THE UNIVERSITY OF CHICAGO | MS-APPLIED DATA SCIENCE

MS in Applied Data Science | Hackathon Summer 2025

Agents in the Sky Challenge: Change the Unchangeable

Co-sponsored by United Airlines & The University of Chicago Data Science Institute

INTRODUCTION

This hackathon brings together aviation professionals from United Airlines and students and alumni from the University of Chicago's Data Science Institute (DSI) to develop cutting-edge solutions using agentic AI. Participants will form interdisciplinary teams to build real-world applications that redefine decision-making and automation in the aviation sector.

CHALLENGE OVERVIEW

Develop a solution—a functional prototype, intelligent application, or agentic AI-powered service—that addresses a meaningful problem within the aviation domain. Your system should integrate cutting-edge technologies such as:

- **Agent-to-Agent Communication Protocols** (e.g. A2A or LangGraph Agent Protocols)
- **Model Context Protocol Servers & Clients** (MCP)
- **Agentic Frameworks & Tools** (e.g., CrewAI, LangGraph, AutoGen, AgentSpace)

Whether your team chooses to build a scheduling assistant, a disruption response coordinator, a predictive maintenance interface, or an internal knowledge agent, the design and application are entirely up to you.

The challenge is intentionally open-ended to foster creativity and encourage diverse problem-solving approaches. The only requirements are:

- Incorporate agentic or multi-agent technologies
- Address a real and relevant problem in the airline industry
- Form a cross-functional team including at least one University of Chicago DSI student or alum and one United Airlines professional

You may register individually or as a team. Final team formation will take place during the kickoff event, where participants from United Airlines and the University of Chicago will be grouped into cross-functional teams.

Teams are encouraged to explore challenges across a wide range of aviation domains, including but not limited to:

- **Flight Operations**: Scheduling, dispatch, crew optimization, route planning
- **Passenger Experience**: Personalization, in-flight services, customer support
- **Disruption Recovery**: Delay management, rebooking systems, anomaly detection
- **Sustainability**: Emissions tracking, fuel optimization, eco-efficient routing
- **Safety and Compliance**: Incident detection, regulatory monitoring, operational risk management
- **Emerging Technologies**: Multimodal systems (e.g. baggage images), wearables, edge deployment, real-time agent orchestration

Why Participate

- Gain hands-on experience with emerging Gen AI technologies
- Collaborate across academic and industry perspectives
- Present your work to decision-makers in airlines industry and academic scholars
- Earn recognition and enhance career development opportunities

Cloud Access

Participants will be provided access to cloud compute resources during the hackathon.

- **University of Chicago participants** will receive instance access for **Google Cloud Platform (GCP)** using student accounts.
- **United Airlines participants** will have access to the internal **MARS environment** for experimentation and deployment.

Ready for Takeoff?

Bring your ideas, expertise, and curiosity. This is your opportunity to push the boundaries of what intelligent systems can do, when agents work together and humans remain at the helm. Sign up here!

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Submission

- Teams up to 5 individuals are permitted.
- Submit code along with a 7–9-minute video showcasing your project. The video should include an explanation of the project, and the demonstration of the working application should display the output generated from input queries.

PROGRAM SCHEDULE

Event	Date	Time	Location
Kickoff Meeting	June 17	10–12PM CST	In-person/Virtual
Lunch	June 17	12–1PM CST	In-person
Development Time	June 17–22	—	Virtual
Office Hour (e.g. LangGraph Platform Overview)	June 19	12-1PM CST	Virtual
SUBMISSION DEADLINE	**June 22**	**5PM CST**	**Virtual**
Presentation Showcase & Award Ceremony	June 23	2-5PM CST	In-person/Virtual
Happy Hour	June 23	5-6PM CST	In-person/Virtual

What to expect after submitting

- Judges will review and score projects based on the evaluation criteria (i.e., on its business value, technical feasibility, implementation, and the overall presentation). Bonus points will be awarded for outstanding innovation, design, and insights. See below for a full breakdown.
- **All teams should be prepared to present at the Presentation Showcase.** If we are unable to accommodate presentations from all teams due to time constraints, we will invite the top ten teams to present their projects. We encourage all participants to attend the event to support your fellow hackathon members and to take part in the networking and happy hour to follow!

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PRIZES

Prizes include but not limited to:

First Place (GOLD)

- United Airlines Model Airplanes
- United Club Passes
- Demo at our Data Engineering Town Hall
- Private lunch with United Airlines tech leadership
- Branded United Airlines merchandise
- Data Science Institute Swag

Second Place (SILVER)

- United Club Passes
- Branded United Airlines merchandise
- Data Science Institute Swag

Third Place (BRONZE)

- Travel Amenity Kit
- Branded United Airlines merchandise and Data Science Institute Swag

A final list of prizes will be announced at the kickoff event!

JUDGES

A panel of UChicago faculty and United Airlines tech leaders will serve as judges.

Sample Challenges & Queries for Inspiration

Note: If your solution involves developing a Retrieval-Augmented Generation (RAG) model, designs that enable **joint reasoning over both structured and unstructured data**, especially in response to **multi-intent queries**, will be viewed favorably.

Challenge 1: Flight Disruption Analyst

1. Which flight routes experienced multiple cancellations last month, and what were the reported causes?
2. Identify flights delayed over 3 hours due to weather and explain the severity of weather conditions on those days.
3. What is the most common reason for cancellations in the past quarter, and how do they correlate with national weather alerts?
4. Find all flights disrupted around Denver Airport during the snowstorm week of January 2024. What weather events were reported?
5. Which airline had the highest rate of NAS-related delays, and what FAA advisories were active at the time?

Challenge 2: Demand Spike Explorer

6. Which 5 U.S. city pairs saw a spike in average ticket prices in August 2023, and were there any major concerts or events in those cities during that time?
7. Which flight destinations showed an increase in bookings that correlate with a sporting event or festival?
8. Were there any unusual increases in last-minute bookings around public safety alerts or political events?
9. Find three examples of days where Google Trends search volume for “flight delay” or “storm” was high, and correlate them with actual flight delay records.
10. How do pricing spikes during weather alerts differ from those during entertainment events?

EVALUATION CRITERIA

Business Value - 30%

- Addresses a significant problem with measurable impact and stakeholder benefits.
- Demonstrates innovation and clearly articulates the challenge, project goals, and real-world applications.

Technical Feasibility - 30%

- Selects relevant data and effectively handles complexity (e.g., text, tables, unstructured formats).
- Evaluates model performance (e.g., spike detection, summarization quality).
- Identifies limitations and proposes future extensions.

Implementation - 25%

- Produces a polished prototype with a clear and actionable production roadmap.
- Combines structured and unstructured reasoning effectively.
- Presents a well-defined narrative synthesis or decision logic.
- Provides clear explanations of tools/methods (e.g., LangGraph, CrewAI, DuckDB).

Presentation - 15%

- Delivers a high-quality, engaging presentation with clear visuals, structure, and system outputs/results.
- Includes comprehensive documentation.
- Adheres to the required presentation duration.

Bonus Points

- Awarded in any category for outstanding innovation, design, or insights (novel agent use, orchestration, or forward-looking recommendations.)