Draft Environmental Assessment for the San Antonio Airspace Modernization Project

October 2022

Prepared by:

United States Department of Transportation

Federal Aviation Administration

Fort Worth, Texas

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1 Introduction

The National Environmental Policy Act of 1969 (NEPA), [42 United States Code (U.S.C.) § 4321 *et seq.*], requires federal agencies to disclose to decision makers and the interested public a clear, accurate description of the potential environmental impacts that could arise from proposed federal actions. Through NEPA, Congress has directed federal agencies to consider environmental factors in their planning and decision-making processes and to encourage public involvement in decisions that affect the quality of the human environment. As part of the NEPA process, federal agencies are required to consider the environmental effects of a proposed action, reasonable alternatives to the proposed action, and a no action alternative (i.e., analyzing the potential environmental effects of not undertaking the proposed action). The Federal Aviation Administration (FAA) has established a process to ensure compliance with the provisions of NEPA through FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*.

The Proposed Action, the subject of this Environmental Assessment (EA), is called the San Antonio Airspace Modernization Project. The San Antonio Airspace Modernization Project seeks to optimize aircraft arrival and departure procedures in the San Antonio Airspace Modernization Project by employing advanced navigational technology. The procedures designed for the San Antonio Airspace Modernization Project would be used by aircraft operating under Instrument Flight Rules at the study area airports ("the Study Airports").

This EA, prepared in accordance with FAA Order 1050.1F, documents the potential effects to the environment that may result from the optimization of Air Traffic Control (ATC) procedures at the Study Airports. These airports were selected based on whether they would be directly served by a proposed procedure and, if so, whether they served the required number of annual Instrument Flight Rules (IFR) filed operations under FAA Order 1050.1F. The Study Airports are detailed further in Section 1.3 and are named, followed by their abbreviated FAA identifier:[1]

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

This EA includes the following chapters and appendices:

- **Chapter 1: Introduction.** Chapter 1 provides basic background information on the air traffic system and airspace for the San Antonio Airspace Modernization Project, the General Study Area, and the Study Airports.
- **Chapter 2: Purpose and Need.** Chapter 2 discusses the need (i.e., problem) and purpose (i.e., solution) for airspace and procedure optimization in the San Antonio Airspace Modernization Project area, and identifies the Proposed Action.
- **Chapter 3: Alternatives.** Chapter 3 discusses the Proposed Action and the No Action Alternative analyzed as part of the environmental review process.
- **Chapter 4: Affected Environment.** Chapter 4 discusses existing environmental conditions within the San Antonio Airspace Modernization Project General Study Area.

1 The FAA is responsible for assignment and tracking the designation of unique 3-character (letters only or numbers and letters except those beginning with the letters N, W, Y, and Z) identifiers for aircraft landing facilities published in U.S. Department of Transportation, Federal Aviation Administration, *FAA Order JO 7350.9BB, Location Identifiers*, July 14, 2022.

- **Chapter 5: Environmental Consequences.** Chapter 5 discusses the potential environmental impacts associated with the Proposed Action and the No Action Alternative.
- **Appendix A: Basic Concepts of Performance Based Navigation (PBN) and Air Traffic Control (ATC).** Appendix A introduces the basic terminology and concepts related to ATC and the specialized components of satellite based PBN.
- **Appendix AA: Proposed Action Procedures and Flight Corridors.** Appendix AA is the comprehensive visualization of all proposed action flight procedures and associated flight corridors.
- **Appendix B Agency Coordination, Community Involvement, and List of Receiving Parties.** Appendix B documents agency coordination and community involvement associated with the EA process and lists the local agencies and parties identified to receive copies of the Draft and Final EA documents.
- **Appendix C: List of Preparers.** Appendix C lists the names and qualifications of the principal persons contributing information to this EA.
- **Appendix D: References.** Appendix D provides references to documents and resources cited to prepare the EA document.
- **Appendix E: Acronyms and Glossary.** Appendix E lists acronyms and provides a glossary of terms used in the EA.
- **Appendix F: Basics of Noise.** Appendix F presents information on aircraft noise as well as the general methodology used to analyze noise associated with aviation projects.
- **Appendix G: FAA PBN Design Team Briefing.** Appendix G contains the conceptual FAA Design Team background briefing slides summarizing the proposed mature designs.
- **Appendix H: Flight Schedules Technical Report.** Appendix H describes the methodology and inputs used to forecast air traffic for the Study Airports described in this EA.
- **Appendix I: Noise Technical Report.** Appendix I presents detailed and technical information on the noise analysis conducted in support of this EA.
- **Appendix J.** Appendix J is reserved for Comments on the Draft EA and is not included in this Draft EA.

1.1 Project Background

On January 16, 2009, the FAA asked RTCA[2] to create a joint government-industry task force to make recommendations for implementation of NextGen operational improvements for the nation's air transportation system. In response, RTCA assembled the NextGen Mid-Term Implementation Task Force (Task Force 5), which included more than 300 representatives from commercial airlines, general aviation, the military, aerospace manufacturers, and airport stakeholders.

On September 9, 2009, RTCA issued the NextGen Mid-Term Implementation Task Force Report,[3] which provided the Task Force 5 recommendations. One of these recommendations directed the

2 RTCA, Inc. (RTCA is not an acronym, simply the name for the organization) is a private, not-for-profit corporation that develops consensus-based recommendations regarding communications, navigation, surveillance (CNS), and air traffic management (ATM) system issues. RTCA functions as a federal advisory committee and includes roughly 400 government, industry, and academic organizations from the United States and around the world. Members represent all facets of the aviation community, including government organizations, airlines, airspace users, airport associations, labor unions, and aviation service and equipment suppliers. More information is available at http://www.rtca.org.
3 RTCA, Inc. Executive Summary, *NextGen Mid-Term Implementation Task Force Report*, September 9, 2009.

FAA to undertake planning for implementing Performance-Based Navigation PBN[4] procedures, including Area Navigation (RNAV) and Required Navigation Performance (RNP), which are discussed further in Appendix A.

The purpose of the airspace modernization initiative is to optimize air traffic procedures and airspace on a regional scale. This is accomplished by developing procedures that take advantage of technological advances in navigation, such as RNAV, while ensuring that aircraft not equipped to use RNAV continue to have access to the National Airspace System (NAS). This approach addresses congestion and other factors that reduce efficiency in busy airport and airspace areas. The San Antonio Airspace Modernization Project Study Airports are further discussed in Section 1.3. The overall intent is to use limited airspace as efficiently as possible in congested airport and airspace areas.[5]

1.2 General Study Area

To describe the background elements and existing conditions in the San Antonio Airspace Modernization Project, the FAA developed a General Study Area. The General Study Area is used to evaluate the potential for environmental impacts under the Proposed Action. Two overall objectives guided the development of the General Study Area:

1. The General Study Area captures all IFR flight tracks using radar data from the period of March 1, 2021 to February 28, 2022 (referred to as 2021/2022)[6], which was the most recent year of data available at the study's inception. The General Study Area also captures IFR flight tracks designed for the Proposed Action, where 95 percent of departing aircraft leaving the major Study Airport (SAT) are below 10,000 feet Above Ground Level (AGL) and 95 percent of arriving aircraft to the major Study Airport are below 7,000 feet AGL. The threshold for capturing flight tracks at BAZ, RND, and SKF is set at 85 percent to account for the lower altitudes at which many aircraft operating from these airports tend to fly. The thresholds are set below 100 percent to account for outlier operations which may not reach the prescribed altitudes within a reasonable distance of the Study Airports or at all. By excluding the flight tracks for these kinds of operations, potential distortion of the lateral boundary can be avoided, and the General Study Area is kept to the most reasonable size. The FAA requires consideration of impacts of airspace actions from the surface to 10,000 feet AGL if the study area is larger than the immediate area around an airport or involves more than one airport or up to 18,000'AGL if the proposed action or alternative(s) are over a national park or wildlife refuge where other noise is very low and a quiet setting is a generally recognized purpose and attribute.[7,8] Furthermore, policy guidance issued by the FAA Program Director for Air Traffic Airspace Management states that for air traffic project environmental analyses, noise impacts should be evaluated for proposed changes in arrival procedures between 3,000 feet AGL and 7,000 feet AGL and

4 Additional information on Performance-Based Navigation (PBN) is provided at *Forming NextGen: From Vision to Reality* (https://www.faa.gov/nextgen/background/forming [accessed June 30, 2022]).
5 U.S. Department of Transportation, Federal Aviation Administration, *FAA Response to Recommendations of the RTCA NextGen Mid-Term Implementation Task Force*, January 2010, p. 14.
6 Radar data obtained from the FAA's Performance Data Analysis and Reporting System (PDARS) and System-Wide Information Management (SWIM) was used to identify military and civilian IFR flights to and from the Study Airports between March 1, 2021 to February 28, 2022 for the existing conditions of the General Study Area.
7 Department of Transportation, Federal Aviation Administration, FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, Appendix B. *Federal Aviation Administration Requirements for Assessing Impacts Related to Noise and Noise-Compatible Land Use and Section 4(f) of the Department of Transportation Act (49 U.S.C. § 303)*, Para. B-1.3, *Affected Environment*. July 16, 2015.
8 Department of Transportation, Federal Aviation Administration, *1050.1F Desk Reference*, Ch. 11, *Noise and Noise-Compatible Land Use*, Para 11.2, *Affected Environment*., February 2020.

departure procedures between 3,000 feet AGL and 10,000 feet AGL for large civil jet aircraft weighing over 75,000 pounds.[9]

2. The lateral boundary of the General Study Area is defined by U.S. Census tract boundaries where aircraft cross at or below the 10,000/7,000 feet AGL thresholds. This extent is concisely defined to focus on areas of air traffic flow.

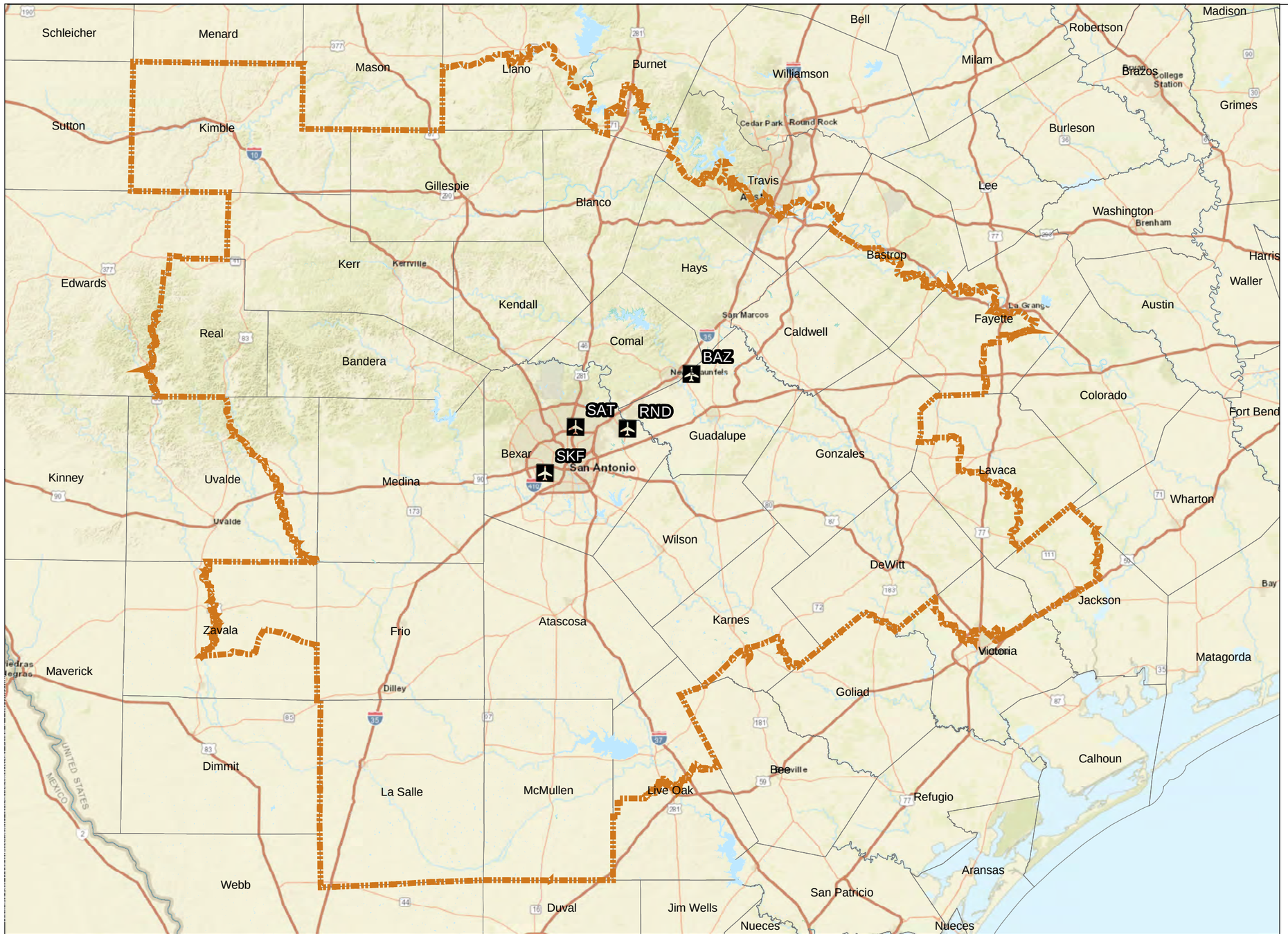
Exhibit 1-1 depicts the General Study Area. **Table 1-1** lists the 32 counties included in whole or in part in the General Study Area.

Table 1-1 Counties within General Study Area

Atascosa	Gillespie	Live Oak
Bandera	Gonzales	Llano
Bastrop	Guadalupe	McMullen
Bexar	Hays	Medina
Blanco	Jackson	Real
Burnet	Karnes	Travis
Caldwell	Kendall	Uvalde
Comal	Kerr	Victoria
DeWitt	Kimble	Wilson
Fayette	La Salle	Zavala
Frio	Lavaca	

Sources: ESRI, U.S. Census Bureau, 2022, ATAC Corporation General Study Area, 2022.
Prepared by: ATAC Corporation, June 2022.

9 Department of Transportation, Federal Aviation Administration, *Memorandum Regarding Altitude Cut-Off for National Airspace Redesign (NAR) Environmental Analyses*, September 15, 2003.



LEGEND

- Study Airport
- General Study Area (GSA)

Water Bodies

- Inundation Area
- Lake/Pond
- Playa
- Reservoir
- Stream/River
- Swamp/Marsh
- US States

Notes:

Major Study Airports
San Antonio International Airport **SAT**

Satellite Study Airports
Kelly Field **SKF**
New Braunfels National Airport **BAZ**
Randolph Air Force Base Airfield **RND**

Projection :GCS North American 1983
Scale: 1:2,631,162

0 5 10 20 Miles

N

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, September 2022.

Exhibit 1-1

General Study Area

SAN ANTONIO AIRSPACE MODERNIZATION PROJECT

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1.3 Study Airports

Exhibit 1-2 depicts the locations of the four San Antonio Airspace Modernization Project Study Airports. The Study Airports were selected based on specific FAA criteria: each airport must have a minimum of 700 annual IFR-filed jet operations or 90,000 or more annual propeller aircraft operations. This project is unique in that military as well as civilian airports were selected due to the use of existing IFR procedures by military aircraft. Airports that did not meet these thresholds were not included as Study Airports because the Proposed Action would result in little or no change to their operations. In addition, airports where the majority of traffic operates under VFR were also excluded from selection as Study Airports because they are not expected to be affected by the Proposed Action. VFR aircraft operating outside controlled airspace are not required to be in contact with ATC. Because these aircraft operate at the discretion of the pilot on a "see and be seen" basis and are not required to file flight plans, the FAA generally has very limited information for these operations.

The Major Study Airport and the three Satellite Study Airports (collectively, the Study Airports) are:

San Antonio International Airport (SAT) is considered the Major Study Airport due to a focus for procedure and airspace optimization. SAT serves as the primary commercial airport classified as a medium hub primary commercial service airport under the FAA's National Plan of Integrated Airport Systems (NPIAS).[10] As described in **Table 1-2**, SAT has one set of parallel runways (Runways 13R-31L and 13L-31R) and a crosswind runway (Runway 4-22). Aircraft arriving at SAT may be assigned the one RNAV STAR or one of four conventional STARs. Departing aircraft may be assigned one of three RNAV SIDs or three conventional SIDs.

Kelly Field (SKF) is the Satellite Study Airport located approximately 11 miles southwest of SAT. Kelly Field is owned by the US Air Force (USAF) and managed by the USAF 502nd Operational Support Squadron of Lackland Air Force Base, a part of Joint-Base San Antonio (JBSA). Port San Antonio leases airside access property on the north airfield as well as the East Kelly Railport adjacent to the airfield. It is classified as a regional general aviation facility in the NPIAS, and functions as a joint use airport with civilian and military based aircraft. As described in **Table 1-2,** SKF has one runway (Runway 16-34). SKF arrivals may be assigned the one RNAV STAR or one of four conventional STARs. There are currently no designated departure procedures for SKF.

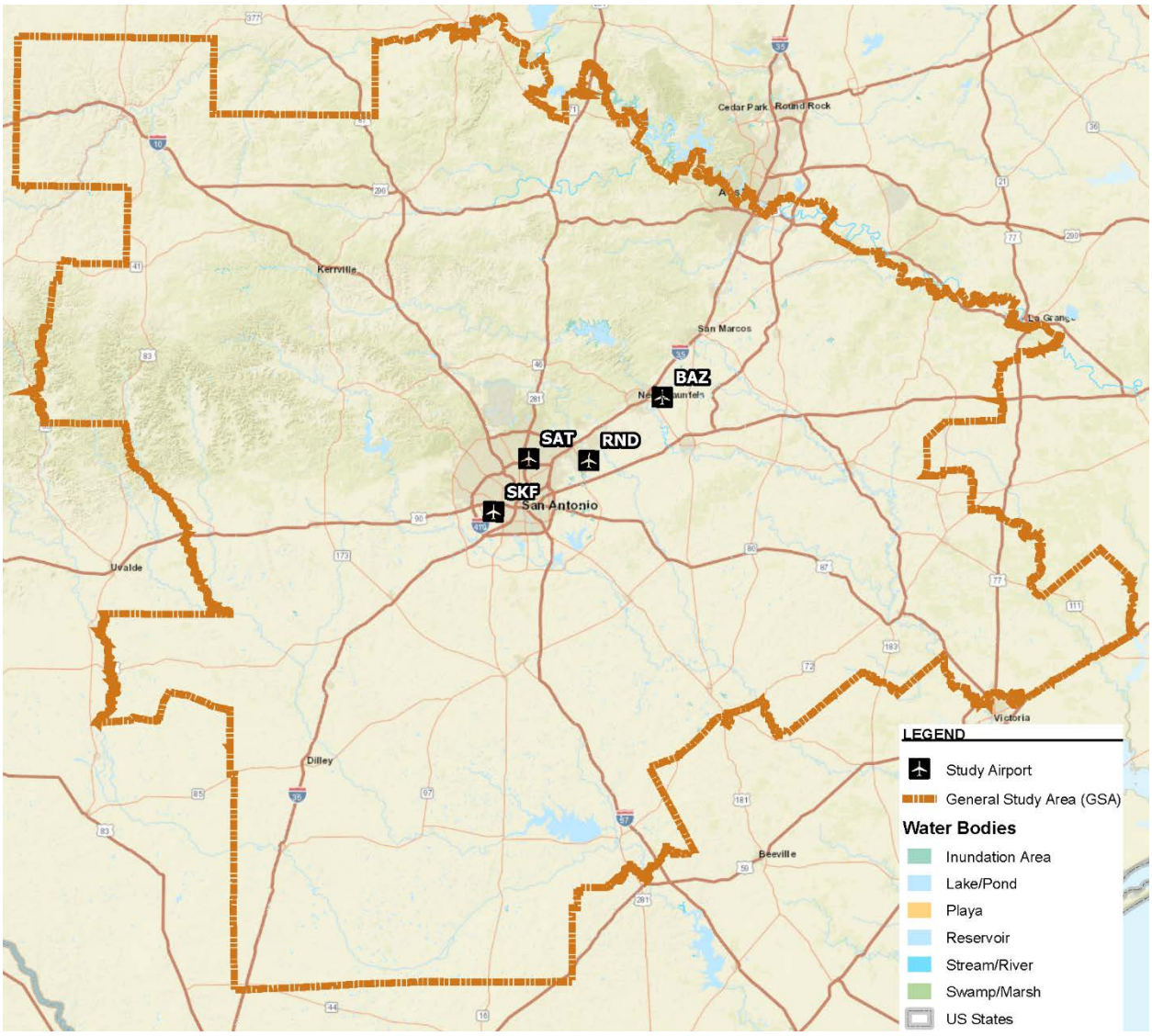
New Braunfels National Airport (BAZ) is the Satellite Study Airport located approximately 27 miles east-northeast of SAT and accommodates a mix of general aviation activity. This airport has been planned and developed as a general aviation airport, serving non-commercial private aircraft. BAZ is classified as a national general aviation airport in the NPIAS. As described in **Table 1-2**, the airport has 2 runways (Runway 13-31 and Runway 17-35). BAZ arrivals have RNAV (GPS) instrument approach procedures to each runway and a Very High Frequency Omnidirectional Range with Distance Measuring Equipment (VOR/DME-A) circle-to-land approach to all runways. The "-A" in VOR/DME-A indicates in this case that the approach is not aligned within 30 degrees of the runways at the airport.

Randolph Air Force Base Airfield (RND) is the Satellite Study Airport located approximately 10 miles east of SAT and is a non-public military use facility that is part of the JBSA complex owned and operated by the U.S. Air Force. RND is used primarily for training in a number of USAF aircraft. As described in **Table 1-2**, the Airfield has two parallel runways (Runway 15L-33R and

10 U.S. Department of Transportation, Federal Aviation Administration, *National Plan of Integrated Airport Systems, 2021-2025, Appendix A*. September 30, 2020.

15R-33L). RND arrivals may be assigned the one RNAV STAR or one of four conventional STARs. There are currently no designated departure procedures for RND.

Exhibit 1-2 Study Airport Locations



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

Sources: FAA, National Airspace System Resource, Special Use Airspace, ESRI, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, METI, NGCC, (c) OpenStreetMap contributors, and the GIS User Community, ESRI US Water Bodies, US Census Bureau, Incorporated Places, State Boundary. FAA Code of Instrument Flight Procedures, Study Airports, ATAC Study Area Boundary.
Prepared by: ATAC Corporation, June 2022.

Table 1-2 San Antonio Airspace Modernization Project EA Study Airports

Airport Name	Airport Code	Location	Runways[1/]
Airports			
San Antonio International Airport[1]	SAT	San Antonio, TX	04, 22, 13R, 31L, 13L, 31R
Kelly Field	SKF	San Antonio, TX	16, 34
New Braunfels National Airport	BAZ	New Braunfels, TX	13, 31, 17, 35
Randolph Air Force Base Airfield	RND	San Antonio, TX	15L, 33R, 15R, 33L

Notes:
1/ San Antonio International Airport is the Major Study Airport due to the primary focus for flight procedure enhancements.
2/ Runway surfaces can be used in both directions, but are named in each direction separately. Runway number is based on the magnetic direction of the runway (e.g., Runway 09 points to 90 degrees, in the east direction). The two numbers on either side always differ by 180 degrees (e.g., If one runway end is labeled 09 (for 90 degrees), the other runway end is labeled 27 (for 270 degrees). If there is more than one runway pointing in the same direction, each runway number includes an 'L', 'C,' or 'R' (left, center, or right) at the end. This is based on which side a runway is on when next to another one in the same direction.

Source: Department of Transportation, Federal Aviation Administration. Chart Supplements. (https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dafd/search/ [Accessed August 17, 2022]).
Prepared by: ATAC Corporation, August 2022.

As shown in **Table 1-3**, for the 2021/2022 radar sample approximately 52.7 percent of all IFR traffic within the San Antonio Airspace Modernization Project area operated at SAT.

Table 1-3 Distribution of 2021/2022 IFR Traffic Among Study Airports

Airport	IFR Annual Operations	Percent of Total Annual Operations
San Antonio International Airport	130,588	52.7%
Kelly Field	17,185	6.9%
New Braunfels National Airport	8,407	3.4%
Randolph Air Force Base Airfield	91,850	37.0%
Total IFR Operations	248,030	100.0%

Note: For consistency with military aircraft operating at civilian airports and due to the mixed nature of military operations under IFR and VFR, military aircraft at RND and SKF were assumed to be operating under IFR since aircraft were in radar contact at some point in the operation.

Source: Department of Transportation, Federal Aviation Administration. Operations Network: Tower Counts for SAT and BAZ (https://aspm.faa.gov/opsnet/sys/Airport.asp; [accessed March 23, 2022]), Department of the Air Force, *Final Environmental Impact Statement for T-7A Recapitalization at Joint Base San Antonio, Texas*, February 2022.
Prepared by: ATAC Corporation, August 2022.

1.3.1 Major Study Airport (SAT) Runway Operating Configurations

SAT operates under several different runway operating configurations depending on factors such as weather, prevailing wind, 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. Controllers use different runway operating configurations depending on prevailing conditions.

Exhibit 1-3 illustrates the primary runway operating configurations at SAT. These configurations are based on the FAA's Performance Data Analysis and Reporting System (PDARS) runway configuration data for 2021/2022 sample.

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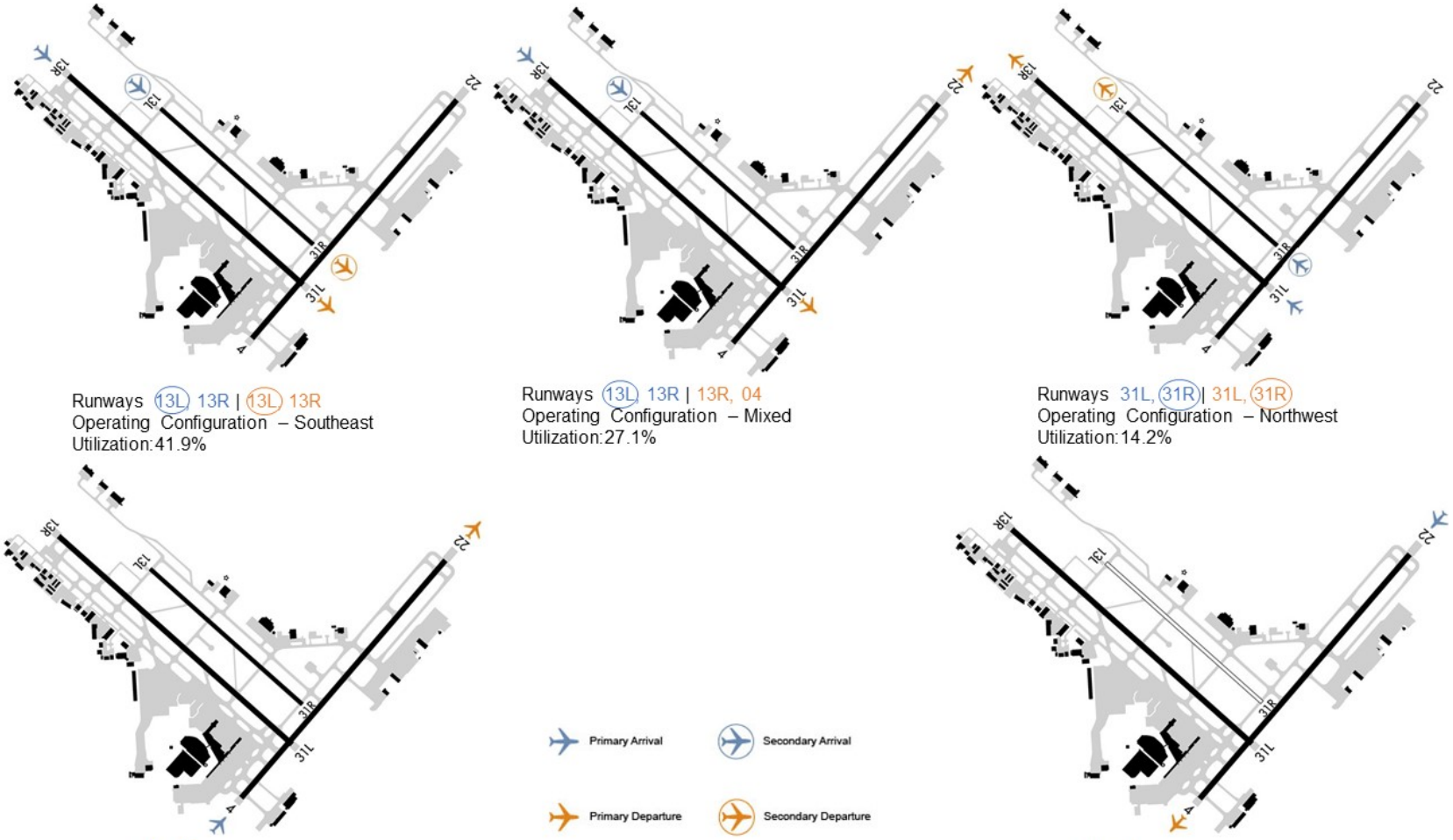
Exhibit 1-3 SAT Runway Operating Configurations



Source: Department of Transportation, Federal Aviation Administration. Airport Diagrams [http://www.faa.gov/airports/runway_safety/diagrams/ (accessed July 2022) PDARS Airport Configuration files for SAT, July 2022.
Prepared By: ATAC Corporation, July 2022.

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1.4 Air Traffic Control Facilities

The NAS[11] is organized into three-dimensional areas of navigable airspace that are defined by a floor, a ceiling, and a lateral boundary. Each is controlled by different types of ATC facilities including:

- **Air Traffic Control Tower:** Controllers at an Air Traffic Control Tower (ATCT) located at an airport provide air traffic services for phases of flight associated with aircraft takeoff and landing. The ATCT typically controls airspace extending from the airport out to a distance of several miles. All four Study Airports shown on **Exhibit 1-2** have ATCT facilities. BAZ is a non-federal ATCT staffed by qualified third-party contract personnel funded through an FAA program, whereas SAT is staffed by FAA employees, and SKF and RND are staffed by the US Air Force and civilian (non-FAA) employees. RND is unique due to the extensive military training mission that necessitates an east and west ATCT operated under the US Air Force 12th Operations Support Squadron. The east ATCT is referred to as Randolph Control Tower, while the west ATCT is referred to as Hangover Control Tower.
- **Terminal Radar Approach Control:** Controllers at a Terminal Radar Approach Control (TRACON) provide air traffic service to aircraft as they transition between an airport and the en route phase of flight, and from the en route phase of flight to an airport. This includes the departure, climb, descent, and approach phases of flights. The TRACON airspace is broken down into sectors. As an aircraft moves between sectors, responsibility for it transfers from controller to controller. Controllers maintain separation between aircraft that operate within their sectors. The terminal airspace in the San Antonio Airspace Modernization Project area is controlled by the SAT TRACON whose boundaries are shown in **Exhibit 1-4**.
- **Air Route Traffic Control Centers:** Controllers at Air Route Traffic Control Centers (ARTCCs or "Centers") provide air traffic services during the en route phase of flight. Similar to TRACON airspace, the Center airspace is broken down into sectors. As shown in **Exhibit 1-4**, the San Antonio Airspace Modernization Project is comprised of airspace delegated to the Houston ARTCC (ZHU).

1.5 Controlled Airspace in the General Study Area

The following sections describe the airspace structure, type, and constraints of the General Study Area Airspace that would be affected by the San Antonio Airspace Modernization Project.

1.5.1 Airspace Responsibility

Exhibit 1-4 depicts the terminal and en route airspace structure within the immediate vicinity of the General Study Area. For an introduction to air traffic and performance based navigation concepts, graphics, and descriptions, please refer to Appendix A. The General Study Area consists of airspace delegated to ZHU and SAT ATCT/TRACON. ZHU provides ATC services covering 276,866 square miles of lateral airspace across the south central United States. ZHU airspace covers the entirety of the General Study Area's 23,849 square miles from various base altitudes up to FL600, occupying roughly 8.6% of ZHU's total lateral coverage. Including the General Study Area, the total breadth of ZHU airspace overlies parts of Mississippi, Louisiana, and Texas as well as the Gulf of Mexico. It abuts Albuquerque Center (ZAB) to the west, Fort

11 See Appendix A: *Basic Concepts of Performance Based Navigation (PBN) and Air Traffic Control (ATC)* for additional descriptions of concepts, terms, and illustrations related to PBN operations in the NAS.

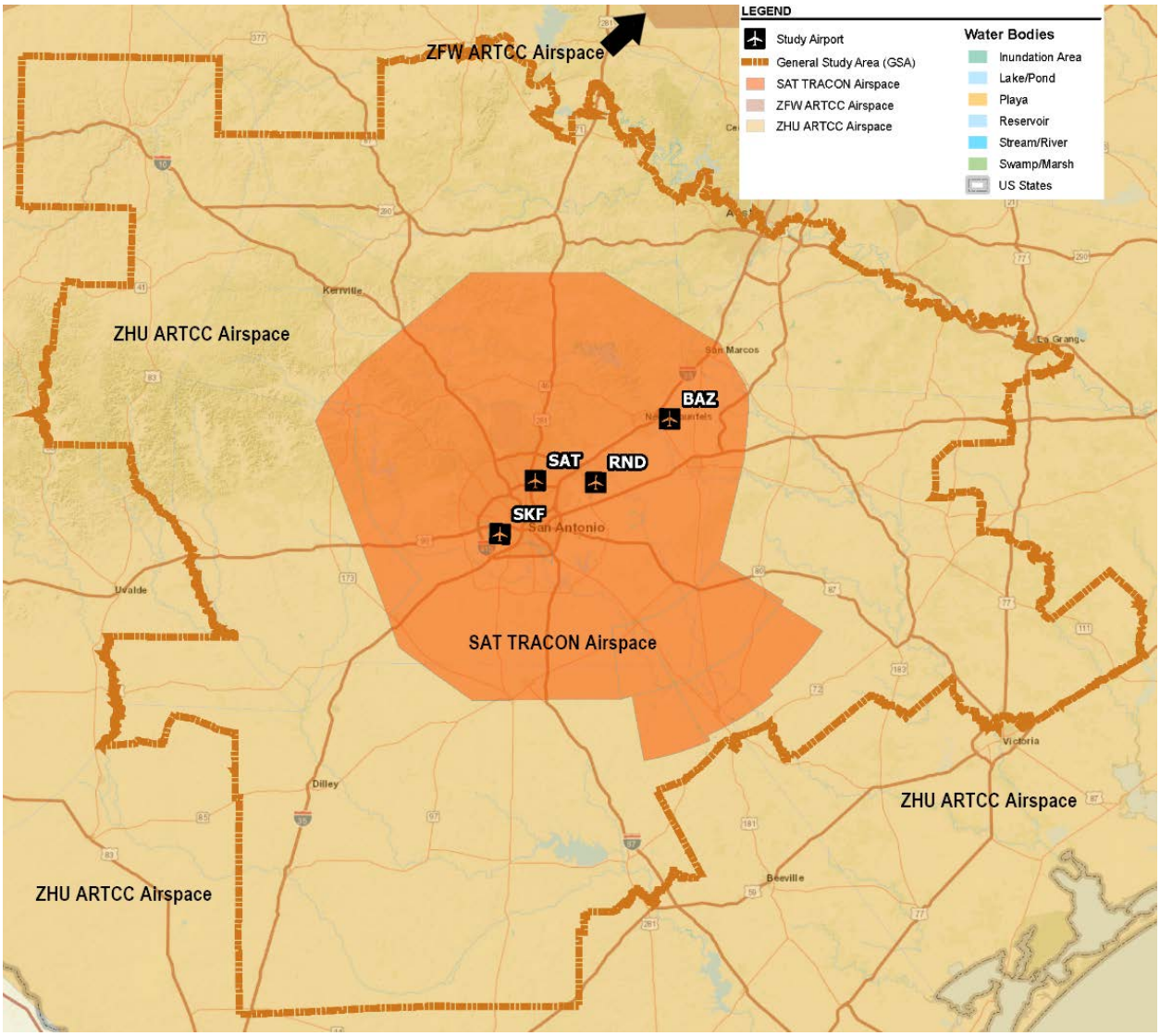
Worth Center (ZFW) to the north, Memphis Center (ZME) to the north, Atlanta Center (ZTL) to the north, Jacksonville Center (ZJX) to the east, ZHU oceanic airspace to the south, and Mexican airspace to the south and southwest. ZHU is responsible for all military, private, and commercial aircraft arriving, departing, and traversing inside its lateral and vertical boundaries when they are operating under IFR and offers select services to aircraft operating under Visual Flight Rules (VFR). ZHU provides air traffic control service to United States and foreign military aircraft operating under both IFR and VFR in ZHU airspace. ZHU controllers provide air traffic services in the airspace above and adjacent to the SAT TRACON airspace.

SAT ATCT and TRACON are a combined operation, offering service to regional as well as SAT-specific local and ground air traffic. This differs from a separate stand-alone TRACON that is unaffiliated with a single local ATCT and offers regional air traffic service, such as I90 TRACON in Houston or D10 TRACON in Dallas-Fort Worth. The lateral boundary of the SAT TRACON airspace is an irregularly shaped circular polygon, extending from SAT approximately 36 miles to the north, 35 miles to the east, 31 miles to the west, and 43 miles to the south. A portion of coverage to the southeast extends approximately 60 miles from SAT. Excluding airspace delegated to the ATCTs at SAT, BAZ, SKF, and RND, SAT TRACON controllers currently manage the airspace within these boundaries from the surface to 18,000' above mean sea level (MSL). Of the 23,849 square miles of the General Study Area, SAT TRACON laterally covers 5,889 square miles, or roughly 24.7% of the General Study Area.

SAT TRACON is generally the first or final radar facility responsible for separating and sequencing airborne aircraft landing at and departing from airports in its airspace. For example, aircraft arriving to SKF are handled by SAT TRACON, then handed over to Kelly Field ATCT until landing. Roughly 25% of all IFR and VFR itinerant operations handled by SAT TRACON are military operations.[12] This includes the initial sequencing of SAT departures, as well as providing safe and expeditious flows of traffic into and out of other area civilian and military airports which have control towers. SAT TRACON coordinates with SKF and RND military towers and provides air traffic control services to IFR-filed aircraft and, when requested or required, VFR aircraft. As with ZHU, SAT TRACON also provides these services to military aircraft that are operating in its airspace.

12 US Department of Transportation, Federal Aviation Administration, Aviation System Performance Metrics (ASPM) Operations Network (OPSNET) (https://aspm/faa.gov/opsnet/sys/opsnet-server-x.asp accessed for SAT TRACON 1/2021 to 6/2022. [Accessed Aug 17, 2022]).

Exhibit 1-4 TRACON and ARTCC Airspace in the General Study Area



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

Sources: FAA, National Airspace System Resource, ESRI, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, METI, NGCC, (c) OpenStreetMap contributors, and the GIS User Community, ESRI US Water Bodies, US Census Bureau, Incorporated Places, State Boundary. FAA Airspace Type Files, Study Airports, ATAC Study Area Boundary.
Prepared by: ATAC Corporation, July 2022.

1.5.2 Airspace Constraints

The following sections provide a general overview of the constraints related to controlling aircraft within the San Antonio Airspace Modernization Project area airspace.

1.5.2.1 Class C Airspace

Class C airspace is regulatory airspace, generally located around complex airspace at mid-sized airports including SAT. Class C generally extends 4,000 feet above an airport elevation, and for SAT, the Class C ceiling is 4,800 feet MSL. The rules for flying inside of Class C airspace are

more restrictive than for other types of terminal airspace and require ATC contact. These rules make for a safer and more orderly flow of traffic within Class C airspace. Class C airspace design has a direct impact on the flow of traffic within the San Antonio Airspace Modernization Project area.

1.5.2.2 Special Use Airspace

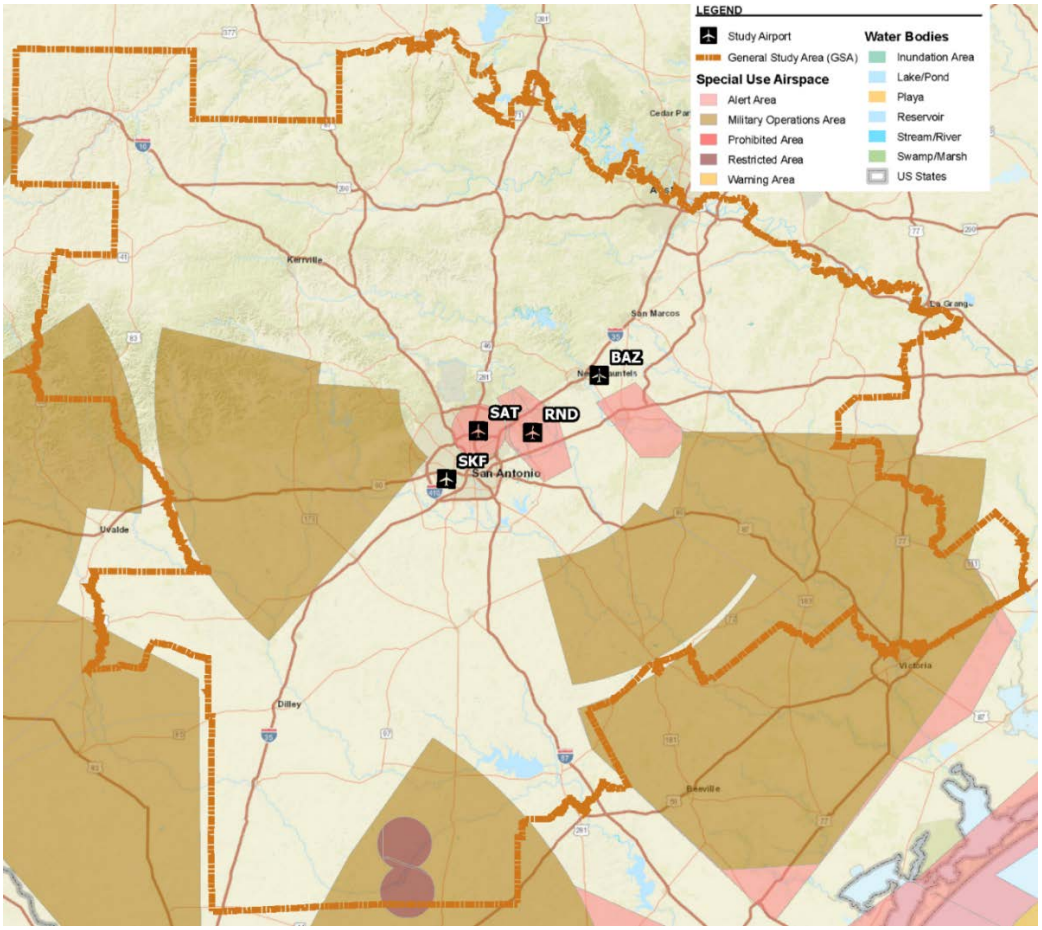
Exhibit 1-5 depicts the boundaries of Special Use Airspace (SUA) in the San Antonio Airspace Modernization Project, illustrating the limited available options for entering and exiting the San Antonio area airspace. SUA is airspace with defined vertical and lateral boundaries containing certain hazardous activities such as military flight training and air-to-ground military exercises that must be confined. SUA defined dimensions are identified by an area on the surface of the earth within which certain air traffic activities must be confined or where certain restrictions are imposed on aircraft operations that are not a part of those activities, or both. SUA is an important component of the NAS that allows for the safe use of the airspace by military and non-military air traffic. In addition to aviation activity, SUA can accommodate ground and combined arms training and testing. These areas either limit aircraft activity allowed within the airspace or restrict other aircraft from entering during specific days and/or times. For example, of the 23,849 square miles in the General Study Area, 7,509 square miles or roughly 31.5% is constrained by SUA of various types. Three types of SUA are found within the San Antonio Airspace Modernization Project:

- **Military Operations Area:** A Military Operations Area (MOA) is airspace established outside of Class A airspace to separate/segregate certain nonhazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted.[13] MOAs are established to contain certain military activities such as air combat maneuvers, air intercepts, aerobatics, etc.[14] The regional MOA airspace is referred to generally as the Randolph, Crystal, Laughlin, and Kingsville MOAs. These areas are further broken into maneuvering blocks such as the Randolph 1A MOA, the Kingsville 4 MOA, and the Crystal North MOA. MOAs have a defined floor and ceiling, with floors ranging from 6,000' MSL (Crystal and Crystal North) to 14,000' MSL (Randolph 2B). All MOAs extend to but do not include 18,000' MSL unless otherwise indicated in tabulation or on an FAA published chart. All MOAs have scheduled operation hours (e.g., Randolph 1A operates sunrise to sunset Monday-Friday) with alternate or modified times indicated by Department of Defense Notices to Air Missions (NOTAMs).[15]
- **Alert Area:** An alert area is depicted on an aeronautical chart to inform pilots of an area or areas that may contain a high volume of pilot training or an unusual type of aerial activity, neither of which is hazardous to aircraft. An Alert Areas is depicted on aeronautical charts for the information of non-participating pilots. For example, on the eastern boundary of the General Study Area, Alert Area A-632 D notes concentrated student jet training within the Kingsville 4 MOA from 6,000' MSL up to but not including 11,000' MSL sunrise to midnight Monday-Friday and 2pm-midnight Sundays as indicated by Department of Defense NOTAM.[16]

13 Class A airspace is generally that airspace from 18,000' MSL up to and including FL 600 over the 48 contiguous States and Alaska. While in Class A airspace pilots use "flight level" altitudes that rely on a common barometric pressure altitude reference of 29.92 inches of mercury. These "flight level" altitudes are not referenced to sea level or ground level as is the case below 18,000' MSL and outside of Class A airspace.
14 U.S. Department of Transportation, Federal Aviation Administration, FAA Order JO 7400.10D, *Special Use Airspace*, February 16, 2022.
15 U.S. Department of Transportation, Federal Aviation Administration, San Antonio Sectional Chart effective 0901Z 14 July 2022 to 0901Z 8 September 2022.
16 Id.

- **Restricted Area:** Restricted areas contain airspace within which aircraft, while not wholly prohibited, are subject to restrictions when the area is being used. The area denotes the existence of unusual, often invisible hazards to aircraft, such as artillery firing, aerial gunnery, or guided missiles. Entering a restricted area without authorization may be extremely hazardous to the aircraft and its occupants. When the area is not being used, control of the airspace is released to the FAA, and ATC may use the area for normal operations. For example, the Kingsville 3 MOA south of the San Antonio area contains Restricted Area R-6312, used for aircraft to ground live fire exercises and operates from sunrise to sunset via Department of Defense NOTAM. The R-6312 ceiling is FL230 to provide for military high altitude release bombing training.[17]

Exhibit 1-5 Special Use Airspace



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

Sources: FAA, National Airspace System Resource, Special Use Airspace, ESRI, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, METI, NGCC, (c) OpenStreetMap contributors, and the GIS User Community, ESRI US Water Bodies, US Census Bureau, Incorporated Places, State Boundary. FAA Code of Instrument Flight Procedures, Study Airports, ATAC Study Area Boundary.
Prepared by: ATAC Corporation, July 2022.

17 Id.

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