



AGENDA MEMORANDUM

Item No.

6a

ACTION ITEM

Date of Meeting

September 12, 2017

DATE: August 24, 2017

TO: Dave Soike, Interim Executive Director

FROM: Michael Ehl, Director, Airport Operations
Wayne Grotheer, Director, Aviation Project Management Group

SUBJECT: Ground Based Augmentation System (GBAS) – CIP#C800834

Amount of this request: \$4,568,000

Total estimated project cost: \$4,588,000

ACTION REQUESTED

Request Commission authorization for the Executive Director to (1) design, advertise and execute a major works construction contract, (2) execute a contract with Honeywell for advanced system features, (3) advertise and execute a contract for the development of flight procedures, and (4) enter into one or more agreements with the Federal Aviation Administration (FAA) for the performance of flight checks, certification, and other support needed for the Ground Based Augmentation System (GBAS) at Seattle-Tacoma International Airport (Sea-Tac) in the amount of \$4,568,000 for a total estimated project cost of \$4,588,000.

EXECUTIVE SUMMARY

This project will upgrade Sea-Tac’s Ground Based Augmentation System (GBAS, a satellite based navigational aid), from a beta system to a fully functioning navigational aid. GBAS will provide a resilient alternative to reliance on old-technology navigational aids and their limitations. In addition, there are potential future environmental benefits if a steeper glide slope is implemented. A number of airlines that operate out of Sea-Tac actively support this project.

JUSTIFICATION

This project will provide upgraded navigational aid technology at Sea-Tac, in the form of GBAS. Aviation is moving away from sole reliance on navigational aid technology developed in the 1930’s, to modern navigational aid technology that uses global positioning system (GPS). The Port of Seattle has been a leader in this arena, with the Greener Skies Over Seattle project. The Port also invested in transformative navigational aid technology in 2003 (beta system), known as Local Area Augmentation System (LAAS). GBAS receives standard GPS signals, corrects them for accuracy then broadcasts them back to aircraft approaching and departing the Seattle area.

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This request is to upgrade the existing beta system to current standards. The existing LAAS system software/hardware was initially installed by Honeywell over 10 years ago. The original 2001 contract with Honeywell (the only FAA certified GBAS vendor) included a free software/hardware upgrade to the LAAS system in the future which Honeywell is still honoring as part of their original contract agreement. Honeywell will install all the necessary software/hardware items at no cost to the Port. This one-time system upgrade is valued at approximately \$1.8 million. There are some enhanced features beyond what is included in the free upgrade that will allow Sea-Tac to operate in low visibility conditions. The Port will purchase these enhanced features from Honeywell as well as the infrastructure, training and maintenance needed to support the new equipment.

Timing is right for this project as airlines are purchasing aircraft with GBAS Landing System (GLS) technology built-in (GLS technology comes standard on all Boeing aircraft and as an option on Airbus aircraft), and in some cases retrofitting old aircraft with the technology. Several airlines operating at Sea-Tac have made a commitment to use GBAS once it is available. There are multiple benefits of using GBAS to the airlines and Sea-Tac; the most prominent benefit is the single system can provide approach capability to every runway end at Sea-Tac. Current navigational aid technology uses an independent system for each runway that can be affected by objects in proximity. Therefore Sea-Tac will realize an immediate positive operational benefit from adding GBAS. Other potential future benefits of GBAS are the positive environmental benefits realized from planes landing at steeper glide slopes. Implementation of a steeper glide slope would require development of new procedures and FAA approval. The request for a single authorization of design, advertisement and execution of a construction contract is for efficiency in the project delivery. Port staff will likely be utilized to complete the design documents.

DETAILS

The GBAS system that the Port will have at the conclusion of this project will support aircraft landings during periods of lower visibility that are not unusual for Sea-Tac. Honeywell has developed and is seeking FAA certification on a system that will support aircraft landings during periods of extreme low visibility that occur at Sea-Tac less than 5% of the time. The system that will be installed by this project will allow it to be upgraded in the future so the system can be used for navigation during extreme low visibility conditions. Port staff will likely be utilized to complete the design documents.

Scope of Work

The scope of this project is to install all infrastructure necessary to support the GBAS upgrade which is located on the airfield (shown in the presentation).

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Key scope elements include:

- (1) Replace existing electronics
- (2) Install new fiber optic cable
- (3) Install up to four new GPS receiver antennas.
- (4) Replace the existing broadcast antenna.
- (5) Contract with a third party to develop new GLS flight procedures that mirror existing approach procedures at Sea-Tac.
- (6) Contract with FAA to certify the system.

Schedule

Activity

Commission design and construction authorization	2017 Quarter 3
Design start	2017 Quarter 4
Construction start	2018 Quarter 2
In-use date	2018 Quarter 4

Cost Breakdown

	This Request	Total Project
Design	\$1,435,000	\$1,455,000
Construction	\$3,133,000	\$3,133,000
Total	\$4,588,000	\$4,588,000

ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1 – Status Quo

Cost Implications: \$0

Pros:

- (1) No cost impact

Cons:

- (1) Limits Sea-Tac’s operational resiliency for landing aircraft
- (2) Prevents future potential environmental benefits from being realized

This is not the recommended alternative.

Alternative 2 – Upgrade to the basic GBAS System, as provided by Honeywell as part of the original contract.

Cost Implications: \$3,181,000

Pros:

- (1) Least expensive GBAS installation alternative

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Cons:

- (1) Reduced service volume (the distance from the GBAS that aircraft can receive the signal) vs. the further upgrade in Alternative 3
- (2) Provides limited availability in poor weather conditions
- (3) Cannot connect to an aircraft’s autopilot system. Many airlines’ flight procedures (especially International carriers) require the pilots to utilize autopilot
- (4) Does not take advantage of the latest GBAS technological advancements

This is not the recommended alternative.

Alternative 3 – Install GBAS with Enhanced Features

Cost Implications: \$4,588,000

Pros:

- (1) This is a balanced alternative between a basic system (Alternative 2) and the yet to be certified future system.
- (2) Provides greater benefits over the basic system by providing increased service volume and capability of connecting to an aircraft’s autopilot system (a necessity for some carriers)
- (3) This alternative provides resiliency to airport operations

Cons:

- (1) Approximately \$1 million more for the GBAS with enhanced features than the basic GBAS upgrade that Honeywell has committed to provide

This is the recommended alternative.

FINANCIAL IMPLICATIONS

<i>Cost Estimate/Authorization Summary</i>	Capital	Expense	Total
COST ESTIMATE			
Original estimate	\$3,158,000	\$425,000	\$3,583,000
Current change	\$371,000	\$634,000	\$1,005,000
Revised estimate	\$3,529,000	\$1,059,000	\$4,588,000
AUTHORIZATION			
Previous authorizations	\$20,000	\$0	\$20,000
Current request for authorization	\$3,509,000	\$1,059,000	\$4,568,000
Total authorizations, including this request	\$3,529,000	\$1,059,000	\$4,588,000
Remaining amount to be authorized	\$0	\$0	\$0

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Annual Budget Status and Source of Funds

GBAS (CIP#C800834) was included in the 2017-2021 capital budget and plan of finance. The budget increase was transferred from the Aeronautical Allowance (CIP#C800753), resulting in no net change to the capital budget. The funding source for this project will be cash (Airport Development Fund). The airlines were briefed at the airport airline affairs committee meeting on July 20, 2018, and a majority-in-interest (MII) vote ballot will be submitted soon.

Financial Analysis and Summary

Project cost for analysis	\$4,568,000
Business Unit (BU)	Airfield Movement Area
Effect on business performance (NOI after depreciation)	NOI after depreciation will increase
IRR/NPV (if relevant)	N/A
CPE Impact	\$0.02 increase in 2019

Future Revenues and Expenses (Total cost of ownership)

Port staff may choose to outsource the on-going maintenance of the Ground Based Augmentation System. This would result in an estimated \$110,250 per year warranty cost. If Aviation Maintenance staff decides to maintain the system instead, there will be an upfront training cost of approximately \$132,000 or more, depending on the number of staff that needs to be trained. Other project expense costs include potential FAA training, Port staff technical training, FAA flight checks, flight procedure development and associated spare parts.

ATTACHMENTS TO THIS REQUEST

- (1) Presentation slides

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

None