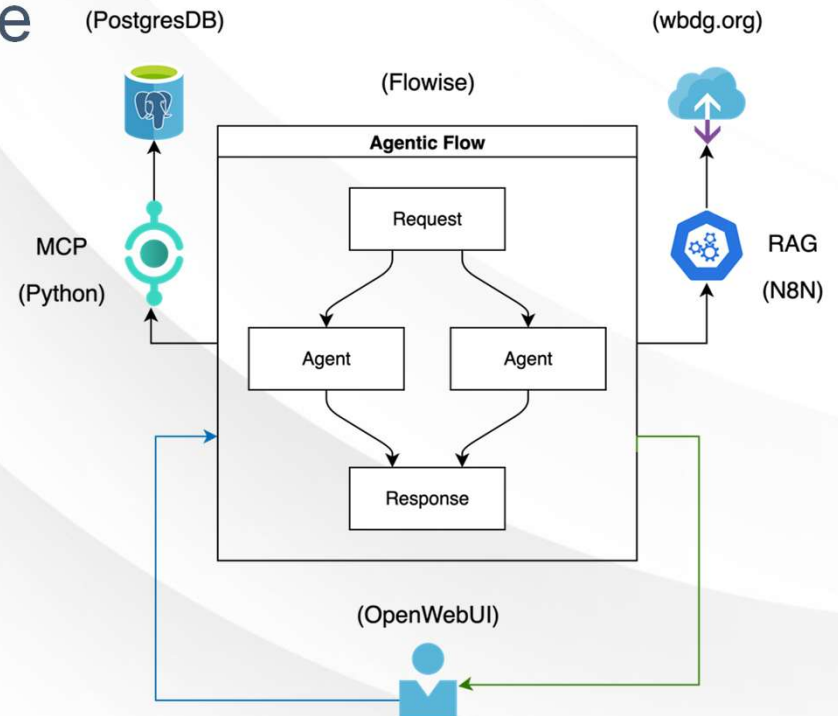
Our Approach: Agentic AI Architecture

Chat-based Interface: Provides a conversational user experience.

Agentic Multi-Agent Flow: Employs a multi-agent framework to handle complex requests, where agents collaborate to achieve a final response.

Dynamic Tool Use via Model Context Protocol (MCP): A custom MCP server enables agents to interact with a Postgres database for data retrieval and manipulation.

Retrieval-Augmented Generation (RAG) for External Data: A custom tool using RAG allows agents to access and integrate information from publicly available web assets.



Technology Agnostic Approach

- ✓ Flexibility
- ✓ Scalability
- ✓ Interoperability

A.I. Assisted CPP - Planning Action Details

ALTUS AFB | Planning Action Details

Planning Action Details

Planning Alternatives

Planning Analysis Wizard

Planning Vector Check

Scope Alternatives

Scope Analysis Wizard

Scope Vector Check

Instructions

Use this page to describe what is driving the need for a Planning Action. Being as descriptive as possible, include how the applicable functions or assets support the mission, what current gaps or shortfalls must be addressed, and link the Planning Action to the applicable Enterprise Objective, SEED, AMP and Component Plan.

Tip: Information on this page should not include any reference to a specific solution (e.g. new construction, repair). These solutions will be developed on the Planning Alternatives page. Additional details, including tooltips, are provided to assist in understanding what information is required for each textbox.

CREATE PLANNING ACTION

***Planning Action Title:**

Input the name of the planning action. This is the requirement—what gap has been identified? The title should be clear, concise, and measurable. Include the What, Where, and When.

You must enter a name for the Planning Action. This field is required to save a draft.

***Objective:**

Mitigate Risk to Mission Essential Functions 1

SEED:

***Validation/Justification:**

Describe how the requirement supports the mission and how the current or projected deficiencies may affect it. Per DAFI 32-1020, 5.3, justification data must clearly describe the impact on the mission, people, productivity, and life-cycle costs. Highlight any compliance issues with existing standards, regulations, or policies.

You must enter a Validation/Justification.

***Authorization Quantity IAW DAFMAN 32-1084:**

CATCODE with quantity (i.e. 311171 ~ 80,000 SF). N/A or other non-substantive entry requires explanation within Section 1: General, Question II of the Planning Analysis Wizard.

You must enter an Authorization Quantity IAW DAFMAN 32-1084.

***Description of Current Situation:**

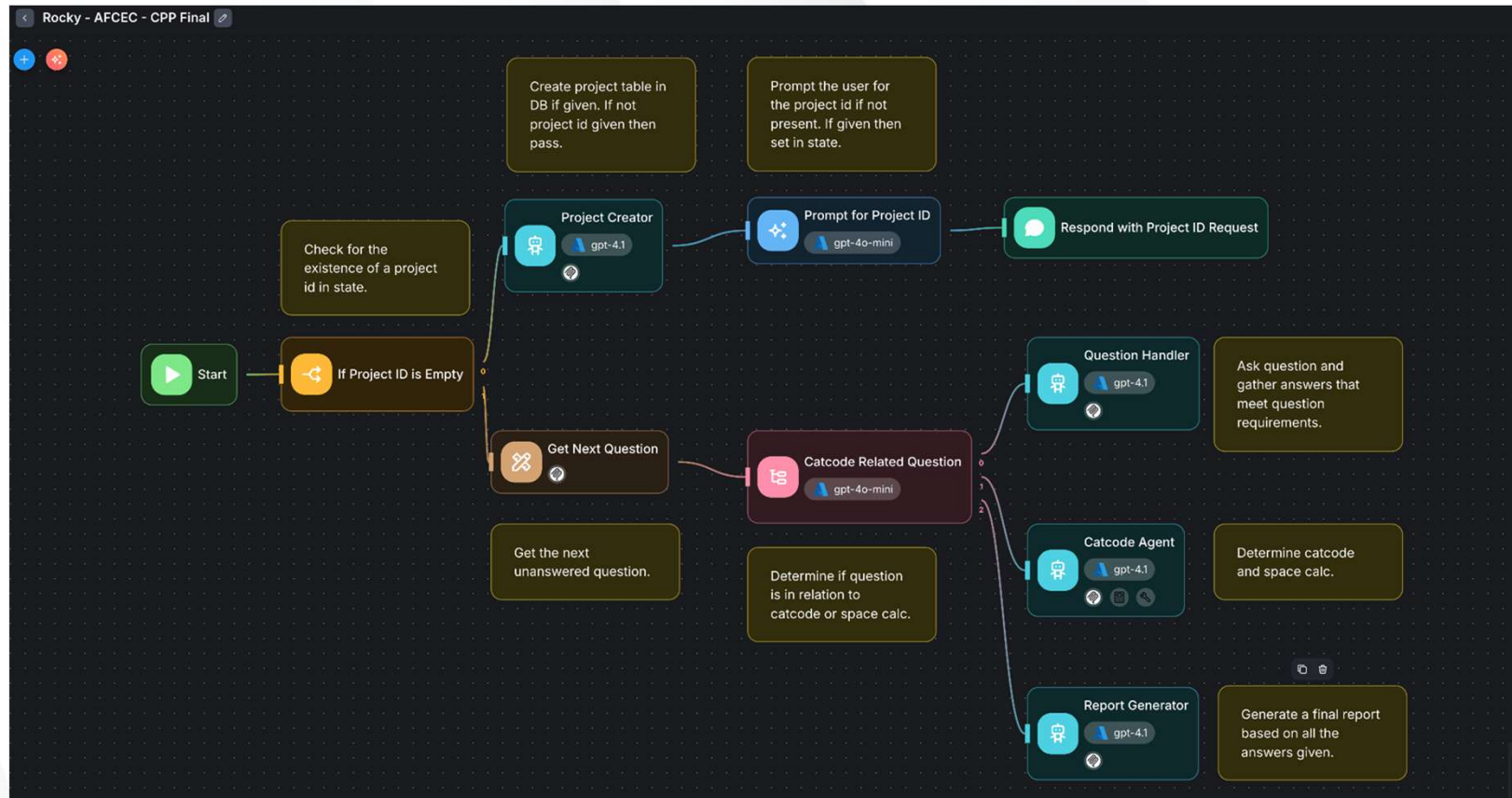
Describe how and under what conditions the requirement is currently being met. Comments must support the stated requirement, identify and describe the assets, and articulate why they are unsuitable. Detail the negative impact on the mission.

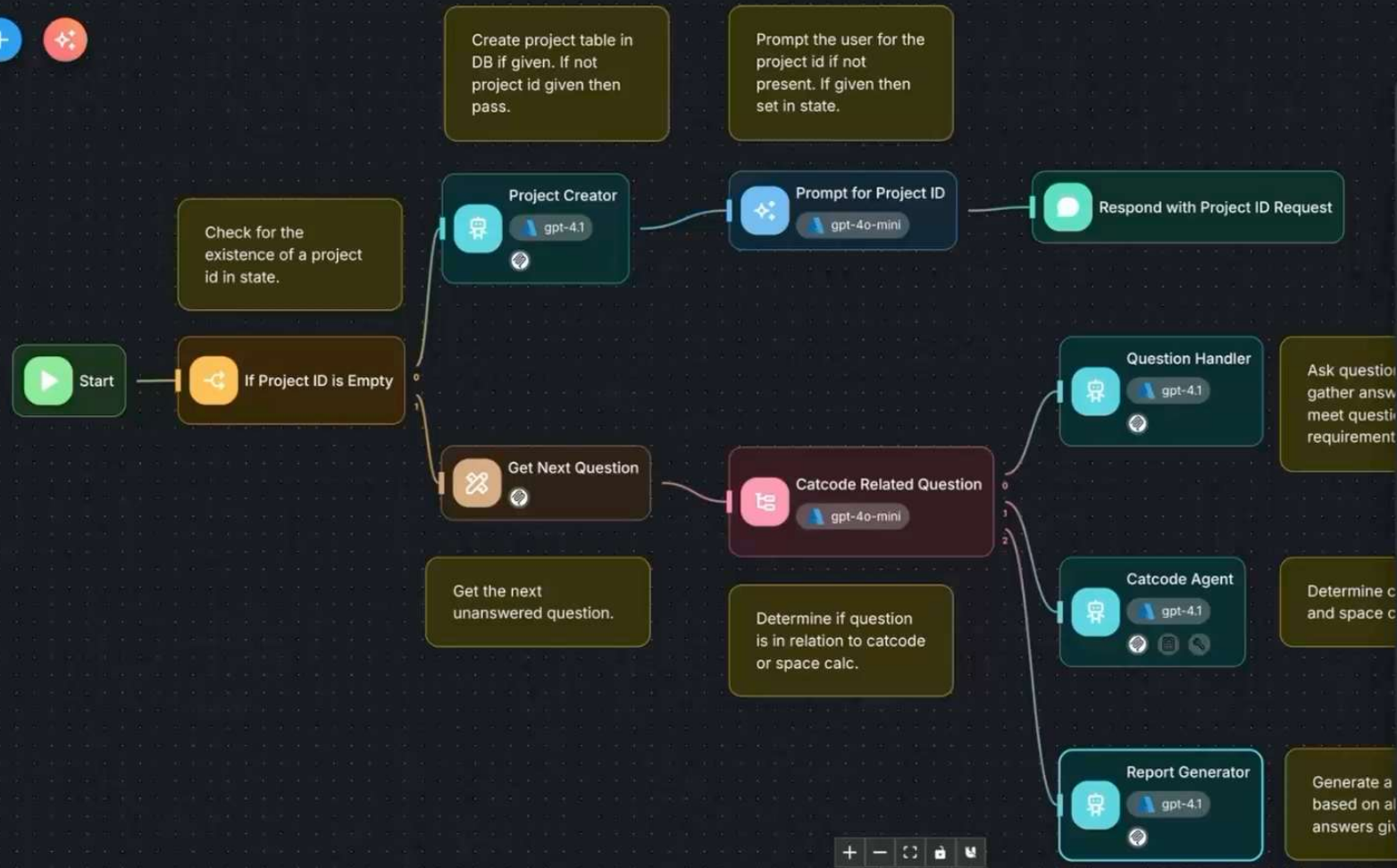
Include the following where applicable:

- SMS and Utilization Data

You must enter a Description of the Current Situation.

A.I. Assisted CPP - Agentic Flow

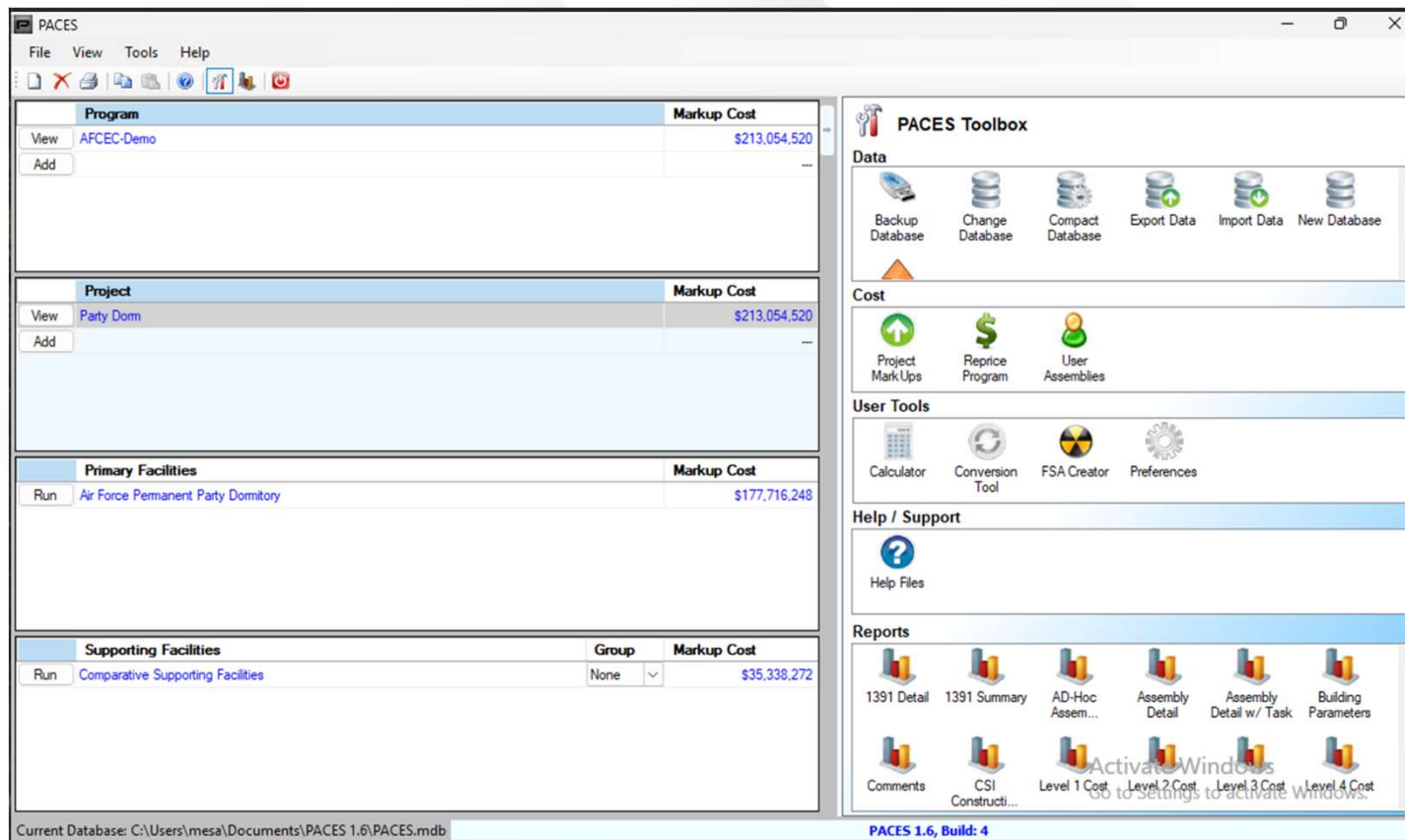




Hi there! How can I help?

Type your question...

A.I. Assisted Cost Estimate - PACES



The screenshot displays the PACES software interface, which is used for cost estimation. The main window is titled "PACES" and includes a menu bar (File, View, Tools, Help) and a toolbar. The interface is divided into several sections:

- Program Section:** Shows a table with columns "Program" and "Markup Cost". The "Program" column contains "AFCEC-Demo" and the "Markup Cost" column shows "\$213,054,520".
- Project Section:** Shows a table with columns "Project" and "Markup Cost". The "Project" column contains "Party Dom" and the "Markup Cost" column shows "\$213,054,520".
- Primary Facilities Section:** Shows a table with columns "Primary Facilities" and "Markup Cost". The "Primary Facilities" column contains "Air Force Permanent Party Dormitory" and the "Markup Cost" column shows "\$177,716,248".
- Supporting Facilities Section:** Shows a table with columns "Supporting Facilities", "Group", and "Markup Cost". The "Supporting Facilities" column contains "Comparative Supporting Facilities", the "Group" column contains "None", and the "Markup Cost" column shows "\$35,338,272".
- PACES Toolbox:** A sidebar on the right containing various tools categorized into:
 - Data:** Backup Database, Change Database, Compact Database, Export Data, Import Data, New Database.
 - Cost:** Project Mark Ups, Reprice Program, User Assemblies.
 - User Tools:** Calculator, Conversion Tool, FSA Creator, Preferences.
 - Help / Support:** Help Files.
 - Reports:** 1391 Detail, 1391 Summary, AD-Hoc Assem..., Assembly Detail, Assembly Detail w/ Task, Building Parameters, Comments, CSI Constructi..., Level 1 Cost, Level 2 Cost, Level 3 Cost, Level 4 Cost.

At the bottom of the window, the status bar indicates the current database path: "Current Database: C:\Users\mesa\Documents\PACES 1.6\PACES.mdb" and the version/build information: "PACES 1.6, Build: 4".

Program		Markup Cost
View	AFCEC-Demo	\$138,532,295
Add		

Project		Markup Cost
View	Party Dom	\$138,532,295
Add		

Primary Facilities		Markup Cost
Run	Air Force Permanent Party Dormitory	\$115,564,754

Supporting Facilities		Group	Markup Cost
Run	Comparative Supporting Facilities	None	\$22,967,541

PACES Toolbox

Data



Cost



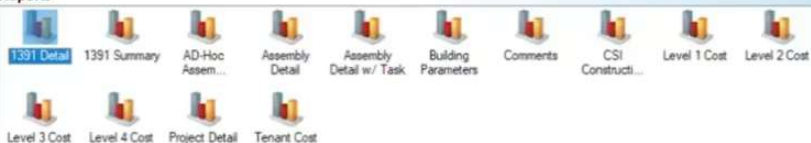
User Tools



Help / Support



Reports



Current Database: C:\Users\mesa\Documents\PACES 1.6\PACES.mdb

PACES 1.6, Build: 4

Activate Windows
Go to Settings to activate Windows.

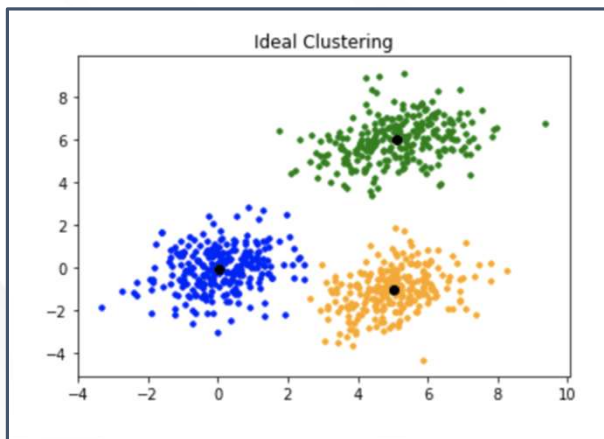
Search



3:15 PM
10/3/2025

Technical Deep Dive: Models, Tools and Rationale

K-Means Algorithm



SBERT Model

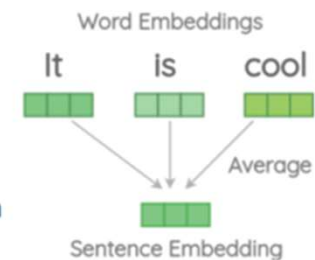
- counting-based: “The cat is in the hat”

Does not take semantics into account at all

the	cat	is	in	hat
2	1	1	1	1

- Averaging word embeddings:

Sentences tend to “bundle up” in the same area of the vector space



AI-Driven Predictability: Key to Faster Decisions and Mission Readiness

Summary of AI-Driven Predictability:

- **Improved Speed:** Streamlines requirements gathering and execution, saving hours to days on initial tasks (e.g., CATCODE Determination: 15 to 90 minutes saved; Space Authorization: 10 minutes to 4 hours saved per project).
- **Enhanced Accuracy & Data Fidelity:** Direct, data-driven validation (via PACES Aid and Clustering) and real-time data access ensure better cost estimates from inception, maintaining high-quality data throughout the planning process.
- **The Strategic Impact:** AI-driven predictability is the key to accelerating the planning process, directly improving infrastructure readiness, and strengthening the mission.

Next Steps:

- Advance the solution to a fuller prototype focusing on integration within the Air Force environment.

Questions / Final Discussion

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