Nuevo Aeropuerto Internacional de la Ciudad de México

Initial Airspace Design Data Request

The data described herein are requested by **Friday 22 January 2016 (or earlier, if possible)**. Electronic transmission is preferred and should be e-mailed to rkleinha@mitre.org (Ing. Robert W. Kleinhans, Project Leader). If e-mail is not possible for particular items, the information should be sent via FedEx. Please include with the delivery a Table of Contents that references in a clear manner the various parts of this request. Likewise, please describe in detail any differences, if any, between the request and what is being delivered, as well as the original source of each item.

Please contact Ing. Kleinhans no later than **Tuesday 29 December 2015** if there are any issues or concerns with providing the requested data on time, as MITRE needs to allocate staff in a most efficient manner.

Prepared for

**Servicios a la Navegación en el Espacio Aéreo Mexicano**

December 2015
1.0 Introduction

MITRE is assisting Servicios a la Navegación en el Espacio Aéreo Mexicano (SENEAM) with its airspace design of the new México Terminal Maneuvering Area (TMA) and its associated enroute environment to support Nuevo Aeropuerto Internacional de la Ciudad de México (NAICM). The initial data being requested herein are particularly important in the analysis of Air Traffic Control (ATC) procedures and routes within the TMA and enroute airspace.

The data requested in this document are necessary to complete many of the required activities associated with the above-mentioned TMA and enroute airspace designs. Furthermore, many of the activities are interrelated and, therefore, delays to one activity may create a cumulative effect that could impact follow-up activities. Additional data request documents will be submitted, as necessary, at the appropriate time later on in the project.

The data described herein are requested by Friday 22 January 2016 (or earlier, if possible). Please see the note concerning other deadlines on the front cover of this document.

All inquiries concerning this data request should be addressed to Ing. Robert W. Kleinhans, Project Leader, at rkleinha@mitre.org explaining in detail, and in English, the inquiry in question. The above Internet address should also be the one utilized for the transmission of data. In case Ing. Kleinhans is out of town or if the inquiry must be in Spanish or it requires further contractual interpretation, questions can be addressed to Dr. Bernard Lisker at bernard@mitre.org or, if data needs to be shipped (please via FedEx), send it to the following address:

Ing. Robert W. Kleinhans
The MITRE Corporation
7515 Colshire Drive
McLean, VA 22102-7539
U.S.A.

2.0 Data Request

This section lists and, if necessary, describes the data required to conduct the activities pertaining to the TMA and enroute airspace design to support NAICM. The list should not be construed as being all-inclusive, as additional information will be requested throughout the project. Figures, tables, and information of a mainly numerical nature can be sent to MITRE in Spanish. Other data, particularly lengthy conceptual texts, are required in English. If in doubt, or if such information is lengthy, please consult MITRE before spending time in translating the information.

To the extent possible, the information should be sent in electronic format (e.g., Excel, Word, AutoCAD, etc.). While paper format is acceptable, it should be a last option. In the case of elevations, these should be provided in meters above Mean Sea Level (MSL). All maps, boundaries, runway thresholds, and in general, all coordinates that are to be provided to MITRE should be based on the Universal Transverse Mercator (UTM)/World Geodetic System 1984
(WGS 84) coordinate system. If for any reason any data sent to MITRE does not use WGS 84, it should be clearly specified what coordinate system is being used. In the case of AutoCAD drawings, please specify both the coordinate system and projection used.

It is important to note that MITRE plans to use as a primary source of information the most recent version (as of the date of this document) of México’s Aeronautical Information Publication (AIP). This is the official, publicly available civil aviation authority publication of México regarding principal aeronautical data. Therefore, MITRE cannot take responsibility for errors, discrepancies, or inconsistencies thereof.

ALL THE INFORMATION REQUESTED THROUGHOUT THE REST OF THIS DOCUMENT SHOULD TAKE INTO ACCOUNT THE CONSIDERATIONS MENTIONED ABOVE.

Operational Data

The following is a list of information concerning operational data that are being requested:

1. One week (i.e., seven consecutive days) of detailed daily operations data for all traffic within the México TMA and México enroute airspace under the authority of the México Area Control Center (ACC) that includes both overflights and traffic originating from or arriving to the following airports:

   Note: MITRE understands that many of the airports listed below are small, low traffic volume airports. However, since the México TMA, and potentially the México ACC, will undergo a significant airspace redesign it is important that MITRE obtains data on all traffic within the México TMA and ACC in order to obtain a comprehensive understanding of ATC matters.

   - México City International Airport (MMMX)
   - Toluca International Airport (MMTO)
   - Cuernavaca Airport (MMCB)
   - Puebla International Airport (MMPB)
   - Querétaro International Airport (MMQT)
   - Santa Lucía Military Base (MMSM)
   - Pachuca Airport (MMPC)
   - Atizapán Airport (MMJC)
   - Zacatecas International Airport (MMZC)
   - Bahías de Huatulco International Airport (MMBT)
   - Puerto Escondido International Airport (MMPS)
   - Uruapan International Airport (MMPN)
- Colima Airport (MMIA)
- Poza Rica el Tajín Airport (MMPA)

The operations data should indicate whether the flight was Visual Flight Rules (VFR) commercial, VFR general aviation, Instrument Flight Rules (IFR) commercial or IFR general aviation. If there are seasonal fluctuations at other times during the year, separate days should be provided for the above airports and México ACC enroute airspace overflights and be representative of the seasonal traffic fluctuations.

The week selected should be considered a relatively high-volume peak week in 2015 that would represent at least 90% of the highest traffic volume. These days need to be free of unusual events that would drive the traffic volume up, such as major sporting events.

If any of the following information is difficult to obtain, contact MITRE to determine which elements are absolutely essential. Operations data should be provided in Excel and include the following elements (see Figure A-1 in Appendix A to this document for the preferred format):

- Date
- Type of operation (arrival, departure, or overflight)
- Registration (“tail number”)
- Associated runway used for either the departure or arrival at the above-mentioned airports
- The entire International Civil Aviation Organization (ICAO) flight plan data for all traffic traversing the México TMA and ACC airspace or any aircraft using the above-mentioned airports that includes at a minimum:
  - Airline name, airline code, and flight number (if not a commercial operation, indicate whether it is general aviation, military, or governmental) or the flight callsign
  - Aircraft type (model and sub-model, for example, Boeing 737-200)
  - Indication of Area Navigation (RNAV) equipment designator
  - Filed true air speed
  - Actual arrival and departure date and time (indicate whether the time is local or Coordinated Universal Time [UTC]), or scheduled arrival and departure date and time (indicate whether the time is local or UTC) if actual is not available
  - Filed flight altitude
  - Origination airport
  - Standard Instrument Departure (SID) used for departures from any of the above-mentioned airports
o Destination airport
o Standard Terminal Arrival Route (STAR) used for arrivals to any of the above-mentioned airports
o Filed or actual route of flight through the México Flight Information Region (FIR). Be sure to indicate whether the data is filed or actual.
o Time stamp and altitude at each waypoint or navigational aid along the route of flight

2. Provide radar data for one of the seven days mentioned above with sufficient information to be able to cross-reference aircraft identification with a particular radar track for all of the airports within the México ACC. Information should show at a minimum:

- Aircraft position data - format needs to include either:
  - Known origin (usually the location of the radar antenna) in latitude/longitude and then displacement coordinates, in Cartesian \((x,y)\) format from the known origin
    
  o Latitude/longitude of each aircraft position

  - Altitude of each aircraft position (Mode C)
  - Time data for each position, at least to the nearest second
  - Callsign
  - Point of origin and destination information for each particular radar track

The radar data should be processed to the point of providing location information either in latitude/longitude or Cartesian \((x,y)\) coordinates. See Table A-1 in Appendix A to this document for the preferred radar data format.

In addition to the radar track data, the definition of the data fields for the radar track data, including the indications of the beginning and ending of each radar track data entry, should be provided.

3. Information on future traffic growth statistics, specifically percentage increases, for each of the airports mentioned above, including overflight traffic in México enroute airspace for a ten-year period, if possible.

**Toluca Specific Operational Data**

This section provides a listing of general information MITRE requires for operations at Toluca Airport including data on operational statistics, through 2015, if available. If operational data for all of 2015 is not available by the due date, then information for 2014 can be provided instead. However, 2015 data should be submitted to MITRE as soon as it is available.

1. Data on operational statistics and other aeronautical information should include:
• Operational information for Toluca Airport, **excluding helicopter operations** (in Microsoft Excel):
  o Total number of annual operations ("movements") from 2005 to 2015. Earlier data, if available, would also be helpful.
  o Total number of operations by month for all of 2015. If not available, the data for all of 2014 should be provided, along with all the available monthly data for 2015.
  o Total number of daily operations (arrivals and departures separately) for the peak-day of the peak-traffic month of the latest year. If the data for all of 2015 is not complete, then the information of the peak-day of the peak traffic month of 2014 should be provided instead. Ensure that the selected day was not a high-volume day due to unusual circumstances (that is, exclude a day when a major one-day tourist or military event occurred).
  o Hourly operations (arrivals and departures separately) for the peak-day of the peak-traffic month of 2015. If 2015 data are not available, the peak-day of the peak-traffic month of 2014 should be provided instead. Indicate, whether the times are local or UTC. Ensure that the selected hour was not a high-volume hour due to unusual circumstances (like a very high traffic hour due to an unexpected runway closing during the previous hour).

**Facility Documents**

The following is a list of information concerning ATC facility documents that are being requested:

1. Letters of Agreement (LOAs) between the following facilities:
   - México Terminal/Approach Control and Puebla Terminal/Approach Control
   - México Terminal/Approach Control and Querétaro Approach Control
   - México Terminal/Approach Control and the following Air Traffic Control Towers (ATCTs):
     o México City International Airport (MMMX)
     o Toluca International Airport (MMTO)
     o Cuernavaca Airport (MCCB)
     o Santa Lucía Military Base (MMSM)
   - México ACC and the following Terminal/Approach Controls:
     o San Luis Potosí
     o Acapulco
     o Veracruz

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- México ACC and the following ATCTs:
  - Zacatecas International Airport (MMZC)
  - Bahías de Huatulco International Airport (MMBT)
  - Puerto Escondido International Airport (MMPS)
  - Querétaro International Airport (MMQT)
  - Uruapan International Airport (MMPN)
  - Colima Airport (MMIA)
  - Poza Rica el Tajín Airport (MMPA)
- México ACC and the adjacent ACCs of Mérida, Monterrey and Mazatlán
- México ACC and any military facilities
- Puebla TMA and Puebla International Airport (MMPB)
- Querétaro TMA and Querétaro International Airport (MMQT)

2. Standard Operating Procedures (SOPs) for all sectors within the following:
- México ACC
- México Terminal/Approach Control
- Puebla Terminal/Approach Control
- Querétaro Terminal/Approach Control
The following ATCTs:
  - México City International Airport (MMMX)
  - Toluca International Airport (MMTO)
  - Cuernavaca Airport (MMCB)
  - Santa Lucía Military Base (MMSM)
  - Puebla International Airport (MMPB)
  - Querétaro International Airport (MMQT)

For each facility/sector the information should include:

- A description of the sector
- The sector's basic functions (i.e., merging, crossing, sequencing traffic, and responsibilities)
- Type of traffic handled (arrivals, departures, and/or overflights), indicating which airports
- General description of the sector traffic flows
- Any aircraft altitude, speed, and/or route restrictions the sector is required to meet (either internal or at sector/position boundary)
- Specific routings required between city pair airports
- Location of and procedures for holding
- Hand off procedures between the following:
  - México ACC and the following Terminal/Approach Controls:
    - San Luis Potosí
    - Acapulco
    - Veracruz
    - Puebla
    - Tampico
    - León-Aguascalientes
    - Guadalajara
    - Puerto Vallarta
    - Manzanillo
    - Morelia
    - Ixtapa-Zihuatanejo
- Oaxaca
- Ciudad Victoria
- México
- Querétaro

  o México ACC and the following ATCTs:
    - Zacatecas International Airport (MMZC)
    - Bahías de Huatulco International Airport (MMBT)
    - Puerto Escondido International Airport (MMPS)
    - Querétaro International Airport (MMQT)
    - Uruapan International Airport (MMPN)
    - Colima Airport (MMIA)
    - Poza Rica el Tajín Airport (MMPA)

  o México ACC and the adjacent ACCs of Mérida, Monterrey, and Mazatlán

  o México, Querétaro, and Puebla Terminal/Approach Controls and México City
    International Airport (MMMX), Toluca International Airport (MMTO),
    Querétaro International Airport (MMQT), and Puebla International Airport
    (MMPB) ATCTs, respectively

- México’s equivalent of the following United States Federal Aviation Administration
  (FAA) documents:
  
  o Order JO 7110.65, Air Traffic Control
  
  o Order JO 7210.3, Facility Operations and Administration
  
  o Aeronautical Information Manual (AIM) or a document containing
    information on basic flight and ATC procedures for México

**Airport/Airspace Boundaries and Maps**

The following is a list of information concerning airport and airspace boundaries and maps
that are being requested:

1. Airspace sector boundaries consisting of latitude/longitude coordinates and floor and
   ceiling altitudes of the following:
   
   - The ACCs/FIRs surrounding the México ACC
   
   - Each sector inside the México ACC (including any shelves and sector/position
     numbers)
- Each sector inside the México/Toluca and Puebla TMAs (including approach control sectors) for each direction in which the airport operates (including any shelves and sector/position numbers)
- Toluca, Puebla, Querétaro, and Cuernavaca ATCT airspace boundaries
- External boundaries of any Special Use Airspace (SUA) not listed in the México AIP and frequency of use (i.e. military restricted areas, including name identifier and vertical limits)
- Airspace classification boundaries (e.g., Class G)

2. Radar and radio coverage charts. Specify any known problems/issues affecting radar/radio coverage including those in the México enroute airspace, México and Puebla TMAs or any ATCT airspace at any of the airports in the México enroute airspace. Indicate the sectors or parts of sectors where there is any known problems or issues.

### Future Airspace and/or Route Plans

The following is a list of information concerning future airspace and/or route development plans that are being requested:

1. Future known plans for the México enroute route structure (AutoCAD diagrams showing the current and future route structure are preferred), including all coordinates for any proposed airways or new navigational aids (NAVAIDs), waypoints, additional entry/exit points for México and Puebla TMAs or México enroute airspace or other significant data.

2. Proposed new routes, airways, or procedures, including RNAV or Required Navigation Performance (RNP) procedures, to include those defined in the Caribbean/South American (CARSAM) Air Navigation Plan (ANP)

3. Current percentages of RNAV and RNP aircraft equipage and future projections, if known

4. Describe any known future plans for:
   - Changes to the existing NAVAID infrastructure within a 100 NM radius of the México ACC. For example, the decommissioning of Very High Frequency (VHF) Omni-directional Range (VOR) or Distance Measuring Equipment (DME) facilities.
   - Changes to the existing enroute airways structure of México

5. Provide any conventional, RNAV or RNP instrument procedures that may have been developed or are in the process of being developed (but are not published in the AIP) within the México TMA
Appendix A

Figure A-1 below shows a sample of the operations data MITRE requires. (Note that the data sample is fictitious.) These data should be provided electronically in Microsoft Excel.

<table>
<thead>
<tr>
<th>Date</th>
<th>Type of Operation</th>
<th>Registration/Tail Number</th>
<th>Airport/Runway Used</th>
<th>Flight CallSIGN</th>
<th>Aircraft Type</th>
<th>Equipment Indicator</th>
<th>Filed True Air Speed</th>
<th>Actual Arrival Date and Time</th>
<th>Actual Departure Date and Time</th>
<th>Filled Altitude</th>
<th>Originating Airport</th>
<th>SID</th>
<th>Destination Airport</th>
<th>STAR/Instrument Approach</th>
<th>Waypoint Status</th>
<th>Time at Fix</th>
<th>Altitude at Fix</th>
</tr>
</thead>
</table>

**Figure A-1. Sample of Operations Data**

Table A-1 shows a sample of radar data, as presented in Excel. If possible, the data should be given in ASCII format.

### Table A-1. Sample Radar Data

<table>
<thead>
<tr>
<th>Time</th>
<th>Transponder Code</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Speed</th>
<th>Aircraft Type</th>
<th>Mode C</th>
<th>Origin</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00:23</td>
<td>0207</td>
<td>82.0469</td>
<td>4.7656</td>
<td>468</td>
<td>A320</td>
<td>390</td>
<td>SUMU</td>
<td>KHCU</td>
</tr>
<tr>
<td>0:00:23</td>
<td>0055</td>
<td>25.3906</td>
<td>2.0781</td>
<td>455</td>
<td>8737</td>
<td>390</td>
<td>SUMU</td>
<td>KATL</td>
</tr>
</tbody>
</table>

A sample of radar data sent in advance of the above dataset would be useful to allow MITRE to check and, if necessary, set up any tailored automatic adaptation and/or conversions of the radar data into a form that can be readily used by MITRE's airspace design tools.