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Subject: Technical Letter: *Informal Feedback on the Final Monitor Aid for Cancún*

Dear CTA. Gómez:

MITRE provided Servicios a la Navegación en el Espacio Aéreo Mexicano (SENEAM) with a summary of the specifications used in the development of the United States (U.S.) Federal Aviation Administration (FAA) Final Monitor Aid (FMA) for use with independent parallel approaches. Refer to Enclosure 5 to MITRE Technical Letter F500-L15-021, dated 24 June 2015. In early April 2017, you sent MITRE via e-mail a presentation prepared by THALES pertaining to the development of an FMA for Cancún International Airport (i.e., hereafter referred to as Cancún). The presentation entitled, "TopSky-ATC Cancun, NTZ & PRM, Mexico Workshop", dated March 2017, includes information about the FMA being considered to support future dual independent parallel approach operations at Cancún.

While MITRE appreciates being asked to provide feedback on the THALES presentation, it is important to mention that technical specifications, acquisition, and installation of Air Traffic Control (ATC) equipment, such as an FMA, are all areas outside MITRE's area of principal expertise and outside the scope of MITRE's contract in Mexico. Therefore, MITRE is not able to review or provide feedback on much of the information contained in the above-mentioned presentation material.

However, MITRE has a good understanding of the primary operational characteristics and capabilities of an FMA. Therefore, to be supportive, MITRE reviewed the THALES presentation to provide informal comments and feedback to SENEAM to assist with its ongoing FMA development efforts. Still, it is important to state that MITRE's legal liability does not extend to any opinions or recommendations provided in this Technical Letter.

The THALES presentation includes a section named “MITRE ATC-related Equipment Requirements Coverage”. This section of the presentation contains a number of “MITRE ATC Requirements” that were not explicitly contained in the MITRE 24 June 2015 enclosure referenced above. Conversely, some information provided in the MITRE enclosure is not provided in this section of the THALES presentation. Additionally, please note that MITRE’s enclosure did not contain “MITRE ATC Requirements,” but rather, contained information derived from the specifications used for the FMA in the U.S.

MITRE wants to ensure that SENEAM and THALES know that MITRE has provided information on the type of ATC equipment required on the basis of U.S. regulations both for Cancún and, eventually, the Nuevo Aeropuerto Internacional de la Ciudad de México (NAICM) to execute independent parallel approaches.

Finally, it is important to note that SENEAM, as the expert in navigational system acquisition matters in Mexico, is in a good position to complement MITRE’s feedback.

THALES FMA Presentation Feedback

As mentioned above, MITRE provided SENEAM with a summary of the specifications used in the development of the U.S. FAA FMA for use when independent parallel approaches are conducted. The THALES presentation indicates that the TopSky-ATC FMA system “...implements a series of features to support independent parallel approach operations according to ICAO guidelines” and cites International Civil Aviation Organization (ICAO) Document 9643 Edition 1 (2004). Appendix A of Document 9643 does provide some very general guidelines based on the display used in the U.S. Precision Runway Monitor (PRM)¹, which is similar to the U.S. FMA display. This is the reason why MITRE provided somewhat more detailed information to SENEAM on the U.S. implementation of the FMA in the 24 June 2015 enclosure noted above.

It appears that the THALES TopSky-ATC FMA system described in the above-mentioned presentation replicates many of the important characteristics of the FMA implemented in the U.S. MITRE must note, however, that the level of detail in the presentation makes it impossible to determine if the actual implementation of the FMA in the THALES TopSky-ATC system complies with the U.S. specifications provided to SENEAM by MITRE.

Other important considerations are also not included in the THALES presentation. For instance, MITRE cannot estimate the capacity of the system for aircraft in the Active Monitored Zone (AMZ). This is an **extremely important consideration** for the implementation of an FMA at Cancún, and will become even more important when an FMA system is activated at NAICM, due to the high volume of operations expected at the new airport. Also, the colors of the FMA implementation cannot be determined from the THALES presentation.

¹ Note that the PRM is no longer being manufactured.

MITRE has comments and questions on the THALES TopSky-ATC FMA implementation. A few examples are:

- The “ASD Scaling Function” is selectable by the operator from a ratio of 1:1 to 1:8. MITRE notes that the required scaling for the FMA in the U.S. is 4:1. While 4:1 scaling is selectable by the operator in the THALES TopSky-ATC FMA, the use of a 4:1 scaling should be regulated and emphasized in Mexico. MITRE would suggest that the scaling be selectable either in adaptation or by a supervisor rather than by the operator.
- MITRE notes that the Normal Operating Zone (NOZ) area is not directly adaptable, but is based on the associated No Transgression Zone (NTZ) area. It is not clear what effect this may have on the depiction of the NOZ.
- MITRE notes that the reference lines used in the U.S. FMA (spaced at 200 ft intervals from the centerline) do not appear to be provided in the THALES TopSky-ATC FMA system. Again, the presence or absence of the reference lines is difficult to determine at the level of detail provided in the presentation.
- Aural alerts are provided, but voice alerts, such as those used in the U.S. FMA, are not provided in the presentation.
- No simulation capability for the FMA is included in the THALES TopSky-ATC system. It is not clear how controllers will train on the FMA before using it for actual operational purposes, since such training should include deviations from final approach and associated breakouts. The presentation indicates that on-the-job training can be accomplished, but it is not clear how such training would include deviations from final approach without a simulation capability.

MITRE has other comments and questions. However, it is recommended that the following actions be conducted before additional comments are provided:

- A line-by-line review of the THALES TopSky-ATC FMA specifications provided to SENEAM by MITRE in the above-mentioned June 2015 enclosure should be conducted by both SENEAM and THALES personnel familiar with the FMA implementation in the TopSky-ATC system. If possible, a THALES TopSky-ATC display with the FMA function should be available for conducting the line-by-line review, including displaying traffic on the FMA.

MITRE is available to travel to Mexico at a mutually-agreeable time to observe this review process and provide additional informal comments, as appropriate.

- Following the line-by-line review process, more detailed FMA specifications should be prepared by THALES for review by SENEAM. MITRE would gladly take a look at those specifications to complement SENEAM's review process.

Please do not hesitate to contact me if you need any additional assistance.

Sincerely,



Ing. Robert W. Kleinhans
Project Technical Coordinator

cc:

Dr. Bernardo Lisker, MITRE