MITRE

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F500-L14-039

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México

Subject: Auditorium Assessment

Dear Capt. López Meyer:

I respectfully submit to you this technical letter that provides information regarding the potential impact to aeronautical operations caused by the proposed construction of an auditorium near the site of the proposed Nuevo Aeropuerto Internacional de la Ciudad de México (NAICM).

The government of the State of Mexico (hereafter referred to as Edomex) is considering constructing an auditorium in an area adjacent to the northwestern portion of "El Caracol" north of the site for the proposed NAICM. The close proximity of the auditorium to the proposed runways at NAICM has raised concerns regarding potential impacts on aircraft operations and procedures, as well as noise exposure over the auditorium caused by future aircraft operations. Therefore, ASA (and simultaneously Edomex) requested that MITRE analyze the potential impact of the auditorium on aircraft operations at NAICM.

The objective of MITRE's assessment was to determine whether the auditorium will have any adverse effects on future aircraft operations at NAICM. MITRE's assessment includes a determination of whether the auditorium impacts key instrument approach and departure procedures and International Civil Aviation Organization (ICAO) Annex 14 Obstacle Limitation Surfaces (OLS). Other important items such as potential engine-out obstacle evaluation areas and noise exposure were also considered.

Background and Data

In mid-February 2014, ASA informed MITRE of plans by Edomex to construct an auditorium near the NAICM site. However, the initial documentation provided to MITRE did not include all of the data necessary for MITRE to conduct its analysis. For example, the initial information only provided a high-level overview of the proposed site for the auditorium and architectural renderings. It did not include coordinates for either the auditorium or the property polygon (hereafter referred to as the perimeter). In addition, the documentation lacked any geographic-referenced data or information regarding the ground elevation at the site of the auditorium.

While additional information was subsequently received, it too was incomplete and included inconsistencies. For example, during the data collection and review process, the

Above Ground Level (AGL) height of the auditorium changed several times from 41 m, then 55 m, then 60 m, and then finally to 25 m, which caused confusion. MITRE identified data discrepancies with the perimeter information, which resulted in subsequent iterations of the provision of perimeter coordinates. MITRE also had difficulty receiving a geographic-referenced AutoCAD file with the coordinates of the auditorium roof, which was critical for MITRE to accurately conduct its assessment. Finally, MITRE had doubts regarding the ground elevation of 2259 m above Mean Sea Level (MSL) at the site of the auditorium provided by Edomex. This is a critical piece of information as it affects the stated elevation of the highest part of the auditorium.

Since mid-February, the MITRE team has spent a significant amount of time and effort trying to resolve data issues and obtain complete and correct information in order to assess the auditorium. Numerous e-mails were sent to officials at Edomex describing issues and requesting appropriate data. At some point Dr. Bernardo Lisker had a telephone conversation with the State Governor, initiated by the latter. Extensive teleconferences were conducted with Edomex officials involved with the auditorium project to clarify data matters and issues.

Finally, and very fortunately, on 30 June 2014, the Secretary of Public Works and Water of Edomex, Ing. Manuel Ortiz, visited MITRE to discuss the auditorium project, as well as data issues. Ing. Ortiz was made fully aware of the data problems MITRE was having and what information was required for MITRE to conduct its assessment of the auditorium. The visit was extremely useful.

On 8 July 2014, MITRE received four files via e-mail from Ing. Ortiz. The MITRE team reviewed the files and determined that the files provided the appropriate information required for MITRE to conduct its assessment of the auditorium. At that time, Ing. Ortiz also indicated that the previous supplied ground elevation of 2259 m MSL was, in fact, incorrect, and that the correct ground elevation was 2232.105 m MSL, which is a significant difference. Ing. Ortiz also stated that the elevation of the highest part of the auditorium will be 2257.105 m MSL (i.e., 25 m AGL). The four files provided by Ing. Ortiz are listed and described below.

- "1.- POLIGONAL EDIFICIO.pdf": a drawing of the auditorium, including the outline of its roof. A table of coordinates of several points along the outline of the auditorium roof, including associated elevation data, was also provided.
- "2.- CUADRO DE CONSTRUCCION POLIGONAL EDIFICIO.pdf": a larger scale version of the table of coordinates provided in file "1.- POLIGONAL EDIFICIO.pdf".
- "3.- POLIGONAL TERRENO Y EDIFICIO.pdf": a drawing showing the perimeter and the auditorium superimposed over aerial imagery. A side profile of the auditorium indicating the ground elevation (i.e., 2232.105 m MSL) and the auditorium roof elevation at its highest point (i.e., 2257.105 m MSL) was also provided. Next, textual descriptions of the highest elevation point of the auditorium, the elevation of the ground at the auditorium, the

highest elevation of light poles within the perimeter (i.e., 2241.105 m MSL), and other information was provided. Finally, the table of coordinates of the outline of the roof, including associated elevation data provided in file "1.-POLIGONAL EDIFICIO.pdf", as well as a table of coordinates of the perimeter were included.

- "Ecatepec 15 has.dwg": a geographic-referenced AutoCAD drawing showing the auditorium and its perimeter.

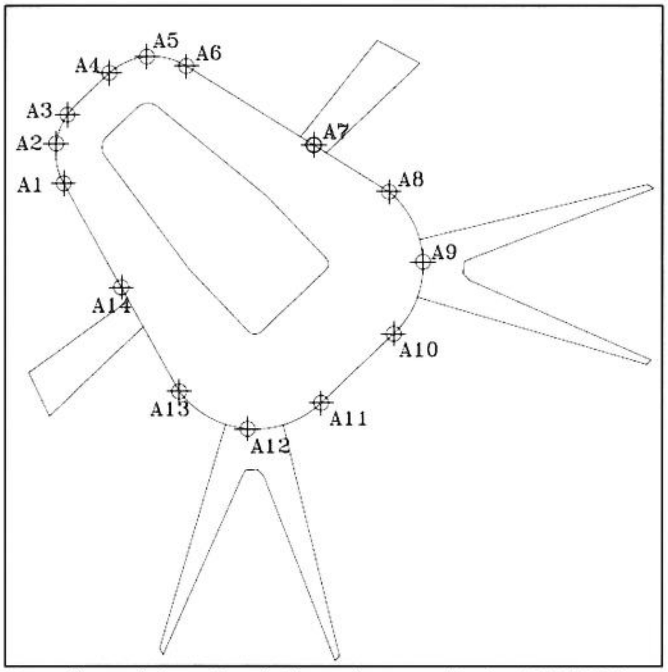
The coordinates of the auditorium roof outline (based on the above-mentioned data) are shown in Table 1 (latitude and longitude information was derived by MITRE based on the data provided by Edomex). Figure 1 shows the drawing of the auditorium provided by Edomex.

The coordinates of the perimeter are shown in Table 2 (latitude and longitude information was derived by MITRE based on the data provided by Edomex). Figure 2 shows the drawing of the perimeter. Figure 3 shows the auditorium and the perimeter superimposed over aerial photography.

Table 1. Proposed Auditorium Coordinates

Auditorium Coordinates				
Point	X	Y	Latitude	Longitude
A1	497985.8227	2164517.8411	19 34 32.14 N	99 1 9.13 W
A2	497982.8263	2164533.6813	19 34 32.66 N	99 1 9.24 W
A3	497987.3273	2164545.0942	19 34 33.03 N	99 1 9.08 W
A4	498004.1568	2164561.7537	19 34 33.57 N	99 1 8.51 W
A5	498018.9538	2164568.1331	19 34 33.78 N	99 1 8.00 W
A6	498034.6325	2164564.3925	19 34 33.66 N	99 1 7.46 W
A7	498085.2915	2164533.0411	19 34 32.64 N	99 1 5.72 W
A8	498115.2882	2164514.4594	19 34 32.03 N	99 1 4.69 W
A9	498128.8546	2164486.5786	19 34 31.12 N	99 1 4.23 W
A10	498117.1263	2164457.9104	19 34 30.19 N	99 1 4.63 W
A11	498088.2602	2164430.3887	19 34 29.30 N	99 1 5.62 W
A12	498059.0733	2164420.0378	19 34 28.96 N	99 1 6.62 W
A13	498031.9137	2164434.9161	19 34 29.44 N	99 1 7.55 W
A14	498008.8890	2164476.3923	19 34 30.79 N	99 1 8.34 W

Note: coordinates are located along the outline of the roof of the auditorium (see Figure 1). Coordinates are based on World Geodetic System 1984 (WGS 84) and the Universal Transverse Mercator (UTM) system.



Note: figure is based on information provided to MITRE by Edomex. See Table 1 for coordinate information of points A1 through A14.

Figure 1. Proposed Auditorium

Table 2. Proposed Perimeter Coordinates

Perimeter Coordinates				
Point	X	Y	Latitude	Longitude
1	497757.7668	2164658.7377	19 34 36.72 N	99 1 16.96 W
2	497880.9599	2164776.2166	19 34 40.55 N	99 1 12.74 W
3	497930.5320	2164724.2353	19 34 38.86 N	99 1 11.03 W
4	498104.5235	2164580.3946	19 34 34.18 N	99 1 5.06 W
5	498264.0368	2164500.2878	19 34 31.57 N	99 0 59.59 W
6	498191.7481	2163987.7608	19 34 14.90 N	99 1 2.06 W
7	497984.7200	2164261.5045	19 34 23.80 N	99 1 9.17 W
8	497919.6582	2164463.7686	19 34 30.38 N	99 1 11.41 W
9	497941.3620	2164480.3875	19 34 30.92 N	99 1 10.66 W
10	497909.2358	2164535.2900	19 34 32.71 N	99 1 11.76 W
11	497894.7041	2164523.0870	19 34 32.31 N	99 1 12.26 W
12	497860.0681	2164580.3165	19 34 34.17 N	99 1 13.45 W
13	497867.8509	2164587.2060	19 34 34.40 N	99 1 13.18 W
14	497846.8267	2164610.9524	19 34 35.17 N	99 1 13.91 W
15	497839.6806	2164604.5817	19 34 34.96 N	99 1 14.15 W
16	497798.9043	2164650.3171	19 34 36.45 N	99 1 15.55 W
17	497781.0040	2164634.3608	19 34 35.93 N	99 1 16.17 W

Note: coordinates are based on WGS 84 and the UTM system.

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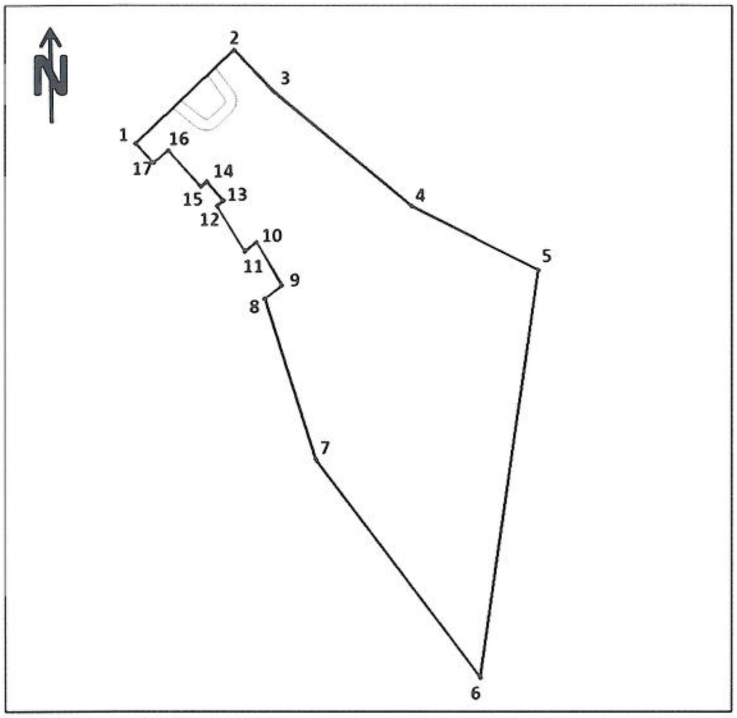


Note: this figure is based on information provided to MITRE by Edomex. See Table 2 for coordinate information of points 1 through 17.

Figure 2. Proposed Perimeter

Source: Edomex

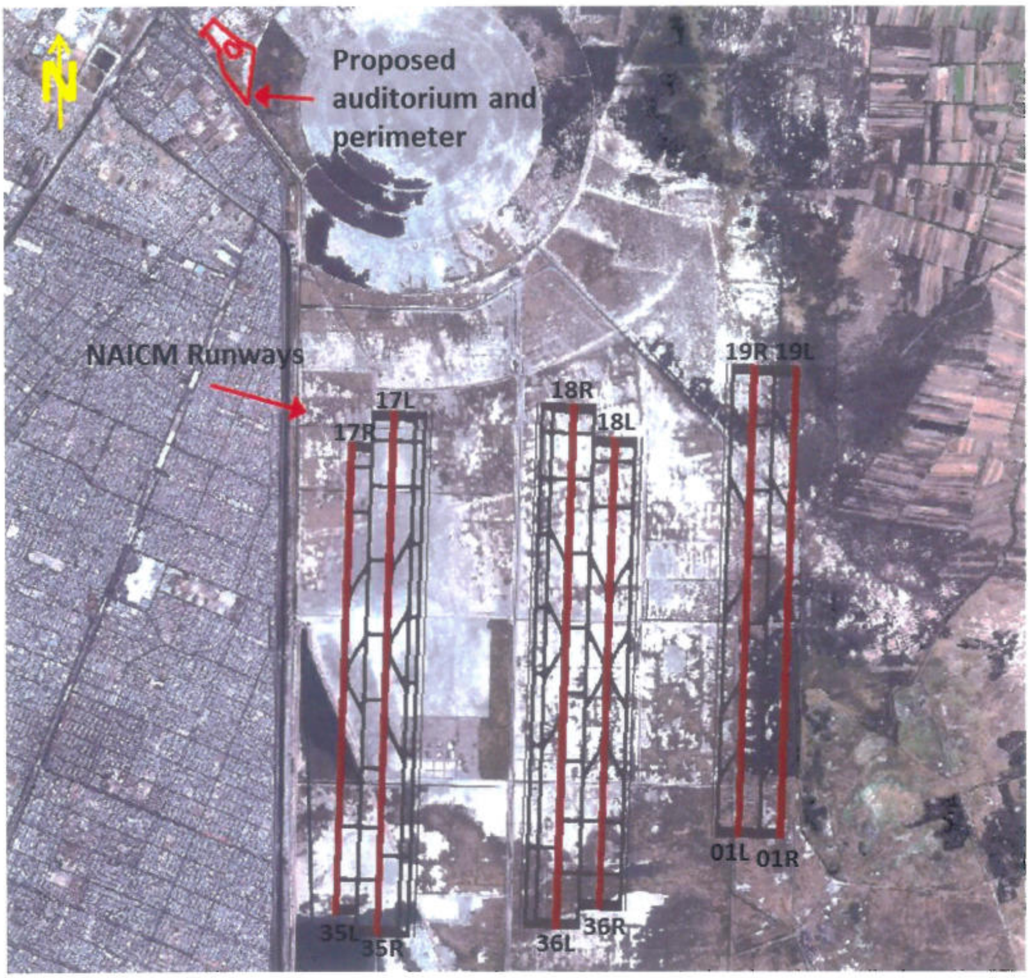
Figure 3. Proposed Auditorium and Perimeter

Methodology

MITRE conducted an assessment of the auditorium based on the above-mentioned information provided by Edomex on 8 July 2014. The AutoCAD file provided to MITRE contained different elevations at each of the auditorium coordinates. To assume a worst-case scenario, and per agreement with Ing. Ortiz, MITRE applied the highest provided elevation of 2257.1050 m MSL to the entire auditorium roof.

MITRE also received information regarding the height of light posts that potentially will be installed in and around the perimeter. Thus, to account for the possible light posts and without knowing their exact locations, MITRE evaluated the entire perimeter using the height of the light posts, i.e., 2241.1050 m MSL.

For the purposes of this assessment, MITRE evaluated the impact of the auditorium on the NAICM proposed runway configuration shown below in Figure 4, referred to as the *MITRE-Recommended Runway Configuration (July 2012)*, that was proven feasible during a previous project.



Source Imagery: Edomex

Figure 4. Proposed Auditorium and Perimeter in Relation to the MITRE-Recommended Runway Configuration (July 2012) at NAICM

As previously stated, the MITRE assessment includes a determination of whether the auditorium impacts key instrument approach and departure procedures, ICAO Annex 14 OLS, and other important items such as potential engine-out obstacle evaluation areas and noise exposure caused by aircraft operations at NAICM.

MITRE used instrument procedure design and obstacle assessment analytical tools, such as PDToolkit, PHX, MITRE's Terminal Area Route Generation, Evaluation, and Traffic Simulation (TARGETS), and other specialized software to evaluate the auditorium. The following evaluations were conducted:

- Evaluation of the auditorium on ICAO Annex 14 OLS: MITRE evaluated the impact of the auditorium against all of the ICAO Annex 14 OLS. The relevant surfaces within which the auditorium falls are the Inner Horizontal and Conical surfaces.
- Evaluation of the auditorium on instrument approach and departure procedures: There are many factors that must be considered in the development of instrument procedures, especially when considering triple independent operations to parallel runways. ICAO does not publish standards for independent approaches to three parallel runways. Therefore, MITRE based its instrument procedure designs for NAICM on United States (U.S.) Standard for Terminal Instrument Procedures (TERPS).
- Evaluation of the auditorium on potential engine-out obstacle assessment areas: MITRE investigated if the auditorium would be located within potential U.S. or ICAO engine-out obstacle assessment surface areas, which could potentially result in adverse operational impacts on future aircraft operations.

  It is important to note, however, that airlines are responsible for developing their own engine-out procedures. Therefore, the engine-out procedure and its associated obstacle assessment surface areas considered by MITRE for its assessment of the auditorium may be different than the procedures and surfaces developed by airlines.
- Evaluation of the auditorium on the Parallel Approach Obstruction Assessment Surfaces (PAOAS): The purpose of the PAOAS is to ensure an obstacle-free path for an aircraft on final approach that needs to conduct an evasive maneuver (typically a command to turn and climb) to avoid another aircraft on final approach to an adjacent runway that blunders into its path. MITRE conducted an analysis to determine whether the auditorium would penetrate the PAOAS, which in this case includes the PAOAS associated with the westernmost runway at NAICM.
- Evaluation of the auditorium on the Minimum Vectoring Altitude Chart (MVAC): An MVAC depicts the lowest altitudes at which air traffic controllers can radar vector aircraft. MITRE, in close coordination with Servicios a la Navegación en el Espacio Aéreo Mexicano (SENEAM), developed a new MVAC to support future NAICM operations. MITRE examined the auditorium to determine if it would require the altitude of an MVAC sector to be raised to ensure appropriate clearance of aircraft over the structure.
- Evaluation of potential aircraft noise exposure on the auditorium: In order to support the siting of runways, MITRE considered key future aircraft demand levels at

NAICM based on MITRE's capacity and delay analyses. MITRE used the results of a previous noise analysis of NAICM (see MITRE technical letter F500-L12-016, dated 3 July 2012) to examine the potential aircraft noise exposure that would be experienced at the proposed location of the auditorium.

Evaluation of the Auditorium on ICAO Annex 14 OLS

MITRE evaluated the impact of the auditorium and perimeter against ICAO Annex 14 OLS. However, given the location of the auditorium, the relevant surfaces to this assessment were the Inner Horizontal and Conical surfaces. Figure 5 shows the location of the auditorium and perimeter in relation to the Inner Horizontal and Conical surfaces.

The purpose of the Inner Horizontal surface is to protect airspace for visual circling prior to landing. The Inner Horizontal surface is a horizontal plane located 45 m above an established airport datum elevation. The surface has a radius of 4000 m from runway thresholds or the end of the runway strip. Similarly, the Conical surface is also designed to protect airspace for visual circling prior to landing. It slopes upwards and outwards from the Inner Horizontal surface at a slope of 5% (20:1) to a height of 100 m as measured in a vertical plane perpendicular to the periphery of the Inner Horizontal surface.

MITRE used an airport datum elevation of 2223 m MSL at NAICM to establish the Inner Horizontal. As a result, the elevation of the Inner Horizontal surface is 2268 m MSL, a height greater than the auditorium (2257.105 m MSL) and perimeter (2241.105 m MSL). Therefore, while both the auditorium and perimeter fall within the lateral confines of the Inner Horizontal and Conical surfaces, they do not penetrate either surface and cause no impact to ICAO Annex 14 OLS.

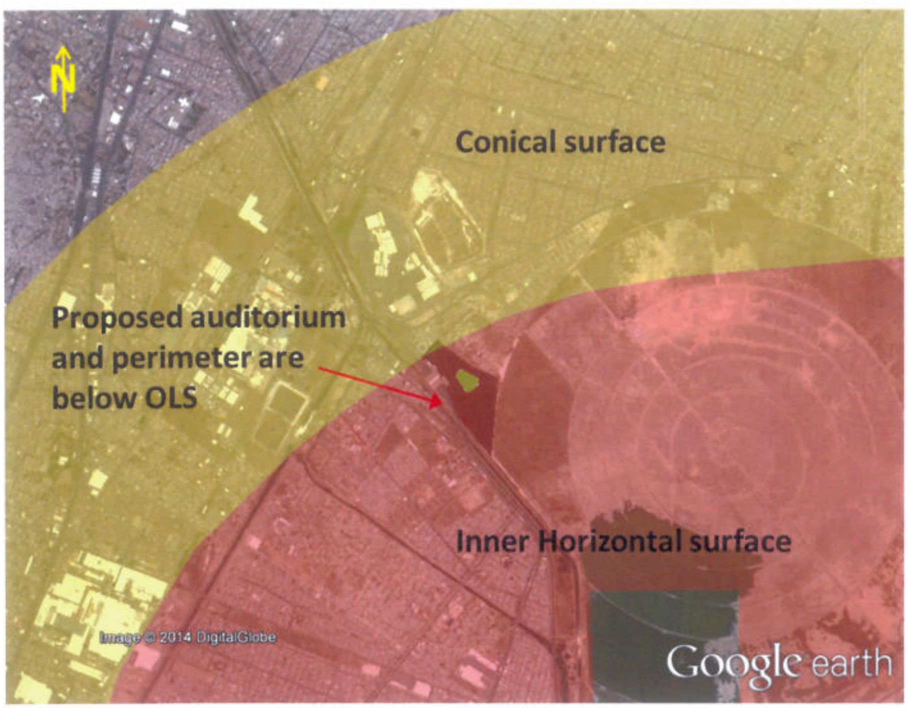


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Figure 5. NAICM Inner Horizontal Surface and Conical Surface

Evaluation of the Auditorium on Instrument Approach and Departure Procedures

MITRE evaluated the impact of the auditorium and perimeter on instrument approach and departure procedures, which included Instrument Landing System (ILS) Category (CAT) I and CAT II/III approach procedures and Required Navigation Performance (RNP) Authorization Required (AR) approach procedures to the relevant runways at NAICM. Standard Instrument Departure (SID) procedures were assessed to determine if the auditorium would cause an increase in climb gradient requirements.

MITRE examined the following northbound approaches (for which the potential issues could be the penetration by the auditorium and/or perimeter to the missed approach surface):

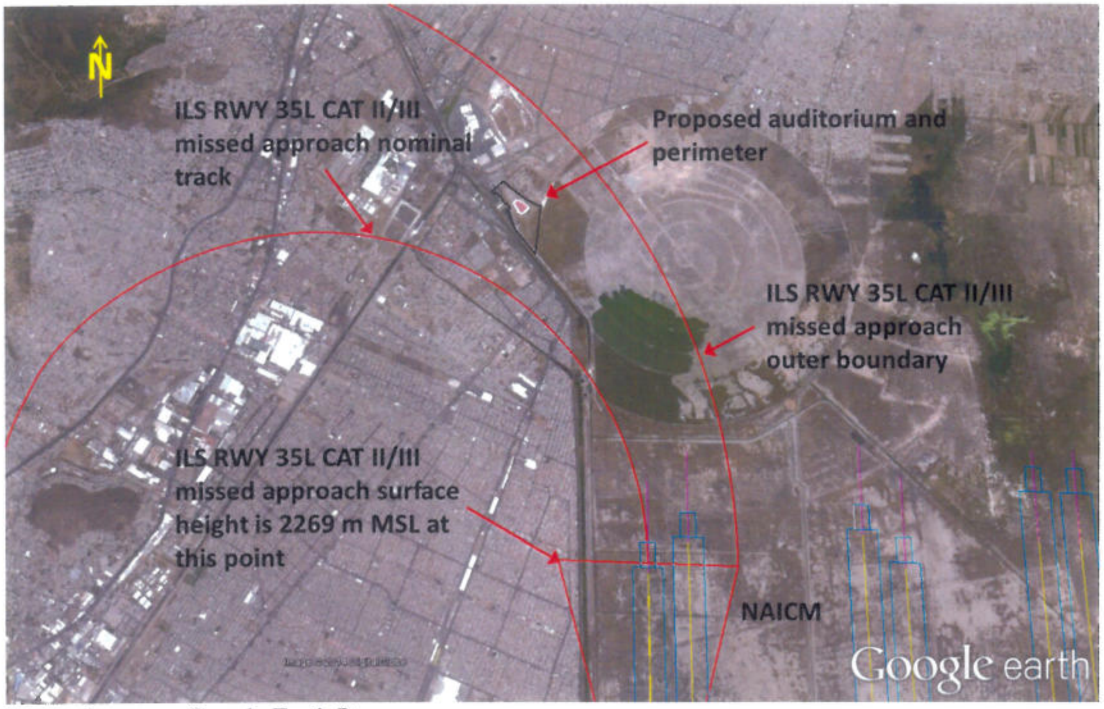
- ILS Runway (RWY) 35L CAT I
- ILS RWY 35L CAT II/III
- ILS RWY 35R CAT I
- ILS RWY 35R CAT II/III
- ILS RWY 36L CAT I
- ILS RWY 36L CAT II/III
- ILS RWY 36R CAT I
- ILS RWY 36R CAT II/III
- ILS RWY 01L CAT I
- ILS RWY 01L CAT II/III
- ILS RWY 01R CAT I
- ILS RWY 01R CAT II/III

The ILS RWY 35L CAT II/III approach represents the worst-case northbound approach in relation to the auditorium and perimeter, and is shown in Figure 6. The auditorium and perimeter are within the lateral confines of the missed approach surface. However, they do not penetrate the surface. Similarly, MITRE analyzed all of the above-mentioned northbound approaches and determined that the proposed auditorium and perimeter would not impact these procedures.

MITRE also examined the following southbound approaches (for which the potential issues could be the penetration by the auditorium and/or perimeter to the final approach surface):

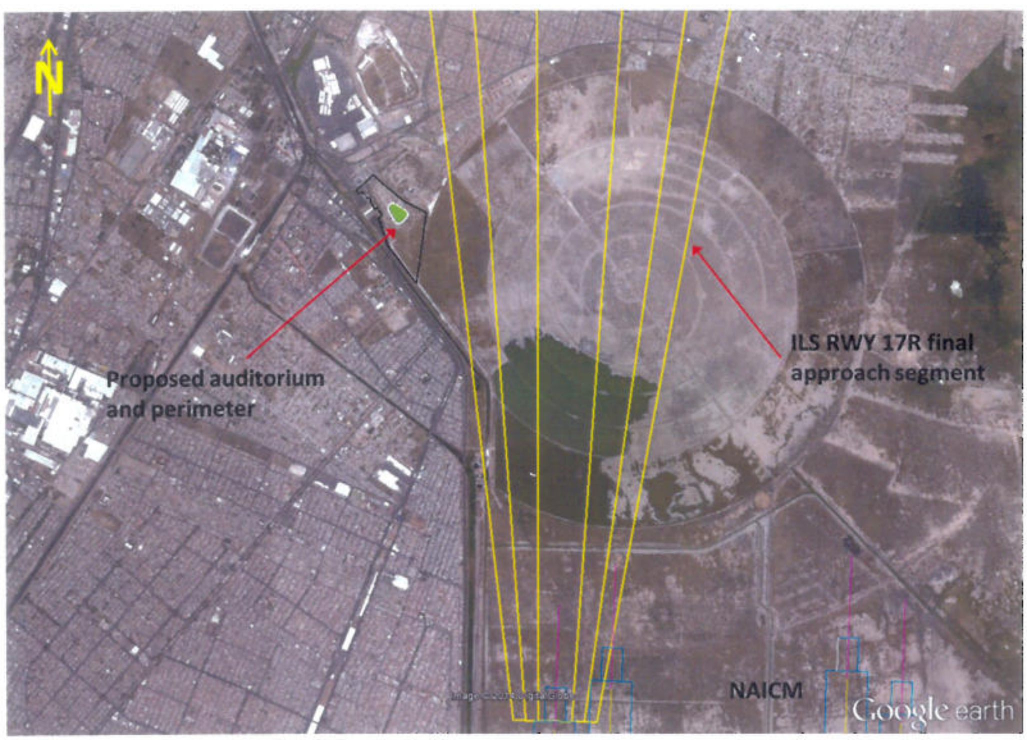
- ILS RWY 17R CAT I
- ILS RWY 17R CAT II/III
- ILS RWY 17L CAT I
- ILS RWY 17L CAT II/III
- ILS RWY 18R CAT I
- ILS RWY 18R CAT II/III
- ILS RWY 18L CAT I
- ILS RWY 18L CAT II/III
- ILS RWY 19R CAT I
- ILS RWY 19R CAT II/III
- ILS RWY 19L CAT I
- ILS RWY 19L CAT II/III

The ILS RWY 17R CAT I and CAT II/III approaches share the same final approach segment surfaces and represent the worst-case southbound approach. As shown in Figure 7, the auditorium and perimeter are outside the lateral confines of this surface. Similarly, MITRE analyzed all of the above-mentioned southbound approaches and determined that the proposed auditorium and perimeter would not impact these procedures.



Source Imagery: Google Earth Pro

Figure 6. ILS RWY 35L CAT II/III Missed Approach



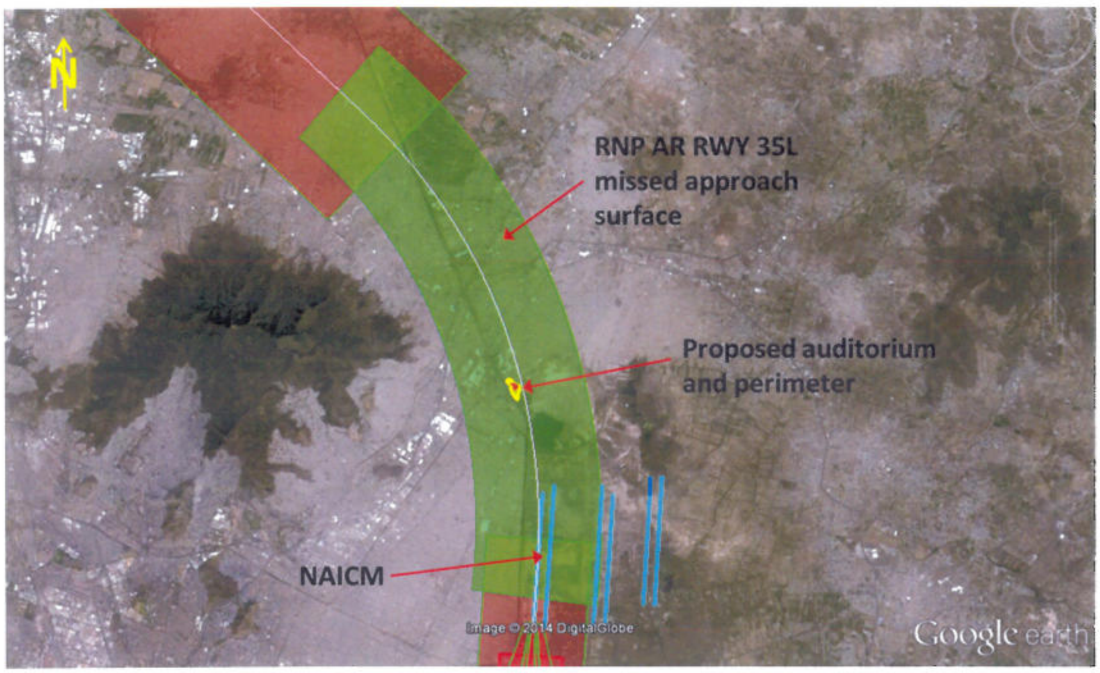
Source Imagery: Google Earth Pro

Figure 7. ILS RWY 17R CAT I and CAT II/III Final Approach

Next, MITRE evaluated the RNP AR approach procedures to the relevant runways at NAICM, which included the following northbound approaches (for which the potential issues could be the penetration by the auditorium and/or perimeter to the missed approach surface):

- RNP AR RWY 35L
- RNP AR RWY 35R
- RNP AR RWY 36L
- RNP AR RWY 36R
- RNP AR RWY 01L
- RNP AR RWY 01R

The RNP AR RWY 35L approach represents the worst-case northbound approach, and is shown in Figure 8. The auditorium and perimeter are within the lateral confines of the missed approach surface. However, they do not penetrate the surface. Similarly, MITRE analyzed all of the above-mentioned northbound approaches and determined that the proposed auditorium and perimeter would not impact these procedures.



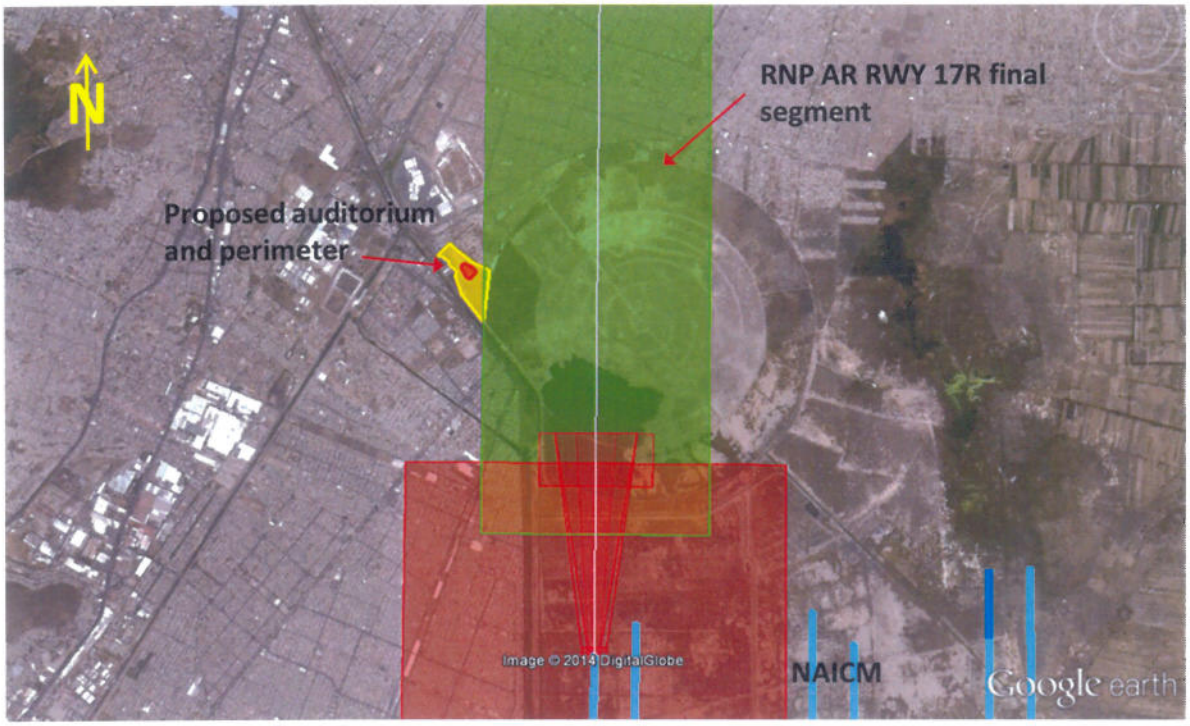
Source Imagery: Google Earth Pro

Figure 8. RNP AR RWY 35L Missed Approach

MITRE evaluated the RNP AR southbound approach procedures, including:

- RNP AR RWY 17L
- RNP AR RWY 17R
- RNP AR RWY 18L
- RNP AR RWY 18R
- RNP AR RWY 19L
- RNP AR RWY 19R

The RNP AR RWY 17R approach represents the worst-case southbound approach, and is shown in Figure 9. The auditorium is completely outside of the lateral confines of the final segment. However, a portion of the perimeter is within the lateral confines of the final segment. Neither the auditorium nor the perimeter penetrates the surface. MITRE analyzed all of the above-mentioned southbound approaches and determined that the proposed auditorium and perimeter would not impact these procedures.



Source Imagery: Google Earth Pro

Figure 9. RNP AR RWY 17R Final Approach

MITRE evaluated applicable northbound conventional and RNAV departure procedures (note: there are multiple departure procedures from each runway). The departures from RWY 35L, which share the same initial climb area criteria in the vicinity of the auditorium and perimeter, represent the worst-case scenario, as shown in Figure 10. While a portion of the perimeter is within the lateral confines of the departure surface, it is significantly lower in elevation than the surface. Therefore, neither the auditorium nor the perimeter impacts the departure procedures at NAICM.

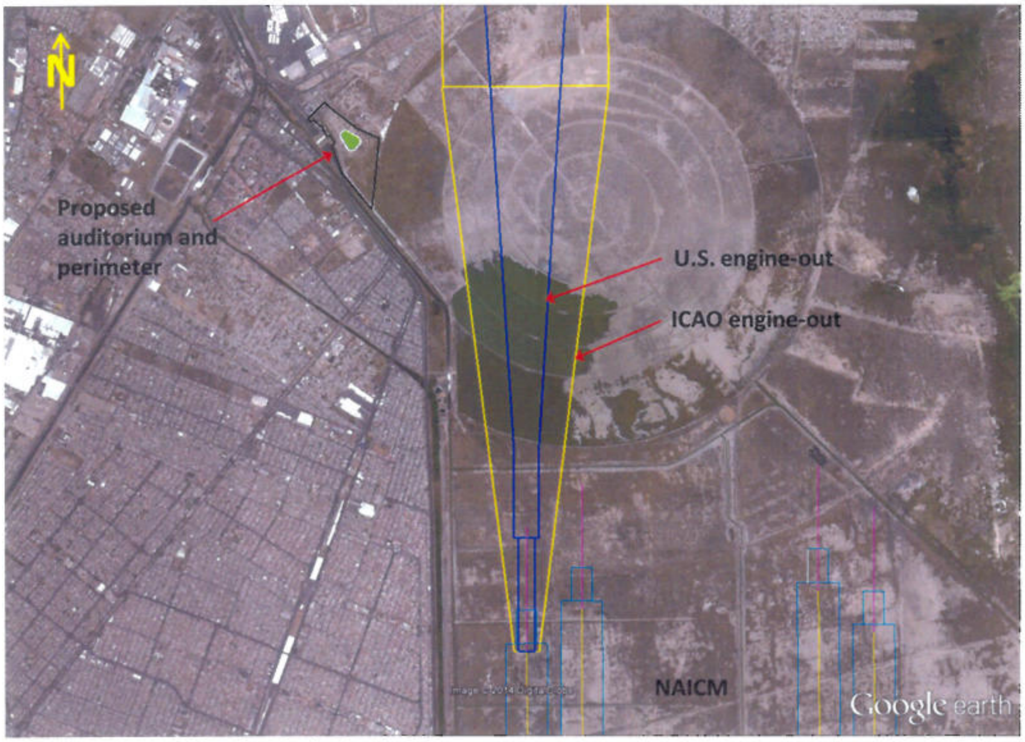
Source Imagery: Google Earth Pro

Figure 10. RWY 35L Departure Initial Climb Area

Evaluation of the Auditorium on Potential Engine-out Obstacle Assessment Areas

MITRE determined if the auditorium and perimeter would be located within or in the vicinity of notional U.S. or ICAO engine-out obstacle assessment areas, which could potentially result in adverse operational impacts on future aircraft operations. Figure 11 shows the notional straight-ahead portion of U.S. and ICAO engine-out obstacle assessment areas for RWY 35L (the runway closest to the auditorium) in relation to the proposed auditorium and perimeter. Neither is located within the lateral confines of the U.S. or ICAO engine-out obstacle assessment areas and therefore, the proposed auditorium and perimeter should not impact these notional engine-out obstacle assessment areas.

It is important to reiterate that airlines are responsible for developing their own engine-out procedures. Therefore, the engine-out procedure and its associated obstacle assessment areas considered by MITRE for its assessment of the auditorium may be different than the procedures and surfaces developed by airlines. Nevertheless, MITRE feels that airlines would likely develop an engine-out procedure for RWY 35L that initially goes straight-ahead for several miles to avoid populated areas for as long as possible, and to allow aircraft to achieve best climb performance.



Source Imagery: Google Earth Pro

Figure 11. RWY 35L U.S. and ICAO Engine-out Obstacle Assessment Areas

Evaluation of the Auditorium on the PAOAS

MITRE conducted an analysis to determine whether the auditorium would penetrate the PAOAS for the westernmost runway at NAICM. More specifically, MITRE examined CAT I and CAT II/III PAOAS for both northbound and southbound procedures. The proposed auditorium and perimeter do not impact the PAOAS at NAICM.

Evaluation of the Auditorium on the MVAC

The auditorium and perimeter are located within two MVAC sectors. The lowest altitude of the two MVAC sectors is 10,400 feet (ft) MSL. Both sectors require 1000 ft of required obstacle clearance. Given the elevation of the proposed auditorium (i.e., 7405.18 ft MSL), neither sector is affected (note: the perimeter also does not affect either sector). Therefore, there are no impacts to the MVAC.

Evaluation of Potential Aircraft Noise Exposure on the Auditorium

MITRE evaluated potential aircraft noise exposure on the auditorium using the previous noise analysis of NAICM. In that previous analysis, three operational scenarios were studied:

1. An opening-day three-parallel runway configuration[1], using flight operations associated with 1530 daily operations;

2. The same three-parallel runway configuration of the above scenario, using flight operations associated with 2360 daily operations (the projected saturation demand for this configuration);

3. A six-parallel runway configuration, using flight operations associated with 3060 daily operations (the projected saturation demand for this configuration).

For each of the three scenarios, north-flow operations and south-flow operations were analyzed separately, i.e., for each case, the airport was modeled as operating in either north flow or south flow for the entire day. The technical details of the previous noise analysis are described in the above-referenced technical letter.

In the U.S., airport noise exposure is governed by Title 14 of the Code of Federal Regulations (CFR), in particular, Part 150, Airport Noise Compatibility Planning, and Title 40 of the CFR, in particular, Parts 1500-1508. The cumulative metric specified is the Day/Night Average Sound Level (DNL, also referred to as L_{dn}), with a level of 65 dBA as the maximum acceptable level for residential areas. However, for other land uses, different levels have historically been used to define acceptability. In particular, for auditoriums and concert halls, noise exposure between 50 and 60 dBA is normally acceptable, while noise exposure greater than 60 dBA is normally unacceptable.

In the previous noise analysis, DNL values of 55, 60, 65, 70, and 75 dBA were generated for the various operational scenarios (although only the 60-75 dBA contours were included in the above-referenced technical letter).

For south-flow operations, the worst-case scenario was Scenario 3 listed above, since this scenario had the highest traffic level and approaches were assumed to land on the westernmost runway (the auditorium would be affected primarily by arrivals in south flow and primarily by departures in north flow). For this scenario, the auditorium could experience noise exposure at approximately the 50 dBA level (see Figure 12), which would be acceptable.

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[1] MITRE's previous noise analysis considered an opening-day three runway configuration consisting of RWYs 35L/17R, 36L/18R, and 01R/19L. However, ASA recently made the decision to include RWY 35R/17L, instead of 35L/17R, in the opening-day three runway configuration. This change affects the results of MITRE's previous noise analysis for Scenarios 1 and 2. The results for Scenario 3, however, are not affected since that scenario considers the ultimate six-runway configuration.

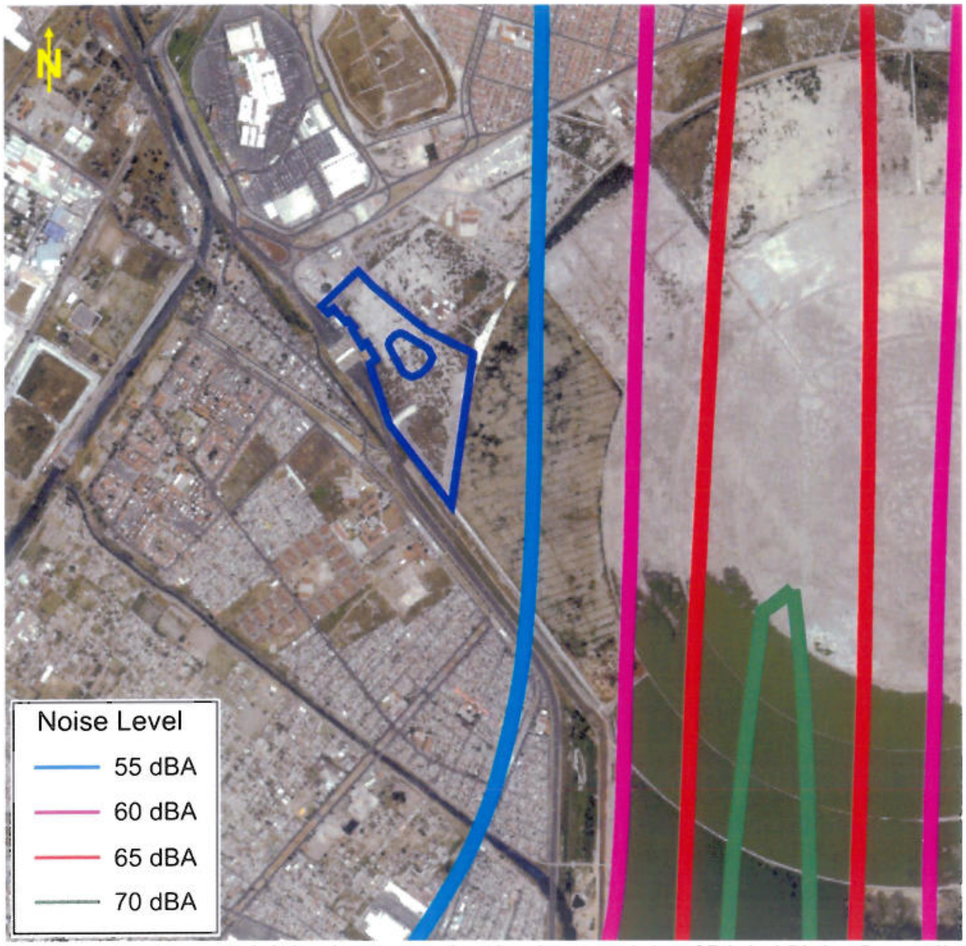

Figure 12. Noise Exposure, South Flow, Scenario 3

For north-flow operations (which will likely be used a high percentage of the time due to the prevailing winds), the noise exposure at the auditorium would be much higher than in south flow. For Scenario 3, the ultimate six-runway configuration with aircraft departing on RWY 35R (i.e., the runway adjacent to the westernmost runway), the auditorium could experience noise exposure at approximately the 60 dBA level, with portions of the auditorium and the eastern portion of the perimeter experiencing slightly higher dBA levels. See Figure 13. These noise levels would be marginally unacceptable.

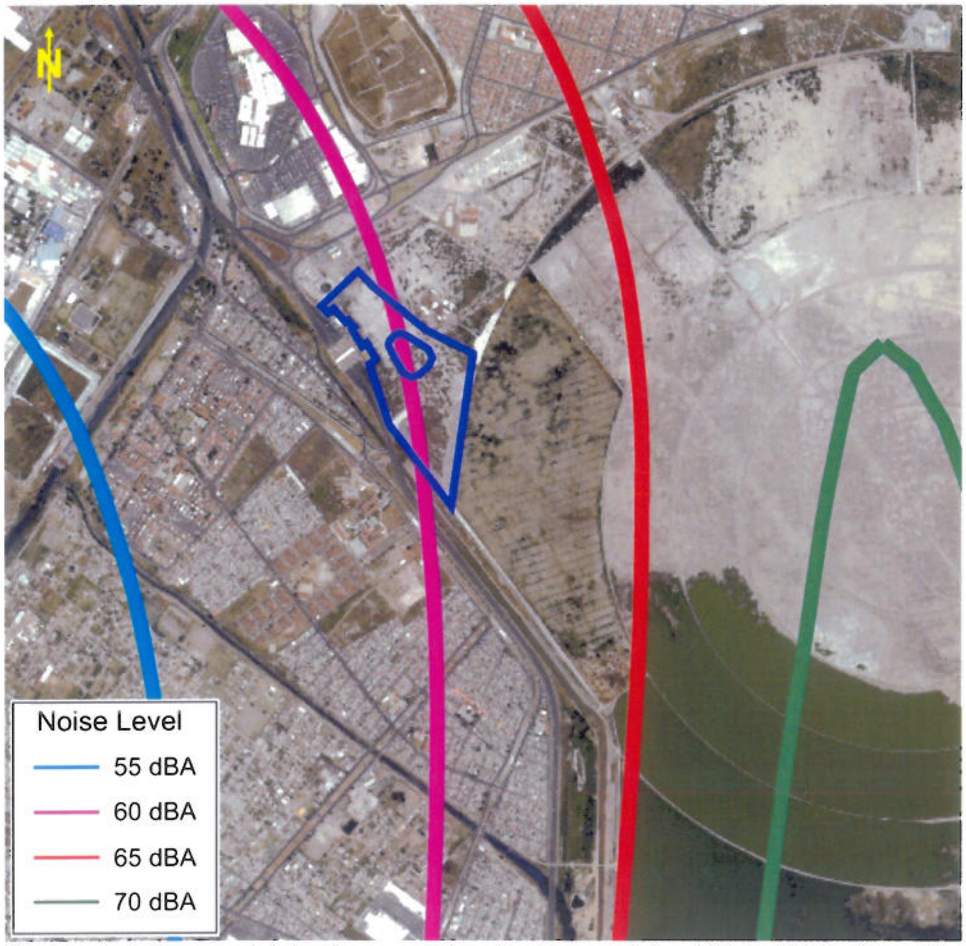

Figure 13. Noise Exposure, North Flow, Scenario 3

Next, although MITRE's previous noise analysis results pertaining to Scenarios 1 and 2 do not apply to the revised opening-day runway configuration at NAICM (i.e., consisting of RWY 35R/17L instead of RWY 35L/17R) by ASA, those results still provide some helpful information. For example, another important consideration is the noise exposure that could occur over the auditorium in the future once RWY 35L/17R is constructed and RWY 35R/17L is closed for maintenance or other reasons. In that case, MITRE's previous noise analysis results pertaining to Scenario 2 (with departures assigned to RWY 35L) would be applicable, as shown in Figure 14. In this case, Scenario 2 shows that the auditorium (including the perimeter) could experience noise exposure at about the 61-63 dBA level, which would be normally unacceptable.

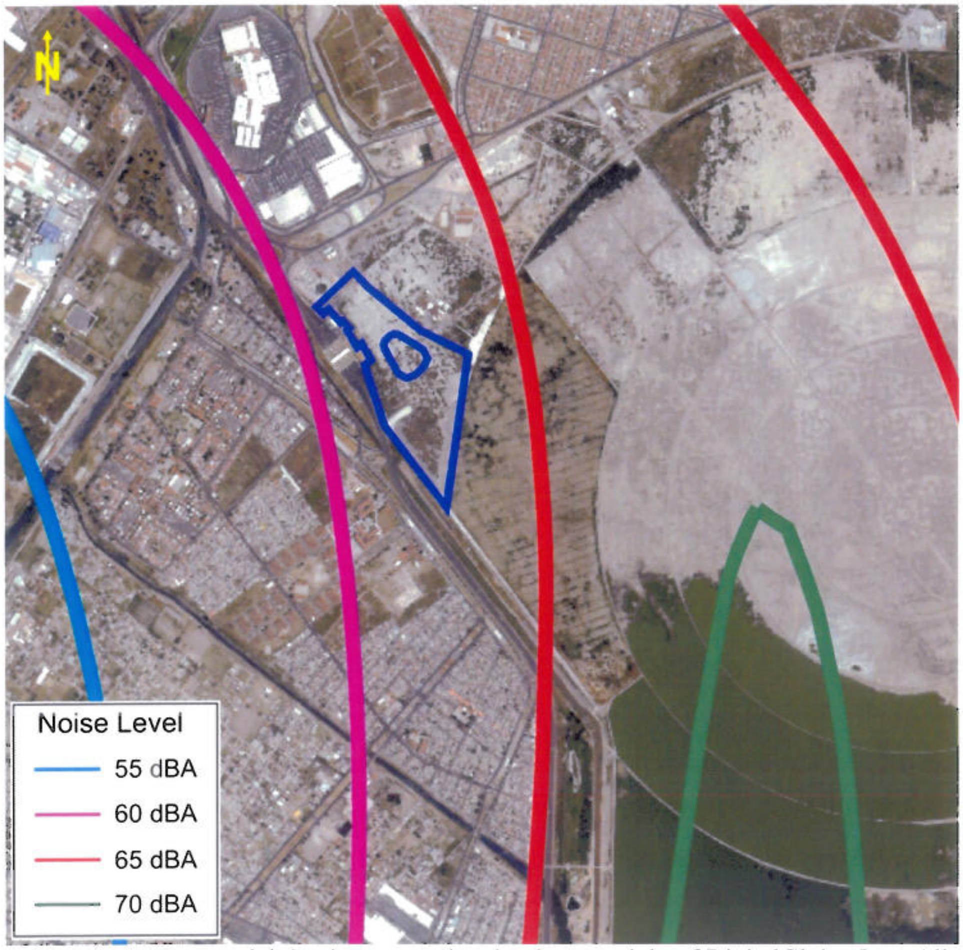

Figure 14. Noise Exposure, North Flow, Scenario 2

Note that the noise exposure actually experienced at the auditorium (including within its perimeter) will be highly dependent on many factors, including the actual number and type of operations, the characteristics of the aircraft fleet operating at NAICM, the operating strategy of the airport (which runways are used for arrivals and which are used for departures) as well as how the individual operations are assigned to each runway, and the actual approach and departure procedures that will be in use when the airport opens. With regard to the approach and departure procedures, MITRE has made several revisions to the candidate procedures being considered at the time of the previous noise analysis, and will likely revise these procedures further as other ongoing procedural and airspace studies may require. Nonetheless, it is expected that the general conclusions from this assessment will remain valid, and that, under north flow, the expected noise exposure at the auditorium (including within its perimeter) could be considered to be marginally unacceptable to potentially unacceptable (in the case of the closure of RWY 35R/17L).

Finally, as with any major international airport, helicopters and small fixed-wing aircraft may also be operating under Visual Flight Rules (VFR) close to NAICM. Several helicopter landing sites (heliports) may be located within the boundary of NAICM for military, government or privately operated helicopters. It is even conceivable that the auditorium itself may have a dedicated heliport. Low altitude VFR routes or corridors may be established to and from these heliports in the future to serve these kinds of operations, although specific locations have not yet been determined. This could place such operations in close proximity to the auditorium with consequent additional noise exposure. It should be noted that pilots operating under VFR are only responsible for avoiding collisions with terrain and man-made obstacles as well as maintaining certain minimum distances from obstacles (unless in the process of taking off and landing). Such distances are significantly lower than those distances normally provided to aircraft operating under Instrument Flight Rules.

Closing Remarks

MITRE's assessment determined that the proposed auditorium and perimeter should not have adverse effects on future aircraft operations at NAICM.

Concerning noise, it is important to note that the expected noise exposure is deemed marginally- to potentially-unacceptable given historical U.S. land-use guidelines. Therefore, consideration should be given to noise mitigation measures, such as soundproofing of the auditorium in order to help reduce potential noise impacts caused by NAICM operations.

It is also important to note that MITRE is not the ultimate approving authority with regard to the construction of buildings. The appropriate aviation authorities of Mexico will need to provide final approval of the construction of the auditorium in relation to future operations at NAICM, as well as current operations in the Mexico City area, which were not assessed by MITRE (recall that the auditorium will be constructed many years before NAICM opens). Finally, as an added margin of safety, MITRE recommends that consideration be given to installing appropriate obstacle lights on the auditorium to improve conspicuity.

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

Sincerely,

Ing. Robert W. Kleinhans
Project Technical Coordinator

cc: Ing. Manuel Ortiz, Edomex
Dr. Bernardo Lisker, MITRE