Subject: Technical Letter: Summary of Work Completed or Ongoing During the Period 1 April 2017 through 30 June 2017

Dear Lic. Patiño:

This letter respectfully submits to your attention a summary of the most significant MITRE project activities conducted or being conducted during the period 1 April 2017 through 30 June 2017.

Reports

At the outset, before proceeding with a full description of activities, please find below a list of the documents included with this Technical Letter, some of which have already been delivered in advance to various Parties throughout the concluding quarter.


10. Enclosure No. 3 to this Technical Letter (F500-L17-070): Mexico Area Control Center - Preliminary Airspace Redesign - Informal Working Notes: Routes and Sectorization, dated 28 June 2017.

11. Enclosure No. 4 to this Technical Letter (F500-L17-070): Guadalajara International Airport - Expansion Feasibility Examination and Technology Transfer: Initial Data Request, dated 28 June 2017.

The eleven above-mentioned documents, whether letters or reports (designated as Enclosures) should be read and analyzed in detail. Some of them include a request for important feedback for MITRE.

The Enclosures are described in a very summary manner below:

- **Enclosure 1: Nuevo Aeropuerto Internacional de la Ciudad de México - Runway Visual Range Data Analysis: Preliminary Findings.** This document describes MITRE’s analysis of the visibility conditions at the Nuevo Aeropuerto Internacional de la Ciudad de México (NAICM) site based on Runway Visual Range (RVR) data from 1 January 2016 through 13 March 2017. The objective of the document is to assist authorities in determining the need, and to what extent, of Category (CAT) II/III Instrument Landing System (ILS) approach capabilities at NAICM.

- **Enclosure 2: New Terminal Maneuvering Area - Preliminary Airspace Redesign - Informal Working Notes: Routes and Sectorization.** This document is intended to provide a record of the new Mexico City Terminal Maneuvering (Control) Area (TMA) route and sector modifications (e.g., waypoint names, latitude/longitude coordinates, etc.) from the Servicios a la Navegación en el Espacio Aéreo Mexicano (SENEAM) and MITRE airspace design workshops that were conducted in February 2017 and June 2017.

- **Enclosure 3: Mexico Area Control Center - Preliminary Airspace Redesign - Informal Working Notes: Routes and Sectorization.** This document is intended to provide a record of the Mexico Area Control Center (ACC) route and sector modifications (e.g., waypoint names, latitude/longitude coordinates, etc.) from the
SENEAM and MITRE airspace design workshops that were conducted in February 2017 and June 2017.

- **Enclosure 4: Guadalajara International Airport - Expansion Feasibility Examination and Technology Transfer: Initial Data Request.** This document is intended to request initial information on Guadalajara Airport necessary for MITRE to perform many of the early project tasks.

**Activities**

The following list describes the activities conducted by MITRE during this reporting period:

- In response to a high-priority request in the autumn of 2016 by Lic. Yuriria Mascott, Undersecretary of Transportation, and CTA. Miguel Peláez, Director General of the Dirección General de Aeronáutica Civil (DGAC), MITRE designated a team of experts to conduct an assessment of the potential impact of a proposed facility named *Centro de Gestión de Residuos Sólidos en el Bordo Poniente* (hereafter referred to as the “facility”) to be constructed near Aeropuerto Internacional de la Ciudad de México (AICM) and NAICM. Refer to Enclosure 1 to Technical Letter F500-L17-030: Assessment of Centro de Gestión de Residuos Sólidos en el Bordo Poniente: Options 3, 4.1, 4.2, and 5, dated 11 January 2017, which describes MITRE’s initial assessment of the proposed facility. One of MITRE’s recommendations to the authorities was that at least a major airline operating at AICM should conduct analyses of the facility (at all proposed locations) utilizing their respective takeoff practices and procedures considering an engine failure for operations at both AICM and NAICM, to determine if the facility would cause any issues and/or restrict aircraft payload and range capabilities.

This matter was discussed between CTA. Peláez and Dr. Bernardo Lisker during a 17 February 2017 meeting in Mexico City. At that time, it was agreed that MITRE would provide information to assist CTA. Peláez with the coordination of an appropriate takeoff performance analysis considering an engine failure by Aeroméxico. As a result, the MITRE team compiled relevant information needed by Aeroméxico to conduct the analysis and sent it to CTA. Peláez via e-mail on 6 March 2017. The results of the analysis by Aeroméxico were sent back to MITRE by CTA. Peláez via e-mail on 18 March 2017.

Since then, MITRE studied the results of the analysis and sent a final report on the matter to Lic. Mascott and CTA. Peláez describing MITRE’s feedback and opinion regarding the results of Aeroméxico’s takeoff performance analysis. That document is being sent along with this Technical Letter as a reference (see MITRE document F500-L17-053).
Note that MITRE’s assessment on engine failure operations, as opposed to normal operations, is informally provided, as it is outside the scope of MITRE’s contractual work.

- In April 2017, GACM sent MITRE a document pertaining to the acquisition of a CAT III ILS for NAICM. GACM provided this document so that MITRE can take a final look at the latest ILS specifications.

Technical specifications, acquisition, and installation of ILS equipment are all areas outside MITRE’s area of principal expertise and outside the scope of MITRE’s contract in Mexico. Nevertheless, to be supportive, MITRE compared the latest ILS specifications document versus the comments that MITRE provided to GACM on 12 August 2016 relating to a previous version of the ILS specifications (see MITRE Technical Letter F500-L16-041).

Therefore, MITRE prepared and sent in April 2017 a document that listed once again comments from MITRE’s above mentioned 12 August 2016 document, as well as those that were not addressed in the latest ILS specifications document that GACM sent. That document is being sent along with this Technical Letter as a reference (see MITRE document F500-L17-057).

- Regarding the acquisition of a CAT III ILS for testing purposes at NAICM, MITRE was informed in early June that GACM had issued the tender for the NAICM CAT III ILS for testing purposes, and received one proposal response from an ILS equipment vendor. However, the proposal stated that a localizer signal coverage of only 25 NM would be provided, instead of the 40 NM signal coverage requested repeatedly and for a long time by MITRE, as final approaches at NAICM are very long. It is essential that the CAT III ILS for testing purposes, as well as the permanent ILSs, consist of a localizer that can provide signal coverage and be flight-inspected to 40 NM. Refer to the document mentioned at the end of the previous bullet for other key recommendations on ILS equipment matters.

Afterwards, MITRE was informed by GACM that the ILS equipment vendor would provide GACM with a complementary letter indicating that they are committed to comply with the coverage requested in the bidding process (MITRE assumes that the tender in the bidding process included a localizer signal coverage of 40 NM). While that is good news, it is critical that GACM ensure that CAT III ILS equipment meeting all appropriate recommendations be acquired as soon as possible. This is important so that pre-commissioning flight validation and inspection activities can be conducted prior to runway construction, something that MITRE has requested for several years. MITRE notes with great concern that preparatory runway construction work is already underway.

Also, it is important that consideration be given (based on recommendations by the ILS manufacturer) for the need to relocate the CAT III ILS testing equipment to
inspect all six initial runway thresholds to ensure that ILS system signal coverage on all six runway thresholds can be achieved.

Please keep MITRE informed of the situation regarding the acquisition of the CAT III ILS systems for NAICM.

- On 20 April 2017, Ing. Enrique Mejía Maravilla, from Comisión Nacional del Agua (CONAGUA) visited MITRE for a full day of presentations and demonstrations pertaining to the NAICM project. The primary objective of the visit was to familiarize Ing. Mejia with MITRE and its NAICM-related work, and to discuss the following topics:
  - The proposed development of the above-mentioned facility (i.e., Centro de Gestión de Residuos Sólidos en el Bordo Poniente)
  - The bird-related concerns at Texcoco, as well as water regulation matters managed by CONAGUA. Recall that MITRE has expressed repeatedly concern about lack of bird mitigation experimentation over the years and a strong preference for removal of Lago Nabor Carrillo.

To support the visit by Ing. Mejía, the MITRE team presented briefings on its aeronautical work for NAICM, as well as its assessment of bird hazards in the Texcoco area. A tour of MITRE’s Air Traffic Management (ATM) Laboratory, including flight demonstrations, was also provided. During the visit, Ing. Mejia provided valuable information and feedback on the proposed construction of the facility, as well as hydrological considerations and plans in the Texcoco area.

The visit by Ing. Mejía was very useful. He commented that there were plans to add a number of reservoirs south of Lago Nabor Carrillo and expressed interest in the fact that MITRE sees this action as a likely error. He also mentioned possible solutions to remove Lago Nabor Carrillo, for which MITRE intends to invite to MITRE CONAGUA’s top leadership. Ing. Mejia also requested some documentation. Therefore, MITRE prepared the following two documents describing MITRE’s work on the facility and the assessment of bird hazards in the Texcoco area for his information:
  - A high-level summary of MITRE’s assessment of the facility and key results, including MITRE’s overall opinion on the best location (Options 4.1 and 4.2) for the facility from an aeronautical perspective. See MITRE document F500-L17-065, dated 8 May 2017
  - A high-level summary of MITRE’s assessment of bird hazards on aircraft operations at NAICM. See MITRE document F500-L17-066, dated 8 May 2017

Ing. Mejía recently expressed not having received the documents MITRE sent in May. Therefore, MITRE copied them and sent today five copies of each, via FedEx to Ing. Mejía. The copies included with this letter are for GACM to keep.
- During MITRE’s visit to Mexico City on 15 through 16 February 2017 to meet with officials from GACM and other stakeholders, the MITRE team received a paper copy of a drawing entitled “Poligono con Ampliación por Pistas 5 y 6”, dated 8 April 2015. MITRE reviewed the above-mentioned drawing to obtain a better understanding of land acquisition matters to accommodate Runway 5 and Runway 6, including their associated Approach Lighting Systems (ALSs), at NAICM. Therefore, MITRE prepared a document to provide feedback to GACM on the appropriateness of land acquisition matters to accommodate Runway 5 and Runway 6 and their associated ALSs. See MITRE document F500-L17-067, dated 28 June 2017. **This is an important document that should be examined carefully and promptly.**

- During MITRE’s above-mentioned February 2017 visit to Mexico City, MITRE was made aware of plans pertaining to the development of infrastructure (e.g., hangars, buildings, aircraft parking areas, etc.) in the southeast campus (i.e., the area east and southeast of Runway 6) at NAICM. It is MITRE’s understanding that, to date, the vertical components of all infrastructure on the southeast campus (e.g., building heights) have yet to be determined.

  Therefore, to help GACM and other stakeholders in the planning of the infrastructure being considered in the southeast campus, MITRE was asked to analyze appropriate obstacle clearance and limitation surfaces that are located over the southeast campus; thus, providing preliminary guidance, from an aeronautical perspective, on the maximum allowable heights of such infrastructure without impacting future operations at NAICM. See MITRE document F500-L17-068, dated 28 June 2017. Unless decisions on the southeast campus have been delayed, it is urgent that GACM examines this document’s comments.

- MITRE provided 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 April 2017, CTA. Augusto Gómez of SENEAM sent MITRE via e-mail a presentation prepared by THALES pertaining to the development of an FMA for Cancún Airport. 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 approach operations at Cancún. MITRE trusts that SENEAM is taking care of these issues.

  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. 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. See MITRE document F500-L17-069, dated 28 June 2017. **The THALES presentation lags**
in clarity or is incomplete. Therefore, this is an important document that should be examined carefully and promptly. MITRE already sent directly the document to CTA. Gómez, so no additional action on GACM’s part appears necessary.

- In January 2015, MITRE submitted to the Mexican aviation authorities and GACM the results of its analysis of meteorological conditions at the NAICM site at Texcoco based on more than five years of detailed data obtained from an Automated Weather Observing System (AWOS) located near the site. See Enclosure 1 to MITRE Technical Letter F500-L15-007, dated 12 January 2015, for the results of the analysis. Although AWOS data summarizes weather sufficiently well for most purposes, it does not provide the precision and accuracy needed for identifying periods of very low visibility, such as CAT II and CAT III, with a high level of confidence. Therefore, the analysis concluded that the greater capabilities of RVR sensing devices were necessary to provide a more accurate assessment of the need of the airport to operate under low visibility conditions.

Therefore, MITRE recommended that a thorough review including more detailed and accurate visibility data be conducted to assist authorities in determining the need for CAT II and CAT III approach procedures at NAICM. Thus, an RVR device was installed near the AWOS site by SENEAM in late 2015. MITRE started receiving detailed RVR data on 1 January 2016.

During this quarter, the MITRE team conducted a detailed and comprehensive examination of visibility conditions at the NAICM site based on RVR data from 1 January 2016 through 13 March 2017. In particular, MITRE estimated the frequency of ILS CAT II or CAT III visibility occurrences, as well as the time of the day those approaches would likely be required. Additionally, wind conditions using the AWOS data were examined to determine the wind environment (and its operational implications) during low visibility conditions. Refer to Enclosure 1 of this Technical Letter for details.

It is important to mention, however, that both the RVR and AWOS systems experienced operational problems/issues resulting in significant loss of data, which is concerning. Due to the operational problems, SENEAM had to adjust and complement the RVR data with estimates. Also, the AWOS has been without power for a very long time and MITRE has not received any AWOS data since December 2016.

Due to the above-mentioned data loss issues and concerns, MITRE proposes to conduct another analysis of RVR data in the spring of 2018, so that more robust results can be provided to further assist authorities in their decision-making process. However, it is first essential that the RVR and AWOS systems operate in a reliable, accurate, and consistent manner that does not require any data adjustments or manipulations by SENEAM.

- On that matter, MITRE has been informed that the RVR and AWOS systems will be relocated inside the NAICM perimeter fence for security reasons. It is
It is important that the systems are relocated as soon as possible. Additionally, once the systems have been relocated they should be appropriately tested and calibrated to ensure that accurate data are being recorded. The clocks of both the RVR and AWOS systems should also be synchronized. Furthermore, a reliable process should be put in place (in coordination with SENEAM) so that both the RVR and AWOS systems are constantly watched and data is sent to MITRE consistently each month for examination. It is important that all the above be completed by 1 August 2017. This is an important document that should be examined carefully and promptly.

- MITRE has been working closely with SENEAM in developing an airspace design for the new Mexico City TMA to support NAICM. In February 2017, SENEAM and MITRE conducted an airspace design workshop, including controllers from Toluca Airport, to continue the airspace design work. From 5 through 7 June 2017 in Mexico City, SENEAM and MITRE conducted another airspace design workshop to continue the airspace design work (described in more detail below).

  During this quarter, the MITRE team spent a significant amount of time preparing a document that provides a reflection of a new TMA airspace route and sector design discussed during the above-mentioned two workshop meetings. Refer to Enclosure 2 of this Technical Letter for details.

- Connected to the new Mexico City TMA airspace design, MITRE has also been working closely with SENEAM in developing an airspace design for the Mexico ACC to support NAICM. During this quarter, the MITRE team spent a significant amount of time preparing a document that provides a record of the Mexico ACC route and sector modifications from the above-mentioned two workshop meetings. Refer to Enclosure 3 of this Technical Letter for details.

- Under Task 8 of the GACM-MITRE contract, MITRE is to assist the Mexican aviation authorities in the examination of problems relating to airport expandability in Mexico, so that, in the process, Mexican engineers and other analysts practice and learn how to reexamine in the future modifications concerning NAICM airside and aeronautical matters (i.e., achieving in the process transfer of technology). As mentioned in MITRE’s previous quarterly technical letter, the aviation authorities of Mexico have selected Guadalajara Airport for MITRE to examine.

  During this quarter, MITRE started preparatory activities for its work on Guadalajara Airport. As part of those activities, MITRE prepared a document requesting initial data on Guadalajara Airport that is needed for MITRE to perform many of the early project tasks. Refer to Enclosure 4 of this Technical Letter for details. **Important: please note that this document contains deadlines.**
MITRE developed two preliminary Minimum Vectoring Altitude Charts (MVACs) to support operations at NAICM and Toluca Airport. The MVACs are based on feedback obtained during previously-conducted SENEAM and MITRE airspace design workshops. For example, the airspace design workshop conducted in February 2017 identified a need to modify the shape of the new Mexico City TMA, which required the MVACs to be revised. This required extensive work by the MITRE team.

The MITRE team prepared a briefing that provided an overview of MITRE’s MVAC-related work and results, which was presented to SENEAM during an airspace design workshop conducted in Mexico City from 5 through 7 June 2017. During that workshop, MITRE worked with SENEAM’s MVAC and airspace designers, and additional feedback that affects the design of the MVACs was provided. For example, the need to extend the MVACs to 80 NM was identified.

In Mexico, MVAC sector altitudes must consider radio and radar coverage. As radio and radar coverage matters are not within MITRE’s area of expertise, MITRE has been coordinating with SENEAM to ascertain where coverage, both radio and radar, does or does not exist so that MVAC sector altitudes can be adjusted appropriately. This is important as changes to MVAC sector altitudes can affect the overall airspace design for the new Mexico City TMA to support operations at NAICM and Toluca, as well as other matters (e.g., surveillance requirements).

Therefore, during the above-mentioned workshop, MITRE met with SENEAM’s radio coverage modelling engineer to discuss matters further. Some radio coverage information was provided to MITRE at that time. Additional radio coverage charts will be provided as well. This will allow both SENEAM and MITRE to obtain a better understanding of possible radio coverage gaps.

Also, MITRE met with SENEAM’s radar engineers to discuss how they can provide MITRE with appropriate radar coverage information. During the meeting, the importance of radar coverage was discussed as well as the potential impact on operations and airspace design matters. In the end, a decision was made by SENEAM to request assistance from a radar manufacturer to provide the appropriate radar coverage information. SENEAM is currently in the process of coordinating that work with the radar manufacturer.

MITRE will continue to work on the MVACs for NAICM and Toluca Airport based on the above-mentioned feedback from SENEAM. A key factor and input to MITRE’s MVAC-related work will be the radio and radar coverage results to be provided by SENEAM. If radio and radar coverage gaps that could impact operations at NAICM and/or Toluca Airport are identified, it will be necessary for SENEAM to investigate how to fill those gaps.
MITRE’s procedure design team developed preliminary instrument approach and departure procedures for the existing single-runway at Toluca Airport to support the redesign of the new Mexico City TMA to accommodate NAICM. This work was necessary because many of the existing procedures at Toluca need to be modified, as per previous SENEAM-MITRE airspace design workshops, to reduce interactions and complexities with operations at NAICM.

MITRE’s procedure design work for the existing single-runway at Toluca Airport considered the satellite-based photogrammetric survey that was completed in late 2016. The following procedure development work (in both runway directions) at Toluca Airport was conducted:

- CAT I/II/III ILS approach procedures
- Required Navigation Performance (RNP) Authorization Required (AR) Approach procedures
- Conventional departure procedures
- Area Navigation (RNAV) departure procedures

A total of 23 instrument procedures for the existing single-runway at Toluca Airport were developed by MITRE. The development of procedures was complicated due to the obstacle environment surrounding Toluca Airport, especially to the west. Additionally, potential obstacle issues to procedures were identified.

The MITRE team presented to SENEAM the above work during an airspace design workshop conducted in Mexico City from 5 through 7 June 2017. Thus, SENEAM was made aware of MITRE’s preliminary findings and potential obstacle issues. MITRE is now in the process of reviewing its procedure design work for Toluca.

MITRE’s NAICM enroute airspace design team spent a significant amount of time conducting its analysis of the Mexico ACC. Two analyses were conducted during this quarter considering the potential volume of traffic that NAICM could experience on opening-day, as well as increased traffic at other airports within the Mexico ACC, based on information provided by SENEAM.

The first analysis considered:

- The SENEAM-developed Performance-Based Navigation (PBN) routes associated with only NAICM and Toluca Airport
- The existing Aeronautical Information Publication (AIP) conventional routes for all other Mexico ACC airports and overflights
The SENEAM-MITRE jointly developed enroute sectors from the February 2017 airspace design workshop

The second analysis considered:

- The SENEAM-developed PBN routes for all Mexico ACC airports (including NAICM and Toluca Airport) and overflights
- The SENEAM-MITRE jointly developed enroute sectors from the February 2017 airspace design workshop

The MITRE team then prepared a detailed briefing of results, which was presented to SENEAM during an airspace design workshop conducted in Mexico City from 5 through 7 June 2017. The results of MITRE’s analysis allowed the SENEAM and MITRE teams to make informed decisions regarding short-term modifications to the Mexico ACC enroute sectors to overcome potential issues in accommodating increased traffic levels at the time NAICM opens.

- MITRE spent a significant amount of time advancing on its analysis of the new Mexico City TMA to support NAICM. (Note that the new TMAs of Toluca and Puebla were also included in the analysis.) MITRE’s new Mexico City TMA analysis considered:
  - The SENEAM-MITRE jointly developed Standard Instrument Departures (SIDs), Standard Terminal Arrival Routes (STARs), and sectorization from the February 2017 airspace design workshop
  - The potential volume of traffic that NAICM could experience on opening-day, as well as increased traffic at other airports within the new Mexico City TMA, based on information provided by SENEAM

The MITRE team then prepared a detailed briefing of results, which was presented to SENEAM during an airspace design workshop conducted in Mexico City from 5 through 7 June 2017. The results of MITRE’s analysis allowed the SENEAM and MITRE teams to make informed decisions regarding short-term modifications to the new Mexico City TMA sectors to overcome potential issues in accommodating increased traffic levels at the time NAICM opens.

- During this quarter, the MITRE Cancún Human-In-The-Loop (HITL) team analyzed the metrics that were obtained during the Cancún HITL 1 simulation evaluation, which occurred from 27 February 2017 through 3 March 2017 at MITRE’s ATM Laboratory. During the HITL, objective metrics (e.g., aircraft counts, time on frequency, etc.) from each HITL scenario run were collected through MITRE’s simulation/automation system. Additionally, subjective metrics (e.g., workload and situational awareness, communications, concept of operations, etc.) were obtained using questionnaires that controllers from SENEAM completed after each HITL scenario run.
For each HITL scenario run, the objective and subjective metrics were aggregated and analyzed. Means and standard deviations were calculated for each metric and charted for a graphical representation of the metrics obtained. The HITL simulation evaluation results showed that the proposed airspace design for dual independent operations at Cancún was acceptable.

The MITRE team then prepared a detailed briefing of results, which was presented to SENEAM during an airspace design workshop conducted in Cancún from 8 through 9 June 2017 (described in more detail below).

- Following the above-mentioned HITL 1 simulation evaluations, SENEAM provided MITRE with proposed airspace and route changes to the Cancún/Cozumel airspace design. The MITRE team spent a significant amount of time reviewing the proposed changes and entering them into its airspace design tools. This was important so that the changes could be appropriately and efficiently discussed with SENEAM during the above-mentioned June 2017 Cancún airspace design workshop.

- A large team of MITRE engineers visited Mexico City from 5 through 7 June 2017 to conduct an airspace design workshop to assist SENEAM with its redesign of the Mexico City TMA and Mexico ACC to support operations at NAICM. Controllers from Toluca Airport also participated in the workshop and provided valuable input and feedback.

The primary objectives of the workshop were as follows:

- Discuss and advance on the modification of the MVACs for the new Mexico City and Toluca TMAs, including radio and radar coverage matters
- Discuss MITRE-developed preliminary instrument approach and departure procedures for the existing single-runway at Toluca Airport
- Review MITRE’s preliminary analysis results for the new Mexico City, Toluca, and Puebla TMAs
- Review MITRE’s preliminary analysis results for the Mexico ACC
- Discuss and refine the new Mexico City TMA and Mexico ACC routes and sectors, as necessary

The workshop achieved its mission and, as a result significant progress was made. For example, key sector modifications were made based on the results of MITRE’s above-mentioned TMA and ACC analyses.

- After the above-mentioned airspace design workshop held in Mexico City, a large team of MITRE engineers conducted an intense two-day workshop in Cancún from
8 through 9 June 2017 to assist SENEAM in the redesign of the Cancún airspace to support dual independent test-bed operations.

The primary objectives of the workshop were as follows:

- Review and discuss the results of the previously mentioned Cancún HITL 1 simulation evaluations that were conducted at MITRE’s ATM Laboratory from 27 February 2017 through 3 March 2017
- Review, discuss, and solidify the Cancún and Cozumel routes and sectorization considering feedback and suggested modifications by SENEAM
- Develop and come to an agreement on scenarios to be accomplished during the upcoming Cancún HITL 2 activities scheduled to be conducted at MITRE’s ATM Laboratory in August 2017

The workshop, as the previous one early that same week, achieved its mission and key decisions were made to allow the project to continue advancing towards the next HITL activity. A significant achievement was the review, discussion and agreement on several airspace and route modifications that were proposed by SENEAM.

- MITRE’s procedure design team previously developed CAT I ILS approaches to support dual independent test-bed activities at Cancún. Refer to Enclosure 2 to Technical Letter (F500-L16-013): Cancún Airport: Feasibility of Independent Category I Instrument Landing System Approach Procedures, dated 14 January 2016. That work determined that some potential obstacle issues, including the existing Air Traffic Control Tower (ATCT), needed to be reviewed and assessed by SENEAM.

At that time, MITRE recommended that the elevation of the ATCT be validated. During this quarter, SENEAM was able to obtain the actual elevation of the ATCT and provided that information to MITRE.

The MITRE team then re-evaluated the CAT I ILS approaches considering the actual elevation of the ATCT and re-determined that the tower is in fact an issue (i.e., it penetrates an obstacle clearance surface). The ATCT and other potential obstacle issues were discussed in more detail with SENEAM procedure designers during the above-mentioned June 2017 airspace design workshop in Mexico City.

- During this quarter, the MITRE Cancún HITL team conducted essential preparatory work to support the above-mentioned upcoming Cancún HITL 2 dry-run simulations. For example, the following HITL 2 dry-run simulation preparatory tasks were conducted:
o Incremental upgrades and maintenance to existing software to enhance performance

o Definition of HITL 2 scenarios (i.e., identification of specific conditions/situations to test during HITL 2) for further discussion with SENEAM during the above-mentioned airspace design workshop in Cancún

o Initial generation of traffic files to be used in the scenarios, as well as testing of an internal MITRE tool to be used for enhanced scenario generation

o Development of a laboratory reconfiguration plan to move assets to replicate the potential physical layout of the new Cancún Approach Control facility

o Consultations with laboratory technical staff to discuss new functions/tools that will be utilized to simulate complex off-nominal (unusual) events during HITL 2 (e.g., airport runway configuration changes or combining sectors)

These preparatory activities required a major MITRE effort, including internal testing at MITRE’s ATM Laboratory. It is important to mention, however, that these are, contractually, out-of-scope activities. Per contract, SENEAM, not MITRE, was to acquire specialized equipment and support most of the HITL effort. In a spirit of collaboration, MITRE is providing equipment and very significant support for the Cancún HITLs at no extra cost to Mexico.

All MITRE requests in lieu of any payment or amendment to the contract is formal acknowledgment of this effort by GACM.

• With GACM’s approval, MITRE held several telephone conversations with representatives of Landrum & Brown regarding matters pertaining to the NAICM project. For example, a discussion was held regarding key capacity-related considerations and assumptions that SENEAM agreed to for modelling purposes. MITRE provided that information (originated at SENEAM) to Landrum & Brown for its use as required by its contract.

• In early 2015, ASA issued a stop-work order to MITRE’s work concerning a second runway for Toluca Airport (on the basis that this is a long-run target), despite the fact that the approved contract’s plan and budget included a second parallel runway. MITRE immediately expressed in many ways that this was an error because in designing NAICM’s airspace, Toluca Airport operations need to be considered.

During the 20 November 2015 visit to MITRE by Lic. Mascott and other high officials, the topic of the second parallel runway at Toluca Airport was discussed.
MITRE expressed its opinion that Toluca Airport should be planned and protected for long-term growth along with NAICM’s growth. As a result, the officials present at the meeting, including Lic. Mascott, Ing. Roberto Kobeh, Director General of SENEAM, and Lic. Alfonso Sarabia, Director General of ASA, agreed that a second parallel runway at Toluca should be considered, as originally planned. However, MITRE never received ASA’s revocation of the stop-work order despite repeated requests over a one-year time period.

The entire Toluca Airport work is now delayed (both runways need to be analyzed simultaneously) and this is already starting to impact other NAICM-related airspace and procedure design work. Furthermore, part of the MITRE Toluca Airport team has been reassigned to work on other tasks. See the Contractual Matters section below.

- Contractual Matters
  - Toluca-Related Work – As mentioned above, MITRE requires formal authorization to re-instate consideration of a second parallel runway at Toluca Airport. This formal notification is now urgent to avoid further work delay in both the Toluca Airport work and part of the NAICM airspace design. Additionally, at that time, MITRE is going to require feedback from appropriate authorities on the preferred location of a second parallel runway for Toluca Airport. Note that runway spacing standards keep changing.
  
  - Hidalgo-Related Work – ASA issued a stop-work order on all of MITRE’s work in the state of Hidalgo, on the basis of the Fuerza Aérea Mexicana’s (FAM’s) preference to relocate Santa Lucia Air Bases’ fixed-wing non-transport aircraft operations to Querétaro Airport.

MITRE informed ASA that FAM’s operations at Querétaro Airport, along with the establishment of Special-Use Airspace (SUA) to support those operations must be thoroughly examined to ensure that the airport is feasible and, more importantly, that FAM’s operations do not interfere with future operations at NAICM. Such investigation must be conducted in close coordination with FAM and SENEAM officials.

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Since this work is not contained in MITRE’s current contract, a modification of the contract will be required, possibly exchanging the Hidalgo work, never completed, for the new work for Querétaro, without requiring additional compensation. Before that happens, it is essential that MITRE meet with officials from FAM to discuss the specific work to be conducted for Querétaro Airport once the NAICM airspace and procedure design reaches an appropriate stage. CTA. Peláez, per instructions by Lic. Mascott, is currently coordinating a visit by officials from FAM to MITRE. MITRE first plans to provide CTA. Peláez with available dates.

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

Sincerely,

Ing. Robert W. Kleinhans
Project Technical Coordinator

Included with this letter:
Eleven documents (including four Enclosures)

cc: Ing. Enrique Lavin, GACM
    Dr. Bernardo Lisker, MITRE
This three-page return receipt (acuse de recibo) is to be scanned and e-mailed to Ing. R. Kleinhans as soon as possible.

I JULY 2017 TECHNICAL LETTER DISTRIBUTION

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10. Enclosure No. 3 to this Technical Letter (F500-L17-070): Mexico Area Control Center - Preliminary Airspace Redesign - Informal Working Notes: Routes and Sectorization, dated 28 June 2017.
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11. Enclosure No. 4 to this Technical Letter (F500-L017-070): Guadalajara International Airport - Expansion Feasibility Examination and Technology Transfer: Initial Data Request, dated 28 June 2017.

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The distribution of the eleven, above-mentioned documents, was completed.

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Signature of GACM Point of Contact for MITRE               Date

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