2 Purpose and Need

The FAA has prepared this Final EA to evaluate the potential environmental impacts associated with implementation of new RNAV-based flight procedures for the South-Central Florida Metroplex (Proposed Action). As required by FAA Order 1050.1F, an EA must include a discussion of the underlying purpose and need for the Proposed Action. This includes a discussion of the problem(s) being addressed and what the FAA plans to achieve by implementing the Proposed Action. The following sections describe the need for the Proposed Action (i.e. the existing issues in the South-Central Florida Metroplex that would be addressed by the Proposed Action), as well as the Proposed Action itself.

2.1 The Need for the Proposed Action

In the context of an EA, "need" describes the problem that the Proposed Action is intended to resolve. The problem in this case is the inefficiency of the existing aircraft flight procedures in the South-Central Florida Metroplex. RNAV-based SIDs and STARs have been in effect in the South-Central Florida Metroplex for nearly 20 years. However, since these procedures were first implemented, RNAV design criteria and guidance have been regularly updated as experience has been gained in the design and use of RNAV procedures. As a consequence, older RNAV procedures do not take full advantage of current RNAV design capabilities and have become increasingly less efficient.

Efficiency in air traffic operations can take many forms that involve distance, time, and/or delay.[25] A flight crew manages aircraft systems and condition, situational aircraft phase-of-flight activity, multi-party communication externally and internally, and on-board passenger/crew activities. The Air Traffic personnel are managing known aircraft in their geographic responsibility; monitoring weather factors; attending to aircraft entering, transiting, and exiting a defined air traffic area; and the time and 3-dimensional aspects of aircraft in their geographic responsibility. Finally, airports are conducting activities influencing arrival and departure times such as runway inspections, temporary movement surface closures, and monitoring weather conditions for potential safety mitigation. Each of these factors influences the distance, time, and/or delay efficiency of the air traffic system.

Focusing on the air traffic and air crew components, arrival and departure procedures serving the South-Central Florida Metroplex can be improved to increase the efficient use of the airspace to the benefit of pilots, controllers, and the general public. Additionally, conventional procedures lack efficiencies inherent in RNAV-based design. This is because they rely on technology that cannot provide specific and precise navigational benefits for aircraft, including predetermined speeds or altitudes. Furthermore, as discussed in **Section 1.2.5.1**, conventional procedures are subject to lateral and vertical flight path limitations eliminated through use of RNAV technology. RNAV procedures can reduce the need for controllers to employ vectoring and speed adjustments, thus reducing controller and pilot workload. In turn, this adds efficiency to an air traffic system by enhancing predictability, flexibility, and route segregation. By taking advantage of the increased benefits associated with RNAV technology, the FAA is better able to meet its primary missions as mandated by Congress – to provide for the efficient use of airspace, to develop plans and policy for the use of the

25 U.S. Department of Transportation, Federal Aviation Administration. [https://www.faa.gov/data_research/aviation_data_statistics/operational_metrics/ (Accessed April 29, 2020)].

navigable airspace, and to assign by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of airspace.

The following sections describe the problem in greater detail. Explanations of the technical terms and concepts used in this chapter are found in **Chapter 1**, *Background*.

2.1.1 Description of the Problem

There are several issues associated with the arrival and departure procedures currently implemented in the South-Central Florida Metroplex. These issues are predominantly caused by inefficient lateral and vertical paths, procedures lacking adequate runway transitions, conflicts between arriving and departing traffic, and delays associated with the close proximity of the major Study Airports and surrounding satellite Study Airports.

Many of the procedures serving the major Study Airports lack procedural de-confliction (laterally or vertically segregated flows). Task complexity increases without procedural de-confliction, including increased usage of radar vectors and level-offs which in turn increases the need for communication between pilots and controllers. The application of Performance Based Navigation (PBN) allows for the development of structured procedures that are deconflicted from each other reducing the potential for operational errors. The lack of procedural deconfliction requires some arrival and departure flight paths to intersect, requiring controllers to direct pilots to level off or vector from the procedure to maintain adequate vertical and lateral separation between aircraft. Examples include aircraft interacting between FLL and MIA often experiencing more than one segment of level-off during flight. These complex, converging interactions require more frequent controller-to-pilot and controller-to-controller communication and reduce the efficient use of the airspace.

Many of the Study Airports are underserved by procedures. 07FA, BCT, ISM, LAL, LEE, and ORL have no SIDs serving them. Currently MLB has no RNAV procedures serving the airport. Lastly, 07FA, BCT, FXE, ISM, LAL, LEE, MCO, MLB, OPF, ORL, PGD, PIE, SFB, and TMB do not have any RNAV SIDs serving them.

Predictability is reduced due to a lack of RNAV procedures serving satellite airports. RNAV routes allow controllers to know the expected location of aircraft, their altitudes (i.e., where and how high), and speeds (i.e., how fast and when) at key points along a flight path. Procedures that provide these elements result in more predictable routes for both controllers and pilots.

Similarly, underutilized en route transitions limit the number of entry and exit points when transitioning from Terminal to en route (ARTCC) airspace. As a result, multiple arriving and departing traffic flows must be sequenced over the same points, increasing both controller and pilot workload and complexity. One example involves PBI departures to the west and northwest which experience delays as they are sequenced over a single point, often requiring extensive coordination between controllers from different sectors. Furthermore, some departure procedures are inefficient due to design constraints, and there are an insufficient number of departure procedures serving many Study Airports during all operating configurations. Again, these issues lead to an increase in controller-to-pilot and controller-to-controller communication and reduce flexibility in the management of the airspace.

The FAA's ability to meet one of its primary missions as mandated by Congress – to provide for the efficient use of airspace – is impeded as a result of these types of inefficiencies. Therefore, the problem is the inability to fully employ the additional efficiency provided by current RNAV design criteria and guidance. By developing RNAV procedures that take full advantage of current design criteria and guidance, the air traffic system would experience increased efficiency demonstrated by enhanced predictability, route segregation, and flexibility.

It is important to note that a key design constraint is safety. Any proposed change to a procedure to resolve a problem must not compromise safety, and if possible must enhance safety. Although the current procedures are less efficient, they meet current FAA safety criteria.

2.1.2 Causal Factors

The inefficiencies and resulting complexities associated with existing procedures are the primary foundation for the problem in the South-Central Florida Metroplex. A problem (or need) is best addressed by examining the circumstances or factors that cause it. Addressing the causal factors behind the problem will help develop a reasonable alternative designed to resolve the problem (i.e., meet the “purpose”).

As summarized above, several issues have been identified as causes for the inefficiencies in the Metroplex. For purposes of this EA, these issues were grouped into three key causal factors:

- Lack of predictable standard routes defined by procedures to/from airport runways to/from en route airspace
- Complex converging and dependent route procedure interactions
- Lack of flexibility in the efficient transfer of traffic between the en route and terminal area airspace

These three causal factors are discussed in the following sections.

2.1.2.1 Lack of Predictable Standard Routes Defined by an Insufficient Number of RNAV Procedures and Insufficient Airport Runway Transitions

Predictable standard routes allow both pilots and controllers to know ahead of time how, where, and when an aircraft should be operated along a defined route. This also allows controllers and pilots to better plan airspace use and the control of aircraft in the given volume of airspace. A predictable route may include expected locations (where), altitudes (where and how high), and speeds (how fast and when) at key points. A procedure that provides these elements results in a more predictable route for the pilot and controller.

Aircraft performance and/or piloting technique can vary and, as a result, may also play a factor in reducing predictability. Because conventional procedures are less precise and predictable than RNAV procedures, controllers will use vectoring, as well as instructions governing speed and altitude level-offs, to ensure safe vertical and lateral separation between aircraft. As discussed in **Section 1.2.6.1**, RNAV procedures enable aircraft to follow more accurate and better-defined direct flight routes in areas covered by GPS-based navigational aids. This allows for predictable routes with fixed locations and altitudes that can be planned ahead of time by the pilot and air traffic control.

The following sections describe some of the issues with predictability in the South-Central Florida Metroplex airspace.

Current Procedures Do Not Take Full Advantage of RNAV Capabilities

As shown in **Table 2-1**, the Study Airports are currently served by 52 RNAV procedures and 33 conventional procedures. Most of the current procedures serving the Study Airports were first developed decades ago and do not utilize the advancements that have been made to PBN procedures that have been developed since then. Because the current RNAV procedures were developed decades ago, they were designed in conjunction with conventional routes, as many aircraft could not fly RNAV routes when they were designed. Because conventional procedures are dependent on the location of ground-based navigational aids, the locations where procedures could be established were limited due to factors such as terrain and location of ground-based navigational aids. Accordingly, the RNAV procedures developed were limited based on the placement of conventional procedures. As a result, the overall benefit that could have been gained for RNAV-equipped aircraft has not been fully realized.

Table 2-1 South-Central Florida Metroplex – Existing STAR and SID Procedures

Airport(s) Served	Gate Served[26]	Procedure Name	Procedure Type	Transitions (en route/runway)
ARRIVALS (STARs)				
07FA, MIA, TMB	N	ANNEY	Conventional	3/0
07FA, FLL, FXE, MIA, OPF, TMB	N	BLUFI	Conventional	1/0
07FA, FLL, FXE, MIA, OPF, TMB	SW	CURSO	RNAV	2/0
07FA, MIA, OPF, TMB	NW	CYPRESS	Conventional	3/0
07FA, MIA, TMB	SE	FLIPR	RNAV	2/0
07FA, MIA, TMB	SE	FOWEE	Conventional	4/0
07FA, MIA, TMB	N, NE	HILEY	RNAV	3/0
07FA, MIA, OPF, TMB	NW	SSCOT	RNAV	2/0
BCT	N	CAYSL	RNAV	3/2
BCT	NW	PRRIE	RNAV	3/2
BCT, PBI	N	TUXXI	Conventional	2/0
FLL, FXE, OPF	SE	DEKAL	Conventional	3/0
FLL, FXE, MIA, OPF, TMB	SW	DVALL	Conventional	2/0
FLL, FXE, OPF	N, NE	FISEL	RNAV	5/0
FLL, FXE, OPF	NW	FORTL	Conventional	3/0
FLL, FXE, OPF	N, NE	GISSH	Conventional	4/0
FLL, FXE, OPF	NW	JINGL	RNAV	2/0
FLL, FXE, OPF	SE	WAVUN	RNAV	1/0
ISM, LEE, MCO, ORL, SFB	S	BAIRN	RNAV	3/0
ISM, MCO, MLB	N	BITHO	Conventional	1/0
ISM, MCO, ORL	N	BUGGZ	RNAV	2/0
ISM, LEE, MCO, MLB, ORL, SFB	SW	COSTR	RNAV	5/0
ISM, LEE, MCO, ORL, SFB	N, NE	CWRLD	RNAV	3/0
ISM, LEE, MCO, ORL, SFB	S	GOOFY	Conventional	3/4
ISM, MCO, ORL	N	LEESE	Conventional	4/0
ISM, LEE, MCO, ORL, SFB	SW	MINEE	Conventional	4/0
ISM, MCO, ORL	N	PIGLT	RNAV	2/0
LAL, PIE, SRQ, TPA	W	BLOND	RNAV	1/2
ORL, SFB	N	CORLL	Conventional	1/0

26 Directional arrival and departure gates are explained further in this EA at: Section 1.2.4.2 *Arrival Flow*, Exhibit 2-7, and Section 2.2.3 *Improve Flexibility and Transitioning Aircraft Traffic*.

Table 2-1 South-Central Florida Metroplex – Existing STAR and SID Procedures

Airport(s) Served	Gate Served	Procedure Name	Procedure Type	Transitions (en route/runway)
ARRIVALS CONT…				
PBI	NE	FRWAY	RNAV	3/0
PBI, SUA	NW	WLACE	RNAV	3/0
PIE, TPA	SE	BRDGE	Conventional	3/2
PIE, TPA	NE	DADES	RNAV	2/2
PIE, TPA	NW	DARBS	Conventional	1/0
PIE, TPA	SE	DEAKK	RNAV	3/2
PIE, TPA	NW	FOOXX	RNAV	1/2
PIE, TPA	NE	LZARD	Conventional	2/2
SRQ, VNC	NW	CLAMP	Conventional	1/0
SRQ, VNC	NW	TEEGN	RNAV	1/2
SRQ, VNC	N	TRAPR	RNAV	1/2
DEPARTURES (SIDs)				
FLL	N	ARKES	RNAV	0/4
FLL	SE	BAHMA	RNAV	0/2
FLL	E	BEECH	RNAV	0/2
FLL, FXE	All	FORT LAUDERDALE	Conventional	0/0
FLL	NE	PREDA	RNAV	0/4
FLL	NW	THNDR	RNAV	0/4
FLL	NE	ZAPPA	RNAV	0/4
MCO	All	CITRUS	Conventional	0/0
MCO	N	JAGUAR	Conventional	1/0
MCO	N	MCCOY	Conventional	0/0
MCO	All	ORLANDO	Conventional	0/0
MIA	NW, N, NE	BSTER	RNAV	4/4
MIA	S, SE, E	DEEEP	RNAV	3/4
MIA	SE	EONNS	RNAV	0/8
MIA	N	HEDLY	RNAV	0/8
MIA	NW, N, NE	HITAG	RNAV	4/4
MIA	S, SE, E	JONZI	RNAV	3/4
MIA, OPF, TMB	All	MIAMI	Conventional	0/0
MIA	S	MNATE	RNAV	0/8
MIA	NE	PADUS	RNAV	0/8
MIA	NW, N, NE	POTTR	Conventional	4/3
MIA	E	SKIPS	RNAV	0/8
MIA	S, SE, E	SOUBY	Conventional	3/3
MIA	NE	VALLY	RNAV	0/8
MIA	NW	WINCO	RNAV	0/8
MLB	All	MELBOURNE	Conventional	0/0
PBI	S	BUFIT	RNAV	1/4
PBI	W	LMORE	RNAV	1/4
PBI	E	MIXAE	RNAV	1/4
PBI	All	PALM BEACH	Conventional	0/0
PBI	NE	SLIDZ	RNAV	1/4
PBI	NW	TBIRD	RNAV	1/4
PIE	All	ST PETE	Conventional	0/0
SFB	All	SANFORD	Conventional	0/0
SRQ	All	SARASOTA	Conventional	0/0
SRQ, VNC	NW	SRKUS	RNAV	3/3

Table 2-1 South-Central Florida Metroplex – Existing STAR and SID Procedures

Airport(s) Served	Gate Served	Procedure Name	Procedure Type	Transitions (en route/runway)
DEPARTURES CONT…				
SUA	E	BRNGR	RNAV	1/6
SUA	NW	SNDLR	RNAV	1/6
TPA	N	BAYPO	RNAV	1/6
TPA	SE	CROWD	RNAV	1/6
TPA	N	ENDED	RNAV	0/6
TPA	S	GANDY	RNAV	1/6
TPA	All	LGTNG	Conventional	0/6
TPA	W	SYKES	RNAV	2/6
TPA	All	TAMPA	Conventional	0/0

Note: Radar vectors are not a defined route and therefore are not included in runway transition counts.

Source: U.S. Department of Transportation, Federal Aviation Administration, Instrument Flight Procedures Information Gateway [https://www.faa.gov/air_traffic/flight_info/aeronav/procedures/ (Accessed June 2018)]. Federal Aviation Administration, Coded Instrument Flight Procedures (CIFP), Accessed June 2018.

Prepared by: ATAC Corporation, March 2020.

Since the implementation of the existing RNAV procedures, RNAV design criteria and guidance have been regularly updated as experience has been gained in the design and use of RNAV procedures. Consequently, the older RNAV procedures in effect in the South-Central Florida Metroplex do not take full advantage of current RNAV design capabilities and have become increasingly less efficient. This inefficiency has grown increasingly unwarranted, as over the last two decades the percentage of RNAV equipped aircraft has increased substantially. When the Study Team commenced, all major airports examined within the South Florida Metroplex project had greater than 94% RNAV capable aircraft.[27] Maintaining the current conventional procedures and the RNAV procedures that coexist with them decreases flight route predictability by reducing the efficiency of the airspace and increasing complexity due to increased controller and pilot workload.

Lack of Runway Transitions

As discussed in **Section 1.4.1**, the major Study Airports operate under many different runway operating configurations depending on factors such as weather, wind direction, and air traffic conditions. As a result, it is possible for the runway ends used for arrivals and departures to change several times throughout a day. Because of the high level of aircraft traffic, especially during peak periods, not providing procedures for each runway end contributes to a less efficient air traffic system.

All of the major Study Airports in the Metroplex experience high levels of aircraft traffic. As shown in **Table 2-1** preceding, many of the procedures serving the major Study Airports lack runway transitions to some or all of the runways. The lack of runway transitions requires controllers to use vectors to direct aircraft to their final approach. The extensive vectoring required results in more frequent controller-to-pilot and controller-to-controller communication, increasing controller and pilot workload and reducing predictability.

27 Original document named: *Optimization of Airspace and Procedures in the Metroplex (OAPM) Study Team Final Report South/Central Florida Metroplex*, referred to herein as Appendix F. *South-Central Florida Metroplex Study Team Final Report*, September 2012.

Lack of Predictable Satellite Airport Procedures

The existing procedures for the satellite Study Airports do not allow for predictable segregation of routes between air traffic arriving to or departing from these satellite Study Airports and neighboring major Study Airports. 07FA, BCT, ISM, LAL, LEE, and ORL have no SIDs serving them. Currently, MLB currently has no RNAV procedures serving the airport. Lastly, 07FA, BCT, FXE, ISM, LAL, LEE, MCO, MLB, OPF, ORL, PGD, PIE, SFB, and TMB do not have any RNAV SIDs serving them. The lack of RNAV procedures for the satellite Study Airports increases workload for both controllers and pilots and reduces predictability.

2.1.2.2 Complex Converging and Dependent Route Procedure Interactions

In some areas, the separation between arrival and departure flight routes (e.g., lateral separation between two routes or vertical separation between crossing routes) does not allow for efficient use of the airspace. This requires that controllers carefully observe aircraft activity along the nearby or crossing flight routes and be prepared to provide air traffic services to ensure standard separation is maintained.[28] For example, where arrival and departure flight routes intersect, flight level-offs may be required for either arrivals or departures to ensure adequate vertical separation between aircraft. In some cases, arriving and departing aircraft on nearby flight routes may need to be vectored to ensure safe lateral separation. In other cases, controllers may need to issue point-outs (a physical or automated action taken by a controller to transfer the radar identification of an aircraft to another controller if the aircraft will or may enter the airspace or protected airspace of another controller and radio communications will not be transferred).

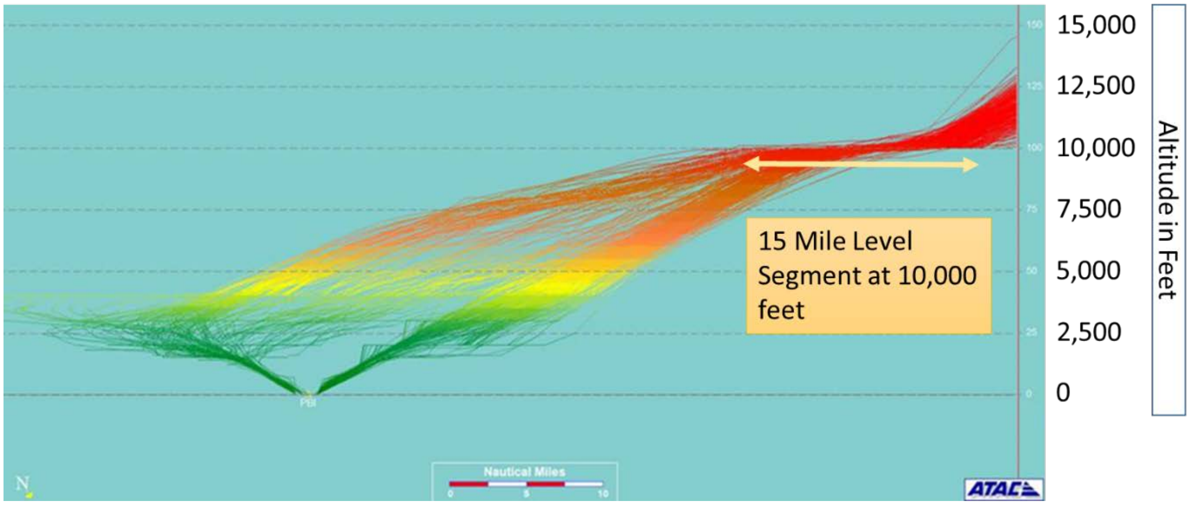
Because the procedures currently in use in the South-Central Florida Metroplex do not take full advantage of RNAV capabilities, multiple procedures share the same NAVAIDs. This may result in conflicts such as aircraft flying at different speeds along adjacent routes, requiring greater separation to prevent operations at similar altitudes or occupation of the same airspace. To avoid potential conflicts, controllers may need to reroute aircraft by issuing vectors or directing aircraft to level off. This increases pilot and controller workload and system complexity.

PBI Arrivals

Aircraft arriving to PBI (and other airports) are frequently required to level off during descent to maintain vertical separation from other arriving and departing aircraft. Aircraft operating on the FRWAY, SLIDZ, and WLACE at PBI typically experience periods of level-off of more than 10 NM. Similarly, aircraft operating on SIDs departing other airports the South-Central Florida Metroplex may also experience periods of level-off. **Exhibit 2-1** shows the vertical profiles for aircraft arriving PBI on the WLACE STAR. As shown by the red lines, aircraft using the WLACE STAR are directed to level off for approximately 15-20 NM at 10,000 feet above mean sea level (MSL). Extended level-offs often result in increased controller-to-pilot communication and may require traffic alerts to pilots of the proximity of other aircraft or point-outs to other controllers responsible for neighboring airspace sectors. This adds to the complexity of managing and operating in the airspace due to higher controller workload, increased controller-to-pilot communication, and inefficient use of aircraft performance capabilities during descent or climb.

28 Areas where the lateral or vertical separation distances are inadequate to allow efficient use of the airspace are referred to as “confliction points” by air traffic controllers.

Exhibit 2-1 WLACE STAR to PBI – Flight Track Vertical Profile

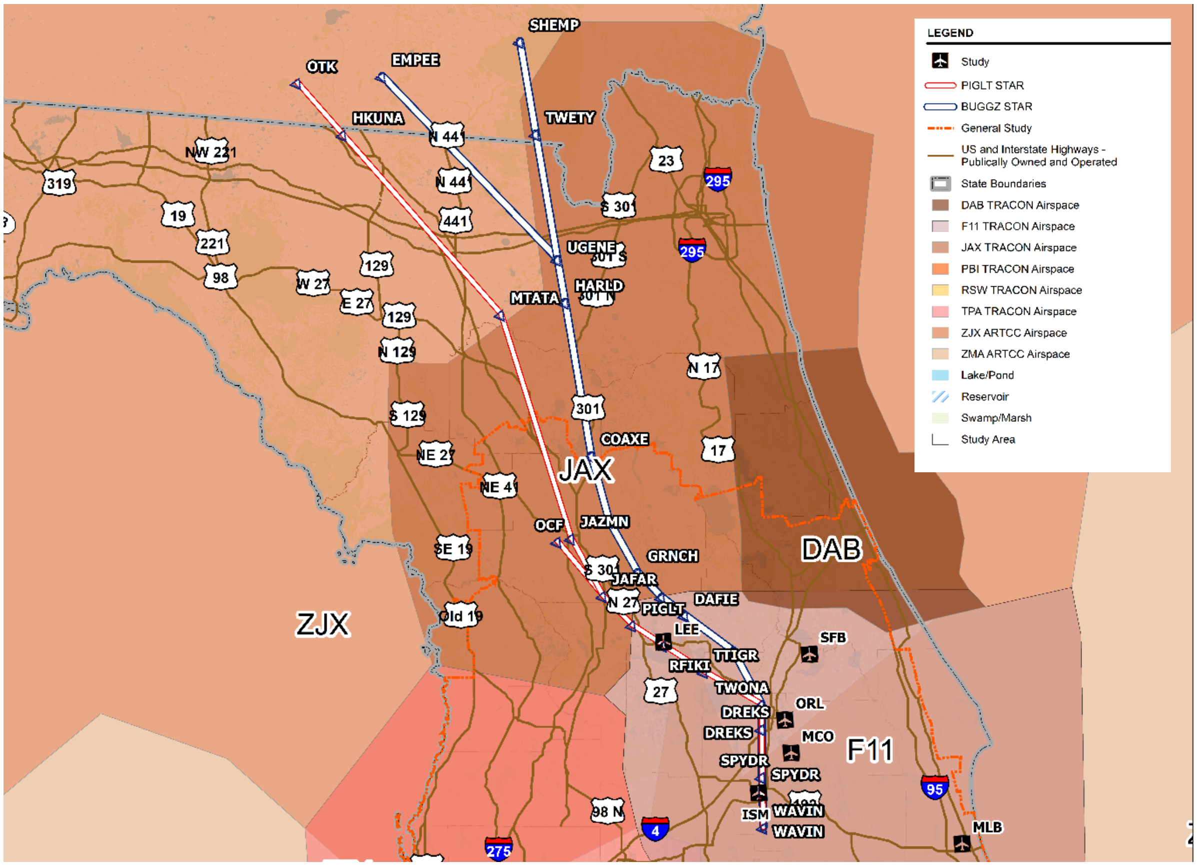


Source: Performance Data and Reporting System (PDARS) radar data, June 1, 2017 to May 30, 2018, ATAC Corporation.
Prepared by: ATAC Corporation, March 2020.

MCO Arrivals

On a south flow, there is limited time to sequence the BUGGZ and PIGLT arrivals. The arrivals are also too high on the routes and conflict with departures. Aircraft usually join the STARs in the middle of the procedure, requiring additional vectoring and increasing the complexity of the operations. **Exhibits 2-2** and **2-3** depict the procedures which converge at the TWONA waypoint.

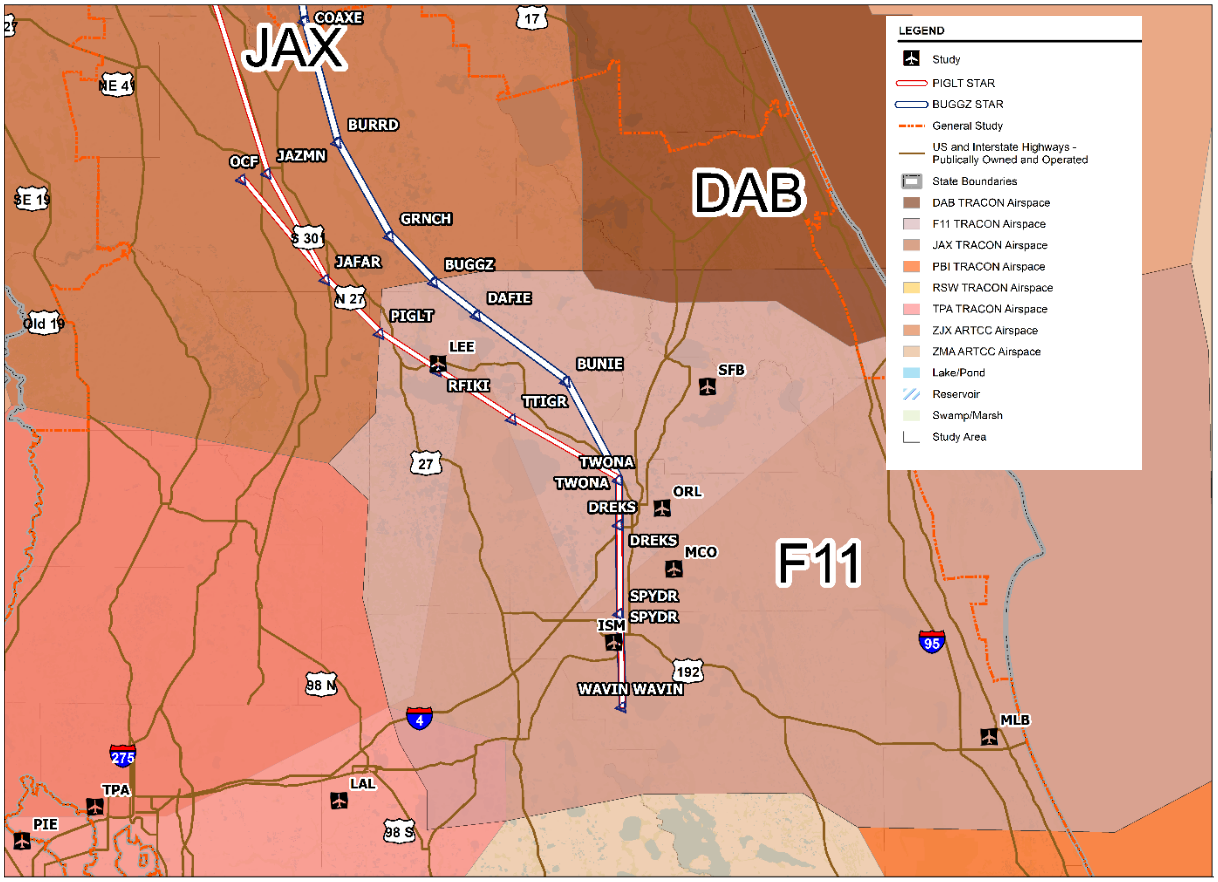
Exhibit 2-2 MCO BUGGZ and PIGLT STARs (Full Procedure View)



Source: U.S. Census Bureau, 2018 (2018 TIGER/Line Shape files (machine-readable data files), (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief). ATAC Corporation, 2019, (2019 General Study Area boundary)

Prepared by: ATAC Corporation, March 2020.

Exhibit 2-3 MCO BUGGZ and PIGLT STARs (MCO Focused View)

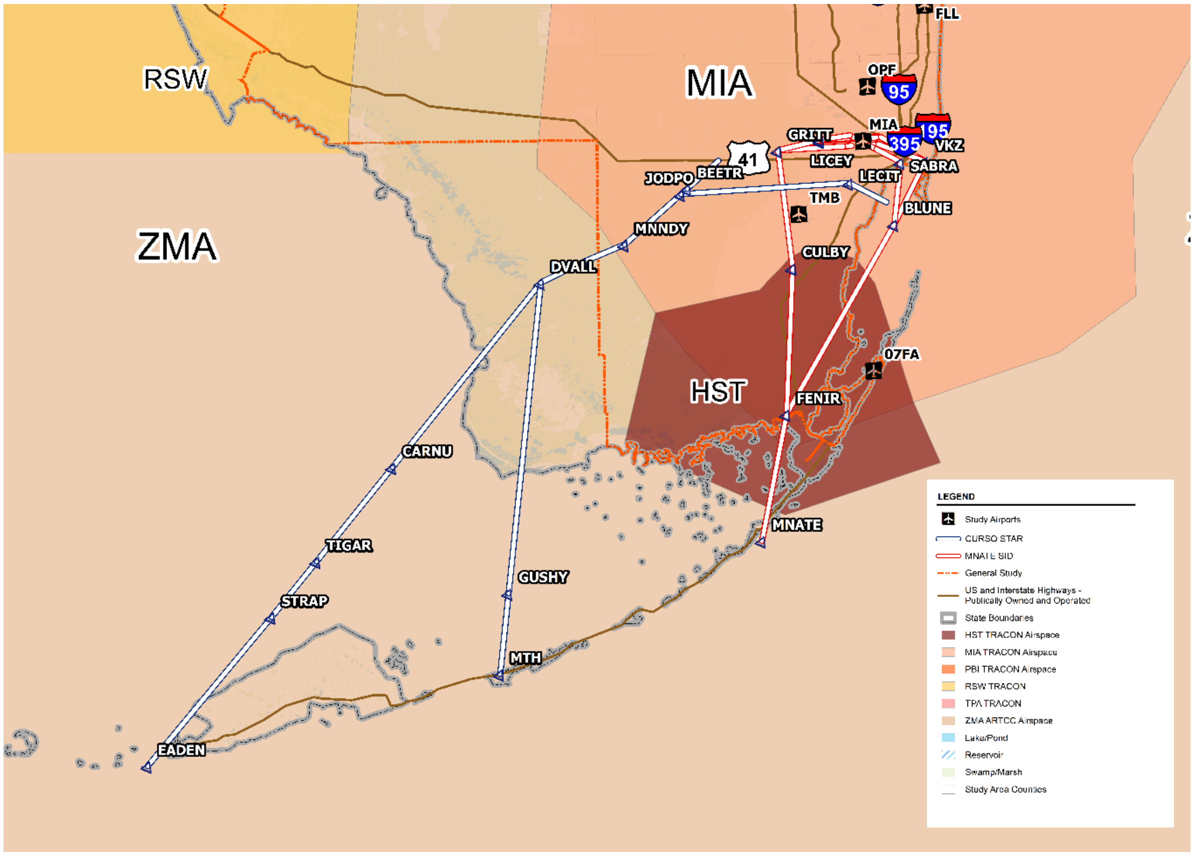


Source:	U.S. Census Bureau, 2018 (2018 TIGER/Line Shape files (machine-readable data files), (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief). ATAC Corporation, 2019, (2019 General Study Area boundary)
Prepared by:	ATAC Corporation, March 2020.

MIA Arrivals/Departures

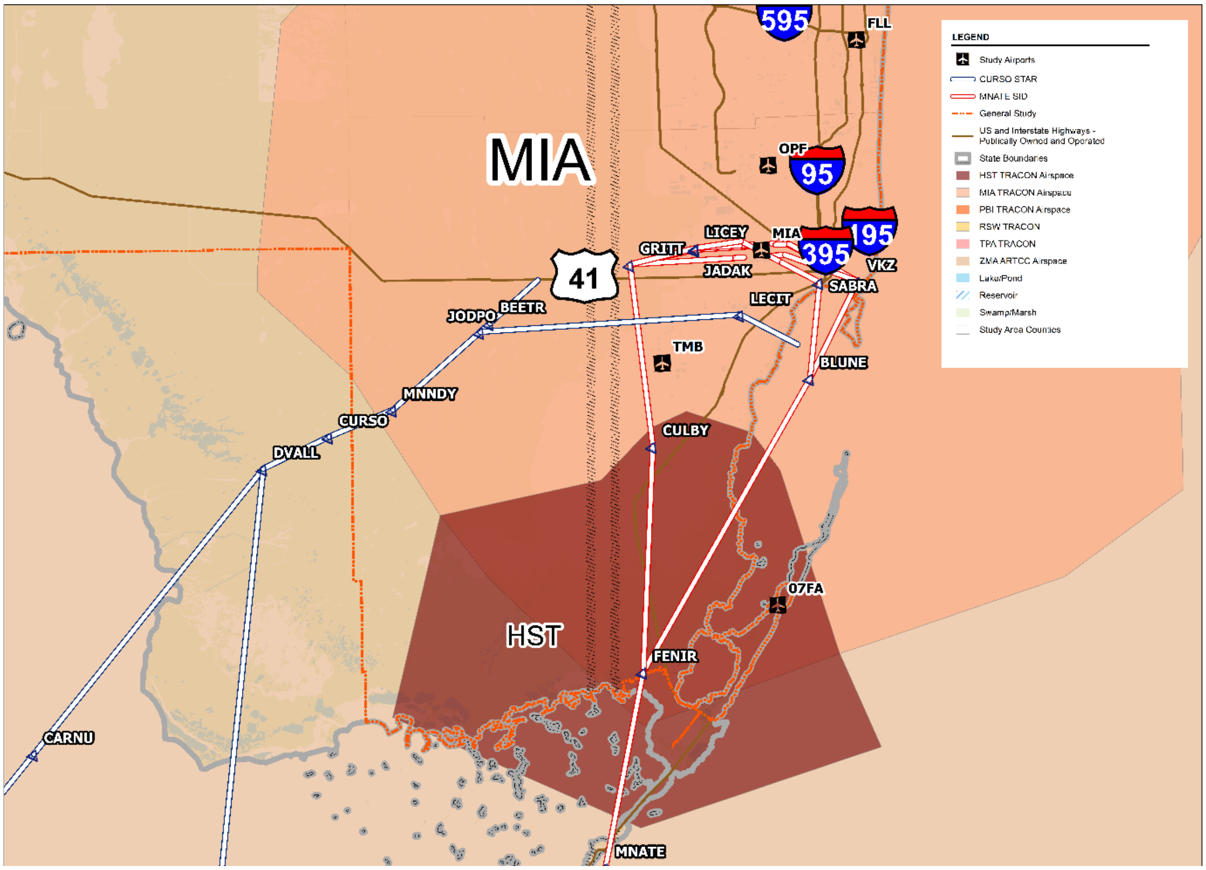
The MNATE SID accounts for approximately 15% of all MIA jet departures. The MNATE departures and CURSO arrivals interact within the airspace surrounding MIA and are not procedurally de-conflicted. These interactions require controllers to level off the procedures creating less than optimal climb and descent profiles. **Exhibits 2-4 and 2-5** depict the procedures and the interactions south of MIA.

Exhibit 2-4 MIA CURSO STAR and MNATE SID (Full Procedure View)



Source:	U.S. Census Bureau, 2018 (2018 TIGER/Line Shape files (machine-readable data files), (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief). ATAC Corporation, 2019, (2019 General Study Area boundary).
Prepared by:	ATAC Corporation, March 2020.

Exhibit 2-5 MIA CURSO STAR and MNATE SID (MIA Focused View)



Source: U.S. Census Bureau, 2018 (2018 TIGER/Line Shape files (machine-readable data files), (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief). ATAC Corporation, 2019, (2019 General Study Area boundary).
Prepared by: ATAC Corporation, March 2020.

2.1.2.3 Lack of Flexibility in the Efficient Transfer of Traffic between the En Route and Terminal Area Airspace

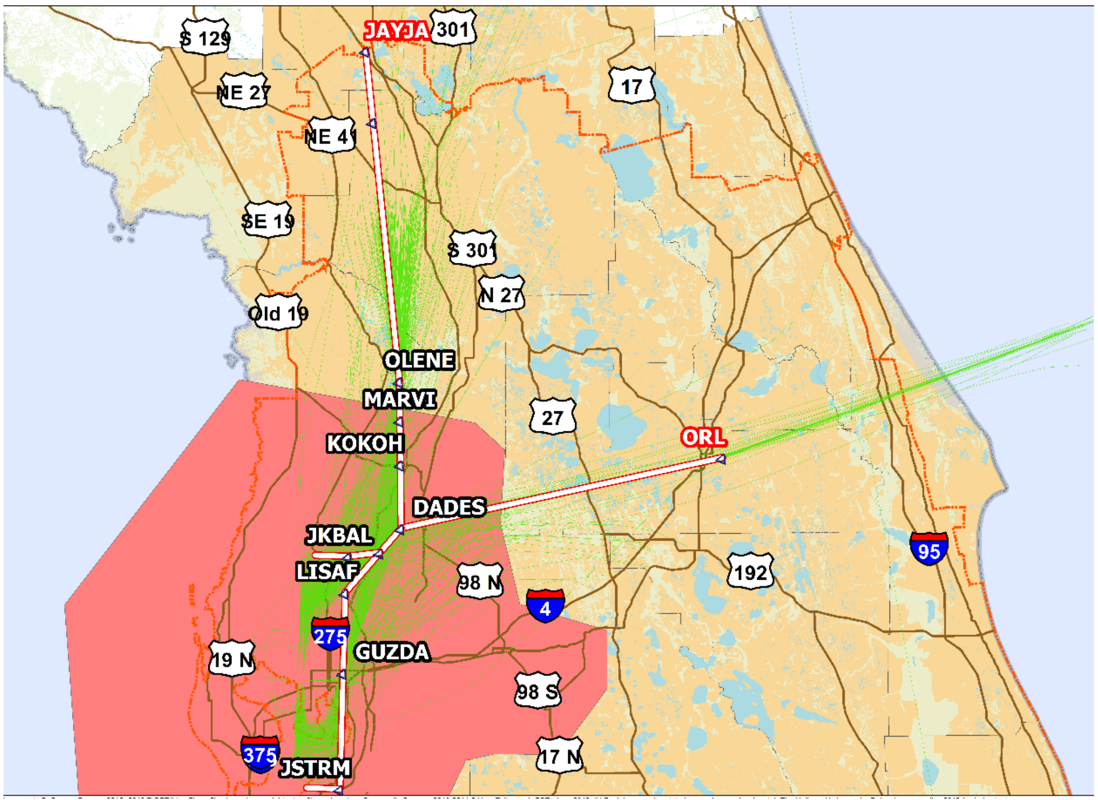
Flexibility allows controllers to plan for and adapt to traffic demands, which change frequently throughout the day. Although commercial flights are scheduled, delays in other regions of the U.S. or severe weather along a route may cause aircraft to enter or exit the en route and terminal area airspace at times not previously scheduled. Controllers require options to manage shifting traffic demand.

Factors such as too few entry or exit points, requiring multiple aircraft flows to be sequenced over the same point, can increase the amount of vectoring needed to merge traffic and maintain safe separation. In addition, too few departure procedures can increase airspace complexity and workload for both controllers and pilots. The following sections further discuss flexibility issues specific to South-Central Florida Metroplex airspace.

TPA DADES Southbound Arrivals

Exhibit 2-6 depicts the DADES arrival into TPA. Currently, there are only two en route transitions for aircraft arriving on the procedure. Previous studies determined aircraft rarely follow the procedure path, and when they do, they are forced to level off for extended periods of time. The flight path of the procedure increases complexity of operations because it is near other flight procedure paths into and out of TPA and surrounding airports in the area.

Exhibit 2-6 TPA – DADES STAR



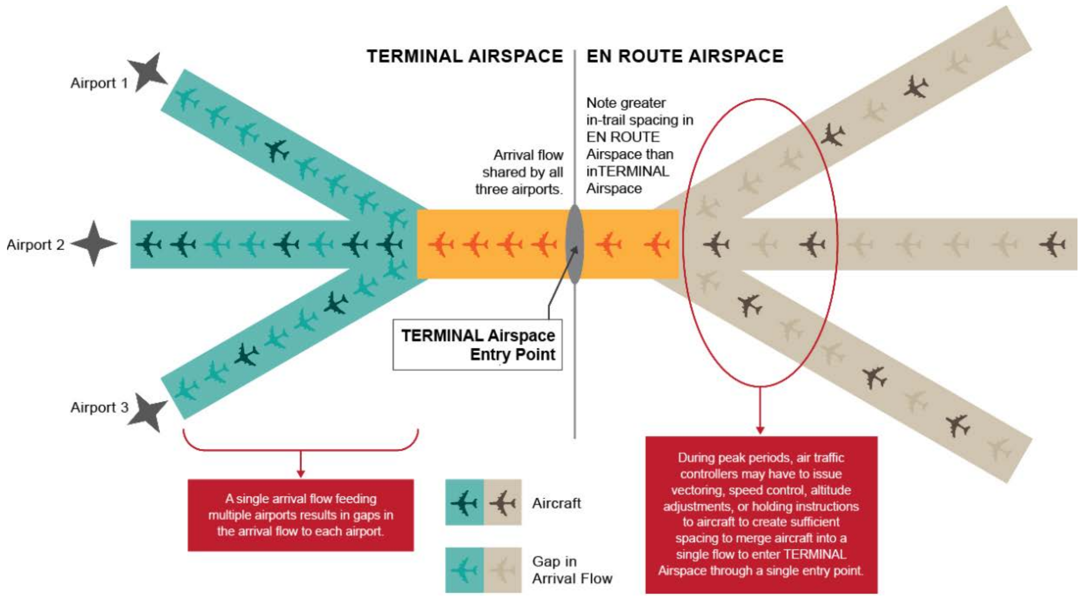
Source: South-Central Florida Metroplex D&I Team TARGETS File, 2019; U.S. Census Bureau, 2016 (2016 TIGER/Line Shape files (machine-readable data files), American Community Survey - 2010-2014 5-Year Estimates); ESRI, Inc., 2016 (U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). ESRI World Water Bodies 2018 (Ocean and Sea). ATAC Corporation, 2019, (2019 General Study Area boundary).
Prepared by: ATAC Corporation, March 2020.

Exhibit 2-7 illustrates how aircraft arrivals are sequenced in the en route airspace and then merged to enter terminal airspace through a single-entry gate. Aircraft arriving from en route airspace must be merged into a single arrival flow before entering terminal airspace through an entry gate. This is similar to automobile traffic travelling in multiple freeway lanes merging into one lane before exiting a freeway. The process of multiple lanes of traffic merging into one lane can cause congestion. In terms of air traffic, to maintain safe separation, controllers must create sufficient gaps between aircraft along a route to safely line up aircraft from multiple streams. This may require controllers to employ airspace management techniques such as vectoring aircraft off procedures or directing pilots to reduce speed, which can increase congestion. The need to employ these management techniques results in increased workload for both the controller and pilot.

Aircraft destined for the Study Airports share arrival procedures that enter the terminal airspace on a single arrival flow through an entry point. Aircraft are then split from a single arrival flow and issued instructions to the final approaches to the various runways at the different Study Airports. Similar to what is depicted in **Exhibit 2-3**, gaps in the flow to the individual Study Airports can develop after aircraft are sequenced and directed to the final approaches to the Study Airport runways.

To some extent, the gaps can be closed if controllers direct the rear aircraft to increase speed along the arrival route to the airport. However, at this critical phase of flight, when aircraft are descending and maneuvering to the final approach to a runway, the feasibility of making significant speed adjustments and reducing the gaps in the arrival flow is limited.

Exhibit 2-7 Airspace Entry Point, Single Arrival Flow, with Multi-Airport Traffic Sequencing

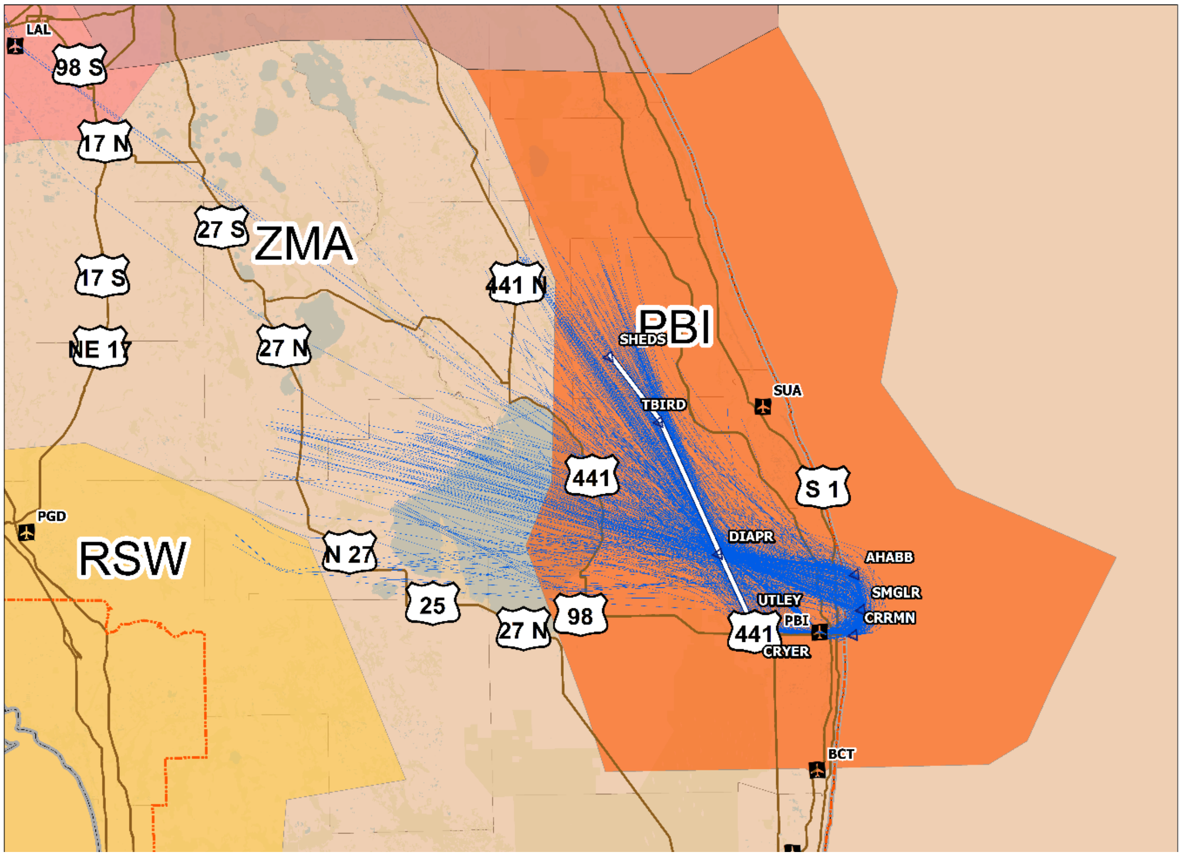


Source: Federal Aviation Administration, July 2012.
Prepared by: ATAC Corporation, March 2020.

PBI TBIRD North/Northwest Departures

Exhibit 2-8 depicts departures to the north or northwest, most of which are assigned to the TBIRD SID. This results in multiple aircraft that eventually will need to fly in different directions all using the same initial flight path. This causes unnecessary congestion and complexity, with a corresponding increase in workload for pilots and air traffic controllers. Sequencing departing aircraft over the DIAPR waypoint and managing adequate separation prior to vectoring them in different directions results in increased complexity and reduced flexibility. This in turn increases controller and pilot workloads and reduces the overall flexibility of the system.

Exhibit 2-8 PBI TBIRD SID to the North/Northwest



Notes:

Source: South-Central Florida Metroplex D&I Team TARGETS File, 2019; U.S. Census Bureau, 2018 (2018 TIGER/Line Shape files (machine-readable data files), U.S. states, counties, tribal properties, roads, airports); The National Hydrography Dataset, waterbodies 2018 (waterbodies). Federal Aviation Administration, 2020 Aeronautical Information Services (Airspace Boundaries), ESRI World Water Bodies 2018 (Ocean and Sea). ESRI 2018 (Shaded Relief). ATAC Corporation, 2019, (2019 General Study Area boundary).

Prepared by: ATAC Corporation, March 2020.

In addition, departing aircraft may conflict with arriving aircraft when sequenced over the same point. There are several consequences that result from arrivals and departures to and from the Study Airports using common arrival and departure procedures and terminal airspace entry and exit points. These consequences include:

- The need to merge arriving aircraft into a single arrival flow at each entry point can increase flight time and distances.
- Gaps in the final arrival flows do not allow for the formation of a constant stream of aircraft to the Study Airports.
- Merging departing aircraft into single departure streams for each exit point requires controllers to create greater separation between subsequent departures from the same airport than would otherwise be required if the routes were separated.

- Holding aircraft on the runway to protect enough airspace to allow for adequate separation leads to departure delays, especially during peak travel periods.
- The need for additional controller-to-pilot communication to issue the variety of instructions required to merge and desegregate the flow of aircraft adds to the workload of both controllers and pilots.
- Options for controllers to redirect aircraft to avoid bad weather or more efficiently handle sequencing are limited when the pilot does not have the runway in sight due to low visibility.

Departure Procedures Unavailable for All Operating Configurations

Certain departure procedures within the Metroplex are only available for use during one-runway operating configuration. Other departure procedures may be available during multiple-runway operating configurations; however, inefficient altitude restraints and exit point locations increase the complexity of these procedures and increase both controller and pilot workload. Over all, a lack of procedures decreases the flexibility for controllers and pilots.

2.2 Purpose of the Proposed Action

The purpose of the Proposed Action is to address the issues discussed in the previous sections in order to improve the efficiency of the procedures and airspace utilization in the South-Central Florida Metroplex. To meet this goal, the Proposed Action would optimize procedures serving the Study Airports, while maintaining or enhancing safety, in accordance with the FAA's mandate under federal law. This goal would be achieved by reducing dependence on ground-based NAVAID technology in favor of more efficient satellite-based navigation, such as RNAV. Specifically, the objectives of the Proposed Action are as follows:

- Improve the predictability in transitioning air traffic between en route and terminal area airspace and between terminal area airspace area and the runways
- Improve the segregation of arrivals and departures in terminal area and en route airspace
- Improve the flexibility in transitioning aircraft traffic between en route and terminal area airspace and between terminal area airspace area and the runways

The FAA expects that the frequency of controller/pilot communication would decrease, reducing both controller and pilot workload by decreasing the complexity of the procedures. Improvements from RNAV procedures would reduce the need for vectoring and level flight segments, resulting in more predictable traffic flows.

Each objective of the Proposed Action is discussed in greater detail below.

2.2.1 Improve the Predictability of Transitioning Air Traffic

As discussed in **Section 2.1.2.1**, the lack of up-to-date RNAV procedures requires controllers to use air traffic management techniques such as vectoring to ensure safe vertical and lateral separation between aircraft during the arrival and departure phases of flight. As a result, controllers and pilots experience a more complex workload. In addition, there are an insufficient number of runway transitions to and from the runways at each of the Study Airports. Finally, there is a lack of RNAV procedures to and from the satellite airports, preventing pilots from filing (submitting a flight plan to ATC) their preferential arrival or departure with predictable flight expectations. These factors affect predictability within the South-Central Florida Metroplex.

This objective can be measured with the following criteria:

- Ensure that the majority of STARs and SIDs to and from the Study Airports are based on RNAV technology utilizing the most current RNAV criteria (measured by count of RNAV STARs and SIDs for an individual Study Airport)
- Increase the number of runway transitions (measured by count of runway transitions for all STAR procedures)

2.2.2 Segregate Arrivals and Departures

As discussed in **Section 2.1.2.2**, aircraft are frequently required to level off to ensure adequate separation between different traffic flows. RNAV procedures can be designed with capabilities such as speed control and altitude restrictions that segregate aircraft on the route while reducing controller and pilot workload by reducing the complexity of the procedures. One objective of the Proposed Action is to implement procedures that would better segregate arrivals and departures within the airspace. This objective can be measured by number of RNAV STARs and/or SIDs that can be used independently to/from Study Airports.

2.2.3 Improve Flexibility in Transitioning Aircraft Traffic

As discussed in **Section 2.1.2.3**, the limited number of available transitions and associated procedures constrain efficiency in the terminal and en route transitional airspace. This requires merging multiple traffic flows before aircraft arrive at and depart from terminal airspace. One objective of the Proposed Action is to minimize the need for merging traffic flows by increasing the number of transitions and procedures that are dedicated to specific Study Airports. This objective can be measured with the following criteria:

- Where possible, increase the number of available transitions compared with the No Action alternative (measured by number of exit/entry points)
- Where possible, increase the number of RNAV STARs and SIDs compared with the No Action alternative (measured by total count of RNAV STARs and RNAV SIDs for each of the Study Airports)

2.3 Criteria Application

The FAA will evaluate the Proposed Action to determine how well it meets the purpose and need based on the measurable criteria and objectives described above. The evaluation of alternatives will include the No Action alternative, under which the existing (June 1, 2017 to May 30, 2018) air traffic procedures serving the Study Airports would remain unchanged except for planned procedure modifications, independent of the South-Central Florida Metroplex Project, which were or are expected to be approved for implementation. The criteria are intended to help compare the Proposed Action with the No Action alternative.

2.4 Description of the Proposed Action

The Proposed Action would implement RNAV SID, STAR, T-routes, final approach procedures, and transitions in the South-Central Florida Metroplex. This would improve the predictability and segregation of air traffic routes, as well as increase flexibility and efficiency in providing air traffic services. The Proposed Action is described in detail in **Chapter 3**, *Alternatives*.

Implementation of the Proposed Action would not increase the number of aircraft operations at the Study Airports. Furthermore, the Proposed Action does not involve physical construction of any facilities such as additional runways or taxiways, and does not require permitting or other approvals or actions at either the state or local level. Therefore, the implementation of the proposed changes to procedures in the South-Central Florida Metroplex would not require any physical alterations.

2.5 Required Federal Actions to Implement Proposed Action

Implementing the Proposed Action requires the FAA to publish new or revised STARs, SIDs, T-Routes, final approach procedures, and transitions and undertake controller training.

2.6 Agency Coordination

On July 25, 2019, the FAA distributed a "Notice of Intent to Prepare an Environmental Assessment" (NOI) letter to 590 federal, state, regional, and local officials as well as to agencies and tribes. A clarification letter was sent on August 16, 2019 to ensure recipients understood the timing of project scope revisions. The FAA sent the early notification letter to:

1. Advise agencies and tribes of the initiation of the EA study
2. Request background information about the General Study Area established for the EA (See **Section 4.1**)
3. Provide an opportunity to advise the FAA of any issues, concerns, policies, or regulations that may affect the environmental analysis that the FAA will undertake in the EA.

On July 28, 2019, a legal notice in English and Spanish was published in the South Florida Sun Sentinel, the Tampa Bay Times, the Orlando Sentinel, the Fort Meyers News-Press, the Miami Herald, and El Nuevo Herald newspapers. A total of 15 emails were received in response to the NOI, including three from agencies (National Park Service, Florida Department of Transportation Bureau of Historic Preservation, and the Environmental Protection Agency), and one from the Seminole Tribe of Oklahoma requesting Consultation with the FAA that was later rescinded on further clarification of the project.

On April 8, 2019, the FAA initiated Section 106 consultation with the Tribal Historic Preservation Officers (THPOs) from the Miccosukee Tribe of Florida, Mississippi Band of Choctaw Indians, Seminole Nation of Oklahoma, Seminole Tribe of Florida, Poarch Band of Creek Indians, and the Muscogee (Creek) Nation that may have interests within the General Study Area in accordance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. § 470 et seq.) and the implementing regulations at 36 C.F.R. Part 800.

Consultation with the Florida State Historic Preservation Officer (SHPO) seeking concurrence with FAA's proposed analysis methodology was initiated on May 6, 2020 and concluded on September 18, 2020.

Appendix A includes a copy of the notice of intent letter (and attachments), affidavits of newspaper publication, a list of the receiving agencies, Tribal consultation details, and community engagement efforts, as well as federal agency outreach and FAA exchanges/responses.