2 Purpose and Need

The FAA has prepared this Draft EA to evaluate the potential environmental impacts associated with implementation of new RNAV-based flight procedures for the San Antonio Airspace Modernization Project (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 need(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 San Antonio Airspace Modernization Project that would be addressed by the Proposed Action), as well as the Proposed Action itself. Explanations of the technical terms and concepts used in this chapter are found in Appendix A: *Basic Concepts of Performance Based Navigation (PBN) and Air Traffic Control (ATC)*.

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 need in this case is the inefficiency of the existing aircraft flight procedures in the San Antonio Airspace Modernization Project. RNAV-based SIDs and STARs have been in effect in the San Antonio Airspace for over 10 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. The arrival and departure procedures serving the San Antonio Airspace Modernization Project 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 Appendix A: *Basic Concepts of Performance Based Navigation (PBN) and Air Traffic Control (ATC)*, 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 one of 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 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 need in greater detail.

2.1.1 Description of the Need

There are several issues associated with the arrival and departure procedures currently implemented in the San Antonio Airspace Modernization Project. 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 SAT and surrounding satellite (other airports within the San Antonio Area Class C airspace) airports.

Most of the STARs serving SAT do not provide for runway transitions. When a controller issues instructions for a pilot to follow an RNAV STAR with a runway transition, the controller knows when and where the aircraft will fly until it reaches the approach to the runway. Without a runway

transition, the controller must issue vectors and speed adjustments to direct the aircraft to the approach to the runway. This requires increased communication between controller and pilot. Consequently, less-precise flight paths may result due to the time it takes the controller to issue an instruction to the pilot and for the pilot to read the instruction back to the controller for confirmation before the instruction can be executed. As a result, flight route predictability is reduced, as is efficient use of the airspace.

Current departure traffic flows rely on vectors for traffic departing to the north and east, increasing task complexity. In addition, the current departure flows have inefficient routes and altitudes. Converging flows requires sequencing and separation through the vectoring and leveling off of aircraft reducing the predictability and repeatability of the procedures while increasing the complexity of the task.

Predictability is also reduced due to a lack of RNAV arrival and departure procedures serving satellite airports. BAZ has no arrival or departure procedures serving the airport, while RND and SKF have only arrival procedures (of which only one is RNAV). 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. This analysis considers and evaluates localized existing and proposed RNAV instrument approach procedures close to the respective Study Airport, but prioritizes arrival and departure procedures at a higher order due to the importance of system connectivity to and from the en route system relative to causal factors such as predictability.

In addition, some arrival and departure flight paths intersect, requiring controllers to direct pilots to vector/level off to maintain adequate vertical and/or lateral separation between aircraft. Aircraft arriving to SAT on RNAV STARs and departing on RNAV SIDs can experience segments of flight where aircraft are required to level off. Some transitions that intersect other procedures may be rarely or completely unused due to the conflicts. Departures from BAZ, RND, and SKF may experience delays due to conflicts with arrivals into SAT. These complex, converging interactions require more frequent controller-to-pilot and controller-to-controller communication and reduce the efficient use of the airspace.

Similarly, underutilized en route transitions limit the number of entry and exit points into SAT 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. The entry point for southeast and southwest arrivals serving SAT require coordination between ZHU controllers managing neighboring airspace sectors. Furthermore, some departure procedures are inefficient due to design constraints, and there are no departure procedures serving the airport for aircraft departing to the east. 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 need 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 need 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 need in the San Antonio Airspace Modernization Project. A need is best addressed by examining the circumstances or factors that cause it. Addressing the causal factors behind the need will help develop a reasonable alternative designed to resolve the need (i.e., meet the "purpose").

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

- Lack of predictable standard routes defined by the need for additional RNAV arrival and departure procedures connecting to/from the en route airspace and a need for runway transitions;
- Complex converging and dependent arrival and departure route procedure interactions; and,
- 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 the Need for Additional RNAV Arrival and Departure Procedures Connecting to/from En Route Airspace and a Need for Runway Transitions

Predictable standard routes allow both pilots and controllers to know in advance 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 Appendix A, 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 San Antonio Airspace Modernization Project airspace.

Current Arrival and Departure Procedures Do Not Take Full Advantage of RNAV Capabilities

As shown in **Table 2-1**, the Study Airports are currently served by four RNAV arrival and departure procedures and seven conventional arrival and departure procedures. Most of the current procedures serving SAT, SKF, and RND are conventional arrival and departure procedures developed over a decade ago. The development of the current RNAV procedures mirrored the conventional procedures so all aircraft could follow the same route. Because conventional

procedures are dependent on the location of ground-based navigational aids, the locations where procedures can be established are limited due to factors such as terrain. Accordingly, the RNAV procedures developed to mirror the conventional procedures do not take full advantage of RNAV design capabilities. As a result, the overall benefit that could have been gained for RNAV-equipped aircraft has not been fully realized.

Table 2-1 Existing STAR and SID Procedures

Airport Served	Gate Served	Procedure Name	Procedure Type	Transitions (en route/runway)
ARRIVALS (STARs)				
SAT, RND, SKF	N, NE	BRAUN	RNAV	6/4
SAT, RND, SKF	W, NW	CENTERPOINT	Conventional	2/0
SAT, RND, SKF	SE, SW	LEMIG	Conventional	4/0
SAT, RND, SKF	N, NE	MARCS	Conventional	5/0
SAT, RND, SKF	N, NW	STONEWALL	Conventional	3/0
DEPARTURES (SIDs)				
SAT	N	ALAMO	Conventional	4/0
SAT	W, NW	ALISS	RNAV	2/0
SAT	SE	BOWIE	Conventional	2/0
SAT	NW	LEJON	Conventional	1/0
SAT	S	MILET	RNAV	1/0
SAT	SE	THREE RIVERS	RNAV	1/0

Notes:
1/ Radar vectors are not defined routes and therefore are not included in runway transition counts.
2/ Three STAR procedures, the BELLR serving HOU and the HTOWN and TEJAS serving IAH are not included in this list as HOU and IAH are not study airports and there was only one change to the procedures in the en route environment to allow for connectivity to the proposed SNIDR SID. This change was considered and is discussed in Section 3.1.2.2 of this EA.

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 May 2022.
Prepared by: ATAC Corporation, June 2022.

Since the implementation of the current 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 San Antonio Airspace Modernization Project do not take full advantage of current RNAV design capabilities and have become increasingly less efficient. Maintaining the current conventional procedures and the RNAV procedures that mirror 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 1.3.1, SAT operates under five 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.

As the only major commercial airport in SAT TRACON airspace, SAT experiences the highest levels of civilian and military aircraft traffic. As shown in **Table 2-1** previously, SAT is currently served by one RNAV STAR. This STAR (BRAUN) is the only existing procedure to provide any

runway transitions into SAT. The lack of runway transitions for the other procedures 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.

Lack of Predictable Satellite Airport Arrival or Departure Procedures

The existing arrival and departure procedures for the satellite Study Airports do not allow for predictable segregation of routes between air traffic arriving to or departing from these Study Airports and SAT. While SFK and RND are currently served by one RNAV STAR, there are no RNAV SIDs serving the airports.

Currently, BAZ has no established RNAV or conventional arrival or departure procedures. All arrivals and departures are vectored and must be released for departure by the SAT TRACON. The lack of RNAV procedures for the BAZ Study Airport 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.[18] 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).

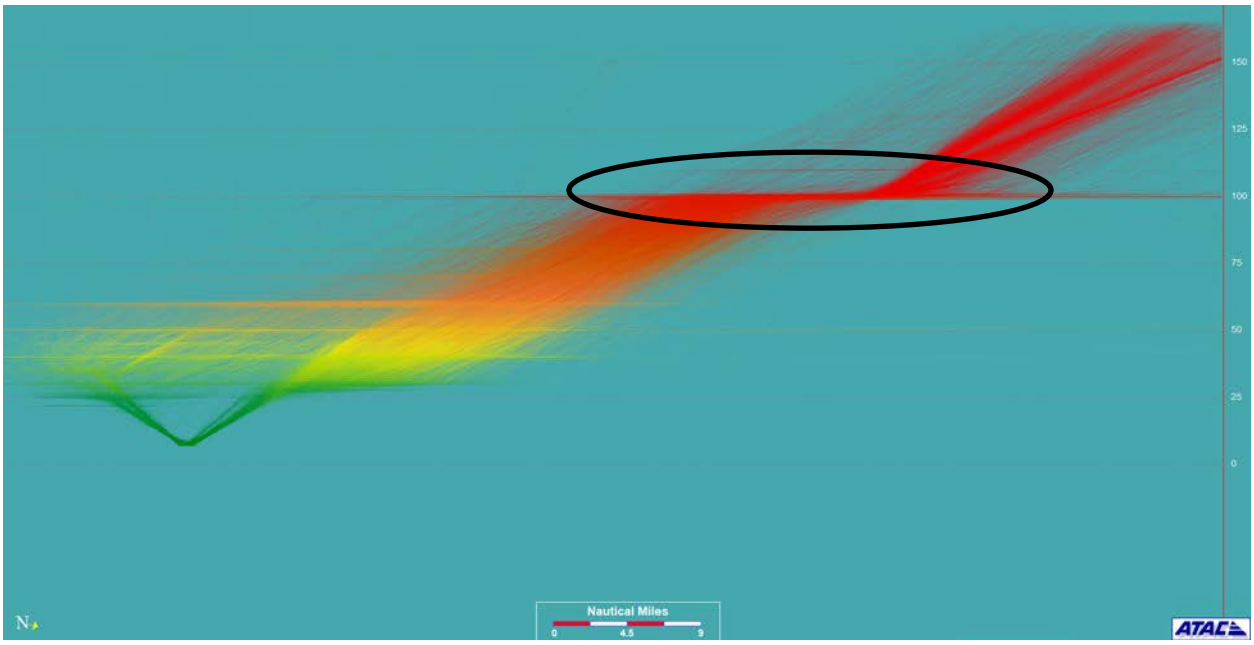
Because the procedures currently in use in the San Antonio Airspace Modernization Project do not take full advantage of RNAV capabilities, multiple procedures share the same NAVAIDs. This may result in conflicts such as aircraft flying at different speeds along adjacent routes, requiring greater separation 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.

Aircraft arriving to SAT are frequently required to level off or vector off a procedure during descent to maintain vertical and/or lateral separation from other arriving and departing aircraft. Aircraft operating on the LEMIG, BRAUN, STONEWALL, CENTERPOINT, and MARCS STARs typically experience one or more periods of level-off of more than 10 nautical miles (NM).[19] Similarly, aircraft operating on SIDs departing the Study Airports may also experience periods of level-off. **Exhibit 2-1** shows the vertical profiles for aircraft arriving at SAT on the STONEWALL STAR. As shown by the black circle, aircraft using the STONEWALL STAR are directed to level off for approximately 20 NM at 10,000' MSL. Extended level-offs often result in increased controller-to-pilot communication and may require traffic alerts to pilots in 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-

18 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.
19 A nautical mile measures 6,076 feet or 1,852 meters.

to-pilot communication, and inefficient use of aircraft performance capabilities during descent or climb.

Exhibit 2-1 STONEWALL STAR - Vertical Profile



Notes: SAT – San Antonio International Airport; SKF – Kelly Field; BAZ – New Braunfels National Airport; RND – Randolph Air Force Base Airfield

Source: US Department of Transportation, Federal Aviation Administration, Performance Data and Reporting System (PDARS) radar data, March 1, 2021 to February 28, 2022, ATAC Corporation.
Prepared by: ATAC Corporation, August 2022.

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

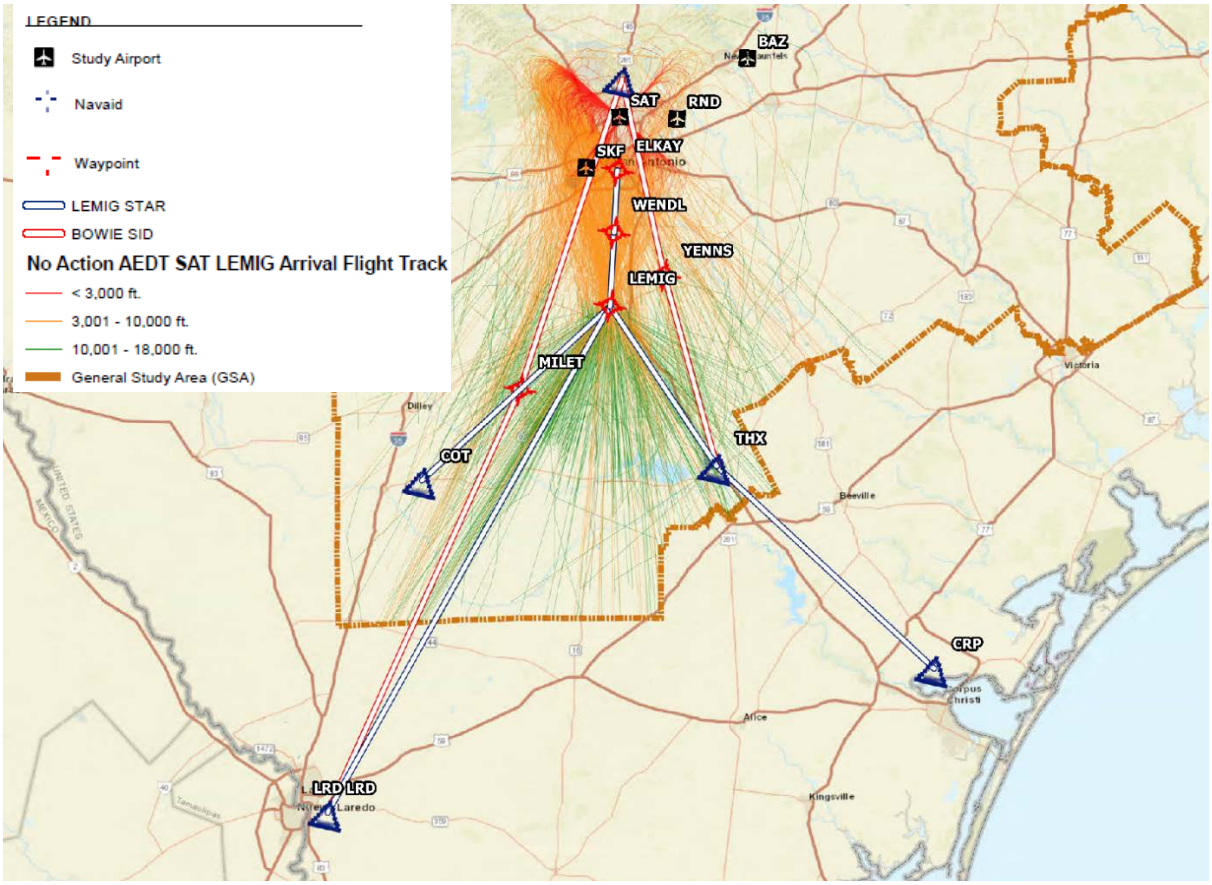
Flexibility allows controllers to plan for and adapt to traffic demands, which change frequently throughout the day. Although commercial flights are scheduled, delays in other regions of the U.S. or severe weather along a route may cause aircraft to enter or exit the en route and terminal area airspace at times other than those 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 San Antonio Airspace Modernization Project airspace.

Entry Points

Exhibit 2-2 depicts aircraft arriving on the LEMIG STAR. Aircraft arriving on the LEMIG STAR have three en route transitions available on the procedure. However, two of the arrival transition waypoints (LRD and CRP) are shared with the BOWIE SID departure transitions

Exhibit 2-2 SAT LEMIG Arrivals



Notes: SAT – San Antonio International Airport; SKF – Kelly Field; BAZ – New Braunfels National Airport; RND – Randolph Air Force Base Airfield

Source: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MaymyIndia, NGCC, (c) OpenStreetMap contributors, and the GIS User Community. ESRI, US Water Boides. US Census Bureau, Incorporated Places, State Boundary. Federal Aviation Administration, Code of Instrument Flight Procedures, Study Airports. ATAC, Study Area Boundaries.
Prepared by: ATAC Corporation, August 2022.

requiring controllers to either coordinate the arrivals and departures or issue a vector to a different point along the route that avoids the potential conflict. The third transition (COT) is rarely used and requires arriving traffic to interact with aircraft departing on the BOWIE SID (LRD transition). These terminal airspace entry points require excessive coordination between sectors which can result in gaps in the arrival flows to the Study Airports. This excessive coordination is further exacerbated by the lack of vertical guidance for all existing procedures in the SAT airspace.

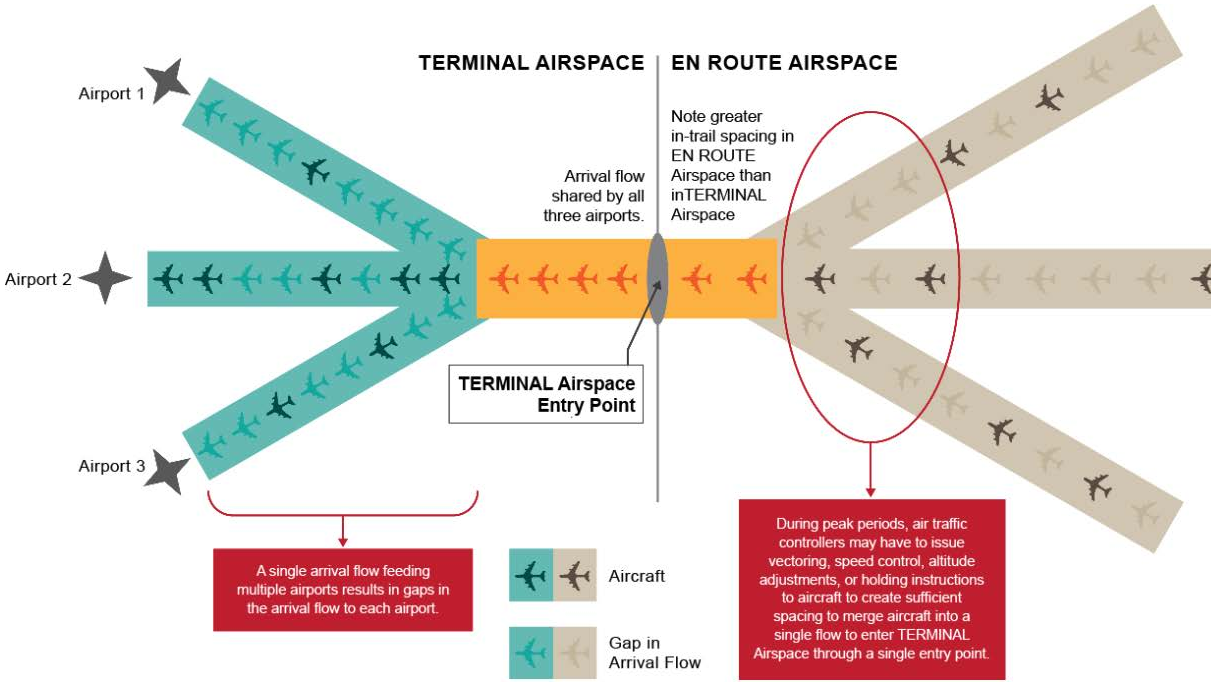
Exhibit 2-3 illustrates how aircraft arrivals are sequenced in the en route airspace and then merged to enter terminal airspace through a single-entry gate. Aircraft arriving from en route airspace must be merged into a single arrival flow before entering terminal airspace through an entry gate. This is similar to automobile traffic traveling 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 2-3 Illustration of Single Terminal Airspace Entry Point and Single Arrival Flow with Traffic Sequenced to Multiple Airports

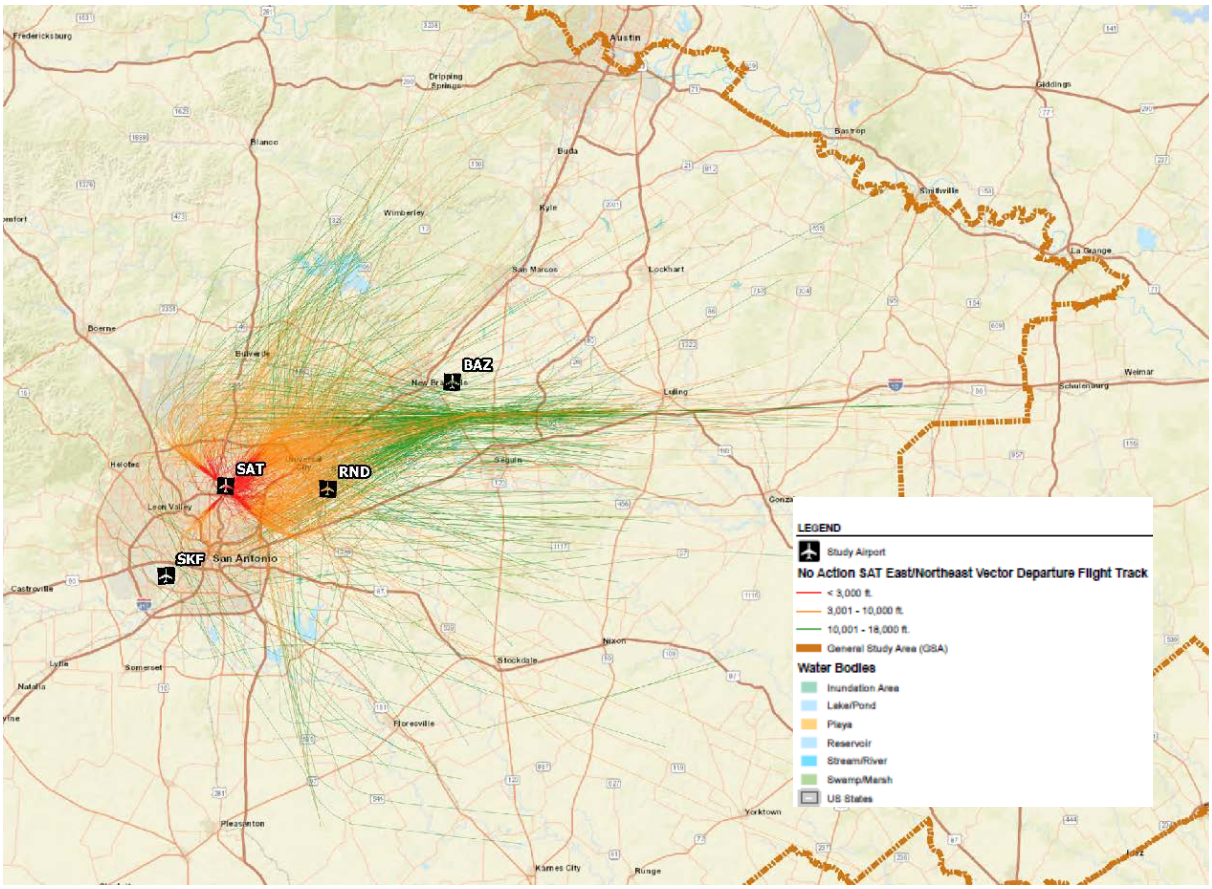


Source: Federal Aviation Administration, July 2012.
Prepared by: ATAC Corporation, August 2022.

Exit Points – SAT Eastbound Departures

Exhibit 2-4 depicts traffic departing SAT to the east. There is currently no departure procedure for aircraft departing to the east; this requires controllers to issue vectors or preferred routes that may vary based upon destination. The lack of a departure procedure for the eastbound traffic increases pilot and controller workload, while increasing the complexity of the operations and reducing the predictability of aircraft movements. Since there is no published exit point, controllers must coordinate the transfer control point with the pilots and other controllers.

Exhibit 2-4 SAT Eastbound Departures



Notes: SAT – San Antonio International Airport; SKF – Kelly Field; BAZ – New Braunfels National Airport; RND – Randolph Air Force Base Airfield

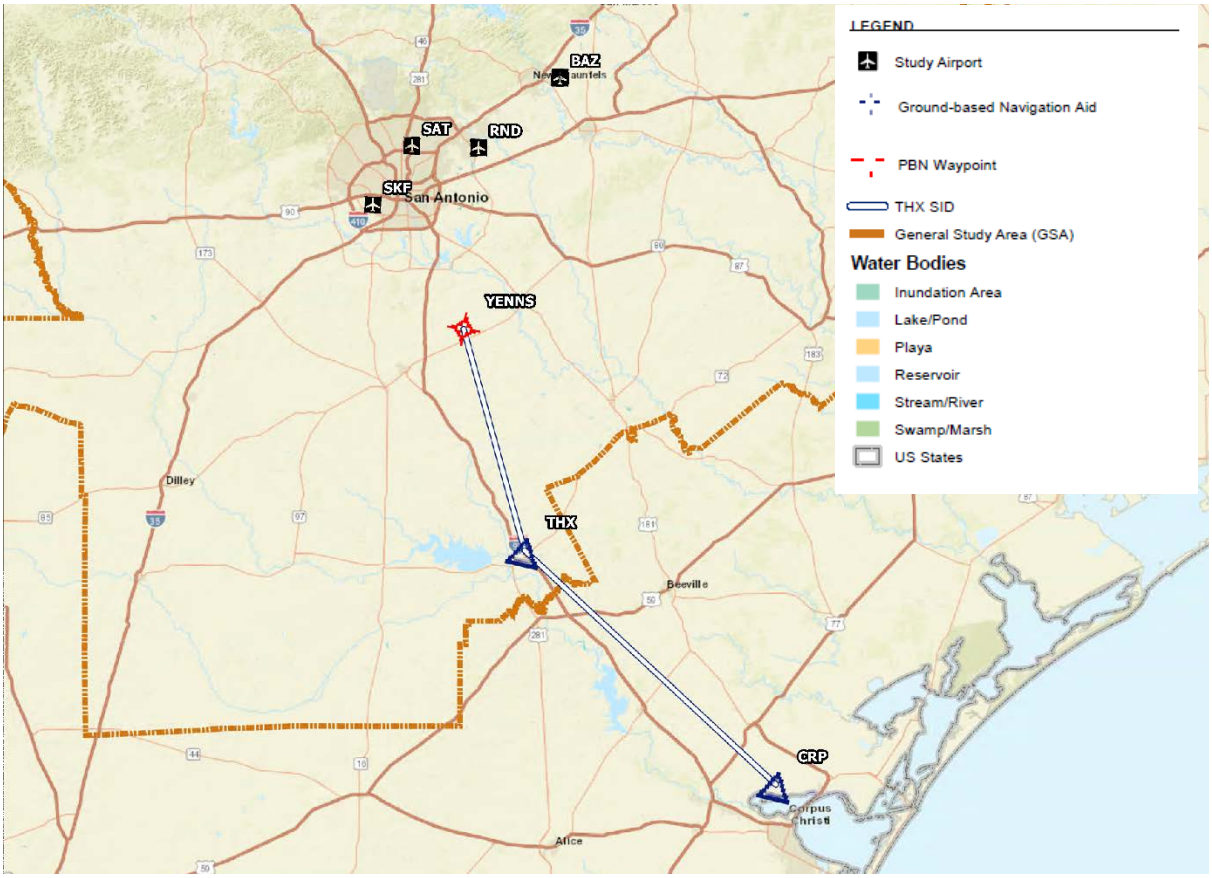
Source: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MaymyIndia, NGCC, (c) OpenStreetMap contributors, and the GIS User Community. ESRI, US Water Boides. US Census Bureau, Incorporated Places, State Boundary. Federal Aviation Administration, Code of Instrument Flight Procedures, Study Airports. ATAC, Study Area Boundaries.
Prepared by: ATAC Corporation, August 2022.

Several of the existing RNAV procedures utilize ground-based navigational aids rather than PBN waypoints. **Exhibit 2-5** depicts the THX SID departing from SAT. The use of ground-based navigational aids limits the flexibility in location of routes and entry and exit points. For the THX SID, it is also in conflict with another FAA initiative called the VOR Minimum Operational Network (MON). VOR MON is the FAA program to transition to PBN navigation from the conventional VOR-defined routes and procedures. As a result, the VOR infrastructure in the Contiguous United States (CONUS) is being repurposed to provide a conventional backup navigation service during potential Global Positioning System (GPS) outages.[20] The VOR MON Program will implement the MON by discontinuing approximately

20 Navigation Programs - Very High Frequency Omnidirectional Range Minimum Operational Network (VOR MON). (https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gbng/vormon [Accessed, August 2022]).

30-50% of the VORs in the NAS, of which, one slated for decommissioning is the THX VOR.[21,22]

Exhibit 2-5 THX SID



Notes: SAT – San Antonio International Airport; SKF – Kelly Field; BAZ – New Braunfels National Airport; RND – Randolph Air Force Base Airfield

Source: Sources: Road Network File, U.S. Census Bureau, 2017 (2017 TIGER/Line Shapefiles (machine-readable data files), County Boundary File, US Census Bureau, (2017 TIGER/Line Shapefiles (machine-readable data files); Airports file, Federal Aviation Administration, 2018 Coded Instrument Flight Procedures (CIFP). Shaded Relief, 2018. ATAC Corporation, 2018, (2018 General Study Area boundary).
Prepared by: ATAC Corporation, August 2022.

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.

21 VOR MON Program Presentation to Aeronautical Charting Forum, October 28-30, 2014
22 *Provision of Navigation Services for the Next Generation Air Transportation System (NextGen) Transition to Performance-Based Navigation (PBN) (Plan for Establishing a VOR Minimum Operational Network)*, 81 Federal Register Vol. 143, 48694-48700, July 26, 2016.

- 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 to more efficiently handle sequencing are limited when the pilot does not have the runway in sight due to low visibility.

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 San Antonio Airspace Modernization Project. To meet this goal, the Proposed Action would optimize procedures serving the Study Airports, while maintaining or enhancing safety, in accordance with 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 most current RNAV procedures requires controllers to disproportionately use inefficient 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 is an insufficient number of runway transitions to and from the runways at each of the Study Airports. Finally, there is a lack of RNAV arrival and departure 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 San Antonio Airspace Modernization Project.

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 and those that have altitude and/or speed controls.

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 independent transitions compared with the No Action Alternative (measured by number of independent 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 2021/2022 air traffic procedures serving the Study Airports would remain unchanged except for planned procedure modifications, independent of the San Antonio Airspace Modernization 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 optimized RNAV SID and STAR procedures in the San Antonio Airspace Modernization Project. 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 would not involve physical construction of

any facilities such as additional runways or taxiways, and would 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 San Antonio Airspace Modernization Project 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, Standard Instrument Approach Procedures (SIAPs), and transitions and undertake controller training.

2.6 Agency Coordination

On July 28, 2022, the FAA distributed an early notification letter to 255 federal, state, regional, and local officials and agencies, as well as to eight tribes. 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
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 31, 2022, a Notice of Intent to Prepare an EA was published in English and Spanish in the San Antonio Express-News, New Braunfels Herald-Zeitung, and La Prensa Texas newspapers. Due to weekly publishing, the same notice was published in the August 3, 2022 San Antonio Observer newspaper. Written comments were received in response to the Notice of Intent and where applicable, were considered in preparation of the Draft EA. Appendix B, *Agency Coordination, Community Involvement and List of Receiving Parties*, includes a copy of the notice of intent letter (and attachments), an affidavit of newspaper publication, a list of the receiving parties, and all comments received.

In October 2022, the FAA initiated formal Section 106 consultation with the Texas Historical Commission (THC) State Historic Preservation Office (SHPO) and Tribal Historic Preservations Officers (THPOs) from the Alabama Coushatta Tribe of Texas, Apache Tribe of Oklahoma, Comanche Nation Oklahoma, Coushatta Tribe of Louisiana, Mescalero Apache Tribe of the Mescalero Reservation New Mexico, Osage Nation, Tonkawa Tribe of Indians of Oklahoma, and the Wichita and Affiliated Tribes (Wichita, Keechi, Waco & Tawakonie) Oklahoma, who 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.

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