



**Center for Advanced
Aviation System Development**

**Pending Items Pertaining
to MITRE's NAICM Project**

In order to assist Mexico's Grupo Aeroportuario de la Ciudad de México (GACM) and, in general, other aviation authorities and stakeholders that report to the Secretaría de Comunicaciones y Transportes (SCT), in the Nuevo Aeropuerto Internacional de la Ciudad de México (NAICM) project, MITRE has prepared this list of key pending items that should be addressed. Various versions of this document have been prepared throughout the years. For example, a previous one was delivered as Enclosure 1 to MITRE Technical Letter F500-L016-013, dated 14 January 2016. Consequently, some actions have taken place, others have not.

The items listed in this table are pending as of 11 August 2017. While the list was prepared with utmost care, it should not be considered all-encompassing: MITRE has communicated all its recommendations and concerns through formal letters and reports that should be carefully examined and considered.

The listing that follows should be considered an executive document. That is, its purpose is to reinforce the authorities' awareness on pending matters of importance, in a succinct fashion. If elaboration is required, MITRE can provide additional information.

It is important to remember that the list focuses on MITRE-connected work. At the same time, MITRE has included some items out of contractual scope to be supportive. Finally, it is worth mentioning that this list does not follow any order of priority.

Prepared for

Grupo Aeroportuario de la Ciudad de México

11 August 2017

Pending Items Pertaining to MITRE’s NAICM Project

| Pending Item | General Description |
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| <p>1. Review of the Master Plan</p> | <p>While outside of contractual scope, it is important that MITRE review the aeronautical parts of the Master Plan and discuss key matters with SCT and stakeholders before the Master Plan is finalized.</p> <p>Note that in late 2014, MITRE received a large amount of Pre-Master Plan material, which was thoroughly reviewed. Feedback was provided to aviation authorities in mid-January 2015. MITRE has asked many questions and expressed concerns about the Pre-Master Plan ever since early 2015. However, MITRE has not received any further information.</p> <p>For example, the Master Plan buildings near the southern end of Runway 6 are of particular concern to MITRE. There could be other issues unknown to MITRE. For instance, MITRE has heard about the possible establishment of helicopter pads. While MITRE is not an expert on this subject, it should be informed of such important aeronautical matters.</p> |
| <p>2. Closure of Santa Lucía Military Base’s Runway</p> | <p>NAICM operations cannot commence unless the current runway at Santa Lucía is closed and Special-Use Airspace (SUA) that affect NAICM operations and/or procedural- and airspace-design are eliminated. MITRE is concerned with being associated to unsafe projects. Therefore, MITRE requires formal confirmation, in writing, that the runway will be closed on time, and that no helicopter operations will take place at the Base, except when using specified routes into and out of the Base.</p> <p>MITRE also needs to discuss with Fuerza Aérea Mexicana (FAM) its interest in relocating its fixed-wing military non-transport aircraft to Querétaro Airport. Note that this work would require signing a contract amendment. See Item 14.</p> <p>This work is pending, but not behind schedule as it should start once a reasonable level of development is reached in the design of the Mexico City airspace (conducted together by SENEAM and MITRE). CTA. Miguel Peláez, Director General of the DGAC, per instructions from Lic. Yuriria Mascott, Undersecretary of Transportation, is going to be coordinating a visit by officials from FAM to MITRE as soon as MITRE communicates upcoming available dates (October/November 2017).</p> |
| <p>3. Bird Mitigation Experimentation</p> | <p>Significant bird mitigation experimentation is required south of the Autopista Peñón- Texcoco, especially at Lago Nabor Carrillo. This is because, despite the fact that MITRE separated runways from water bodies by at least a 3-km distance, the bird population in the area needs to be reduced sharply.</p> <p>MITRE has repeatedly requested via letters, reports, and briefings that mitigation experimentation start (since at least 2012).</p> <p>While this matter is outside of contractual scope, MITRE would be pleased to discuss options and potential work with the stakeholders.</p> |
| <p>4. Air Traffic Control (ATC) Equipment Acquisition</p> | <p>ATC equipment, usually customized, needs to be ordered both for Cancún (early-on to support dual independent test-bed operations) and NAICM (at the appropriate time to support triple independent operations). Examples of this are the acquisition of specialized Instrument Landing Systems (ILSs) and Final Monitor Aids (FMAs).</p> <p>While outside of contractual scope, MITRE stands ready to provide support within its area of expertise and knowledge. In that connection, it is important to state that MITRE is a systems engineering research organization that does not normally participate in supporting the validity of detailed specifications of equipage or its fielding.</p> |

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| <p>5. NAICM Runway Visual Range (RVR) and Automated Weather Observing System (AWOS)</p> | <p>The RVR and AWOS systems located at the NAICM site have experienced significant problems for a long time. MITRE has not received any AWOS data since December 2016 and the RVR data series is incomplete.</p> <p>As a result of missing data, MITRE has not been able to assess the extent of ILS Category III weather. Such an assessment is important in the decision process relating to the number and category of ILSs that need to ultimately be purchased.</p> <p>It is essential that the equipage is maintained properly and electrical power is reliable, if necessary through back-up systems. If the equipage fails during the upcoming winter (starting in October 2017), the most crucial period of the year will not be assessed once again.</p> |
| <p>6. Chiconautla and Chimalhuacán</p> | <p>The hills at Chiconautla and Chimalhuacán penetrate some important obstacle limitation/assessment surfaces.</p> <p>Stakeholders need to make key decisions regarding runway threshold elevations, grading (and its extent) of Chiconautla and Chimalhuacán, and other related aeronautical matters, including the location of landing thresholds.</p> <p>MITRE’s previously conducted parametric analysis of runway threshold elevations that consider the elevation of the hills at Chiconautla and Chimalhuacán can assist authorities in making important decisions.</p> <p>MITRE should be informed in all matters and decisions pertaining to runway elevation, threshold locations and the grading of Chiconautla and Chimalhuacán. An erroneous decision could be very costly.</p> |
| <p>7. NAICM ILS Acquisition to Support Pre-Runway Construction Flight Inspection and Flight Validation Activities</p> | <p>This is an activity outside of MITRE’s contractual scope.</p> <p>In order to support pre-runway construction Flight Inspection and Flight Validation activities, an appropriate ILS system must be installed (for both flight directions).</p> <p>As ILSs have not been acquired, the inspection and validation activities mentioned above have not taken place. This is not in accordance with best practices as, once runways are constructed, issues concerning ILSs may be more difficult to overcome. Likewise, inspections regarding Performance-Based Navigation (PBN) procedures, not requiring an ILS, should also take place.</p> <p>While this is also an activity outside its contractual scope, MITRE has reviewed part of the ILS specifications several times at GACM’s request, yet errors often continued to reappear and the acquisition was delayed. MITRE has repeatedly expressed concern regarding the entire issue of flight inspections since at least 2014, through various stakeholders.</p> |
| <p>8. Examination of CFE Powerlines</p> | <p>CFE is proposing to construct high-tension powerlines and a substation to the north of the NAICM site. MITRE has not received detailed drawings of the powerlines to be established above ground to the north of the airport. This is a matter that would be costly to resolve if not examined soon. MITRE has been requesting this information since at least 2014.</p> |

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| 9. Grúa Torre | <p>A Grúa Torre, related to water management, was located near the southern end of Runway 1. MITRE requested that authorities verify in writing that the device is replaced by one with a height of less than 10 m.</p> <p>MITRE was informed that the permanent device was removed. However, to assist with the water pump preventive maintenance and corrective work, a mobile device is to be used, MITRE as informed, in the same location. No information about the height of the mobile device has been provided to MITRE. High structures in that area impact safety.</p> |
| 10. Acquisition of New Procedure Design Software Tool by SENEAM | <p>Per conversations with Undersecretary Mascott, a procedure design tool based on U.S. FAA Standard for Terminal Instrument Procedures (TERPS) criteria will be acquired to facilitate SENEAM's review of MITRE's procedural work. This will allow SENEAM and MITRE to work efficiently together on procedure design matters.</p> <p>MITRE held discussions with the provider of the procedure design tool being considered. After numerous discussions, the software provider agreed to offer an 18-month evaluation license <u>at no cost</u>.</p> <p>Following the 18-month evaluation period, hopefully much earlier, as this should be budgeted, SENEAM will need to purchase the software tool, preferably two licenses so designers can review each other's work. This action is not behind schedule and Ing. Roberto Kobeh has told MITRE that this should not be an issue.</p> |
| 11. Regulatory Modernization to Support the Operation of NAICM | <p>Regulations required to support dual- and triple-independent operations at NAICM must be developed. Regulations to support dual independent test-bed operations at Cancún are also required.</p> <p>A team of MITRE experts prepared a document outlining the initial set of regulatory matters that may need to be addressed to operate NAICM, as well as to conduct dual independent test-bed operations at Cancún.</p> <p>MITRE understands that the authorities have started to develop draft regulations. It is important that MITRE is kept informed.</p> |
| 12. Confirmation that Land to the North of the NAICM Site has been Acquired | <p>Authorities should confirm that land to the north of the NAICM site needed to accommodate Runway 5 and Runway 6, including its Approach Lighting System (ALS), has been fully acquired.</p> <p>MITRE noticed on a drawing provided by GACM that several parcels within and adjacent to the NAICM site boundary have yet to be acquired. These parcels are in areas close to Runway 5 and Runway 6. In addition, there are areas in the drawing that lack any symbology or classification regarding their acquisition status or have been labeled as "parcelas sin trámite de pago."</p> <p>MITRE would like to receive confirmation that the parcels and areas within and adjacent to the NAICM site boundary identified by MITRE in a 28 June 2017 Technical Letter sent to GACM have or have not been acquired. Any parcels that have not been fully acquired should be acquired as soon as possible.</p> |
| 13. Strict Control of Construction in the Vicinity of the NAICM Site | <p>Authorities should establish strict regulations to control construction in the vicinity of the NAICM site to prevent the development of obstacles to aircraft operations, as well as the construction of housing units that could be impacted by noise. This already happened at an area north of El Caracol despite of repeated warnings by MITRE.</p> <p>It is important that authorities continue efforts to control development around NAICM that could cause aeronautical problems.</p> |

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| <p>14. Human-in-the-Loop (HITL) Activities</p> | <p>MITRE has been supporting the authorities by conducting HITLs at a MITRE laboratory. Being this an activity out of MITRE's contractual scope, it required a major effort, including internal testing and software manipulation. In a spirit of collaboration, MITRE is providing equipment and very significant staff support for the Cancun HITLs at no extra cost to Mexico. MITRE appreciates the participation of SENEAM's excellent controllers in these simulations led by CTA. Augusto Gómez.</p> <p>It is MITRE's intention to support the much larger HITL effort required for NAICM in 2018/2019. This should be accomplishable as well as the Querétaro/FAM work due to the requested elimination of work for Toluca and Hidalgo. A few other minor adaptations should be effected as well. To accomplish this at no extra cost to GACM, it is important for MITRE to sign a contract amendment with GACM no later than late October 2017. See Items 2 and 16.</p> |
| <p>15. Strategic Plan for NAICM Runway 1</p> | <p>MITRE has stated that it is an error not to construct Runway 1 (westernmost runway), during the initial phase of NAICM construction. Doing nothing now will likely mean not being able to construct Runway 1 ever, consequently creating a terminal building unbalanced on its western side and an important capacity reduction. At the very least, MITRE strongly suggests that the construction of Runway 1 be partially started in 2018. Not doing so would jeopardize an important part of the legacy of the current government of Mexico.</p> |
| <p>16. Second Parallel Runway at Toluca Airport</p> | <p>The authorities instructed MITRE to eliminate the work relating to a second runway at Toluca in the original contract. Likewise, the Hidalgo work was stopped.</p> <p>Given the fact that a majority of officials believe that those two pieces of work should be eliminated, and due to the need to support the Querétaro/FAM work as well as the NAICM HITLs, MITRE proposes to sign a contract amendment to support these two priority activities at no extra cost to GACM in lieu of the second runway at Toluca and the Hidalgo work. See Items 2 and 14.</p> |
| <p>17. Airport Expansion Feasibility Analysis and Transfer of Technology (Task 8)</p> | <p>Under Task 8, 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 valuable transfer of technology). The aviation authorities of Mexico selected Guadalajara Airport for this work.</p> <p>To avoid project delays, GACM needs to gather and obtain the data requested by MITRE as soon as possible (the data, required by 31 July 2017, has not been received).</p> |
| <p>18. Radar and Radio Coverage Examination to Support Mexico City Terminal Maneuvering Area Airspace Design</p> | <p>MITRE developed two preliminary Minimum Vectoring Altitude Charts (MVACs) to support operations at NAICM and Toluca Airport. A key factor and input to MITRE's MVAC- and airspace design-related work is the radio and radar coverage results to be provided by SENEAM. Therefore, MITRE requires appropriate radio and radar coverage information as soon as possible to determine if operational issues exist and to avoid delays in the overall airspace design process.</p> <p>The reason why this is necessary is because radio and radar coverage gaps could impact operations at NAICM and/or Toluca Airport. If so, it will be necessary for authorities to investigate how to fill those gaps.</p> |