

Runway Incursion Risk Modelling

Click here to see problem statement in IdeaHub: <http://ideascale.com/t/UKsrZBS9G> (Note: you must be a registered user in myACRP/IdeaHub.)

TAGS: Airport Planning, Design, Operations, Safety

STAFF COMMENTS

The cost to develop and validate a model designed to predict the potential for site-specific incursions would easily cost twice the proposed amount.

AVERAGE INDUSTRY RATING SUMMARY

	Committees¹	Airport Community²
Achievable	3.25	3.54
Applicable	4.00	4.08
Implementable	3.25	3.23
Understandable	4.00	4.00
OVERALL	3.63	3.71

Notes: 1. Includes TRB aviation committees and committees from ACI-NA and AAAE.

2. Includes airport employees serving on active ACRP project panels.

[USE THIS LINK TO SEE DETAILED INDUSTRY RATINGS.](#) Click on the arrow in the Problem Statements dropdown menu in the upper right and select the problem statement number.

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ACRP OVERSIGHT COMMITTEE (AOC) DISPOSITION

The average AOC rating among its voting members was 3.3 on a scale of 1 to 5. FAA continues to regularly research this topic. There might be benefit to an independent review. The problem statement was not selected for ACRP funding and will be returned to the idea collection phase of ACRP's IdeaHub.

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OBJECTIVE

Develop tools for evaluating the risk of runway incursions based on airport-specific factors such as airfield configuration, weather, aircraft operations, aircraft characteristics, and air traffic management practices. This project would involve data collection from historical runway incursion event data for storage in a relational database. These events would be classified by type following FAA and international taxonomy. Separate models would be developed for each type of event. The models would employ independent variables identified as either causal or contributing factors for the occurrence of the event. Separate models would be developed to determine the likelihood of an incursion and the severity of the incursion using estimates of aircraft separation and speeds. The results would be a tool that airport planners and designers could use to evaluate runway incursion risk potential associated with specific airport operations and proposed changes to airfield configurations.

BACKGROUND

The FAA has completed a number of studies that identify specific airfield configurations that contribute to runway incursions. For example, wide taxiway entrances to an active runway are shown to be associated with a higher likelihood of a runway incursion. However, these findings are not location-specific. They apply to all airports regardless of size, complexity and geography. Other airport-specific factors in addition to the specific configuration can also contribute to runway incursions. For example, pilots in smaller aircraft might have increased perception difficulties when negotiating wide entrance taxiways. Airports that are considering airfield changes that are intended to decrease the potential of runway incursion need to have a complete risk analysis tool to fully understand existing and potential runway incursion risks. Proposed airfield changes intended to decrease runway incursion risk at one specific location might also be increasing the risk at other locations on the airport. A tool is needed to help airports understand the net risk reduction for these types of proposals.

APPROACH TO RESEARCH

The project is planned for three phases. Phase 1 will ascertain relevant data for a runway incursion risk assessment model. This would consist of a review of runway incursion reports from FAA and international agencies by a panel of research experts to identify data types that would be appropriate for modelling. It is expected that this phase would consider operational and environmental factors such as airfield configuration, aircraft characteristics, weather, visibility, ATCT communications, irregular events such as construction and weather interruptions, and pilot/controller familiarity with the airfield. Phase 2 will target the collection of data, evaluation of availability, suitability of information from runway incursion reports and other data sources, and the development of the riskbased approach and models. In addition, the research team will propose an outline of analysis software to be completed in the phase 3. Phase 3 will focus on software development and model validation. Model validation will require the use of the software tool and other airfield simulation software to obtain analysis results for a sample of airports.

COST AND JUSTIFICATION

Project Budget: \$200,000

Duration: 18 months

Research Milestones:

2 months to identify relevant model data elements

5 months to collect and evaluate data, including outline of the model software

6 months to develop a model from various data bases, preparation of user manual, reports to ACRP,

2 months to validate model, including interviews with several US airports (LAX, ORD, DFW, PHL, SEA, SFO, SAN, RDU, MIA) operations personnel, FAA Control Tower personnel and the FAA Runway Safety Management Professionals

3 months to prepare and coordinate final report.

RELATED RESEARCH

RPZ risk assessment modeling and tool (ACRP Report 168)

RSA risk assessment modeling and tool (ACRP Report 50 and Report 3)

Runway Veer-off risk assessment modeling and tool (ACRP Report 107)

Risk assessment to support modifications of airfield separation standards (ACRP Report 51)

IDEA CREATOR

Person who first shared the idea with the IdeaHub community.

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Technical / Professional (non-supervisory)

Applied Research Associates

OWNER/SUBMITTER

Person who volunteered to be responsible for developing the idea into a problem statement.

Kenneth Jacobs

Technical / Professional (non-supervisory)

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