

27 April 2015  
F500-L15-020

Lic. Manuel Ángel Núñez  
Director General  
Grupo Aeroportuario de la Ciudad de México (GACM)  
Insurgentes Sur 2453, 2do. Piso,  
Col. Tizapán, Del. Álvaro Obregón  
México, D.F., 09730  
México

**Subject: Special Technical Letter: Analysis of a Shift of Runways 1 and 2**

Dear Lic. Núñez:

This document is in response to your correspondence with Dr. Bernardo Lisker regarding the inquiry by Arup of shifting runways 1 and 2 (as counted from west to east) to the west in order to allow for airfield geometry issues to be addressed. MITRE also acknowledges receipt of a letter from Ms. Jackie Coburn of Arup, dated 21 April 2015, transmitted by you, that describes the reason for requesting the shifting of runways 1 and 2 to the west by approximately a minimum of 16 m up to a maximum of 70 m.

A specially assigned MITRE team has worked the whole week on this important matter. As you know, locating appropriately all runways at the Nuevo Aeropuerto Internacional de la Ciudad de México (NAICM) site is extremely challenging due to factors such as surrounding high terrain, airspace issues, land availability constraints, and close noise sensitive areas. These factors made it very difficult for MITRE to establish in the first place the location of the six-runway configuration that it recommended in 2012, and some runways of that configuration already have problems such as high climb gradients on procedures and obstacle considerations. Furthermore, adverse aircraft noise is very close to some residential areas, in particular to the west.

The location of runways 1 and 2 is very close-fitting due to the Sierra de Guadalupe and other obstacles in the city to the west. Also, as mentioned above, shifting runways 1 and 2 to the west would increase noise exposure over the residential areas to the west of the site to unacceptable international levels. As a result, there would likely be even more social protests in the future when trying to construct runway 1, which is something that MITRE is already greatly concerned about. Climb gradient requirements on some procedures would also increase. Airlines do not like such procedures. Precipitous terrain, which can prevent the establishment of advanced approach procedures, is also a concern. In fact, MITRE was glad that the 2012 coordinates were finally adopted, as numerous adjustments were made to advanced approach procedures on the basis of the 2012 coordinates to ensure that precipitous terrain was not a factor. Shifting runways 1 and 2 to

the west would likely re-introduce precipitous terrain issues and prevent the establishment of advanced approach procedures to those runways which are required to avoid high climb gradients on conventional Instrument Landing System (ILS) approaches.

You may recall that there were already other cases where issues could not be resolved due to runway siting limitations. For example, the governor of the State of Mexico (Edomex), Lic. Eruviel Ávila Villegas, requested that MITRE examine the proposed location of an auditorium near El Caracol. Secretary Gerardo Ruiz Esparza asked that MITRE try hard to accomplish this, and a top team tried hard. Yet, in the end, after months of out-of-scope project work, the auditorium could not be allowed as planned. Edomex architects had to significantly change their plans.

In short, there is not much flexibility for locating runways at the site and MITRE's associated procedures are designed on the very margins of what MITRE feels is appropriate. Therefore, based on the above-mentioned considerations it is our very careful conclusion that the position of the runways should not change, and that the runway coordinates associated with the MITRE-recommend runway configuration be utilized.

MITRE understands the importance of planning an efficient taxiway and terminal system, and wants to be as supportive as possible. The MITRE team can investigate if runways 1 and 2 could be shifted slightly to the west. The question for the authorities of Mexico and other stakeholders is if it is worth the time and effort given all the other work that MITRE has to conduct that would have to be postponed and delayed. For example, MITRE would have to delay its examination of Category (CAT) II/III ILS approaches (which is critical so that decisions regarding ILS system acquisition and other related matters can be made) and Area Navigation (RNAV) departures at NAICM. Procedure design work at Cancún, which will be used as a test-bed for conducting independent operations in anticipation of opening NAICM, would also be delayed. Additionally, MITRE would have to re-accomplish work that it is in the process of conducting at this time using the 2012 coordinates. Of course, shifting runway 1 and 2 a few meters is not an issue, but more than 10 m should be fully examined to ensure there are no issues or surprises.

You may remember that in late 2013 MITRE examined the possibility of shifting the entire six-runway configuration farther to the west in order to reduce land acquisition requirements on the eastern side of the site. This was a very quick and cursory examination based on out-of-date survey data from 2010 (MITRE indicated at that time that it would take six or so months to confirm the validity of that new runway configuration). The configuration did not consider advanced navigation procedures. MITRE was glad to hear that the land to the east was acquired and the runways would not have to be shifted so far to the west because, as we know today, there would have been many problems with the design of advanced navigation procedures and excessive noise exposure would have penetrated west into the city.

As MITRE agrees with Arup's concerns, it recommends that the architects working on the terminal building modify their design in order to remove or minimize the airfield geometry issues discussed by Arup. Architects are experts at dealing with issues of space

constraints. For example, Atlanta's terminal complex (a triple approach airport, normally the first or second largest U.S. airport in terms of number of operations) is located between parallel runways spaced 1340 m apart. The architects may be able to make slight modifications that could solve this problem easier than having MITRE analyze runway shifts at this stage of the project, which will take many months of effort and significantly delay other important work.

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

Sincerely,

A handwritten signature in blue ink, appearing to read "Robert W. Kleinhans", with a long, sweeping flourish extending to the right.

Ing. Robert W. Kleinhans  
Project Technical Coordinator