Flight Procedures Cover Page	Task Action: FLIGHT CHECK	Task Type: STAR	Estimated Chart Date: 06/12/2025	APWS Task ID: 2824DD55B8AB4917820167103722CCE4	APWS Project ID: 35239729C23A4E65B183831F0CBB17F2
Procedure: STAR CSTAL THREE (RNAV) MIAMI FL KMIA		Enroute: YES	Specialist: Owens, Westley		Agreement Number:
Airport ID: KMIA			Airport City: MIAMI		State: FL
Facility ID:	Facility Type:	Flight Inspection Remark Type: New FC Slot			

Procedure Comments:
CHANGED FIX NAME "KAIZR" TO "CADEE"
ADDED HOLDING AT CADEE.

CONTACT: ERIC SUSKI, AJV-A431, (405) 954-7331.

12/16/2024

Data as of: 10/23/2024 11:29:11 CDT

FIPC DME/DME FORM

PROCEDURE:	AIRPORT NAME:	AIRPORT ID:	SPECIAL CONTROL NO:
CSTAL (RNAV) THREE ARRIVAL	MIAMI INTL	KMIA	AG-12-186-24

FAC ID: CSTAL3	CITY: MIAMI	ST: FL	ORIG CHART DATE: 06/12/2025

DFL TYPE:	THIRD PARTY:	EST. TIME ON SITE:	REIMB. NUMBER:	PTS TASK ID:
PROC/D	☐ YES	1.0		2824DD55B8AB4917820167103722CCE4

PREFLIGHT NOTES

REVIEWER: eric l geyer

DATE: 01/23/2025

COMMENTS:
Can be completed in the FMS: Check waypoint CADEE replaced KAIZR (same location). Check new holding pattern at CADEE :(HOLD N, LT, 162.26 INBOUND, 10 NM LEGS).

CHECK ONE:
☒ FLT CK REQ ☐ NFCR ☐ REJECT

	YES	NO
CPV COMPLETE?	X	

PROCEDURE RESULTS

INSPECTION DATE:	CREW #:	N #:	INSTRUMENT PROCEDURE STATUS:	ARINC CODING:
01/27/2025	VN526		☒ SAT ☐ SAT W/CHANGES ☐ UNSAT	☒ SAT ☐ SAT/GOLD ☐ UNSAT

FLIGHT INSPECTOR SIGNATURE:	PRINTED NAME:	NOTAM INITIATED?
james r jones @ 01/28/2025 08:52	GEYER, ERIC LEE	☐ YES ☒ NO

FLIGHT INSPECTOR REMARKS:
Miami INTL, Miami, FL, CSTAL THREE (RNAV) MIAMI FL KMIA, SAT.
Changed fix name on an already established route segment.

DME/DME STATUS:	SPECIALIST SIGNATURE:	PRINTED NAME:
☒ SAT ☐ UNSAT	erik j-ctr john @ 02/04/2025 07:45	Erik J. John

SPECIALIST REMARKS:
No Flight Check Required. No DME Post Flight Check Analysis necessary.

IN-FLIGHT OBSTACLE REPORT

OBSTRUCTION ID #:	COORDINATES OR LOCATION:	GNSS ALTITUDE (MSL):	BAROMETRIC ALTITUDE (MSL):	HEIGHT ABOVE GROUND LEVEL:

FIPC DME/DME FORM

PROCEDURE:	AIRPORT NAME:	AIRPORT ID:	SPECIAL CONTROL NO:
CSTAL (RNAV) THREE ARRIVAL	MIAMI INTL	KMIA	AG-12-186-24

FAC ID: CSTAL3	CITY: MIAMI	ST: FL	ORIG CHART DATE: 06/12/2025

DFL TYPE:	THIRD PARTY:	EST. TIME ON SITE:	REIMB. NUMBER:	PTS TASK ID:
PROC/D	☐ YES	1.0		2824DD55B8AB4917820167103722CCE4

PREFLIGHT NOTES

REVIEWER: eric l geyer

DATE: 01/23/2025

COMMENTS:
Can be completed in the FMS: Check waypoint CADEE replaced KAIZR (same location). Check new holding pattern at CADEE :(HOLD N, LT, 162.26 INBOUND, 10 NM LEGS).

CHECK ONE:
☒ FLT CK REQ ☐ NFCR ☐ REJECT

	YES	NO
CPV COMPLETE?	X	

PROCEDURE RESULTS

INSPECTION DATE:	CREW #:	N #:	INSTRUMENT PROCEDURE STATUS:	ARINC CODING:
01/27/2025	VN526		☒ SAT ☐ SAT W/CHANGES ☐ UNSAT	☒ SAT ☐ SAT/GOLD ☐ UNSAT

FLIGHT INSPECTOR SIGNATURE:	PRINTED NAME:	NOTAM INITIATED?
james r jones @ 01/28/2025 08:52	GEYER, ERIC LEE	☐ YES ☒ NO

FLIGHT INSPECTOR REMARKS:
Miami INTL, Miami, FL, CSTAL THREE (RNAV) MIAMI FL KMIA, SAT.
Changed fix name on an already established route segment.

DME/DME STATUS:	SPECIALIST SIGNATURE:	PRINTED NAME:
☐ SAT ☐ UNSAT		

SPECIALIST REMARKS:

IN-FLIGHT OBSTACLE REPORT

OBSTRUCTION ID #:	COORDINATES OR LOCATION:	GNSS ALTITUDE (MSL):	BAROMETRIC ALTITUDE (MSL):	HEIGHT ABOVE GROUND LEVEL:

NEW

(CSTAL.CSTAL3) FIG AL-257 (FAA)

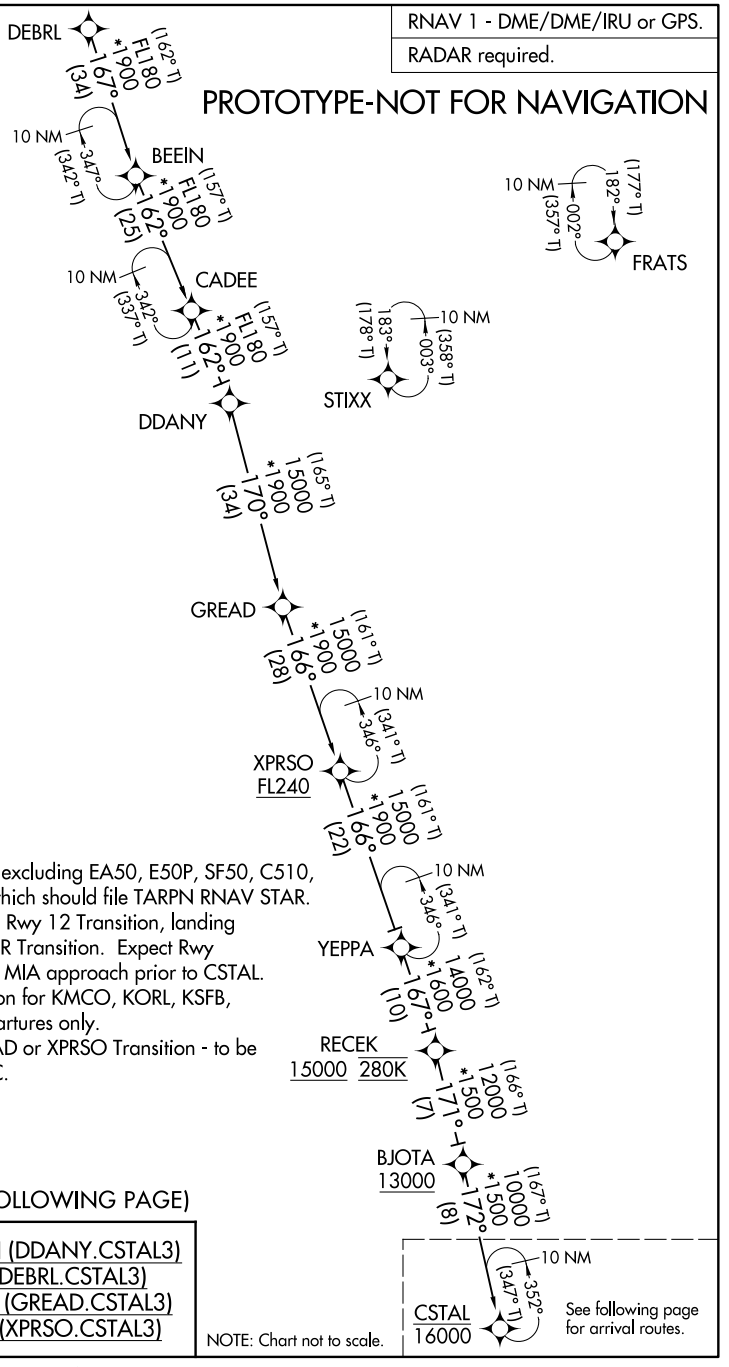
CSTAL THREE ARRIVAL (RNAV) Transition Routes

MIAMI, FLORIDA

MIAMI APP CON
124.85 263.025
KHST ATIS ★
132.275 269.9
MIA D-ATIS
119.15
TMB ATIS
124.0
X51 AWOS-3
118.375

RNAV 1 - DME/DME/IRU or GPS.
RADAR required.

PROTOTYPE-NOT FOR NAVIGATION



NOTE: Jet aircraft only, excluding EA50, E50P, SF50, C510, C525 aircraft, which should file TARPN RNAV STAR.

NOTE: Landing east use Rwy 12 Transition, landing west use Rwy 26R Transition. Expect Rwy assignment from MIA approach prior to CSTAL.

NOTE: DDANY Transition for KMCO, KORL, KSFB, KISM, KLEE departures only.

NOTE: Do not file GREAD or XPRSO Transition - to be assigned by ATC.

(CONTINUED ON FOLLOWING PAGE)

DDANY TRANSITION (DDANY.CSTAL3)
DEBRL TRANSITION (DEBRL.CSTAL3)
GREAD TRANSITION (GREAD.CSTAL3)
XPRSO TRANSITION (XPRSO.CSTAL3)

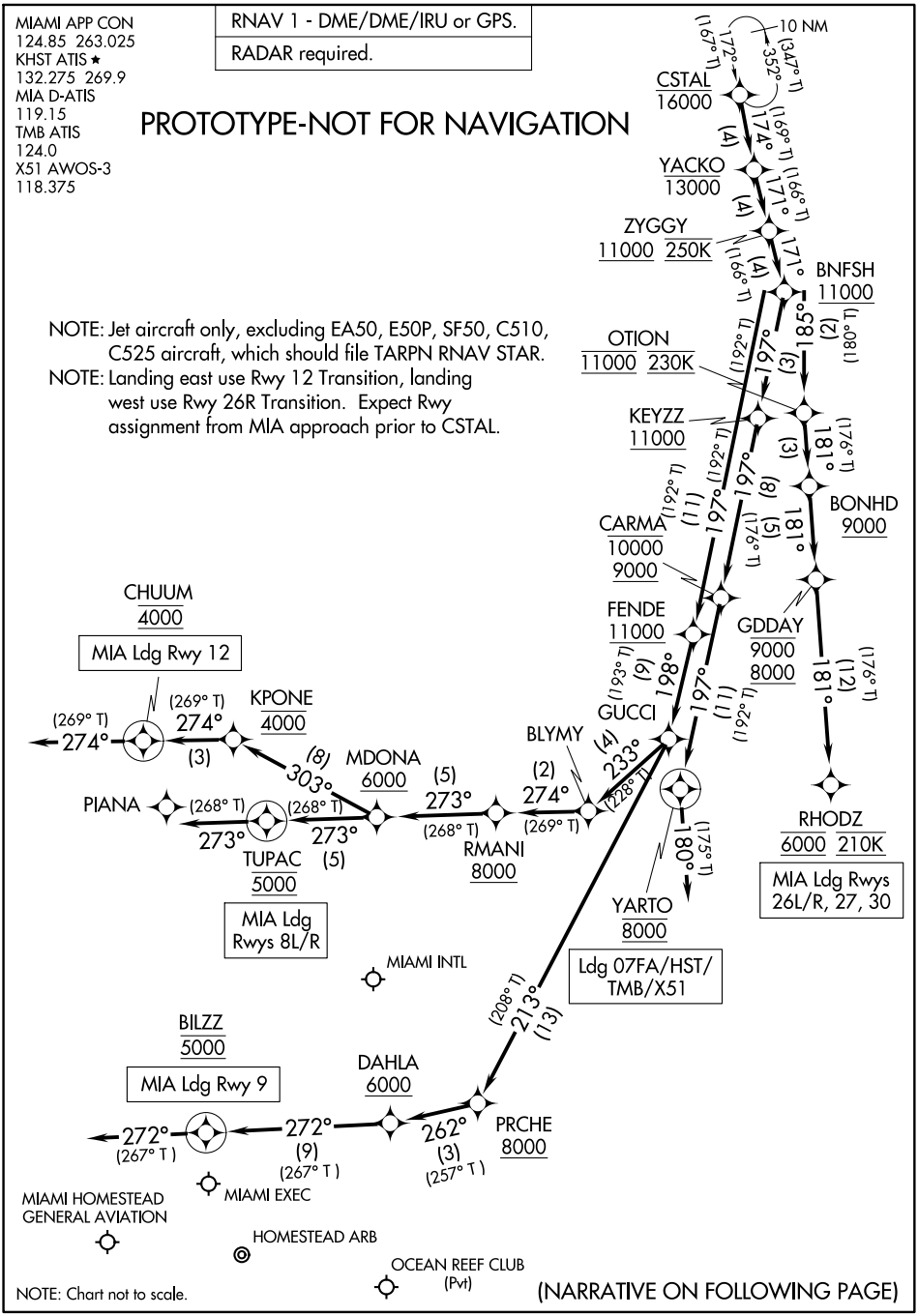
NOTE: Chart not to scale.

See following page for arrival routes.

CSTAL THREE ARRIVAL (RNAV) Transition Routes

MIAMI, FLORIDA

(CSTAL.CSTAL3) FIG


MIAMI APP CON
124.85 263.025
KHST ATIS ★
132.275 269.9
MIA D-ATIS
119.15
TMB ATIS
124.0
X51 AWOS-3
118.375
RNAV 1 - DME/DME/IRU or GPS.
RADAR required.
PROTOTYPE-NOT FOR NAVIGATION
NOTE: Jet aircraft only, excluding EA50, E50P, SF50, C510, C525 aircraft, which should file TARPN RNAV STAR.
NOTE: Landing east use Rwy 12 Transition, landing west use Rwy 26R Transition. Expect Rwy assignment from MIA approach prior to CSTAL.
10 NM
CSTAL 16000
YACKO 13000
ZYGGY 11000 250K
BNFSH 11000
OTION 11000 230K
KEYZZ 11000
CARMA 10000 9000
BONHD 9000
FENDE 11000
GDDAY 9000 8000
GUCCI
BLYMY
CHUUM 4000
MIA Ldg Rwy 12
KPONE 4000
MDONA 6000
PIANA
TUPAC 5000
MIA Ldg Rwys 8L/R
RMANI 8000
YARTO 8000
RHODZ 6000 210K
MIA Ldg Rwys 26L/R, 27, 30
Ldg 07FA/HST/ TMB/X51
MIAMI INTL
BILZZ 5000
MIA Ldg Rwy 9
DAHLA 6000
PRCHE 8000
MIAMI EXEC
MIAMI HOMESTEAD GENERAL AVIATION
HOMESTEAD ARB
OCEAN REEF CLUB (Pvt)
NOTE: Chart not to scale.
(NARRATIVE ON FOLLOWING PAGE)

ARRIVAL ROUTE DESCRIPTION

LANDING MIA RUNWAYS 8L/R: From CSTAL on track 174° to cross YACKO at or below 13000, then on track 171° to cross ZYGGY at or above 11000 and at 250K, then on track 171° to cross BNFSH at or above 11000, then on track 197° to cross FENDE at or above 11000, then on track 198° to GUCCI, then on track 233° to BLYMY, then on track 274° to cross RMANI at or above 8000, then on track 273° to cross MDONA at or above 6000, then on track 273° to cross TUPAC at 5000, then on track 273°. Expect RADAR vectors to final approach course.

LANDING MIA RUNWAY 9: From CSTAL on track 174° to cross YACKO at or below 13000, then on track 171° to cross ZYGGY at or above 11000 and at 250K, then on track 171° to cross BNFSH at or above 11000, then on track 197° to cross FENDE at or above 11000, then on track 198° to GUCCI, then on track 213° to cross PRCHE at or above 8000, then on track 262° to cross DAHLA at or above 6000, then on track 272° to cross BILZZ at 5000, then on track 272°. Expect RADAR vectors to final approach course.

LANDING MIA RUNWAY 12: From CSTAL on track 174° to cross YACKO at or below 13000, then on track 171° to cross ZYGGY at or above 11000 and at 250K, then on track 171° to cross BNFSH at or above 11000, then on track 197° to cross FENDE at or above 11000, then on track 198° to GUCCI, then on track 233° to BLYMY, then on track 274° to cross RMANI at or above 8000, then on track 273° to cross MDONA at or above 6000, then on track 303° to cross KPONE at 4000, then on track 274° to cross CHUUM at 4000, then on heading 274°. Expect RADAR vectors to final approach course.

LANDING MIA RUNWAY 26L/R, 27, 30: From CSTAL on track 174° to cross YACKO at or below 13000, then on track 171° to cross ZYGGY at or above 11000 and at 250K, then on track 171° to cross BNFSH at or above 11000, then on track 185° to cross OTION at 11000 and at 230K, then on track 181° to cross BONHD at or above 9000, then on track 181° to cross GDDAY between 8000 and 9000, then on track 181° to cross RHODZ at 6000 and at 210K. Expect ILS or RNAV Rwy 26L/R approach or RADAR vectors to final approach course.

LANDING 07FA/X51/HST/TMB: From CSTAL on track 174° to cross YACKO at or below 13000, then on track 171° to cross ZYGGY at or above 11000 and at 250K, then on track 171° to cross BNFSH at or above 11000, then on track 197° to cross KEYZZ at or above 11000, then on track 197° to cross CARMA between 9000 and 10000, then on track 197° to cross YARTO at 8000, then on heading 180°. Expect RADAR vectors to final approach course.

US Department of Transportation
Federal Aviation Administration

FLIGHT PROCEDURE STANDARDS WAIVER

FLIGHT STANDARDS USE ONLY
CONTROL NO.

1. FLIGHT PROCEDURE IDENTIFICATION:

MIAMI INTL, KMIA

CSTAL RNAV STAR

INFORMATION ONLY

2. WAIVER REQUIRED AND APPLICABLE STANDARD:

Waiver requirement to chart speed less than 250K above 10,000 feet MSL. Order 8260.58B, Paragraph 1-2-5.c.(2), Table 1–2–2. Indicated Airspeeds (KIAS). Minimum Speed Restriction, reference #2: "Airspeed restrictions may be established at a charted fix to reduce turn radius, avoid obstacles, accommodate ATC request, etc."

3. REASON FOR WAIVER (JUSTIFICATION FOR NONSTANDARD TREATMENT):

The CSTAL RNAV STAR is designed as an Optimized Profile Descent, (OPD) RNAV STAR in an airspace that precludes the use of 250K above 10,000FT at the point OTION in order to meet the Descent Gradient and leg length requirement from OTION to BONHD. The restriction at OTION, At 11,000 and 230K reduces the arrivals speed prior to 10,000FT which establishes a shorter leg length requirement between OTION and BONHD, which has a restriction of At or Above 9,000.

4. EQUIVALENT LEVEL OF SAFETY PROVIDED:

The requirements stated in Order 8260.3E, (United States Standard for Terminal Instrument Procedures (TERPS)), paragraph 2-2-8.a. are:
"(1) the maximum permissible gradient 10000 MSL and above is 330 ft/NM (approximately 3.11 degrees).
"(2) The maximum permissible DG below 10000 feet MSL is 318 ft/NM (approximately 3.0 degrees).
"(3) When a STAR contains a descent between fixes that passes through 10000 feet MSL, the maximum permissible DG is between 318 ft/NM and 330 ft/NM and is in proportion to the amount of the altitude change that is below/above 10000 feet MSL. Use formula 2-2-1 to determine the maximum DG (DGmax) between fixes that contain a descent that passes through 10000 feet MSL."

"Formula 2-2-1. Maximum DG Passing through 10000 Feet MSL (ft/NM) DBmax=(Alt1 – 10000) x 12 / (Alt1 – Alt2) + 318

The descent from OTION (11,000 230K) to BONHD (+9,000) to GDDAY (+8,000 -9,000) spans a total leg length of 7.53nm. A descent gradient of 324ft/nm (Use of the above formula) requires a minimum of 6.17nm. At 7.53nm the arrival will cross GDDAY at 8,559ft. The CSTAL STAR was simulated in two platforms at the FAA Mike Monroney Aeronautical Center, the B737-700 and the Airbus A320, as well as by Industry partners and the profile was sound.

5. ALTERNATIVE ACTIONS DEEMED NOT FEASIBLE:

Due to the airspace complexity and constraints created by the geographic location of the neighboring airports, KFLL and KPBI, the use of a Non OPD STAR serving KMIA was not an option that met the procedural de-confliction required by the project. The removal of the restriction at BONHD was also considered, however it provides ATC Airspace protection for the adjacent departure sector.

6. COORDINATION WITH USER ORGANIZATIONS (SPECIFY):

Eastern Service Area PBN FAA and NATCA leads.
ZMA ARTCC
MIA Approach Control.
American Airlines.

7. SUBMITTED BY:

DATE	OFFICE IDENTIFICATION TITLE	SIGNATURE
		VICKI LYNN TURNER Digitally signed by VICKI LYNN TURNER Date: 2022.01.12 15:37:15 -05'00'

7. AFS ACTIONS:

☐ ☐ ☐

US Department of Transportation
Federal Aviation Administration

FLIGHT PROCEDURE STANDARDS WAIVER

FLIGHT STANDARDS USE ONLY
CONTROL NO.

REQUIRED COMMENTS:

DATE	ROUTING SYMBOL	SIGNATURE

Federal Aviation Administration

Memorandum

INFORMATION ONLY

Date: April 26, 2022

To: Christopher Hope, Manager, Flight Technologies and Procedures Division
THRU: Romana Wolf, Manager, Flight Procedures and Airspace Group

From: Bev Bordy, Manager, Instrument Flight Procedures (IFP) Coordination Team, AJV-A45

Prepared by: Jefferson Rutledge, Sr. ATC Specialist, NAVTAC CTR Support

Digitally signed by
ALLAN WILL
Apr 27, 2022

Subject: Approval Request: Miami, FL (KMIA) CSTAL (RNAV) STAR, Non-standard Chart Notes

FAAO 8260.19I para 4-5-2w and para 4-5-12d: ATC will request that a chart note be placed on the STAR in the "Procedural Data Notes" section of Form 8260-17.1 to exclude certain aircraft from the procedure.

ATC request to use the following Procedural Data Note: "CHART NOTE: Jet Aircraft Only, excluding EA50, E50P, SF50, C510, and C525 aircraft, which should file TARPN TWO (RNAV) STAR."

This is to support ATC procedures that are required to prevent low performance Jet Aircraft from Flight Planning or filing procedures with the same lateral path that are standard routing for arrivals into the South Florida Metroplex area for these type aircraft. This procedure is Data Comm, ERAM, and FMC compliant.

Federal Aviation Administration

Memorandum

INFORMATION ONLY

Date: March 28, 2022

To: Christopher Hope, Manager, Flight Technologies and Procedures Division
THRU: Romana Wolf, Manager, Flight Procedures and Airspace Group

From: Bev Bordy, Manager, Instruction Flight Procedures (IFP) Coordination Team, AJV-A45

Digitally signed by
ALLAN WILL
Apr 04, 2022

Prepared by: Jefferson Rutledge, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Approval Request: Miami, FL (KMIA) CSTAL (RNAV) STAR
Non- standard Chart Notes

FAAO 8260.19I para 4-5-2 w**.** When ATC has determined that they do not want pilots to "Flight Plan" or file a particular STAR (i.e., use will be determined by ATC), ATC will request that a chart note be placed on the STAR. In the "Procedural Data Notes" section of Form 8260-17.1, use: "Chart Note: Do Not File – To Be Assigned by ATC."

ATC request to use the following Procedural Data Note: "Chart Note: Do Not File GREAD, XPRSO Transitions – To Be Assigned by ATC." This is to support ATC assigned transitions which are required to prevent users from filing Flight Plans that are non- standard routing for arrivals into the South Florida Metroplex area. These ATC assigned transitions will be Data Comm, ERAM, and FMC compliant to allow users to utilize these routes when necessary.

Federal Aviation Administration

Memorandum

INFORMATION ONLY

Date: December 9, 2021

To: Mark Steinbicker, Manager, Flight Technologies and Procedures Division
THRU: Wade Terrell, Manager, Flight Procedures and Airspace Group

From: Eddie Perez Manager Plans and Procedures, Miami ARTCC.

Prepared by: Jefferson Rutledge, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Deceleration Approval Request: CSTAL RNAV STAR, KMIA

BNFSH to OTION Segment

The requirements stated in Order 8260.3E, (United States Standard for Terminal Instrument Procedures (TERPS)), paragraph 2-2-10.a. are:
"2-2-10. Deceleration. Sufficient distance and a reduced descent gradient are required prior to any fix with a speed restriction. STARs not meeting the requirements of this paragraph may be authorized with Flight Standards approval (see paragraph 1-4-2).

a. Where deceleration is required but descent is not permitted (for example, between two fixes with the same mandatory altitudes) or is not required (for example, between two fixes with the same minimum altitudes), provide a minimum distance of at least 4 NM prior to a fix with a speed reduction of 40 KIAS or less. For deceleration greater than 40 KIAS, allow 1 NM between fixes for every 10 knots of deceleration required. For example, a deceleration of 10, 20, 30, or 40 KIAS requires a minimum length of 4 NM; a deceleration of 50 KIAS requires a minimum length of 5 NM; a deceleration of 60 KIAS requires 6 NM.

Paragraph 1-4-2. …states in part:
"**Nonstandard IFP.** …obstacles, navigation information, or traffic congestion may require special consideration where justified by operational requirements. In such cases, nonstandard IFPs that deviate from these criteria may be approved, provided they are documented and an equivalent level of safety exists…"

“RSO179: [Approval Required] The length of the leg from BNFSH to OTION is 2.477851816357096 NM. This leg must be at least 4.0 NM long due to deceleration from 250.0 KIAS to 230 KIAS between 11000.0 ft. MSL to 11000.0 ft. MSL.”

The segment with the restrictions of At or Above (AOA) 11000 250KIAS at ZYGGY followed by AOA 11000 at BNFSH then At 11000 230KIAS at OTION requires a 4 NM length, per the 8260.3E paragraph 2-2-10 a, for a reduction of 10- 40Kts. The deceleration required by the BNFSH-OTION segment is 20Kts. The reduction from 250Kts to 230Kts from ZYGGY to OTION is 6.96 NM. The KMIA CSTAL STAR was tested in simulation by American Airlines and in the Mike Monroney flight simulators and the deceleration of 20Kts over 2.48 NM did not have an adverse effect of the descent profile.

Consideration was given to removing and or changing the restrictions at BNFSH and or OTION. However, to allow aircraft to be configured for the segments following OTION the restrictions remained unchanged after simulation proved losing 20 KIAS over 2.48 NM was not an impediment to the safety or profile of the procedure.

EDDIE PEREZ-COLON

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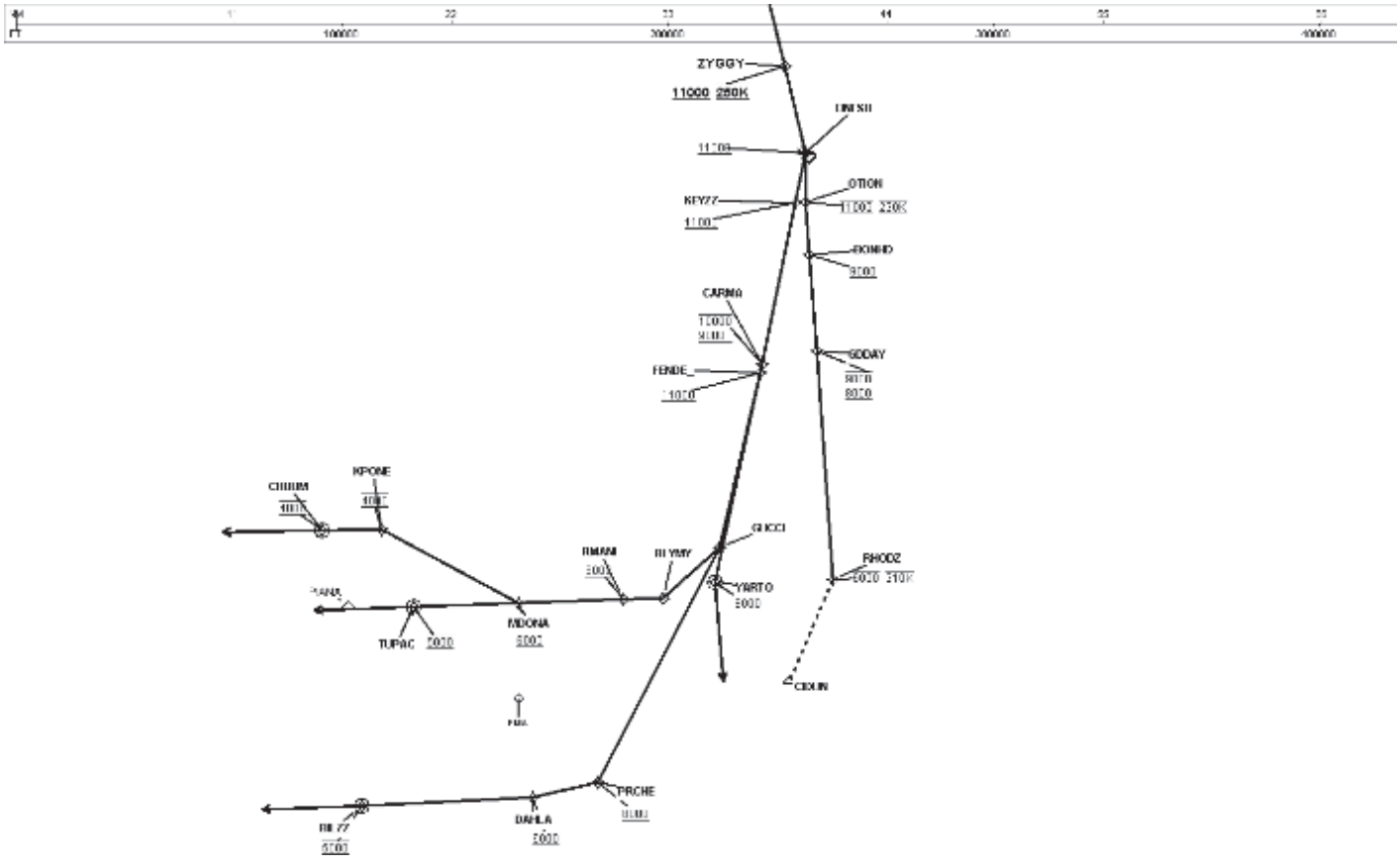
Date: 2022.01.14 12:23:33 -05'00'

Manager Plans and Procedures, Miami ARTCC

KMIA CSTAL STAR



Federal Aviation Administration

Memorandum

INFORMATION ONLY

Date: December 9, 2021

To: Mark Steinbicker, Manager, Flight Technologies and Procedures Division
THRU: Wade Terrell, Manager, Flight Procedures and Airspace Group

From: Eddie Perez Manager Plans and Procedures, Miami ARTCC.

Prepared by: Jefferson Rutledge, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Descent Gradient Approval Request: CSTAL RNAV STAR, KMIA

CSTAL to YACKO Segment

The requirements stated in Order 8260.3E, (United States Standard for Terminal Instrument Procedures (TERPS)), paragraph 2-2-8.a. are:
"(1) the maximum permissible gradient 10000 MSL and above is 330 ft/NM (approximately 3.11 degrees).
"(2) The maximum permissible DG below 10000 feet MSL is 318 ft. /NM (approximately 3.0 degrees).
"(3) When a STAR contains a descent between fixes that passes through 10000 feet MSL, the maximum permissible DG is between 318 ft. /NM and 330 ft. /NM and is in proportion to the amount of the altitude change that is below/above 10000 feet MSL. Use formula 2-2-1 to determine the maximum DG (DGmax) between fixes that contain a descent that passes through 10000 feet MSL."

"Formula 2-2-1. Maximum DG Passing through 10000 Feet MSL (ft/NM)

$$DBmax=(Alt_1 - 10000) \times 12 / (Alt_1 - Alt_2) + 318$$

"Where:
"Alt_1 = Altitude at the fix prior to crossing 10000 feet MSL
"Alt_2 = Altitude at the fix after crossing 10000 feet MSL"

Paragraph 2-2-8.b states:
"When a gradient exceeds the maximum DG allowed in paragraph 2-2-8a, the STAR requires approval."

Paragraph 1-4-2. …states in part:
"**Nonstandard IFP.** …obstacles, navigation information, or traffic congestion may require special consideration where justified by operational requirements. In such cases, nonstandard IFPs that deviate from these criteria may be approved, provided they are documented and an equivalent level of safety exists…"

RSO144: [Approval Required] The Descent Gradient (752.43) from CSTAL to YACKO is greater than the Maximum Permissible Descent Gradient (330.0).

A computed descent gradient value from CSTAL to YACKO of 752.43 ft./NM resulted from the descent gradient being calculated from descending from the restriction of At or Below (AOB) 16000 at CSTAL (13000 used) to cross YACKO AOB 13000 (13000 used) over a distance of 3.98 NM. The restriction after YACKO is at ZYGGY, a restriction of AOA 11000 and 250Kts. The restriction prior to CSTAL is at BJOTA AOA 13000. The distance required to descend from BJOTA (+13,000) to ZYGGY (At 11000). Calculating a descent gradient from BJOTA to ZYGGY 23.62 NM resulted in a descent gradient of 146.1 ft. per nm.

IFPA r0 08-12-21 TO UNK	BJOTA WP	N26 35 57.41	W080 06 31.59	FB	TF	166.30	171.30	6.93	+13000		12000	1500	
IFPA r0 08-12-21 TO UNK	CSTAL WP	N26 27 39.82	W080 04 27.27	FB	TF	167.33	172.33	8.48	-16000		10000	1500	
IFPA r0 08-12-21 TO UNK	YACKO WP	N26 23 44.31	W080 03 37.34	FB	TF	169.19	174.19	3.98	-13000		8000	1500	
	ZYGGY WP	N26 19 37.40	W080 02 29.70	FB	TF	166.13	171.13	4.23	+11000	250	8000	1400	
	BNFSH WP	N26 15 15.83	W080 01 18.14	FB	TF	166.14	171.14	4.48	+11000		8000	1400	

The bi-directional STAR and the dual feed in the Northeast quadrant of MIA terminal airspace require the “At or Below” constraints at CSTAL and YACKO. Consideration was given to removing and or changing the restrictions at BJOTA, CSTAL, YACKO and ZYGGY. However, due to airspace constraints and traffic flows it was decided that the restrictions are necessary to prevent aircraft from entering adjacent airspace, prevent confliction from other traffic and procedures, and reduce ATC workload due to required coordination, (point outs).

EDDIE PEREZ-COLON

Digitally signed by EDDIE PEREZ-COLON
Date: 2022.01.14 12:29:16 -05'00'

Manager Plans and Procedures, Miami ARTCC

Federal Aviation Administration

Memorandum

INFORMATION ONLY

Date: December 9, 2021

To: Mark Steinbicker, Manager, Flight Technologies and Procedures Division
THRU: Wade Terrell, Manager, Flight Procedures and Airspace Group

From: Eddie Perez Manager Plans and Procedures, Miami ARTCC.

Prepared by: Jefferson Rutledge, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Descent Gradient Approval Request: CSTALRNAV STAR, KMIA

OTION to BONHD Segment

The requirements stated in Order 8260.3E, (United States Standard for Terminal Instrument Procedures (TERPS)), paragraph 2-2-8.a. are:
"(1) the maximum permissible gradient 10000 MSL and above is 330 ft/NM (approximately 3.11 degrees).
"(2) The maximum permissible DG below 10000 feet MSL is 318 ft. /NM (approximately 3.0 degrees).
"(3) When a STAR contains a descent between fixes that passes through 10000 feet MSL, themaximum permissible DG is between 318 ft. /NM and 330 ft. /NM and is in proportion to theamount of the altitude change that is below/above 10000 feet MSL. Use formula 2-2-1 to determine the maximum DG (DGmax) between fixes that contain a descent that passes through 10000 feet MSL."

"Formula 2-2-1. Maximum DG Passing through 10000 Feet MSL (ft/NM)

$$DBmax=(Alt_1 - 10000) \times 12 / (Alt_1 - Alt_2) + 318$$

"Where:
"AAlt$_1$ = Altitude at the fix prior to crossing 10000 feet MSL
"AAlt$_2$ = Altitude at the fix after crossing 10000 feet MSL"

Paragraph 2-2-8.b states:
"When a gradient exceeds the maximum DG allowed in paragraph 2-2-8a, the STAR requires approval."

Paragraph 1-4-2. …states in part:
"**Nonstandard IFP.** …obstacles, navigation information, or traffic congestion may require special consideration where justified by operational requirements. In such cases, nonstandard IFPs that deviate from these criteria may be approved, provided they are documented and an equivalent level of safety exists…"

RSO144: [Approval Required] The Descent Gradient (747.91) from OTION to BONHD is greater than the Maximum Permissible Descent Gradient (324.0).

A computed descent gradient value from OTION to BONHD of 747.91 ft. per NM resulted from the descent gradient being calculated from descending from the restriction of At 11000 and 230KIAS at OTION to cross BONHD At or Above 9000 (9000 used) over a distance of 2.67 NM. The restriction after BONHD is at GDDAY, a block altitude, 8000-9000, followed by RHODZ, at 6000 and 210KIAS.
The distance from OTION to GDDAY is 7.53NM, the distance from GDDAY to RHODZ is 11.50NM (7.53+11.50=19.03NM) and using a descent gradient of 324ft/NM a total distance of 17.43NM is required. An aircraft crossing OTION at 11000 and crossing GDDAY between 8000 - 9000 descending at 324 ft. per NM places an aircraft over BONHD (at or above 9000) at 10135. The calculated descent gradient from OTION to RHODZ is 294ft. per NM.

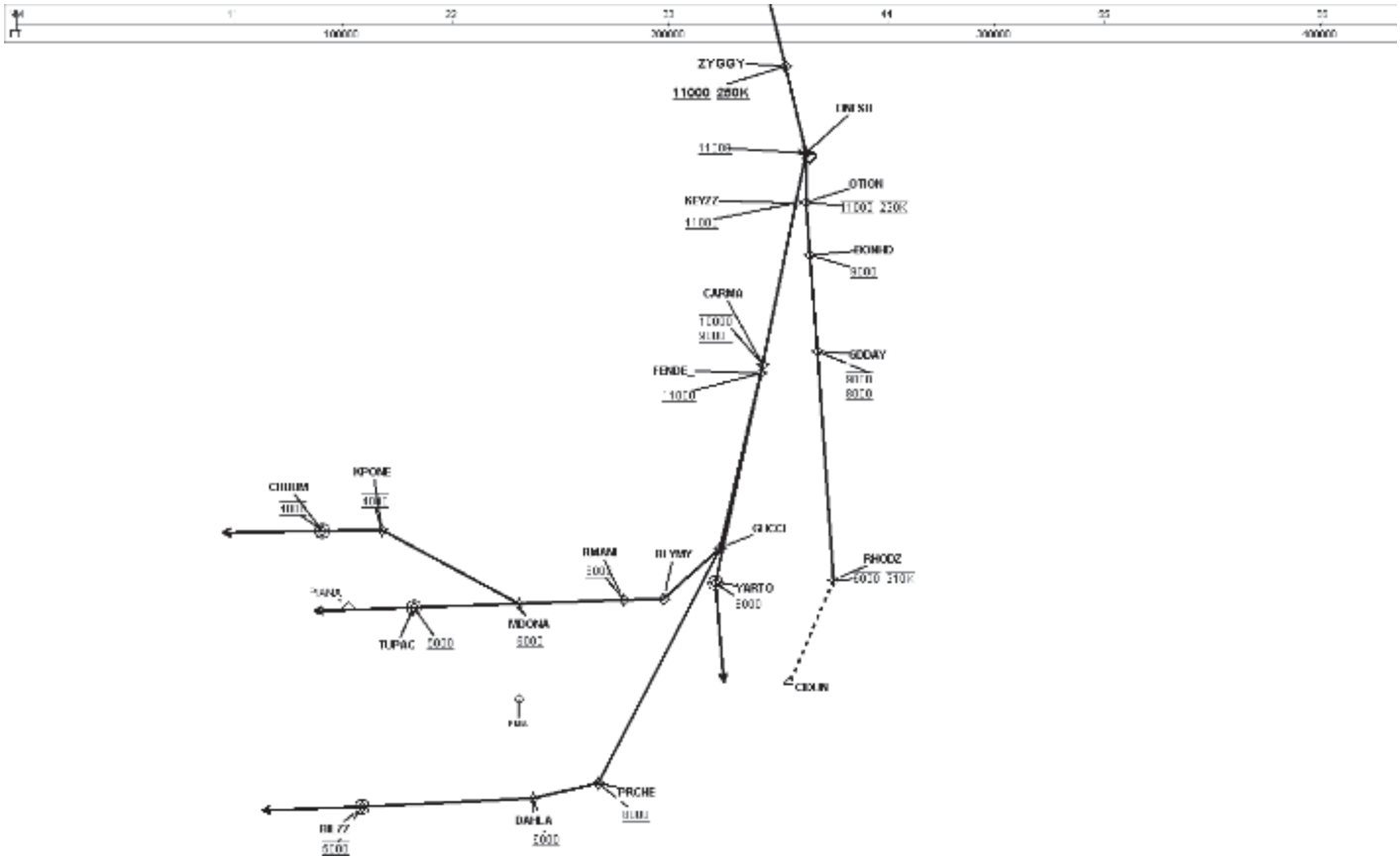
Consideration was given to removing and or changing the restrictions at OTION, BONHD, GDDAY and RHODZ. However, due to airspace constraints and traffic flows it was decided that the restrictions are necessary to prevent aircraft from entering adjacent airspace, prevent confliction from other traffic and procedures, and reduce ATC workload due to required coordination, (point outs).

EDDIE PEREZ-COLON

Digitally signed by EDDIE PEREZ-COLON
Date: 2022.01.14 12:24:00 -05'00'

Manager Plans and Procedures, Miami ARTCC

KMIA CSTAL STAR



Federal Aviation Administration

Memorandum

INFORMATION ONLY

Date: December 9, 2021

To: Mark Steinbicker, Manager, Flight Technologies and Procedures Division
THRU: Wade Terrell, Manager, Flight Procedures and Airspace Group

From: Eddie Perez Manager Plans and Procedures, Miami ARTCC.

Prepared by: Jefferson Rutledge, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Descent Gradient Approval Request: CSTALRNAV STAR, KMIA

PRCHE to DAHLA Segment

The requirements stated in Order 8260.3E, (United States Standard for Terminal Instrument Procedures (TERPS)), paragraph 2-2-8.a. are:
"(1) the maximum permissible gradient 10000 MSL and above is 330 ft/NM (approximately 3.11 degrees).
"(2) The maximum permissible DG below 10000 feet MSL is 318 ft. /NM (approximately 3.0 degrees).
"(3) When a STAR contains a descent between fixes that passes through 10000 feet MSL, the maximum permissible DG is between 318 ft. /NM and 330 ft. /NM and is in proportion to the amount of the altitude change that is below/above 10000 feet MSL. Use formula 2-2-1 to determine the maximum DG (DGmax) between fixes that contain a descent that passes through 10000 feet MSL."

"Formula 2-2-1. Maximum DG Passing through 10000 Feet MSL (ft/NM)

$$DBmax=(Alt_1 - 10000) \times 12 / (Alt_1 - Alt_2) + 318$$

"Where:
"Alt_1 = Altitude at the fix prior to crossing 10000 feet MSL
"Alt_2 = Altitude at the fix after crossing 10000 feet MSL"

Paragraph 2-2-8.b states:
"When a gradient exceeds the maximum DG allowed in paragraph 2-2-8a, the STAR requires approval."

Paragraph 1-4-2. …states in part:
"**Nonstandard IFP.** …obstacles, navigation information, or traffic congestion may require special consideration where justified by operational requirements. In such cases, nonstandard IFPs that deviate from these criteria may be approved, provided they are documented and an equivalent level of safety exists…"

RSO144: [Approval Required] The Descent Gradient (596.22) from PRCHE to DAHLA is greater than the Maximum Permissible Descent Gradient (318.0).

A computed descent gradient value from PRCHE to DAHLA of 596.22 ft/NM resulted from the descent gradient being calculated from descending from the restriction of AOA 8000 at PRCHE (8000 used) to cross DAHLA AOA 6000 (6000 used) over a distance of 3.35 NM. The next restriction after DAHLA is BILZZ at 5000. The distance from PRCHE to BILZZ is 12.05 NM and using a descent gradient of 318 ft. per NM a total distance of 9.44 NM is required. An aircraft is permitted to cross DAHLA AOA 6000 and cross BILZZ at 5000. The calculated descent gradient from PRCHE to BILZZ IS 249ft. per NM. Descending at 249ft. per nm places the aircraft at 7165 over DAHLA.

Consideration was given to removing and or changing the restrictions at PRCHE and/or DAHLA. However, due to airspace constraints and traffic flows it was decided that the restrictions are necessary to prevent aircraft from entering adjacent airspace, prevent confliction from other traffic and procedures and reduce ATC workload due to required coordination, (point outs).

EDDIE PEREZ-COLON
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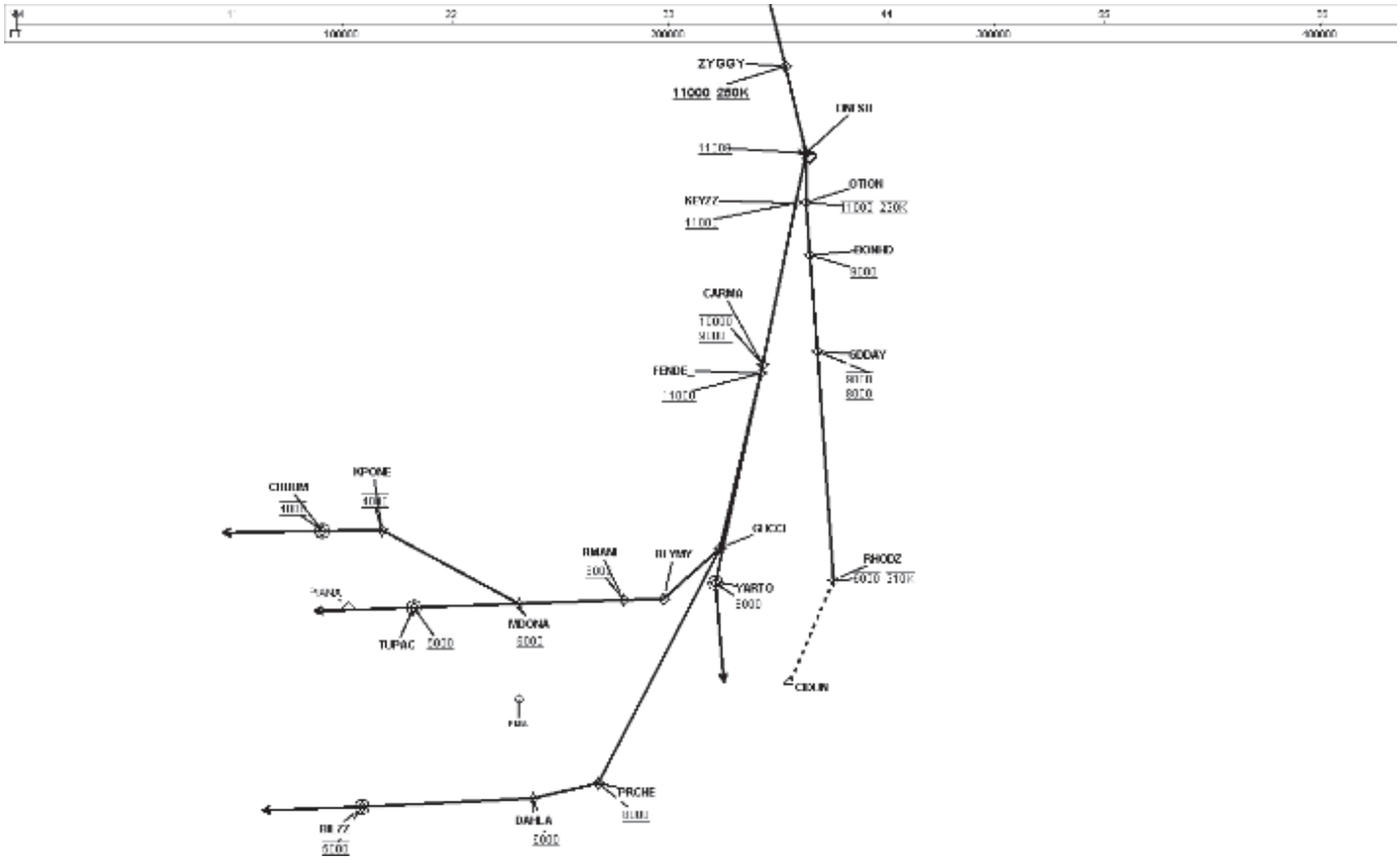
Date: 2022.01.14 12:29:42 -05'00'
Manager Plans and Procedures, Miami ARTCC

KMIA CSTAL STAR



Federal Aviation Administration

Memorandum

INFORMATION ONLY

Date: December 9, 2021

To: Mark Steinbicker, Manager, Flight Technologies and Procedures Division
THRU: Wade Terrell, Manager, Flight Procedures and Airspace Group

From: Eddie Perez Manager Plans and Procedures, Miami ARTCC.

Prepared by: Jefferson Rutledge, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Descent Gradient Approval Request: CSTAL RNAV STAR,KMIA,

RMANI to MDONA Segment

The requirements stated in Order 8260.3E, (United States Standard for Terminal Instrument Procedures (TERPS)), paragraph 2-2-8.a. are:
"(1) the maximum permissible gradient 10000 MSL and above is 330 ft/NM (approximately 3.11 degrees).
"(2) The maximum permissible DG below 10000 feet MSL is 318 ft. /NM (approximately 3.0 degrees).
"(3) When a STAR contains a descent between fixes that passes through 10000 feet MSL, the maximum permissible DG is between 318 ft. /NM and 330 ft. /NM and is in proportion to the amount of the altitude change that is below/above 10000 feet MSL. Use formula 2-2-1 to determine the maximum DG (DGmax) between fixes that contain a descent that passes through 10000 feet MSL."

"Formula 2-2-1. Maximum DG Passing through 10000 Feet MSL (ft/NM)

$$DBmax=(Alt_1 - 10000) \times 12 / (Alt_1 - Alt_2) + 318$$

"Where:
"Alt_1 = Altitude at the fix prior to crossing 10000 feet MSL
"Alt_2 = Altitude at the fix after crossing 10000 feet MSL"

Paragraph 2-2-8.b states:
"When a gradient exceeds the maximum DG allowed in paragraph 2-2-8a, the STAR requires approval."

Paragraph 1-4-2. …states in part:
"**Nonstandard IFP.** …obstacles, navigation information, or traffic congestion may require special consideration where justified by operational requirements. In such cases, nonstandard IFPs that deviate from these criteria may be approved, provided they are documented and an equivalent level of safety exists…"

RSO144: [Approval Required] The Descent Gradient (377.60) from RMANI to MDONA is greater than the Maximum Permissible Descent Gradient (318.0).

A computed descent gradient value from RMANI to MDONA of 377.60 ft. per NM resulted from the descent gradient being calculated from descending from the restriction of At or Above (AOA) 8000 at RMANI (8000 used) to cross MDONA AOA 6000 (6000 used) over a distance of 5.29 NM. The next restriction after MDONA is TUPAC at 5000 or KPONE at 4000. The distance from RMANI to TUPAC is 10.60 NM and using a descent gradient of 318 ft/NM a total distance of 9.44 NM is required. RMANI to KPONE is 13.14 NM and using a descent gradient of 318 ft. per NM a total distance of 12.58 NM is required. An aircraft is permitted to cross MDONA AOA 6000 and cross KPONE at 4000. Descending at 318 ft. per NM places an aircraft descending from 8000 over RMANI across the restriction at MDONA (AOA 6000) at 6318. The calculated descent gradient from RMANI to TUPAC IS 283 ft. per NM and RMANI to KPONE is 304 ft. per NM.

Consideration was given to removing and or changing the restrictions at RMANI and/or MDONA. However, due to airspace constraints and traffic flows it was decided that the restrictions are necessary to prevent aircraft from entering adjacent airspace, prevent confliction from other traffic and procedures and reduce ATC workload due to required coordination, (point outs).

EDDIE PEREZ-COLON

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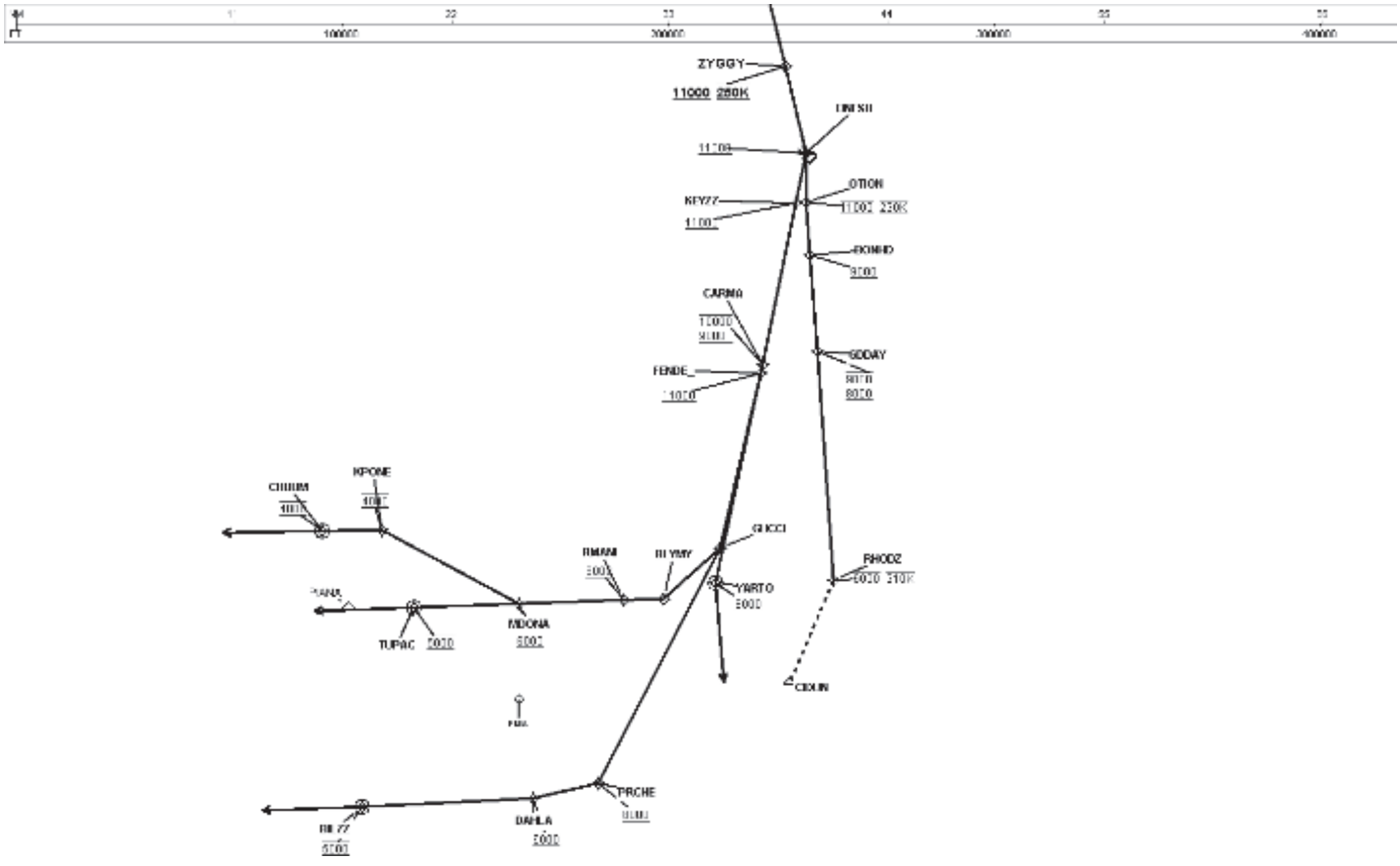
Date: 2022.01.14 12:24:26 -05'00'

Manager Plans and Procedures, Miami ARTCC

KMIA CSTAL STAR



Federal Aviation Administration

Memorandum

INFORMATION ONLY

Date: December 9, 2021

To: Mark Steinbicker, Manager, Flight Technologies and Procedures Division
THRU: Wade Terrell, Manager, Flight Procedures and Airspace Group

From: Eddie Perez Manager Plans and Procedures, Miami ARTCC.

Prepared by: Jefferson Rutledge, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Descent Gradient Approval Request: CSTALRNAV STAR, KMIA

YACKO to ZYGGY Segment

The requirements stated in Order 8260.3E, (United States Standard for Terminal Instrument Procedures (TERPS)), paragraph 2-2-8.a. are:
"(1) the maximum permissible gradient 10000 MSL and above is 330 ft/NM (approximately 3.11 degrees).
"(2) The maximum permissible DG below 10000 feet MSL is 318 ft. /NM (approximately 3.0 degrees).
"(3) When a STAR contains a descent between fixes that passes through 10000 feet MSL, the maximum permissible DG is between 318 ft. /NM and 330 ft. /NM and is in proportion to the amount of the altitude change that is below/above 10000 feet MSL. Use formula 2-2-1 to determine the maximum DG (DGmax) between fixes that contain a descent that passes through 10000 feet MSL."

"Formula 2-2-1. Maximum DG Passing through 10000 Feet MSL (ft/NM)

$$DBmax=(Alt_1 - 10000) \times 12 / (Alt_1 - Alt_2) + 318$$

"Where:
"Alt_1 = Altitude at the fix prior to crossing 10000 feet MSL
"Alt_2 = Altitude at the fix after crossing 10000 feet MSL"

Paragraph 2-2-8.b states:
"When a gradient exceeds the maximum DG allowed in paragraph 2-2-8a, the STAR requires approval."

Paragraph 1-4-2. …states in part:
"**Nonstandard IFP.** …obstacles, navigation information, or traffic congestion may require special consideration where justified by operational requirements. In such cases, nonstandard IFPs that deviate from these criteria may be approved, provided they are documented and an equivalent level of safety exists…"

RSO144: [Approval Required] The Descent Gradient (472.98) from YACKO to ZYGGY is greater than the Maximum Permissible Descent Gradient (330.0).

A computed descent gradient value from YACKO to ZYGGY of 472.98 ft./NM resulted from the descent gradient being calculated from descending from the restriction of At or Below (AOB) 16000 at CSTAL (16000 used) to cross YACKO AOB 13000 (13000 used) over a distance of 3.98 NM. The restriction after YACKO AOB 13000 is at ZYGGY AOA 11000 and 250KIAS. The restriction prior to CSTAL is at BJOTA AOA 13000.

Calculating a descent gradient from BJOTA to ZYGGY 23.62 NM resulted in a descent gradient of 146.1 ft. per nm.

IFPA r0 08-12-21 TO UNK	BJOTA WP	N26 35 57.41	W080 06 31.59	FB	TF	166.30	171.30	6.93	+13000		12000	1500	
IFPA r0 08-12-21 TO UNK	CSTAL WP	N26 27 39.82	W080 04 27.27	FB	TF	167.33	172.33	8.48	-16000		10000	1500	
IFPA r0 08-12-21 TO UNK	YACKO WP	N26 23 44.31	W080 03 37.34	FB	TF	169.19	174.19	3.98	-13000		8000	1500	
	ZYGGY WP	N26 19 37.40	W080 02 29.70	FB	TF	166.13	171.13	4.23	+11000	250	8000	1400	
	BNFSH WP	N26 15 15.83	W080 01 18.14	FB	TF	166.14	171.14	4.48	+11000		8000	1400	

The bi-directional STAR and the dual feed in the Northeast quadrant of MIA terminal airspace require the “At or Below” constraints at CSTAL and YACKO. Consideration was given to removing and or changing the restrictions at BJOTA, CSTAL, YACKO and ZYGGY. However, due to airspace constraints and traffic flows it was decided that the restrictions are necessary to prevent aircraft from entering adjacent airspace, prevent confliction from other traffic and procedures, and reduce ATC workload due to required coordination, (point outs).

EDDIE PEREZ-COLON

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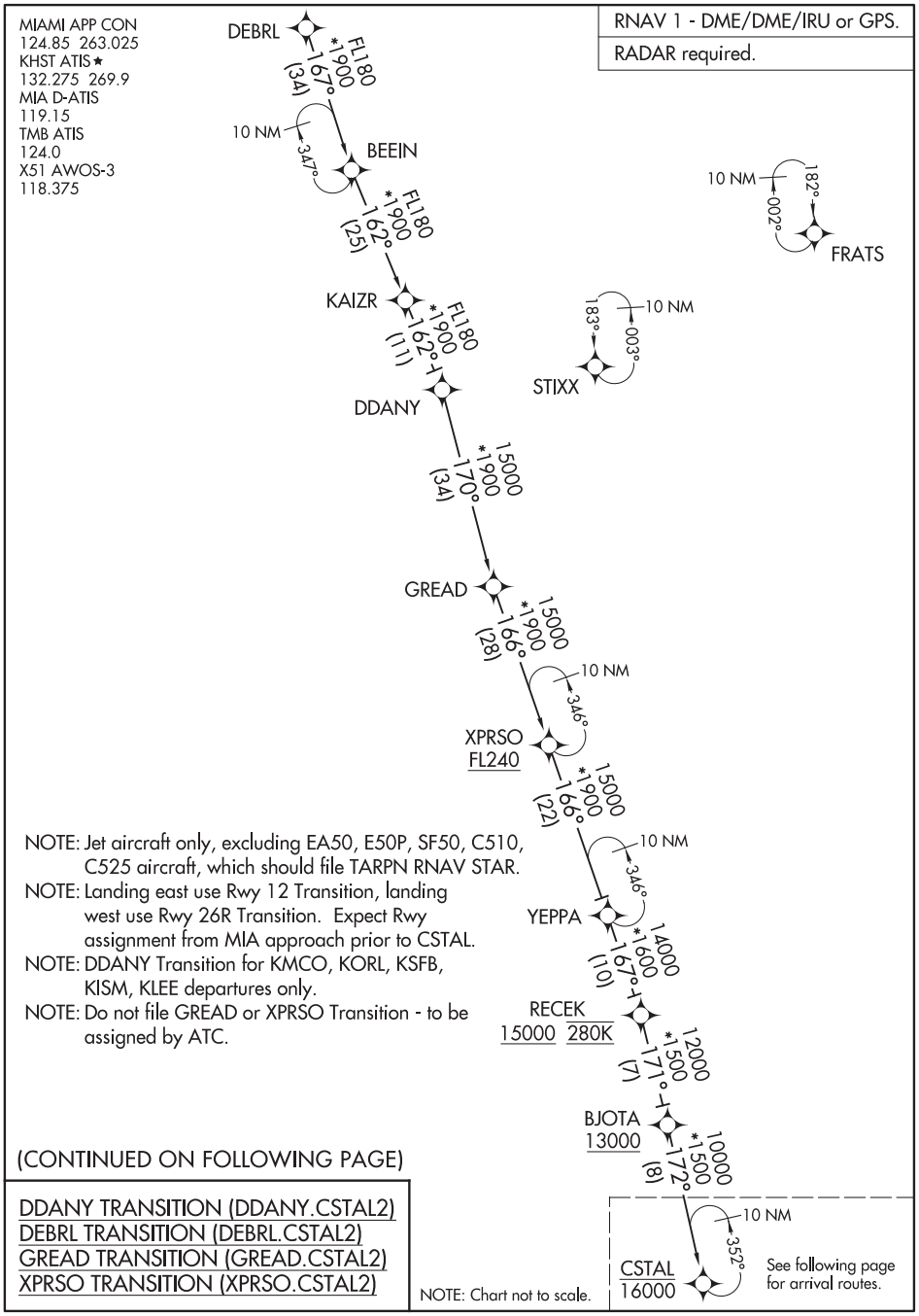
Date: 2022.01.14 12:30:13 -05'00'

Manager Plans and Procedures, Miami ARTCC

(CSTAL.CSTAL2) 22139 AL-257 (FAA) OLD

CSTAL TWO ARRIVAL (RNAV) Transition Routes

MIAMI, FLORIDA



CSTAL TWO ARRIVAL (RNAV) Transition Routes

MIAMI, FLORIDA

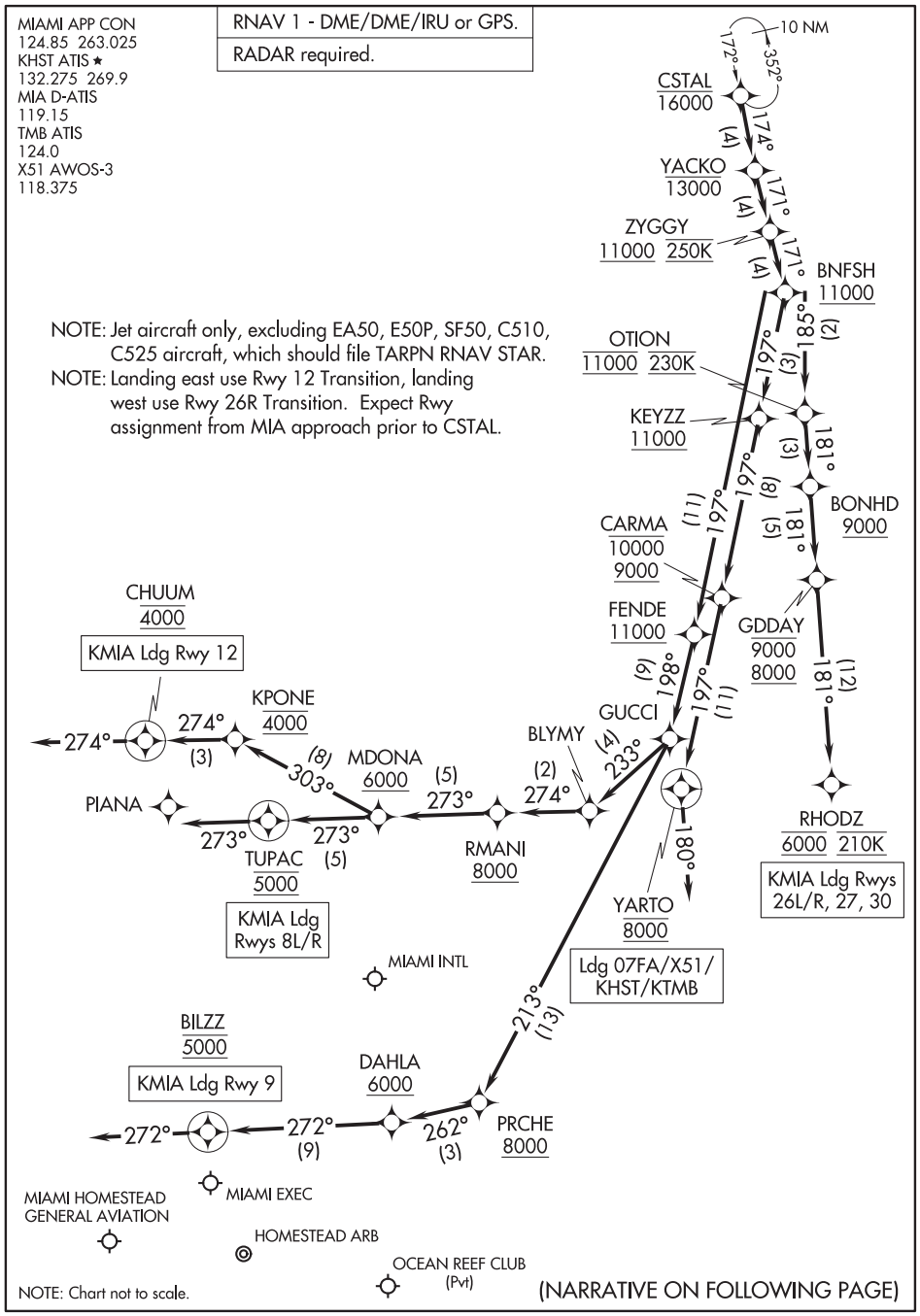
(CSTAL.CSTAL2) 19MAY22

SE-3, 03 OCT 2024 to 31 OCT 2024

(CSTAL.CSTAL2) 23222 AL-257 (FAA) OLD

CSTAL TWO ARRIVAL (RNAV) Arrival Routes

MIAMI, FLORIDA



SE-3, 03 OCT 2024 to 31 OCT 2024

SE-3, 03 OCT 2024 to 31 OCT 2024

CSTAL TWO ARRIVAL (RNAV) Arrival Routes MIAMI, FLORIDA

(CSTAL.CSTAL2) 19MAY22

SE-3, 03 OCT 2024 to 31 OCT 2024

ARRIVAL ROUTE DESCRIPTION

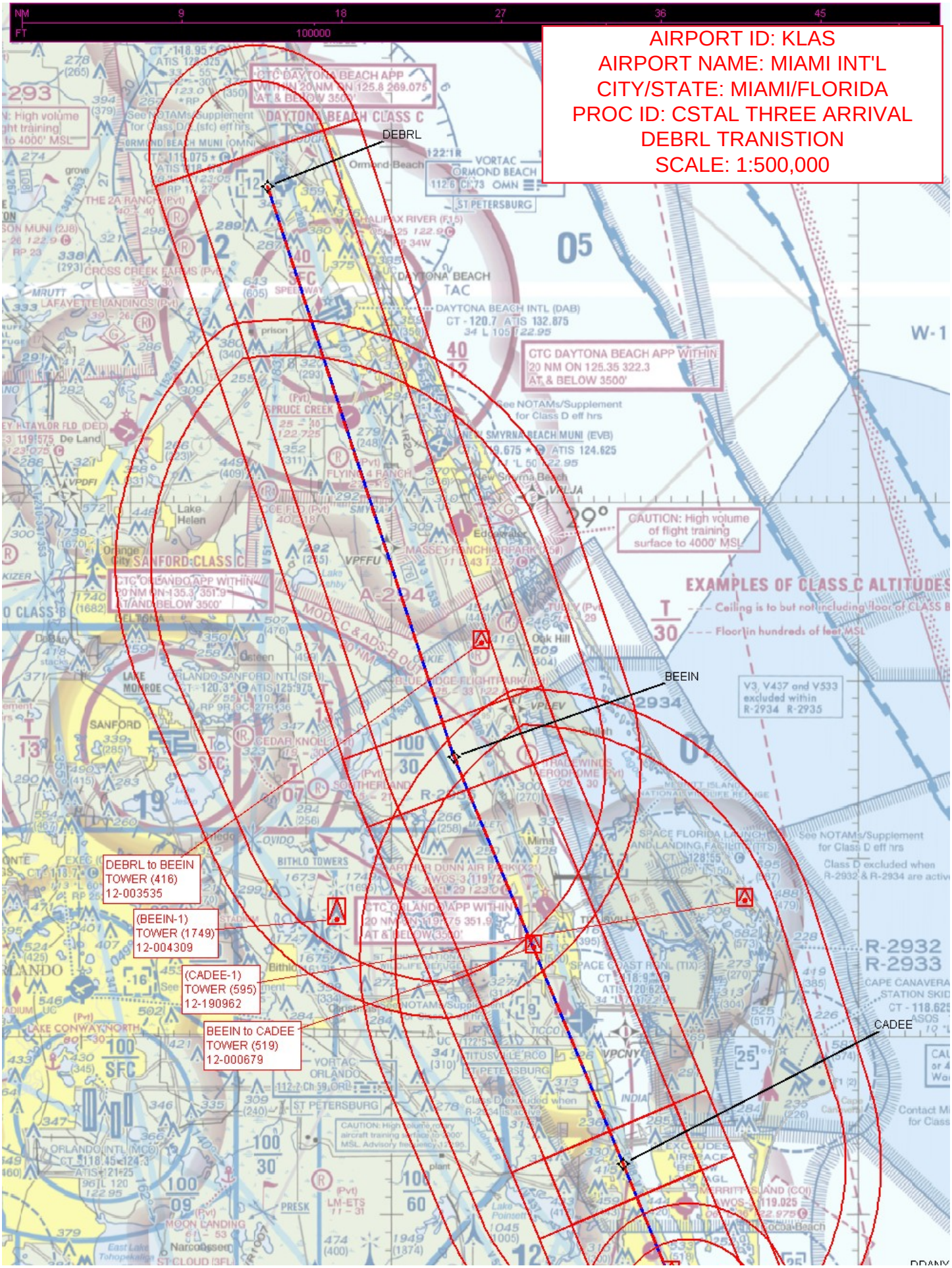
LANDING KMIA RUNWAYS 8L/R: From CSTAL on track 174° to cross YACKO at or below 13000, then on track 171° to cross ZYGGY at or above 11000 and at 250K, then on track 171° to cross BNFSH at or above 11000, then on track 197° to cross FENDE at or above 11000, then on track 198° to GUCCI, then on track 233° to BLYMY, then on track 274° to cross RMANI at or above 8000, then on track 273° to cross MDONA at or above 6000, then on track 273° to cross TUPAC at 5000, then on track 273°. Expect RADAR vectors to final approach course.

LANDING KMIA RUNWAY 9: From CSTAL on track 174° to cross YACKO at or below 13000, then on track 171° to cross ZYGGY at or above 11000 and at 250K, then on track 171° to cross BNFSH at or above 11000, then on track 197° to cross FENDE at or above 11000, then on track 198° to GUCCI, then on track 213° to cross PRCHE at or above 8000, then on track 262° to cross DAHLA at or above 6000, then on track 272° to cross BILZZ at 5000, then on track 272°. Expect RADAR vectors to final approach course.

LANDING KMIA RUNWAY 12: From CSTAL on track 174° to cross YACKO at or below 13000, then on track 171° to cross ZYGGY at or above 11000 and at 250K, then on track 171° to cross BNFSH at or above 11000, then on track 197° to cross FENDE at or above 11000, then on track 198° to GUCCI, then on track 233° to BLYMY, then on track 274° to cross RMANI at or above 8000, then on track 273° to cross MDONA at or above 6000, then on track 303° to cross KPONE at 4000, then on track 274° to cross CHUUM at 4000, then on heading 274°. Expect RADAR vectors to final approach course.

LANDING KMIA RUNWAY 26L/R, 27, 30: From CSTAL on track 174° to cross YACKO at or below 13000, then on track 171° to cross ZYGGY at or above 11000 and at 250K, then on track 171° to cross BNFSH at or above 11000, then on track 185° to cross OTION at 11000 and at 230K, then on track 181° to cross BONHD at or above 9000, then on track 181° to cross GDDAY between 8000 and 9000, then on track 181° to cross RHODZ at 6000 and at 210K. Expect ILS or RNAV Rwy 26L/R approach or RADAR vectors to final approach course.

LANDING 07FA/X51/KHST/KTMB: From CSTAL on track 174° to cross YACKO at or below 13000, then on track 171° to cross ZYGGY at or above 11000 and at 250K, then on track 171° to cross BNFSH at or above 11000, then on track 197° to cross KEYZZ at or above 11000, then on track 197° to cross CARMA between 9000 and 10000, then on track 197° to cross YARTO at 8000, then on heading 180°. Expect RADAR vectors to final approach course.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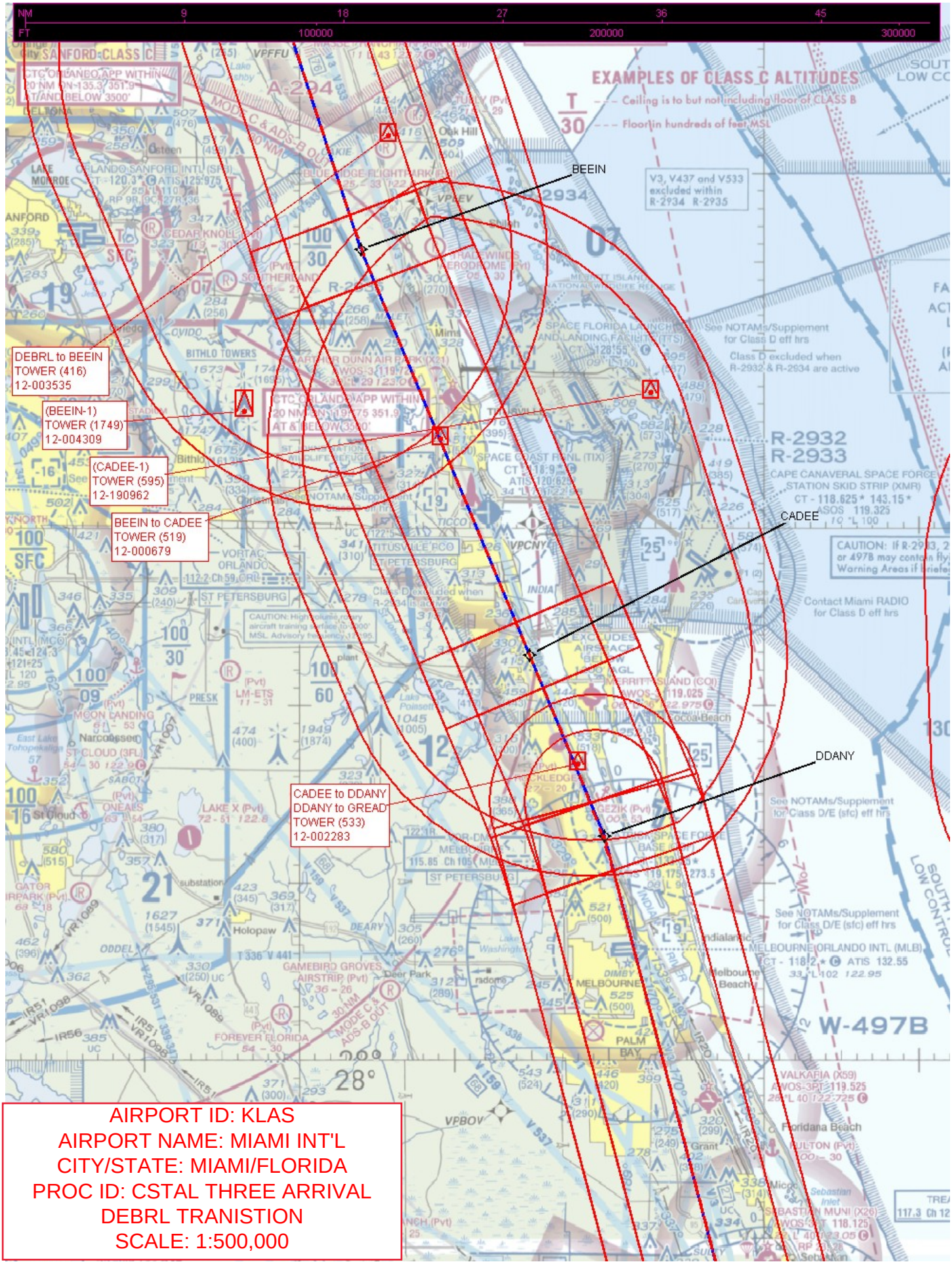
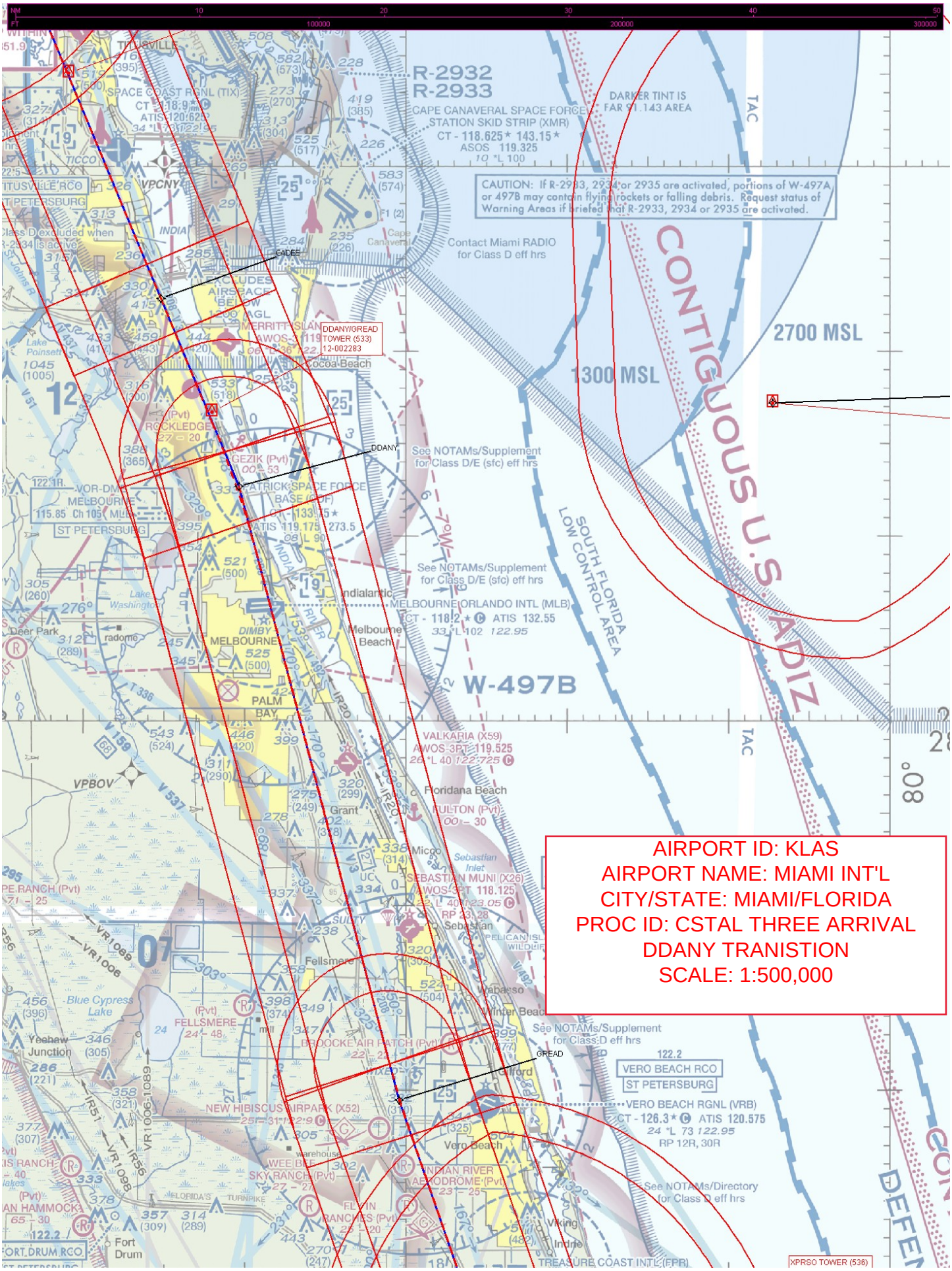
DEBRL
BEEIN
CADEE
DEBRL to BEEIN
TOWER (416)
12-003535
(BEEIN-1)
TOWER (1749)
12-004309
(CADEE-1)
TOWER (595)
12-190962
BEEIN to CADEE
TOWER (519)
12-000679


BEEIN
CADEE
DDANY
DEBRL to BEEIN
TOWER (416)
12-003535
(BEEIN-1)
TOWER (1749)
12-004309
(CADEE-1)
TOWER (595)
12-190962
BEEIN to CADEE
TOWER (519)
12-000679
CADEE to DDANY
DDANY to GREAD
TOWER (533)
12-002283
EXAMPLES OF CLASS C ALTITUDES
R-2932
R-2933
W-497B
AIRPORT ID: KLAS
AIRPORT NAME: MIAMI INT'L
CITY/STATE: MIAMI/FLORIDA
PROC ID: CSTAL THREE ARRIVAL
DEBRL TRANISTION
SCALE: 1:500,000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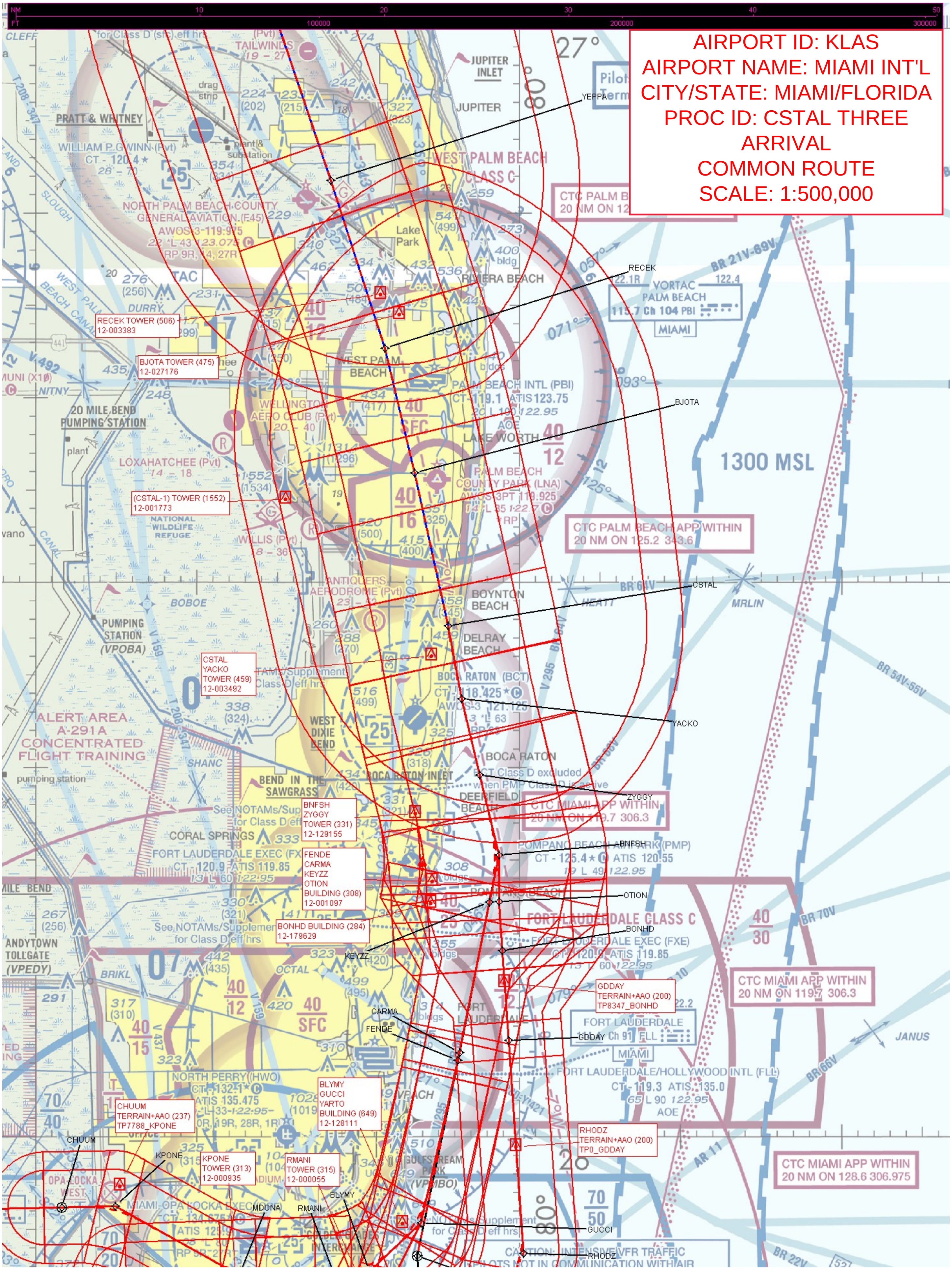
AIRPORT NAME: MIAMI INT'L
CITY/STATE: MIAMI/FLORIDA
PROC ID: CSTAL THREE ARRIVAL
DDANY TRANISTION
SCALE: 1:500,000
R-2932
R-2933
CAPE CANAVERAL SPACE FORCE STATION SKID STRIP (XMR)
CT - 118.625* 143.15*
ASOS 119.325
DARKER TINT IS FAR 91.143 AREA
CAUTION: If R-2933, 2934 or 2935 are activated, portions of W-497A or 497B may contain flying rockets or falling debris. Request status of Warning Areas if briefed that R-2933, 2934 or 2935 are activated.
Contact Miami RADIO for Class D eff hrs
CONTIGUOUS U.S. ADIZ
2700 MSL
1300 MSL
W-497B
SOUTH FLORIDA LOW CONTROL AREA
CADEE
DDANY
GREAD
DDANY/GREAD TOWER (533) 12-002283
See NOTAMs/Supplement for Class D/E (sfc) eff hrs
MELBOURNE ORLANDO INTL (MLB)
CT - 118.2 ATIS 132.55
VERO BEACH RGNL (VRB)
CT - 126.3 ATIS 120.575
VERO BEACH RCO
ST PETERSBURG
See NOTAMs/Directory for Class D eff hrs
TREASURE COAST INTL (FPR)
XPRSO TOWER (536)


AIRPORT ID: KLAS
AIRPORT NAME: MIAMI INT'L
CITY/STATE: MIAMI/FLORIDA
PROC ID: CSTAL THREE ARRIVAL
GREAD TRANISTION
SCALE: 1:500,000
GREAD
XPRSO
YEPPA
RECEK
YEPPA (HOLDING)
XPRSO TOWER (1548)
12-001525
XPRSO TOWER (536)
12-001124
RECEK TOWER (506)
12-003383
CONTIGUOUS U.S. ADIZ
DEFENSE AREA
W-497E
VERO BEACH RGNL (VRB)
TREASURE COAST INTL (FPR)
FORT PIERCE (1FL)
WITHAM FLD (SUA)
NORTH PALM BEACH COUNTY GENERAL AVIATION (F45)
PALM BEACH COUNTY GLADES (PHK)
WEST PALM BEACH
CLASS C
JUPITER INLET
PRATT & WHITNEY
HOBE SOUND NATIONAL WILDLIFE REFUGE
PELICAN ISLAND NATIONAL WILDLIFE REFUGE
CTC PALM BEACH APP
20 NM ON 128.3 317.4
Pilots are encou
erminal Area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CITY/STATE: MIAMI/FLORIDA
PROC ID: CSTAL THREE
ARRIVAL
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YEPPA
RECEK
BJOTA
CSTAL
YACKO
ZYGGY
BNFSH
OTION
BONHD
KEYZZ
CARMA
FENDE
GDDAY
CHUUM
KPONE
MDONA
RMANI
BLYMY
GUCCI
RHODZ
RECEK TOWER (506)
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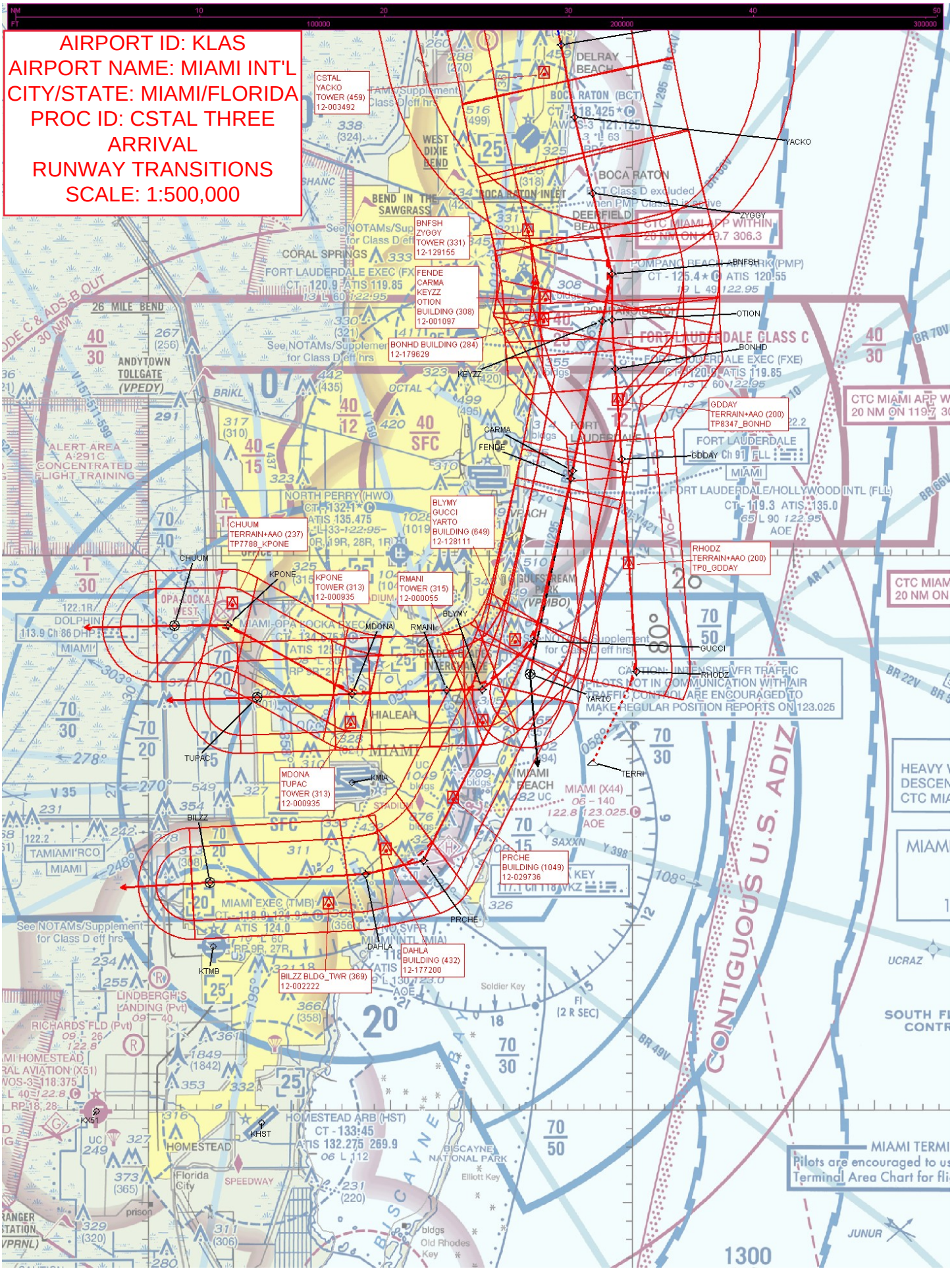
BJOTA TOWER (475)
12-027176
(CSTAL-1) TOWER (1552)
12-001773
CSTAL
YACKO
TOWER (459)
12-003492
BNFSH
ZYGGY
TOWER (331)
12-129155
FENDE
CARMA
KEYZZ
OTION
BUILDING (308)
12-001097
BONHD BUILDING (284)
12-179629
GDDAY
TERRAIN+AAO (200)
TP8347_BONHD
CHUUM
TERRAIN+AAO (237)
TP7788_KPONE
BLYMY
GUCCI
YARTO
BUILDING (649)
12-128111
RHODZ
TERRAIN+AAO (200)
TP0_GDDAY
KPONE
TOWER (313)
12-000935
RMANI
TOWER (315)
12-000055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CITY/STATE: MIAMI/FLORIDA
PROC ID: CSTAL THREE
ARRIVAL
RUNWAY TRANSITIONS
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YACKO
TOWER (459)
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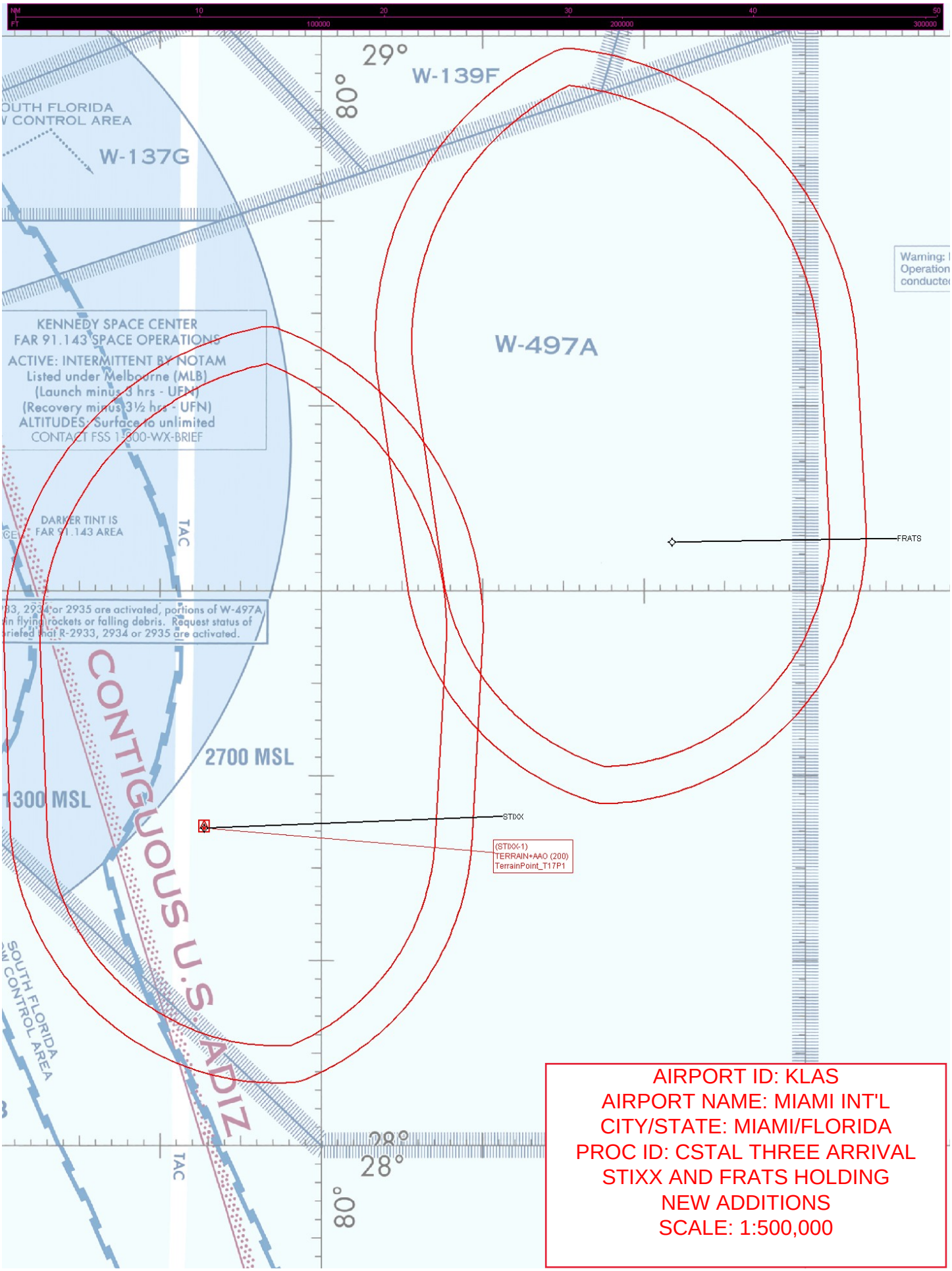
BNFSH
ZYGGY
TOWER (331)
12-129155
FENDE
CARMA
KEYZZ
OTION
BUILDING (308)
12-001097
BONHD BUILDING (284)
12-179629
BLYMY
GUCCI
YARTO
BUILDING (649)
12-128111
CHUUM
TERRAIN+AAO (237)
TP7788_KPONE
KPONE
TOWER (313)
12-000935
RMANI
TOWER (315)
12-000055
MDONA
TUPAC
TOWER (313)
12-000935
PRCHE
BUILDING (1049)
12-029736
DAHLA
BUILDING (432)
12-177200
BILZZ BLDG_TWR (369)
12-002222
GDDAY
TERRAIN+AAO (200)
TP8347_BONHD
RHODZ
TERRAIN+AAO (200)
TP0_GDDAY
CTC MIAMI APP WITHIN
20 NM ON 119.7 306.3
FORT LAUDERDALE GLASS C
CTC MIAMI APP W
20 NM ON 119.7
CTC MIAM
20 NM ON
HEAVY
DESCEN
CTC MIA
MIAM
MIAMI TERMI
Pilots are encouraged to us
Terminal Area Chart for fli
CAUTION-INTENSIVE VFR TRAFFIC
PILOTS NOT IN COMMUNICATION WITH AIR
TRAFFIC CONTROL ARE ENCOURAGED TO
MAKE REGULAR POSITION REPORTS ON 123.025
See NOTAMs/Supplement
for Class D eff hrs
CTC MIAMI APP WITHIN
20 NM ON 119.7 306.3
FORT LAUDERDALE/HOLLYWOOD INTL (FLL)
CT - 119.3 ATIS 135.0
MIAMI INTL (MIA)
CT - 118.9 124.9
ATIS 124.0
HOMESTEAD ARB (HST)
CT - 133.45
ATIS 132.275 269.9
MIAMI EXEC (TMB)
CT - 118.9 124.9
ATIS 124.0
FORT LAUDERDALE EXEC (FXE)
CT - 120.9 ATIS 119.85
POMPANO BEACH AIRPARK (PMP)
CT - 125.4 ATIS 120.55
NORTH PERRY (HWO)
CT - 132.1
ATIS 135.475
MIAMI-OPA LOCKA EXEC
CT - 134.675
ATIS 124.0
MIAMI (X44)
06 - 140
122.8 123.025
BOCA RATON (BCT)
CT - 118.425
ATIS 121.125
DELRAY BEACH
DEERFIELD BEACH
CORAL SPRINGS
HIALEAH
MIAMI BEACH
KEY
BISCAYNE NATIONAL PARK
Soldier Key
Elliott Key
Old Rhodes Key
Florida City
HOMESTEAD
SPEEDWAY
LINDBERGH'S LANDING (Pvt)
RICHARDS FLD (Pvt)
TAMIAMI'RCO
DOLPHIN
113.9 Ch 86 DHP
ANDYTOWN TOLLGATE (VPEDY)
26 MILE BEND
BEND IN THE SAWGRASS
WEST DIXIE BEND
ALERT AREA A-291C
CONCENTRATED FLIGHT TRAINING
CONTIGUOUS U.S. ADIZ
SOUTH FL CONTR
UCRAZ
JUNUR
1300



AIRPORT ID: KLAS
AIRPORT NAME: MIAMI INT'L
CITY/STATE: MIAMI/FLORIDA
PROC ID: CSTAL THREE ARRIVAL
STIXX AND FRATS HOLDING
NEW ADDITIONS
SCALE: 1:500,000