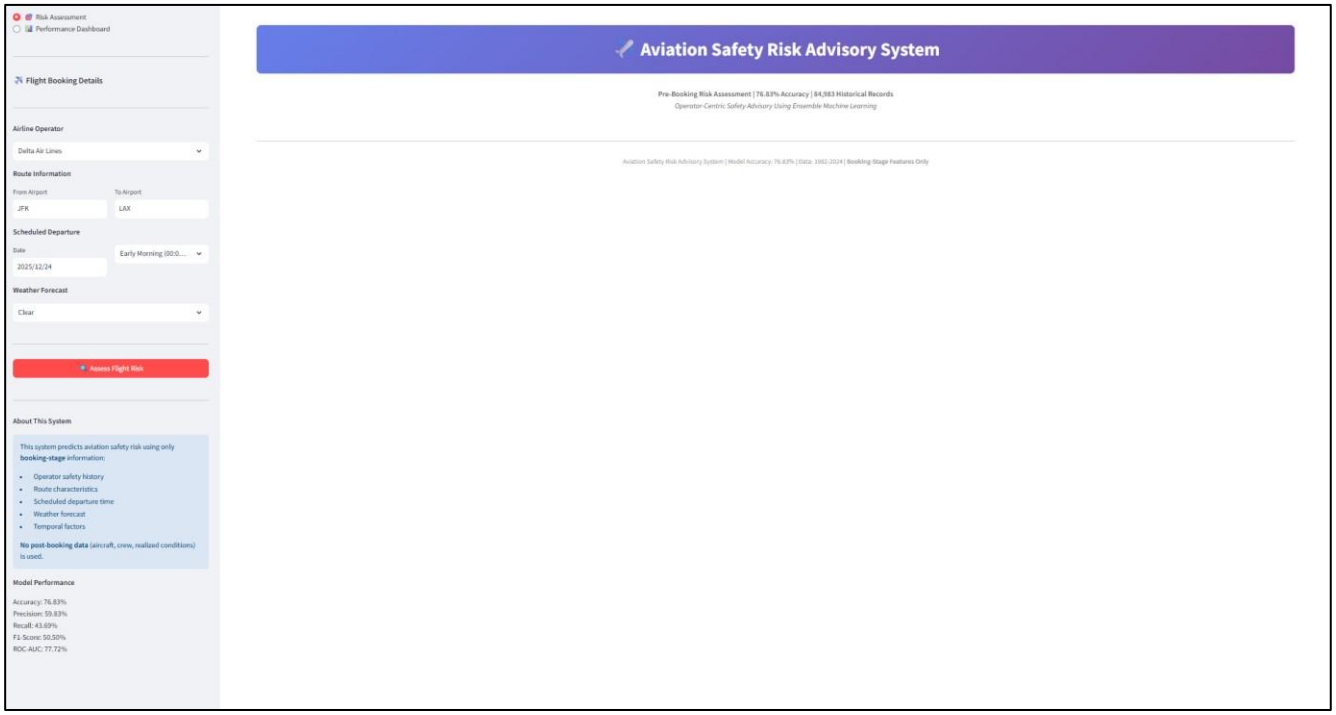
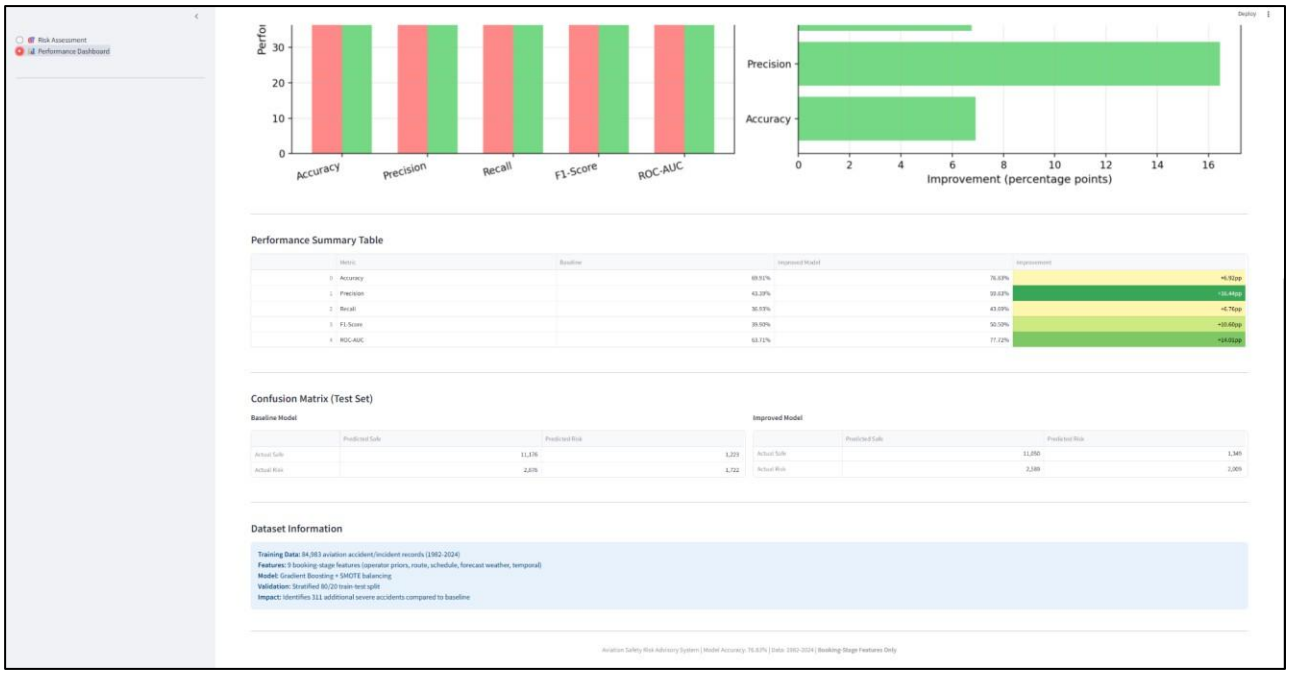
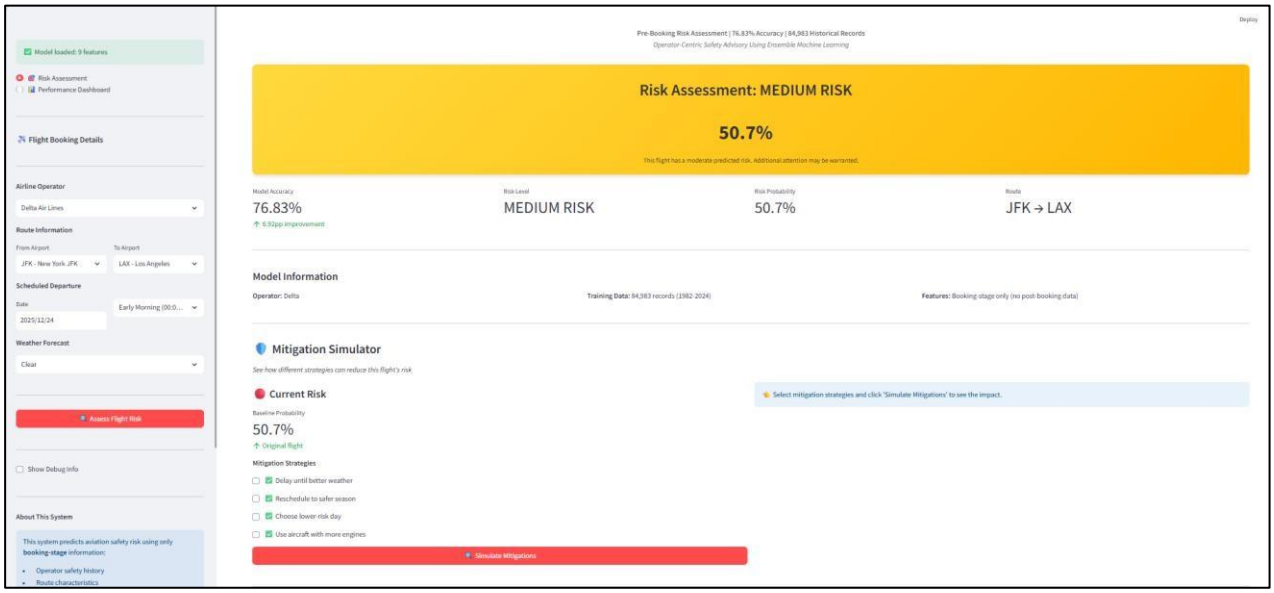
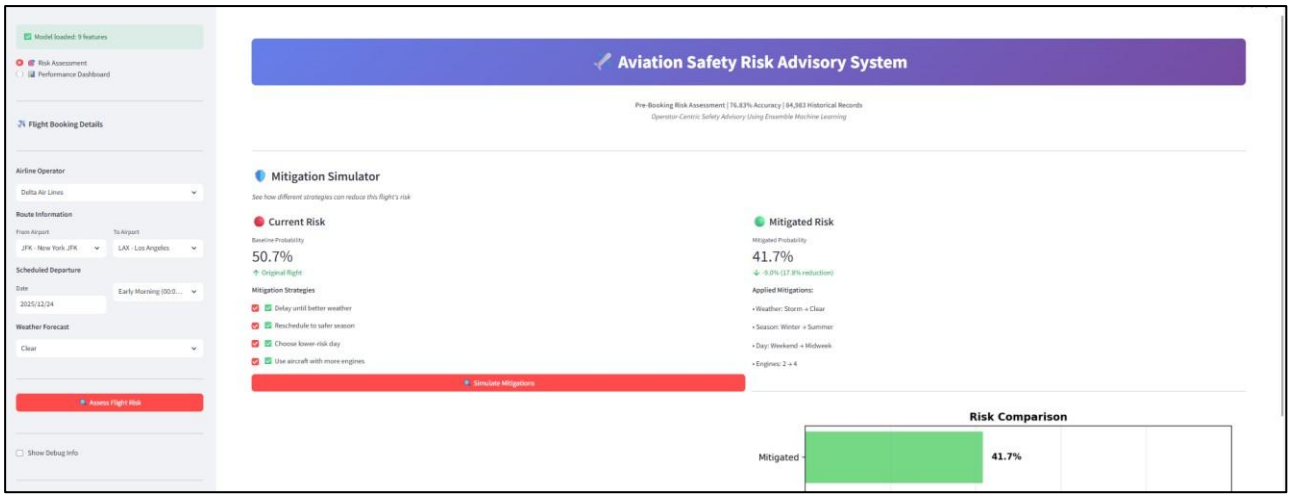
Output of the Deployed streamlit/app.py.





Risk Assessment
Performance Dashboard
Deploy
Accuracy
Precision
Recall
F1-Score
ROC-AUC
Improvement (percentage points)
Performance Summary Table
Confusion Matrix (Test Set)
Baseline Model
Improved Model
Dataset Information
Training Data: 84,963 aviation accident/incident records (1982-2024)
Features: 9 booking-stage features (operator priors, route, schedule, forecast weather, temporal)
Model: Gradient Boosting + SMOTE balancing
Validation: Stratified 80/20 train-test split
Impact: Identifies 311 additional severe accidents compared to baseline


Model loaded: 9 features
Risk Assessment
Performance Dashboard
Flight Booking Details
Airline Operator
Delta Air Lines
Route Information
From Airport
JFK - New York JFK
To Airport
LAX - Los Angeles
Scheduled Departure
Date
2025/12/24
Early Morning (00:0...
Weather Forecast
Clear
Assess Flight Risk
Show Debug Info
About This System
This system predicts aviation safety risk using only booking-stage information:
Operator safety history
Route characteristics
Deploy
Pre-Booking Risk Assessment | 76.83% Accuracy | 84,963 Historical Records
Operator-Centric Safety Advisory Using Ensemble Machine Learning
Risk Assessment: MEDIUM RISK
50.7%
This flight has a moderate predicted risk. Additional attention may be warranted.
Model Accuracy
76.83%
6.92pp improvement
Risk Level
MEDIUM RISK
Risk Probability
50.7%
Route
JFK → LAX
Model Information
Operator: Delta
Training Data: 84,983 records (1982-2024)
Features: Booking-stage only (no post-booking data)
Mitigation Simulator
See how different strategies can reduce this flight's risk
Current Risk
Baseline Probability
50.7%
Original flight
Mitigation Strategies
Delay until better weather
Reschedule to safer season
Choose lower risk day
Use aircraft with more engines
Simulate Mitigations
Select mitigation strategies and click 'Simulate Mitigations' to see the impact.


Model loaded: 9 features
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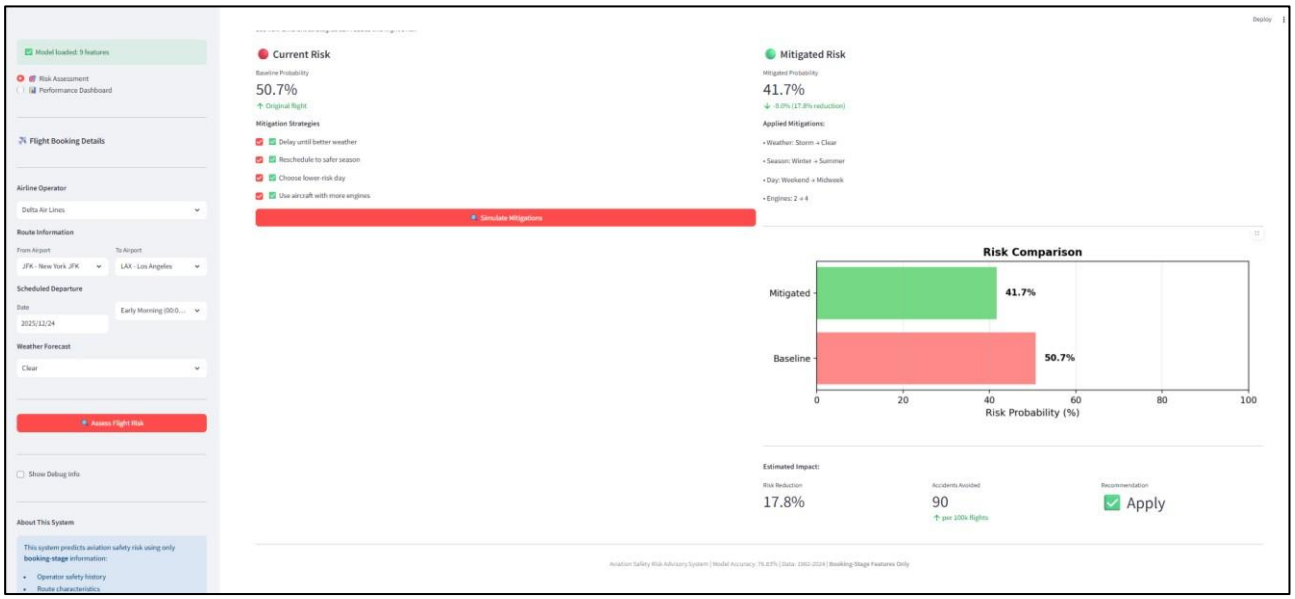
Performance Dashboard
Flight Booking Details
Airline Operator
Delta Air Lines
Route Information
From Airport
JFK - New York JFK
To Airport
LAX - Los Angeles
Scheduled Departure
Date
2025/12/24
Early Morning (00:0...
Weather Forecast
Clear
Assess Flight Risk
Show Debug Info
Aviation Safety Risk Advisory System
Pre-Booking Risk Assessment | 76.83% Accuracy | 84,983 Historical Records
Operator-Centric Safety Advisory Using Ensemble Machine Learning
Mitigation Simulator
See how different strategies can reduce this flight's risk
Current Risk
Baseline Probability
50.7%
Original flight
Mitigation Strategies
Delay until better weather
Reschedule to safer season
Choose lower-risk day
Use aircraft with more engines
Simulate Mitigations
Mitigated Risk
Mitigated Probability
41.7%
-9.0% (17.8% reduction)
Applied Mitigations:
• Weather: Storm → Clear
• Season: Winter → Summer
• Day: Weekend → Midweek
• Engines: 2 → 4
Risk Comparison
Mitigated
41.7%


Model loaded: 9 features
Risk Assessment
Performance Dashboard
Flight Booking Details
Airline Operator
Delta Air Lines
Route Information
From Airport
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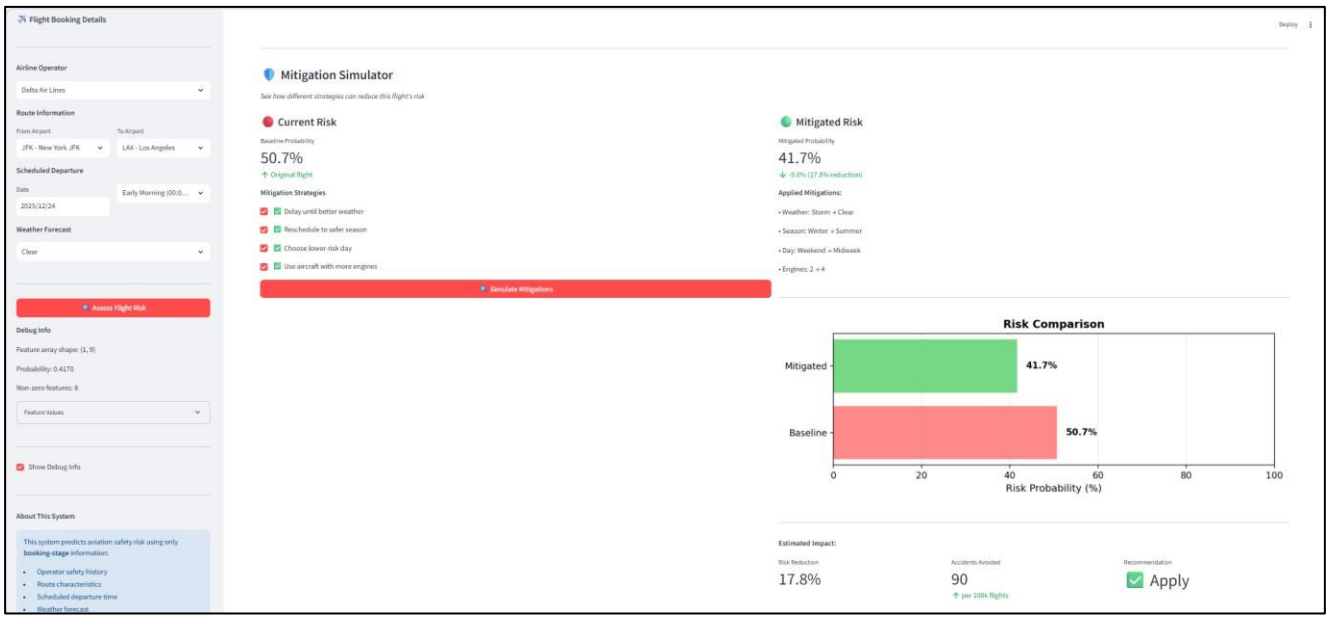
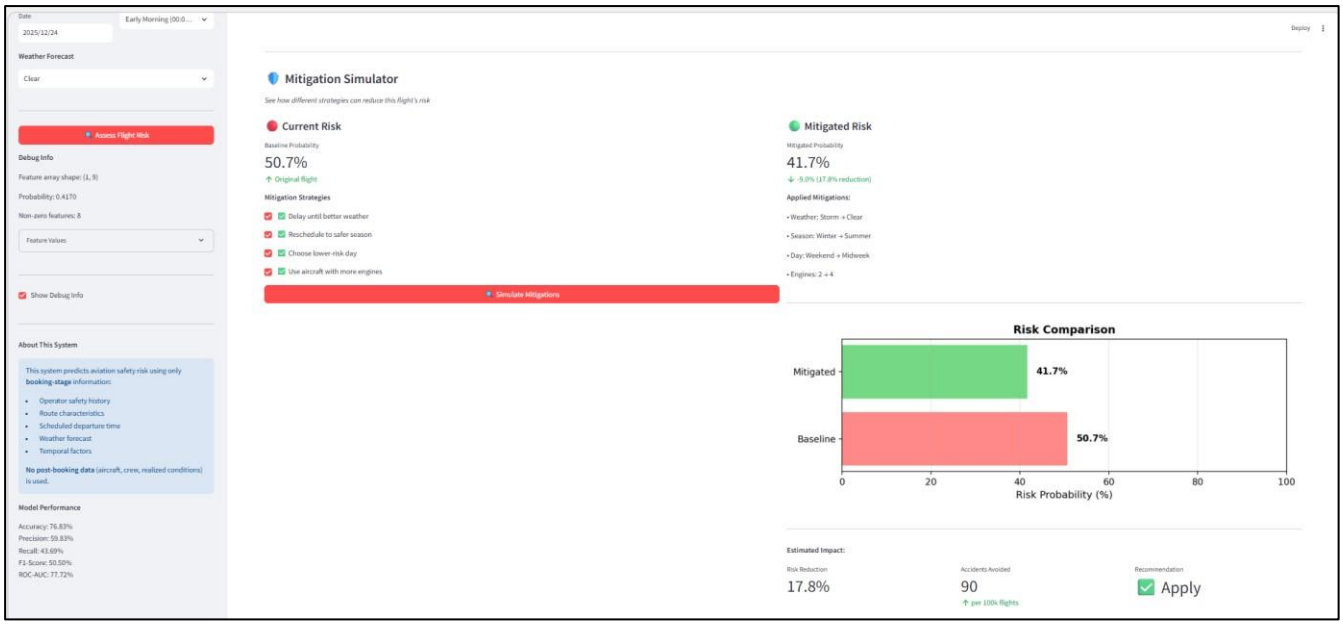
Applied Mitigations:
• Weather: Storm → Clear
• Season: Winter → Summer
• Day: Weekend → Midweek
• Engines: 2 → 4
Risk Comparison
Mitigated
41.7%
Baseline
50.7%
0
20
40
60
80
100
Risk Probability (%)
Estimated Impact:
Risk Reduction
17.8%
Accidents Avoided
90
per 100k flights
Recommendation
Apply


Flight Booking Details
Airline Operator
Delta Air Lines
Route Information
From Airport
JFK - New York JFK
To Airport
LAX - Los Angeles
Scheduled Departure
Date
2025/12/24
Early Morning (00:0...
Weather Forecast
Clear
Assess Flight Risk
Debug Info
Feature array shape: (1, 9)
Probability: 0.4170
Non-zero features: 8
Feature Values
Show Debug Info
About This System
This system predicts aviation safety risk using only booking-stage information:
Operator safety history
Route characteristics
Scheduled departure time
Weather forecast
Mitigation Simulator
See how different strategies can reduce this flight's risk
Current Risk
Baseline Probability
50.7%
Original flight
Mitigation Strategies
Delay until better weather
Reschedule to safer season
Choose lower-risk day
Use aircraft with more engines
Simulate Mitigations
Mitigated Risk
Mitigated Probability
41.7%
-9.0% (17.8% reduction)
Applied Mitigations:
• Weather: Storm → Clear
• Season: Winter → Summer
• Day: Weekend → Midweek
• Engines: 2 → 4
Risk Comparison
Mitigated
41.7%
Baseline
50.7%
0
20
40
60
80
100
Risk Probability (%)
Estimated Impact:
Risk Reduction
17.8%
Accidents Avoided
90
per 100k flights
Recommendation
Apply


Date
2025/12/24
Early Morning (00:0...
Weather Forecast
Clear
Assess Flight Risk
Debug Info
Feature array shape: (1, 9)
Probability: 0.4170
Non-zero features: 8
Feature Values
Show Debug Info
About This System
This system predicts aviation safety risk using only booking-stage information:
Operator safety history
Route characteristics
Scheduled departure time
Weather forecast
Temporal factors
No post-booking data (aircraft, crew, realized conditions) is used.
Model Performance
Accuracy: 76.83%
Precision: 59.83%
Recall: 43.69%
F1-Score: 50.50%
ROC-AUC: 77.72%
Deploy
Mitigation Simulator
See how different strategies can reduce this flight's risk
Current Risk
Baseline Probability
50.7%
↑ Original flight
Mitigation Strategies
Delay until better weather
Reschedule to safer season
Choose lower-risk day
Use aircraft with more engines
Simulate Mitigations
Mitigated Risk
Mitigated Probability
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↓ -9.0% (17.8% reduction)
Applied Mitigations:
• Weather: Storm → Clear
• Season: Winter → Summer
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• Engines: 2 → 4
Risk Comparison
Mitigated
41.7%
Baseline
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20
40
60
80
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Accidents Avoided
90
↑ per 100k flights
Recommendation
Apply