2 Purpose and Need

Under NEPA, an Environmental Assessment (EA) must describe the purpose and need for the Proposed Action. The following sections discuss the need for the Proposed Action and provide specific examples of the problems in the Cleveland-Detroit Metroplex. Following this discussion is a description of the purpose for the Proposed Action, the criteria that the FAA will use to evaluate the project alternatives, and the requested federal actions needed to complete the CLE-DTW Metroplex Project.

2.1 The Need for the Proposed Action

In the context of an EA, "need" refers to the problem that the Proposed Action intends to resolve. The problem in this case is the inefficiency of the existing aircraft flight procedures in the Cleveland-Detroit Metroplex. This is due to the use of older NAVAID technology when newer RNAV technology is readily available. As described in Chapter 1, more than 90 percent of U.S. scheduled air carriers are equipped for some level of RNAV. However, under existing conditions,[16] only one of the 31 procedures used in the Cleveland-Detroit Metroplex is an RNAV procedure.

Conventional procedures lack efficiencies inherent in RNAV-based design. This is because they rely on technology that cannot provide specific and precise navigational benefits for aircraft, including predetermined speeds or altitudes. Furthermore, as discussed in Section 1.2.5.1, conventional procedures are subject to lateral and vertical flight path limitations eliminated through use of RNAV technology. RNAV procedures can reduce the need for controllers to employ vectoring and speed adjustments, thus reducing controller and pilot workload. In turn, this adds efficiency to an air traffic system by enhancing predictability, flexibility, and route segregation. By taking advantage of the increased benefits associated with RNAV technology, the FAA is better able to meet 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.[17]

The following sections describe in greater detail the problem and the factors that have caused the problem. The technical terms and concepts used in this chapter are explained in Chapter 1, *Background*.

2.1.1 Description of the Problem

As previously stated, the Cleveland-Detroit Metroplex airspace can be improved to increase efficiency. Under existing conditions, 30 of the 31 current procedures are conventional procedures, which are less efficient than RNAV procedures. Efficiency decreases and procedural complexity increases in the Cleveland-Detroit Metroplex when ATC is required to use aircraft management tools and coordination techniques to provide separation services. These services can include speed control, level flight segments, and vectoring.

In many situations, applying these tools and techniques increases the complexity of providing air traffic services and leads to less efficient aircraft operations and use of airspace. Aircraft

[16] For purposes of this Environmental Assessment, "existing conditions" pertains to conditions for the period of December 1, 2015 – November 30, 2016 (the most recent year of radar data available). Existing conditions are further discussed in Chapter 4, *Affected Environment*.

[17] 49 U.S.C. § 40103(b).

management tools and coordination techniques are further discussed in Section 1.2.2, *Air Traffic Control within the National Airspace System*.

As described in Section 1.2.5.1, conventional procedures, compared to RNAV procedures, require larger areas of clearance to ensure accurate signal reception. As a result, conventional procedures typically require more airspace, are less efficient, and may result in increased controller and pilot workload due to the level of accuracy of the procedures. For example, it may be necessary for aircraft to fly an extended common route prior to diverging on their separate courses to their assigned exit fixes. To ensure appropriate separation between aircraft along the common route, controllers may employ airspace management tools, such as issuing speed control and/or vectors. This may result in more frequent controller/pilot and controller/controller communication. This increased communication may result in less predictable flight paths, due to the time needed for a controller to issue an instruction to a pilot and for a pilot to confirm the instruction prior to executing it. As a result, even more airspace must be protected to allow aircraft the room to operate. This reduces flexibility by limiting the airspace in which air traffic services can be provided to aircraft and results in less efficient operations.

For example, there are no RNAV Standard Instrument Departure (SID) procedures within the Detroit portion of the General Study Area and only one RNAV SID (ALPHE SID) serving three airports in the Cleveland portion of the General Study Area. Current radar vector and conventional arrival and departure procedures at the satellite airports result in a mix of traffic to/from different destinations operating on the same procedure. This results in excessive vectoring, speed control and limitation issues, in-trail spacing issues, and excessive level-offs as aircraft are climbing or departing Metroplex airspace. While these issues occur on a limited basis in the Cleveland area, aircraft arriving to or departing from DTW or the outlying satellite Study Airports experience these issues frequently.

Similar issues exist with the Standard Terminal Arrival Route (STAR) procedures. Current conventional procedures are less efficient and reduce flexibility for controllers providing air traffic services. As a result, controllers must issue vectors or require aircraft to level-off more frequently to maintain required separation between aircraft. This results in prolonged flight times, as well as increased workload for controllers and pilots as communication must be maintained between controllers and pilots as long as the aircraft is operating on the procedure. Combined, these factors form the basis for the problem within the Cleveland-Detroit Metroplex.

It is important to note that a key design constraint is safety. Any proposed change to a procedure to resolve a problem must not compromise safety, and if possible must enhance it. 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 SID and STAR procedures are the primary foundation for the problem in the Cleveland-Detroit Metroplex. A problem (or need) is best addressed by examining the circumstances or factors that cause it. Addressing the causal factors behind the problem will help develop a reasonable alternative designed to resolve the problem (i.e., meet the “purpose”).

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

- Lack of flexibility in the efficient transfer of traffic between the enroute and terminal area airspace
- Complex converging and dependent route procedure interactions
- Lack of predictability in the efficient transfer of traffic between enroute and terminal area airspace

These three causal factors are discussed in the following sections.

2.1.2.1 Lack of Flexibility in the Efficient Transfer of Traffic between the Enroute and Terminal Area Airspace

Lack of procedural flexibility limits air traffic controllers' ability to adapt to often-changing traffic demands. For example, constraints associated with SUA, delays in other regions, or severe weather along an air traffic route may cause aircraft to enter or exit the enroute or terminal area airspace at times and locations other than those previously planned. Controllers require options to manage traffic when faced with these kinds of demands. Additional enroute transitions can reduce the need for the vectoring needed to maintain separation between aircraft. Additional transitions can also provide additional options to better balance traffic and controller workload. Transitions are further discussed in Section 1.2.4.1.

Less efficient procedures, with fixes based on ground-based navigational aids (NAVAIDs), may only allow for a limited number of transitions. This can result in some transitions experiencing heavy traffic and congestion while others may go unused. Some existing conventional transitions go unused because they are excessively long and result in inefficient lateral paths for aircraft travelling on them. Other transitions go unused because they conflict with other procedures.

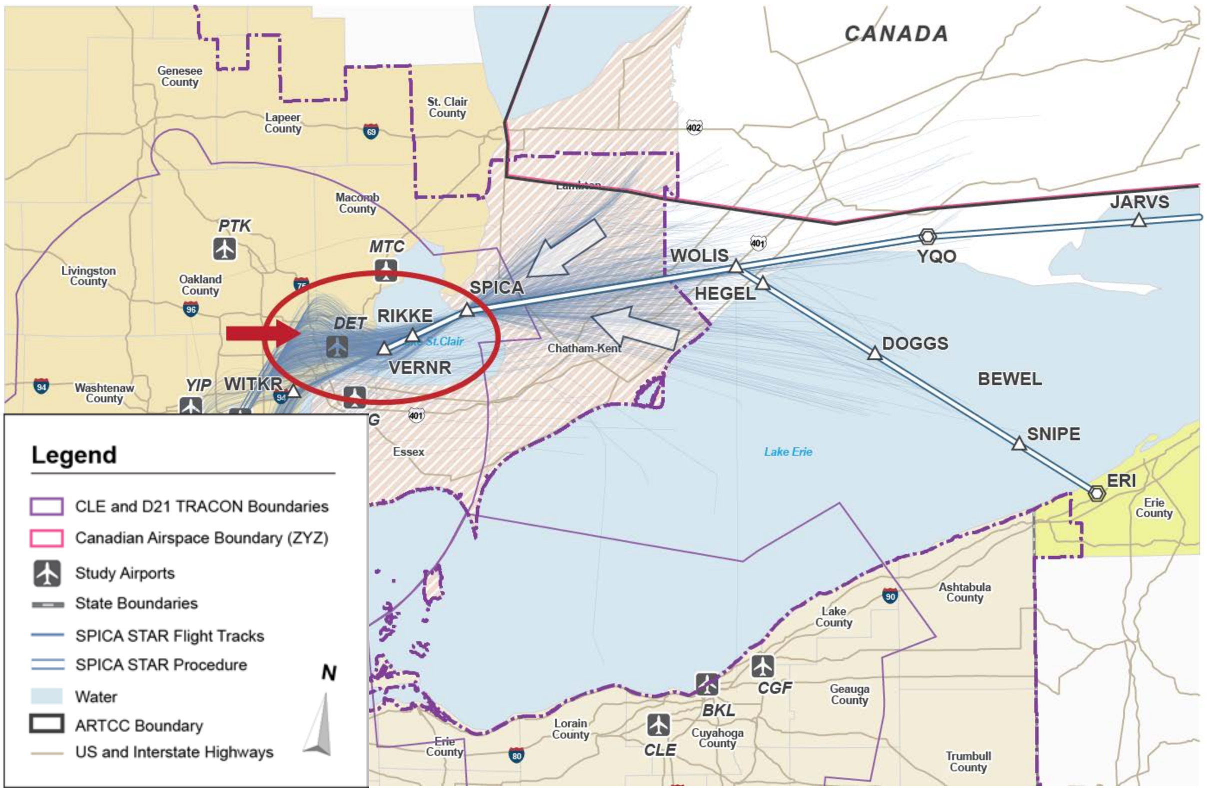
Some current transitions can provide additional challenges. For example, transitions used by both propeller and jet aircraft are often constrained because lower-performing aircraft are unable to maintain sufficient speed and altitude to ensure adequate separation from other aircraft on the route. As a result, controllers must employ airspace management tools, such as issuing vectors or speed restrictions, to maintain separation between aircraft.

The following sections provide specific examples of how some of these interactions function within the Cleveland-Detroit Metroplex.

DTW SPICA STAR

Exhibit 2-1 depicts traffic arriving to DTW on the SPICA STAR. This conventional STAR accounts for 23 percent of jet arrivals to DTW. As shown by the flight tracks (depicted in blue), the majority of aircraft are not flying the currently published route. Instead, many aircraft are vectored along more direct paths to the terminal airspace boundary where they are sequenced to join the STAR. Sequencing and merging different streams of traffic onto the SPICA STAR is challenging due to high volume of aircraft coming from New England and New York area airports. Both vectoring air traffic off a designated procedure and late sequencing of arrivals result in inefficient lateral paths and require extended level segments (see area in red circle). This increases workload and reduces flexibility for pilots and controllers.

Exhibit 2-1 DTW - Arrivals on the SPICA STAR



Notes:

CGF – Cuyahoga County Airport	*CYQG – Windsor Airport*	*DET – Coleman A. Young Airport*	*DTW – Detroit Metropolitan Wayne County Airport*
MTC – Selfridge Air National Guard Base	*PTK – Oakland County International Airport*	*TOL – Toledo Express Airport*	*YIP – Willow Run Airport*

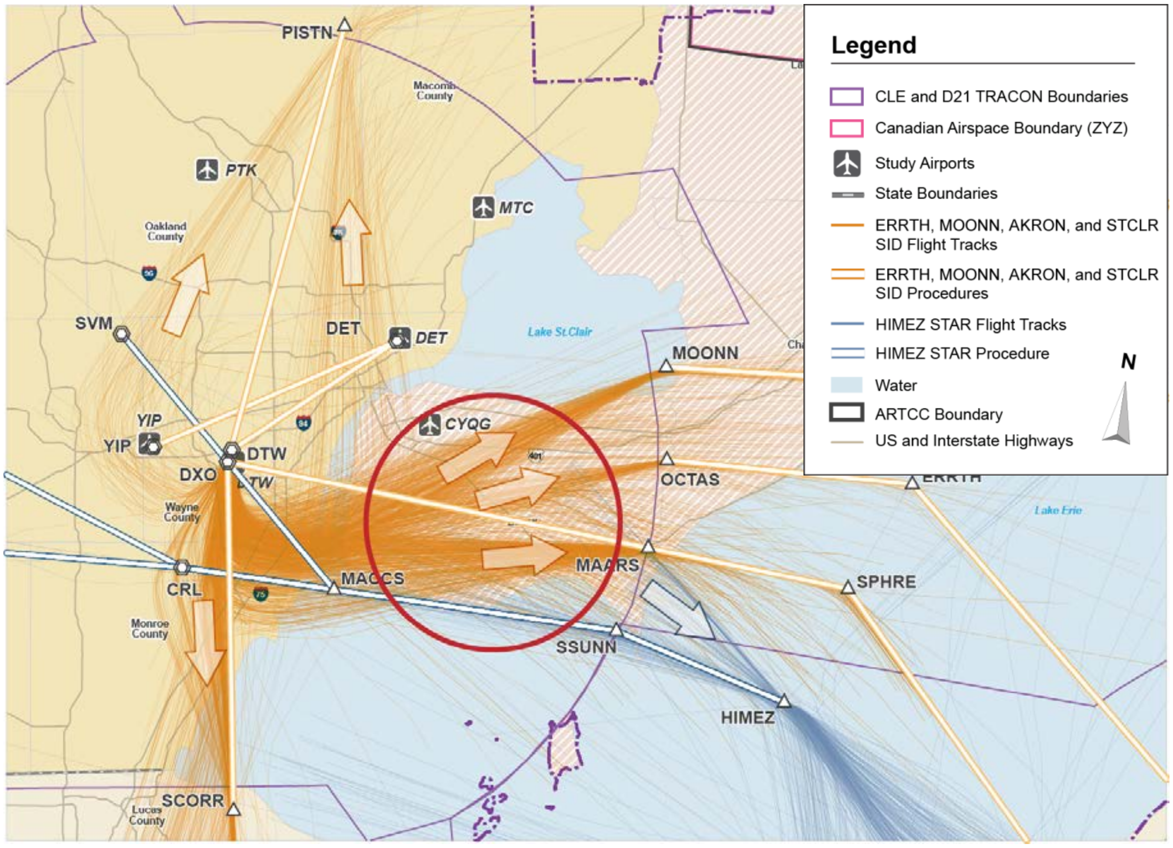
Sources: U.S. Department of Transportation, Federal Aviation Administration, National Flight Data Center, National Airspace System Resources, Airport, and Runway databases, accessed June 2017 (airspace boundaries); National Atlas of the United States of America (U.S. County and State Boundaries, Water Bodies); Bureau of Transportation Statistics, National Transportation Atlas Database (U.S. and Interstate Highways); ATAC Corporation (Flight Track Data); *CLE-DTW Metroplex OAP Study Team Final Report*, May 2014.

Prepared by: ATAC Corporation, October 2017.

DTW ERRTH, MOONN, ST. CLAIR, and AKRON Departures

Exhibit 2-2 depicts DTW eastbound departure procedures under south flow conditions. The procedure routes and associated flight tracks are shown in orange. These conventional departure procedures account for approximately 33 percent of all DTW jet departures. Currently, aircraft operating on these procedures during south flow conditions must be vectored (see red circle) around arrivals to the Cleveland area on the HIMEZ STAR. Arrivals to the Cleveland area on the HIMEZ STAR are shown in blue.

Exhibit 2-2 DTW - Eastbound Departures - South Flow



Notes:

CYQG – Windsor International Airport
DET – Coleman A. Young Airport
DTW – Detroit Metropolitan Wayne County Airport
MTC – Selfridge Air National Guard Base
PTK – Oakland County International Airport

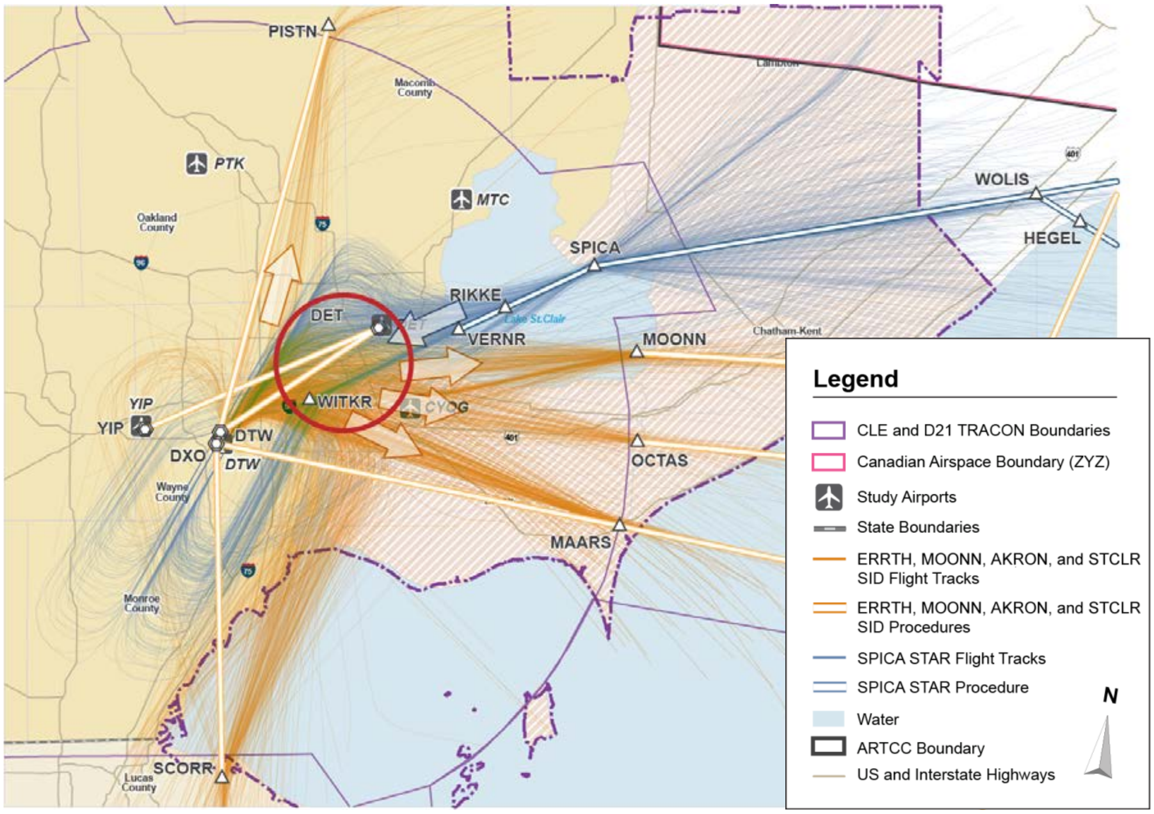
Sources: U.S. Department of Transportation, Federal Aviation Administration, National Flight Data Center, National Airspace System Resources, Airport, and Runway databases, accessed June 2017 (airspace boundaries); National Atlas of the United States of America (U.S. County and State Boundaries, Water Bodies); Bureau of Transportation Statistics, National Transportation Atlas Database (U.S. and Interstate Highways); ATAC Corporation (Flight Track Data); *CLE-DTW Metroplex OAP Study Team Final Report*, May 2014.

Prepared by: ATAC Corporation, October 2017.

Exhibit 2-3 depicts the DTW east departure procedures under north flow conditions. During north flow conditions, controllers must vector aircraft departing on these procedures (see area in red circle) to minimize conflicts with aircraft arriving to the Detroit area on the SPICA STAR (shown in blue).

Radar vector SIDs share intersections that create situations where controllers have to use off course vectors to ensure lateral separation. The vectoring results in more frequent controller/pilot and controller/controller communication, increasing workload. The lack of published SIDs, particularly RNAV SIDs, reduces flexibility for controllers and pilots.

Exhibit 2-3 DTW - Eastbound Departures - North Flow



Notes:
CYQG – Windsor Airport
DET – Coleman A. Young Airport
DTW – Detroit Metropolitan Wayne County Airport
MTC – Selfridge Air National Guard Base
PTK – Oakland County International Airport

Sources: U.S. Department of Transportation, Federal Aviation Administration, National Flight Data Center, National Airspace System Resources, Airport, and Runway databases, accessed June 2017 (airspace boundaries); National Atlas of the United States of America (U.S. County and State Boundaries, Water Bodies); Bureau of Transportation Statistics, National Transportation Atlas Database (U.S. and Interstate Highways); ATAC Corporation (Flight Track Data); CLE-DTW Metroplex OAP Study Team, May 2014.

Prepared by: ATAC Corporation, October 2017.

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 airspace use. This requires that controllers carefully observe aircraft activity along proximate 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.

[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.

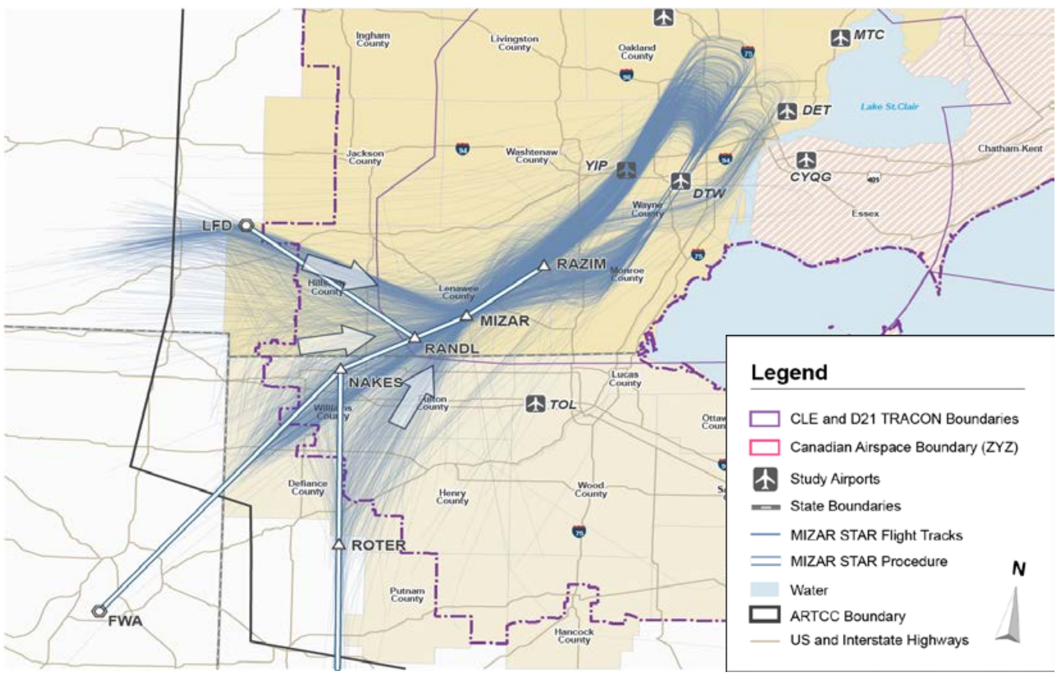
The limited number of ground-based NAVAIDs often results in multiple procedures sharing the same NAVAIDs. This may cause congestion and dependent routes. For example, propeller-driven and jet aircraft are frequently placed on different routes that share the same ground based NAVAIDs. This may result in conflicts such as aircraft flying at different speeds along adjacent routes, requiring greater separation to prevent operations at similar altitudes occupying the same airspace. To avoid potential conflicts, controllers may issue vectors or level offs to aircraft. This increases pilot and controller workload and system complexity.

The following sections provide examples of how some of these interactions function within the Cleveland-Detroit Metroplex.

Arrivals on the MIZAR STAR

Exhibit 2-4 depicts traffic arriving to DTW on the MIZAR STAR. Aircraft travelling on the MIZAR STAR are sequenced and merged from three streams into a single stream of traffic by ZOB controllers prior to entering D21 airspace. This can be particularly complex and challenging due to high tailwinds experienced by arriving aircraft.

Exhibit 2-4 DTW MIZAR STAR



Notes:

CYQG – Windsor Airport	*DET – Coleman A. Young Airport*	*DTW – Detroit Metropolitan Wayne County Airport*	*MTC – Selfridge Air National Guard Base*
PTK – Oakland County International Airport	*YIP – Willow Run Airport*	*TOL – Toledo Express Airport*	

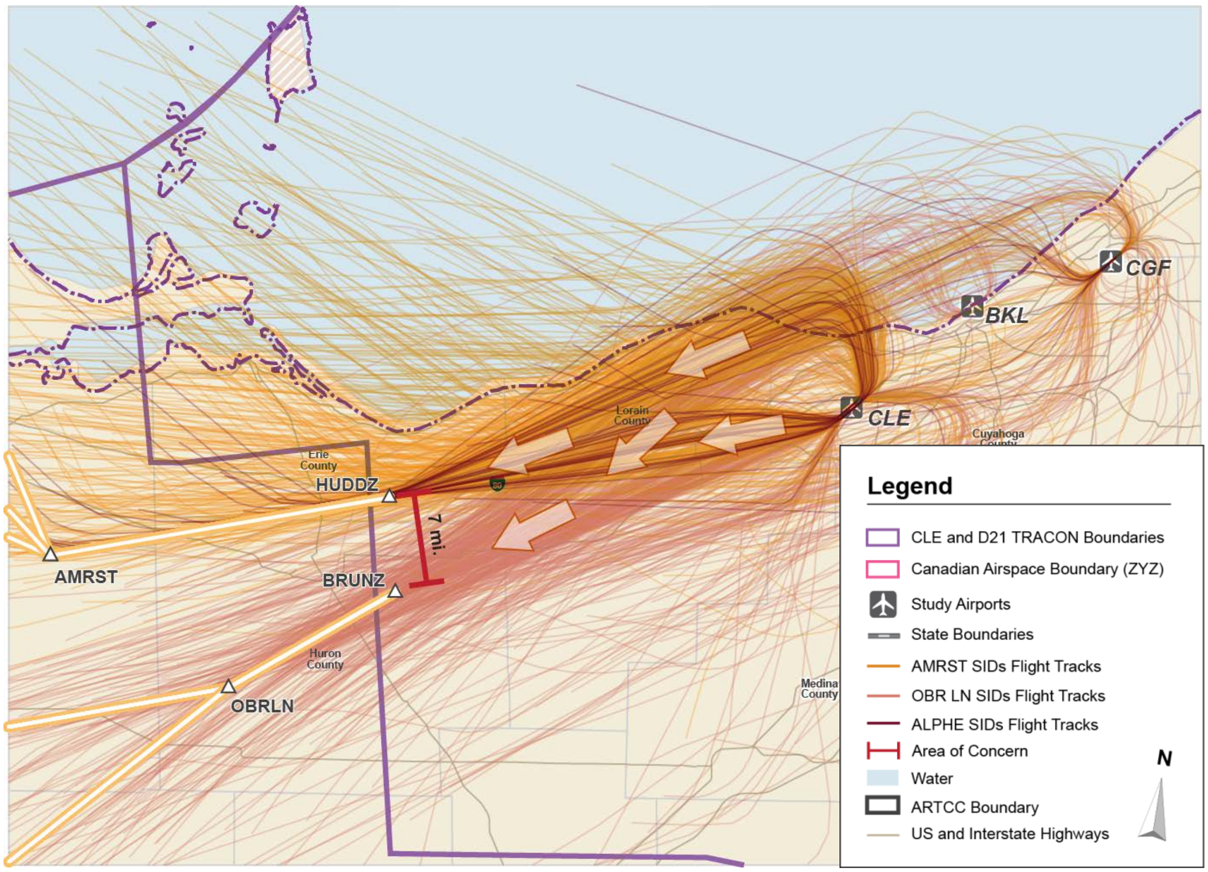
Sources: U.S. Department of Transportation, Federal Aviation Administration, National Flight Data Center, National Airspace System Resources, Airport, and Runway databases, accessed June 2017 (airspace boundaries); National Atlas of the United States of America (U.S. County and State Boundaries, Water Bodies); Bureau of Transportation Statistics, National Transportation Atlas Database (U.S. and Interstate Highways); ATAC Corporation (Flight Track Data); *CLE-DTW Metroplex OAP Study Team Final Report*, May 2014.

Prepared by: ATAC Corporation, October 2017.

Close Proximity of CLE West SIDs

Exhibit 2-5 depicts traffic operating on the CLE ALPHE THREE, AMRST THREE, and OBRLN THREE departure procedures. These SIDs account for 41 percent of jet departures from CLE. The close proximity of the HUDDZ and BRUNZ waypoints, located only seven miles apart, creates unnecessary complexity for departing aircraft separation for dual use. As shown by the arrows on the exhibit, aircraft on the OBRLN THREE use BRUNZ and AMRST THREE, and ALPHE THREE aircraft use HUDDZ.

Exhibit 2-5 Lateral Separation - HUDDZ and BRUNZ



Notes:
BKL-Burke Lakefront Airport *CGF-Cuyahoga County Airport* *CLE-Cleveland-Hopkins International Airport*

Sources: U.S. Department of Transportation, Federal Aviation Administration, National Flight Data Center, National Airspace System Resources, Airport, and Runway databases, accessed June 2017 (airspace boundaries); National Atlas of the United States of America (U.S. County and State Boundaries, Water Bodies); Bureau of Transportation Statistics, National Transportation Atlas Database (U.S. and Interstate Highways); ATAC Corporation (Flight Track Data); CLE-DTW Metroplex OAP Study Team, May 2014.

Prepared by: ATAC Corporation, October 2017.

Lack of Detroit Area Satellite Airport Arrival Procedures

Aircraft arriving to Detroit area satellite Study Airports account for approximately 23 percent of all D21 arrival traffic. Five of the Detroit area Study Airports, Windsor International Airport (CYQG), Coleman A. Young Municipal Airport (DET), Oakland County International Airport (PTK), Selfridge Air National Guard Base (MTC), and Willow Run Airport (YIP), share five multi-use STARs. These STARs are the CRUXX FOUR, LLEEO TWO, SWWAN TWO, SPRTN THREE, and GOHMA TWO. Currently, there are no STARs uniquely dedicated to these Study Airports. Aircraft are vectored on notional de-conflicted headings and altitudes to the destination facility. For example, aircraft arriving to PTK via the LLEEO TWO procedure are required to descend over 40 miles from the Study Airport. As a result, system efficiency is affected by the lack of more predictable STAR procedures at the Detroit area satellite Study Airports.

Many of these airports serve as reliever or alternate airports in the event DTW closes due to unexpected conditions such as bad weather. The existing procedures for the satellite Study Airports do not allow for predictable segregation of routes between air traffic arriving to these Study Airports and DTW. These issues affect routing for conventional procedures and can result in limits on the location and number of transitions available in the Cleveland-Detroit Metroplex.

2.1.2.3 Lack of Predictability in the Efficient Transfer of Traffic between Enroute and Terminal Area Airspace

Airports with a significant volume of IFR aircraft need SID and STAR procedures to help achieve optimal efficiency. SID and STAR procedures establish consistent flight routes, which help maintain a predictable flow of aircraft to and from an airport. Predictable, defined routes enable pilots and controllers to know ahead of time how, where, and when an aircraft should be operated. This allows for better planning of airspace use and aircraft control within a given volume of airspace. A predictable route may include expected locations (i.e., where), altitudes (i.e., where and how high), and speeds (i.e., how fast and when) at key points. Aircraft performance and/or piloting technique can vary and may be a factor in reducing predictability. Because conventional procedures are less predictable than RNAV procedures, controllers use vectoring and verbal instructions governing speed and altitude level-offs to ensure standard separation between aircraft. As discussed in Section 1.2.5.1, RNAV procedures enable aircraft to follow more accurate and better-defined flight routes. This allows for more idle throttle descent, predictable routes with fixed locations, and altitudes that can be planned ahead of time by the pilot and air traffic control. Fixed routes help segregate traffic by providing separation between aircraft on the routes. This allows for improved use of the airspace. Therefore, increased availability of RNAV procedures in a metroplex provides a greater degree of predictability. **Table 2-1** summarizes the conventional and RNAV-based procedures for the Study Airports under existing conditions.

Table 2-1 Existing Conditions (2016) STAR and SID Procedures at the Study Airports

	Procedures			
	Conventional Procedures		RNAV Procedures	
Airport	**STAR**	**SID**	**STAR**	**SID**
DTW	GEMINI FOUR	AKRON FIVE		
	MIZAR THREE	ERRTH SIX		
	POLAR FIVE	FORT WAYNE SIX		
	SPICA TWO	MOONN SEVEN		
	WEEDA TWO	PALACE NINE		
		RICHMOND EIGHT		
		ROSEWOOD FIVE		
		ST. CLAIR NINE		
CLE	CHARDON THREE	AMRST FIVE		ALPHE FOUR
	HIMEZ THREE	OBRLN FOUR		
	KEATN SIX			
	ZABER FOUR			
BJJ	None	None	None	None
BKL	ZABER FOUR	AMRST FIVE		ALPHE FOUR
	CHARDON THREE	OBRLN FOUR		
	FAILS TWO			
	KEATN SIX			
CAK	None	None	None	None
CGF	ZABER FOUR	AMRST FIVE		ALPHE FOUR
	CHARDON THREE	OBRLN FOUR		
	FAILS TWO			
	KEATN SIX			
CYQG	LLEEO TWO	WINDSOR FOUR		
	SPRTN THREE			
	GOHMA THREE			
DET	CRUXX FIVE	AKRON THREE		
	LLEEO TWO	ERRTH SIX		
	SPRTN THREE	FORT WAYNE SIX		
		MOONN SEVEN		
		PALACE NINE		
		RICHMOND EIGHT		
		ROSEWOOD FIVE		
		ST CLAIR NINE		
MTC	LLEEO TWO			
	SPRTN THREE			
PTK	CRUXX FIVE	AKRON FIVE		
	LLEEO TWO	ERRTH SIX		
	SPRTN THREE	FORT WAYNE SIX		

Table 2-1 Existing Conditions (2016) STAR and SID Procedures at the Study Airports

	Procedures			
	Conventional Procedures		RNAV Procedures	
Airport	**STAR**	**SID**	**STAR**	**SID**
	SWWAN TWO	MOONN FIVE		
		PALACE NINE		
		RICHMOND EIGHT		
		ROSEWOOD FIVE		
		ST CLAIR NINE		
TOL	None	None	None	None
YIP	CRUXX FIVE	AKRON FIVE		
	LLEEO TWO	ERRTH SIX		
	SPRTN THREE	FORT WAYNE SIX		
		MOONN SEVEN		
		PALACE NINE		
		RICHMOND EIGHT		
		ROSEWOOD FIVE		
		ST CLAIR NINE		
		AKRON FIVE		
		ERRTH SIX		
		FORT WAYNE SIX		

Sources: *Cleveland-Detroit Metroplex OAP Study Team Final Report*, May 2014; NFDC, accessed 2016.
Prepared by: ATAC Corporation, November 2017.

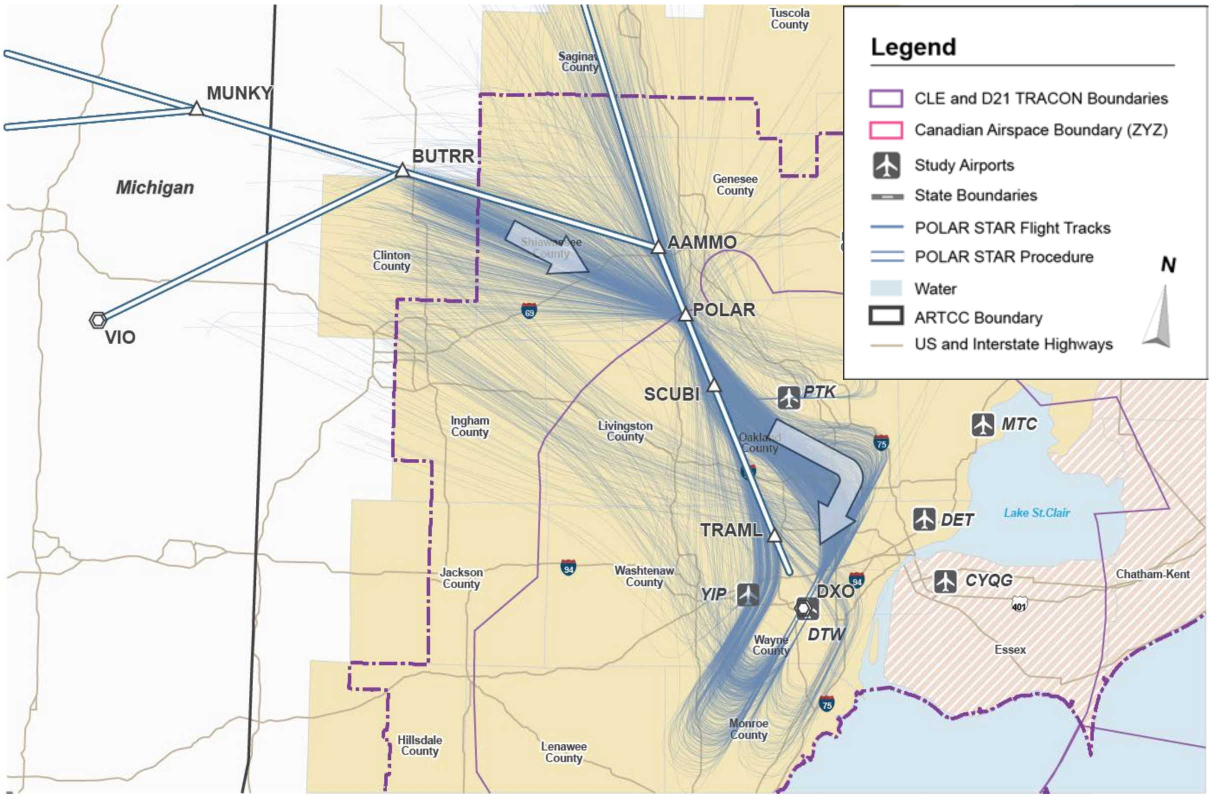
The following sections describe the two areas – ground path and vertical path – in which conventional procedures in the Cleveland-Detroit Metroplex are less predictable than RNAV procedures.

Ground Path (Lateral Path)

The ground path is the track along the surface of the earth directly below an aircraft that represents where it is flying. Because nearly all of the STAR and SID procedures in the Cleveland-Detroit Metroplex airspace use ground-based NAVAIDs, navigation can be affected by line-of-sight and signal degradation issues associated with this type of technology. This limits where conventional procedure routes can be located. Because the NAVAIDs are less precise, conventional procedures require wider areas of airspace to protect aircraft flying on neighboring routes. This can result in aircraft flying routes that vary from those that are published.

Exhibit 2-6 shows flight tracks for aircraft arriving to DTW on the POLAR STAR. As shown by the flight tracks, a substantial amount of traffic is being vectored off the procedure and directly to POLAR at the boundary between the ARTCC and D21 airspace. Arrivals during south flow are directed onto a long base turn before final approach to the runways in order to allow for adequate separation between aircraft. The extensive vectoring requires more frequent controller/pilot and controller/controller communication, increasing controller and pilot workload and reducing predictability.

Exhibit 2-6 Arrivals to DTW on the POLAR STAR



Notes:

CYQG – Windsor Airport
DET – Coleman A. Young Airport
DTW – Detroit Metropolitan Wayne County Airport
MTC – Selfridge Air National Guard Base
PTK – Oakland County International Airport
YIP – Willow Run Airport

Sources: U.S. Department of Transportation, Federal Aviation Administration, National Flight Data Center, National Airspace System Resources, Airport, and Runway databases, accessed June 2017 (airspace boundaries); National Atlas of the United States of America (U.S. County and State Boundaries, Water Bodies); Bureau of Transportation Statistics, National Transportation Atlas Database (U.S. and Interstate Highways); ATAC Corporation (Flight Track Data); *CLE-DTW Metroplex OAP Study Team Final Report*, May 2014.

Prepared by: ATAC Corporation, October 2017.

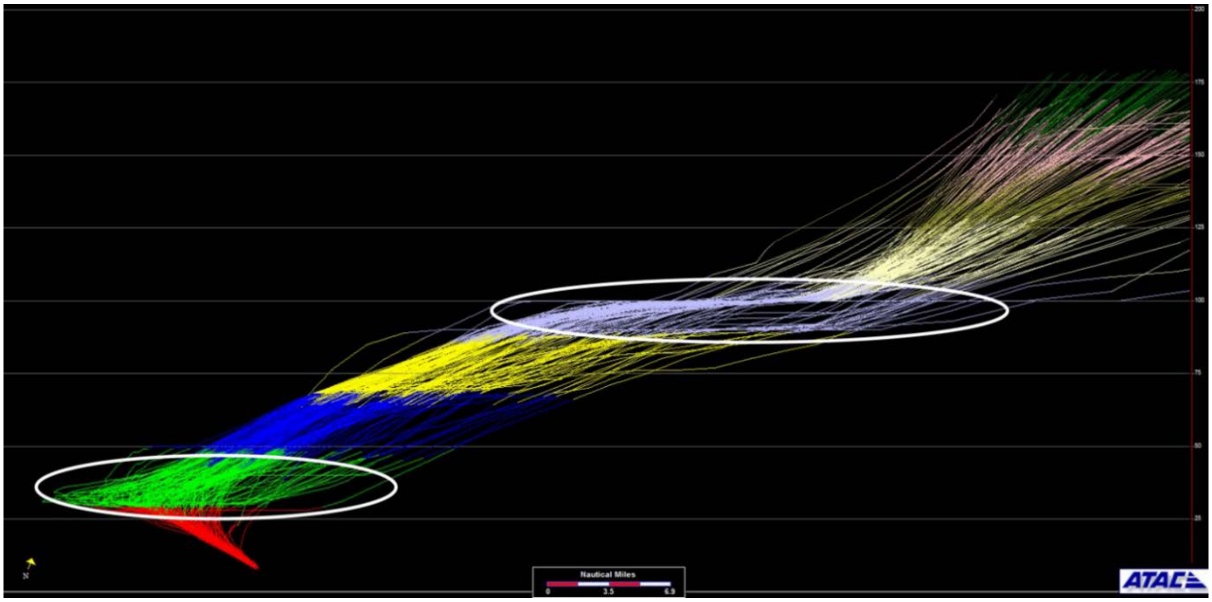
Vertical Path

In guiding aircraft along their routes, controllers direct aircraft to climb, descend, or level off. During climb, the point when an aircraft reaches an assigned altitude may vary depending upon factors such as aircraft performance, weather conditions, and piloting technique. Aircraft arriving at or departing from the Study Airports are often required to level off during climb and descent to maintain vertical separation from other aircraft. Interrupted climbs and descents can increase flight time and distance as the aircraft exit/enter the terminal airspace or transition to/from the runway approach environment.

Exhibit 2-7 depicts vertical profiles for aircraft arriving on the CHARDON STAR into CLE. The circled areas indicate level-offs throughout all phases of the procedure. Level-offs during descent require application of thrust for aircraft set up to land (e.g., flaps extended) to maintain approach speeds and altitude. This results in increased flight time and distance.

Unpredictable vertical guidance resulting from conflicting traffic leads to increased controller workload and inefficient aircraft operation.

Exhibit 2-7 Vertical Arrival Flow Profile Example (CHARDON STAR)



Source: ATAC (PDARS radar data), July 2017.
Prepared by: ATAC Corporation, July 2017.

Extended level-offs often result in increased controller/pilot communication. They also may require increased traffic advisories to pilots about the proximity of other aircraft or point-outs to other controllers responsible for neighboring airspace sectors. This adds to complexity and inefficient aircraft performance during a descent or climb. This results in less predictable routes and reduced airspace efficiency.

Lack of RNAV SIDs and STARs

There is only one RNAV SID serving the CLE-DTW Metroplex. The lack of RNAV SIDs and STARs reduces efficiency for aircraft and increases delays by decreasing the rate at which aircraft can arrive and depart terminal airspace and increasing inter-departure or inter-arrival times.

2.2 Purpose of the Proposed Action

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

- Improve the flexibility in transitioning traffic between enroute and terminal area airspace and between terminal area airspace and the runways
- Improve the segregation of arrivals and departures in terminal area and enroute airspace
- Improve the predictability in transitioning traffic between enroute 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. 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 Flexibility in Transitioning Aircraft

As discussed in Section 2.1.2.1, the limited number of practically available transitions and associated procedures constrain efficiency in the terminal and enroute transitional airspace. This requires merging multiple traffic flows before aircraft arrive at and depart from terminal airspace. One objective of the Proposed Action is to minimize the need for merging traffic flows by increasing the number of transitions and procedures that are dedicated to specific Study Airports. This objective can be measured with the following criteria:

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

2.2.2 Segregate Arrivals and Departures

As discussed in Section 2.1.2.2, arrival and departure routes cross, converge, or are within close proximity of each other in some portions of the airspace. 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. 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 with the following criterion:

- Segregate arrival and departure traffic (measured by number of RNAV STARs and/or SIDs that can be used independently to/from Study Airports)

2.2.3 Improve the Predictability of Air Traffic Flow

As discussed in Section 2.1.2.3, the lack of up-to-date airspace procedures requires controllers to use vectoring, speed control, and level-offs to ensure safe vertical and lateral separation between aircraft during the arrival and departure phases of flight. As a result, controllers and pilots experience more complex workload. Some STARS are underused because of flow restrictions.[19] There are also a limited number of procedures with runway transitions to and from the runways at each of the Study Airports. In addition, there is a lack of RNAV procedures to and from the Satellite Airports, preventing pilots from filing their preferential arrival or departure with predictable flight expectations. These factors affect predictability within the Cleveland-Detroit Metroplex.

This objective can be measured with the following criteria:

- RNAV procedures with altitude controls intended to optimize descent or climb patterns
- Ensure that the majority of STARs and SIDs to and from the Study Airports are based on RNAV technology (measured by count of RNAV STARs and SIDs for an individual Study Airport)

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 (2016) air traffic procedures serving the Study Airports would remain unchanged except for planned procedure modifications and/or cancellations that 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 and RNP approaches, where feasible, in the Cleveland-Detroit Metroplex. Refer to Section 1.2.5 for a description of RNAV, RNP, and optimized climb and descent profiles. This would improve the predictability and segregation of routes, as well as increase flexibility in providing air traffic services. The Proposed Action is described in detail in Chapter 3, *Alternatives*.

Implementation of the Proposed Action would not increase the number of aircraft operations at the Study Airports. Furthermore, the Proposed Action does not involve physical construction of any facilities such as additional runways or taxiways, and does not require permitting or other approvals or actions on a state or local level. Therefore, the implementation of the proposed changes to procedures in the Cleveland-Detroit Metroplex would not require any physical alterations to environmental resources identified in FAA Order 1050.1F.

[19] Those air traffic control processes and decisions made to avoid overloads and to ensure that airspace and airport capacity are fully exploited.

2.5 Required Federal Actions to Implement Proposed Action

Implementing the Proposed Action requires the FAA to publish new or revised STARs, SIDs, and transitions and undertake controller training.

2.6 Agency Coordination

On June 11, 2015, the FAA distributed notice of intent to prepare an EA for the Cleveland-Detroit Metroplex Project to 282 federal, state, regional, and local officials. There are no federally recognized tribes in the Study Area, thus no tribal notification was made. The FAA sent the early notification letter to:

1. Advise agencies of the initiation of the EA study
2. Request background information about the 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 June 12, 2015, a notice of intent to prepare an EA was published in four newspapers: the Detroit News and Free Press, the Toledo Blade, The Plain Dealer (Cleveland), and the Akron Beacon Journal. Eight comments were received in response to the notice of intent and were considered in preparation of the Draft EA. **Appendix A**, *Agency Coordination, Community Involvement and List of Receiving Parties*, includes a copy of the notice of intent letter (and attachments), affidavits of newspaper publication, and a list of the receiving agencies.