II. Purpose and Need

The FAA proposes to redesign the air traffic routes (specifically the standard instrument arrival and departure procedures and the supporting airspace management structure[1]) serving the EA Airports. This project is referred to as Las Vegas Area Optimization or LAS Optimization. The EA Airports are located in the Las Vegas area within the terminal airspace known as L30, which itself is located within the Los Angeles ARTCC en route area known as ZLA. (Refer to Section I for background discussion of these and other technical concepts discussed throughout this section.)

When the FAA undertakes a project, such as LAS Optimization, the purpose of the project is to address the specific problem(s) identified with the existing design of air traffic routes, which vary from project to project, while ensuring that the redesign will maintain and improve system safety, reduce controller and pilot workload, and increase system flexibility and predictability.

In the Las Vegas area, the existing standard instrument procedures and the supporting airspace management structure are inefficient and complex. The inefficiencies and complexities of the existing design of air traffic routes limit air traffic controllers' ability to manage air traffic in an expeditious or efficient manner. Through LAS Optimization, FAA intends to:

1. Redesign standard instrument arrival and departure procedures to more efficiently serve the EA Airports and to improve the predictability and repeatability of air traffic routes.
2. Redesign the supporting airspace management structure to support the efficient use of the optimized standard instrument procedures.

LAS Optimization, the Proposed Action addressed in this EA, would not increase the number of aircraft operations at the EA Airports, but would improve the efficiency and reduce the complexity of the air traffic routes serving the EA Airports. The FAA proposes to implement the LAS Optimization in 2012. For purposes of this EA, conditions in 2012 and 2017 (five years after implementation) are evaluated.

The FAA is preparing this EA to evaluate the potential environmental impacts of the Proposed Action. NEPA and FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, require that an EA include a description of the purpose of a proposed action and why it is needed. The identification of the purpose and need for a proposed action provides rationale and forms the foundation for the identification of reasonable alternatives that can meet the purpose, and therefore, address the need or problem.

This chapter presents:

- The Need for the Proposed Action,
- The Purpose of the Proposed Action, and
- The Proposed Action itself.

2.1 Need for the Proposed Action

In the context of an EA, need refers to the problem that the Proposed Action is intended to resolve. The problem that the Proposed Action should resolve is the inefficiency and complexity of air traffic routes in the L30 terminal airspace. This section first presents a discussion of the problem to demonstrate the inefficiency and complexity of the air traffic routes serving the EA Airports, and is

[1] The airspace management structure is the defined volumes of airspace assigned to ATC facilities and the sectors within the ATC facilities for purposes of managing aircraft flow.

followed by a discussion of the circumstances or causal factors that together serve as the basis for the problem that must be addressed.

2.1.1 Problem Formulation

Problem formulation is a process that involves identifying the problem, verifying that the problem exists or is about to occur, and exposing causal factors that, if addressed, may partially or entirely resolve the problem.

The concept of airfield and airspace throughput is introduced in Section 1.1.4, "National Airspace Efficiency." Maintaining predictable and sustained maximum throughput rates both on the airfield and in the airspace is critical to airport users such as airlines. Airport users may plan flight schedules based on the sustained maximum throughput for a frequently used runway operating configuration. If winds and/or weather, for example, cause air traffic controllers to change to a different runway operating configuration that has a lower throughput, the operation of the airport may be disrupted. Flights may be delayed, diverted, or cancelled. This condition prevents air traffic controllers from meeting their mission: to manage traffic in an efficient manner while maintaining a high level of safety.

According to a simulation analysis conducted at the initial stages of this project by the FAA's Federally Funded Research and Development Center, The MITRE Corporation's Center for Advanced Aviation System Development (MITRE-CAASD), the sustained maximum throughputs differ between Configurations 1 and 2, the two most frequently used runway operating configurations at LAS, representing about 89 percent of the operations. The simulated throughput analysis demonstrated that by optimizing the standard instrument arrival and departure procedures currently serving the EA Airports, the simulated throughputs of both configurations can be increased, and that the simulated throughput of Configuration 2 can be increased so that the simulated throughputs of Configurations 1 and 2 are more closely balanced.[2] This analysis indicates that optimizing the standard instrument arrival and departure procedures, without improvements to the LAS runway system, would help maintain predictable and sustained throughput rates.[3] In other words, the airspace, rather than the airfield, is the factor limiting the predictable throughput at the EA Airports.

2.1.2 Causal Factors

In order to address a problem, the circumstances or causal factors that together serve as the basis for the problem must be addressed. The inefficiencies and complexities of the existing standard instrument arrival and departure procedures within the L30 terminal airspace are considered by the FAA to be the primary factors causing the problem. The need for the Proposed Action can be better understood and addressed based on the specific factors causing the inefficiencies and complexities, or the causal factors. Addressing the causal factors that lead to the problem will ultimately facilitate development of a reasonable alternative designed to resolve the problem. The primary factors

[2] The simulated throughput analysis identified the following throughput rates: (1) under a future no action scenario: 68 arrivals/hour and 67 departures/hour for Configuration 1 and 48 arrivals/hour and 58 departures/hour for Configuration 2, and (2) under future LAS Optimization scenario: same arrival and departure throughput for Configuration 1 as the future no action scenario and 65 arrivals/hour and 63 departures per hour for Configuration 2. In other words, with LAS Optimization, the arrival and departure throughput of Configurations 1 and 2 are more balanced than under the No Action Alternative.

[3] The MITRE Corporation's Center for Advanced Aviation System Development, *Airspace Analysis of the SNSA Airspace Design Alternatives*, MITRE Technical Report, MTR090390, October 2009, Section 5.5.

identified by the FAA from the initial analysis conducted by MITRE-CAASD,[4] which individually and cumulatively create inefficiencies and complex operations in the terminal airspace, include:

- Procedures lack the flexibility to efficiently transfer aircraft between the en route airspace and the terminal airspace.
- Aircraft departing from and landing at the three EA Airports share entry and exit points and arrival/departure routes that limit air traffic controller flexibility to manage EA Airport traffic.
- Complex converging interactions between arriving and departing flights that impede efficiency in the terminal airspace.
- Current standard instrument procedures do not take full advantage of RNAV capabilities that can provide more predictable and repeatable flight routing.
- Lack of published standard instrument procedures to direct aircraft to and from the EA Airport runways increases complexity.

The five factors listed above are described in the following sections. In addition to the causal factors, an existing physical condition of the Las Vegas area airspace contributes to the complexity of air traffic routes in the terminal airspace—the terminal airspace area available to accommodate arriving and departing aircraft operating at the EA Airports is limited by mountainous terrain, man-made obstructions, and Special Use Airspace (see Exhibits I-2 and I-3). These physical constraints limit the total area within which FAA has available to accommodate air traffic routes and are a contributing condition to the complexities associated with the five causal factors. While these factors cannot be changed, improvements in navigation capabilities, as described in Section 1.1.3, allow more efficient air traffic routes to be defined than could be defined using earlier technologies.

2.1.2.1 Procedures Lack the Flexibility to Efficiently Transfer Aircraft between the En Route and the Terminal Airspace

The current number of terminal airspace entry and exit points is insufficient, and their distribution along the boundary between the L30 terminal airspace and the ZLA airspace is not balanced with the distribution of air traffic to destinations served by the exit points and from origins served by the entry points.

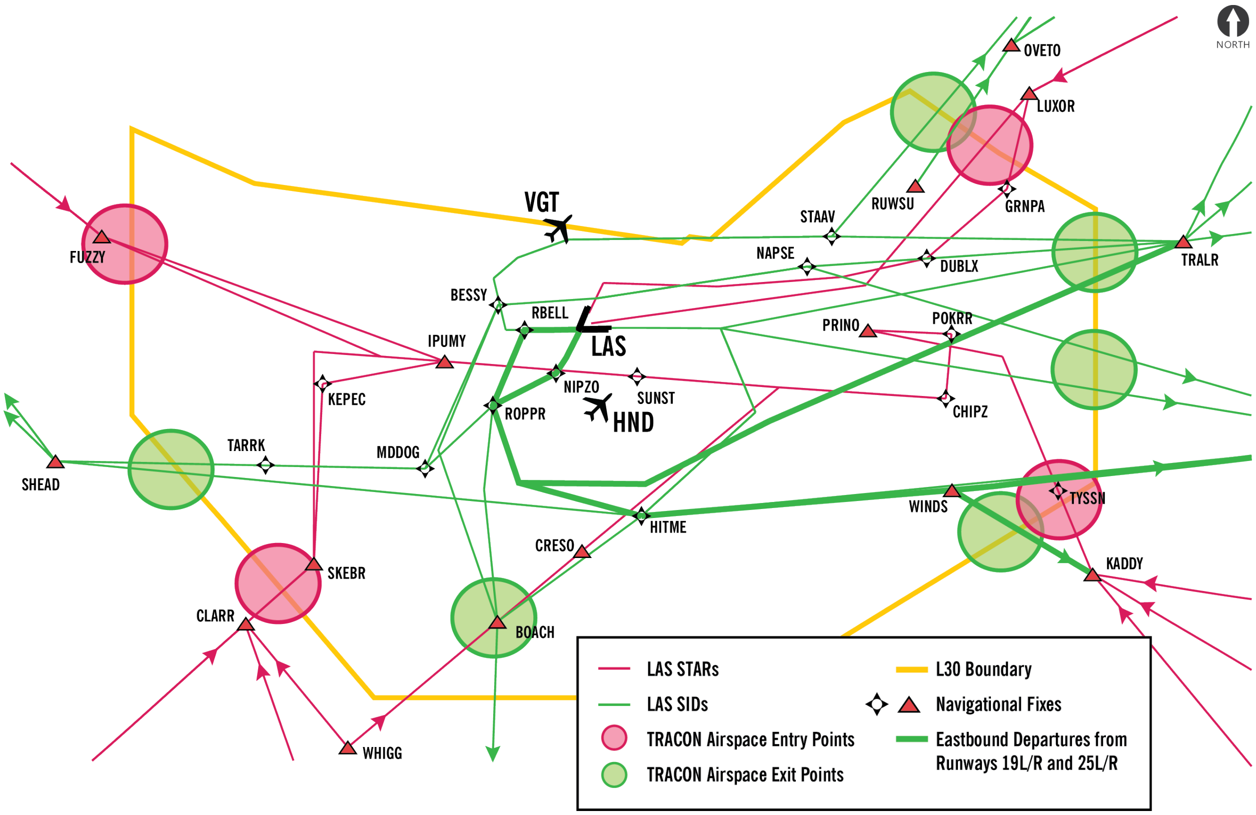
Entry Points

Exhibit II-1 depicts both entry and exit points to/from the L30 terminal airspace. The four entry points are shared by aircraft arriving at all three of the EA Airports—one each in the northeast, southeast, southwest, and northwest segments of the terminal airspace. The limited number of entry points results in two challenges that affect the efficient management of aircraft.

[4] The MITRE Corporation's Center for Advanced Aviation System Development, *Airspace Analysis of the SNSA Airspace Design Alternatives*, MITRE Technical Report, MTR090390, Section 4, "Problem Identification," October 2009.

Exhibit II-1

Terminal Airspace Entry and Exit Points



Notes:

VGT North Las Vegas Airport
LAS McCarran International Airport
HND Henderson Executive Airport
1/ The heavy green line indicating the eastbound departures from LAS Runways 19L/R and 25L/R illustrate the merging of two departure streams into a single departure stream at the ROPPR navigational fix (southwest of LAS), before being routed to the east. This merging example is referenced in the exit points discussion.

Source: The MITRE Corporation's Center for Advanced Aviation System Development, *Airspace Analysis of the SNSA Airspace Design Alternatives*, MTR090390, October 2009, p. 4-6.
Prepared by: Ricondo & Associates, Inc., March 2010.

First, given the geographic location of Las Vegas, the greatest proportion of aircraft enter the terminal airspace from the northeast and southeast, with approximately 30 percent of the traffic passing through each of these two entry points, or 60 percent of all aircraft entering the airspace.[5] As a result, airspace congestion occurs during periods of high demand for these two entry points. The resulting congestion requires the issuance of air traffic instructions such as vectoring, controlling speed, holding aircraft, leveling off aircraft, or rerouting aircraft to other entry points, which, as described in Section 1.1.2.3, increase pilot and controller workload, increase complexity for both controllers and pilots, and can result in delays.

Second, aircraft entering the terminal airspace from different en route streams must be merged into a single arrival stream at an entry point, which can result in congestion. Controllers must maintain both longitudinal and vertical separations between aircraft. Therefore, as controllers sequence

5 The MITRE Corporation's Center for Advanced Aviation System Development, *Airspace Analysis of the SNSA Airspace Design Alternatives*, MITRE Technical Report, MTR090390, October 2009, p. 5-7.

aircraft into an arrival stream, in order to maintain adequate separations they may have to issue instructions such as directing a pilot to take any of the following actions:

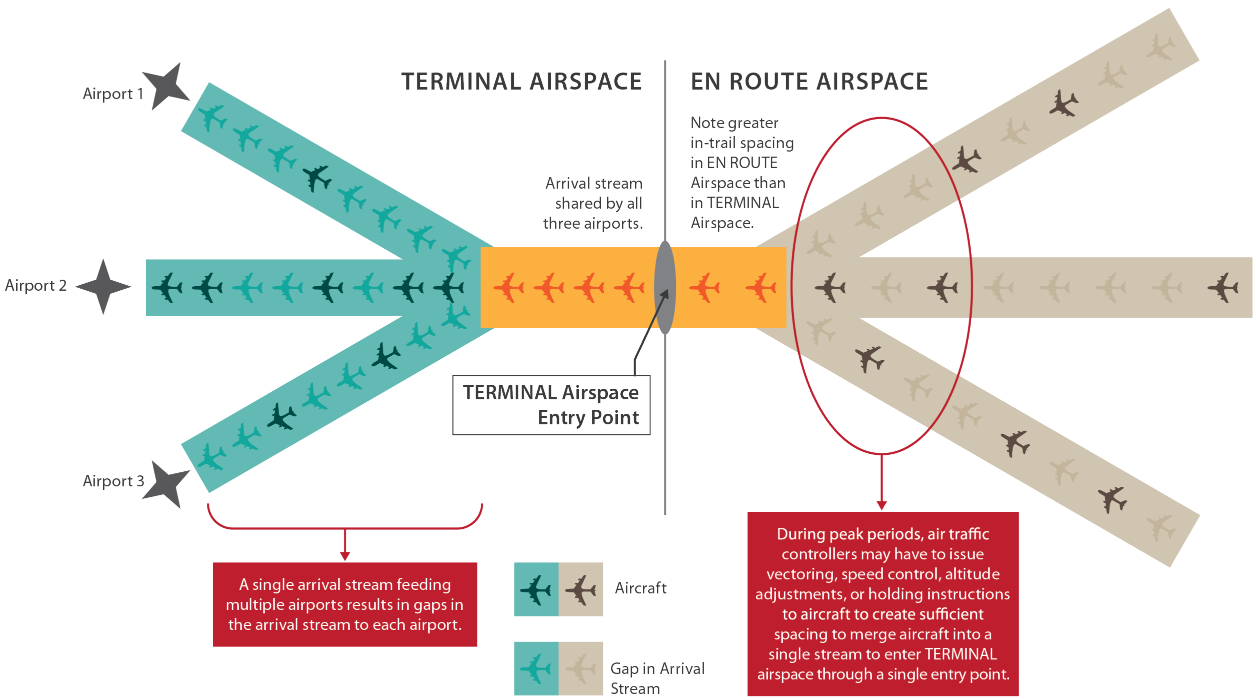
- Follow a series of vectors that reroute the aircraft until it can be sequenced into the arrival stream;
- Reduce speed to enable the aircraft to be sequenced into the arrival stream; or
- Enter into a holding pattern until the aircraft can be sequenced into the arrival stream.

Any of these actions can result in the slowing of air traffic, congestion on the arrival stream, and an increase in workload for both the controller and pilot.

Exhibit II-2 illustrates how aircraft arrivals are merged into a single stream and separated longitudinally in the en route airspace to enter a single entry point to the terminal airspace, as well as the potential effects of having to merge aircraft into a single stream.

Exhibit II-2

Illustration of Single Terminal Airspace Entry Point and Single Arrival Stream with Traffic Separated Longitudinally to Multiple Airports



Source: Ricondo & Associates, Inc., March 2010.
Prepared by: Ricondo & Associates, Inc., March 2010.

Exit Points

The EA Airports are served by six exit points, as depicted on Exhibit II-1. During peak periods of departures to the east and southeast, controllers must merge departures from the EA Airports to route aircraft into single departure streams to pass through the exit points. Merging departing aircraft into departure streams can lead to delays because controllers must either hold departing aircraft on the ground before takeoff, which directly affects departure throughput at the EA Airports; or assign vectors and level-offs to aircraft during their departure climbs to provide adequate separation between aircraft as they are gradually merged into the departure stream. The need to merge aircraft into departure streams increases the complexity of managing the terminal airspace. Vectoring can also increase flight distances and reduce predictability, as aircraft must be assigned to less direct routes due to congestion along the preferred flight route.

One example of the problem caused by the limited number of exit points involves departures to the east and southeast. As depicted by the green circles on Exhibit II-1, the current four exit points serving routes to the northeast, east, and southeast of the Las Vegas area are located along the northeastern and eastern edges of the L30 terminal airspace-ZLA en route airspace boundary. All eastbound and southeastern-bound departures that takeoff on LAS Runways 19L/R and 25L/R (indicated by the heavy green line on Exhibit II-1), must be merged into a single departure stream at the ROPPR navigational fix (southwest of LAS) and routed to the east rather than having a separate route for southeastern-bound departures exiting the L30 terminal airspace along the southeastern portion of the L30 terminal airspace-ZLA en route airspace boundary. Merging these departure streams to exit the L30 terminal airspace increases the complexity of managing the terminal airspace and results in inefficiencies, especially during peak periods for departures to the east and southeast.

2.1.2.2 Aircraft Arriving at and Departing from EA Airports Share Entry and Exit Points and Arrival/Departure Routes

In addition to the causal factor related to entry and exit points discussed in Section 2.1.2.1 (the inefficient transfer of aircraft between the terminal and en route airspace), the limited number of terminal airspace entry and exit points also results in gaps in the arrival and departure flows to and from the EA Airports within the L30 terminal airspace, as discussed below.

Aircraft destined for each of the three EA Airports share standard instrument arrival procedures that enter the terminal airspace on single arrival streams through each of the four entry points. When aircraft are then split from a single arrival stream and issued instructions to the final approaches to the various runways, gaps in the flow to the individual EA Airports result.

Exhibit II-2 illustrates how aircraft arrivals are merged into a single stream and separated longitudinally in the en route airspace to access an entry point, as discussed in Section 2.1.2.1. The exhibit also depicts how gaps develop in the arrival stream to each airport (representative of the three EA Airports) after aircraft in the single arrival stream are separated and directed to the final approaches to the respective airport runways. To some degree, the gaps can be closed if controllers direct the following aircraft to increase speed along the arrival route to the airport. 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. The need to share arrival entry points among aircraft landing at the EA Airports results in gaps in the individual arrival streams at each of the three EA Airports, preventing the achievement of a constant flow of aircraft to the EA Airport runways.

A similar situation applies to standard instrument departure procedures as flights depart through the six terminal airspace exit points. Departures from each EA Airport and/or runway assigned to the same exit point must be merged into a single flow at designated locations within the terminal airspace prior to moving into the en route airspace at the assigned exit point. During peak departure periods, controllers may need to hold aircraft on the ground to ensure that departures are spaced at intervals adequate to merge the aircraft from the different EA Airports or runways into a single departure stream while maintaining required longitudinal separation requirements. Holding aircraft to create the necessary gaps leads to departure delays at each of the EA Airports during peak departure activity periods.

The consequences of instrument arrivals and departures to and from all EA Airports sharing common standard instrument procedures and terminal airspace entry and exit points include the following:

- The need to merge instrument arrivals into a single arrival stream at each terminal airspace entry point can create delays, decrease throughput, and increase flight distances.
- Gaps in the final arrival flows to the EA Airports prevent the achievement of a constant flow of aircraft to the EA Airport runways, thus preventing the full use of the potential arrival throughput at the EA Airports.
- The need to merge aircraft from all EA Airports into single departure streams for each terminal airspace exit point requires controllers to create greater separations between subsequent departures from a runway than would otherwise be required if there were a dedicated departure stream for that runway. Holding aircraft to create the necessary gaps leads to departure delays at all EA Airports during peak activity periods, preventing full utilization of the potential departure throughput of the Airports.
- The need for controller-to-pilot communication to issue the variety of instructions required to manage the flow of aircraft adds to the workload of both controllers and pilots.

2.1.2.3 Current Procedures Do Not Take Full Advantage of RNAV Capabilities

As of February 2012, eight RNAV STARs were published for the EA Airports—four for LAS and four for HND (refer to Section 1.1.3 for a discussion of RNAV and Section 1.2 for STARs serving the EA Airports). Many of the current standard instrument procedures, including the LAS RNAV STARs were initially developed as part of the Four Corner-Post Plan airspace redesign in 2000. As part of that airspace redesign, it was necessary to develop conventional STAR procedures and then develop RNAV STAR procedures that mimicked the conventional procedure routing so all aircraft could follow the same route. Therefore, the RNAV procedures that were designed did not take full advantage of RNAV design capabilities. The design of conventional procedures is dependent on the location of ground-based navigational aids, which limits where procedures can be established. As a result, the overall benefit that could have been gained for RNAV-equipped aircraft has not been fully realized.

Since the implementation of the Four Corner-Post Plan, RNAV procedure design criteria and guidance have been updated and enhanced based on experience with designing and implementing RNAV procedures (in other words, learning what works and what does not). Furthermore, over 95 percent of all IFR-capable aircraft operating at LAS were RNAV-equipped as of the end of 2009.[6] Considering the refined design criteria and guidance (e.g., required distance between waypoints, obstruction clearance requirements, turn angles, or speed requirements), and an increase in the percentage of RNAV-equipped aircraft operating at LAS from 75 percent in 2001 to over 95 percent by the end of 2009, the existing procedures do not take full advantage of RNAV capabilities, especially the ability to use the technology to reduce the complexity of the terminal airspace system and allow for more efficient movement of aircraft.

Existing procedures serving LAS do not take full advantage of current RNAV design criteria. As a result of maintaining the current conventional procedures and the RNAV procedures that mimic the conventional procedures, airspace throughput is limited due to the existing complexity caused by controller workload, controller-to-pilot communication requirements, and lack of flight route predictability.

[6] The MITRE Corporation's Center for Advanced Aviation System Development, *Performance Based Navigation Capability Report 2010,* p. 57.

2.1.2.4 Lack of Published Procedures to and from Airport Runways

Airports such as LAS are typically operated under different runway operating configurations (as discussed in Section 1.1.4) based on factors such as weather, prevailing wind, and the type and amount of air traffic. At an airport with a high level of air traffic, especially during peak periods, the availability of standard instrument arrival and departure procedures for each runway used in the various runway operating configurations contributes to the efficiency of operations when each of the configurations is in use. Standard instrument arrival and departure procedures enhance efficiency by minimizing the need for controller-to-pilot communication, providing flexibility to redirect aircraft to a secondary runway during peak demand, and making multiple route options available to minimize the need for holding aircraft or use of other airspace management tools to meet aircraft separation requirements. Standard instrument arrival procedures also make it easier for controllers to monitor the flow of traffic to the runways and to maintain a constant and predictable flow of aircraft to the runways.

Of the four RNAV STARs for LAS, only three include runway transitions to the final approach to a runway end. Furthermore, these three RNAV STARS only serve Runways 25L and 25R. As discussed in Section 1.1.2.2, the inclusion of runway transitions in the RNAV STARs reduces pilot and controller workload by increasing flight route predictability and reducing the need for controller-to-pilot communication to issue vectoring instructions. After issuing instructions to follow an RNAV STAR that contains a runway transition, the air traffic controller knows how the aircraft will maneuver to the final approach. Thus, there is no need for further controller-to-pilot communication unless an unusual circumstance arises, such as the need to call out the proximity of other traffic.

For runways at LAS other than Runways 25L and 25R, the STARs stipulate that pilots are to expect vectoring by air traffic controllers to direct the aircraft to a point at which the pilot can start the final approach to those runways.[7] The lack of full guidance (from the en route airspace to the final approach) to Runways 1L, 1R, 19L, 19R, 7L, and 7R is attributable to the constrained terminal airspace, limitations on RNAV guidance available at the time of the last airspace redesign, and the need for RNAV procedures to mimic the conventional procedures.[8] The lack of STARs with runway transitions to the final approaches to all runways limits the runway throughput rates at LAS when runway operating configurations in use require arrivals on runways other than Runways 25L and 25R. The problem is demonstrated by an arrival rate of 48 operations per hour when LAS operates in Configuration 2 with arrivals on Runways 1L and 1R, compared with an arrival rate of 60 operations per hour in Configuration 1, which includes arrivals on Runways 25L and 25R (as well as Runways 19L and 19R).[9]

2.1.2.5 Complex Converging Interactions between Arriving and Departing Flights

In some areas, the separation between arrival and departure flight routes (e.g., lateral separation between two routes or vertical separation between crossing routes) is not sufficient for the airspace to be used efficiently, which requires controllers to carefully observe aircraft activity along the

7 AirNav.com, See terminal procedures plates for CLARR TWO, CRESO THREE, FUZZY SEVEN, GRNPA ONE, KADDY ONE, KEPEC TWO, LUXOR TWO, SUNST TWO, and TYSSN TWO Arrivals, [http://www.airnav.com/airport/KLAS, accessed March 30, 2010].

8 The MITRE Corporation's Center for Advanced Aviation System Development, *Airspace Analysis of the SNSA Airspace Design Alternatives*, MITRE Technical Report, MTR090390, October 2009, p. 4-2.

9 In Operating Configuration 1, arrivals are on Runways 25L and 25R. Runways 19L and 19R are available as secondary arrival runways. See The MITRE Corporation's Center for Advanced Aviation System Development, *Airspace Analysis of the SNSA Airspace Design Alternatives*, MITRE Technical Report, MTR090390, October 2009, p. 4-2.

proximate or crossing flight routes and to be prepared to actively manage aircraft to maintain safe separations. (Areas where the lateral or vertical separations are not adequate to allow efficient use of the airspace are referred to as "confliction points" in air traffic control phraseology.) 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 other cases, arriving and departing aircraft on nearby flight routes may need to be vectored to ensure safe lateral separation. In yet other cases, controllers may need to alert pilots or another controller responsible for a neighboring airspace sector of the proximity of other aircraft (point-outs). Any of the actions described above requires verbal communication between controllers or between controllers and pilots, increasing pilot and controller workload and therefore increasing the complexity of the system. In addition, vectoring and level-offs reduce the efficiency of airspace and the efficiency of flight. The longer flight routes caused by vectoring and the interrupted climbs and descents add distance and time to flights and may also delay the exit of aircraft from the terminal airspace.

Particular problems are caused by the proximity of the exit and entry points at the northeast and southeast quadrants of terminal airspace, depicted on Exhibit II-1. At certain times, aircraft departing to the southeast or northeast are required to level off during climb-out to maintain vertical separation from aircraft arriving from the southeast or northeast.

2.2 Purpose of the Proposed Action

The purpose of the Proposed Action is to address the problems discussed in the previous section. The Proposed Action would allow the FAA to improve the efficiency of the procedures within the terminal airspace serving the EA Airports and to reduce the complexity of the procedures while maintaining a safe airspace system.

In Section 2.1.2 the factors that the FAA identified to be individually and cumulatively the causes of the problem were described. Therefore, the objectives, or the purpose, of the Proposed Action involve addressing the causal factors. If the objectives are reasonably achieved, the efficiency of the air traffic routes serving the EA Airports would improve and the complexity of managing air traffic flow through the terminal airspace would decrease. The objectives include the following:

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

Controller workload and controller-to-pilot communication would be expected to decrease, which would decrease airspace complexity. With reduced airspace complexity, the efficiency of the air traffic routes would improve and overall delay would decrease. The objectives defined in this section are intended to meet the goal of addressing the inefficiencies and complexities of the existing procedures and supporting airspace management structure; furthermore, the Proposed Action must also meet the FAA's goal to maintain or improve the safety of the navigable airspace. Therefore, the redesign of air traffic routes will be done in accordance with FAA's responsibility under the 49 U.S.C. 40101, *et seq.,* to manage the use of the nation's navigable airspace in the interest of safety.

Each objective of the Proposed Action is discussed in greater detail below. In Section III, the alternatives identified as having the potential to meet the Purpose and Need will be evaluated to determine how well they would achieve the purpose of the Proposed Action; therefore, the following discussion of each objective also includes criteria that may be applied to the determination. The evaluation of alternatives will include the No Action Alternative, under which the existing (2009) air traffic routes serving the EA Airports would be maintained, along with approved procedure modifications already planned and approved for implementation (as described in Chapter 4, Affected Environment, Section 4.4, Table IV-14, Regional Airspace Projects category). Thus, the criteria are intended to compare any action alternative with the No Action Alternative, or the conditions of not implementing a project.

2.2.1 Improve Flexibility in Transitioning Aircraft

As discussed in Sections 2.1.2.1 and 2.1.2.2, the limited number of entry and exit points and the associated procedures that require aircraft in multiple streams to be merged into a single stream to pass through an entry or exit point are constraints that limit the efficiency of the air traffic routes in the L30 airspace.

This objective can be measured for the Proposed Action and the alternatives with the following criteria:

- Where possible, increase the number of entry and exit points compared with the No Action Alternative.
- Segregate LAS traffic from VGT and HDN traffic via entry and exit points.

Providing additional entry and exit points and segregating LAS traffic from VGT and HND traffic would be expected to improve the throughput of the L30 terminal airspace.

2.2.2 Improve the Predictability of Air Traffic Flow

As discussed in Section 2.1.2.3, current RNAV procedures do not take full advantage of RNAV capabilities. The current RNAV criteria and guidance allow for additional capabilities (such as speed control and altitude restrictions built specifically into the RNAV procedure) that can be designed into a procedure. The additional capabilities, which reduce pilot workload and the need for controller-to-pilot communication, provide a more predictable and repeatable flight route than is possible in most conventional procedure designs. Section 2.1.2.4 describes the effects of the limited number of procedures that include runway transitions to and from the runways at each of the EA Airports. Additional runway transitions to and from each runway would provide air traffic controllers more flexibility to balance demand, maintain runway departure separations, and segregate procedures without the need for controller intervention.

This objective can be measured for the Proposed Action and the alternatives with the following criteria:

- Ensure that the majority of STARs and SIDs to and from the EA Airports are based on RNAV technology.
- Increase the number of entry/exit point and runway end combinations served by runway transitions in the RNAV STARs and SIDs in comparison to the No Action Alternative.

RNAV procedures with runway transitions provide for a predictable flow of air traffic through the airspace and require less controller-to-controller and controller-to-pilot communications to manage air traffic flows through the airspace.

2.2.3 Segregate Arrivals and Departures

As discussed in Section 2.1.2.5, in some portions of the terminal airspace, arrival and departure flight routes cross, converge, or are within proximity of each other, requiring controllers to actively manage the traffic to ensure that safe separations between aircraft are maintained. One objective of the

Proposed Action is to implement procedures that would achieve better segregation of arrivals and departures within the terminal airspace.

This objective can be measured for the Proposed Action and alternatives with the following criterion:

- Where possible, increase the number of RNAV STARs and SIDs compared with the No Action Alternative.

RNAV procedures provide for predictable lateral and vertical guidance (including providing for unrestricted climb-outs) and separation of flows and, therefore, would require less controller-to-controller and controller-to-pilot communications to manage flows that cross, converge, or are within proximity to each other.

2.3 Proposed Action

The Proposed Action considered in this EA is the implementation of optimized standard arrival and departure instrument procedures serving air traffic flows into and out of the EA Airports as well as optimization of the supporting airspace management structure. A detailed description of the Proposed Action is provided in Section III, *Alternatives*. The primary components of the Proposed Action include:

- To the extent possible, add terminal airspace entry points and independent LAS RNAV STARs that are separated from VGT and HND RNAV STARs, and include runway transitions to final approaches to runway ends at the EA Airports in the RNAV STARs.
- To the extent possible, add terminal airspace exit points and independent LAS RNAV SIDs that are separated from VGT and HND RNAV SIDs, with new RNAV SIDs providing adequate segregation between arrival and departure procedures and including runway transitions from the EA Airport runway ends to the exit points.

LAS Optimization, the Proposed Action addressed in this EA, would not increase the number of aircraft operations at the EA Airports, but would improve the efficiency and reduce the complexity of the air traffic routes serving the EA Airports. The Proposed Action does not involve physical construction of any facilities, such as additional runways or taxiways, and does not require any state or local actions. The implementation of Las Vegas Area Optimization would not require physical alterations to any environmental resource identified in FAA Order 1050.1E or changes to any Airport Layout Plan (ALP), the scaled drawings of airports that depict existing and future facilities and property necessary for the operation and development.

2.4 Required Federal Actions to Implement Proposed Action

Implementation of the Proposed Action requires the following actions to be taken by the FAA:

- Complying with FAA standard instrument procedure development and implementation process, including training, flight checks, and publication of new or revised STARs and SIDs.
- Revision of the standard operating procedures of the en route and terminal airspace ATC facilities (ZLA and L30, respectively).
- Promulgation and execution of new letters of agreement between ARTCC and TRACON ATC facilities.
- Promulgation and execution of new letters of agreement between each EA Airport, ATCT, and the TRACON (L30).

All proposed standard instrument procedure changes must go through the FAA's Safety Management System (SMS) process, which provides a systematic and integrated method for managing safety of air traffic control and navigation services in the NAS. Through the SMS process, the FAA must verify that the changes proposed to airspace, flight procedures, and air traffic control procedures would maintain and improve the safety of the air traffic system.

2.5 Agency Coordination, Agency Consultation, and Public Review

Appendix A provides information on the agency coordination, agency consultation, and public review efforts conducted in support of this EA. This section summarizes the agency and public coordination efforts.

The FAA distributed an early notification letter to 109 federal, state, and local agencies and elected officials as well as to 21 Tribes on December 18, 2009. FAA sent the early notification letter in order to:

- Advise of the initiation of the EA;
- Request any background information regarding study areas established for the EA; and
- Gain an understanding of any issues, concerns or policies, or regulations that agencies may have regarding the environmental analysis for the EA.

The FAA conducted three agency coordination meetings with agencies, elected officials, and tribes on January 25, 2012 (one meeting), and January 26, 2012 (two meetings). The purpose of the tribal meetings was to conduct government-to-government consultation. The FAA also conducted three follow-on regional tribal meetings on May 1–3, 2012, to increase accessibility for tribal representatives, as requested by those representatives attending the January 25, 2012 meeting. The purpose of the regional tribal meetings was to provide additional opportunities to meet with the FAA representatives to discuss project details and obtain input on tribal concerns and how to effectively address them.

In accordance with Section 106 of the National Historic Preservation Act of 1966 and implementing regulations of 36 CFR Part 800, FAA initiated consultation with the Nevada State Historic Preservation Officer. The Nevada State Historic Preservation Officer concurred with the FAA's determinations and findings related to historic resources documented in this EA.

The Draft EA was made available to agencies, tribes, elected officials, and the public for review and comment from July 1, 2012 through August 6, 2012. (See **Appendix B** for lists of the parties that received copies of the Draft EA.) The FAA also conducted two public workshops on July 23, 2012 and July 24, 2012. During the comment period, the FAA received comments from four agencies, one tribe, and one member of the public. The comments and FAA's response to comments are provided in Appendix A. One of the six comments resulted in clarifications to the information presented in the EA—the discussion of existing (as of May 2009) air quality conditions in Section 4.3.8.

Additional changes reflected in the Final EA following the review period for the Draft EA include:

- FAA made changes to certain sections of the EA to provide clarification and to reorganize some of the information. These changes do not represent significant new information. A summary of the changes made by FAA for the Final EA is provided in Appendix A.
- Following release of the Draft EA to the public, several changes were made to FAA's modeling software that affect aircraft fuel burn calculations and results that are presented in the discussions of natural resources and energy supply in Sections 4.3.7 and 5.7 as well as the air quality and climate discussions related to aircraft fuel burn results, as discussed in Sections 4.3.8, 4.3.9, 5.8, and 5.9. The absolute values of reported aircraft fuel burn presented in the Final EA are lower than the values presented in the Draft EA, and the relative changes between scenarios that were compared to evaluate the potential for significant impacts is consistent with the findings presented in the Draft EA. Therefore, the conclusions of the energy supply, air quality, and climate assessments presented in the Draft EA are unchanged in the Final EA. A more detailed discussion of this change is provided in Appendix A.

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