Planning and Designing Airport Infrastructure to Support GPS and PBN Approach Development

ACRP Staff Comments

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TRB Aviation Committee Comments

AIRFIELD AND AIRSPACE CAPACITY AND DELAY: Do not support. Recommend retaining this problem statement for future consideration upon release of the ACRP Project 03-34, NextGen--Understanding the Airport's Role in Performance-Based Navigation (PBN) final report.

Review Panel Recommendation and Comments

Not recommended. The proposed research has some overlap with NextGen projects 03-33, NextGen: Airport Planning and Development and 03-34, NextGen: Understanding the Airport's Role in Performance-Based Navigation, although it could be a potential building block, as it can go deeper into those two studies. This may already be being done--no need to further research what is already done. Needs to be some installations of additional monitors, if not done under the FAA, it will be the responsibility of the airport sponsor. The audience consists of airports responsible for the infrastructure. The FAA may be making some modifications to their ACs. May be less research oriented and more of a how-to on navigating on existing guidelines. This is more of a compliance issue that will be done before any instrumentation is installed. Could be valuable for small airports, as it could be more useful in connecting GA airports with existing policy to educate airports.

AOC Disposition

There was no discussion. No funds were allocated.
1. **Problem Statement**

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2. **Background**

With the onset of satellite navigation and NextGen, runways that could not historically support instrument approaches can now have such approaches published to them. The result is a large number of published GPS and Performance-Based Navigation (PBN) approaches and a safer flying environment. Unfortunately, instrument approach procedure development has progressed rapidly without appropriate infrastructure (lighting, obstacle free approaches, etc.) to support approach minimums desired by Airport Sponsors.

The FAA flight procedures division is responsible for generating, reviewing and publishing approach procedures according to FAA TERPS requirements. Meanwhile, the FAA airports division is responsible for building and maintaining airports to current design standards (advisory circulars and FAR Part 77). The flight procedures process is not directly tied to airport division work resulting in unexpected challenges for Airport Sponsors. Sponsors do not have infrastructure in place to support desired approach procedures and are inadvertently becoming responsible to clear trees or power poles off of airport property or in areas where they may not have jurisdiction. In some cases airports may need to alter existing infrastructure to accommodate new approaches; these challenges need to be defined well before procedure development begins.

FAR Part 77 surfaces are confusing to both aviation professionals and those outside of the industry. The relationship between GPS approach approaches and infrastructure needed to facilitate GPS approach planning is not well understood at many airports. In many cases airport infrastructure is carried out independently from approach planning; industry guidance is lacking.

An analysis should be conducted to help Airport Sponsors tie requirements of the approach procedure development process to the airport design process. Further, Airport Sponsors should be provided with guidance as to their role and requirements throughout approach procedure development. First, Airport Sponsors would benefit from guidance to define procedure minimums appropriate for each of their runways. Then, infrastructure requirements to support the desired minimums could be defined and tools provided to assist Airport Sponsors in defining appropriate capital improvement projects to meet the requirements of the desired minimums.

3. **Objective**

To provide guidance to Airport Sponsors to define appropriate approach minimums and develop guidance to plan, design and construct infrastructure developments necessary for GPS approach procedures.

4. **Proposed Tasks**

Research work may include review of existing FAA guidance related to airport design and associated sections of TERPS and FAR Part 77 to succinctly define useful and practical requirements for appropriate GPS and PBN approach procedure minimums. The deliverable may include two parts:
a. A guide to help Airport Sponsors define appropriate approach minimum goals based on airport need/demand and infrastructure constraints.
b. A tool to assist Airport Sponsors and designers in applying appropriate infrastructure standards to support desired approach procedure development.

Common research tasks such as literature review, a state of practice survey and interim report would likely be included in the research. One to three case studies applying the draft guidebook at representative airports would also be recommended prior to final publication of the document.

5. **Estimated Funding**

$250,000

6. **Estimated Research Duration**

15 months

7. **Related Research**

ACRP 04-18 – Runway Protection Zone (RPZ) Risk Assessment Tool (on-going)
FAA work regarding RPZ requirements is ongoing and may influence this proposed GPS approach research.

ACRP 03-37 – Using GIS for Collaborative Land Use Compatibility Planning Near Airports (pending)
Many communities are using GIS software for land use planning, ACRP 03-37 looks to capitalize on this tool by implementing airport related constraints within GIS systems. Constraints related to approach procedure development (outlined in this problem statement) should also be considered in the GIS systems.

ACRP 03-33 – NextGen – Airport Planning and Development (on-going) and
ACRP 03-34 – NextGen – Understanding the Airport’s Role in Performance-Based Navigation (on-going)
These topics are investigating implementation of the approach procedures noted in section 2 – Background, of this statement. This problem statement is intended to address the infrastructure needs (and related planning efforts) required to support the future development of PBN approaches.

Related publications
- FAA Advisory circular 5300-13A “Airport Design” (approach safety area control and clearing requirements)
- FAR Part 77 “Objects Affecting Navigable Airspace”
- FAA Order 8260.3B “United States Standard for Terminal Area Instrument Procedures (TERPS)”

8. **Process Used to Develop Problem Statement**

Problem statement drafted and submitted by Casey Ries, P.E. (Civil Engineering Manager, Gerald R. Ford International Airport) with input from Dr. Mohamed El-Gafy, P.E. (Michigan State University) and Mark Johnson (Manager, Livingston County Spencer J. Hardy Airport).

9. **Person Submitting Problem Statement and Date**

Problem statement submitted by:
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Note: This problem statement was originally submitted, reviewed, and recommended to the AOC for funding last year. It is being resubmitted for review because the AOC did not discuss it and funds were exhausted. Below are comments from the previous review.

ACRP Problem Statement: 16-07-04

Recommended Allocation: $450,000

Planning and Designing Airport Infrastructure to support GPS and PBN Approach Development

COMMENTS FROM LAST YEAR’S REVIEW

ACRP Staff Comments

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TRB Aviation Committee Comments

AIRFIELD AND AIRSPACE CAPACITY AND DELAY (AV060): Not supported. There appears to be significant overlap with ongoing ACRP Project 03-34, NextGen--Understanding the Airport's Role in Performance-Based Navigation (PRN).

Review Panel Comments

Recommended. The proposed research is well thought out. Small airports do not have the same resources as large airports. The FAA airport GIS design program may be duplicative to 4B. Good improvement to safety. The funding and time are too low if a GIS tool will be developed. Funding should be increased to $450,000 and the timing should be increased to 24 months. Suggest the project panel makes sure the study takes into account the sourcing for geospatial data for the airport and the community and how to leverage existing data to cost effectively establish PBN or GPS approaches, as this data is very expensive.

AOC Disposition

This problem statement received an average rating of 3.0 points out of a possible 5 points among voting AOC members. There was no discussion. No funds were allocated.