Nighttime Feasibility Status Update: FAA Working Group Updates 13APR20

Overview

Since the previous update on the Nighttime Instrument Approach Feasibility study, delivered in January 2020, the FAA has significantly increased their regional and national level exploration into the challenges currently preventing the use of instrument approaches to runway 27 at nighttime. Several developments occurred during February and March of this year which have spawned two independent levels of FAA led analysis at no immediate cost to the Airport Authority. The result of the FAA led analysis, supported by LEAN Engineering, will either result in FAA recommending to the airport to consider moving forward with either a 2 PAPI solution or a 2 PAPI solution combined with one of the extended approach lighting solutions identified in the feasibility report. Regardless of the solution, confidence among FAA stakeholders is high that one of the two solutions will achieve a restoration of nighttime instrument approaches with minimal additional obstacle survey required by the airport. However, the final determination will rest with FAA Flight Inspection following the real-world implementation of any of the analyzed solutions.

LEAN expects FAA to make significant progress with their analysis of the potential solutions over the next two to three months with the possibility of preliminary results available to share with the Airport Authority in mid-summer 2020.

The following sections provide more insight into the latest FAA analysis stemming from the working group and some additional insight regarding potential obstacle surveying.

Two PAPI Solution on RWY 27

The FAA Working Group, currently led by FAA NAS Planning and Integration Doc Richardson, has determined that a two PAPI solution may be sufficient to restore nighttime instrument approaches to runway 27, for the RNAV (GPS) RWY 27 approach, without the need for any additional approach lighting systems.

The two PAPI suggestion originated from FAA Flight Inspection and Flight Standards representatives following recent enhancements to a 2 VASI solution at Washington Reagan Airport (DCA) in support of their offset visual approaches to runway 19.

The two PAPI solution at Carson City would involve the airport purchasing, installing and commissioning a second 2 light PAPI that would be located on the right-hand side of runway 27. This PAPI would be laterally aimed along the final approach course of the RNAV (GPS) RWY 27 approach (approximately 29 degrees offset to the north of the runway centerline) and would be vertically aimed to match the Visual Descent Angle associated with the current approach of 3.77 degrees. The existing 2 light PAPI located on the left side of runway 27 would be vertically adjusted to also achieve 3.77 degrees but would continue to be aimed down the extended runway centerline. Both PAPIs

would be baffled in such a way that a pilot would not be able to see "both" PAPIs at the same time during the visual portion of the approach.

FAA Operations Engineering Support Group will be working with Doc Richardson and LEAN Engineering to evaluate preliminary designs for the two PAPI system, including possible aiming and baffling, that will be used in an FAA led full motion flight simulation. This work is currently being performed by FAA at no cost to the Airport Authority.

FAA Flight Simulation of Two PAPI and Extended Approach Light Systems

As an unexpected outcropping from the FAA Working Group, representatives from AFS-450 have indicated that they are authorized to use their full motion flight simulator in OKC to create virtual lighting models that match the two PAPI solution, and extended approach lighting solutions presented in the Nighttime Feasibility Study, for the purpose of technical evaluation with FAA Flight Inspection and Flight Standards.

This work will be performed by FAA, in Oklahoma City, with the opportunity for data and video capture onboard the FAA's 737-800 simulator. Results from the flight simulation work will inform the FAA Working Group regarding whether the 2 PAPI solution alone is sufficient to solve the challenge, whether additional elements of the extended approach lighting system will need to be introduced, or whether additional hazards and mitigations need to be considered beyond those already suggested.

FAA Flight Simulation work will be undertaken by AFS-450 at no cost to the Airport Authority and LEAN Engineering is particularly grateful to FAA for offering to perform this exceptional level of technical modeling in support of increased safety of operations at the State Capital Airport.

New or Updated AC-150-5300-18B Compliant Obstacle Survey

During the FAA Working Group discussions, considerable time was spent on the topic of the AC-150-5300-18B VGA compliant survey performed in 2010 and submitted to FAA AGIS in 2013. The primary challenge was focused on whether the extent of the survey was sufficient to enable FAA Flight Procedure Teams to eliminate the consideration of Adverse Assumption Obstacles[1] in the visual portion of the approach. After several verbal and electronic conversations, it was decided that the FAA will not require a new survey to be performed in the specific area where the current RNAV (GPS) RWY 27 visual approach area extends beyond the AC-150-5300-18B survey boundaries in order to disregard the application of AAOs. However, two important details were revealed with respect to current and future obstacle surveys that may be important for the restoration of nighttime instrument approaches.

The first detail is related to the age of the current VGA survey which is approaching 10 years old. FAA guidelines are to keep obstacle surveys as up to date as possible with a strong recommendation to update obstacle surveys every 3 years for airports with

[1] Adverse Assumption Obstacles, or AAO, are typically a 200ft additive intended to be applied to known terrain values in areas near airports where a survey has not been performed and/or the airspace is not under control/supervision of the airport.

vertically guided approaches. Therefore, while Carson City does not have any vertically guided approaches at this time, it is not unreasonable to expect that the FAA may encourage Carson City to perform an updated -18B compliant obstacle survey before the restoration of nighttime instrument approaches are granted.

The second detail is that while an -18B survey does not currently appear to be "required" to potentially enable the proposed two PAPI and extended approach lighting solutions to achieve their desired enhancement of safety for nighttime operations, some level of obstacle survey and/or analysis will be required over the areas covered by the two PAPI solution. This obstacle survey work can be performed in accordance with FAA AC-150-5300-16/17/18 but limited to the areas beyond the current VGA survey extents where the PAPI Light Signal Clearance Surface and Obstacle Clearance Surface come within 200ft of known terrain.

This obstacle survey effort would likely be performed as an enabling phase during the 30% design of a two PAPI solution and should be planned for if the FAA technical and simulator analysis proves successful this summer.