

**PORT OF SEATTLE**  
**MEMORANDUM**

**COMMISSION AGENDA**

**Item No.** 6a

**Date of Meeting** July 12, 2011

**DATE:** June 30, 2011

**TO:** Tay Yoshitani, Chief Executive Officer

**FROM:** Dave Soike, Director, Aviation Facilities and Capital Program  
Wayne Grotheer, Director, Aviation Project Management Group

**SUBJECT:** Design and Construction of Airfield Lighting Control and Monitoring System  
Upgrades at SeaTac International Airport (CIP #C800415)

**Amount of This Request:** \$2,109,000

**Source of Funds:** Airport Development Fund

**State and Local Taxes:** \$48,000

**Jobs Created:** 30 (Total Project)

**Total Estimated Cost:** \$2,109,000

**ACTION REQUESTED:**

Request Port Commission authorization for the Chief Executive Officer to 1) proceed with the design of phase 1 of the Airfield Lighting Control and Monitoring System (ALCMS) project; 2) execute purchases and authorize Port Construction Services (PCS) and Port crews to self-perform work for phase 1 of the project; and 3) execute a contract for the phase 2 consultant, hardware purchase, and resulting software upgrades. The total cost of the ALCMS Upgrades project at the SeaTac International Airport (Airport) is \$2,109,000. This request seeks a single Commission authorization to move forward with design and construction of phase 1, selection of a phase 2 design consultant, execution of a phase 2 contract, purchase of hardware, and necessary final testing.

**SYNOPSIS:**

Airfield lighting is a vital component of infrastructure that is necessary to operate the runways at night or in challenging low visibility conditions, such as heavy fog in the early fall. It is a key component of an all-weather Airport. This project will increase the reliability of the airfield lighting control system. This authorization is for both phases of the project. Phase 1 includes design and construction work in two areas; installing improved communication cable in a looped arrangement beneath the airfield, and raising a radio antenna to improve emergency back-up communication capability if the underground cable system ever fails. The phase 1 field work includes both design and construction because the work is weather dependent and needs to be completed during the dry season of this summer and fall. Phase 2 of the project is not weather dependent and includes programming design, hardware purchase and installation, and necessary final testing.

## **COMMISSION AGENDA**

Tay Yoshitani, Chief Executive Officer

June 30, 2011

Page 2 of 6

Long winter nights in Seattle and a high degree of low visibility weather such as fog in the Seattle area warranted installation of an all-weather aircraft landing radar Instrument Landing System (ILS) by the Federal Aviation Administration (FAA) on all three runways at the Airport by 2005. The FAA owns and operates the radar component of these instrument landing systems, while the Port owns and operates the airfield surface lighting systems that work in concert with the ILS. Without such systems during periods of low visibility, flights must be re-routed.

The proposed upgrade of the airfield lighting control system will greatly reduce the possibility of a system failure during low visibility weather that would result in aircraft being diverted to Portland, Moses Lake, or Vancouver, BC, which would cause disruption to travelers and extra costs for our customer airlines in Seattle. Improvement of the Airport's lighting system is necessary to boost reliability and compliance with FAA regulations. This request is for a total project estimated at \$2,109,000.

### **BACKGROUND:**

Since 2008, the constantly evolving airfield has seen many features added to the control system such as the third runway's lighted stop bars, beacon, emergency generators, and additional control stations. In addition, runway safety status lights elsewhere on the airfield have been added as have many additional lighting circuits and regulators. The overall lighting system was designed in 1999 and installed by 2005 during the long third runway construction. The lighting system is experiencing periodic interruptions and must be upgraded to meet FAA response requirements. The system is beyond its design limitations and has a demonstrated history of interruptions in the Aircraft Traffic Control Tower (ATCT). This has resulted in over \$100,000 of additional maintenance staffing costs since 2008.

To ensure reliability of the system in low visibility conditions, it is necessary to perform the phase 1 field work during the fair weather summer months. As a result, this request includes both design and construction work to occur this season. This season's work includes design, ordering necessary equipment, trenching for additional electrical and communication cables, raising the height of the back-up communication antenna to ensure it has adequate line-of-sight connectivity above large aircraft to the ATCT, and various connections to equipment and control stations. The phase 2 work will be accomplished during the following year as it is not weather dependent.

As part of phase 1, PCS and maintenance crews and small works contractors will install new single-mode fiber optic cable and patch panels on the airfield and ramp tower. PCS crews will install a new Airfield Lighting Vault radio antenna at a higher location. The Port Electric Shop will relocate the existing transmitter and receiver on the airfield lighting vault to the new antenna, which will improve the backup radio communications between the Lighting Vault and the ACTC.

Phase 2 work consists of programming and hardware installation. Staff will advertise, select and contract with a consultant to perform the phase 2 work during the following year. This authorization includes the approval and budget to award contracts.

These ALCMS upgrades and improvements must be in compliance with FAA requirements.

## **COMMISSION AGENDA**

Tay Yoshitani, Chief Executive Officer

June 30, 2011

Page 3 of 6

### **PROJECT JUSTIFICATION:**

This project to upgrade the existing ALCMS is necessary in order to stabilize the system's performance and ensure compliance with FAA regulatory requirements. It improves ALCMS infrastructure and equipment, brings system and operating software and equipment up to date, and ensures system control and monitoring meet FAA requirements.

The existing multi-mode fiber cable and the radio communication have distance limitations. The multi-mode fiber is not capable of adequately transmitting the increasing amount of necessary data over the current length of cable. Radio communication no longer has direct line of sight to all antennas as a result of the new lighting vault location. This creates intermittent communication outages and system lockup.

Existing ALCMS communication monitoring, as designed in 1999 and installed by 2005, is inefficient and does not accurately reflect airfield conditions in real time as required by FAA Advisory Circular 150/5345-56. The Airport's ALCMS software code needs to be redesigned to improve reporting capabilities to meet the FAA Advisory circular.

Past airfield projects did not consistently upgrade the ALCMS hardware and software resulting in a lack of ALCMS processing speed and storage. Past projects used varying programming logic and architecture, which ultimately has affected system performance and reliability while adding undue complexity to the system. Past software upgrades did not meet program documentation requirements, thereby making future ALCMS program designs more difficult. The result is a system that intermittently does not meet the regulatory intent of Federal Aviation Regulation 139 regarding the reliability of airfield lighting controls.

Existing Allen-Bradley ALCMS software has limited development capability and has reached the end of its support cycle by the manufacturer, Rockwell Automation. Development software varies by location and version due to incremental expansion of the system over multiple years. An upgraded level of development software will be required (Phase 2 work) to meet the demands of future programming.

### **PROJECT SCOPE OF WORK AND SCHEDULE:**

#### ***Scope of Work:***

The project is divided into two phases, each with a separate defined scope and schedule. They are as follows:

- Phase 1: Existing multi-mode fiber will be replaced with single mode, and the existing radio antenna mounted on the north wall of the Airfield Lighting Vault will be relocated to a new 60-foot antenna. This work will be performed by Port crews and small works contractors. Estimated Cost: \$965,500.
- Phase 2: An FAA-certified consultant will be selected to optimize the ALCMS programming to comply with existing FAA requirements. The design and hardware purchases would be extensively supported by the Facilities and Infrastructure Department and the Electric Shop. Estimated Cost: \$1,143,500.

## **COMMISSION AGENDA**

Tay Yoshitani, Chief Executive Officer

June 30, 2011

Page 4 of 6

### ***Schedule:***

Phase 1 Design	July 2011
Procurement of Material	July-August 2011
Phase 1 Complete	October 2011
Phase 2 Consultant Procurement	July 2011-March 2012
Phase 2 Complete	September 2012

### **FINANCIAL IMPLICATIONS:**

#### **Budget/Authorization**

##### **Summary:**

Original Budget	\$1,125,000
Revised Budget	\$2,109,000
Previous Authorizations	\$0
Current request for authorization	\$2,109,000
Total Authorizations, including this request	\$2,109,000

#### **Project Cost Breakdown:**

#### **This Request**

#### **Total Project**

	<b><u>This Request</u></b>	<b><u>Total Project</u></b>
Construction Costs	\$945,000	\$945,000
Sales tax	\$48,000	\$48,000
Outside professional services	\$863,000	\$863,000
Aviation PMG and other soft costs	\$253,000	\$253,000
<b>Total</b>	<b>\$2,109,000</b>	<b>\$2,109,000</b>

#### **Budget Status and Source of Funds:**

This project was included in the 2011-2015 capital budget and plan of finance as a business plan prospective project, under CIP #C800415 with a budget of \$1.125 million. The budget was increased because staff decided to provide airfield lighting control redundancy by encircling the entire airfield with fiber optic cable, updating the original budget to reflect material inflation, and applying new markups to reflect current procedures. The budget increase has been transferred from CIP #C102166, Aeronautical Renewal & Replacement, resulting in no change to the Aviation capital budget. The funding source will be the Airport Development Fund.

## **COMMISSION AGENDA**

Tay Yoshitani, Chief Executive Officer

June 30, 2011

Page 5 of 6

### **Financial Analysis and Summary:**

<b>CIP Category</b>	Renewal/Enhancement
<b>Project Type</b>	Renewal & Replacement
<b>Risk adjusted Discount rate</b>	N/A
<b>Key risk factors</b>	N/A
<b>Project cost for analysis</b>	\$2,109,000
<b>Business Unit (BU)</b>	Airfield
<b>Effect on business performance</b>	NOI after debt service will increase
<b>IRR/NPV</b>	N/A
<b>CPE Impact</b>	CPE will increase by \$0.02 by 2013, but no change to business plan forecast as this project was included.

### **Lifecycle Cost and Savings:**

Based on this information, the additional operating and maintenance costs currently incurred will be significantly reduced by completion of this project.

### **ENVIRONMENT AND SUSTAINABILITY:**

The new single mode fiber optic cable will transmit data more efficiently and reliably than the existing multi mode fiber, requiring less maintenance. Computers and touch screen monitors will be Energy Star compliant.

### **STRATEGIC OBJECTIVES:**

This project is directly aligned with the Airport's strategic goal of "operating a world class international airport". The project enhances and improves the Airport's ALCMS performance, reliability, control, reporting, monitoring capabilities and equipment. The system will comply with the latest FAA Advisory Circular 150/5345-56 design specifications.

### **TRIPLE BOTTOM LINE SUMMARY:**

Upgrading the lighting system to be compliant with FAA regulations ensures consistent operations for our airline business customers and travelers within our community, while also benefitting our environment by minimizing the diversion of aircraft to other airports which in turn requires a greater amount of fuel burn.

### **ALTERNATIVES CONSIDERED AND THEIR IMPLICATIONS:**

ALTERNATIVE 1: Proceed with design for the ALCMS airfield and radio upgrades (phase 1), issue an RFP for a software consultant for phase 2 and award phase 2 contract. This request seeks Commission authorization to move forward with design and construction of phase 1 and phase 2. **This is the recommended action.**

## **COMMISSION AGENDA**

Tay Yoshitani, Chief Executive Officer

June 30, 2011

Page 6 of 6

ALTERNATIVE 2: Do nothing: This option fails to correct the ALCMS control problems, monitoring issues, and lack of FAA reporting capabilities. *This is not the recommended alternative.*

### **OTHER DOCUMENTS ASSOCIATED WITH THIS REQUEST:**

None.

### **PREVIOUS COMMISSION ACTIONS OR BRIEFINGS:**

None.