

Flexible Simulation Capability for Terminal Airspace

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FAA/MOIE

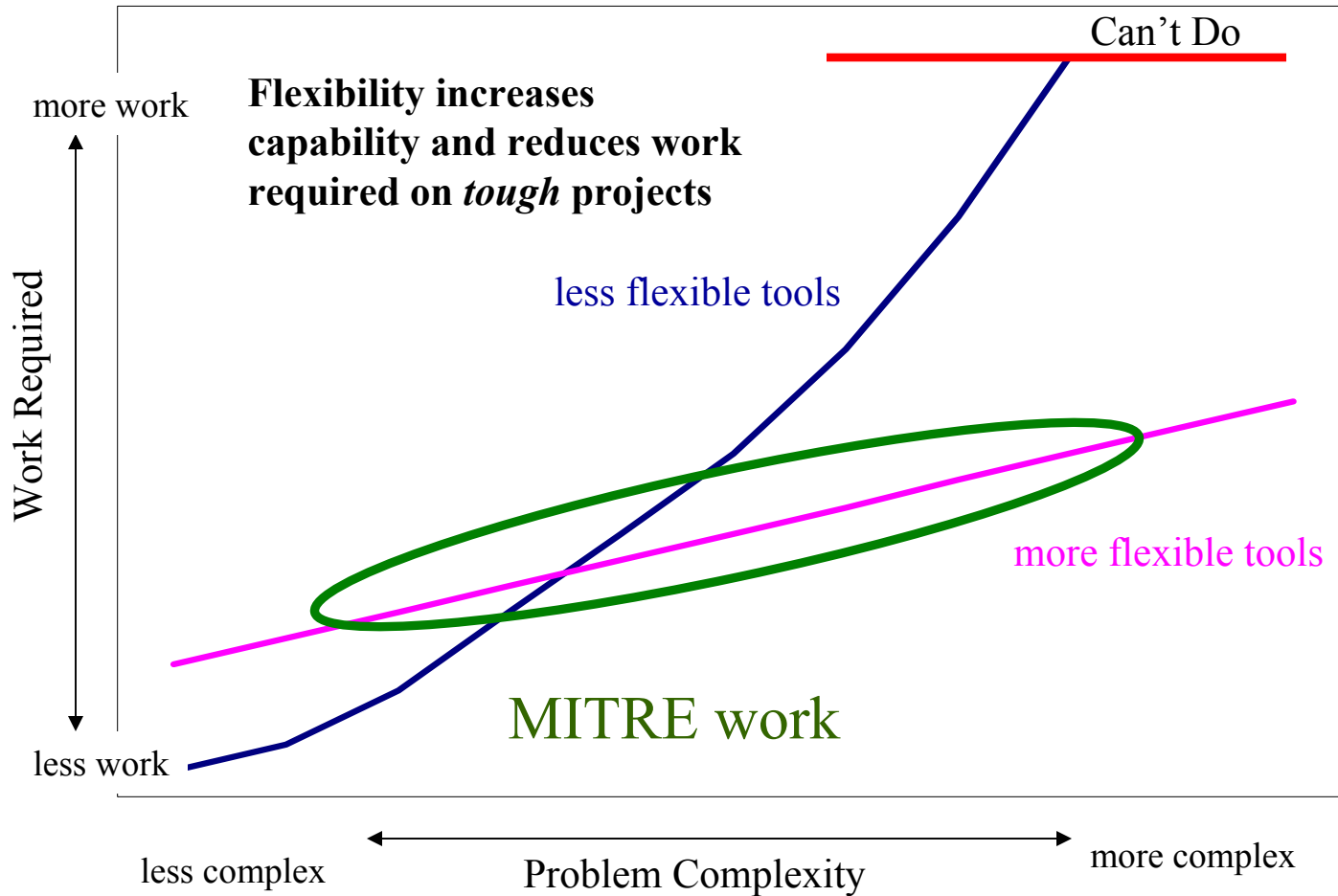
The logo for the MITRE Technology Program, featuring a stylized graphic of stacked, colorful blocks (yellow, orange, and blue) to the left of the text.

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Problem

- Existing simulation tools lack the *flexibility* needed to model important **Terminal Radar Approach Control facilities (TRACONs)**.
- This makes it extremely difficult to evaluate the capacity and delay **benefits** resulting from
 - Navigational Improvements
 - Airspace Redesign
 - Innovative Procedures

Background



Objective

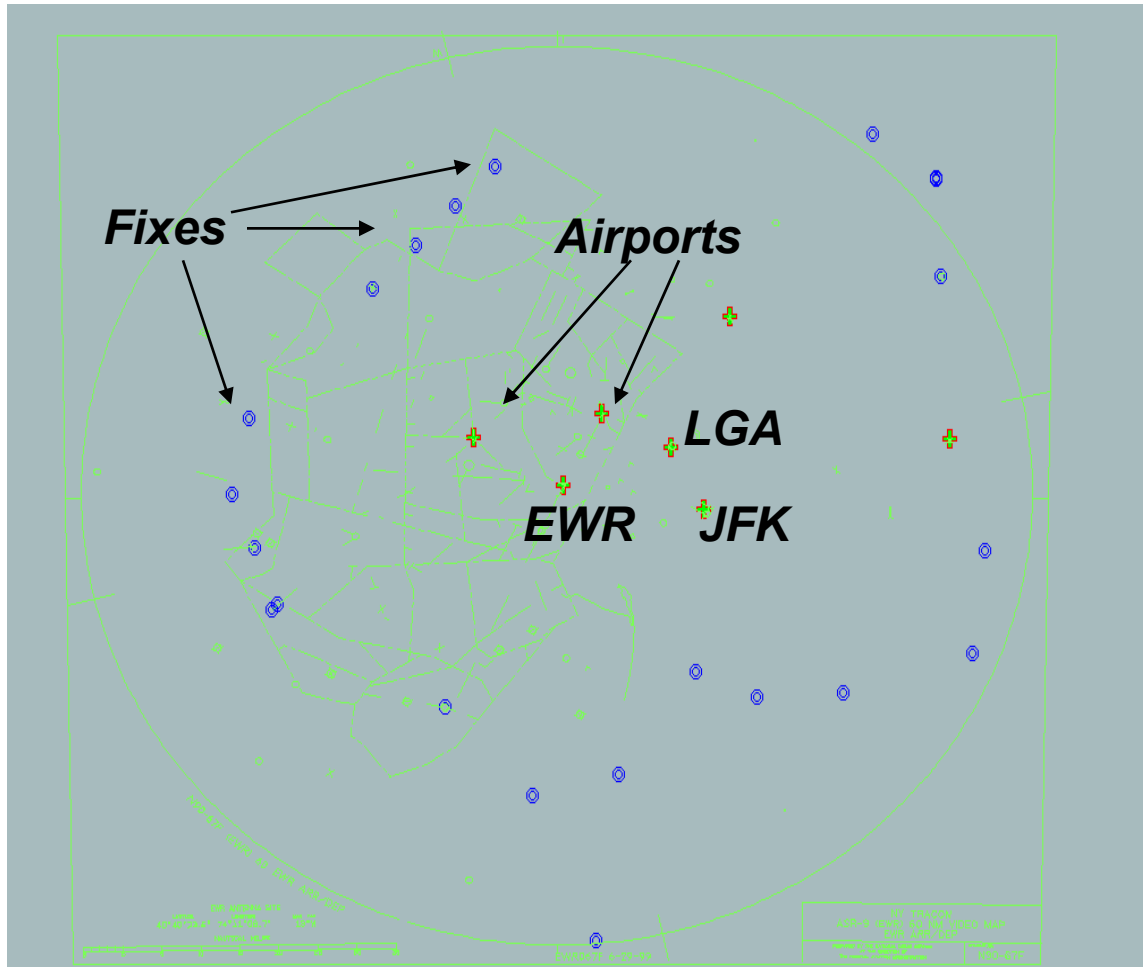
- **Build a low-level, flexible, TRACON simulation tool suite in the SLX simulation language. It will include:**
 - **Arrival Sequencing module**
 - **Departure Miles-In-Trail (MIT) module**
 - **Traffic generation module**
- **Using such a tool suite, a skilled modeler can perform a very wide range of TRACON studies.**

Activities

- **We *have* produced SLX code for:**
 - **Fast, PC-based trajectory model**
 - **Multiple merges and sequencing on arrival**
 - **Extended downwind/moving merge capability**
- **We are working on:**
 - **Integrating trajectory model with sequencing scheme**
 - **Performing dynamic runway/route selection**
 - **Quantifying benefits of additional departure fixes serving Chicago O'Hare**

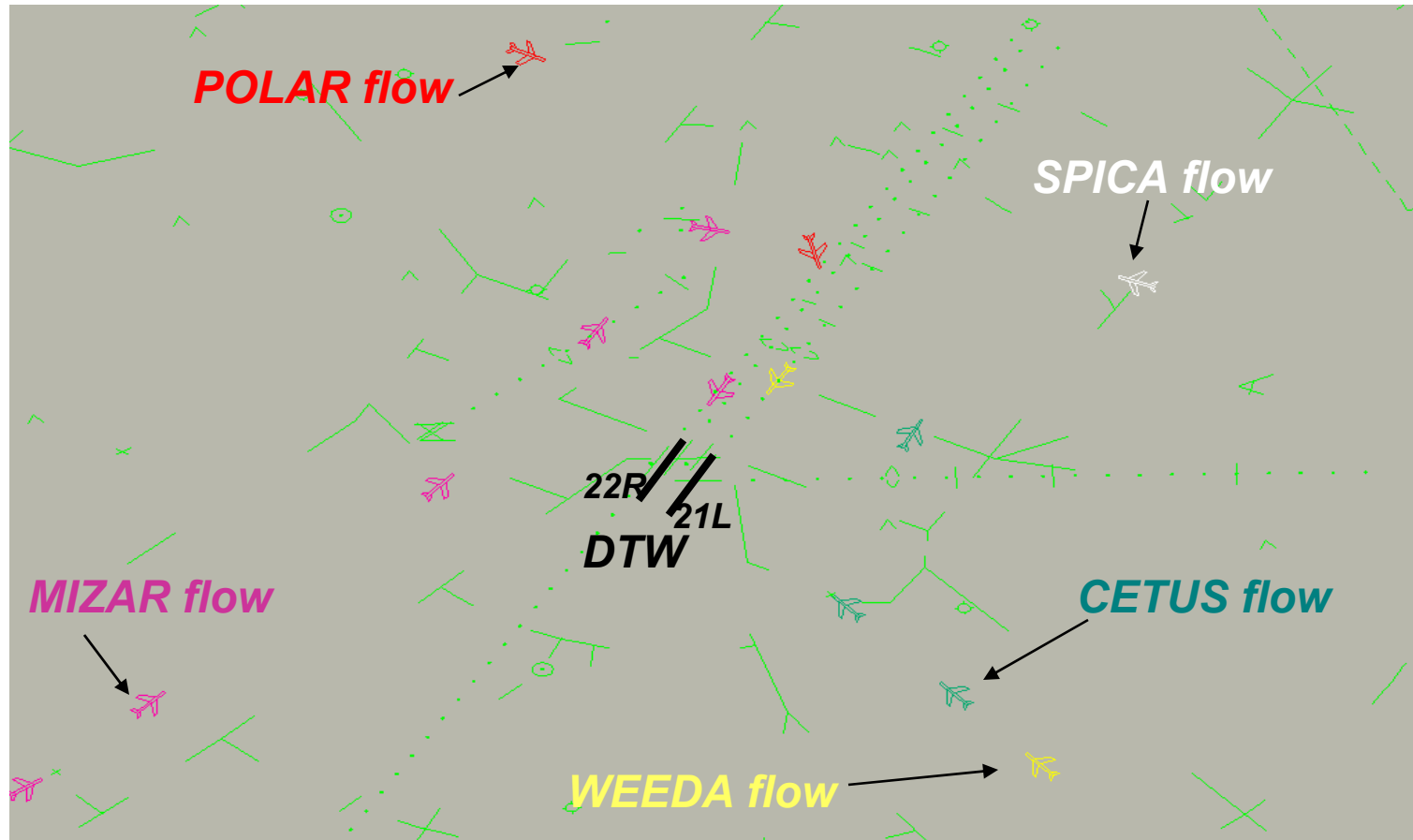
Highlight

Departure Fixes Shared by Large Airports



Demonstration

*Animation of Merging Arrivals into Detroit (DTW)
(Different color flights represent different flows)*

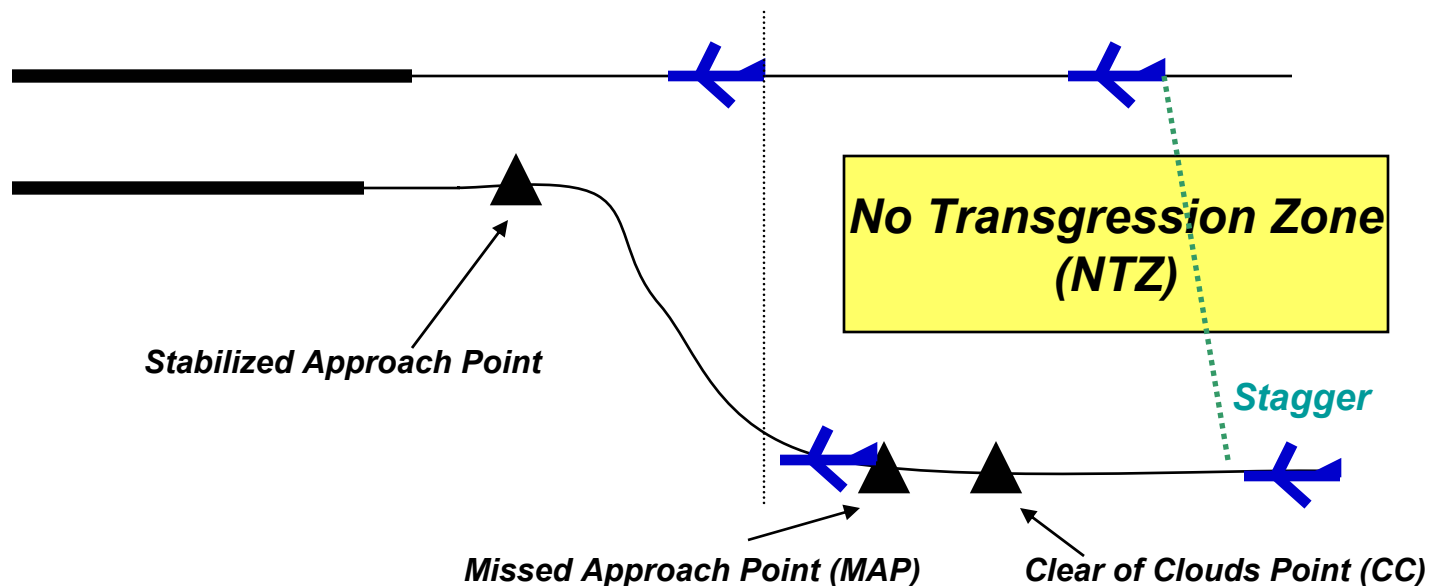


Impacts

- We are making it *easier* and *faster* to do tailored TRACON analyses:
 - Measure benefits of new departure fixes serving O'Hare
 - Quantify benefits of proposed navigation systems and procedures serving Philadelphia

Future Plans

Paired Arrival Procedures for Airports with Closely Spaced Runways



Graphic adapted from Gladstone et al, "Analysis of Triple Arrivals to Hartsfield Atlanta International Airport" MITRE CAASD, 2000.