MITRE

Center for Advanced
Aviation System Development

Recommendations and Suggestions for SENEAM's Preliminary Airspace Redesign of Cancún Airport

Informal Working Notes

Prepared for

Servicios a la Navegación en el Espacio Aéreo Mexicano

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1. Introduction

The MITRE Corporation (MITRE) is assisting Aeropuertos y Servicios Auxiliares (ASA) and the aviation authorities of Mexico with the implementation of a new airport, referred to in this document as Nuevo Aeropuerto Internacional de la Ciudad de México (NAICM), to replace the current Aeropuerto Internacional de la Ciudad de México. The proposed runway layout of NAICM will allow for dual- and triple-independent arrival and departure operations. In connection with that, MITRE is assisting the Mexican aviation authorities in implementing dual independent operations at Aeropuerto Internacional de Cancún (hereinafter referred to as CUN). This would provide a significant increase in capacity for CUN when needed to accommodate higher volumes of traffic. Moreover, it would also allow CUN to serve as a test-bed location where Mexican air traffic controllers could obtain an understanding of the issues associated with independent operations, and gain valuable experience for the future implementation of such procedures at NAICM.

MITRE has been working closely with Servicios a la Navegación en el Espacio Aéreo Mexicano (SENEAM) since late 2014 on important matters pertaining to the implementation of dual independent test-bed operations at CUN. For example, a large team of MITRE engineers visited Cancún from 18 through 22 May 2015 to assist SENEAM in the redesign of the CUN airspace to support dual independent operations. The MITRE team has continued to advance on the airspace redesign work for CUN. Most recently, MITRE visited Cancún from 25 through 26 January 2016 to conduct intense planning and coordination sessions and to discuss other project-related matters.

This document, along with its associated appendices, is a reflection of informal working notes discussed during meetings between SENEAM and MITRE to provide feedback and suggestions for consideration by SENEAM on its preliminary airspace redesign for CUN. As a result, SENEAM will be able to continue advancing on its airspace redesign to support dual independent test-bed operations.

2. MITRE's Feedback and Suggestions

MITRE reviewed the CUN and Cozumel International Airport (hereinafter referred to as CZM) routes, the enroute and Terminal Maneuvering Area (TMA) holding locations and altitudes, the proposed partial altitude restrictions, and the Visual Flight Rule (VFR) routes that SENEAM sent to MITRE in July 2015. MITRE's review of this information and data was completed in three stages.

1. Stage One Review: the first stage examined the airspace redesign information that SENEAM provided to MITRE in July 2015

2. Stage Two Review: the second stage concentrated on making recommendations and suggestions on possible improvements to the airspace redesign, such as reducing the track miles associated with the routes which is an important airline consideration

3. Stage Three Review: the third stage tested relevant routes against Federal Aviation Administration (FAA) criteria for Area Navigation (RNAV) equipped aircraft to determine "flyability".

In addition, MITRE has taken the initiative to develop preliminary arrival offload routes and a set of single runway departure routes for those times when the airport would be required to operate with only one runway.

Stage One Review

For the stage one review, MITRE examined the SENEAM-provided routes, holding locations and altitudes, and altitude restrictions associated with the preliminary airspace redesign using the following criteria:

- Route definitions and adherence to independent operations criteria
  - Adequate departure divergence
  - Arrival and departure route pairs for the various directions
  - Confliction points with other routes
- Holding locations and altitudes
  - Containment within Mexican airspace
  - Location of proposed holding, on or near arrival routes
  - Confliction with other routes
- VFR routes
  - Confliction points with Instrument Flight Rule (IFR) routes
- Altitude restrictions
  - Likely ability of aircraft to meet those restrictions
- Existing conventional routes
  - Confliction points with other routes
  - Feasibility to handle dual independent operations

Most of the results of the stage one review are contained in Table 1, with the exception of the feedback on the individual routes, which is provided in Appendix A. Note that Table 1 is organized as follows:

- Column 1 describes the airspace design elements reviewed by MITRE
- Column 2 is a reference number for the issues and feedback
- Column 3 describes MITRE's feedback

Appendix B contains MITRE's suggested definitions for the arrival offload routes and the single runway departure routes, along with a depiction of the original route and its associated offload or single runway departure route.

Note that all waypoint and navigational aids in this document are based on the Mexican Aeronautical Information Publication dated January 2016.

Table 1. MITRE's Stage One Feedback

Airspace Design Element	Ref No	MITRE's Feedback
General	1	The coordinates for the waypoint URVEN in the spreadsheet "MMUN & MMCZ procedures" are not the same as what is in the AIP. MITRE has chosen to use the coordinates that are in the AIP for that waypoint.
	2	The coordinates for the waypoint AXENI from the Jeppesen database are not the same as those in the AIP. MITRE has chosen to use the coordinates that are in the AIP for that waypoint.
	3	MITRE used the coordinates for CZM Runway 29 that were in the AIP.
	4	A new arrival route to CUN for Runway 12R was developed for aircraft coming from CZM as a result of the modification of moving the arrival route from WP10797 (CUN ARR S 12R).
	5	The waypoint WP10834 was combined with WP10836 due to the small distance between the waypoints.
	6	The departure routes proposed by SENEAM to URVEN from CZM and the departure route to CZM W from CZM were deleted since it was assumed that these routes were the same as the CZM DEP SW 11 and CZM DEP S 29, respectively, and both routes are not necessary. If this is not the case please let MITRE know and we will evaluate the URVEN and CZM W routes.
	7	Are the CZM arrival and departure routes allowed to go through the unofficial SUA?
CZM Runway 11 Routes	8	The arrivals and departures are not separated and need to have altitude restrictions applied when the same waypoint is used for both entry into the TMA and exit from the TMA at AXENI and WP10797.
	9	MITRE made the assumption that the new departure route that goes to AXENI would join the enroute airways to exit the ACC through SIGMA, TAKUX, or DANUL.
	10	The turn at WP10821 for CZM DEP CZA 11 to the west does not separate the aircraft from the CZM downwind that is formed by the CZM ARR AXENI 11 and CZM ARR S 11 routes. See the CZM DEP CZA 11 route in Appendix A for routing suggestions.
	11	The arrival merge at waypoint CZM 11 A is merging 3 routes together which is fine for low volume merge locations but as traffic grows then this can cause problems. See the CZM ARR NW 11 and CZM ARR EMOSA 11 routes in Appendix A for routing suggestions.
	12	The arrival merge at CZM 11 E is merging 3 routes together which is fine for low volume merge locations but as traffic grows then this can cause problems. See the CZM ARR SW 11 and CZM ARR CTM 11 routes in Appendix A for routing suggestions.
	13	CZM DEP AXENI 11 and CUN ARR DANUL 12R would have aircraft that would be head on, need to ensure separation. See CUN ARR DANUL 12R route in Appendix A for routing suggestions.
	14	Is the departure route to URVEN the same as the CZM DEP SW 11 route? If so, then MITRE recommends that SENEAM delete the route to URVEN unless the intent is to end the departure route there. MITRE did not review the URVEN route.
CZM Runway 29 Routes	15	Is the CZM DEP SW 29 route the same as the CZM DEP CZA 29 route? If so, then MITRE recommends that you delete CZM DEP SW 29 unless the intent is to end the departure route there. The MITRE comments for CZM DEP CZA 29 then would apply to the CZM DEP SW 29 route.
	16	The CZM DEP CZA 29 route crosses the arrival routes for Runway 29 twice for the arrivals from the WP10797 and WP10819 and would probably need to cross under the arrival routes both times. This is a long way for departures to be held down. See the CZM DEP CZA 29 route in Appendix A for routing suggestions.
	17	The arrival merge at CZM 11 E is merging 3 routes together which is fine for low volume merge locations but as traffic grows then this can cause problems. See the CZM ARR SW 29 and CZM ARR CTM 29 routes in Appendix A for routing suggestions.
	18	The merge at CZM 11 A is very close to the merge at CZM 11 E. MITRE suggests spacing the two merges out more. See the CZM ARR NW 29 and CZM ARR EMOSA 29 routes in Appendix A for routing suggestions.
	19	The picture for CZM ARR SW 29 shows a different route definition than what is in the text. MITRE assumed that the picture is correct and used that for the analysis.
	20	There is no proposed departure route to the south east to match up with the AXENI and CZM ARR S 29 routes. The departure route could come from WP10868 to CZM 11 F and TAKUX or from WP10867 to DANUL for the high performing aircraft. The low performing aircraft could use WP10867 for all of the three waypoints.
	21	The downwind for the arrivals for Runway 29 at CZM goes through the unoffical SUA. This would cause a problem if the SUA was active and CZM was operating in the Runway 29 direction. One resolution would be to change the dimentions of the unoffical SUA which would require negotiation with the military.

Table 1. MITRE's Stage One Feedback (Continued)

Airspace Design Element	Ref No	MITRE's Feedback
CUN Runway 12 Routes	22	Does the CUN DEP CZM 12R departure route continue past CZM to WP10797? If not then a possible routing would be to depart CUN to CUN 12D..CZM 11 E..WP10797 if the desire is to have a dedicated departure route to CZM.
	23	CUN DEP CZA 12R is too close laterally to the CUN DEP CZM 12R route and aircraft would be head on with CUN ARR CZM 12R. MITRE modified the CUN DEP CZA 12R route to ensure separation (near WP10812). See the CUN DEP CZA 12R route in Appendix A for routing suggestions.
	24	CUN ARR DANUL 12R and CZM DEP AXENI 11 would have aircraft that would be head on. MITRE modified the CUN ARR DANUL 12R route to ensure separation. See the CUN ARR DANUL 12R route in Appendix A for routing suggestions.
	25	CUN ARR DANUL 12R and CUN ARR SIGMA 12R are too close laterally to CUN DEP TAKUX 12R and CUN DEP DANUL 12R routes. MITRE modified the CUN ARR DANUL 12R, CUN ARR SIGMA 12R, CUN DEP TAKUX 12R, and the CUN DEP DANUL 12R routes (near WP10811 and WP SUR A) to ensure separation. See the CUN ARR DANUL 12R, CUN ARR SIGMA 12R, CUN DEP TAKUX 12R, and CUN
	26	The arrivals and departures are not separated and need to have an altitude restrictions when the same waypoint is used for both entry into the TMA and exit from the TMA at DANUL.
	27	Departure routes do not diverge by 15 degrees. MITRE adjusted the routes so that the departure routes would diverge by 15 degrees, see departure routes for 12R in Appendix A for routing suggestions.
CUN Runway 30 Routes	28	There is an arrival route from the south over WP10797 but there is no departure route in that direction. Should there be a departure route to the south?
	29	routes. See the CUN DEP NUKAN 30R and the CUN DEP NUDAL 30R routes in Appendix A for routing suggestions.
	30	The CUN ARR DANUL 30L, CUN ARR SIGMA 30L, CUN DEP DANUL 30L, CUN DEP TAKUX 30L, and the CZM departure routes to the north from Runway 29 create a complex area. See the CUN ARR DANUL 30L and CUN ARR SIGMA 30L routes in Appendix A for routing suggestions.
	31	Does the CUN DEP CZM 30L departure route continue past CZM to WP10797? If not then a possible routing would be to depart CUN to WP10839..CZM 11 E..WP10797.
	32	The arrivals and departures are not separated and need to have an altitude restrictions when the same waypoint is used for both entry into the TMA and exit from the TMA at DANUL.
Altitude Restriction	33	When establishing altitude restriction for routes it is advisable to have the restriction type to be an *"at or below"* or an "*at or above*" rather than an *"at altitude" restriction*. The *"at or below"* or *"at or above"* restriction types provides flexibility for the climb or descent rates.
	34	Altitude restrictions needed for vertical separation must be set at least 3 nautical miles (NMs) prior to the crossing point for arrival routes and 3 NMs after the crossing point for departure routes to ensure separation.
	35	All of the altitude restrictions should be redetermined if SENEAM accepts the route modifications suggested by MITRE.
Enroute Holding	36	For the holding at 201358N/0854204W (new holding point 1), why is it not on the DANUL arrival route?
	37	The proposed protected airspace for the holding altitude of FL210 would not be contained within the Mérida ACC airspace.
	38	If CUN is landing in the Runway 30 direction, the TMA would need to be holding the aircraft at the new holding point 1 so that the aircraft can get descend with sufficient track mileage to land.
	39	Does SENEAM intend to hold for the arrival traffic over WP10797 at the holding point 1940455N/0864520W (new holding point 2)?
	40	The aircraft over SIGMA would need to make a 90 degree turn to join the holding pattern at new holding point 2
	41	The proposed protected airspace for the holding altitude of FL210 would not be contained within the Mérida ACC airspace. MITRE suggestes that the holding point is moved to WP10797.
	42	There is no holding pattern for any arrivals from the northeast. How would these aircraft be held if it becomes necessary?

Table 1. MITRE's Stage One Feedback (Concluded)

Airspace Design Element	Ref No	MITRE's Feedback
Existing Conventional Routes	43	The existing departure routes do not diverge by 15 degrees.
	44	The intercept altitudes for the turn onto final at CUN is not located far enough from the arrival threshold for dual independent arrival operations.
	45	The existing turn-on altitudes do not keep aircraft separated vertically until the aircraft are transferred to the tower.
	46	The existing CZM conventional routes can be used with the new route design for CZM.
	47	The existing conventional CUN arrival route over VITAR for Runway 30 could work with the proposed routes as this procedure puts the aircraft on the downwind for Runwy 30R.
VFR Routes	48	No issues.
TMA Holding Locations and Altitudes	49	MITRE recommends that SENEAM use radar holding instead of published procedural holding as the TMA holding is for non-daily holding needs. The controller would determine the location and the altitude at which aircraft would hold. The amount of airspace to be protected would not need to be as large since the controller would still be providing radar services.
	50	If published procedural holding is desired additional work would need to be done to ensure that the procedural holding locations and altitudes are appropriate. Does SENEAM wish to conduct procedural holding inside the TMA?

Stage Two Review

For the stage two review, MITRE examined the routes to identify ways to decrease the track miles that an aircraft would fly on the routes and to suggest potential solutions to issues found in the stage one review. The suggested route definitions based on MITRE's stage 2 review can be found in Appendix A.

In Appendix A, the MITRE-suggested route definitions are presented to the right of the SENEAM route definitions. Waypoints that have been changed are highlighted in green. In the cases where the route has been modified to resolve an issue or to decrease the route track miles, MITRE provided a picture of the SENEAM route, shown as a solid line, and the MITRE-modified route, shown as a dashed line. An explanation of why the route was modified, "Rationale of Modification", is also provided. For the cases where MITRE did not make any changes to SENEAM's route definition, only SENEAM's route definition table is shown along with any graphic that SENEAM provided with their route definition.

In all but two cases, a new waypoint was created instead of moving a previously defined waypoint if a route was moved to a new location. The two exceptions are WP10804, a waypoint associated with the CUN departures from Runway 12L and WP7867, and a waypoint associated with CUN arrivals to Runway 12R. WP10804 was modified to ensure that the departures from Runway 12L would fly the extended runway centerline ensuring separation from Runway 12R departures. WP7867 was modified to allow the downwind for Runway 12R at CUN to parallel the final approach course. It was possible that this waypoint was moved accidently and this modification relocates the waypoint to the appropriate position. (Please note that the waypoint coordinates are now provided in greater accuracy due to the greater accuracy that is needed for procedure designer purposes.) In recommending route modifications, MITRE used the same TMA entry and exit points that had been agreed upon between the SENEAM Cancún TMA and Mérida Area Control Center (ACC) airspace designers.

Table 2 shows the distances aircraft would fly on the SENEAM-proposed routes and the MITRE-suggested routes for CUN. Table 3 shows the distances aircraft would fly on the

SENEAM-proposed routes and the MITRE-suggested routes for CZM. All of the distances are given in nautical miles (NM) for each of the routes where a route was moved laterally. A negative difference value represents a reduction in the reduction in track miles. Not all of the routes show a reduction in track miles due to the need to accommodate and separate other routes and for reduction in complexity.

Table 2. CUN Track Mile Differences

Route Name	SENEAM-Proposed	MITRE-Suggested	Difference (NM)
CUN ARR DANUL 12R	142.15	131.99	-10.16
CUN ARR DANUL 30L	114.22	100.81	-13.41
CUN ARR S 12R	110.64	110.66	0.02
CUN ARR S 30L	108.62	91.69	-16.93
CUN ARR SIGMA 12R	121.10	119.12	-1.98
CUN ARR SIGMA 30L	93.19	95.42	2.23
CUN DEP CZA 12R	101.83	98.60	-3.23
CUN DEP DANUL 12R	100.23	99.62	-0.61
CUN DEP DANUL 30L	117.60	119.51	1.91
CUN DEP N 12L	58.17	59.05	0.88
CUN DEP N 12L 2	61.66	59.99	-1.67
CUN DEP N 30R 2	49.94	49.77	-0.17
CUN DEP NUDAL 30R	82.35	85.46	3.11
CUN DEP NUKAN 30R	75.69	78.57	2.88
CUN DEP TAKUX 12R	80.93	83.03	2.10
CUN DEP TAKUX 30L	95.37	95.38	0.01
Total	1513.69	1478.67	-35.02

Note: A negative value is a reduction in distance flown assuming that the aircraft flies the route as designed

Table 3. CZM Track Mile Differences

Route Name	SENEAM-Proposed	MITRE-Suggested	Difference (NM)
CZM ARR AXENI 11	77.28	78.22	0.94
CZM ARR CTM 11	62.05	64.46	2.41
CZM ARR CTM 29	93.16	85.77	-7.39
CZM ARR EMOSA 11	116.75	119.14	2.39
CZM ARR EMOSA 29	158.12	156.11	-2.01
CZM ARR NW 11	75.04	73.65	-1.39
CZM ARR NW 29	114.99	110.62	-4.37
CZM ARR S 11	84.23	85.17	0.94
CZM ARR SW 11	54.70	57.84	3.14
CZM ARR SW 29	85.80	82.87	-2.93
CZM DEP CZA 11	94.25	94.73	0.48
CZM DEP N 11	99.18	107.60	8.42
CZM DEP N 11 2	90.91	100.44	9.53
CZM DEP NUKAN 11	89.16	101.54	12.38
CZM DEP S 11	51.58	51.17	-0.41
CZM DEP CZA 29	94.44	85.59	-8.85
CZM DEP N 29	157.34	155.53	-1.81
CZM DEP N 29 2	149.06	148.47	-0.59
CZM DEP N 29 Low Performing Aircraft	112.59	111.25	-1.34
CZM DEP N 29 2 Low Performing Aircraft	104.31	104.19	-0.12
CZM DEP NUKAN 29	147.32	144.04	-3.28
CZM DEP NUKAN 29 Low Performing Aircraft	102.57	99.76	-2.81
Total	2214.83	2218.16	3.33

Note: A negative value is a reduction in distance flown assuming that the aircraft flies the route as designed

Stage Three Review

The stage three review preliminarily tests the "flyability" of the routes for CUN and CZM. MITRE's airspace design tool has the capability to evaluate RNAV routes and procedures against FAA RNAV criteria to determine if the route or procedure is flyable. The tool uses multiple different user-defined aircraft performance sets. The aircraft performance sets that were used in this evaluation includes a large jet (e.g., B757) with a maximum cruise altitude of flight level (FL) 390, a heavy jet (e.g., B745), a low-performing large jet that has a maximum cruise altitude of FL330, and a small jet (e.g., BE40). This review is the first step in testing the RNAV

routes to determine if they are flyable as designed. If the RNAV route fails this test then the route is modified and tested again. If the route then passes, additional testing with increased fidelity (e.g., through the use of Flight Management Systems) may need to be done before implementation. Each of the RNAV routes were tested and passed therefore no route modifications were needed and the routes appear to be flyable. Of course, as stated above, higher fidelity testing may need to be conducted later on prior to implementation.

Arrival Offload and Single-Runway Departure Routes

MITRE developed preliminary arrival offload routes to help balance the runways, as well as single runway departure routes. The arrival offload routes enter the TMA at the same entry point as the normal arrival route and follows the same path until closer to the airport. The arrival offload route would diverge and deliver the aircraft to the opposite runway. For instance, the route definition for "CUN ARR DANUL 12R" has aircraft on this route going to Runway 12R at CUN. This arrival route's offload route, named "CUN ARR DANUL 12R Offload to 12L", delivers aircraft to Runway 12L instead. The suggested arrival offload route definitions can be found in Appendix B. Each of the figures in Appendix B contain the route name, airport, flight type, route definition in degrees, minutes, and seconds as well as decimal degrees, and a picture of both the normal arrival route and its corresponding offload route. In the picture, the normal arrival route is depicted in a dotted purple line and the arrival offload route is depicted in a solid yellow line. The arrival offload routes were built for both runway operating directions at CUN.

Appendix B also contains suggestions for departure routes that would be used when CUN is operating with only a single departure runway. For instance, when CUN is operating with two departure runways, a departure route to the west is CUN DEP CZA 12L which departs CUN using Runway 12L. When CUN is operating with only one runway then the departure route would depart Runway 12R instead. The development of departure routes from a single runway was done for all of the departure routes at CUN. The same information (e.g., route definition, latitude and longitude coordinates for each fix in the route definition in both degrees minutes and seconds and decimal degrees, and a graphic of the departure route) is presented in each of the figures in Appendix B. The suggested single runway departure route in the picture is designated by a red dotted line, while the dual independent departure route is shown as a purple solid line.

Appendix A

This appendix contains information on the route definitions for the SENEAM-MITRE airspace design work for the Cancún/Cozumel TMA that would introduce dual independent test-bed operations at CUN. For the routes that MITRE made no modifications to the SENEAM route definitions, only SENEAM's route definition table and graphic (if provided) is shown. For the routes that MITRE is suggesting modifications to the SENEAM route definitions, both the SENEAM route definition and graphic (if one was provided) and the MITRE-suggested route definition and graphic showing the difference in the routes are provided.

The SENEAM route definition is contained in the table on the left in the figure. These routes were developed during the SENEAM-MITRE airspace design workshop and contain SENEAM's subsequent modifications highlighted in yellow. The second table contains MITRE's suggested route definition with the fix modifications highlighted in green. For some of the SENEAM route definitions, SENEAM supplied a graphic of the route which is under the route definition table. MITRE followed this practice and included a graphic showing the difference between SENEAM's routes and MITRE's suggested routes under MITRE's route definition table.

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CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

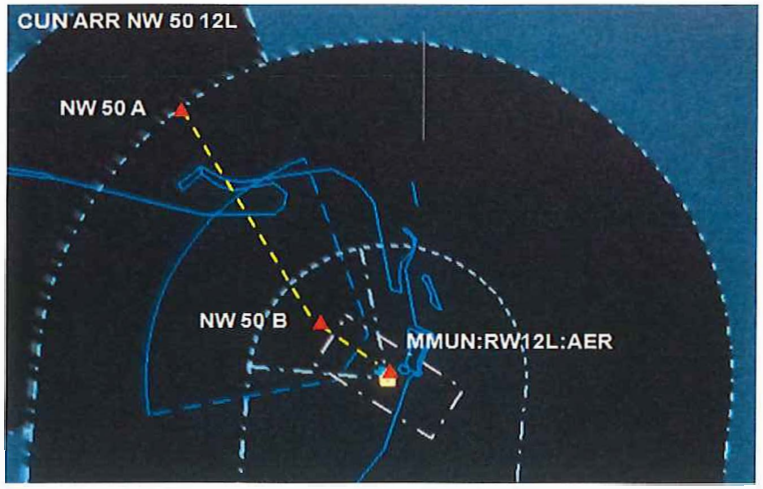
Route:CUN ARR nw 50 12L

Airport: MMUN

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
NW 50 A	N21° 41' 08"	W087° 24' 15"	21.6855	-87.4041
NW 50 B	N21° 09' 18"	W087° 02' 33"	21.1383	-87.0425
MMUN:RW12L:AER	N21° 03' 17"	W086° 52' 53"	21.0547	-86.8813

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
NW 50 A	N21° 41' 08.00"	W087° 24' 15.00"	21.6855	-87.4041
WP 30A	N21° 20' 05.00"	W087° 09' 50.00"	21.3348	-87.164
NW 50 B	N21° 09' 18.00"	W087° 02' 33.00"	21.1383	-87.0425
MMUN:RW12L:AER	N21° 03' 17.00"	W086° 52' 53.00"	21.0547	-86.8813

Rationale for modification: added WP 30A to route to accommodate the offload route



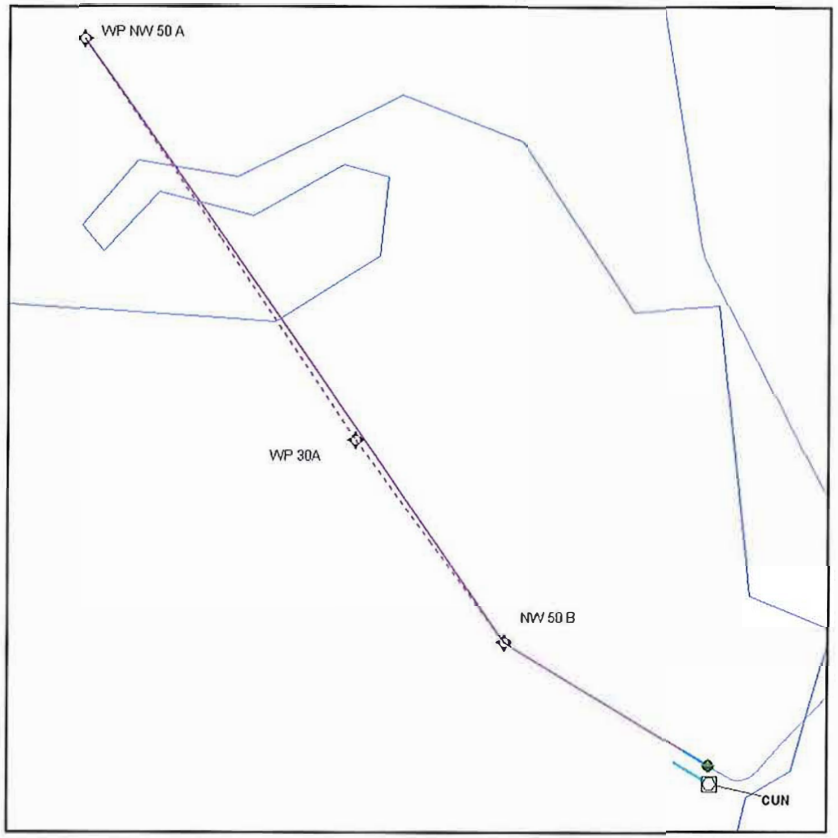
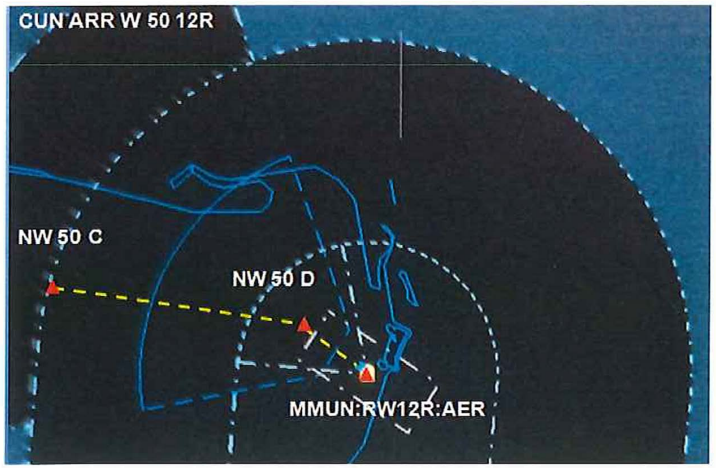


Figure A-1. CUN Runway 12L: CUN ARR NW 50 12L

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CUN ARR 50W 12R
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP W 50 C	N21° 13' 23"	W087° 43' 40"	21.223	-87.7277
WP W 50 D	N21° 08' 45"	W087° 03' 09"	21.1458	-87.0525
MMUN:RW12R:AER	N21° 02' 43"	W086° 53' 28"	21.0452	-86.8911



	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP W 50 C	N21° 13' 23.00"	W087° 43' 40.00"	21.223	-87.7277
WP 30 E	N21° 10' 10.37"	W087° 15' 50.59"	21.1695	-87.264
WP12902	N21° 09' 04.96"	W087° 06' 32.22"	21.1513	-87.1089
WP W 50 D	N21° 08' 45.00"	W087° 03' 09.00"	21.1458	-87.0525
MMUN:RW12R:AER	N21° 02' 43.22"	W086° 53' 27.66"	21.0453	-86.891

Rationale for modification: added WP 30 E and WP12902 to route to line up offload route

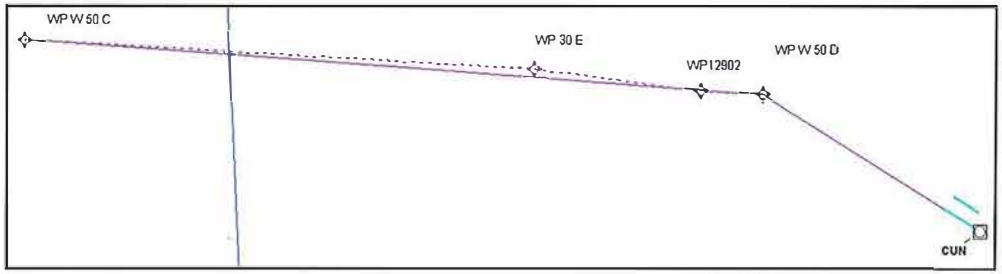


Figure A-2. CUN Runway 12R: CUN ARR 50W 12R

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CUN ARR NOSAT 12L

Airport: MMUN

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
NOSAT	N21° 57' 49"	W085° 58' 52"	21.9636	-85.9811
LETIS	N21° 31' 43"	W086° 23' 24"	21.5286	-86.39
WP7862	N21° 06' 39"	W086° 48' 38"	21.1108	-86.8105
WP7863	N21° 14' 40"	W087° 01' 27"	21.2444	-87.0241
WP7860	N21° 11' 21"	W087° 03' 53"	21.1891	-87.0647
WP NW 50 B	N21° 09' 18"	W087° 02' 33"	21.155	-87.0425
MMUN:RW12L:AER	N21° 03' 17"	W086° 52' 53"	21.0547	-86.8813

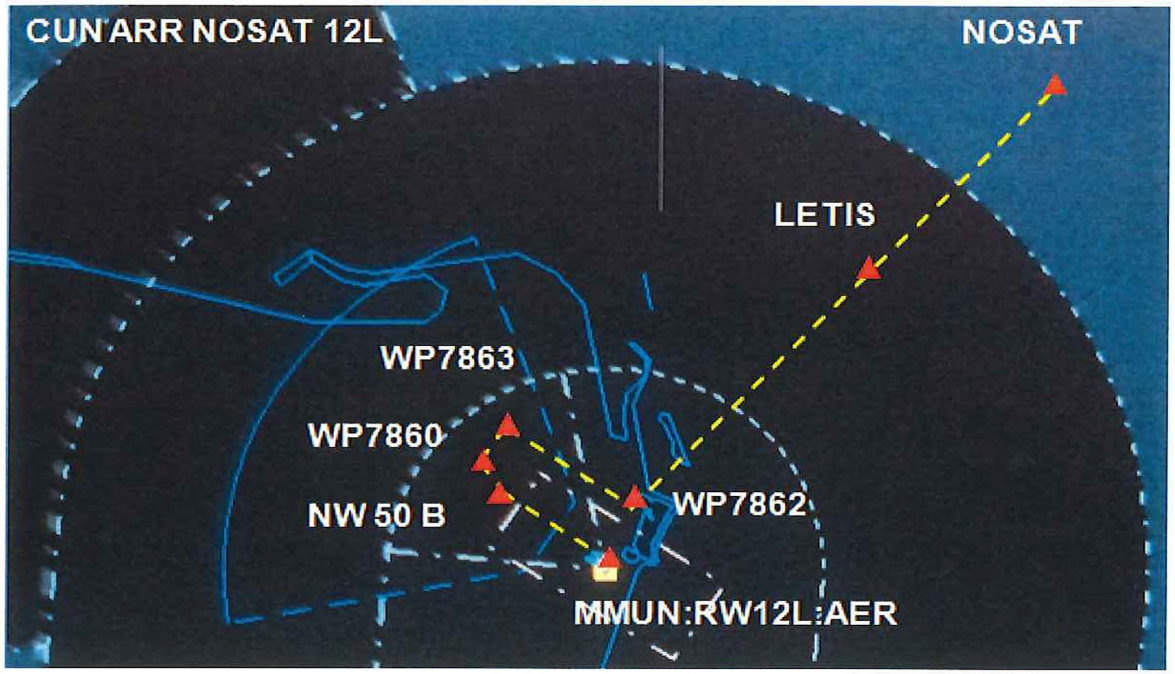


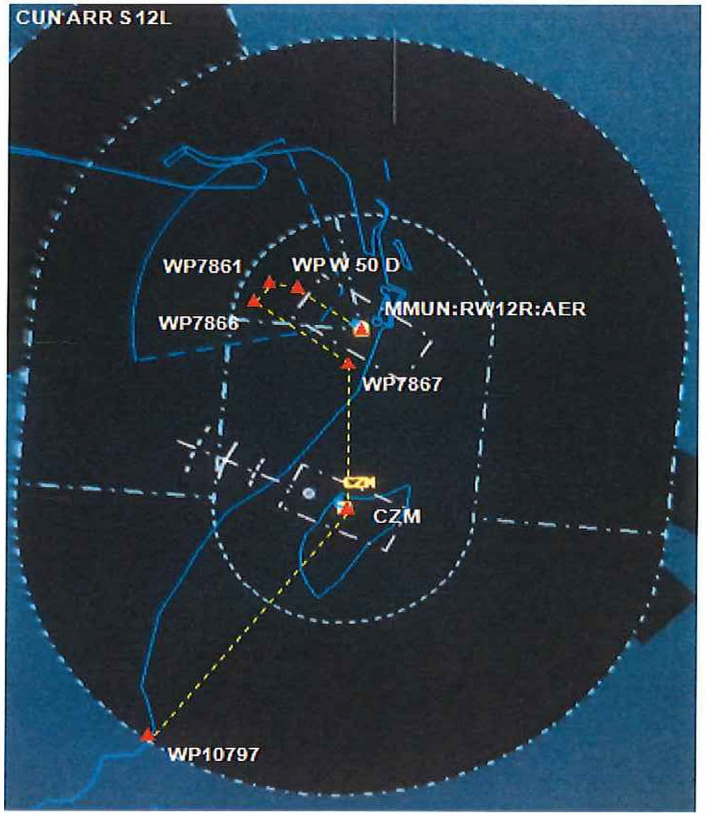
Figure A-3. CUN Runway 12L: CUN ARR NOSAT 12L

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CUN ARR S 12R
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10797	N19° 51' 22"	W087° 27' 49"	19.8561	-87.4636
CZM	N20° 30' 27"	W086° 54' 43"	20.5075	-86.9119
WP7867	N20° 57' 28"	W086° 54' 41"	20.9577	-86.9113
WP7866	N21° 05' 43"	W087° 07' 53"	21.0952	-87.1313
WP7861	N21° 09' 06"	W087° 05' 37"	21.1516	-87.0936
WP W 50 D	N21° 08' 45"	W087° 03' 09"	21.1458	87.0525
MMUN:RW12R:AER	N21° 02' 43"	W086° 53' 28"	21.0452	-86.8911

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10797	N19° 51' 21.59"	W087° 27' 49.12"	19.8559	-87.4636
CUN 12 B	N20° 49' 13.22"	W086° 52' 05.96"	20.8203	-86.8683
WP27783	N20° 53' 53.53"	W086° 48' 58.81"	20.8982	-86.8163
WP7866	N21° 05' 43.19"	W087° 07' 53.46"	21.0953	-87.1315
WP7861	N21° 09' 06.49"	W087° 05' 37.07"	21.1518	-87.0936
WP W 50 D	N21° 08' 45.00"	W087° 03' 09.00"	21.1458	-87.0525
MMUN:RW12R:AER	N21° 02' 43.22"	W086° 53' 27.66"	21.0453	-86.891

Rationale for modification: decrease track miles and merge wih arrival route from CZM and TAKUX



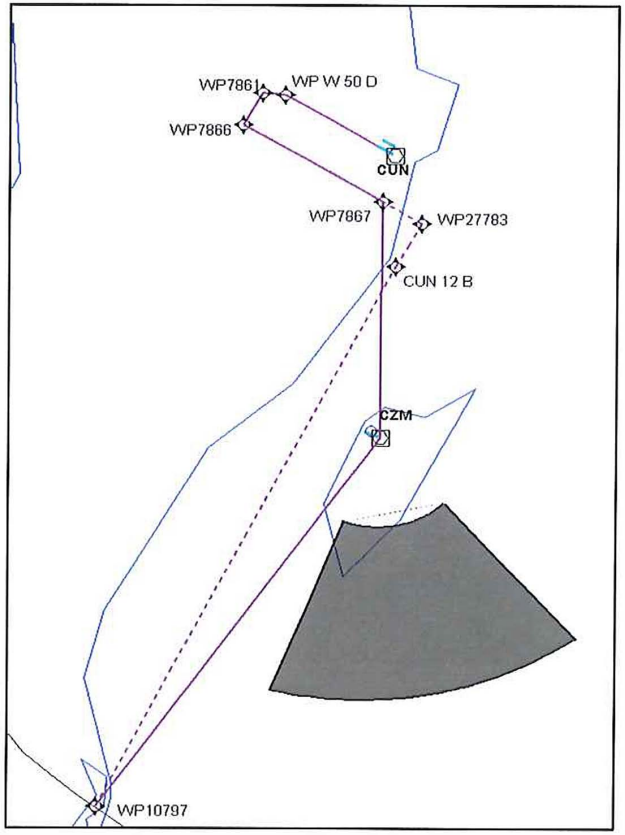


Figure A-4. CUN Runway 12R: CUN ARR S 12R

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

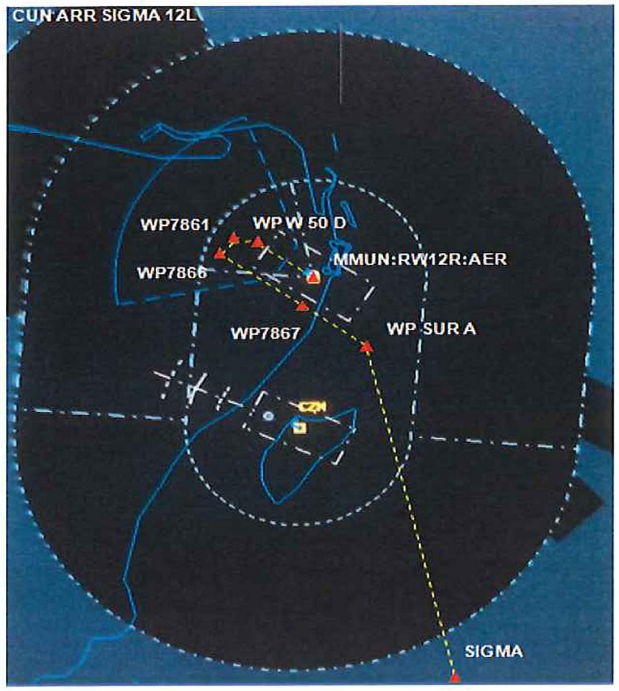
Route:CUN ARR SIGMA 12R

Airport: MMUN

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
SIGMA	N19° 37' 02"	W086° 22' 00"	19.6172	-86.3666
WP SUR A	N20° 48' 40"	W086° 41' 03"	20.8111	-86.6841
WP7867	N20° 57' 28"	W086° 54' 41"	20.9577	-86.9113
WP7866	N21° 05' 43"	W087° 07' 53"	21.0952	-87.1313
WP7861	N21° 09' 06"	W087° 05' 37"	21.1516	-87.0936
WP W 50 D	N21° 08' 45"	W087° 03' 09"	21.1458	-86.8911
MMUN:RW12R: AER	N21° 02' 43"	W086° 53' 28"	21.0452	-86.8911

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
SIGMA	N19° 37' 02.00"	W086° 22' 00.00"	19.6172	-86.3666
WP27783	N20° 53' 53.53"	W086° 48' 58.81"	20.898203	-86.816336
WP7867	N20° 56' 29.58"	W086° 53' 8.08"	20.94155	-86.885578
WP7866	N21° 05' 43.19"	W087° 07' 53.46"	21.0953	-87.1315
WP7861	N21° 09' 06.49"	W087° 05' 37.07"	21.1518	-87.0936
WP W 50 D	N21° 08' 45.00"	W087° 03' 09.00"	21.1458	-87.0525
MMUN:RW12R:AER	N21° 02' 43.22"	W086° 53' 27.66"	21.0453	-86.891

Rationale for modification: moved the CUN DANUL Runway 12 arrivals to not fly head on with the CZM AXENI Runway 11 departures and moved this route to merge with the CUN DANUL route before joining the downwind and increased distance between CUN departures and this arrival



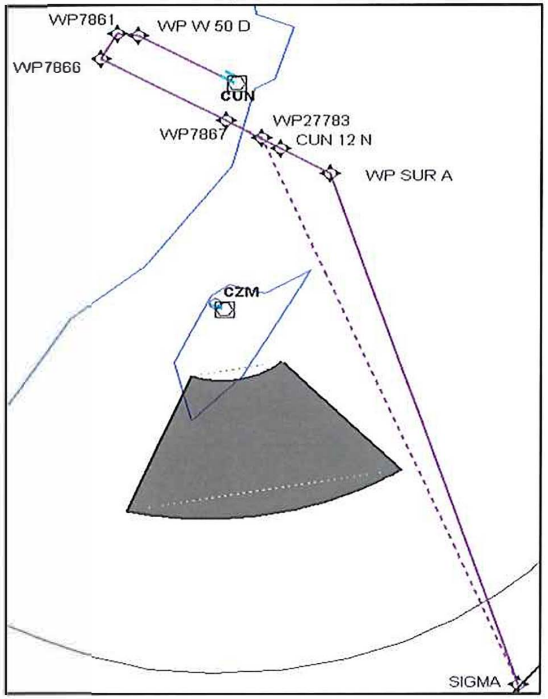
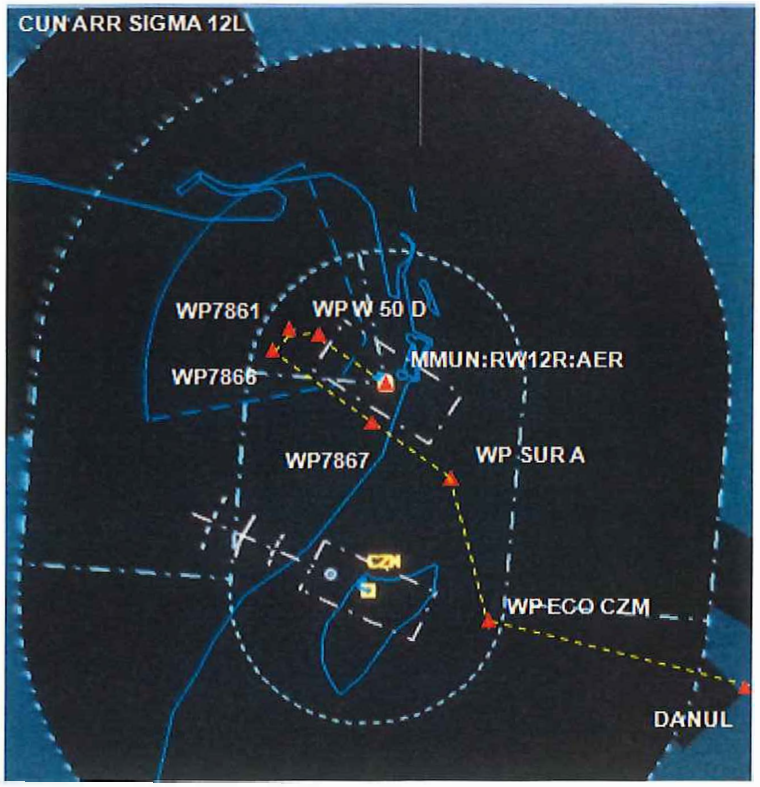


Figure A-5. CUN Runway 12R: CUN ARR SIGMA 12R

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CUN ARR D ANUL 12R
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
DANUL	N20° 11' 17"	W085° 20' 29"	20.188	-85.3413
WP ECO CZM	N20° 26' 35"	W086° 35' 19"	20.443	-86.5886
WP SUR A	N20° 48' 40"	W086° 41' 03"	20.8111	-86.6841
WP7867	N20° 57' 28"	W086° 54' 41"	20.9577	-86.9113
WP7866	N21° 05' 43"	W087° 07' 53"	20.0952	-87.1313
WP7861	N21° 09' 06"	W087° 05' 37"	21.1516	-87.0936
WP W 50 D	N21° 08' 45"	W087° 03' 09"	21.1458	-87.0525
MMUN:RW12R:AER	N21° 02' 43"	W086° 53' 28"	21.0452	-86.8911

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
DANUL	N20° 11' 22.00"	W085° 20' 28.00"	20.1894	-85.3411
CUN 12 E	N20° 39' 14.08"	W086° 25' 56.77"	20.6539	-86.4324
CUN 12 N	N20° 52' 18.82"	W086° 46' 44.73"	20.8718	-86.779
WP7867	N20° 56' 29.58"	W086° 53' 8.08"	20.94155	-86.885578
WP7866	N21° 05' 43.19"	W087° 07' 53.46"	21.0953	-87.1315
WP7861	N21° 09' 06.49"	W087° 05' 37.07"	21.1518	-87.0936
WP W 50 D	N21° 08' 45.00"	W087° 03' 09.00"	21.1458	-87.0525
MMUN:RW12R:AER	N21° 02' 43.22"	W086° 53' 27.66"	21.0453	-86.891



Rationale for Modification: moved the CUN DANUL Runway 12 arrivals to not fly head on with the CZM AXENI Runway 11 departures, decreased track miles and increased distance between CUN departures and this arrival

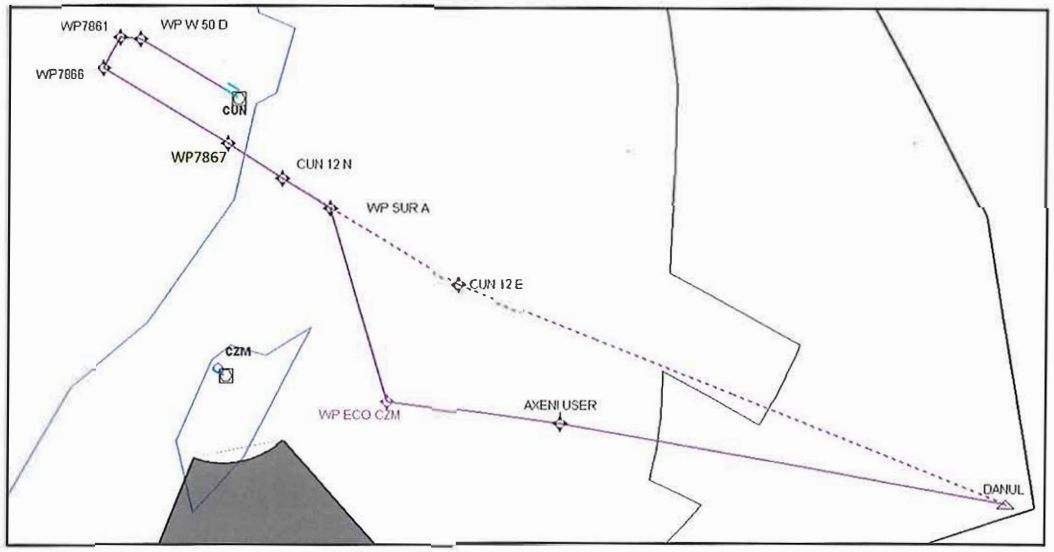


Figure A-6. CUN Runway 12R: CUN ARR DANUL 12R

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CUN ARR CZM 12R

Airport: MMUN

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
CZM	N20° 30' 26.90"	W086° 54' 43.20"	20.5074	-86.912
CUN 12 B	N20° 49' 13.22"	W086° 52' 05.96"	20.8203	-86.8683
WP27783	N20° 53' 53.53"	W086° 48' 58.81"	20.8982	-86.8163
WP7866	N21° 05' 43.19"	W087° 07' 53.46"	21.0953	-87.1315
WP7861	N21° 09' 06.49"	W087° 05' 37.07"	21.1518	-87.0936
WP W 50 D	N21° 08' 45.00"	W087° 03' 09.00"	21.1458	-87.0525

Rationale for Modification: added this route since the southern arrival route (CUN ARR S 12R) was moved

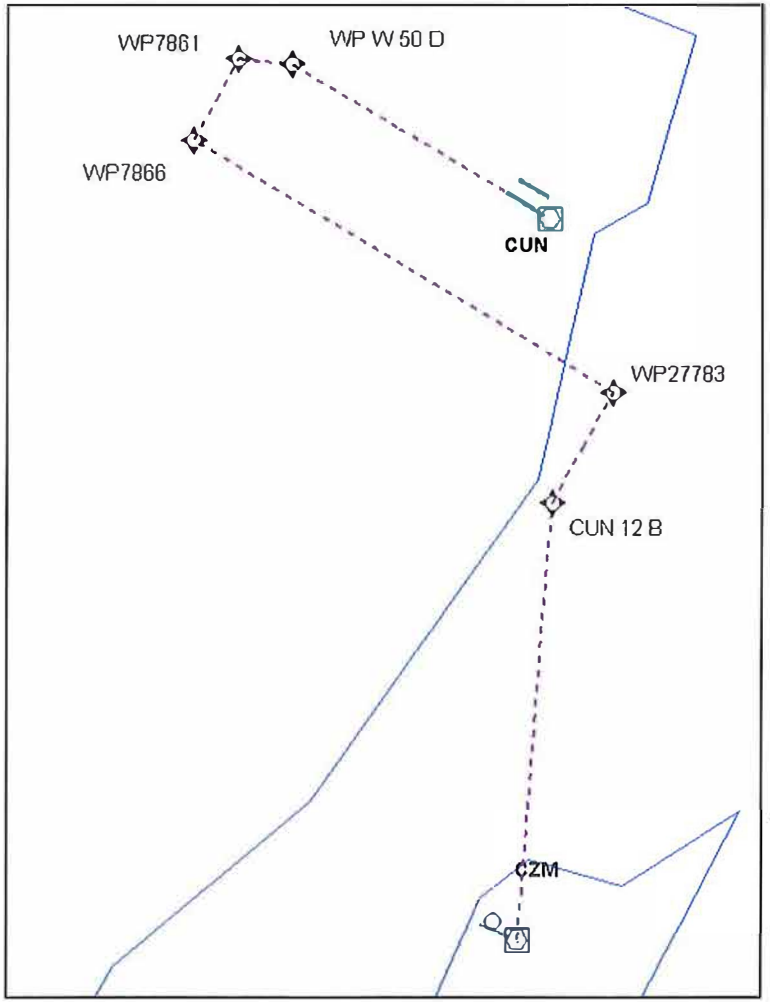


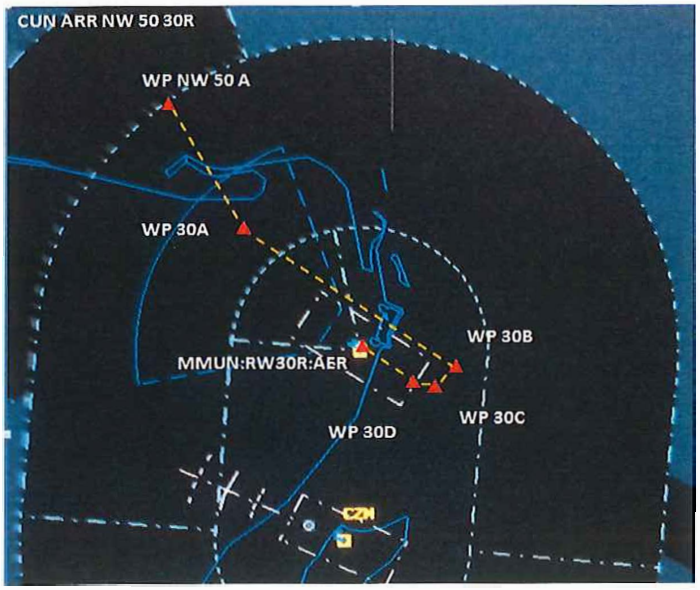
Figure A-7. CUN Runway 12R: CUN ARR CZM 12R

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)
Route:CUN ARR NW 50 30R
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP NW 50 A	N21° 41' 08"	W087° 24' 15"	21.6855	-87.4041
WP 30A	N21°20'00"	W087 10'15"	21.3333	-87.1708
WP 30B	N20°58'30"	W086°35'05"	20.975	-86.5847
WP 30C	N20°55'29"	W86°37'14"	20.9247	-86.6205
WP 30D	N20°55'31"	W086°40'24"	20.9252	-86.6733
MMUN:RW30R:AER	N21° 02' 27"	W086° 51' 32"	21.0408	-86.8588

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP NW 50 A	N21° 41' 08"	W087° 24' 15"	21.6855	-87.4041
WP 30A	N21°20'05"	W087 09'50"	21.3348	-87.164
WP 30B	N20°58'30"	W086°35'05"	20.975	-86.5847
WP 30C	N20°55'29"	W86°37'14"	20.9247	-86.6205
WP 30D	N20°55'31"	W086°40'24"	20.9252	-86.6733
MMUN:RW3	N21° 02' 27"	W086° 51' 32"	21.0408	-86.8588

Rationale for Modification: moved WP 30A to be on CUN ARR NW 50 12L route



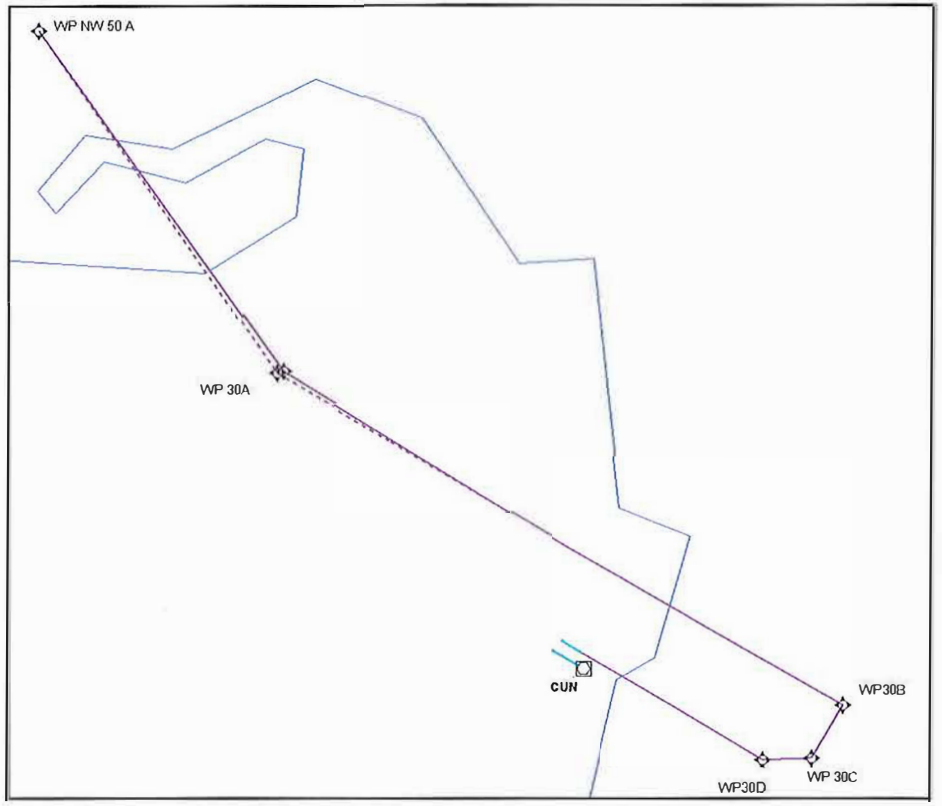


Figure A-8. CUN Runway 30R: CUN ARR NW 50 30R

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)
Route:CUN ARR NOSAT 30R
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
NOSAT	N21° 57' 49"	W085° 58' 52"	21.9636	-85.9811
LETIS	N21° 31' 43"	W086° 23' 24"	21.5286	-86.39
LETIS B	N21°08'21"	W086°46'57"	21.1391	-86.7825
LETIS C	N21°05'32"	W086°46'42"	21.0922	-86.7783
WP30B	N20°58'30"	W086°35'05"	20.975	-86.5847
WP30C	N20°55'29"	W86°37'14"	20.9247	-86.6205
WP30D	N20°55'31"	W086°40'24"	20.9252	-86.6733
MMUN:RW30R:AER	N21° 02' 27"	W086° 51' 32"	21.0408	-86.8588

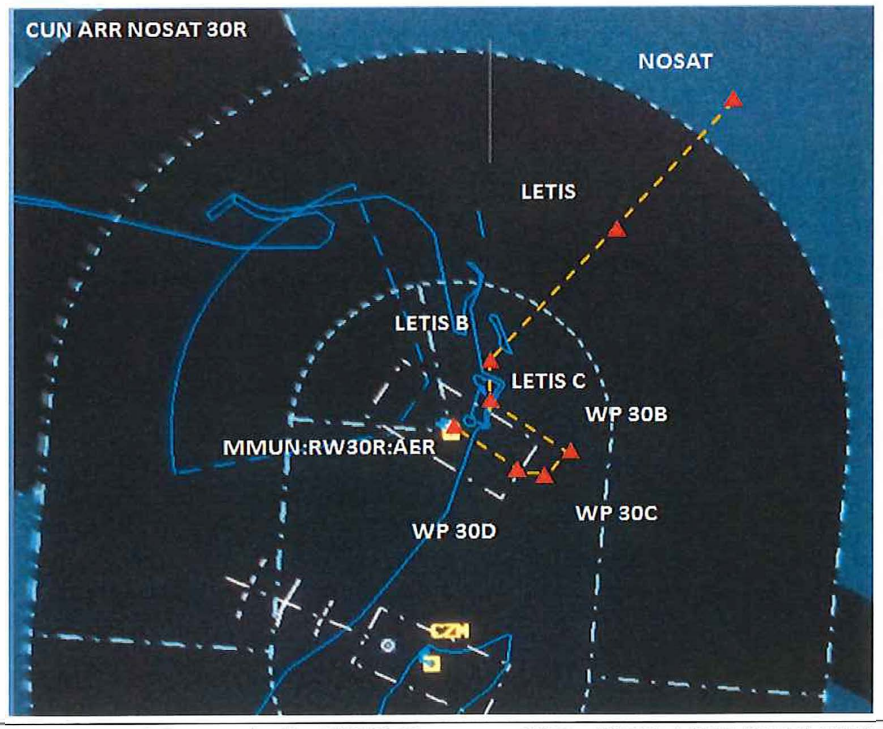


Figure A-9. CUN Runway 30R: CUN ARR NOSAT 30R

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CUN ARR W 50 30L

Airport: MMUN

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP W 50	N21° 13' 23"	W087° 43' 40"	21.223	-87.7277
WP 30E	N21°10´35"	W087°15´37"	21.1763	-87.2602
WP SUR A	N20° 48' 40"	W086° 41' 03"	20.8111	-86.6841
WP 30F	N20°51´44"	W086°38´54"	20.8622	-86.6483
WP 30G	N20°54´48"	W086°40´35"	20.9133	-86.6763
MMUN:RW30L:AER	N21° 01' 40"	W086° 51' 47"	21.0277	-86.863

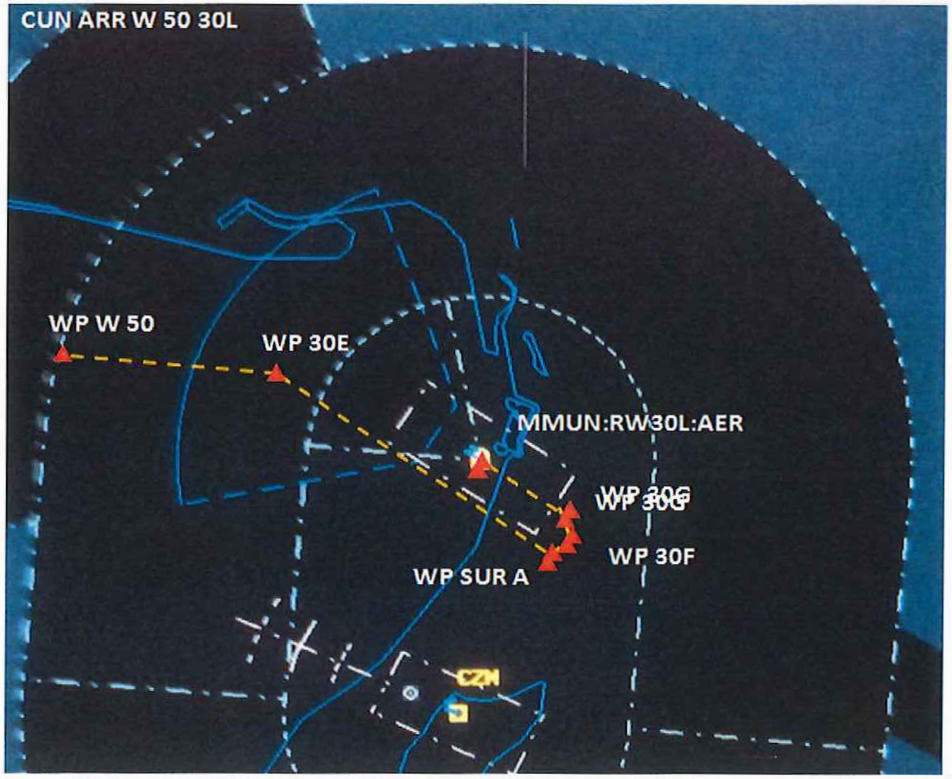


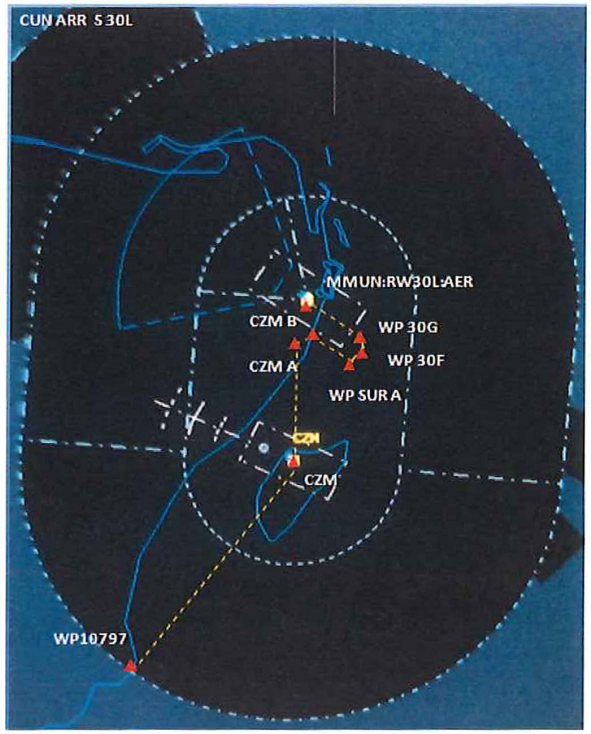
Figure A-10. CUN Runway 30L: CUN ARR W 50 30L

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)
Route:CUN ARR S 30L
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10797	N19° 51' 22"	W087° 27' 49"	19.8561	-87.4636
CZM	N20° 30' 27"	W086° 54' 43"	20.5075	-86.9119
CZM A	N20°54'22"	W086°54'44"	20.9061	-86.9122
CZM B	N20°55'43"	W086°51'57"	20.9286	-86.8658
WP SUR A	N20° 48' 40"	W086° 41' 03"	20.8111	-86.6841
WP 30F	N20°51'44"	W086°38'54"	20.8622	-86.6483
WP30G	N20°54'48"	W086°40'35"	20.9133	-86.6763
MMUN:RW30L:AER	N21° 01' 40"	W086° 51' 47"	21.0277	-86.863

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10797	N19° 51' 21.59"	W087° 27' 49.12"	19.8559	-87.4636
CZM	N20° 30' 26.90"	W086° 54' 43.20"	20.5074	-86.912
WP SUR A	N20° 48' 40.00"	W086° 41' 03.00"	20.8111	-86.6841
WP 30 F	N20° 51' 44.00"	W086° 38' 54.00"	20.8622	-86.6483
WP 30 G	N20° 54' 45.80"	W086° 40' 34.07"	20.9127	-86.6761
MMUN:RW30L:AER	N21° 01' 40.07"	W086° 51' 46.76"	21.0277	-86.8629
deleted CZM A and B				

Rationale for Modification: moved arrival to join at the base leg to allow the departures to top the arrival route and to decrease the track miles



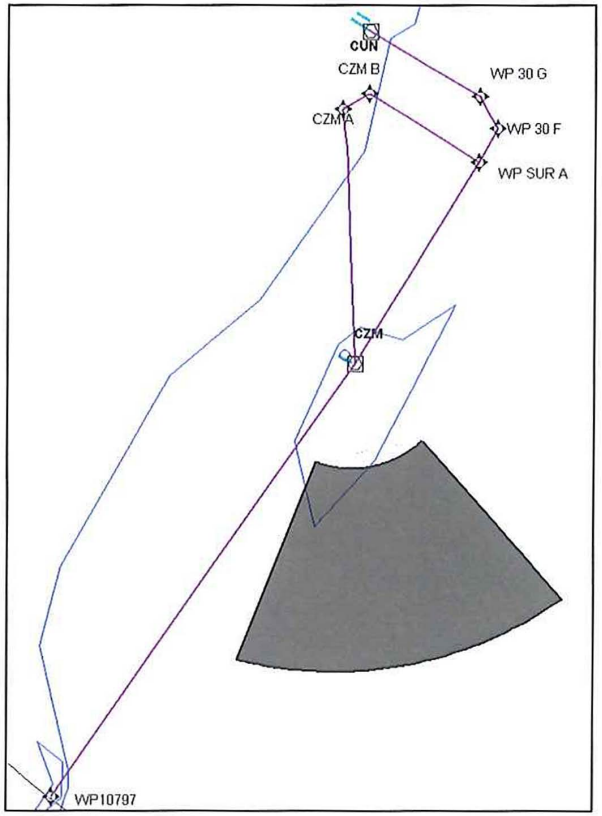


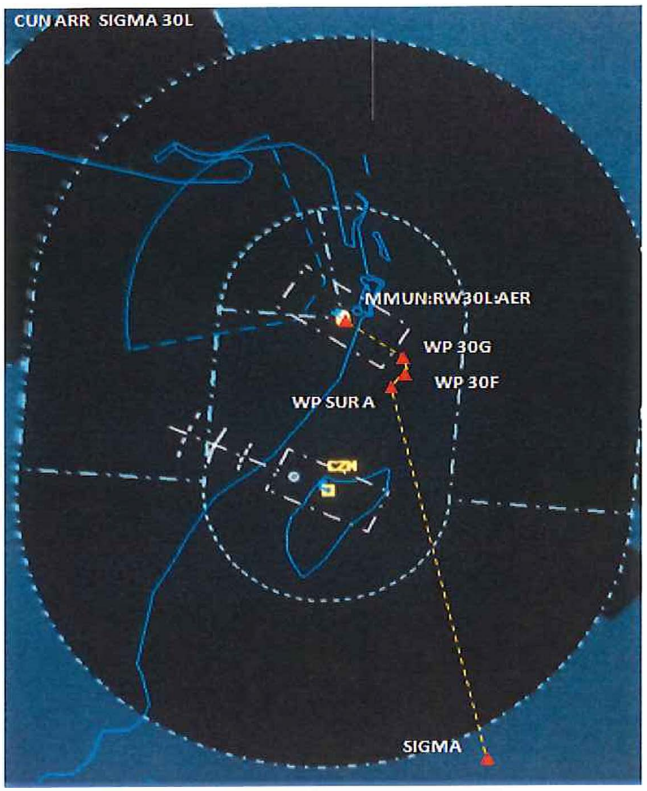
Figure A-11. CUN Runway 30L: CUN ARR S 30L

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)
Route:CUN ARR SIGMA 30L
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
SIGMA	N19° 37' 02"	W086° 22' 00"	19.6172	-86.3666
WP SUR A	N20° 48' 40"	W086° 41' 03"	20.8111	-86.6841
WP 30F	N20°51´44"	W086°38´54"	20.8622	-86.6483
WP30G	N20°54´48"	W086°40´35"	20.9133	-86.6763
MMUN:RW30L:AER	N21° 01' 40"	W086° 51' 47"	21.0277	-86.863

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
SIGMA	N19° 37' 02.00"	W086° 22' 00.00"	N19.6172	W86.3666
CUN 12 E	N20° 39' 14.08"	W086° 25' 56.77"	N20.6539	W86.4324
WP 30 F	N20° 51' 44.00"	W086° 38' 54.00"	N20.8622	W86.6483
WP 30 G	N20° 54' 45.80"	W086° 40' 34.07"	N20.9127	W86.6761
MMUN:RW30L:AER	N21° 01' 40.07"	W086° 51' 46.76"	N21.0277	W86.8629

Rationale for Modification: moved the arrival to simplify the crossing with the CUN DANUL and TAKUX departure routes and CZM departure routes to the north and NUKAN



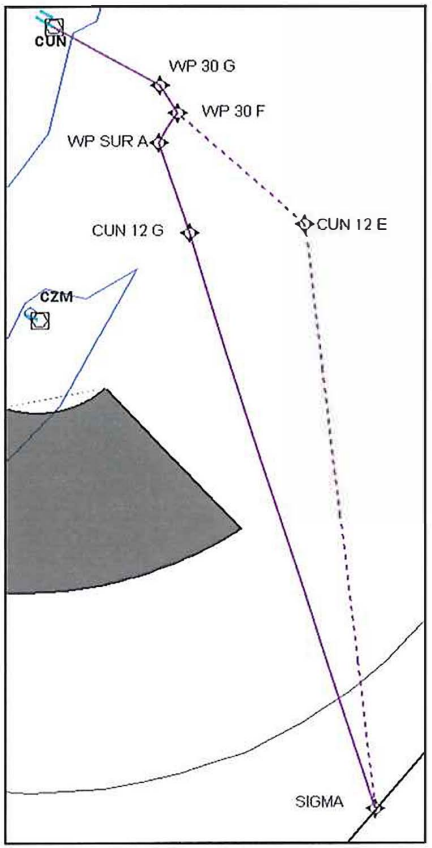


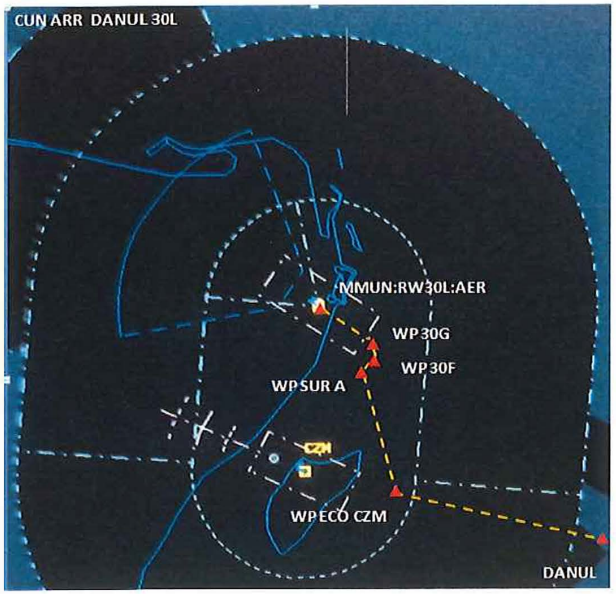
Figure A-12. CUN Runway 30L: CUN ARR SIGMA 30L

CUN Runway 30 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CUN ARR DANUL 30L
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
DANUL	N20° 11' 17"	W085° 20' 29"	20.188	-85.3413
WP ECO CZM	N20° 26' 35"	W086° 35' 19"	20.443	-86.5886
WP SUR A	N20° 48' 40"	W086° 41' 03"	20.8111	-86.6841
WP 30F	N20°51'44"	W086°38'54"	20.8622	-86.6483
WP30G	N20°54'48"	W086°40'35"	20.9133	86.6763
MMUN:RW30L:AER	N21° 01' 40"	W086° 51' 47"	21.0277	-86.863

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
DANUL	N20° 11' 22.00"	W085° 20' 28.00"	20.1894	-85.3411
CUN 12 E	N20° 39' 14.08"	W086° 25' 56.77"	20.6539	-86.4324
WP 30 F	N20° 51' 44.00"	W086° 38' 54.00"	20.8622	-86.6483
WP 30 G	N20° 54' 45.80"	W086° 40' 34.07"	20.9127	-86.6761
MMUN:RW30L:AER	N21° 01' 40.07"	W086° 51' 46.76"	21.0277	-86.8629

Rationale for Modification: moved the arrival to simplify the crossing with the CUN DANUL and TAKUX departure routes and CZM departure routes to the north and NUKAN and to decrease track miles



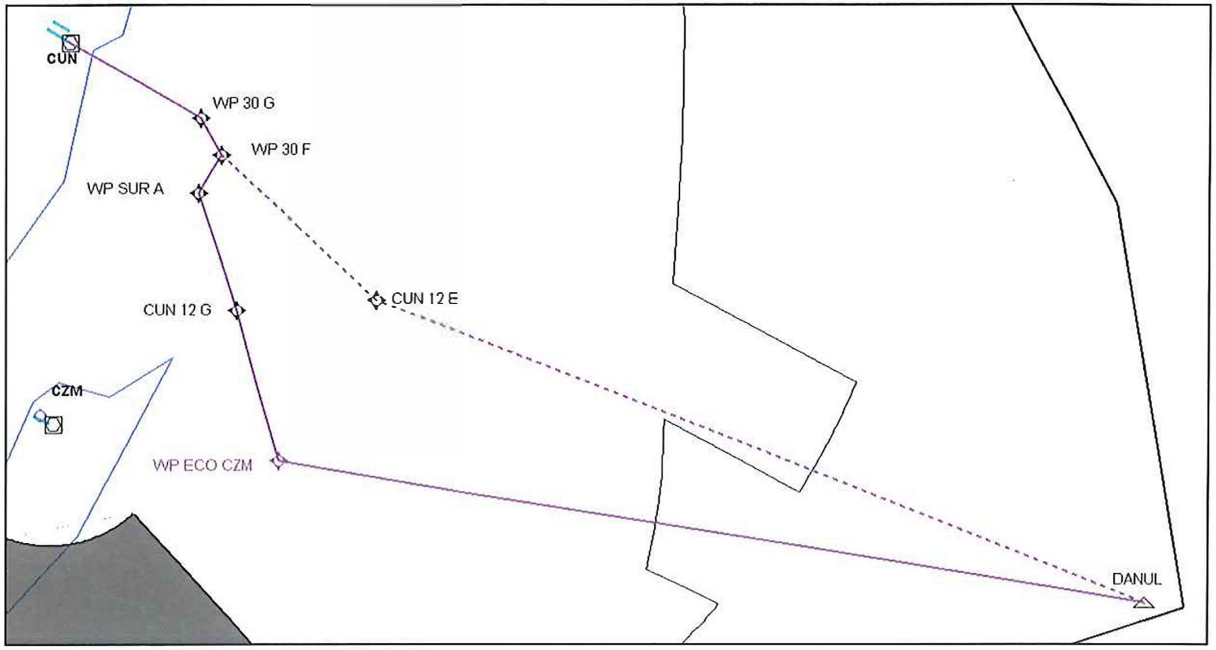


Figure A-13. CUN Runway 30L: CUN ARR DANUL 30L

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CUN DEP CZA 12R
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12R:DER	N21° 01' 40"	W086° 51' 47"	21.0277	-86.8629
ghost	N21° 01' 05"	W086° 50' 51"	21.0181	-86.8475
WP10812	N20° 51' 26"	W086° 50' 35"	20.8571	-86.8431
CZA	N20° 38' 35"	W088° 26' 54"	20.643	-88.4482

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12R:DER	N21° 01' 40.07"	W086° 51' 46.76"	21.0277	-86.8629
ghost	N21° 01' 05.19"	W086° 50' 51.05"	21.0181	-86.8475
CUN 12 D	N20° 49' 00.17"	W086° 58' 24.06"	20.8167	-86.9733
CZA	N20° 38' 35.01"	W088° 26' 53.63"	20.643	-88.4482

Rationale for Modification: moved departure route to increase the separation with the departures going to CZM, moved route away from CZM arrival route and decrease track miles

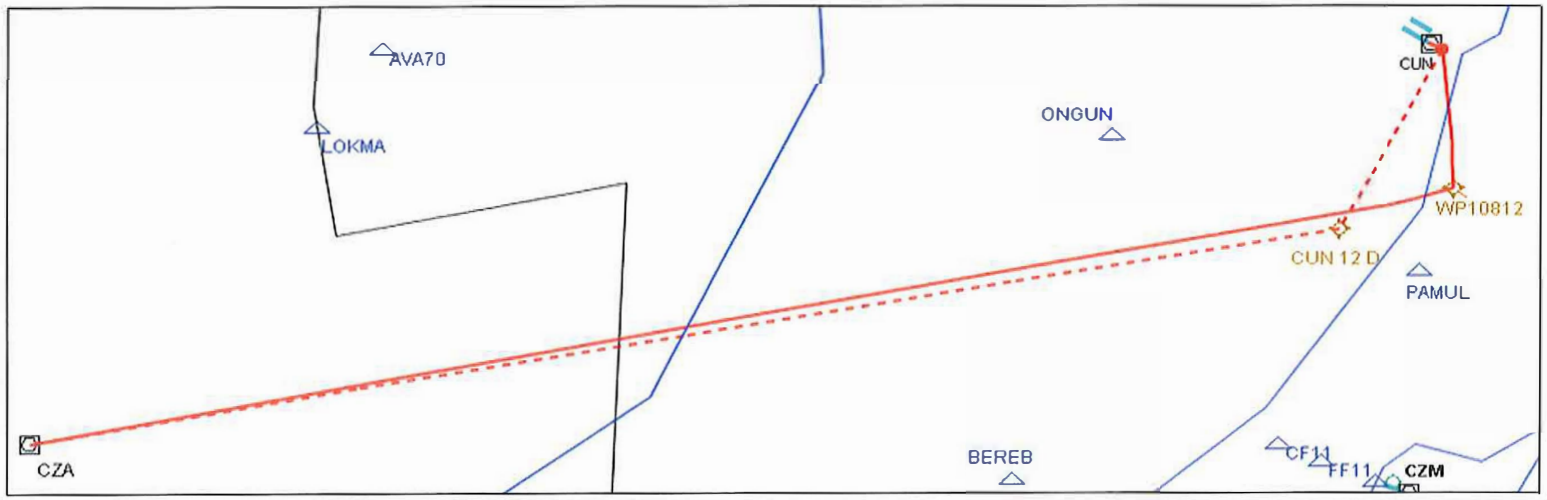


Figure A-14. CUN Runway 12R: CUN DEP CZA 12R

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CUN DEP CZM 12R

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12R:DER	N21° 01' 40"	W086° 51' 47"	21.0277	-86.8629
ghost	N21° 01' 05"	W086° 50' 51"	21.0181	-86.8475
WP10810	N20° 55' 35"	W086° 45' 23"	20.9265	-86.7564
CZM	N20° 30' 27"	W086° 54' 43"	20.5074	-86.912

Figure A-15. CUN Runway 12R: CUN DEP CZM 12R

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CUN DEP DANUL 12R
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12R:DER	N21° 01' 40"	W086° 51' 47"	21.0277	-86.8629
ghost	N21° 01' 05"	W086° 50' 51"	21.0181	-86.8475
WP10810	N20° 55' 35"	W086° 45' 23"	20.9265	-86.7564
WP10811	N20° 47' 40"	W086° 37' 37"	20.7945	-86.6268
DANUL	N20° 11' 22"	W085° 20' 28"	20.1894	-85.3411

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12R:DER	N21° 01' 40.07"	W086° 51' 46.76"	21.0277	-86.8629
ghost	N21° 01' 05.19"	W086° 50' 51.05"	21.0181	-86.8475
CUN 12 P	N20° 56' 54.61"	W086° 47' 14.33"	20.9485	-86.7873
CUN 12 C	N20° 43' 35.62"	W086° 22' 01.01"	20.7265	-86.3669
DANUL	N20° 11' 22.00"	W085° 20' 28.00"	20.1894	-85.3411

Rationale for Modification: Rationale for Modification: moved the arrival to separate the DANUL and SIGMA arrivals from the DANUL and TAKUX departures routes near WP10811 and WP SUR A

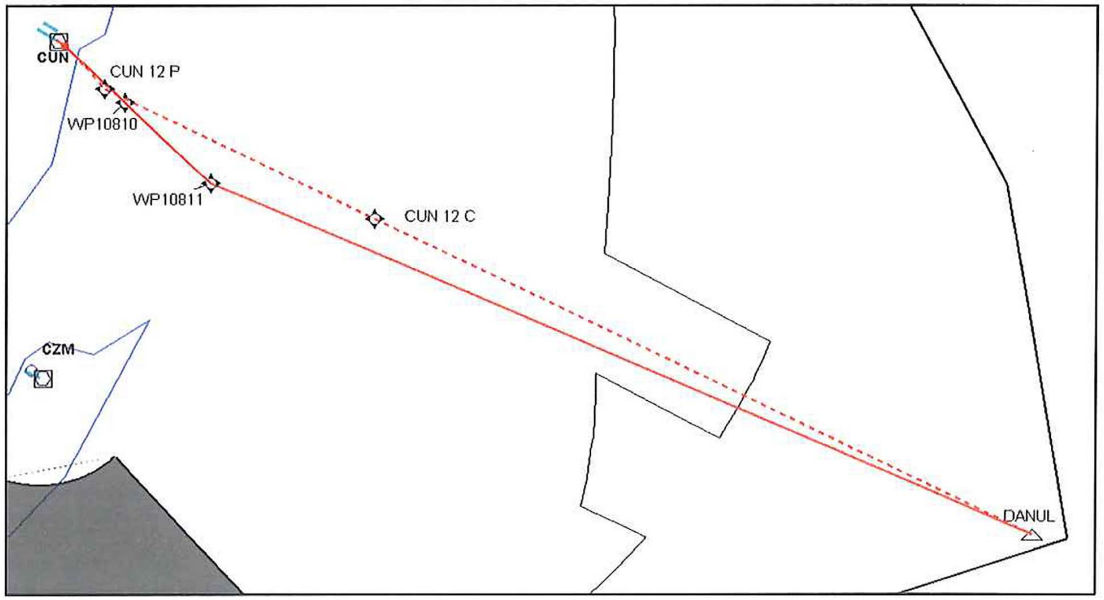


Figure A-16. CUN Runway 12R: CUN DEP DANUL 12R

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CUN DEP N 12L
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12L:DER	N21° 02' 27"	W086° 51' 32"	21.0407	-86.8589
ghost	N21° 01' 52"	W086° 50' 37"	21.031	-86.8434
WP10799	N21° 01' 22"	W086° 49' 46"	21.0226	-86.8295
WP10801	N21° 09' 03"	W086° 40' 47"	21.1509	-86.6796
WP10802	N21° 28' 21"	W086° 50' 27"	21.4726	-86.8408
WP10803	N21° 51' 52"	W086° 53' 18"	21.8644	-86.8884

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12L:DER	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.8589
ghost	N21° 01' 51.64"	W086° 50' 36.55"	21.031	-86.8434
CUN 12 M	N21° 11' 12.85"	W086° 37' 54.54"	21.1869	-86.6318
WP10803	N21° 51' 50.30"	W086° 53' 10.42"	21.8639	-86.8862
deleted WP10802 and WP 10799				

Rationale for Modification: moved to join with the modified CZM departure route going to the same TMA exit point

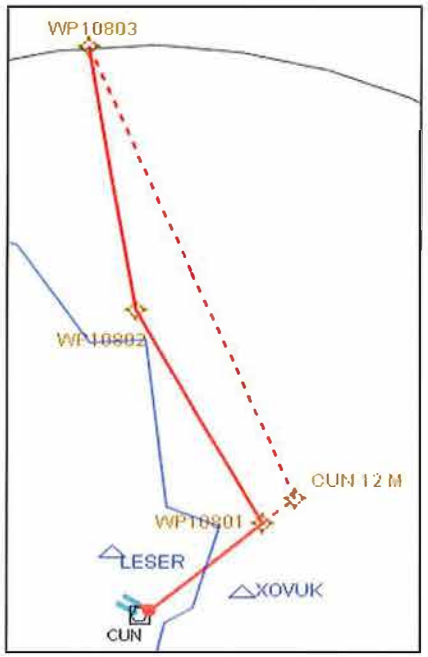


Figure A-17. CUN Runway 12L: CUN DEP N 12L

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CUN DEP N 12L 2
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12L:DER	N21° 02' 27"	W086° 51' 32"	21.0407	-86.8589
ghost	N21° 01' 52"	W086° 50' 37"	21.031	-86.8434
WP10799	N21° 01' 22"	W086° 49' 46"	21.0226	-86.8295
WP10804	N21° 00' 22"	W086° 48' 24"	21.0059	-86.8066
WP10805	N21° 01' 24"	W086° 42' 41"	21.0232	-86.7113
WP10806	N21° 13' 07"	W086° 28' 53"	21.2186	-86.4815
WP10807	N21° 48' 19"	W086° 32' 18"	21.8052	-86.5383

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12L:DER	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.8589
ghost	N21° 01' 51.64"	W086° 50' 36.55"	21.031	-86.8434
WP10804	N21° 00' 25.90"	W086° 48' 18.08"	21.0071	-86.805
WP10805	N21° 01' 24.00"	W086° 42' 41.00"	21.0233	-86.7113
CUN 12 K	N21° 12' 49.24"	W086° 31' 15.52"	21.2136	-86.5209
WP10807	N21° 48' 20.89"	W086° 32' 12.38"	21.8058	-86.5367

deleted WP10799

Rationale for Modification: moved to join with the modified CZM departure route going to the same TMA exit point and to decrease track miles

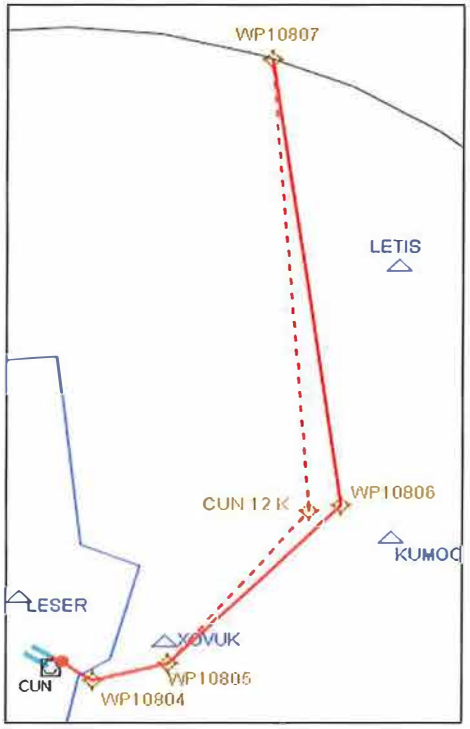


Figure A-18. CUN Runway 12L: CUN DEP N 12L 2

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CUN DEP NUDAL 12L
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12L:DER	N21° 02' 27"	W086° 51' 32"	21.0407	-86.8589
ghost	N21° 01' 52"	W086° 50' 37"	21.031	-86.8434
WP10799	N21° 01' 22"	W086° 49' 46"	21.0226	-86.8295
WP10804	N21° 00' 22"	W086° 48' 24"	21.0059	-86.8066
WP10805	N21° 01' 24"	W086° 42' 41"	21.0232	-86.7113
WP10809	N21° 04' 11"	W086° 34' 37"	21.0697	-86.5769
NUDAL	N21° 15' 48"	W085° 37' 14"	21.2633	-85.6205

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12L:DER	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.8589
ghost	N21° 01' 51.64"	W086° 50' 36.55"	21.031	-86.8434
WP10804	N21° 00' 25.90"	W086° 48' 18.08"	21.0071	-86.805
WP10805	N21° 01' 24.00"	W086° 42' 41.00"	21.0233	-86.7113
WP10809	N21° 04' 11.00"	W086° 34' 37.00"	21.0697	-86.5769
NUDAL	N21° 15' 48.00"	W085° 37' 14.00"	21.2633	-85.6205

deleted WP10799

Rationale for Modification: moved WP10804 to ensure 15 degrees divergence on departures

Figure A-19. CUN Runway 12L: CUN DEP NUDAL 12L

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CUN DEP NUKAN 12L
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12L:DER	N21° 02' 27"	W086° 51' 32"	21.0407	-86.8589
ghost	N21° 01' 52"	W086° 50' 37"	21.031	-86.8434
WP10799	N21° 01' 22"	W086° 49' 46"	21.0226	-86.8295
WP10804	N21° 00' 22"	W086° 48' 24"	21.0059	-86.8066
WP10805	N21° 01' 24"	W086° 42' 41"	21.0232	-86.7113
WP10809	N21° 04' 11"	W086° 34' 37"	21.0697	-86.5769
NUKAN	N21° 29' 34"	W085° 44' 17"	21.4927	-85.738

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12L:DER	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.8589
ghost	N21° 01' 51.64"	W086° 50' 36.55"	21.031	-86.8434
WP10804	N21° 00' 25.90"	W086° 48' 18.08"	21.0071	-86.805
WP10805	N21° 01' 24.00"	W086° 42' 41.00"	21.0233	-86.7113
WP10809	N21° 04' 11.00"	W086° 34' 37.00"	21.0697	-86.5769
NUKAN	N21° 29' 34.00"	W085° 44' 17.00"	21.4927	-85.738

deleted WP10799

Rationale for Modification: moved WP10804 to ensure 15 degrees divergence on departures

Figure A-20. CUN Runway 12L: CUN DEP NUKAN 12L

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CUN DEP TAKUX 12R
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12R:DER	N21° 01' 40"	W086° 51' 47"	21.0277	-86.8629
ghost	N21° 01' 05"	W086° 50' 51"	21.0181	-86.8475
WP10810	N20° 55' 35"	W086° 45' 23"	20.9265	-86.7564
WP10811	N20° 47' 40"	W086° 37' 37"	20.7945	-86.6268
TAKUX	N20° 01' 37"	W085° 53' 46"	20.0269	-85.8961

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12R:DER	N21° 01' 40.07"	W086° 51' 46.76"	21.0277	-86.8629
ghost	N21° 01' 05.20"	W086° 50' 51.05"	21.0181	-86.8475
CUN 12 P	N20° 56' 54.61"	W086° 47' 14.33"	20.9485	-86.7873
CUN 12 C	N20° 43' 35.62"	W086° 22' 01.01"	20.7265	-86.3669
TAKUX	N20° 01' 37.00"	W085° 53' 46.00"	20.0269	-85.8961

Rationale for Modification: Rationale for Modification: moved the arrival to separate the DANUL and SIGMA arrivals from the DANUL and TAKUX departures routes near WP10811 and WP SUR A

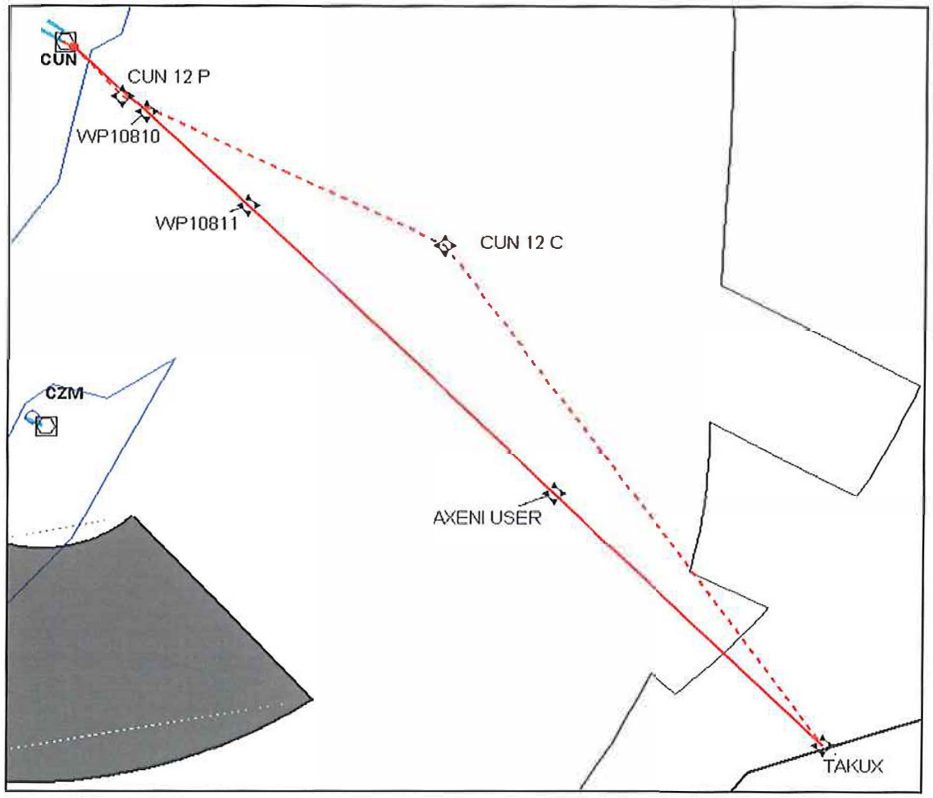


Figure A-21. CUN Runway 12R: CUN DEP TAKUX 12R

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CUN DEP CZA 30L

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30L:DER	N21° 02' 43"	W086° 53' 28"	21.0453	-86.891
ghost	N21° 03' 18"	W086° 54' 23"	21.0549	-86.9064
WP10841	N21° 04' 01"	W086° 58' 44"	21.0669	-86.9789
CZA	N20° 38' 35"	W088° 26' 54"	20.643	-88.4482

Figure A-22. CUN Runway 30L: CUN DEP CZA 30L

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CUN DEP CZM 30L

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30L:DER	N21° 02' 43"	W086° 53' 28"	21.0453	-86.891
ghost	N21° 03' 18"	W086° 54' 23"	21.0549	-86.9064
WP10838	N20° 55' 05"	W087° 01' 26"	20.9179	-87.0239
CZM	N20° 30' 27"	W086° 54' 43"	20.5074	-86.912

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW3(	N21° 02' 43"	W086° 53' 28'	21.0453	-86.891
ghost	N21° 03' 18"	W086° 54' 23'	21.0549	-86.9064
WP10838	N20° 54' 19.6(	W087° 02' 01	20.9054	-87.0338
CZM	N20° 30' 27"	W086° 54' 43'	20.5074	-86.912

Rationale for Modification: changed for consistency

Figure A-23. CUN Runway 30L: CUN DEP CZM 30L

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CUN DEP DANUL 30L

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30L:DER	N21° 02' 43"	W086° 53' 28"	21.0453	-86.891
ghost	N21° 03' 18"	W086° 54' 23"	21.0549	-86.9064
WP10838	N20° 55' 05"	W087° 01' 26"	20.9179	-87.0239
WP10839	N20° 36' 39"	W086° 34' 50"	20.6106	-86.5806
DANUL	N20° 11' 22"	W085° 20' 28"	20.1894	-85.3411

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30L:DER	N21° 02' 43.22"	W086° 53' 27.66"	21.0453	-86.891
ghost	N21° 03' 17.95"	W086° 54' 23.17"	21.0549	-86.9064
WP10838	N20° 54' 19.60"	W087° 02' 01.90"	20.9054	-87.0338
WP10839	N20° 34' 09.48"	W086° 37' 03.74"	20.5693	-86.6177
WP27589	N20° 28' 58.79"	W086° 30' 39.68"	20.4829	-86.511
DANUL	N20° 11' 22.00"	W085° 20' 28.00"	20.1894	-85.3411

Rationale for Modification: decrease interaction points with CZM

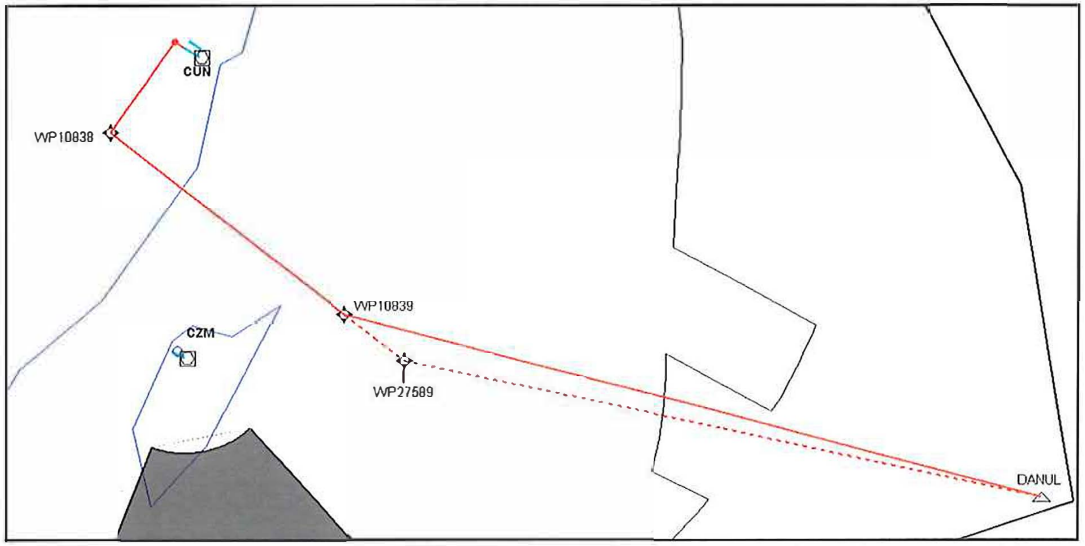


Figure A-24. CUN Runway 30L: CUN DEP DANUL 30L

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CUN DEP N 30R

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30R:DER	N21° 03' 17"	W086° 52' 53"	21.0547	-86.8813
ghost	N21° 03' 52"	W086° 53' 48"	21.0643	-86.8967
WP10833	N21° 05' 31"	W086° 56' 27"	21.0918	-86.9407
WP10803	N21° 51' 52"	W086° 53' 18"	21.8644	-86.8884

Figure A-25. CUN Runway 30R: CUN DEP N 30R

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)
Route:CUN DEP N 30R 2
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30R:DER	N21° 03' 17"	W086° 52' 53"	21.0547	-86.8813
ghost	N21° 03' 52"	W086° 53' 48"	21.0643	-86.8967
WP10834	N21° 13' 22"	W086° 46' 58"	21.2226	-86.7826
WP10807	N21° 48' 19"	W086° 32' 18"	21.8052	-86.5383

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30R:DER	N21° 03' 17.04"	W086° 52' 52.99"	21.0547	-86.8813
ghost	N21° 03' 51.63"	W086° 53' 48.30"	21.0643	-86.8967
CUN 30 C	N21° 13' 36.76"	W086° 48' 38.22"	21.2268	-86.8106
CUN 12 A	N21° 24' 00.24"	W086° 43' 00.80"	21.4	-86.7168
WP10807	N21° 48' 20.89"	W086° 32' 12.38"	21.8058	-86.5367

Rationale to Modification: decrease track miles

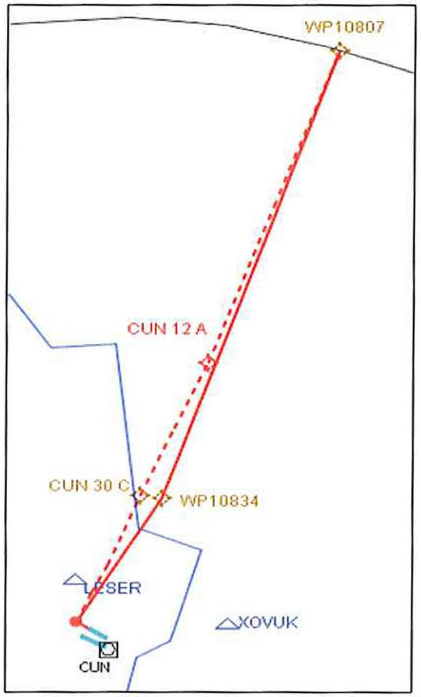


Figure A-26. CUN Runway 30R: CUN DEP N 30R 2

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)
Route:CUN DEP NUDAL 30R
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30R:DER	N21° 03' 17"	W086° 52' 53"	21.0547	-86.8813
ghost	N21° 03' 52"	W086° 53' 48"	21.0643	-86.8967
WP10836	N21° 13' 01"	W086° 47' 13"	21.2169	-86.7869
WP10835	N21° 23' 13"	W086° 37' 17"	21.3869	-86.6215
NUDAL	N21° 15' 48"	W085° 37' 14"	21.2633	-85.6205

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30R:DER	N21° 03' 17.04"	W086° 52' 52.99"	21.0547	-86.8813
ghost	N21° 03' 51.63"	W086° 53' 48.30"	21.0643	-86.8967
CUN 30 C	N21° 13' 36.76"	W086° 48' 38.22"	21.2268	-86.8106
CUN 12 A	N21° 24' 00.24"	W086° 43' 00.80"	21.4	-86.7168
NUDAL	N21° 15' 48.00"	W085° 37' 14.00"	21.2633	-85.6205

Rationale for Modification: increased track miles to allow the CUN departures to cross over the CUN arrivals from the NE and to increase separation with the NE arrival route

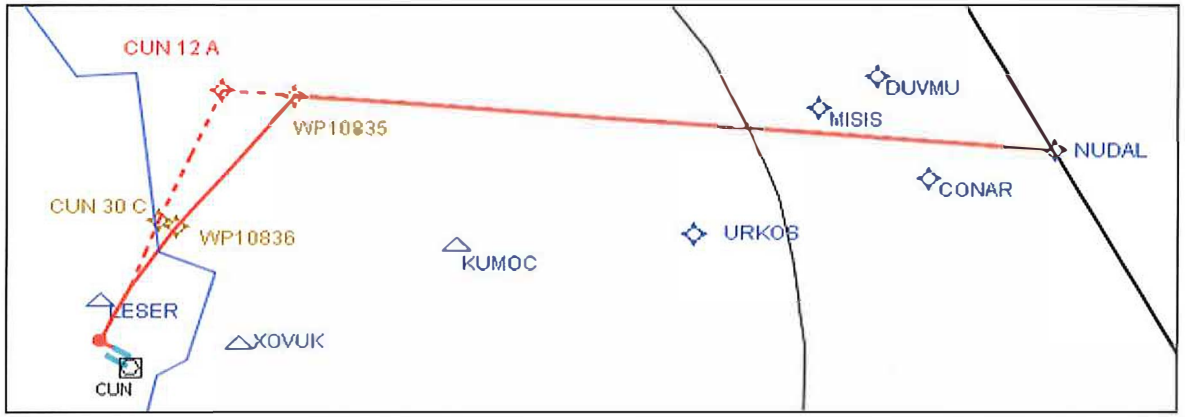


Figure A-27. CUN Runway 30R: CUN DEP NUDAL 30R

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)
Route:CUN DEP NUKAN 30R
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30R:DER	N21° 03' 17"	W086° 52' 53"	21.0547	-86.8813
ghost	N21° 03' 52"	W086° 53' 48"	21.0643	-86.8967
WP10834	N21° 13' 22"	W086° 46' 58"	21.2226	-86.7826
WP10835	N21° 23' 13"	W086° 37' 17"	21.3869	-86.6215
NUKAN	N21° 29' 34"	W085° 44' 17"	21.4927	-85.738

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30R:DER	N21° 03' 17.04"	W086° 52' 52.99"	21.0547	-86.8813
ghost	N21° 03' 51.63"	W086° 53' 48.30"	21.0643	-86.8967
CUN 30 C	N21° 13' 36.76"	W086° 48' 38.22"	21.2268	-86.8106
CUN 12 A	N21° 24' 00.24"	W086° 43' 00.80"	21.4	-86.7168
NUKAN	N21° 29' 34.00"	W085° 44' 17.00"	21.4927	-85.738

Rationale for Modification: increased track miles to allow the CUN departures to cross pver the CUN arrivals from the NE and to increase separation with the NE arrival route

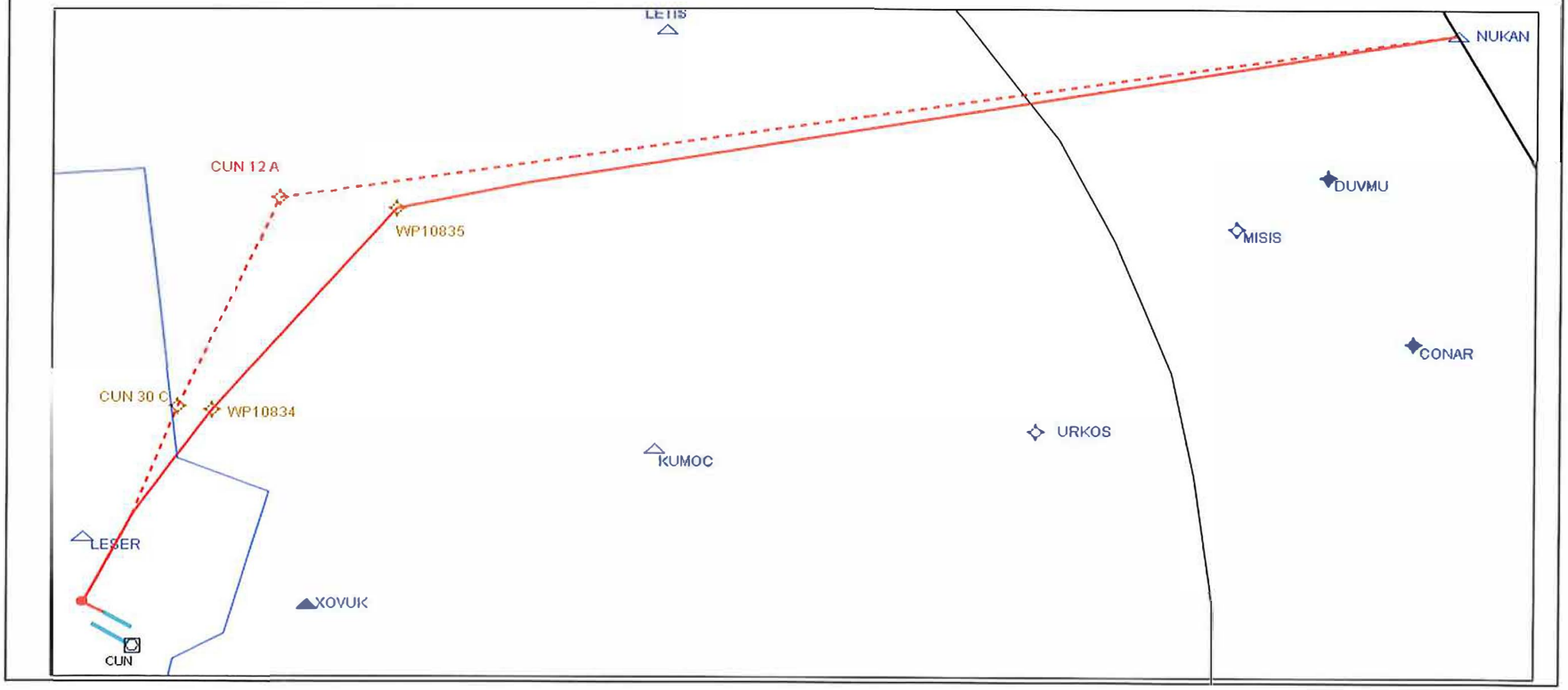


Figure A-28. CUN Runway 30R: CUN DEP NUKAN 30R

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CUN DEP TAKUX 30L

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30L:DER	N21° 02' 43"	W086° 53' 28"	21.0453	-86.891
ghost	N21° 03' 18"	W086° 54' 23"	21.0549	-86.9064
WP10838	N20° 55' 05"	W087° 01' 26"	20.9179	-87.0239
WP10839	N20° 36' 39"	W086° 34' 50"	20.6106	-86.5806
TAKUX	N20° 01' 37"	W085° 53' 46"	20.0269	-85.8961

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30L:DER	N21° 02' 43.22"	W086° 53' 27.66"	21.0453	-86.891
ghost	N21° 03' 17.95"	W086° 54' 23.17"	21.0549	-86.9064
WP10838	N20° 54' 19.60"	W087° 02' 01.90"	20.9054	-87.0338
WP10839	N20° 34' 09.48"	W086° 37' 03.74"	20.5693	-86.6177
WP27589	N20° 28' 58.79"	W086° 30' 39.68"	20.4829	-86.511
TAKUX	N20° 01' 37.00"	W085° 53' 46.00"	20.0269	-85.8961

Rationale for Modification: decrease interaction points with CZM

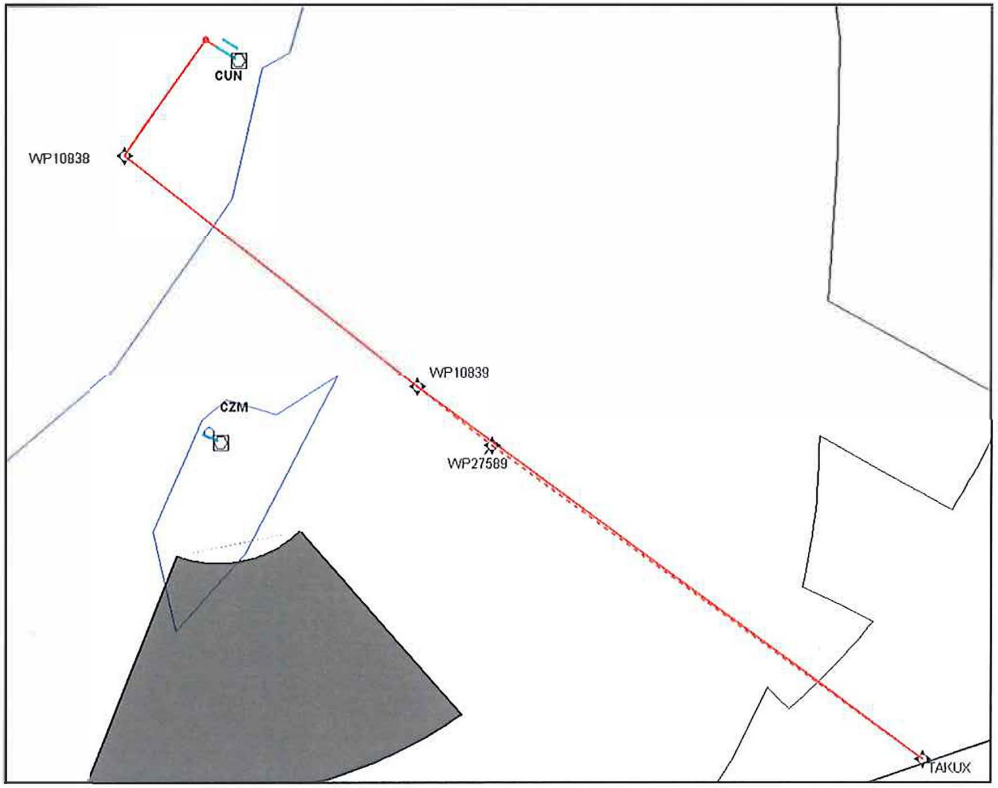


Figure A-29. CUN Runway 30L: CUN DEP TAKUX 30L

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP CZA 11

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34"	W086° 55' 00"	20.5095	-86.9166
ghost	N20° 30' 07"	W086° 53' 59"	20.5019	-86.8998
WP10821	N20° 23' 29"	W086° 56' 29"	20.3913	-86.9412
CZA	N20° 38' 35"	W088° 26' 54"	20.643	-88.4482

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34.40"	W086° 54' 59.92"	20.5095	-86.9166
ghost	N20° 30' 07.03"	W086° 53' 59.42"	20.5019	-86.8998
CZM 11 N	N20° 23' 55.06"	W086° 57' 21.76"	20.3986	-86.956
CZA	N20° 38' 35.01"	W088° 26' 53.63"	20.643	-88.4482

Rationale for Modificaiton: Increase the distance between the departure and the downwind before the departure route turns towards the west and ensuring that the route does not enter the unoffical SUA

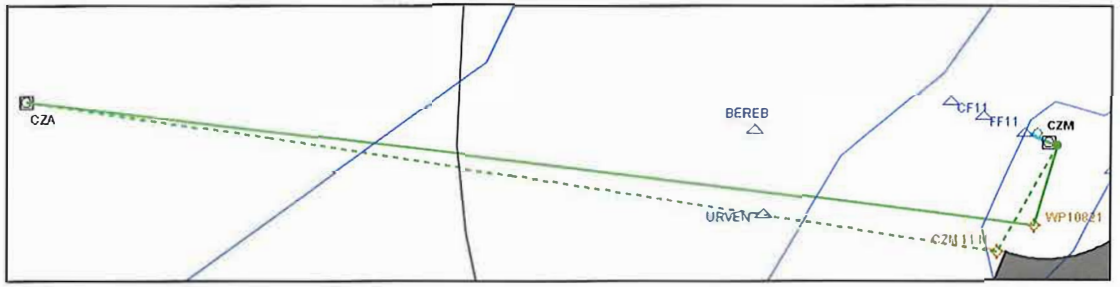


Figure A-30. CZM Runway 11: CZM DEP CZA 11

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP N 11

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34"	W086° 55' 00"	20.5095	-86.9166
ghost	N20° 30' 07"	W086° 53' 59"	20.5019	-86.8998
WP10822	N20° 52' 53"	W086° 26' 30"	20.8813	-86.4416
WP10803	N21° 51' 52"	W086° 53' 18"	21.8644	-86.8884

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34.40"	W086° 54' 59.92"	20.5095	-86.9166
ghost	N20° 30' 07.02"	W086° 53' 59.42"	20.5019	-86.8998
WP10867	N20° 30' 30.00"	W086° 30' 44.00"	20.5083	-86.5122
CZM 11 M	N20° 51' 57.38"	W086° 30' 38.10"	20.8659	-86.5105
WP10803	N21° 51' 52.00"	W086° 53' 18.00"	21.8644	-86.8883

Rationale for Modification: added miles to ensure that aircraft would be above CUN departures and align with modified CUN departure route going to the same TMA exit point

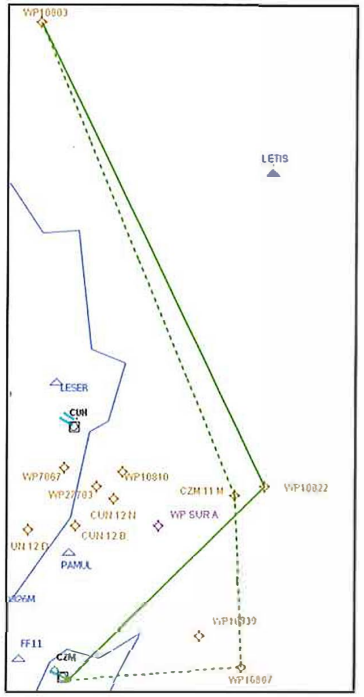


Figure A-31. CZM Runway 11: CZM DEP N 11

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP N 11 2

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34"	W086° 55' 00"	20.5095	-86.9166
ghost	N20° 30' 07"	W086° 53' 59"	20.5019	-86.8998
WP10822	N20° 52' 53"	W086° 26' 30"	20.8813	-86.4416
WP10806	N21° 13' 07"	W086° 28' 53"	21.2186	-86.4815
WP10807	N21° 48' 19"	W086° 32' 18"	21.8052	-86.5383

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34.40"	W086° 54' 59.92"	20.5095	-86.9166
ghost	N20° 30' 07.03"	W086° 53' 59.42"	20.5019	-86.8998
WP10867	N20° 30' 30.00"	W086° 30' 44.00"	20.5083	-86.5122
CZM 11 M	N20° 51' 57.38"	W086° 30' 38.10"	20.8659	-86.5105
WP10807	N21° 48' 20.89"	W086° 32' 12.38"	21.8058	-86.5367

Rationale for Modification: added miles to ensure that aircraft would be above CUN departures and align with modified CUN departure route going to the same TMA exit point

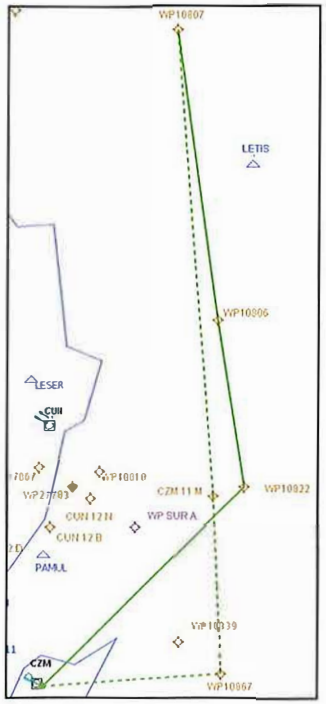


Figure A-32. CZM Runway 11: CZM DEP N 11 2

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP NUKAN 11

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34"	W086° 55' 00"	20.5095	-86.9166
ghost	N20° 30' 07"	W086° 53' 59"	20.5019	-86.8998
WP10822	N20° 52' 53"	W086° 26' 30"	20.8813	-86.4416
NUKAN	N21° 29' 34"	W085° 44' 17"	21.4927	-85.738

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34.40"	W086° 54' 59.92"	20.5095	-86.9166
ghost	N20° 30' 07.03"	W086° 53' 59.42"	20.5019	-86.8998
WP10867	N20° 30' 30.00"	W086° 30' 44.00"	20.5083	-86.5122
CZM11M	N20° 51' 57.38"	W086° 30' 38.10"	20.8659	-86.5105
NUKAN	N21° 29' 34.00"	W085° 44' 17.00"	21.4927	-85.738

Rationale for Modification: added miles to ensure that aircraft would be above CUN departures and merge with the north departures

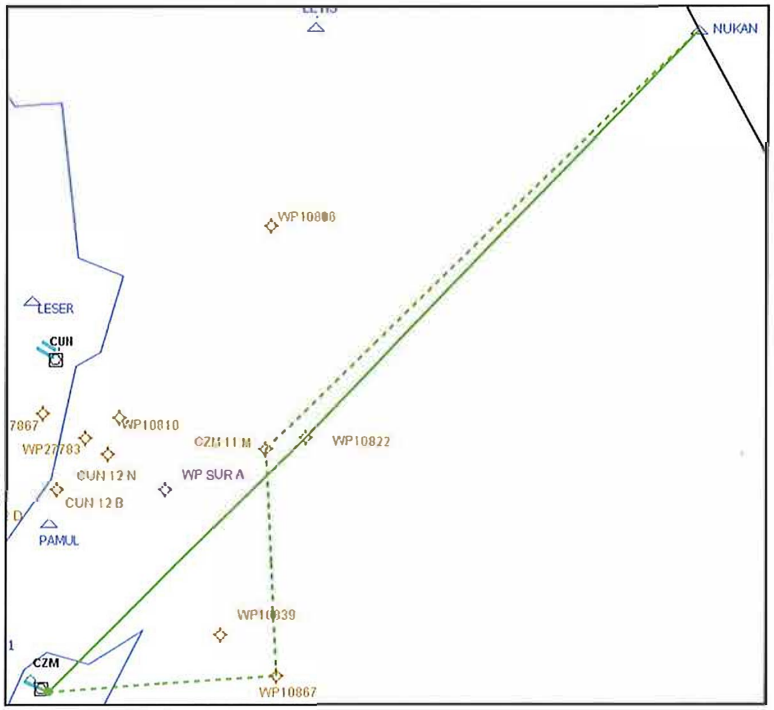


Figure A-33. CZM Runway 11: CZM DEP NUKAN 11

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP S 11

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34"	W086° 55' 00"	20.5095	-86.9166
ghost	N20° 30' 07"	W086° 53' 59"	20.5019	-86.8998
WP10821	N20° 23' 29"	W086° 56' 29"	20.3913	-86.9412
WP10797	N19° 51' 22"	W087° 27' 49"	19.8559	-87.4636

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34.40"	W086° 54' 59.92"	20.5095	-86.9166
ghost	N20° 30' 07.03"	W086° 53' 59.42"	20.5019	-86.8998
CZM 11 N	N20° 23' 55.06"	W086° 57' 21.76"	20.3986	-86.956
WP10797	N19° 51' 21.59"	W087° 27' 49.12"	19.8559	-87.4636

Rationale for Modification: ensure that departure does not enter the unoffical SUA, decrease track miles and moved farther away from downwind before dividing

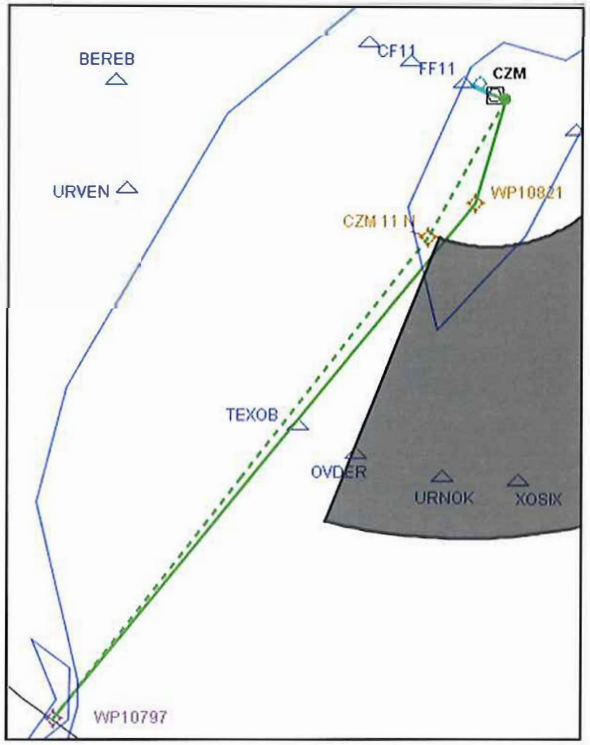


Figure A-34. CZM Runway 11: CZM DEP S 11

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP SW 11

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34"	W086° 55' 00"	20.5095	-86.9166
ghost	N20° 30' 07"	W086° 53' 59"	20.5019	-86.8998
URVEN	N20° 25' 43"	W087° 20' 52"	20.4286	-87.3477

Rationale for Modification: assumed that this route was the same as the CZA route and so deleted it

Figure A-35. CZM Runway 11: CZM DEP SW 11

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CZM DEP DANUL 11
Airport: MMCZ
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34"	W086° 55' 00"	20.5095	-86.9166
ghost	N20° 30' 07"	W086° 53' 59"	20.5019	-86.8998
AXENI	N20° 23' 02"	W086° 14' 18"	20.3838	-862383

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW11:DER	N20° 30' 34.40"	W086° 54' 59.92"	20.5095	-86.9166
ghost	N20° 30' 07.03"	W086° 53' 59.42"	20.5019	-86.8998
AVSEB	N20° 22' 13.00"	W086° 13' 31.00"	20.3702	-86.2252

Rationale for Modification: Added new fix AVSEB

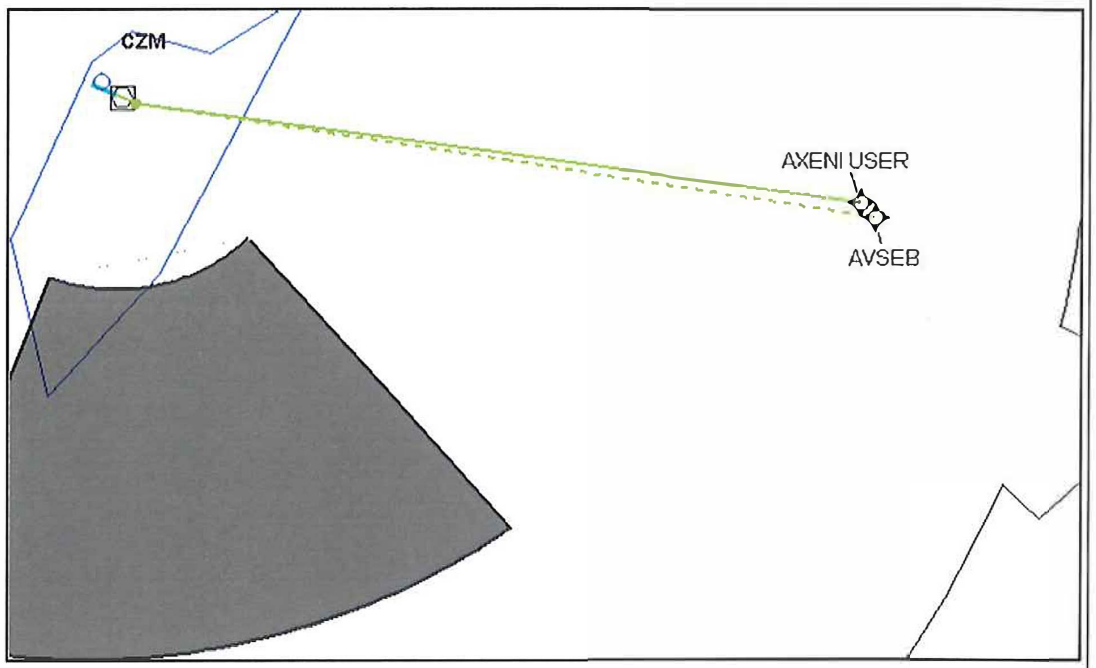


Figure A-36. CZM Runway 11: CZM DEP DANUL 11

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP CZA 29

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12"	W086° 56' 24"	20.5201	-86.9399
ghost	N20° 31' 40"	W086° 57' 25"	20.5277	-86.9569
WP10851	N20° 18' 55"	W087° 06' 17"	20.3151	-87.1046
CZA	N20° 38' 35"	W088° 26' 54"	20.643	-88.4482

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12.38"	W086° 56' 23.77"	20.5201	-86.9399
ghost	N20° 31' 40.03"	W086° 57' 24.90"	20.5277	-86.9569
CZM 29 F	N20° 32' 08.57"	W087° 48' 07.67"	20.5357	-87.8021
CZA	N20° 38' 35.01"	W088° 26' 53.63"	20.643	-88.4482

Rationale for Modification: moved route to simplify the crossing with the arrivals from the north and to decrease track miles. If TMA exit point can change then suggest that the waypoint CZM 29 F is elminated to further decrease track miles.

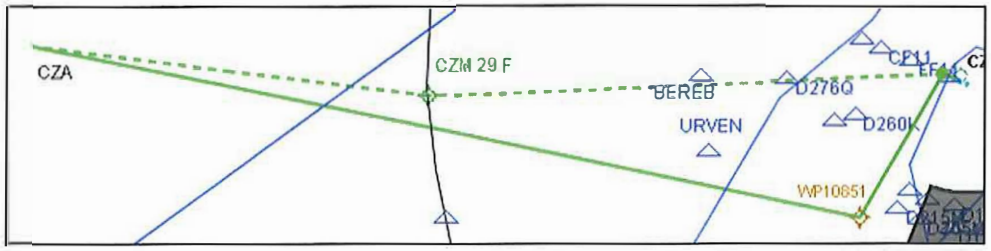


Figure A-37. CZM Runway 29: CZM DEP CZA 29

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP N 29

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12"	W086° 56' 24"	20.5201	-86.9399
ghost	N20° 31' 40"	W086° 57' 25"	20.5277	-86.9569
WP10851	N20° 18' 55"	W087° 06' 17"	20.3151	-87.1046
WP10865	N20° 15' 09"	W087° 08' 57"	20.2525	-87.1491
WP10866	N20° 12' 04"	W086° 36' 03"	20.2011	-86.6009
WP10867	N20° 30' 30"	W086° 30' 44"	20.5082	-86.5121
WP10822	N20° 52' 53"	W086° 26' 30"	20.8813	-86.4416
WP10803	N21° 51' 52"	W086° 53' 18"	21.8644	-86.8884

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12.38"	W086° 56' 23.77"	20.5201	-86.9399
ghost	N20° 31' 40.03"	W086° 57' 24.90"	20.5277	-86.9569
WP10851	N20° 18' 54.51"	W087° 06' 16.63"	20.3151	-87.1046
WP10865	N20° 15' 09.13"	W087° 08' 57.08"	20.2525	-87.1491
WP10866	N20° 12' 04.05"	W086° 36' 03.37"	20.2011	-86.6009
WP10867	N20° 30' 29.72"	W086° 30' 43.92"	20.5082	-86.5121
CZM 11 M	N20° 51' 57.38"	W086° 30' 38.10"	20.8659	-86.5105
WP10803	N21° 51' 50.30"	W086° 53' 10.42"	21.8639	-86.8862

Rationale for Modification: moved to align with modified CUN departure route over the same TMA exit point and to decrease track miles

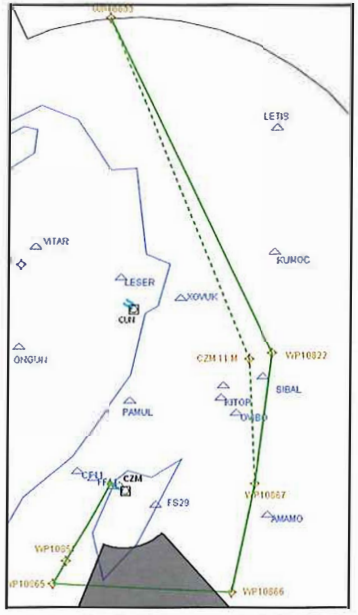


Figure A-38. CZM Runway 29: CZM DEP N 29

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)
Route:CZM DEP N 29 2
Airport: MMCZ
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12"	W086° 56' 24"	20.5201	-86.9399
ghost	N20° 31' 40"	W086° 57' 25"	20.5277	-86.9569
WP10851	N20° 18' 55"	W087° 06' 17"	20.3151	-87.1046
WP10865	N20° 15' 09"	W087° 08' 57"	20.2525	-87.1491
WP10866	N20° 12' 04"	W086° 36' 03"	20.2011	-86.6009
WP10867	N20° 30' 30"	W086° 30' 44"	20.5082	-86.5121
WP10822	N20° 52' 53"	W086° 26' 30"	20.8813	-86.4416
WP10807	N21° 48' 19"	W086° 32' 18"	21.8052	-86.5383

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12.38"	W086° 56' 23.77"	20.5201	-86.9399
ghost	N20° 31' 40.03"	W086° 57' 24.90"	20.5277	-86.9569
WP10851	N20° 18' 54.51"	W087° 06' 16.63"	20.3151	-87.1046
WP10865	N20° 15' 09.13"	W087° 08' 57.08"	20.2525	-87.1491
WP10866	N20° 12' 04.05"	W086° 36' 03.37"	20.2011	-86.6009
WP10867	N20° 30' 29.72"	W086° 30' 43.92"	20.5082	-86.5121
CZM 11 M	N20° 51' 57.38"	W086° 30' 38.10"	20.8659	-86.5105
WP10807	N21° 48' 20.89"	W086° 32' 12.38"	21.8058	-86.5367

Rationale for Modification: moved to align with modified CUN departure route over the same TMA exit point and to decrease track miles

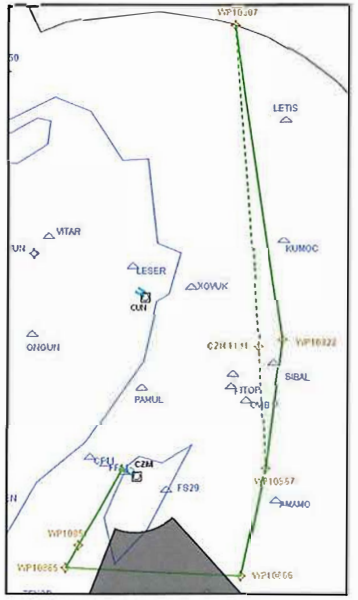


Figure A-39. CZM Runway 29: CZM DEP N 29 2

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP NUKAN 29

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12"	W086° 56' 24"	20.5201	-86.9399
ghost	N20° 31' 40"	W086° 57' 25"	20.5277	-86.9569
WP10851	N20° 18' 55"	W087° 06' 17"	20.3151	-87.1046
WP10865	N20° 15' 09"	W087° 08' 57"	20.2525	-87.1491
WP10866	N20° 12' 04"	W086° 36' 03"	20.2011	-86.6009
WP10867	N20° 30' 30"	W086° 30' 44"	20.5082	-86.5121
WP10822	N20° 52' 53"	W086° 26' 30"	20.8813	-86.4416
NUKAN	N21° 29' 34"	W085° 44' 17"	21.4927	-85.738

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12.38"	W086° 56' 23.77"	20.5201	-86.9399
ghost	N20° 31' 40.03"	W086° 57' 24.90"	20.5277	-86.9569
WP10851	N20° 18' 54.51"	W087° 06' 16.63"	20.3151	-87.1046
WP10865	N20° 15' 09.13"	W087° 08' 57.08"	20.2525	-87.1491
WP10866	N20° 12' 04.05"	W086° 36' 03.37"	20.2011	-86.6009
WP10867	N20° 30' 29.72"	W086° 30' 43.92"	20.5082	-86.5121
NUKAN	N21° 29' 34.00"	W085° 44' 17.00"	21.4927	-85.738
deleted WP10822				

Rationale for Modification: decrease track miles

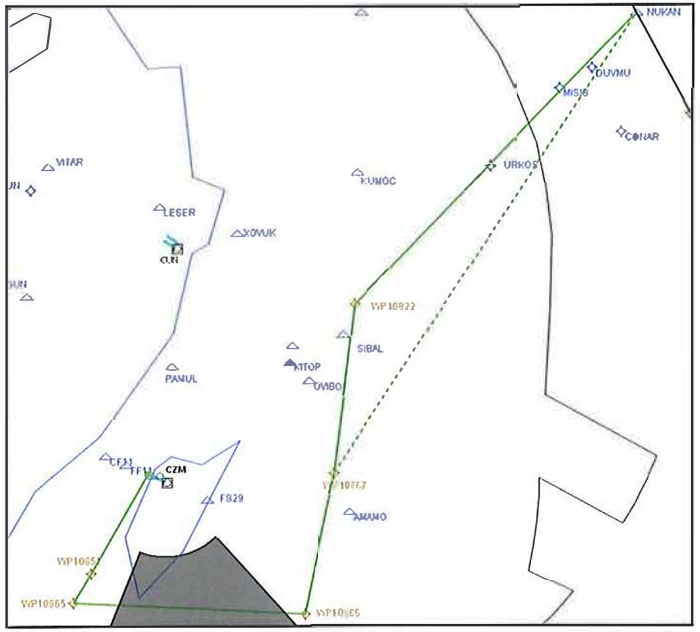


Figure A-40. CZM Runway 29: CZM DEP NUKAN 29

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)
Route:CZM DEP S 29
Airport: MMCZ
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12"	W086° 56' 24"	20.5201	-86.9399
ghost	N20° 31' 40"	W086° 57' 25"	20.5277	-86.9569
WP10851	N20° 18' 55"	W087° 06' 17"	20.3151	-87.1046
WP10865	N20° 15' 09"	W087° 08' 57"	20.2525	-87.1491
WP10797	N19° 51' 22"	W087° 27' 49"	19.8559	-87.4636

Figure A-41. CZM Runway 29: CZM DEP S 29

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP SW 29

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12"	W086° 56' 24"	20.5201	-86.9399
ghost	N20° 31' 40"	W086° 57' 25"	20.5277	-86.9569
WP10851	N20° 18' 55"	W087° 06' 17"	20.3151	-87.1046
CZM W	N20° 24' 20"	W087° 28' 18"	20.4055	-87.4716

Rationale for Modification: Route not necessary if have CZA route

Figure A-42. CZM Runway 29: CZM DEP SW 29

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP N 29 2 Low Performing Aircraft

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12"	W086° 56' 24"	20.5201	-86.9399
ghost	N20° 31' 40"	W086° 57' 25"	20.5277	-86.9569
WP10867	N20° 30' 30"	W086° 30' 44"	20.5082	-86.5121
WP10822	N20° 52' 53"	W086° 26' 30"	20.8813	-86.4416
WP10807	N21° 48' 19"	W086° 32' 18"	21.8052	-86.5383

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12.38"	W086° 56' 23.77"	20.5201	-86.9399
ghost	N20° 31' 40.03"	W086° 57' 24.90"	20.5277	-86.9569
CZM 29 G	N20° 32' 23.75"	W086° 56' 58.09"	20.5399	-86.9494
WP10867	N20° 30' 29.72"	W086° 30' 43.92"	20.5082	-86.5121
CZM 11 M	N20° 51' 57.38"	W086° 30' 38.10"	20.8659	-86.5105
WP10807	N21° 48' 20.89"	W086° 32' 12.38"	21.8058	-86.5367

Rationale for Modification: moved to align with modified CUN departure route over the same TMA exit point and to decrease track miles

Figure A-43. CZM Runway 29: CZM DEP N 29 2 Low Performing

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP N 29 Low Performing Aircraft

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12"	W086° 56' 24"	20.5201	-86.9399
ghost	N20° 31' 40"	W086° 57' 25"	20.5277	-86.9569
WP10867	N20° 30' 30"	W086° 30' 44"	20.5082	-86.5121
WP10822	N20° 52' 53"	W086° 26' 30"	20.8813	-86.4416
WP10803	N21° 51' 52"	W086° 53' 18"	21.8644	-86.8884

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12.38"	W086° 56' 23.77"	20.5201	-86.9399
ghost	N20° 31' 40.03"	W086° 57' 24.90"	20.5277	-86.9569
CZM 29 G	N20° 32' 23.75"	W086° 56' 58.09"	20.5399	-86.9494
WP10867	N20° 30' 29.72"	W086° 30' 43.92"	20.5082	-86.5121
CZM 11 M	N20° 51' 57.38"	W086° 30' 38.10"	20.8659	-86.5105
WP10803	N21° 51' 50.30"	W086° 53' 10.42"	21.8639	-86.8862

Rationale for Modification: moved to align with modified CUN departure route over the same TMA exit point and to decrease track miles

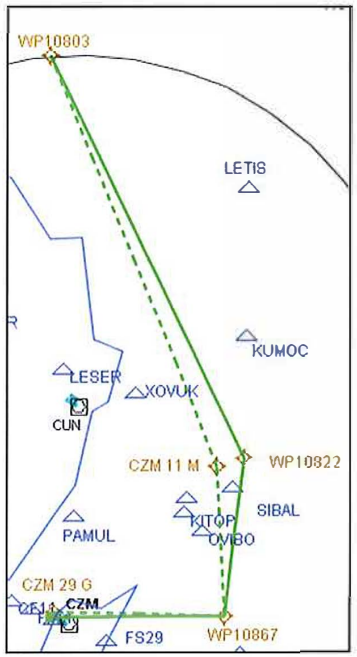


Figure A-44. CZM Runway 29: CZM DEP N 29 Low Performing

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CZM DEP NUKAN 29 Low Performing Aircraft

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12"	W086° 56' 24"	20.5201	-86.9399
ghost	N20° 31' 40"	W086° 57' 25"	20.5277	-86.9569
WP10867	N20° 30' 30"	W086° 30' 44"	20.5082	-86.5121
WP10822	N20° 52' 53"	W086° 26' 30"	20.8813	-86.4416
NUKAN	N21° 29' 34"	W085° 44' 17"	21.4927	-85.738

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMCZ:RW29:DER	N20° 31' 12.38"	W086° 56' 23.77"	20.5201	-86.9399
ghost	N20° 31' 40.03"	W086° 57' 24.90"	20.5277	-86.9569
CZM 29 G	N20° 32' 23.75"	W086° 56' 58.09"	20.5399	-86.9494
WP10867	N20° 30' 29.72"	W086° 30' 43.92"	20.5082	-86.5121
NUKAN	N21° 29' 34.00"	W085° 44' 17.00"	21.4927	-85.738
deleted WP 10822				

Rationale for Modification: decrease track miles and more graceful turn off of runway

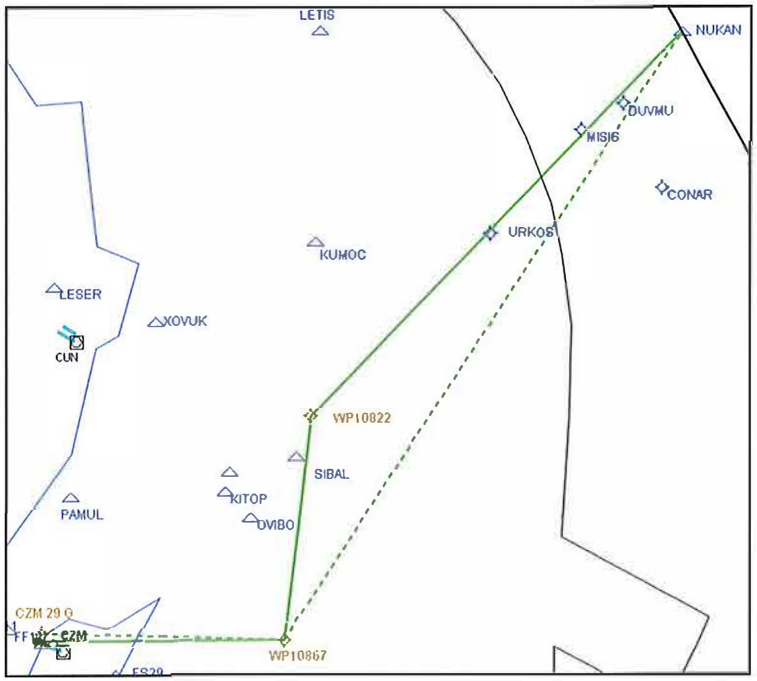


Figure A-45. CZM Runway 29: CZM DEP NUKAN 29 Low Performing

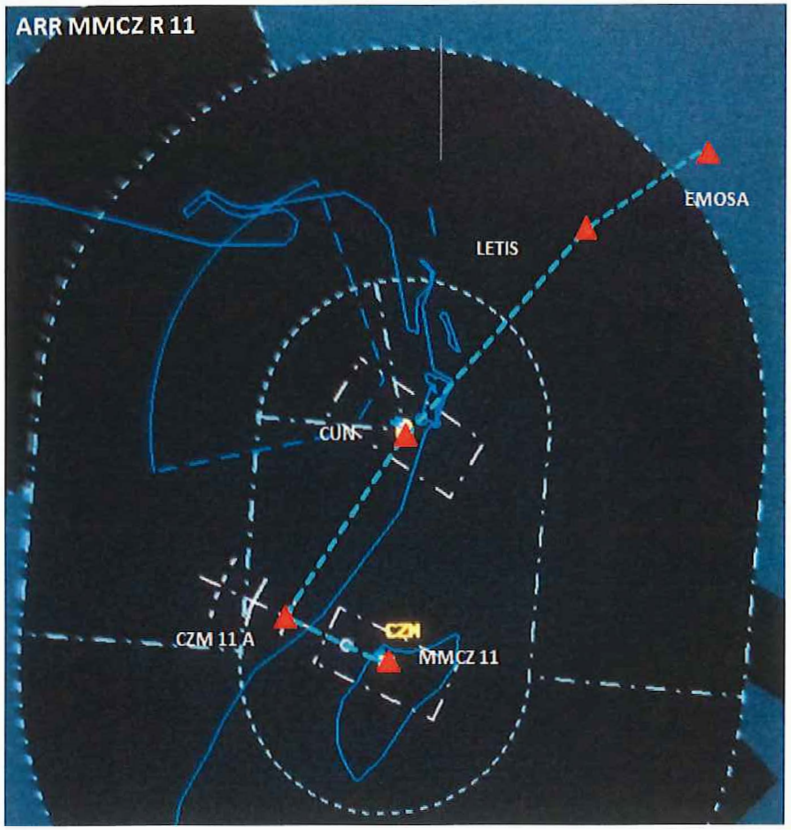
CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM ARR EMOSA 11

Airport: MMCZ

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
EMOSA	N21° 49' 21"	W085° 54' 29"	21.8225	-85.908
LETIS	N21° 31' 43"	W086° 23' 24"	21.5286	-86.39
CUN	N21° 01' 30"	W086° 51' 32"	21.0251	-86.8589
CZM 11 A	N20° 36' 29"	W087° 10' 16"	20.608	-87.1711
MMCZ 11	N20° 30' 35"	W086° 54' 50"	20.5097	-86.9138



	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
EMOSA	N21° 49' 21.00"	W085° 54' 29.00"	21.8225	-85.908
LETIS	N21° 31' 43.00"	W086° 23' 24.00"	21.5286	-86.39
CUN	N21° 01' 30.39"	W086° 51' 32.38"	21.0251	-86.8589
CZM 11 X	N20° 51' 00.49"	W087° 08' 34.07"	20.8501	-87.1427
CZM 11 P	N20° 37' 17.92"	W087° 09' 59.65"	20.6216	-87.1665
MMCZ:RW11:AER	N20° 31' 09.53"	W086° 56' 17.57"	20.5193	-86.9382

Rationale for Modification: decrease the number of routes that are merging at one time on the final and line up the final with the runway

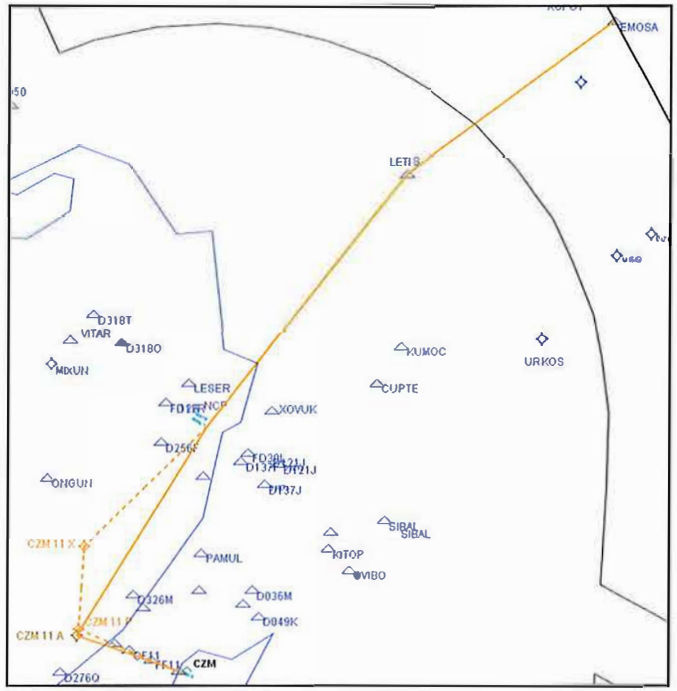


Figure A-46. CZM Runway 11: CZM ARR EMOSA 11

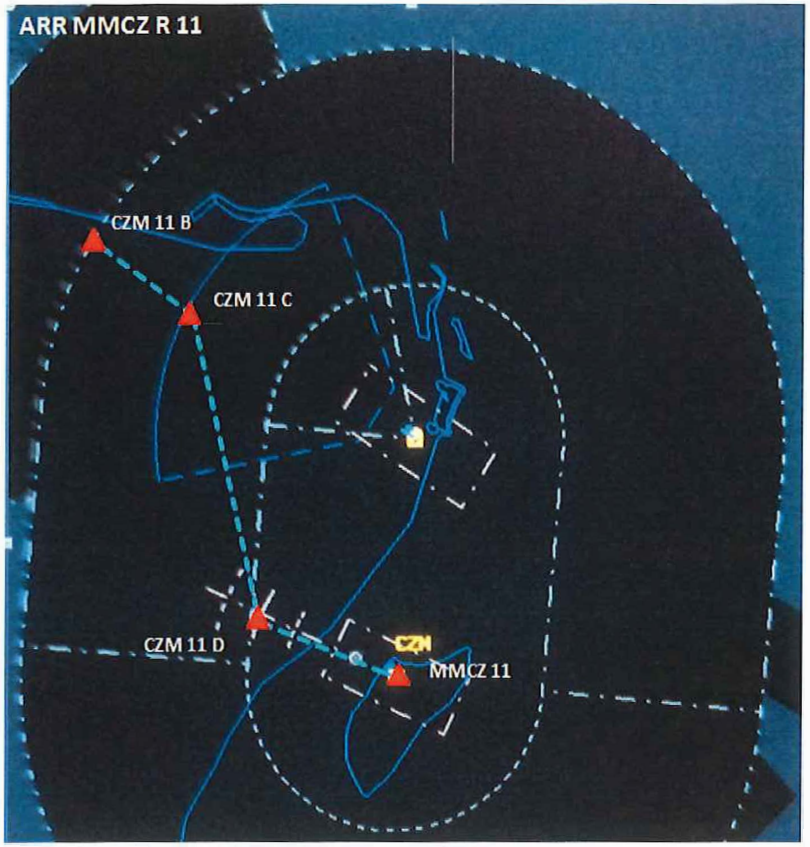
CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM ARR NW 11

Airport: MMCZ

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
CZM 11 B	N21° 28' 32"	W087° 36' 40"	21.4755	-87.6111
CZM 11 C	N21° 20' 00"	W087° 24' 38"	21.3333	-87.4105
CZM 11 D	N20° 37' 58"	W087° 13' 57"	20.6327	-87.2325
MMCZ 11	N20° 30' 35"	W086° 54' 50"	20.5097	-86.9138



	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
CZM 11 B	N21° 28' 32.00"	W087° 36' 40.00"	21.4755	-87.6111
CZM 11 X	N20° 51' 00.49"	W087° 08' 34.07"	20.8501	-87.1427
CZM 11 P	N20° 37' 17.92"	W087° 09' 59.65"	20.6216	-87.1665
MMCZ:RW11:AER	N20° 31' 09.53"	W086° 56' 17.57"	20.5193	-86.9382

Rationale for Modification: cross the CUN arrival route sooner, decrease track miles, decrease the number of routes merging on final and line up the final with the runway

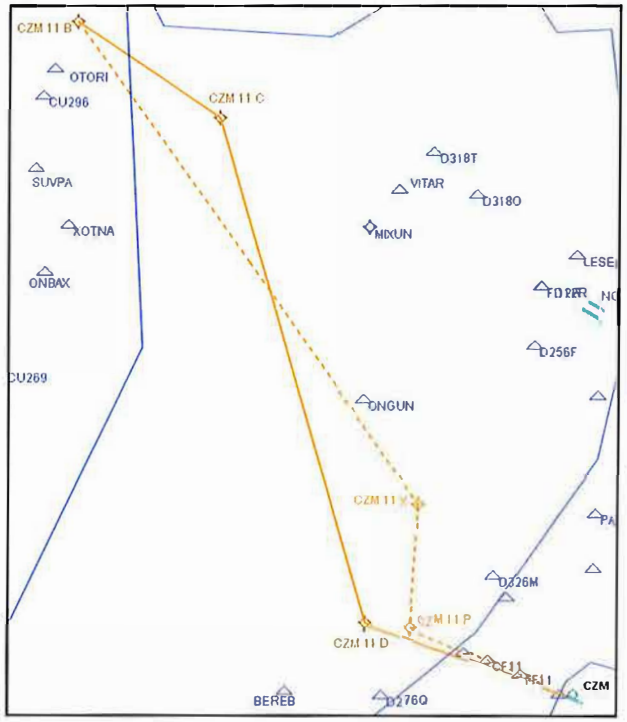


Figure A-47. CZM Runway 11: CZM ARR NW 11

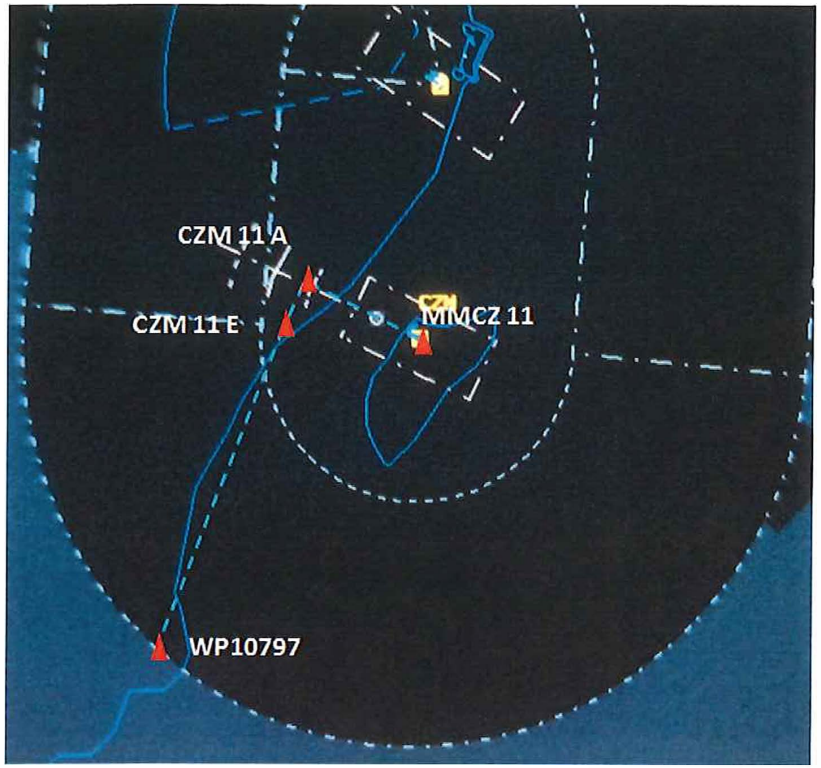
CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM ARR CTM 11

Airport: MMCZ

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10797	N19° 51' 22"	W087° 27' 49"	19.8559	-87.4636
CZM 11 E	N20° 31' 47"	W087° 12' 30"	20.5297	-87.2083
CZM 11 A	N20° 36' 29"	W087° 10' 16"	20.608	-87.1711
MMCZ 11	N20° 30' 35"	W086° 54' 50"	20.5097	-86.9138



	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10797	N19° 51' 21.59"	W087° 27' 49.12"	19.8559	-87.4636
CZM 11 W	N20° 18' 10.88"	W087° 23' 52.02"	20.303	-87.3977
CZM 11 T	N20° 31' 44.07"	W087° 12' 29.08"	20.5289	-87.208
CZM 11 P	N20° 37' 17.92"	W087° 09' 59.65"	20.6216	-87.1665
MMCZ RW11 AER	N20° 31' 09.53"	W086° 56' 17.57"	20.5193	-86.9382

Rationale for Modification: decrease the number of routes merging on the base leg and line up the final with the runway

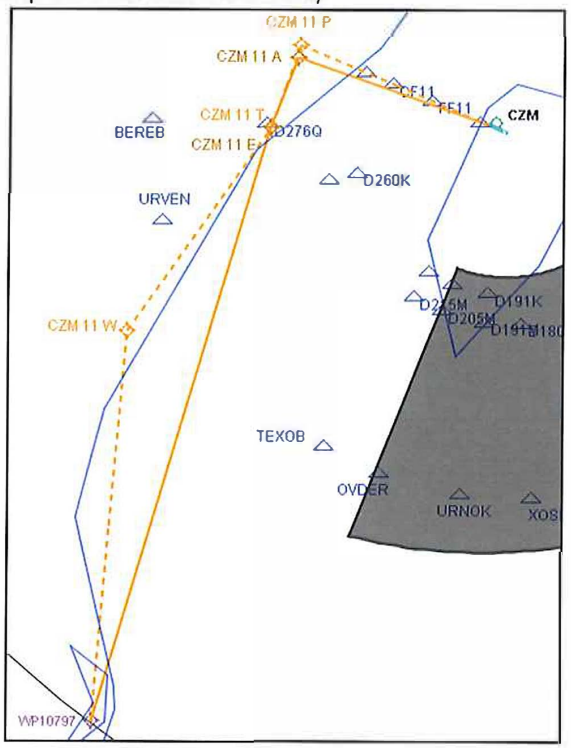


Figure A-48. CZM Runway 11: CZM ARR CTM 11

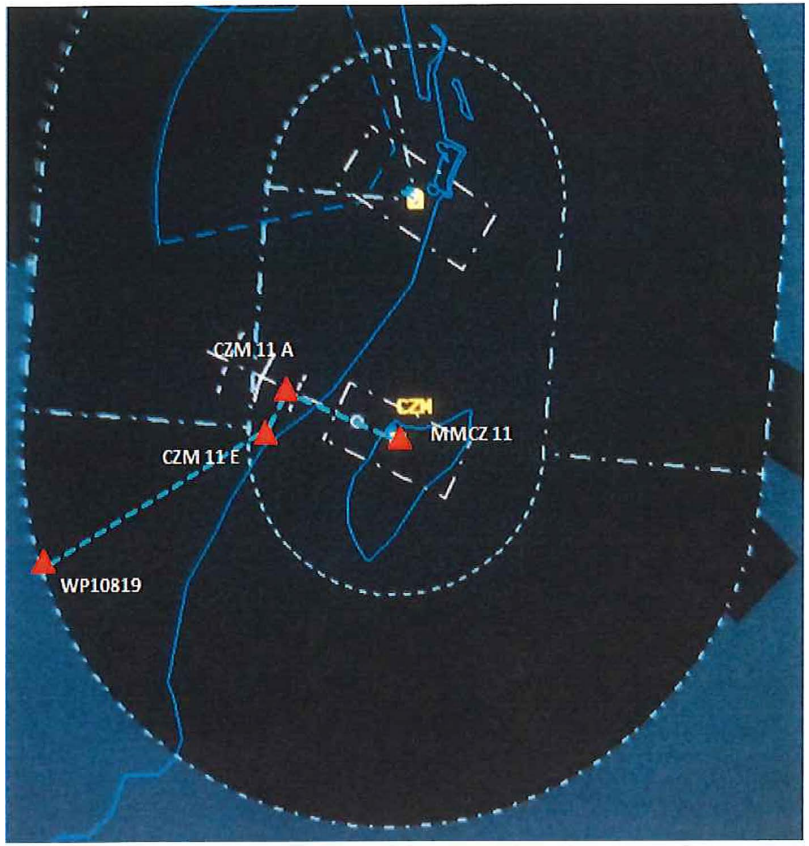
CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM ARR SW 11

Airport: MMCZ

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10819	N20° 13' 47"	W087° 45' 01"	20.2298	-87.7502
CZM 11 E	N20° 31' 47"	W087° 12' 30"	20.5297	-87.2083
CZM 11 A	N20° 36' 29"	W087° 10' 16"	20.608	-87.1711
MMCZ 11	N20° 30' 35"	W086° 54' 50"	20.5097	-86.9138



	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10819	N20° 13' 47.37"	W087° 45' 01.02"	20.2298	-87.7502
CZM 11 W	N20° 18' 10.88"	W087° 23' 52.02"	20.303	-87.3977
CZM 11 T	N20° 31' 44.07"	W087° 12' 29.08"	20.5289	-87.208
CZM 11 P	N20° 37' 17.92"	W087° 09' 59.65"	20.6216	-87.1665
MMCZ:RW11:AER	N20° 31' 09.53"	W086° 56' 17.57"	20.5193	-86.9382

Rationale for Modification: decrease the number of routes merging on the base leg and line up the final with the runway

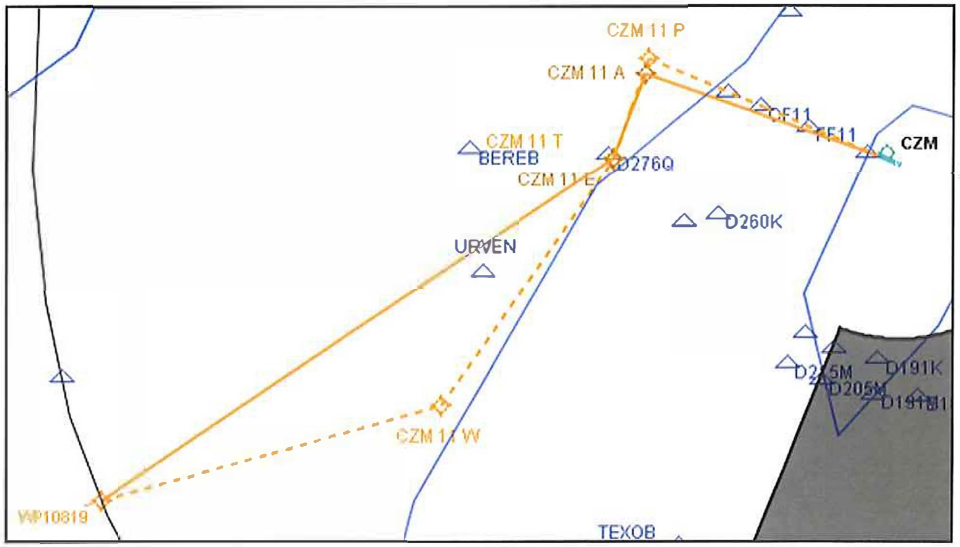


Figure A-49. CZM Runway 11: CZM ARR SW 11

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

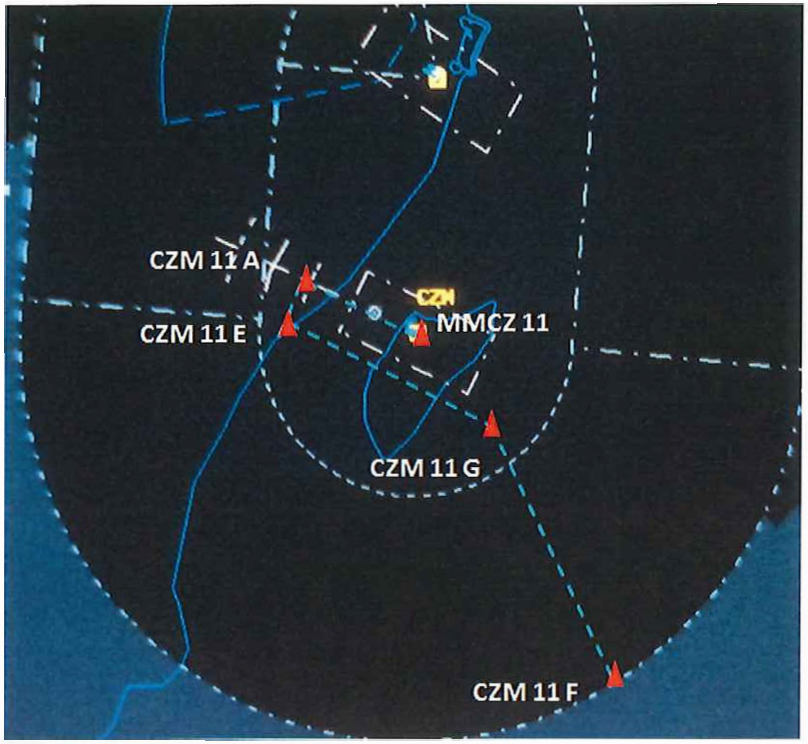
Route:CZM ARR S 11

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
CZM 11 F	N19° 46' 59"	W086° 27' 59"	19.783	-86.4663
CZM 11 G	N20° 18' 39"	W086° 43' 34"	20.3108	-86.7261
CZM 11 E	N20° 31' 47"	W087° 12' 30"	20.5297	-87.2083
CZM 11 A	N20° 36' 29"	W087° 10' 16"	20.608	-87.1711
MMCZ 11	N20° 30' 35"	W086° 54' 50"	20.5097	-86.9138

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
CZM 11 F	N19° 46' 59.00"	W086° 27' 59.00"	19.783	-86.4663
CZM 11 G	N20° 18' 39.00"	W086° 43' 34.00"	20.3108	-86.7261
CZM 11 E	N20° 31' 47.00"	W087° 12' 30.00"	20.5297	-87.2083
CZM 11 P	N20° 37' 17.92"	W087° 09' 59.65"	20.6216	-87.1665
MMCZ:RW11:AER	N20° 31' 09.53"	W086° 56' 17.57"	20.5193	-86.9382



Rationale for Modification: line up final with runway

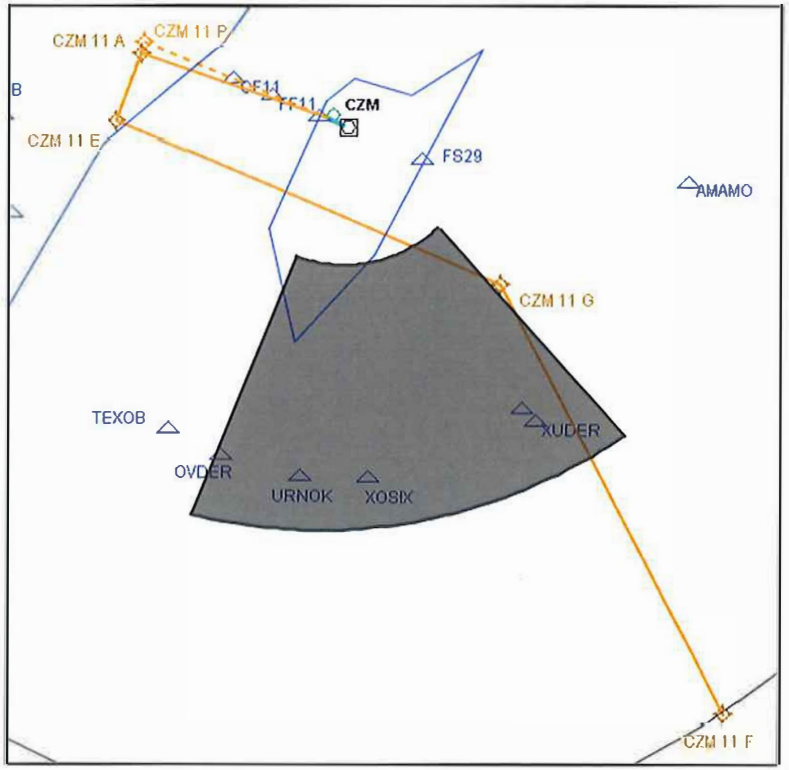
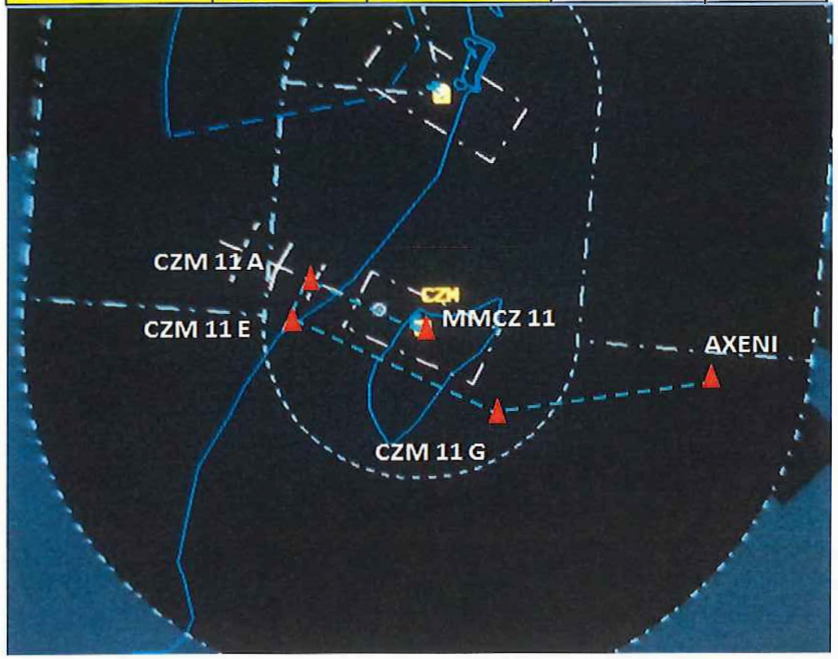


Figure A-50. CZM Runway 11: CZM ARR S 11

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)
Route:CZM ARR AXENI 11
Airport: MMCZ
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
AXENI	N20° 23' 02"	W086° 14' 18"	20.3838	-862383
CZM 11 G	N20° 18' 39"	W086° 43' 34"	20.3108	-86.7261
CZM 11 E	N20° 31' 47"	W087° 12' 30"	20.5297	-87.2083
CZM 11 A	N20° 36' 29"	W087° 10' 16"	20.608	-87.1711
MMCZ 11	N20° 30' 35"	W086° 54' 50"	20.5097	-86.9138



	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
AVSEB	N20° 22' 13.00"	W086° 13' 131.00"	20.3702	-86.2252
CZM 11 G	N20° 18' 39.00"	W086° 43' 34.00"	20.3108	-86.7261
CZM 11 E	N20° 31' 47.00"	W087° 12' 30.00"	20.5297	-87.2083
CZM 11 P	N20° 37' 17.92"	W087° 09' 59.65"	20.6216	-87.1665
MMCZ:RW11:AER	N20° 31' 09.53"	W086° 56' 17.57"	20.5193	-86.9382

Rationale for Modification: line up final with runway, new fix AVSEB added

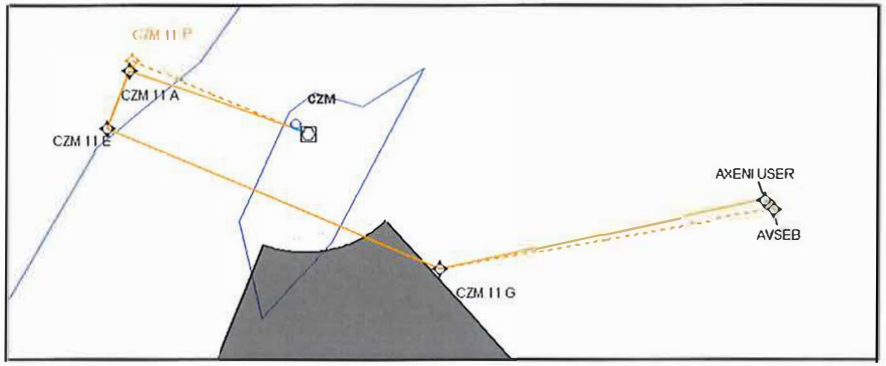


Figure A-51. CZM Runway 11: CZM ARR AXENI 11

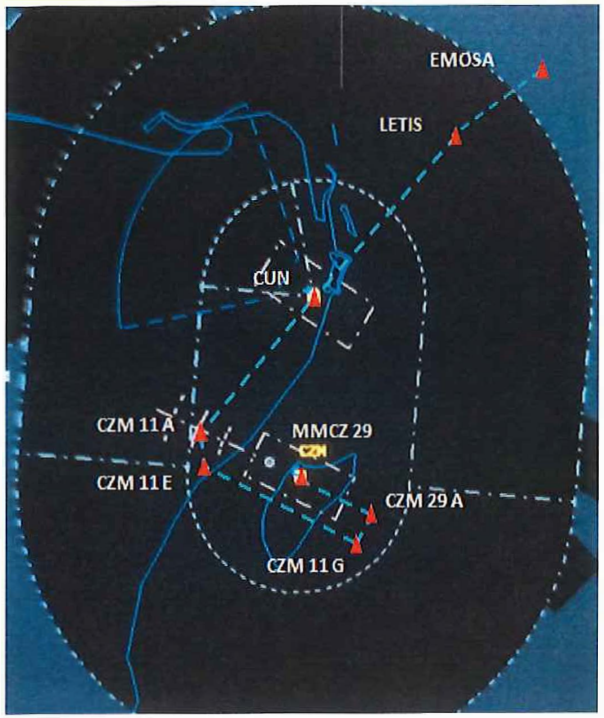
CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CZM ARR EMOSA 29

Airport: MMCZ

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
EMOSA	N21° 49' 21"	W085° 54' 29"	21.8225	-85.908
LETIS	N21° 31' 43"	W086° 23' 24"	21.5286	-86.39
CUN	N21° 01' 30"	W086° 51' 32"	21.0251	-86.8589
CZM 11 A	N20° 36' 29"	W087° 10' 16"	20.608	-87.1711
CZM 11 E	N20° 31' 47"	W087° 12' 30"	20.5297	-87.2083
CZM 11 G	N20° 18' 39"	W086° 43' 34"	20.3108	-86.7261
CZM 29 A	N20° 24' 25"	W086° 41' 26"	20.4069	-86.6905
MMCZ 29	N20° 30' 23"	W086° 54' 46"	20.5063	-86.9127



	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
EMOSA	N21° 49' 21.00"	W085° 54' 29.00"	21.8225	-85.908
LETIS	N21° 31' 43.00"	W086° 23' 24.00"	21.5286	-86.39
CUN	N21° 01' 30.39"	W086° 51' 32.38"	21.0251	-86.8589
CZM 11 X	N20° 51' 00.49"	W087° 08' 34.07"	20.8501	-87.1427
CZM 29 C	N20° 27' 52.81"	W087° 03' 58.31"	20.4646	-87.0661
CZM 11 G	N20° 18' 39.00"	W086° 43' 34.00"	20.3108	-86.7261
CZM 29 A	N20° 24' 25.00"	W086° 41' 26.00"	20.4069	-86.6905
MMCZ:RW29:AER	N20° 30' 34.40"	W086° 54' 59.92"	20.5095	-86.9166

Rationale for Modification: merge route with arrival route from the NW to decrease the number of routes merging at one point on the downwind, decrease track miles and improved the merge angle on the downwind

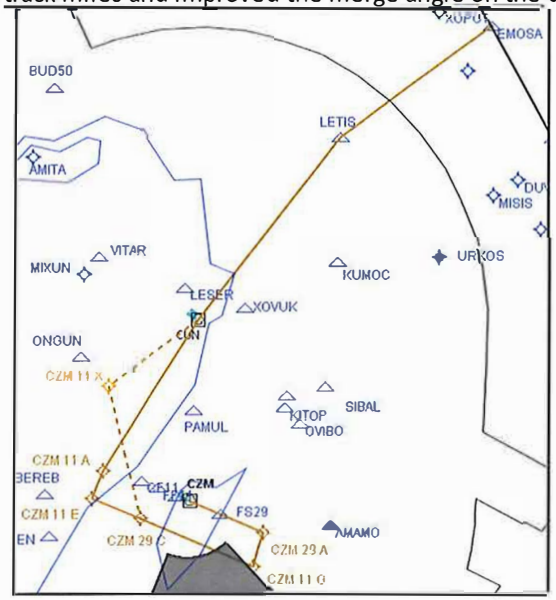


Figure A-52. CZM Runway 29: CZM ARR EMOSA 29

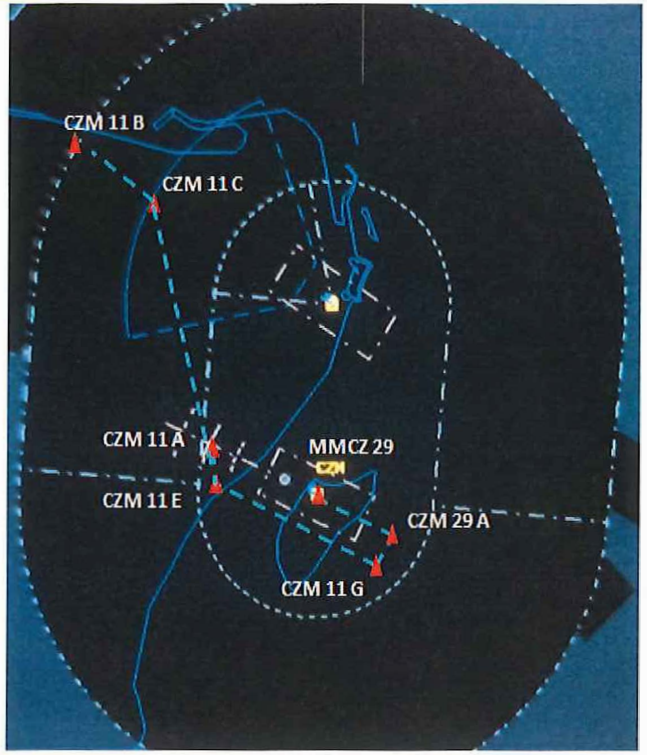
CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CZM ARR NW 29

Airport: MMCZ

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
CZM 11 B	N21° 28' 32"	W087° 36' 40"	21.4755	-87.6111
CZM 11 C	N21° 20' 00"	W087° 24' 38"	21.3333	-87.4105
CZM 11 A	N20° 36' 29"	W087° 10' 16"	20.608	-87.1711
CZM 11 E	N20° 31' 47"	W087° 12' 30"	20.5297	-87.2083
CZM 11 G	N20° 18' 39"	W086° 43' 34"	20.3108	-86.7261
CZM 29 A	N20° 24' 25"	W086° 41' 26"	20.4069	-86.6905
MMCZ 29	N20° 30' 23"	W086° 54' 46"	20.5063	-86.9127



	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
CZM 11 B	N21° 28' 32.00"	W087° 36' 40.00"	21.4755	-87.6111
CZM 11 X	N20° 51' 00.49"	W087° 08' 34.07"	20.8501	-87.1427
CZM 29 C	N20° 27' 52.81"	W087° 03' 58.31"	20.4646	-87.0661
CZM 11 G	N20° 18' 39.00"	W086° 43' 34.00"	20.3108	-86.7261
CZM 29 A	N20° 24' 25.00"	W086° 41' 26.00"	20.4069	-86.6905
MMCZ:RW29:AER	N20° 30' 34.40"	W086° 54' 59.92"	20.5095	-86.9166

Rationale for Modification: cross the CUN arrival sooner to be able to descend, reduce the number of routes merging at the same point on the downwind, decrease track miles and improved the angle of merge on the

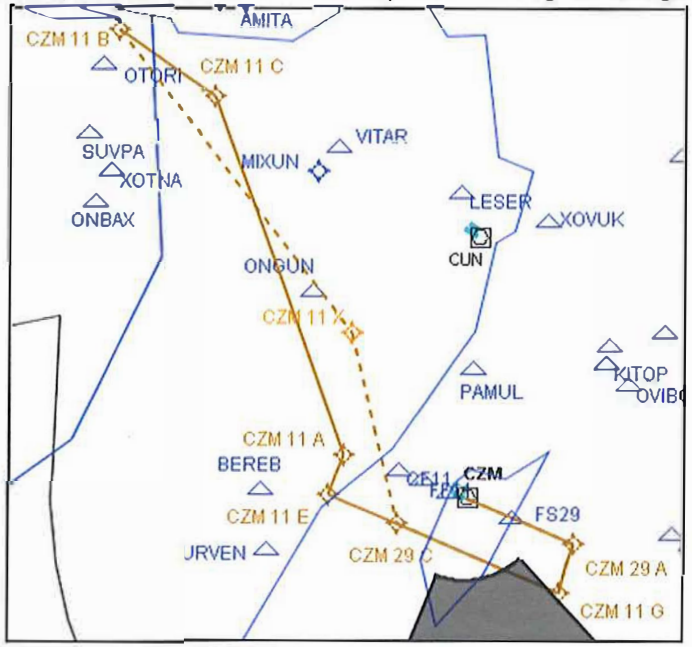


Figure A-53. CZM Runway 29: CZM ARR NW 29

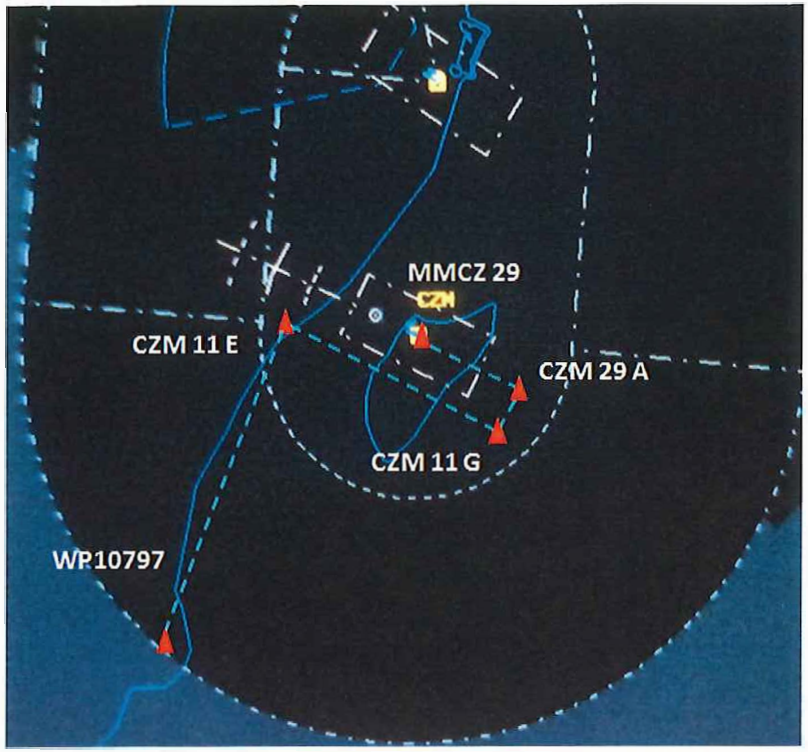
CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CZM ARR CTM 29

Airport: MMCZ

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10797	N19° 51' 22"	W087° 27' 49"	19.8559	-87.4636
CZM 11 E	N20° 31' 47"	W087° 12' 30"	20.5297	-87.2083
CZM 11 G	N20° 18' 39"	W086° 43' 34"	20.3108	-86.7261
CZM 29 A	N20° 24' 25"	W086° 41' 26"	20.4069	-86.6905
MMCZ 29	N20° 30' 23"	W086° 54' 46"	20.5063	-86.9127



	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10797	N19° 51' 21.59"	W087° 27' 49.12"	19.8559	-87.4636
CZM 29 D	N20° 21' 54.61"	W087° 14' 07.23"	20.3651	-87.2353
CZM 29 C	N20° 27' 52.81"	W087° 03' 58.31"	20.4646	-87.0661
CZM 11 G	N20° 18' 39.00"	W086° 43' 34.00"	20.3108	-86.7261
CZM 29 A	N20° 24' 25.00"	W086° 41' 26.00"	20.4069	-86.6905
MMCZ:RW29:AER	N20° 30' 34.40"	W086° 54' 59.92"	20.5095	-86.9166

Rationale for Modification: reduce the number of routes merging at the same point on the downwind, decrease track miles and improve the angle of merge on the downwind

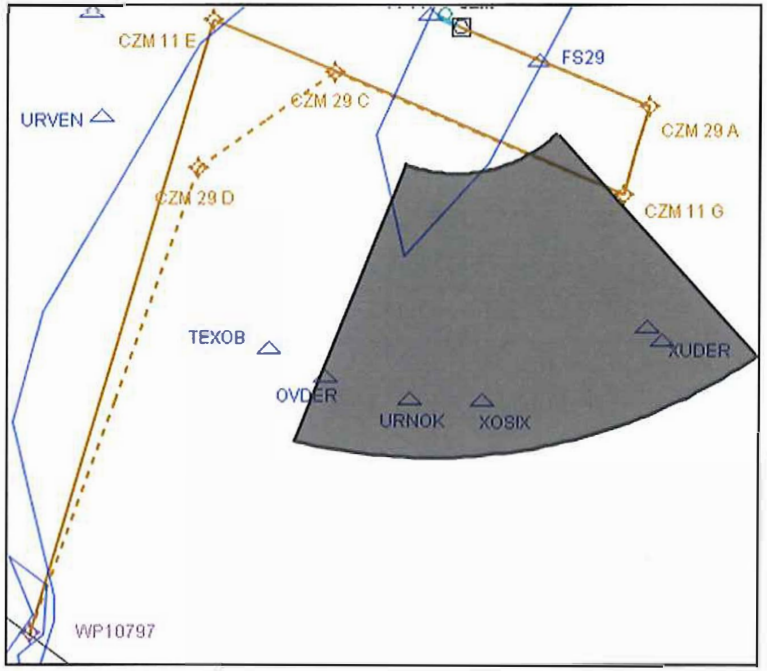


Figure A-54. CZM Runway 29: CZM ARR CTM 29

CUN Runway 30 Direction/CZM Runway 29 Direction Working DRAFT (3 JUL 2015)

Route:CZM ARR AXENI 11

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
AXENI	N20° 23' 02"	W086° 14' 18"	20.3838	-862383
CZM 29 A	N20° 24' 25"	W086° 41' 26"	20.4069	-86.6905
MMCZ 29	N20° 30' 23"	W086° 54' 46"	20.5063	-86.9127

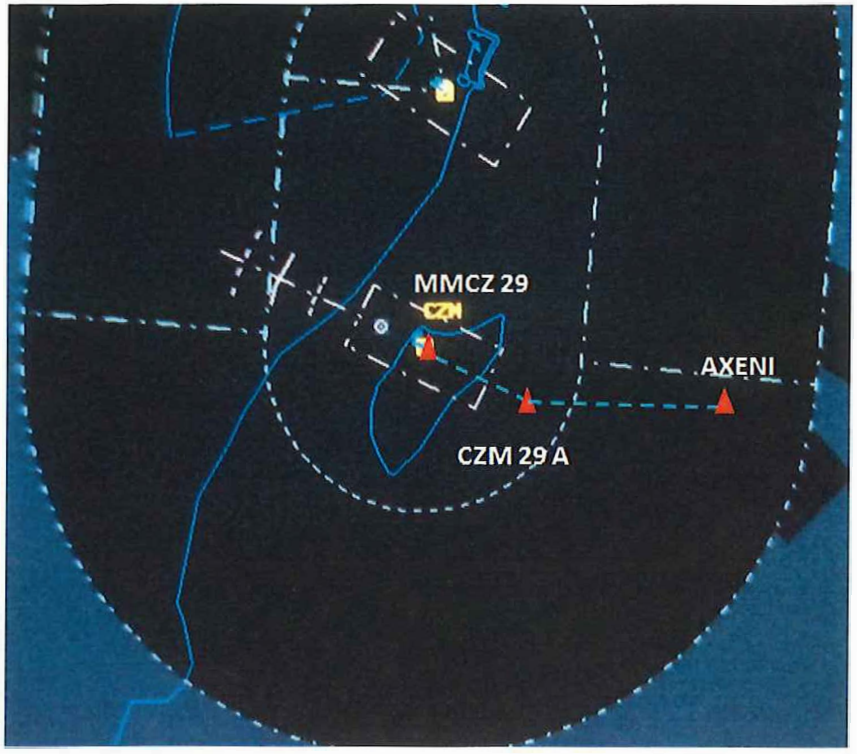


Figure A-55. CZM Runway 29: CZM ARR AXENI 29

CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM ARR S 29

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
CZM 11 F	N19° 46' 59"	W86° 27' 59"	19.783	-86.4663
CZM 11 G	N20° 18' 39"	W086° 43' 34"	20.3108	-86.7261
CZM 29 A	N20° 24' 25"	W086° 41' 26"	20.4069	-86.6905
MMCZ 29	N20° 30' 23"	W086° 54' 46"	20.5063	-86.9127

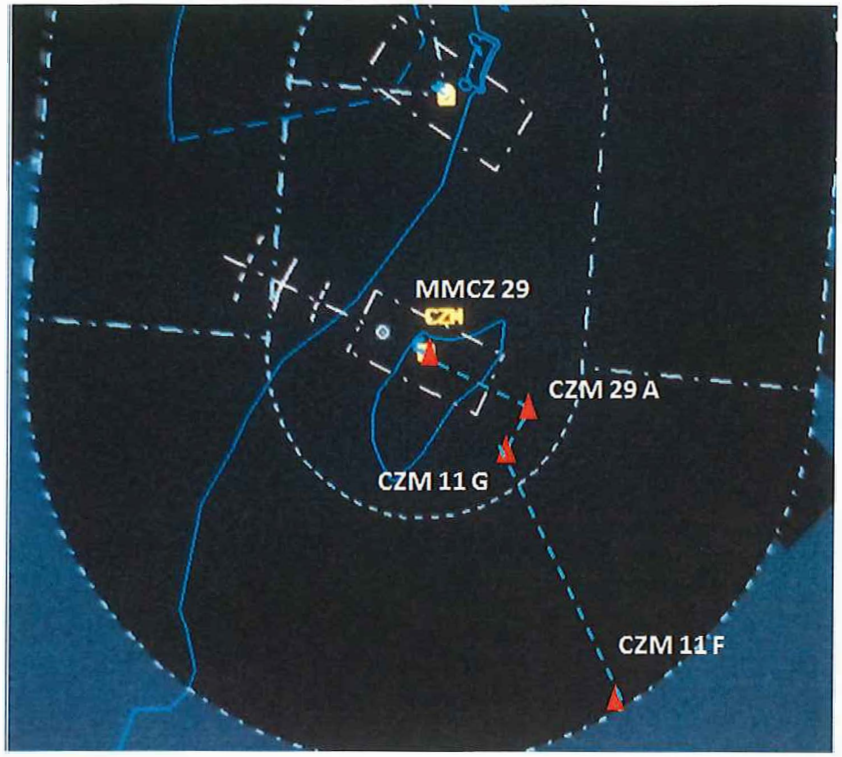


Figure A-56. CZM Runway 11: CZM ARR S 29

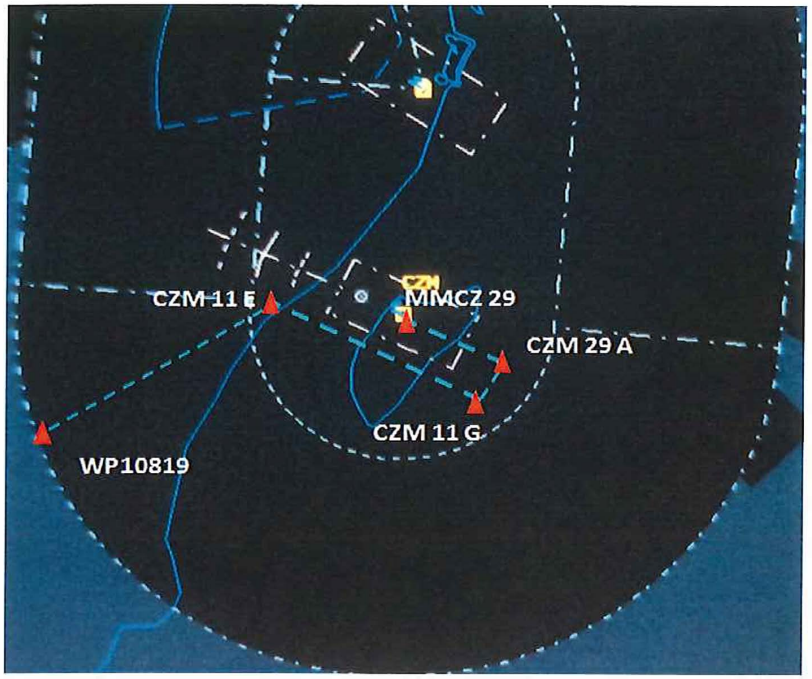
CUN Runway 12 Direction/CZM Runway 11 Direction Working DRAFT (3 JUL 2015)

Route:CZM ARR SW 29

Airport: MMCZ

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10819	N20° 13' 47"	W087° 45' 01"	20.2298	-87.7502
CZM 11 G	N20° 18' 39"	W086° 43' 34"	20.3108	-86.7261
CZM 29 A	N20° 24' 25"	W086° 41' 26"	20.4069	-86.6905
MMCZ 29	N20° 30' 23"	W086° 54' 46"	20.5063	-86.9127



	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10819	N20° 13' 47.37"	W087° 45' 01.02"	20.2298	-87.7502
CZM 29 D	N20° 21' 54.61"	W087° 14' 07.23"	20.3651	-87.2353
CZM 29 C	N20° 27' 52.81"	W087° 03' 58.31"	20.4646	-87.0661
CZM 11 G	N20° 18' 39.00"	W086° 43' 34.00"	20.3108	-86.7261
CZM 29 A	N20° 24' 25.00"	W086° 41' 26.00"	20.4069	-86.6905
MMCZ:RW29:AER	N20° 30' 34.40"	W086° 54' 59.92"	20.5095	-86.9166

Rationale for Modification: reduce the number of routes merging at the same point

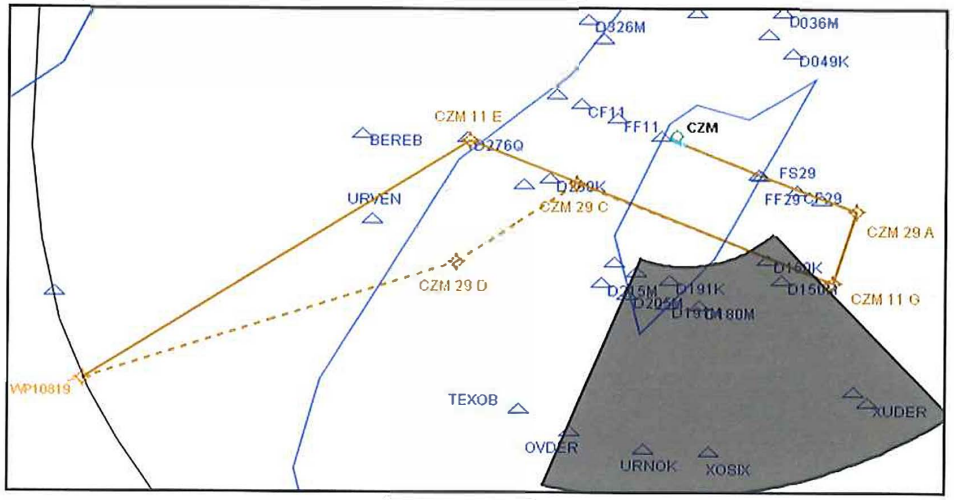


Figure A-57. CZM Runway 11: CZM ARR SW 29

Appendix B

This appendix contains MITRE's suggested route definitions for the arrival offload and the single runway departure routes. Each arrival offload figure shows the route definition and a graphic depicting the normal arrival route and the corresponding offload route. For the single runway departure route figures, a route definition table and a graphic is shown.

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CUN ARR 50W 12R Offload to 12L (20 NOV 2015)

Route:CUN ARR OFFLOAD

Airport: MMUN

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP W 50 C	N21° 13' 23.00"	W087° 43' 40.00"	21.22305556	-87.72777778
WP 30 E	N21° 10' 10.37"	W087° 15' 50.59"	21.16954722	-87.26405278
WP7860	N21° 11' 21.31"	W087° 03' 52.51"	21.18925278	-87.06458611
NW 50 B	N21° 09' 18.00"	W087° 02' 33.00"	21.155	-87.0425
MMUN:RW12L:AER	N21° 03' 17.04"	W086° 52' 52.99"	21.05473333	-86.88138611

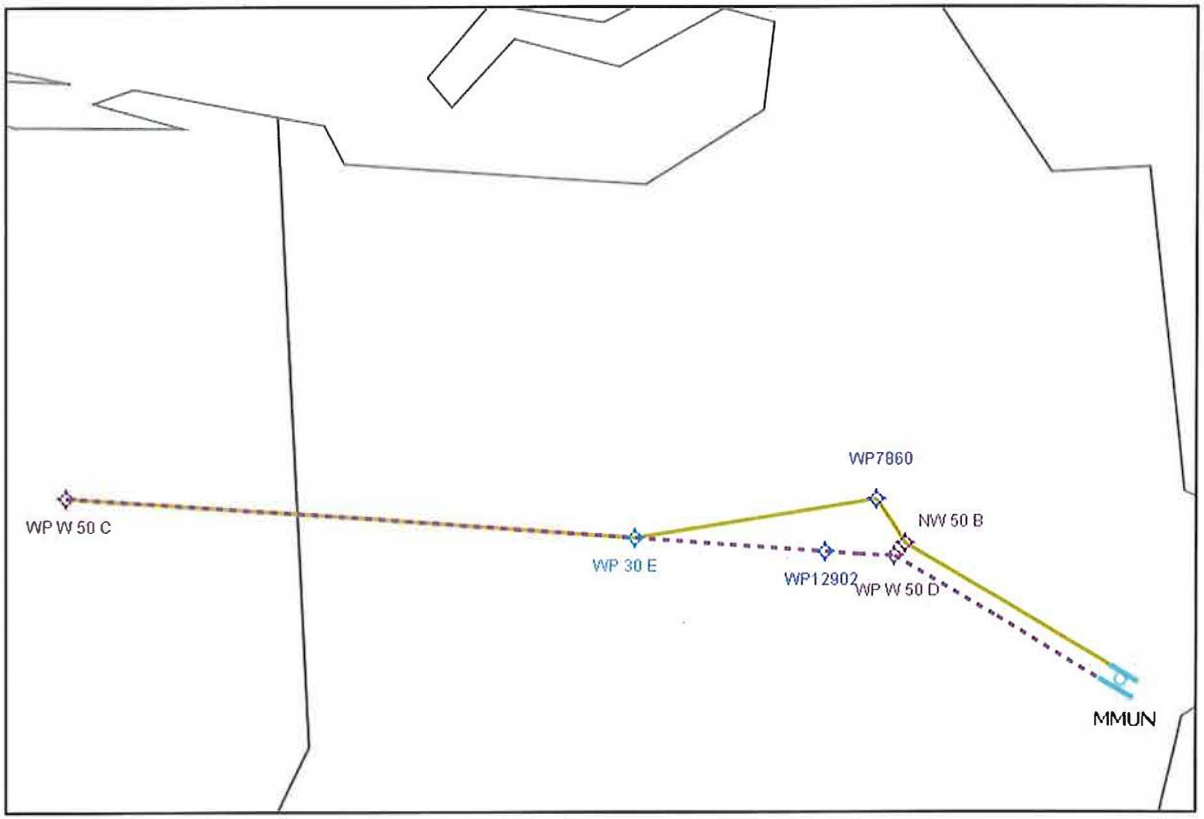

Figure B-1. CUN Runway 12L: CUN ARR 50W 12R Offload to 12L

CUN ARR CZM 12R Offload to 12L (20 NOV 2015)
Route:CUN ARR OFFLOAD
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
CZM	N20° 30' 27.00"	W086° 54' 43.20"	20.5075	-86.912
CUN 12 B	N20° 49' 13.22"	W086° 52' 05.96"	20.82033889	-86.86832222
WP7867	N20° 55' 07.34"	W086° 51' 16.43"	20.91870556	-86.85456389
WP7862	N21° 06' 39.01"	W086° 48' 37.50"	21.11083611	-86.81041667
WP7863	N21° 14' 39.73"	W087° 01' 26.65"	21.24436944	-87.02406944
WP7860	N21° 11' 21.31"	W087° 03' 52.51"	21.18925278	-87.06458611
NW 50 B	N21° 09' 18.00"	W087° 02' 33.00"	21.155	-87.0425
MMUN:RW12L:AER	N21° 03' 17.04"	W086° 52' 52.99"	21.05473333	-86.88138611

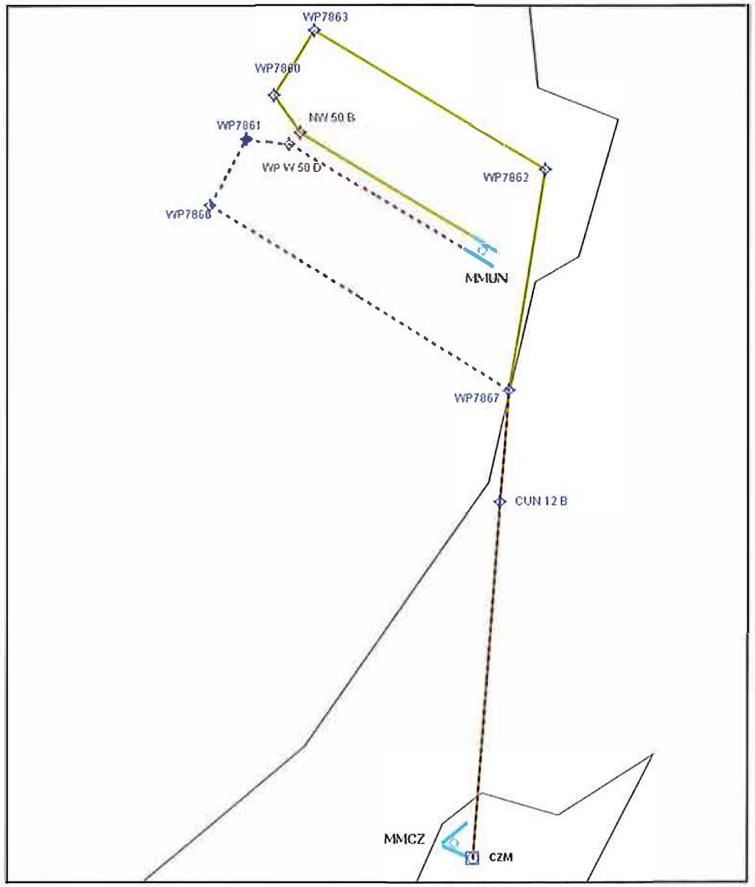

Figure B-2. CUN Runway 12L: CUN ARR CZM 12R Offload to 12L

CUN ARR DANUL 12R Offload to 12L (20 NOV 2015)
Route:CUN ARR OFFLOAD
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
DANUL	N20° 11' 22.00"	W085° 20' 28.00"	20.18944444	-85.34111111
CUN 12 E	N20° 39' 14.08"	W086° 25' 56.77"	20.65391111	-86.43243611
WP7867	N20° 56' 29.58"	W086° 53' 8.08"	20.94155	-88.8856
WP7862	N21° 06' 39.01"	W086° 48' 37.50"	21.11083611	-86.81041667
WP7863	N21° 14' 39.73"	W087° 01' 26.65"	21.24436944	-87.02406944
WP7860	N21° 11' 21.31"	W087° 03' 52.51"	21.18925278	-87.06458611
NW 50 B	N21° 09' 18.00"	W087° 02' 33.00"	21.155	-87.0425
MMUN:RW12L:AER	N21° 03' 17.04"	W086° 52' 52.99"	21.05473333	-86.88138611

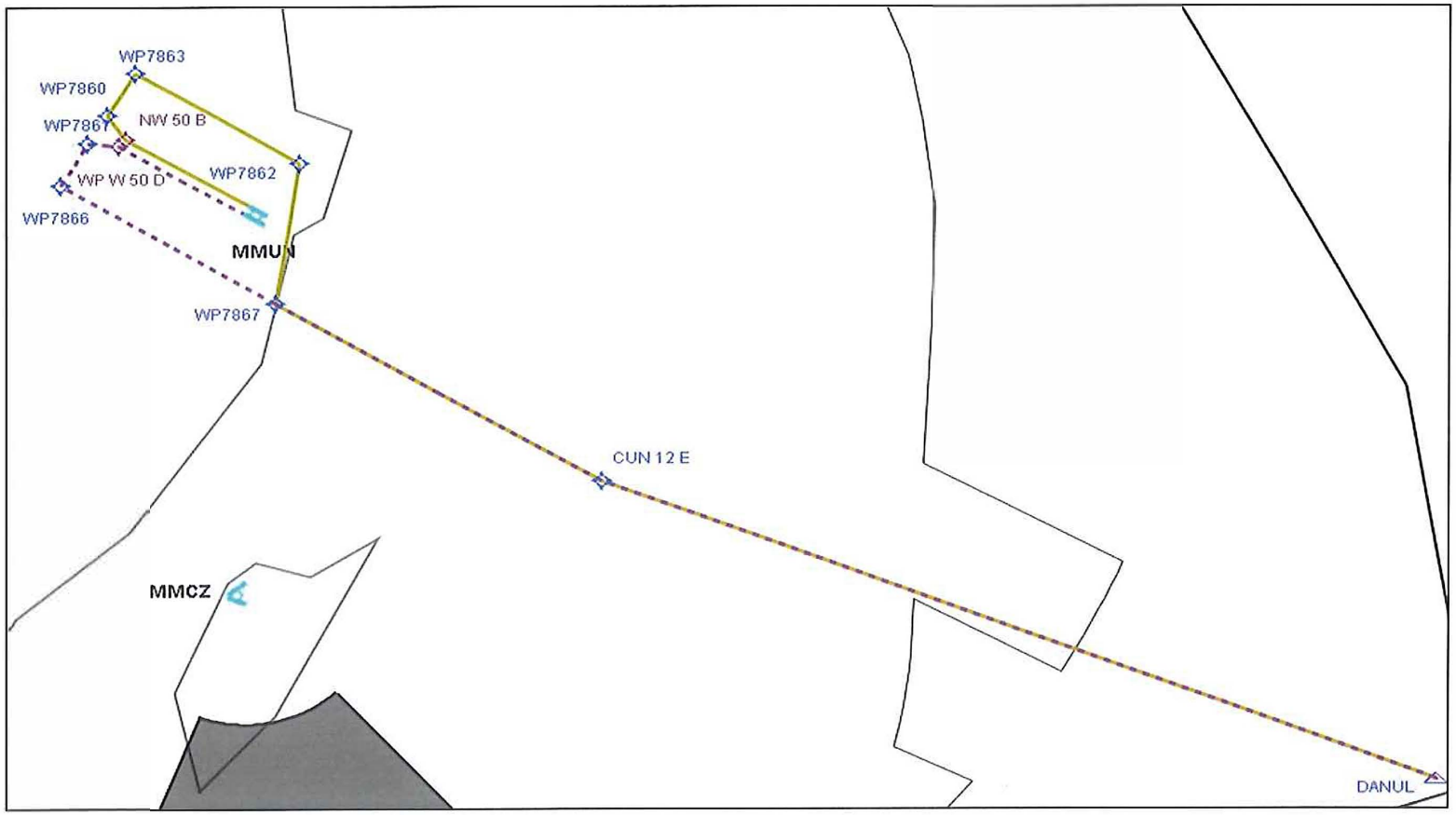

Figure B-3. CUN Runway 12L: CUN ARR DANUL 12R Offload to 12L

CUN ARR DANUL 30L Offload to 30R (20 NOV 2015)
Route:CUN ARR OFFLOAD
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
DANUL	N20° 11' 22.00"	W085° 20' 28.00"	20.18944444	-85.34111111
CUN 12 E	N20° 39' 14.08"	W086° 25' 56.77"	20.65391111	-86.43243611
WP 30 F	N20° 51' 44.00"	W086° 38' 54.00"	20.86222222	-86.64833333
WP30D	N20° 55' 31.00"	W086° 40' 24.00"	20.92527778	-86.67333333
MMUN:RW30R:AER	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.85896111

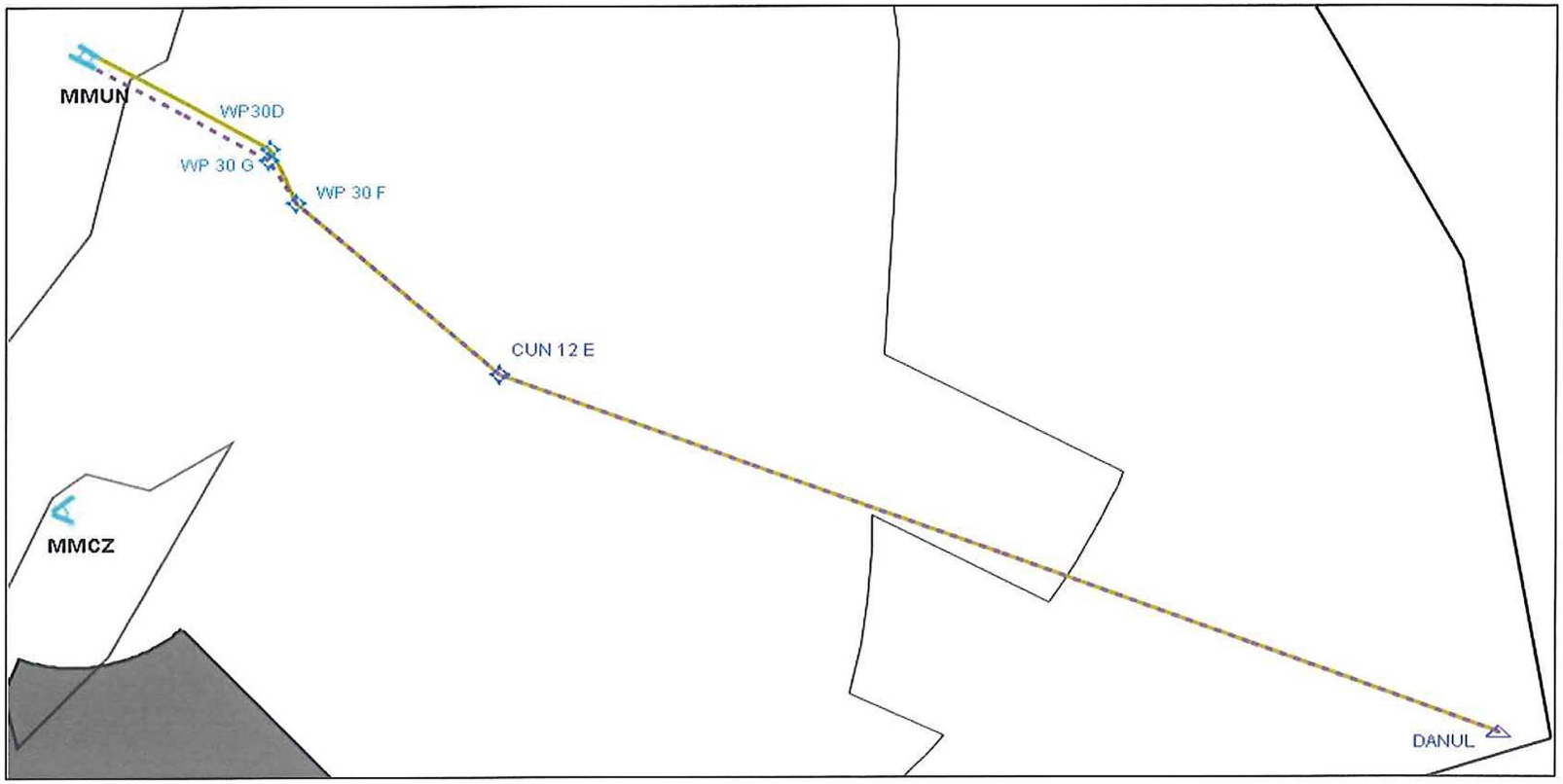

Figure B-4. CUN Runway 30R: CUN ARR DANUL 30L Offload to 30R

CUN ARR NOSAT 12L Offload to 12R (20 NOV 2015)
Route:CUN ARR OFFLOAD
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
NOSAT	N21° 57' 49.00"	W085° 58' 52.00"	21.96361111	-85.98111111
LETIS	N21° 31' 43.00"	W086° 23' 24.00"	21.52861111	-86.39
WP7862	N21° 06' 39.01"	W086° 48' 37.50"	21.11083611	-86.81041667
WP7863	N21° 14' 39.73"	W087° 01' 26.65"	21.24436944	-87.02406944
WP7860	N21° 11' 21.31"	W087° 03' 52.51"	21.18925278	-87.06458611
WP W 50 D	N21° 08' 45.00"	W087° 03' 09.00"	21.14583333	-87.0525
MMUN:RW12R:AER	N21° 02' 43.22"	W086° 53' 27.66"	21.04533889	-86.89101667

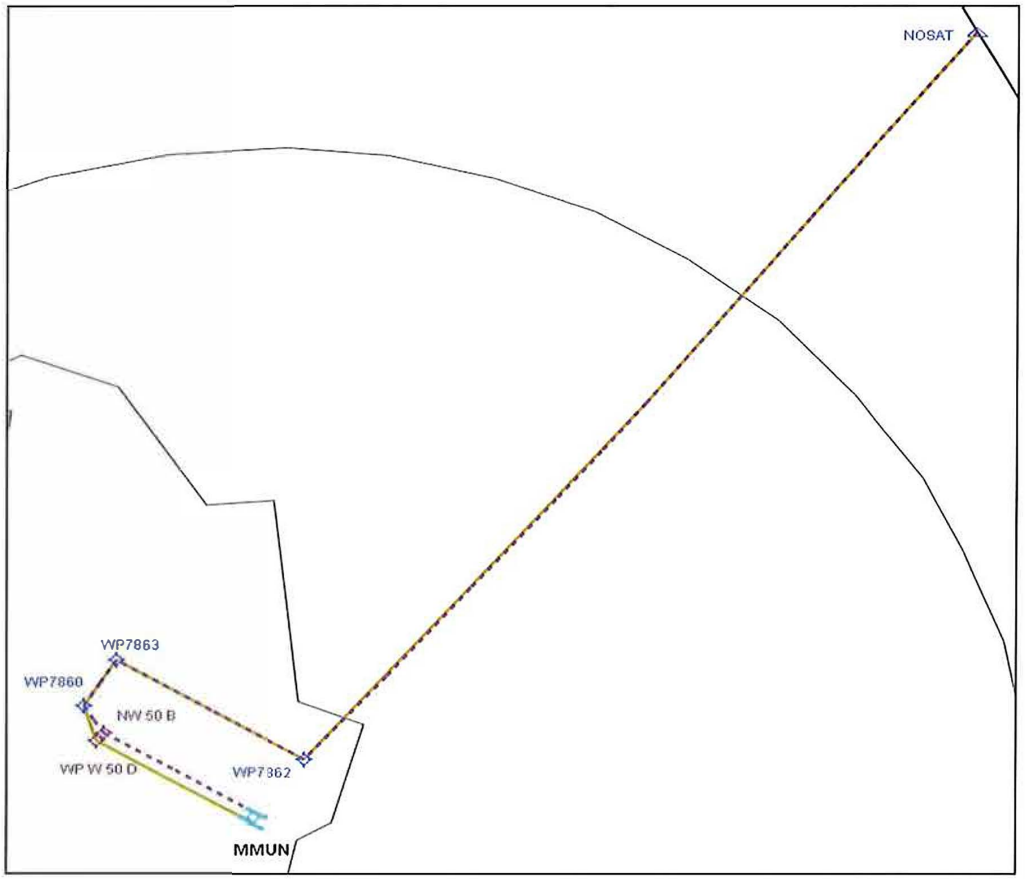

Figure B-5. CUN Runway 12R: CUN ARR NOSAT 12L Offload to 12R

CUN ARR NOSAT 30R Offload to 30L (20 NOV 2015)
Route:CUN ARR OFFLOAD
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
NOSAT	N21° 57' 49.00"	W085° 58' 52.00"	21.96361111	-85.98111111
LETIS	N21° 31' 43.00"	W086° 23' 24.00"	21.52861111	-86.39
CUN 30 D	N21° 11' 17.01"	W086° 43' 57.08"	21.18805833	-86.73252222
CUN 30 E	N21° 05' 58.39"	W086° 47' 30.17"	21.09955278	-86.79171389
WP30B	N20° 58' 30.00"	W086° 35' 05.00"	20.975	-86.58472222
WP 30C	N20° 55' 29.00"	W086° 37' 14.00"	20.92472222	-86.62055556
WP 30 G	N20° 54' 45.80"	W086° 40' 34.07"	20.91272222	-86.67613056
MMUN:RW30L:AER	N21° 01' 40.07"	W086° 51' 46.76"	21.02779722	-86.86298889

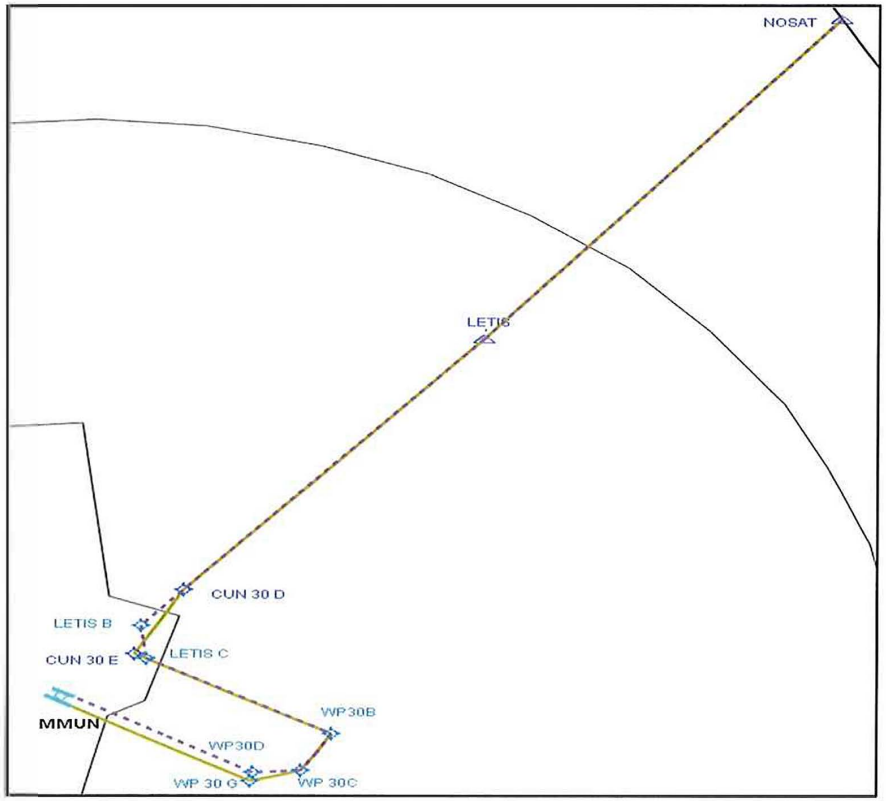

Figure B-6. CUN Runway 30L: CUN ARR NOSAT 30R Offload to 30L

CUN ARR NW 50 12L Offload to 12R (20 NOV 2015)
Route:CUN ARR OFFLOAD
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP NW 50 A	N21° 41' 08.00"	W087° 24' 15.00"	21.68555556	-87.40416667
WP 30A	N21° 20' 05.58"	W087° 09' 50.60"	21.33488333	-87.16405556
WP12902	N21° 09' 04.96"	W087° 06' 32.22"	21.15137778	-87.10895
WP W 50 D	N21° 08' 45.00"	W087° 03' 09.00"	21.14583333	-87.0525
MMUN:RW12R:AER	N21° 02' 43.22"	W086° 53' 27.66"	21.04533889	-86.89101667

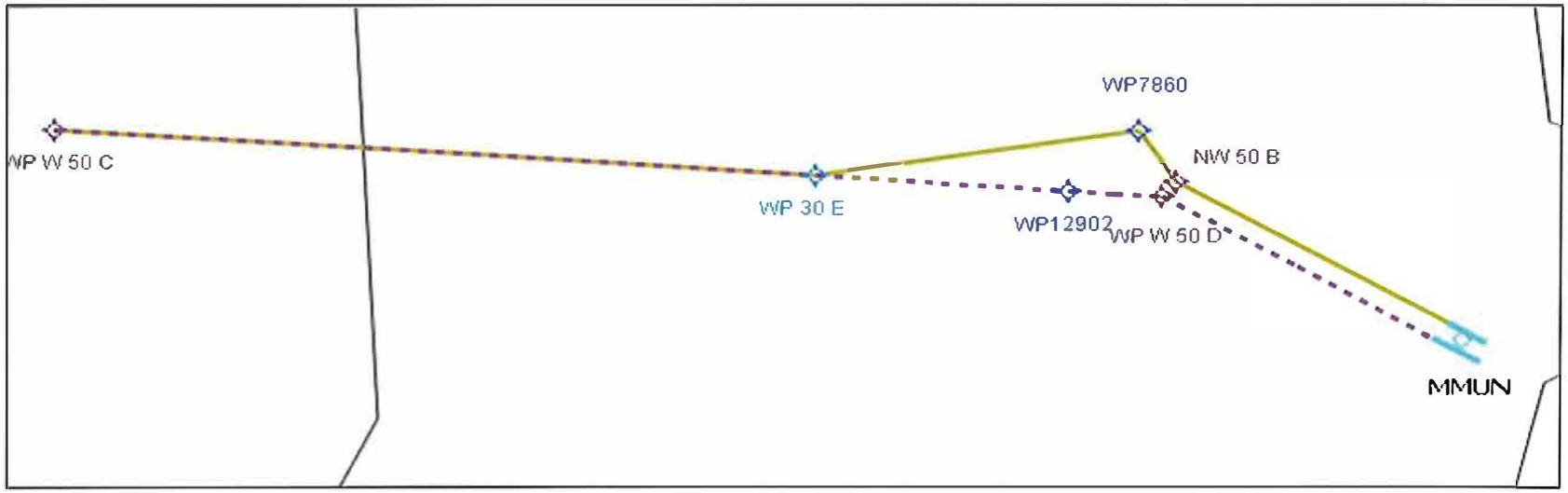

Figure B-7. CUN Runway 12R: CUN ARR NW 50 12L Offload to 12R

CUN ARR NW 50 30R Offload to 30L (20 NOV 2015)
Route:CUN ARR OFFLOAD
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP NW 50 A	N21° 41' 08.00"	W087° 24' 15.00"	21.68555556	-87.40416667
WP 30A	N21° 20' 05.58"	W087° 09' 50.60"	21.33488333	-87.16405556
WP7863	N21° 14' 39.73"	W087° 01' 26.65"	21.24436944	-87.02406944
CUN 30 F	N21° 11' 05.66"	W086° 55' 59.34"	21.18490556	-86.93315
CUN 30 G	N20° 59' 15.96"	W086° 57' 42.88"	20.98776667	-86.96191111
WP7867	N20° 56' 29.58"	W086° 53' 8.08"	20.94155	-88.8856
WP SUR A	N20° 48' 40.00"	W086° 41' 03.00"	20.81111111	-86.68416667
WP 30 F	N20° 51' 44.00"	W086° 38' 54.00"	20.86222222	-86.64833333
WP 30 G	N20° 54' 45.80"	W086° 40' 34.07"	20.91272222	-86.67613056
MMUN:RW30L:AER	N21° 01' 40.07"	W086° 51' 46.76"	21.02779722	-86.86298889

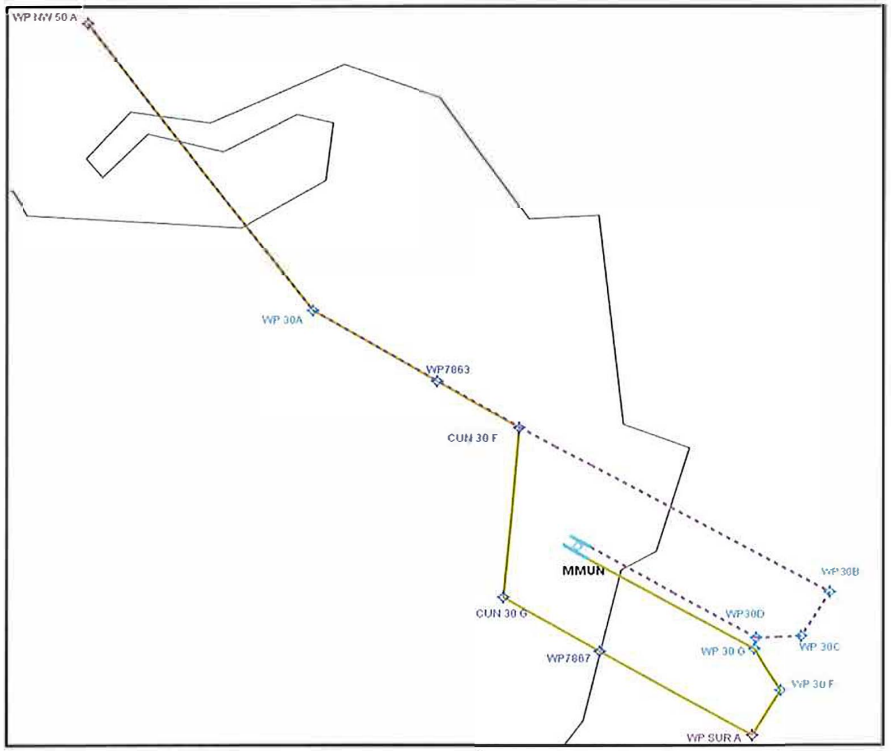

Figure B-8. CUN Runway 30L: CUN ARR NW 50 30R Offload to 30L

CUN ARR S 12R Offload to 12L (20 NOV 2015)
Route:CUN ARR OFFLOAD
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10797	N19° 51' 21.59"	W087° 27' 49.12"	19.8559	-87.4636
CUN 12 B	N20° 49' 13.22"	W086° 52' 05.96"	20.8203	-86.8683
WP27783	N20° 53' 53.53"	W086° 48' 58.81"	20.8982	-86.8163
WP7862	N21° 06' 39.01"	W086° 48' 37.50"	21.1108	-86.8104
WP7863	N21° 14' 40.00"	W087° 01' 27.00"	21.2444	-87.0241
WP7860	N21° 11' 21.00"	W087° 03' 53.00"	21.1891	-87.0647
NW 50 B	N21° 09' 18.00"	W087° 02' 33.00"	21.1549	-87.0425
MMUN:RW12L:AER	N21° 03' 17.04"	W086° 52' 52.99"	21.0547	-86.8813

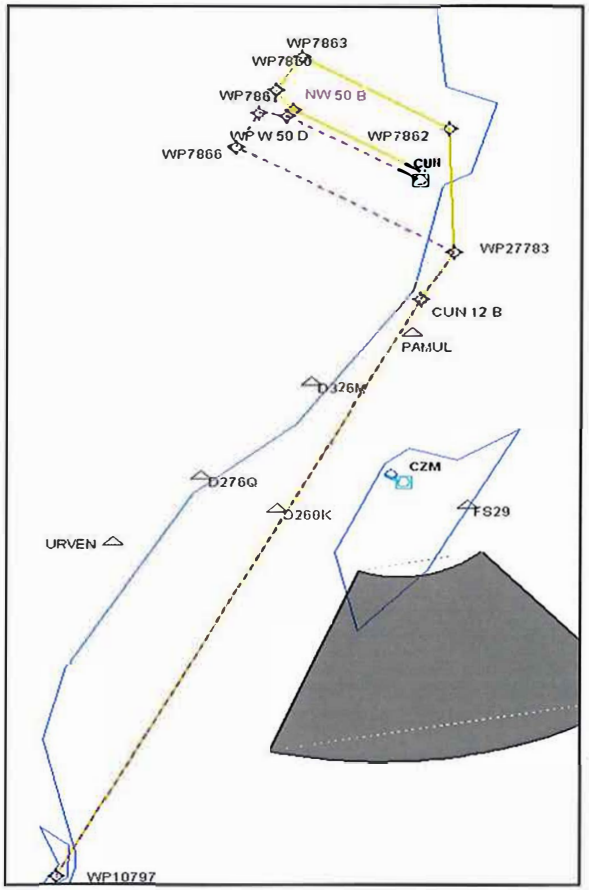

Figure B-9. CUN Runway 12L: CUN ARR S 12R Offload to 12L

CUN ARR S 30L Offload to 30R (20 NOV 2015)

Route:CUN ARR OFFLOAD

Airport: MMUN

Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP10797	N19° 51' 21.59"	W087° 27' 49.12"	19.85599722	-87.46364444
CZM	N20° 30' 27.00"	W086° 54' 43.00"	20.5075	-86.91194444
WP SUR A	N20° 48' 40.00"	W086° 41' 03.00"	20.81111111	-86.68416667
WP 30 F	N20° 51' 44.00"	W086° 38' 54.00"	20.86222222	-86.64833333
WP30D	N20° 55' 31.00"	W086° 40' 24.00"	20.92527778	-86.67333333
MMUN:RW30R:AER	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.85896111

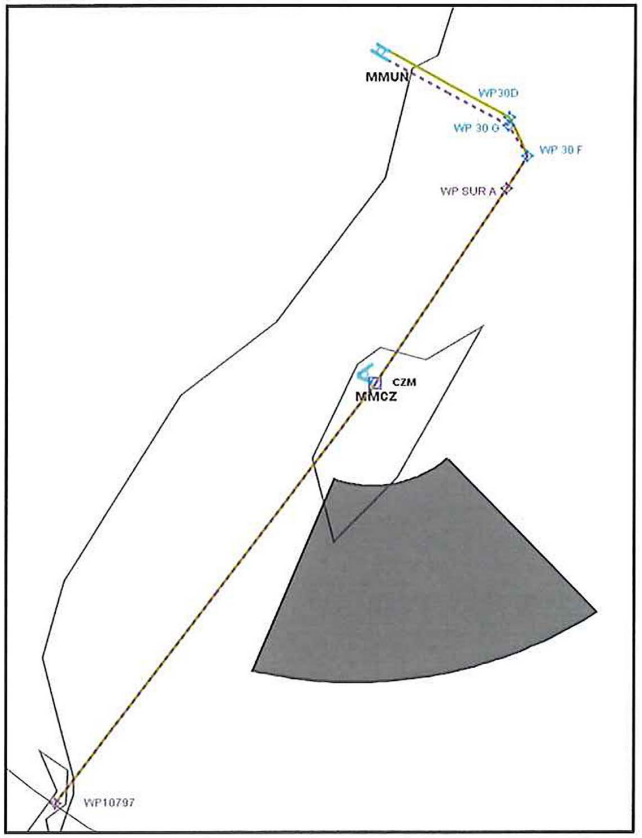

Figure B-10. CUN Runway 30R: CUN ARR S 30L Offload to 30R

CUN ARR SIGMA 12R Offload to 12L (20 NOV 2015)
Route:CUN ARR OFFLOAD
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
SIGMA	N19° 37' 02.00"	W086° 22' 00.00"	19.61722222	-86.36666667
WP27783	N20° 53' 53.53"	W086° 48' 58.81"	20.89820278	-86.81633611
WP7862	N21° 06' 39.01"	W086° 48' 37.50"	21.11083611	-86.81041667
WP7863	N21° 14' 40.00"	W087° 01' 27.00"	21.24444444	-87.02416667
WP7860	N21° 11' 21.00"	W087° 03' 53.00"	21.18916667	-87.06472222
NW 50 B	N21° 09' 18.00"	W087° 02' 33.00"	21.155	-87.0425
MMUN:RW12L:AER	N21° 03' 17.04"	W086° 52' 52.99"	21.05473333	-86.88138611

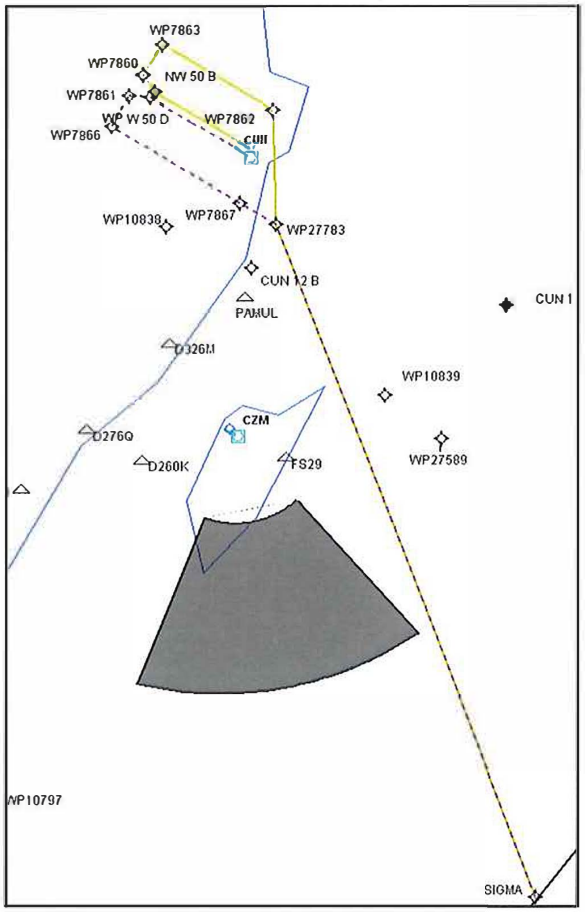

Figure B-11. CUN Runway 12L: CUN ARR SIGMA 12R Offload to 12L

CUN ARR SIGMA 30L Offload to 30R (20 NOV 2015)
Route:CUN ARR OFFLOAD
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
SIGMA	N19° 37' 02.00"	W086° 22' 00.00"	19.61722222	-86.36666667
CUN 12 E	N20° 39' 14.08"	W086° 25' 56.77"	20.65391111	-86.43243611
WP 30 F	N20° 51' 44.00"	W086° 38' 54.00"	20.86222222	-86.64833333
WP30D	N20° 55' 31.00"	W086° 40' 24.00"	20.92527778	-86.67333333
MMUN:RW30R:AER	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.85896111

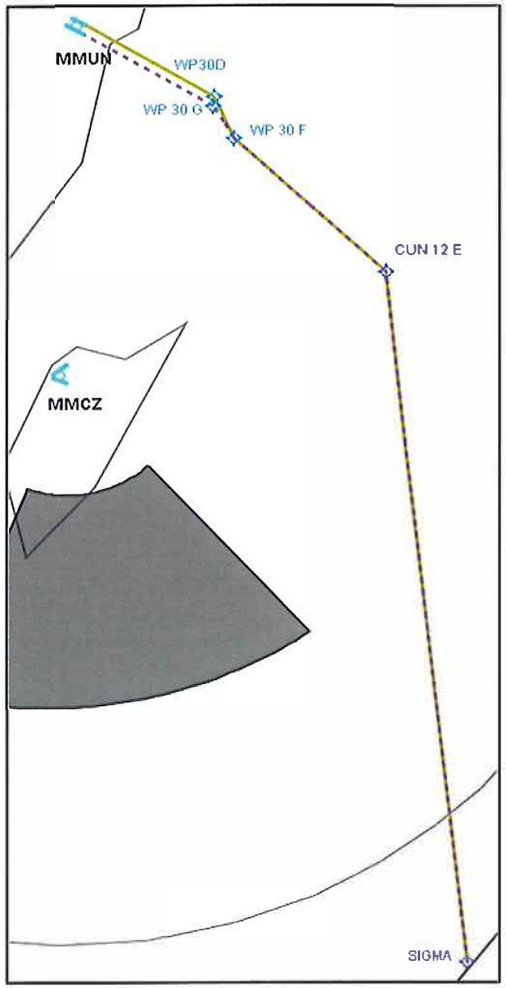

Figure B-12. CUN Runway 30R: CUN ARR SIGMA 30L Offload to 30R

CUN ARR W 50 30L Offload to 30R (20 NOV 2015)
Route:CUN ARR OFFLOAD
Airport: MMUN
Flight Type: ARR

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
WP W 50 C	N21° 13' 23.00"	W087° 43' 40.00"	21.22305556	-87.72777778
WP 30 E	N21° 10' 10.37"	W087° 15' 50.59"	21.16954722	-87.26405278
CUN 30 H	N21° 02' 38.34"	W087° 02' 56.91"	21.04398333	-87.04914167
CUN 30 E	N21° 05' 58.39"	W086° 47' 30.17"	21.09955278	-86.79171389
WP30B	N20° 58' 30.00"	W086° 35' 05.00"	20.975	-86.58472222
WP 30C	N20° 55' 29.00"	W086° 37' 14.00"	20.92472222	-86.62055556
WP30D	N20° 55' 31.00"	W086° 40' 24.00"	20.92527778	-86.67333333
MMUN:RW30R:AER	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.85896111

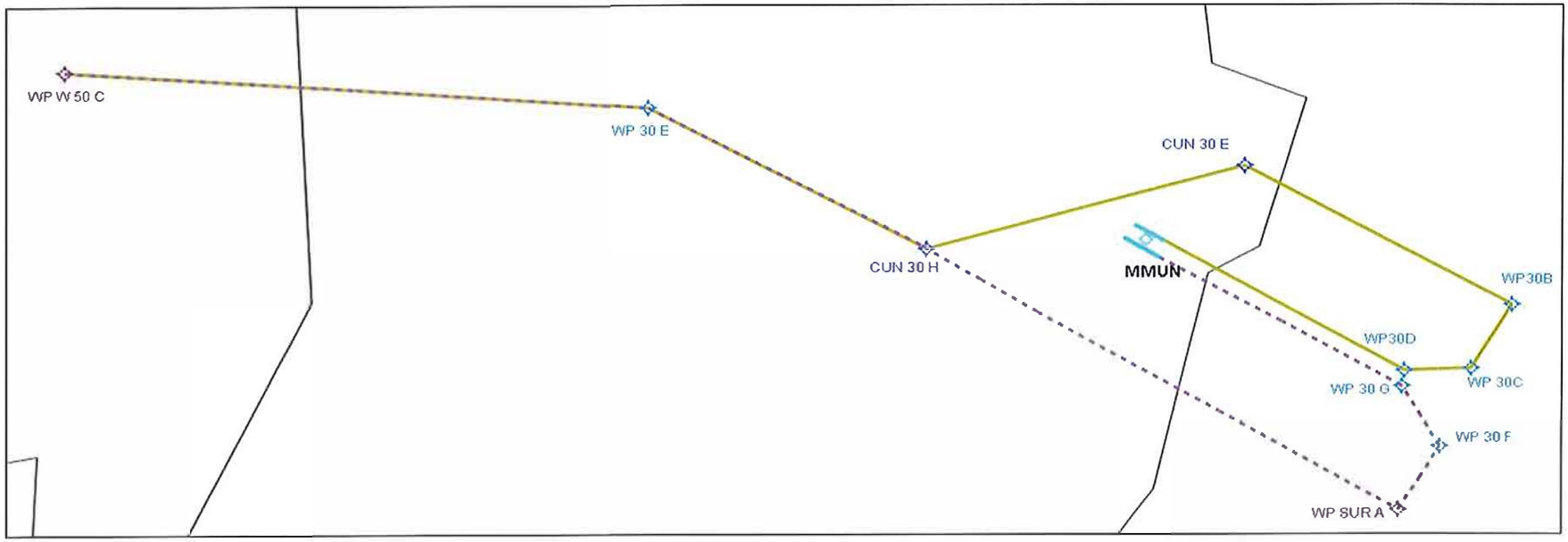

Figure B-13. CUN Runway 30R: CUN ARR W 50 30L Offload to 30R

CUN DEP CZA 12L Single Runway (20 NOV 2015)

Route:CUN DEP SINGLE RUNWAY

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12L:DER	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.85896111
ghost	N21° 01' 51.65"	W086° 50' 36.55"	21.03101389	-86.84348611
WP7867	N20° 56' 29.58"	W086° 53' 08.08"	20.94155	-86.88557778
CUN 12 D	N20° 49' 00.17"	W086° 58' 24.06"	20.81671389	-86.97335
CZA	N20° 38' 35.01"	W088° 26' 53.63"	20.64305833	-88.44823056

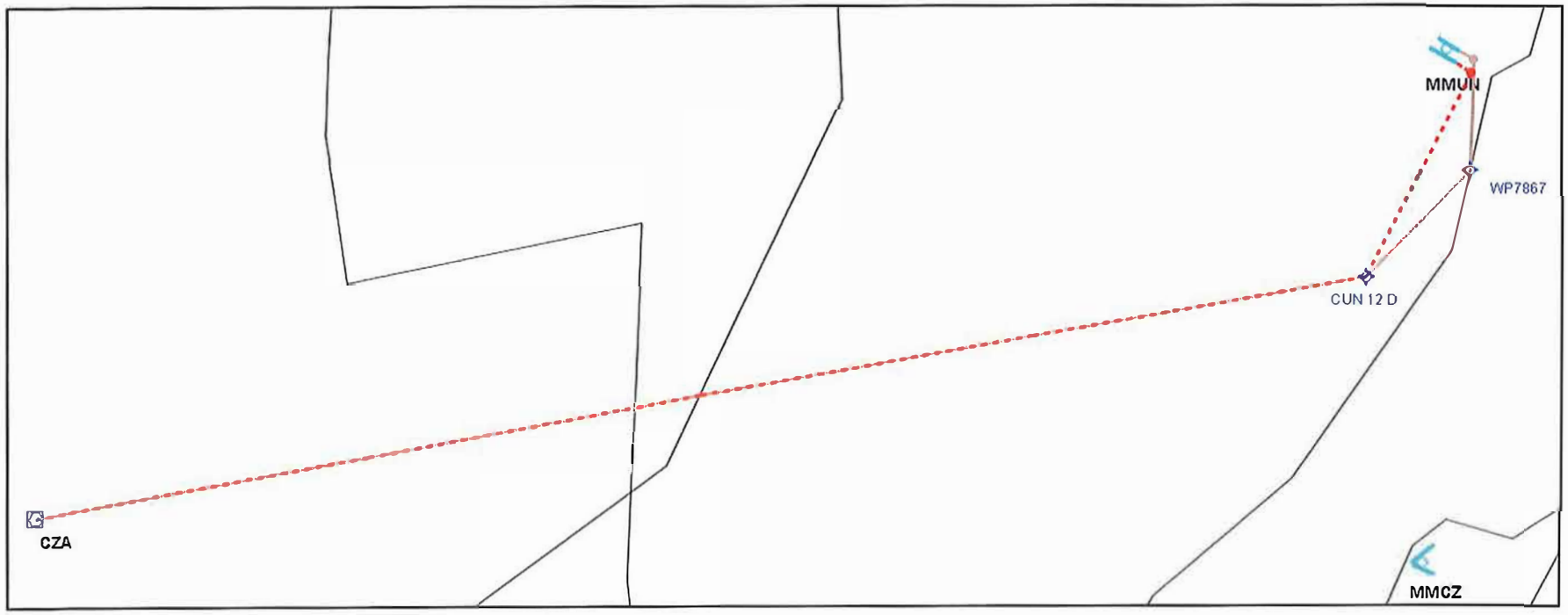

Figure B-14. CUN Runway 12L: CUN DEP CZA 12L Single Runway

CUN DEP CZA 30R Single Runway (20 NOV 2015)

Route:CUN DEP SINGLE RUNWAY

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30R:DER	N21° 03' 17.04"	W086° 52' 52.99"	21.05473333	-86.88138611
ghost	N21° 03' 51.64"	W086° 53' 48.29"	21.06434444	-86.89674722
CUN 30J	N21° 08' 14.07"	W087° 00' 54.06"	21.13724167	-87.01501667
CZA	N20° 38' 35.01"	W088° 26' 53.63"	20.64305833	-88.44823056

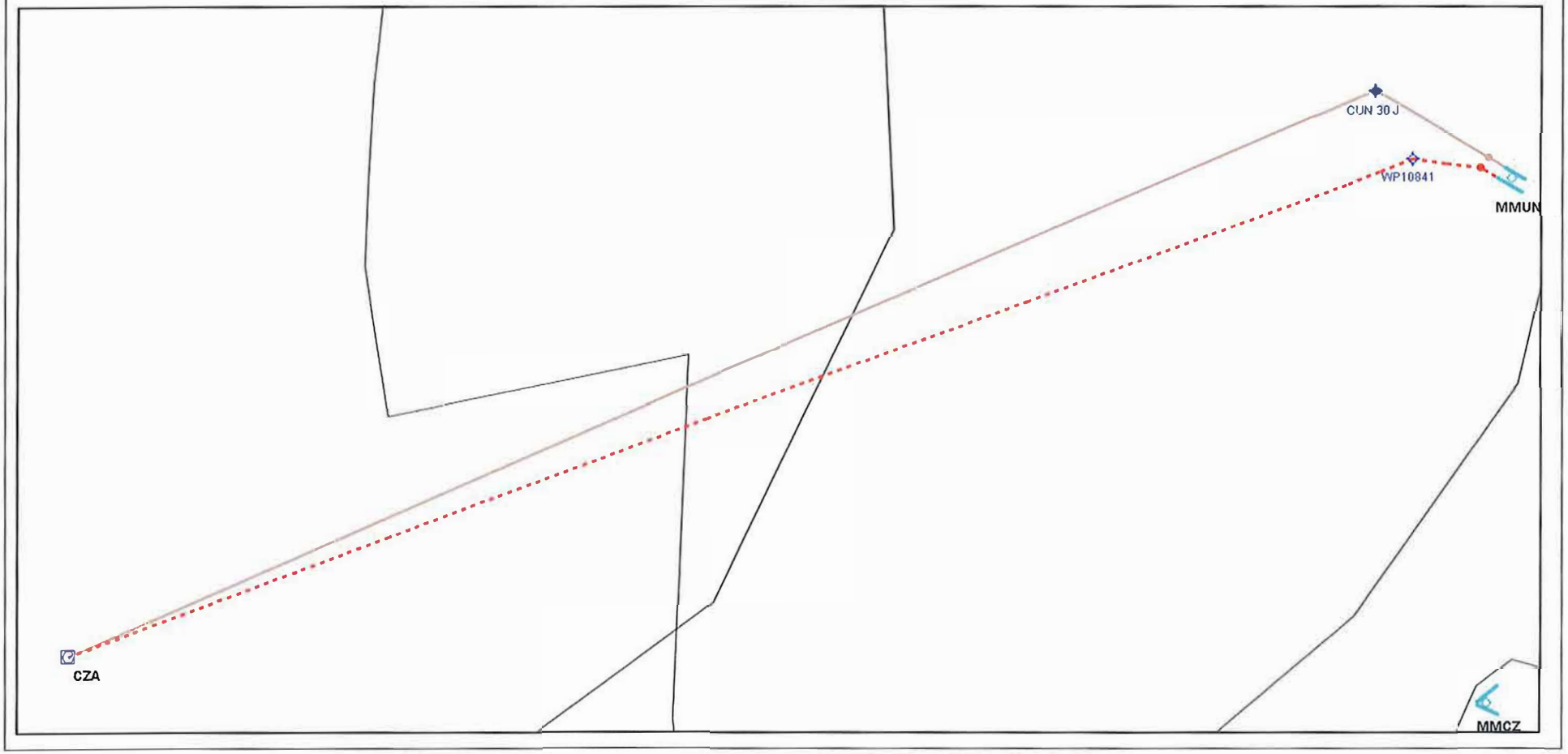

Figure B-15. CUN Runway 30R: CUN DEP CZA 30R Single Runway

CUN DEP CZM 12L Single Runway (20 NOV 2015)
Route:CUN DEP SINGLE RUNWAY
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12L:DER	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.8589611
ghost	N21° 01' 40.64"	W086° 50' 18.98"	21.02795556	-86.8386056
WP10810	N20° 55' 35.00"	W086° 45' 23.00"	20.92638889	-86.7563889
CZM	N20° 30' 26.00"	W086° 54' 43.20"	20.50722222	-86.912

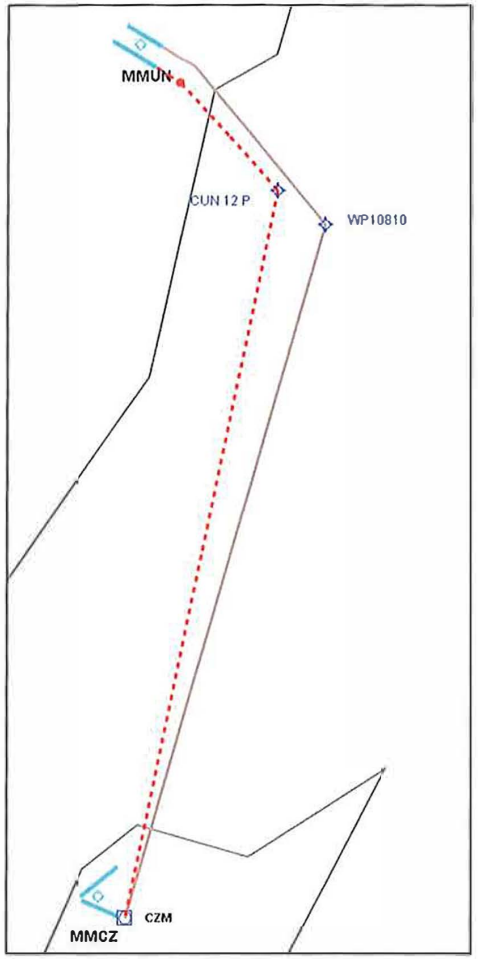

Figure B-16. CUN Runway 12L: CUN DEP CZM 12L Single Runway

CUN DEP CZM 30R Single Runway (20 NOV 2015)
Route:CUN DEP SINGLE RUNWAY
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30R:DER	N21° 03' 17.04"	W086° 52' 52.99"	21.05473333	-86.88138611
ghost	N21° 03' 51.63"	W086° 53' 48.30"	21.06434167	-86.89675
WP10838	N20° 54' 19.60"	W087° 02' 01.90"	20.90544444	-87.03386111
CZM	N20° 30' 26.90"	W086° 54' 43.20"	20.50747222	-86.912

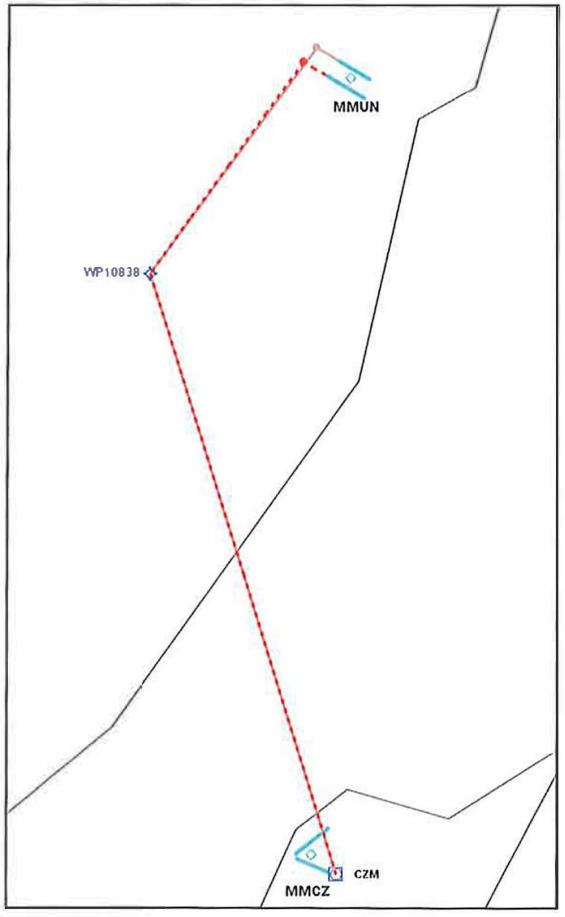

Figure B-17. CUN Runway 30R: CUN DEP CZM 30R Single Runway

CUN DEP DANUL 12L Single Runway (20 NOV 2015)

Route:CUN DEP SINGLE RUNWAY

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12L:DER	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.85896111
ghost	N21° 01' 40.64"	W086° 50' 18.98"	21.02795556	-86.83860556
WP10810	N20° 55' 35.00"	W086° 45' 23.00"	20.92638889	-86.75638889
CUN 12 C	N20° 43' 35.62"	W086° 22' 01.01"	20.72656111	-86.36694722
DANUL	N20° 11' 22.00"	W085° 20' 28.00"	20.18944444	-85.34111111

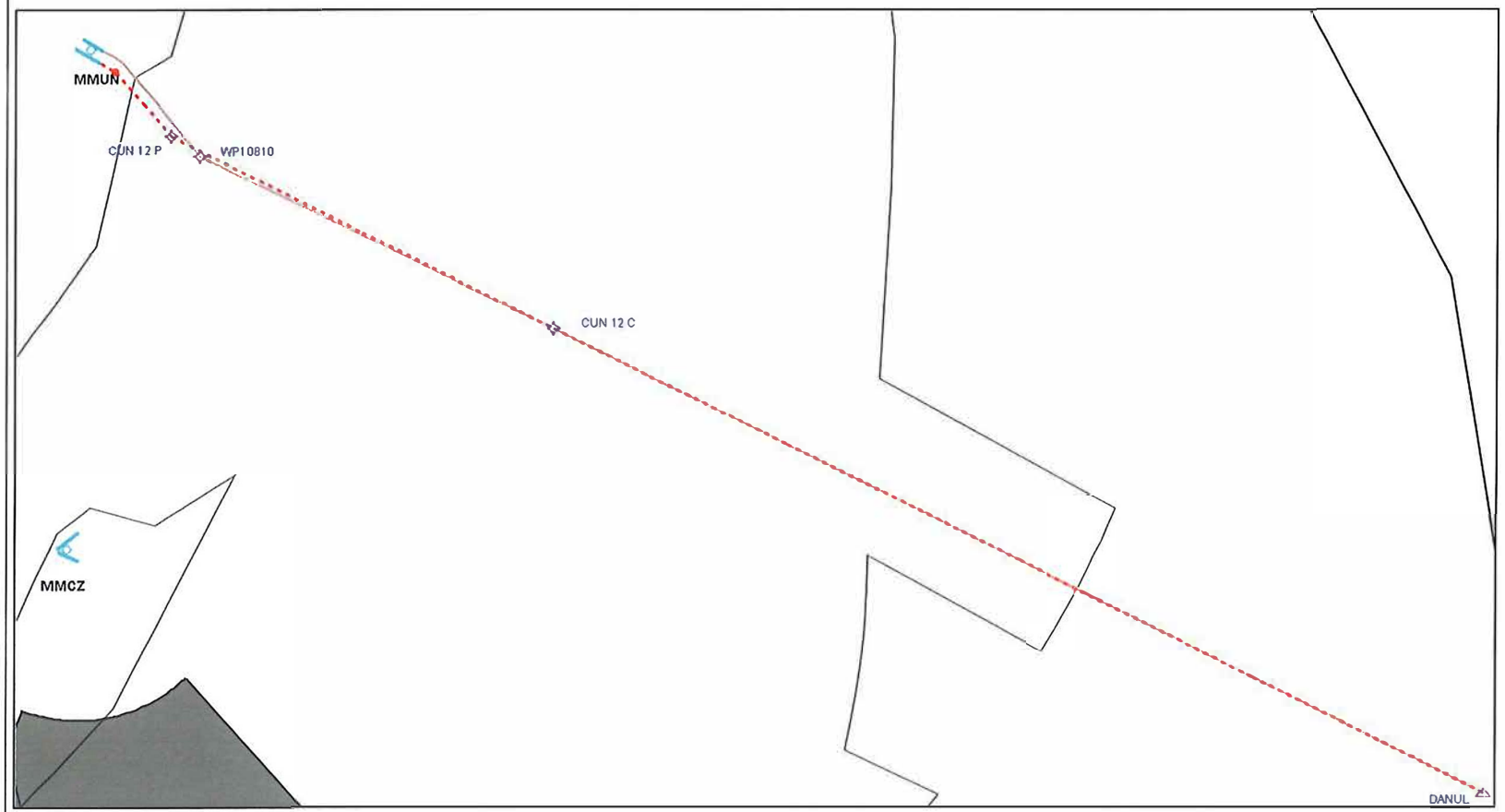

Figure B-18. CUN Runway 12L: CUN DEP DANUL 12L Single Runway

CUN DEP DANUL 30R Single Runway (20 NOV 2015)
Route:CUN DEP SINGLE RUNWAY
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30R:DER	N21° 03' 17.04"	W086° 52' 52.99"	21.05473333	-86.88138611
ghost	N21° 03' 51.63"	W086° 53' 48.30"	21.06434167	-86.89675
NO 14	N21° 08' 13.11"	W086° 51' 12.23"	21.136975	-86.85339722
WP10834	N21° 13' 21.50"	W086° 46' 57.63"	21.22263889	-86.782675
WP10835	N21° 23' 13.04"	W086° 37' 17.48"	21.38695556	-86.62152222
DANUL	N20° 11' 22.00"	W085° 20' 28.00"	20.18944444	-85.34111111

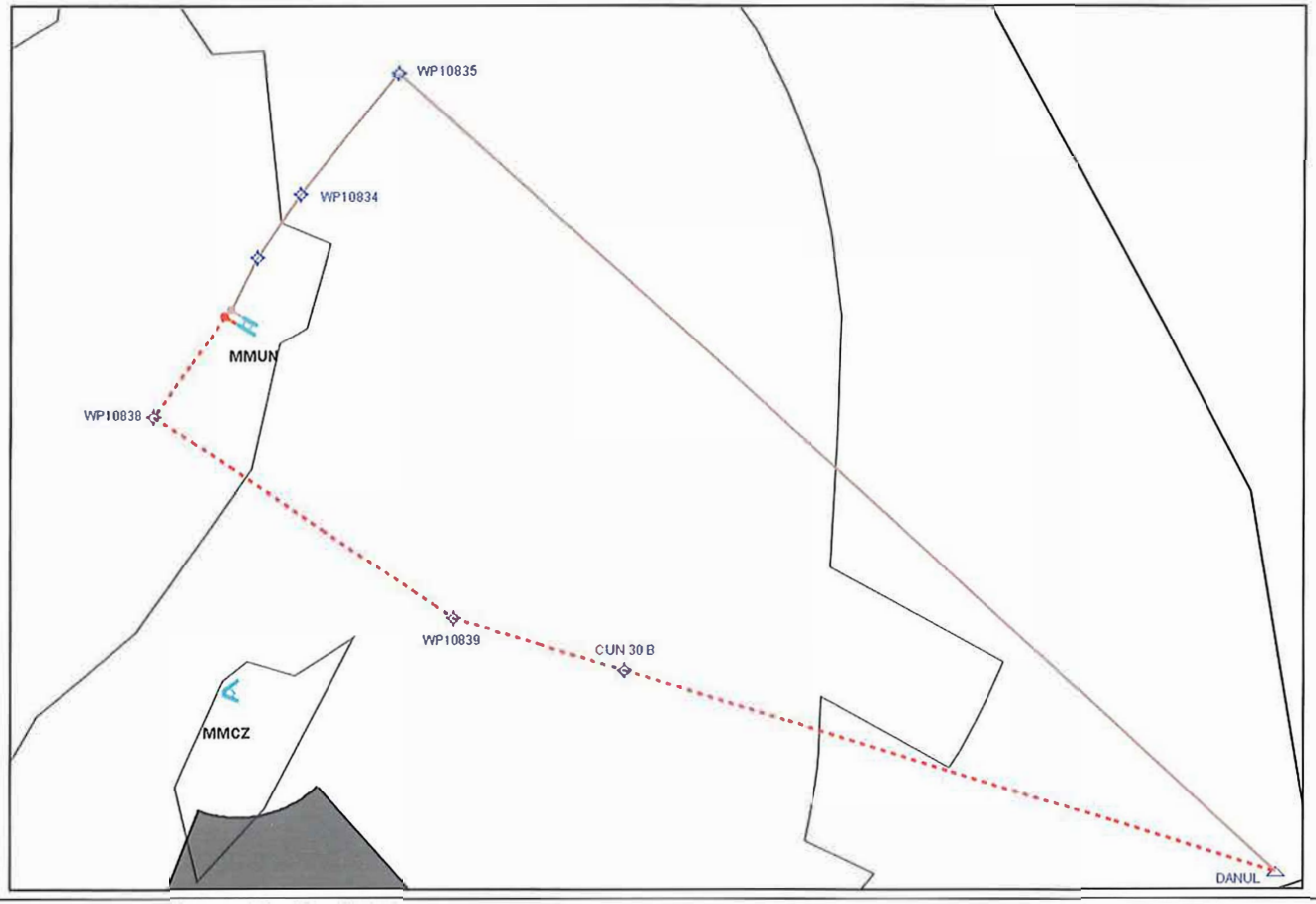

Figure B-19. CUN Runway 30R: CUN DEP DANUL 30R Single Runway

CUN DEP N 12R 2 Single Runway (20 NOV 2015)
Route:CUN DEP SINGLE RUNWAY
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12R:DER	N21° 01' 40.07"	W086° 51' 46.76"	21.02779722	-86.86298889
ghost	N21° 01' 05.20"	W086° 50' 51.05"	21.01811111	-86.84751389
WP10804	N21° 00' 25.90"	W086° 48' 18.08"	21.00719444	-86.80502222
WP10805	N21° 01' 24.00"	W086° 42' 41.00"	21.02333333	-86.71138889
WP10806	N21° 13' 07.00"	W086° 28' 53.00"	21.21861111	-86.48138889
WP10807	N21° 48' 20.89"	W086° 32' 12.38"	21.80580278	-86.53677222

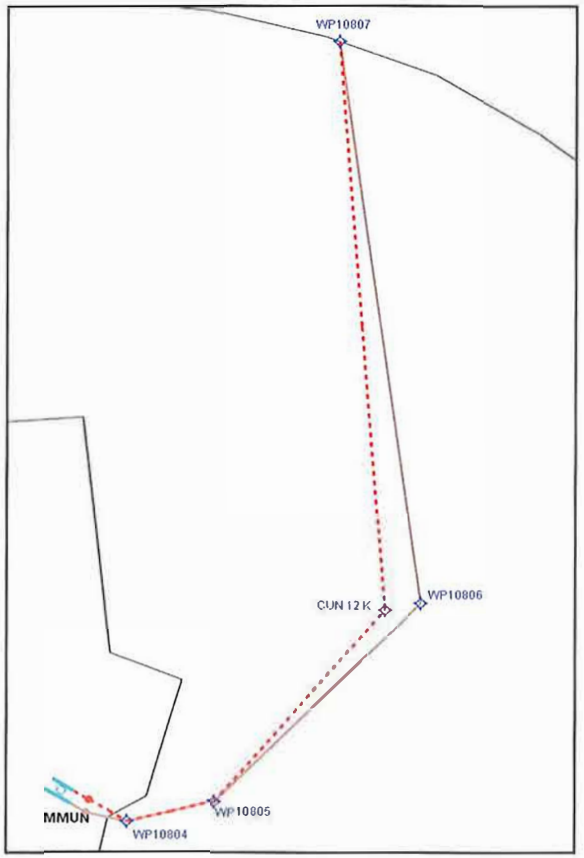

Figure B-20. CUN Runway 12R: CUN DEP N 12R 2 Single Runway

CUN DEP N 12R Single Runway (20 NOV 2015)

Route:CUN DEP SINGLE RUNWAY

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12R:DER	N21° 01' 40.07"	W086° 51' 46.76"	21.02779722	-86.86298889
ghost	N21° 01' 05.20"	W086° 50' 51.05"	21.01811111	-86.84751389
WP10799	N21° 01' 22.00"	W086° 49' 46.00"	21.02277778	-86.82944444
CUN 12 M	N21° 11' 12.85"	W086° 37' 54.54"	21.18690278	-86.63181667
WP10803	N21° 51' 50.30"	W086° 53' 10.42"	21.86397222	-86.88622778

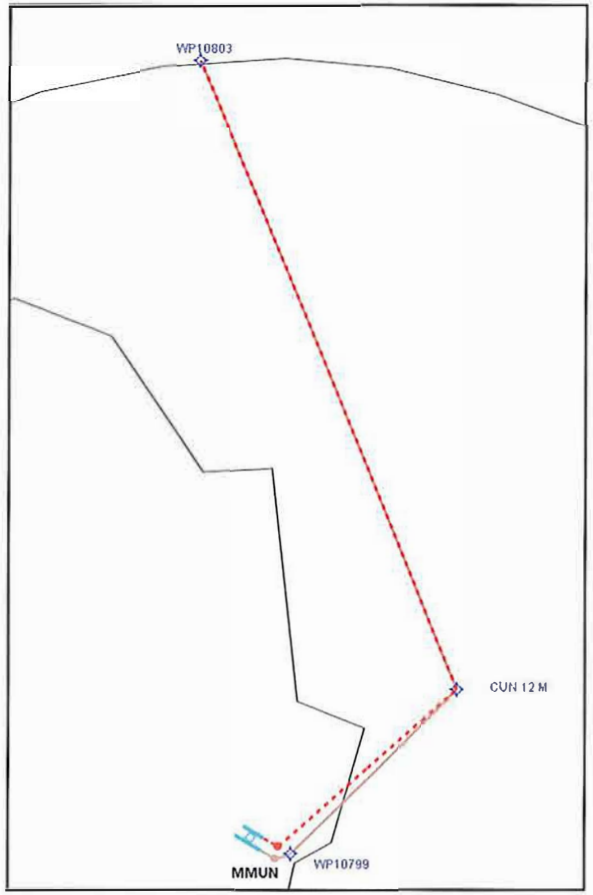

Figure B-21. CUN Runway 12R: CUN DEP N 12R Single Runway

CUN DEP N 30L 2 Single Runway (20 NOV 2015)
Route:CUN DEP SINGLE RUNWAY
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30L:DER	N21° 02' 43.22"	W086° 53' 27.66"	21.04533889	-86.89101667
ghost	N21° 03' 53.64"	W086° 55' 20.23"	21.0649	-86.92228611
WP10841	N21° 04' 01.06"	W086° 58' 44.29"	21.06696111	-86.97896944
CUN 30 K	N21° 09' 25.97"	W087° 11' 10.01"	21.15721389	-87.18611389
WP10807	N21° 48' 20.89"	W086° 32' 12.38"	21.80580278	-86.53677222

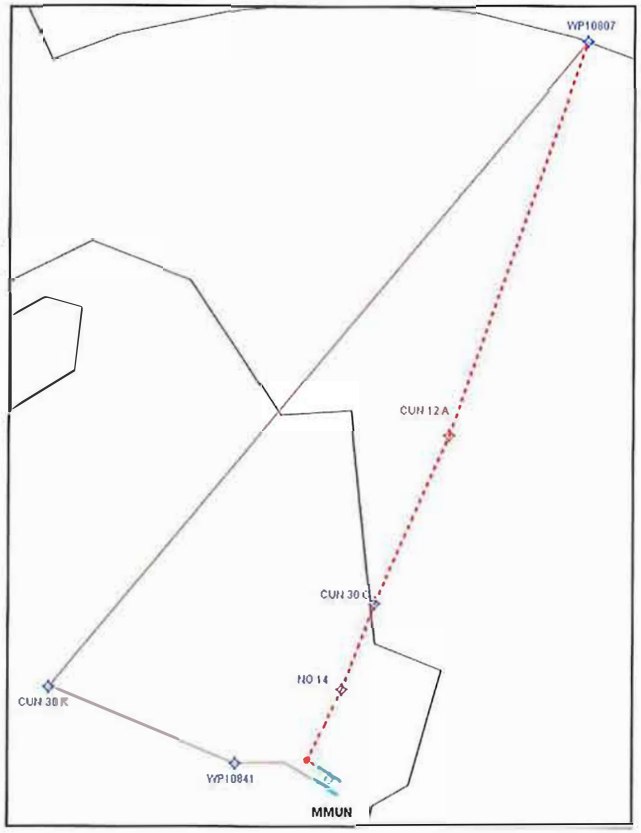

Figure B-22. CUN Runway 30L: CUN DEP N 30L 2 Single Runway

CUN DEP N 30L Single Runway (20 NOV 2015)

Route:CUN DEP SINGLE RUNWAY

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30L:DER	N21° 02' 43.22"	W086° 53' 27.66"	21.04533889	-86.89101667
ghost	N21° 03' 53.64"	W086° 55' 20.23"	21.0649	-86.92228611
WP10841	N21° 04' 01.06"	W086° 58' 44.29"	21.06696111	-86.97896944
CUN 30 K	N21° 09' 25.97"	W087° 11' 10.01"	21.15721389	-87.18611389
WP10803	N21° 51' 50.30"	W086° 53' 10.42"	21.86397222	-86.88622778

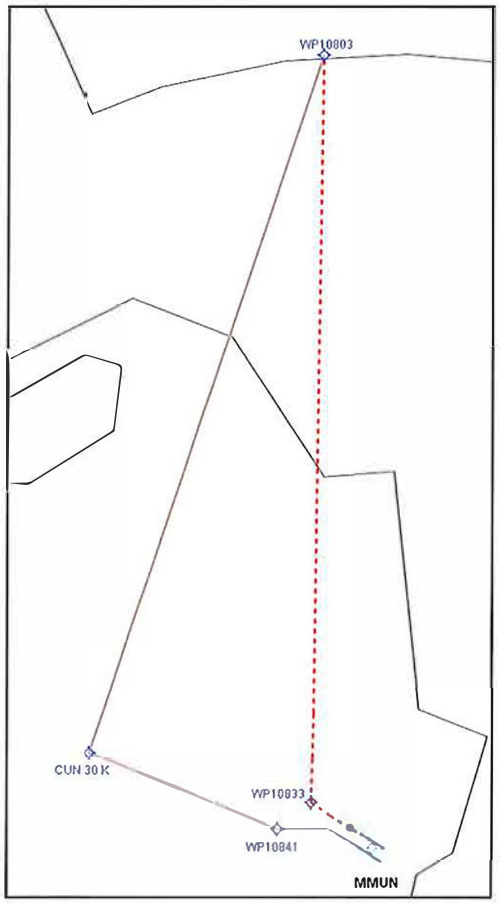

Figure B-23. CUN Runway 30L: CUN DEP N 30L Single Runway

CUN DEP NUDAL 12R Single Runway (20 NOV 2015)

Route:CUN DEP SINGLE RUNWAY

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12R:DER	N21° 01' 40.07"	W086° 51' 46.76	21.02779722	-86.8629889
ghost	N21° 00' 37.54"	W086° 50' 06.90	21.01042778	-86.83525
WP10804	N21° 00' 25.90"	W086° 48' 18.08	21.00719444	-86.8050222
WP10805	N21° 01' 24.00"	W086° 42' 41.00	21.02333333	-86.7113889
CUN 12 L	N21° 03' 22.49"	W086° 34' 14.86	21.05624722	-86.5707944
NUDAL	N21° 15' 48.00"	W085° 37' 14.00	21.26333333	-85.6205556

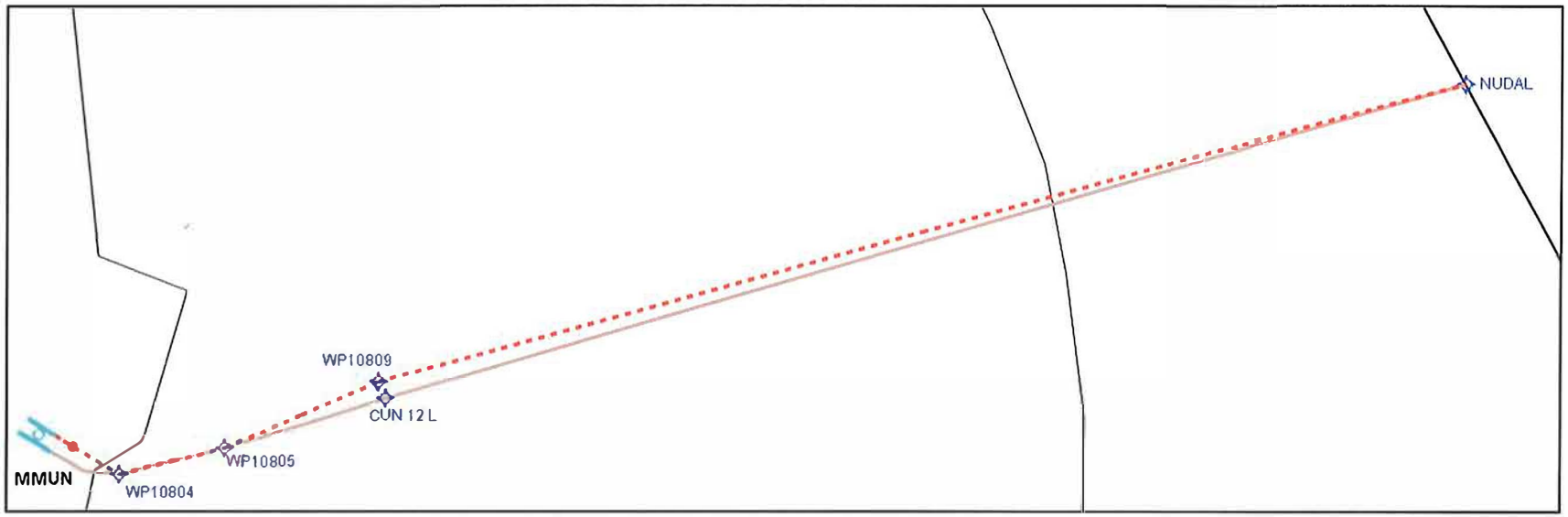

Figure B-24. CUN Runway 12R: CUN DEP NUDAL 12R Single Runway

CUN DEP NUDAL 30L Single Runway (20 NOV 2015)

Route:CUN DEP SINGLE RUNWAY

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30L:DER	N21° 02' 43.22"	W086° 53' 27.66"	21.04533889	-86.89101667
ghost	N21° 03' 17.95"	W086° 54' 23.18"	21.05498611	-86.90643889
CUN 30 C	N21° 13' 36.76"	W086° 48' 38.22"	21.22687778	-86.81061667
CUN 12 A	N21° 24' 00.24"	W086° 43' 00.80"	21.40006667	-86.71688889
NUDAL	N21° 15' 48.00"	W085° 37' 14.00"	21.26333333	-85.62055556

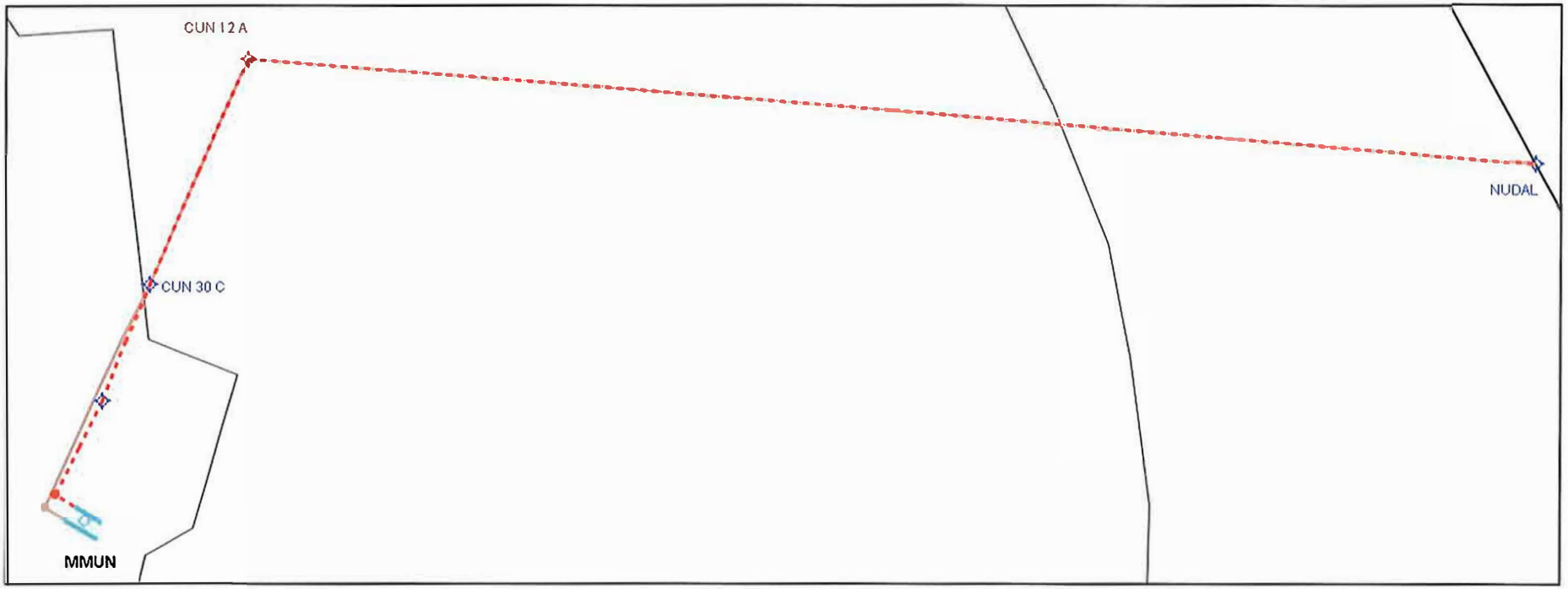

Figure B-25. CUN Runway 30L: CUN DEP NUDAL 30L Single Runway

CUN DEP NUKAN 12R Single Runway (20 NOV 2015)

Route:CUN DEP SINGLE RUNWAY

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW12R:DER	N21° 01' 40.07"	W086° 51' 46.76"	21.02779722	-86.86298889
ghost	N21° 00' 37.54"	W086° 50' 06.90"	21.01042778	-86.83525
WP10804	N21° 00' 25.90"	W086° 48' 18.08"	21.00719444	-86.80502222
WP10805	N21° 01' 24.00"	W086° 42' 41.00"	21.02333333	-86.71138889
CUN 12 L	N21° 03' 22.49"	W086° 34' 14.86"	21.05624722	-86.57079444
NUKAN	N21° 29' 34.00"	W085° 44' 17.00"	21.49277778	-85.73805556

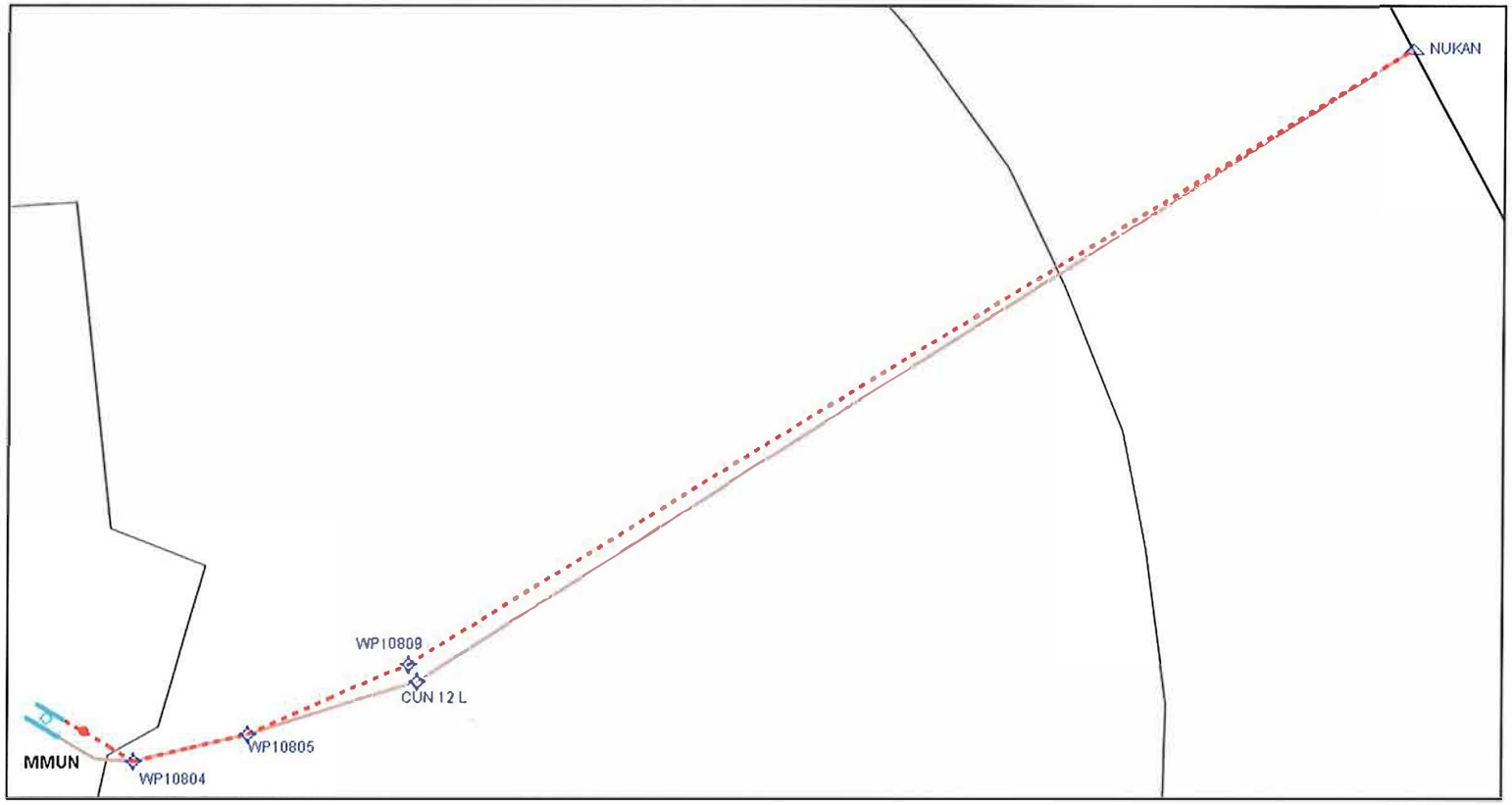

Figure B-26. CUN Runway 12R: CUN DEP NUKAN 12R Single Runway

CUN DEP NUKAN 30L Single Runway (20 NOV 2015)

Route:CUN DEP SINGLE RUNWAY

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW30L:DER	N21° 02' 43.22"	W086° 53' 27.66"	21.04533889	-86.89101667
ghost	N21° 03' 17.95"	W086° 54' 23.18"	21.05498611	-86.90643889
CUN 30 C	N21° 13' 36.76"	W086° 48' 38.22"	21.22687778	-86.81061667
CUN 12 A	N21° 24' 00.24"	W086° 43' 00.80"	21.40006667	-86.71688889
NUKAN	N21° 29' 34.00"	W085° 44' 17.00"	21.49277778	-85.73805556

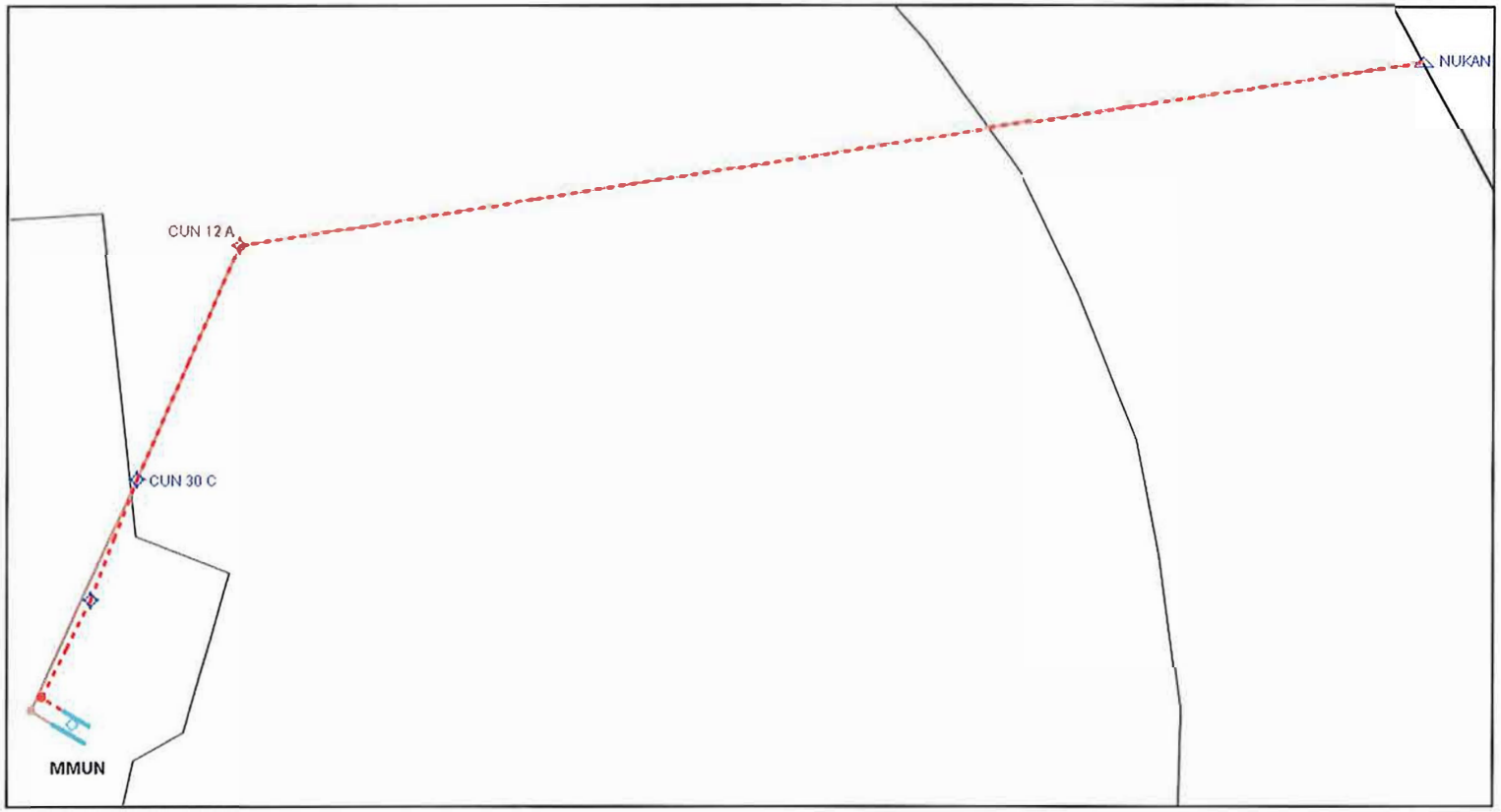

Figure B-27. CUN Runway 30L: CUN DEP NUKAN 30L Single Runway

CUN DEP TAKUX 12L Single Runway (20 NOV 2015)

Route:CUN DEP SINGLE RUNWAY

Airport: MMUN

Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RV	N21° 02' 26.52"	W086° 51' 32.26"	21.0407	-86.85896111
ghost	N21° 01' 40.64"	W086° 50' 18.98"	21.02795556	-86.83860556
WP10810	N20° 55' 35.00"	W086° 45' 23.00"	20.92638889	-86.75638889
CUN 12 C	N20° 43' 35.62"	W086° 22' 01.01"	20.72656111	-86.36694722
TAKUX	N20° 01' 37.00"	W085° 53' 46.00"	20.02694444	-85.89611111

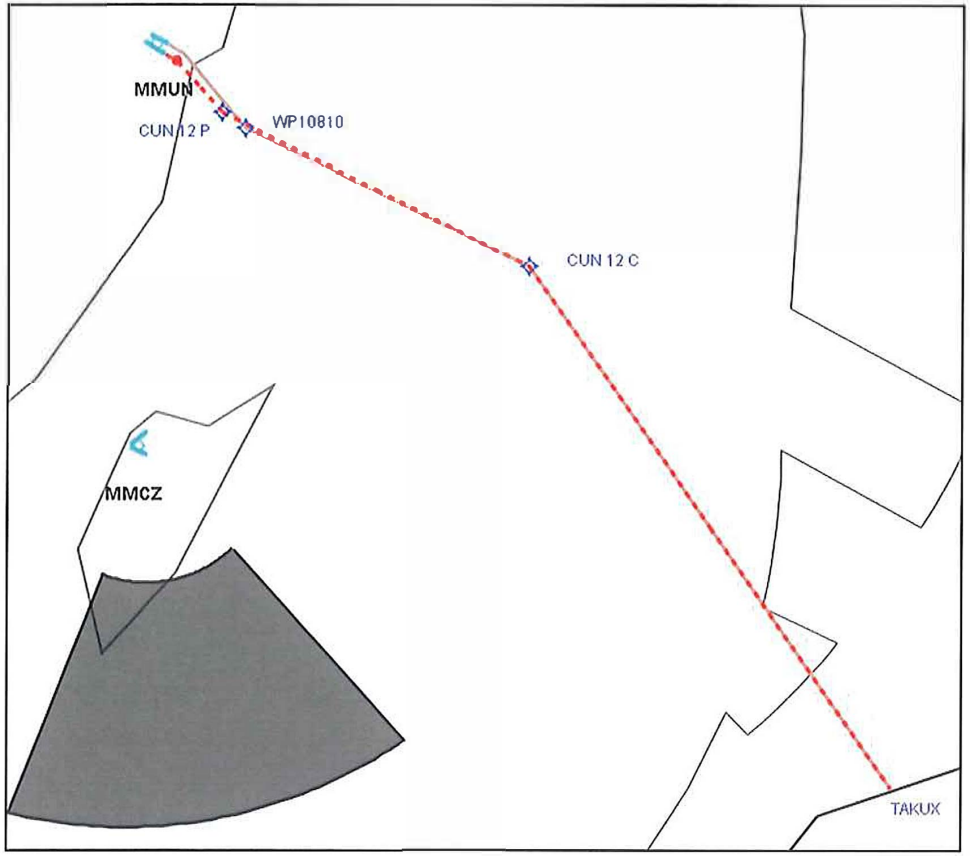

Figure B-28. CUN Runway 12L: CUN DEP TAKUX 12L Single Runway

CUN DEP TAKUX 30R Single Runway (20 NOV 2015)
Route:CUN DEP SINGLE RUNWAY
Airport: MMUN
Flight Type: DEP

	DMS		Decimal Degrees	
Point	Latitude	Longitude	Latitude	Longitude
MMUN:RW	N21° 03' 1	W086° 52'	21.05473333	-86.88138611
ghost	N21° 03' 5	W086° 53'	21.06434167	-86.89675
WP10838	N20° 54' 1	W087° 02'	20.90544444	-87.03386111
WP10839	N20° 34' 0	W086° 37'	20.5693	-86.61770556
WP27589	N20° 28' 5	W086° 30'	20.48299722	-86.51102222
TAKUX	N20° 01' 3	W085° 53'	20.02694444	-85.89611111

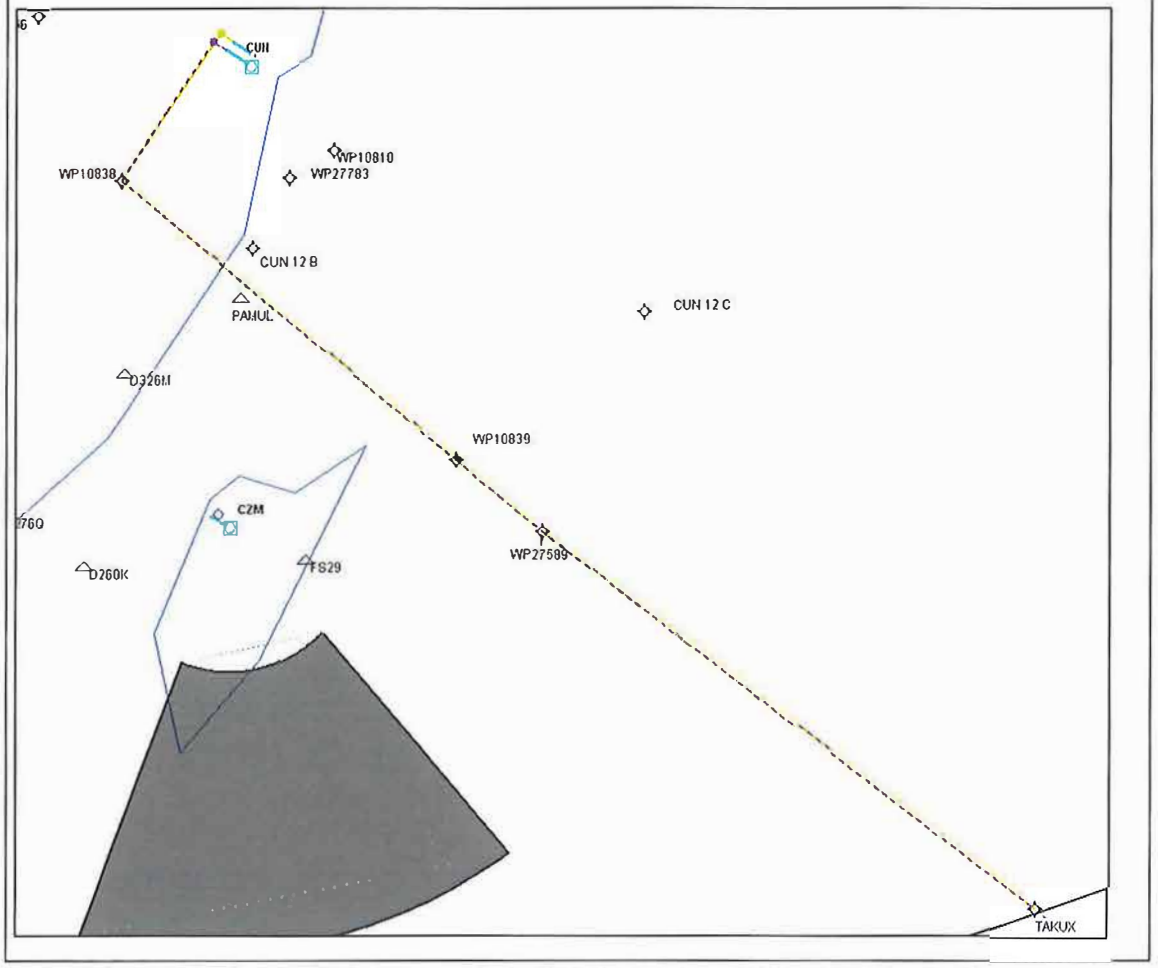

Figure B-29. CUN Runway 30R: CUN DEP TAKUX 30R Single Runway