

# Optimization of Airspace and Procedures in the Metroplex (OAPM)

**Charlotte Design and Implementation Team**

**Final Report**

November 16, 2012

Prepared by:

**United States Department of Transportation  
Federal Aviation Administration**



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Attachment A: Proposed Final Design Packages

## **1.0 Optimization of Airspace and Procedures in the Metroplex**

In September 2009, the Federal Aviation Administration (FAA) received the RTCA's Task Force 5 Final Report on Mid-Term NextGen Implementation, containing recommendations concerning the top priorities for the implementation of NextGen initiatives. A key component of the FAA response to the RTCA recommendations was the formation of teams leveraging FAA and Industry Performance Based Navigation (PBN) expertise and experience to expedite implementation of optimized airspace and procedures.

Optimization of Airspace and Procedures in the Metroplex (OAPM) is a systematic, integrated and expedited approach to implementing PBN procedures and associated airspace changes. OAPM was developed in direct response to the recommendations from Task Force 5 Final Report on Mid-Term NextGen Implementation on the quality, timeliness, and scope of metroplex solutions.

OAPM focuses on a geographic area, rather than a single airport. This approach considers multiple airports and the airspace surrounding a metropolitan area, including all types of operations, as well as connectivity with other metroplexes. The OAPM initiative is intended to enable accelerated development and implementation of beneficial PBN procedures. The OAPM process is made up of five phases: Study, Design, Evaluation, Implementation, and Post Implementation. This Executive Summary describes the Design Phase, while Appendix A, Proposed Final Design Submission Packages, provides the detailed designs that will be carried forward to the Evaluation Phase.

## **2.0 Overview of the Charlotte OAPM Study and Design Team Process**

The Charlotte Study Team was active from February 2011 through May 2011. The Study Team consisted of participants from the FAA, the National Air Traffic Controller Association (NATCA), ATC and Performance-Based Navigation (PBN) subject matter experts (SMEs), industry stakeholders, and the MITRE Corporation's Center for Advanced Aviation System Development. These non-local experts were tasked to identify operational and efficiency issues that could be addressed through PBN procedure and airspace design, to develop conceptual solutions that addressed the identified problems, and to make a preliminary assessment of associated benefits, costs, and risks. Throughout the process, the Study Team held multiple outreach sessions with local facility and industry stakeholders. Working with those local stakeholders, they identified 40 issues, developed conceptual solutions to many of them, and performed a preliminary assessment of benefits, costs, and risks. Their efforts were documented in the Charlotte OAPM Study Team Final Report, dated 3 June, 2011.

The Study Team identified conceptual PBN solutions that resulted in both quantitative and qualitative efficiency gains. The estimated annual fuel savings were between \$10.2 million and \$17.0 million.<sup>1</sup> These estimates were developed by the National Analysis Team (NAT) based on the Study Team's conceptual designs, and do not reflect the refinements made by the Charlotte Metroplex Design Team. Quantitative benefits were derived from reductions in level segments and/or track distances, which reduce fuel burn and emissions. The qualitative benefits expected by the Study Team include reduced ATC task complexity, reduced pilot/controller communications, repeatable and predictable flight paths, and a reduction in the need for Traffic Management Initiatives. In total, the Study Team recommended that conceptual solutions to 21 of the 40 identified issues be carried forward to the Design Phase. As described in greater detail in the Study Team Final Report, the 19 issues that were not addressed either could not be addressed through PBN or airspace solutions, or they could not be addressed within the OAPM scope and timeframe.

The Charlotte OAPM Design Team was active from February 2012 through November 2012. The Charlotte OAPM Design Team was led by FAA management and NATCA Article 48 Co-Leads, and included participants from the local FAA ATC facilities, NATCA, ATC SMEs, industry stakeholders, representatives from the Eastern Service Area, other FAA lines of business such as PBN Policy and Support and Flight Procedures, MITRE CAASD, and various support contractors. The Study Team Final Report served as the foundation for the Design Team's scope of work. The Design Team focused on finalizing the Study Team's conceptual designs in order to address identified operational and efficiency issues through the application of PBN procedures and associated airspace changes within the metroplex, with the ultimate goal of creating designs that support both FAA and industry needs.

The final designs proposed by the Charlotte Design Team refine the Study Team recommendations to increase efficiency in the metroplex. These efficiencies include maximizing the use of existing aircraft technologies and aircrew capabilities, and optimizing vertical profiles to eliminate or reduce level flight segments. The Design Team was able to develop procedural changes to improve both lateral and vertical paths for Standard Terminal Arrival Routes (STARs) and Standard Instrument Departures (SIDs) to reduce fuel burn and emissions, de-conflict arrival and departure procedures to enhance safety, and provide for repeatable/predictable paths and reduce ATC task complexity.

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<sup>1</sup> *The estimated fuel burn savings considered a lower bound based on a conservative European Organization for the Safety of Air Navigation (EUROCONTROL) Base of Aircraft Data (BADA) fuel burn model and an upper bound based on Industry stakeholder flight simulation analysis. This analysis was performed in 2011, and assumed a fuel price of \$2.77 per gallon.*

### 3.0 Scope and Process

The Charlotte Metroplex consists of airspace delegated to the Charlotte Terminal Radar Approach Control (CLT), the Greer Air Traffic Control Tower (GSP), the Greensboro Air Traffic Control Tower (GSO), the Asheville Air Traffic Control Tower (AVL), the Columbia Air Traffic Control Tower (CAE), the Florence Air Traffic Control Tower (FLO), the Shaw Radar Approach Control (SSC), the Atlanta Air Route Traffic Control Center (ZTL), the Jacksonville Air Route Traffic Control Center (ZJX), Indianapolis Air Route Traffic Control Center (ZID) and the Washington Air Route Traffic Control Center (ZDC). Specific airports were selected based on their proximity and their potential interaction with CLT, ZTL, ZJX, ZID and ZDC operations. The Charlotte OAPM Design Team focused on aircraft operations at Charlotte/Douglas International Airport (CLT), as well as numerous satellite airports (see Table 1).

**Table 1. Charlotte OAPM Airports with New/Revised PBN Procedures**

<b>Airport ID</b>	<b>Airport Name</b>		<b>Airport ID</b>	<b>Airport Name</b>
GSO	Piedmont Triad International Airport		UZA	Rock Hill (York Co) Airport
GSP	Greenville Spartanburg International Airport		EQY	Charlotte-Monroe Executive Airport
AVL	Asheville Regional Airport		AKH	Gastonia Municipal Airport
CAE	Columbia Metropolitan Airport		IPJ	Lincolnton-Lincoln County Regional Airport
FLO	Florence Regional Airport		JQF	Concord Regional Airport
SSC	Shaw Air Force Base		LKR	Lancaster County-McWhirter Field Airport
RDU	Raleigh-Durham International Airport		RUQ	Rowan County Airport
VUJ	Stanley County Airport			

The Design Team began the process by reviewing the Study Team Final Report to identify all conceptual proposals. The proposals were then prioritized based on their complexity, their interdependencies, and the magnitude of the potential benefit. The remainder of the Design Phase was focused on the refinement of the Study Team conceptual solutions, with the goal of developing Proposed Final Designs that were 90 percent complete before proceeding to the Evaluation Phase, where additional operational validation, environmental review, and safety review would lead to Final Designs that could be carried forward to the Implementation Phase.

The Design Team refinement of the Study Team concepts ensured that Proposed Final Designs met the requirements in the Airspace Management Handbook, FAA Order 7100.9D (Standard Terminal Arrival Program and Procedures, Appendix 5 Guidelines for Implementing Terminal RNAV Procedures), and other applicable guidance. While the Study Team Report provided the framework for the Design Team activities, the Design Team had the flexibility to modify or adjust the Study Team proposals if the changes enhanced the expected benefit or if the changes were operationally necessary, provided they did not significantly reduce the expected benefits, increase the expected costs, or extend the project timeline.

The Design Team refined the Study Team concepts by dividing into workgroups, including industry representatives that systematically developed more refined PBN and airspace designs that met the intent of the Study Team. The workgroup's preliminary designs were then shared with the full Design Team, allowing FAA, NATCA, SMEs and industry to provide additional input. Numerous factors supported the refinement, including industry flight simulations, human-in-the-loop validations, flyability and criteria checks, and other stakeholder feedback. Finally, the Team documented the designs and obtained signatures from all affected FAA and NATCA stakeholders indicating agreement on Proposed Final Designs (pending environmental and safety review, and further operational validation, which will occur during Evaluation).

It is important to note that the Design Team considered numerous alternatives in the development of the Proposed Final Designs. For each individual Study Team concept, the Design Team went through an iterative design process, considering alternative lateral and vertical paths, various speed and altitude restrictions, alternative leg types, different de-confliction options, various charting considerations, etc. The Design Team considered the efficiency gains associated with each proposal, the potential impact to controller task complexity, and the implementation challenges, among other considerations. The process was informed by a range of tools and analyses (human-in the-loop simulations, simulator flights, flyability assessment, criteria checks, etc.), with a focus on reducing flight times, flying distances, and level-segments. The actual design refinement of each Study Team concept was an iterative process conducted over a nine month period with each version of the process documented in evolving TARGETS files with supporting documentation (meeting summaries and various versions of Design Submission Packages) maintained on the OAPM SharePoint Site maintained by CAASD.

At the conclusion of the Design Process, the Design Team had created 86 Proposed Final Design Submission Packages<sup>2</sup>. These Submission Packages describe 38 new procedures, 8 new ATS routes and 40 airspace redesign proposals.

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<sup>2</sup> Track Data used for Design Package graphics were from March 8, 2012 and March 9, 2012

## 4.0 Proposed Solutions

As stated above, the Design Team considered each of the conceptual solutions proposed by the Study Team and refined those concepts into comprehensive designs. These designs are captured in the Proposed Final Design Packages, which are included as Attachment A. Each Design Package describes the issue identified by the Study Team, their conceptual solution, and the design refinements made by the Design Team resulting in the Proposed Final Design. The Design Packages also identify dependencies among various proposals, include graphical depictions of current conditions and the proposed final designs, identify potentially impacted sectors, provide a broad overview of expected benefits, and identify additional considerations.

As identified in each Package, the Design Team was able to create procedural changes including the development of Optimized Profile Descents (OPDs), improved lateral and vertical paths for both STAR and SIDs to reduce fuel burn and emissions, and earlier divergence on departures. Where applicable, arrival and departure procedures were de-conflicted and designed to create repeatable/predictable paths, reduce ATC task complexity, and enhance safety.

In total, the Design Team has proposed 16 new PBN STARs, 14 new PBN SIDs, 40 en route and terminal airspace changes, 4 new T routes, 2 T-route modifications, 2 new Atlantic Routes, 3 conventional SIDs to serve non-RNAV primary and satellite airports, and five conventional STARs to serve non-RNAV primary and satellite airports. The Design Team procedures are projected to yield an estimated, additional \$3.6 million<sup>3</sup> over the Study Team's conceptual designs. Stakeholders will begin realizing benefits with the first major implementation in April 2014, and will realize the full benefits of all of the proposals in September 2014.

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<sup>3</sup> *The estimated fuel burn savings considered a lower bound based on a conservative European Organization for the Safety of Air Navigation (EUROCONTROL) Base of Aircraft Data (BADA) fuel burn model and an upper bound based on Industry stakeholder flight simulation analysis. This analysis was performed in 2011, and assumed a fuel price of \$2.77 per gallon.*

## **5.0 Key Deliverables and Recommendations**

Per the OAPM nominal project schedule, the primary deliverables and milestones for this Design Phase of the proposed project include this Executive Summary and the attached Proposed Final Design Submission Packages. The Charlotte OAPM project is now ready to proceed with the Evaluation Phase.

Adopting the Design Team proposals will result in reduced flying miles, minimal level-offs for departures, implementation of Optimized Profile Descents, reduced fuel burn and emissions, as well as reduced controller task complexity. Considering the potential benefits and anticipated costs, it is recommended that Charlotte OAPM project proceed with the Evaluation Phase, including all applicable operational, environmental, safety, and business case analyses. Upon completion of Evaluation, a decision will be made whether to proceed with Implementation.



**Federal Aviation  
Administration**

# Charlotte Design and Implementation Team Final Report

## ATTACHMENT A: Proposed Final Design Packages

# CLT OAPM Design Package

CLT STARs, SW BANKR

Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/02/2013	<ul style="list-style-type: none"> <li>• Added Current Date</li> <li>• Changed Implementation Date</li> </ul>		
10/08/2013	<ul style="list-style-type: none"> <li>• Added Current Date</li> <li>• Updated Related/Dependent Submissions per the ATL and CLT OAPM Airspace and Procedures Dependencies v4</li> <li>• Added the following statement: In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52), Stanly County (VUJ), Concord Regional (JQF), and Anson County (AFP).</li> <li>• Editorial Changes</li> </ul>		
10/31/2013	<ul style="list-style-type: none"> <li>• Added Current Date</li> <li>• Added ZJX Sectors 65, 66, 72 to Related/Dependent Submissions</li> <li>• Added clarifier for jet aircraft only</li> </ul>		
05/13/2014	<ul style="list-style-type: none"> <li>• Amended Current Date</li> <li>• Amended proposed implementation date</li> <li>• Added 10 NM legs for holding</li> <li>• Editorial Changes</li> </ul>		
06/25/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Changed proposed date</li> <li>• Changed current to original</li> <li>• Removed phone numbers</li> </ul>		
11/17/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• NOOOK replaced with UNARM in Related/Dependent Submissions and Implementation Dependencies</li> <li>• Editorial changes to Implementation Dependencies</li> </ul>		

# CLT OAPM Design Package

CLT STARs, SW BANKR

Name of Change	Date
<b>BANKR ARRIVAL (RNAV)</b>	<b>17 November 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV STAR)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Southwest Arrivals Proposed</b>	<b>26 July 2016</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Positions: Arrival Radar West (ARW), Departure Radar West (DRW) and Departure Radar East (DRE)</b> <b>Atlanta ARTCC (ZTL) Sectors: 20, 23, 24, 28, 31, 32, and 34</b> <b>Jacksonville ARTCC (ZJX) Sectors: 66 and 72</b>	<b>CLT: Roland Alexander, James Williams</b> <b>ZTL: Roger Cerovsky, Bill Wise</b> <b>ZJX: Evan Darby, Jeff Wood</b>
Related/Dependent Submissions	Associated Data Files
<b>Airspace Design Packages</b> <ul style="list-style-type: none"> <li>• CLT: ARW, DRE, DRW</li> <li>• ZTL: Sectors 24, 28, 31 32 (ATL OAPM), 34 (ATL OAPM)</li> <li>• ZJX Sectors 65, 66, 72</li> </ul> <b>Procedure Design Packages</b> <ul style="list-style-type: none"> <li>• CLT STARs: CHPTR, JONZE, UNARM</li> </ul>	<b>Master TARGETS File</b>

## Purpose

The Study Team concluded that several opportunities existed for optimizing descent profiles. This included optimizations specific to the arrivals from each corner post of operation. The ATC facilities also expressed a need for the modification, addition, or removal of arrival transitions for existing STARs and the need for a new dual RNAV STAR to efficiently accommodate arrival traffic from the southwest. The BANKR STAR provides a more direct arrival route from Colliers VOR (IRQ).

This STAR will incorporate decreased track miles flown, reduced level-offs, reduced delay vectoring and increased arrival efficiency.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.



# CLT OAPM Design Package

## CLT STARs, SW BANKR

### Proposed Final Design

The Design Team proposal includes changes to the Study Team recommendation, which resulted in a more direct routing to the CLT boundary. The final design, which has transitions for all Charlotte runways, is the result of collaboration and consultation with ZTL, CLT, ZJX, GSP, CAE, our industry partner U.S. Airways and the Atlanta OAPM Team. The final design required several airspace changes in the Center environment and a redesign of CLT TRACON airspace.

On a South Operation the procedure ends at JRDEN for Runway 18R/C/L, and WOOOO for Runway 23, with the last altitude being STKUP at 12,000. This decision was made to ensure separation from the JONZE STAR OPD.

On a north operation the last altitude on the procedure is BLNCE at 9000' on Base Leg. The position of the base is such that aircraft can be easily flowed to 36L/C/R and is in position to serve 36C in a triple ILS configuration. This base is approximately 9 miles south of the JONZE STAR base.

Table 1 depicts the additional track miles saved compared to the Study Team recommendation.

Table 1. Additional Track Mile Savings from the Design Team Proposal

	RWY 18	RWY 23	RWY 36
<b>Additional Savings (NM) As Compared To Study Team Route</b>	<b>0.11</b>	<b>1.48</b>	<b>7.98</b>

This STAR is designed for jet aircraft only. In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52), Stanly County (VUJ), Concord Regional (JQF), and Anson County (AFP). Holding is established at BANKR (right turns 10NM legs) and GRD VOR (right turns 10NM legs). JONZE (left turns 10 NM legs) will be used for offload holding. The following waypoints were designed on the procedure:

- PONZE Moves traffic off of IRQ which is a heavy ALT fix and saves track miles
- NTRST Vector return point AOA FL240 @ 270 knots, located 3 NM from the proposed ZTL Sector 24/31 boundary for airspace protection
- CHKNG Protects center sector boundary - AOA FL210 @ 270 knots
- CRDET De-conflicts arrivals from CAE northbound departures -AOA 17,000 @ 270 knots
- BANKR Between 13,000 and FL220 @270 knots
- DEBBT Between 12,000 and FL210 @ 250 knots
- CONTR AOA 11,000 (North Operation)
- BLNCE 9,000 @ 210 knots (North Operation)
- ROBBR Between 12,000 and 16,000
- FOBAR Between 12,000 and 14,000
- STKUP 12,000 @ 210 knots
- DOSBE Turn to RWY23 downwind
- AAIRE Defines downwind to RWY18R/C/L
- JRDEN Anchor fix

# CLT OAPM Design Package

## CLT STARs, SW BANKR

- RRIKK No restrictions
- FLAIR Second turn to RWY23 downwind
- WOOOO Anchor fix

Figure 3 depicts the Proposed Final Design.

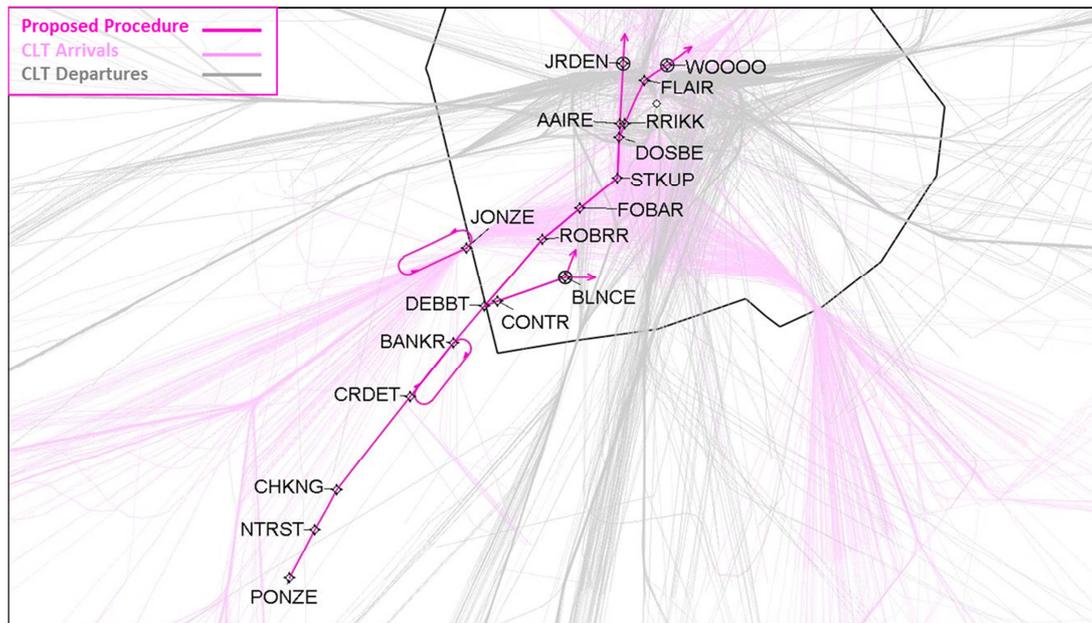


Figure 3. Proposed Final Design

### Additional Design Considerations

A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure.

CHS TRTLS/OSPRI STARs were designed to de-conflict with the new BANKR and CHPTR STARs

### Implementation Dependencies

- JONZE, CHPTR, and UNARM STARs need to be implemented at the same time to ensure lateral separation and arrival flow compatibility
- Airspace sector modifications
  - CLT Departure Radar West, Arrival Radar West and Departure Radar East airspace was realigned to accommodate the BANKR STAR
  - ZTL Sector 31, ZTL Sector 32, and ZTL Sector 34 airspace were realigned to accommodate the BANKR STAR
  - ZJX Sector 65, ZJX Sector 66, and ZJX Sector 72 airspace was realigned to accommodate the BANKR STAR

# CLT OAPM Design Package

## CLT STARs, SW BANKR

To maximize arrival capacity utilizing all CLT OPD STARs, a robust traffic management metering tool should be developed, evaluated and incorporated into the Traffic Management System.

Issues identified include: OPDs are relatively new with regard to Traffic Management. There are no definitive standards regarding miles-in-trail (MIT) or time requirement to initiate an OPD and still maintain appropriate separation to terminal airspace. Additionally, current Traffic Management Advisory (TMA) adaptation does not provide a seamless merge of dual arrival flows at a corner post or multiple flows in the approach environment to a single runway to the finite degree needed to allow aircraft to take full advantage of an OPD. Discussion with the National TMA/Time Based Flow Management (TBFM) Operations Team has advised that future enhancements to TMA/TBFM should address these concerns.

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZJX sector boundary maps
- ZTL/ZJX Letter of Agreement (LOA)
- ZTL/GSP Letter of Agreement (LOA)
- ZTL/CLT Letter of Agreement (LOA)
- CLT/GSP Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- GSP ATCT Standard Operating Procedures (SOP)
- CLT ATCT Standard Operating Procedures (SOP)
- ERAM and STARs Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database)
- Standard Instrument Approach Procedure (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- En route Information Display System (ERIDS)
- En route Decision Support Tool (EDST)

### Attachments

- BANKR TARGETS Distribution Package
- BANKR RNAV PRO results
- BANKR RNAV 7100-3
- BANKR RNAV 7100-4
- BANKR RNAV 8260.2 Worksheets

# CLT OAPM Design Package

CLT STARs, SW CHPTR

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/02/2013	<ul style="list-style-type: none"> <li>In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP).</li> <li>Added Current Date</li> <li>Changed Implementation Date</li> </ul>		
09/04/2013	<ul style="list-style-type: none"> <li>BGRED replaced with CHOPZ</li> </ul>		
10/08/2013	<ul style="list-style-type: none"> <li>Updated Related/Dependent Submissions per the ATL and CLT OAPM Airspace and Procedures Dependencies v4</li> <li>Added Current Date</li> <li>Added VUJ and JQF as airports served</li> <li>Editorial Changes</li> </ul>		
12/11/2013	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Changed proposed date</li> </ul>		
01/23/2014	<ul style="list-style-type: none"> <li>Added holding at EYPAD</li> </ul>		
05/16/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed proposed date</li> </ul>		
05/29/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed NOOOK to UNARM</li> </ul>		
05/30/2014	<ul style="list-style-type: none"> <li>Updated Figure 2</li> </ul>		
06/17/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Added description of STAR termination in Proposed Final Design</li> </ul>		
06/20/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Removed proposed</li> </ul>		
06/25/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed proposed date</li> <li>Changed current to original</li> <li>Removed phone numbers</li> </ul>		
10/21/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Amended Proposed Implementation Date</li> <li>Removed all airspace changes from Related/Dependent Submissions</li> </ul>		

# CLT OAPM Design Package

CLT STARs, SW CHPTR

	<ul style="list-style-type: none"><li>• Removed BANKR and JONZE from the Related/Dependent Submissions</li><li>• Editorial change to Proposed Final Design</li><li>• Removed BANKR, JONZE and airspace changes from the Implementation Dependencies</li></ul>		
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# CLT OAPM Design Package

CLT STARs, SW CHPTR

Name of Change	Date
CHPTR ARRIVAL	21 October 2014
Change Classification	Current Phase of Design
Terminal Procedure (Conventional STAR)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
General Considerations for Conceptual SIDs and STARs	5 January 2017
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Charlotte ATCT (CLT) Positions: Arrival Radar West (ARW), Departure Radar West (DRW) and Departure Radar East (DRE) Atlanta ARTCC (ZTL) Sectors: 20, 23, 24, 28, 31, 32, and 34 Jacksonville ARTCC (ZJX) Sectors: 66 and 72	CLT: Roland Alexander, James Williams ZTL: Roger Cerovsky, Bill Wise ZJX: Evan Darby, Jeff Wood
Related/Dependent Submissions	Associated Data Files
Procedure Design Packages <ul style="list-style-type: none"> <li>CLT STARs: UNARM</li> </ul>	Master TARGETS File

## Purpose

New OPD RNAV STARs require conventional STARs for non-RNAV aircraft to efficiently accommodate arrival traffic from the southwest.

Figure 1 depicts Original Procedures, Route and Airspace.

# CLT OAPM Design Package

## CLT STARs, SW CHPTR

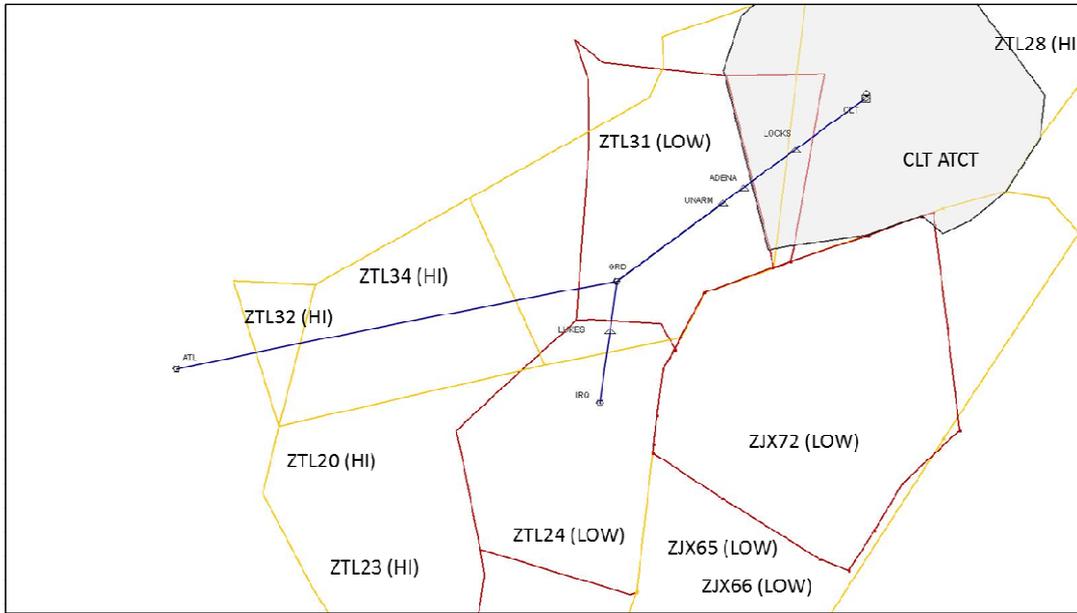


Figure 1. Original Procedure/Route/Airspace

### Proposed Final Design

The Design Team created a conventional arrival for turbojets only that closely aligns the lateral paths of the proposed BANKR STAR (RNAV) to the CLT boundary. This was designed to have minimal impact on the JONZE STAR (RNAV). CLT arrivals on the new procedure terminate on a 070° heading after CHPTR intersection in a North Operation and in a South Operation CLT arrivals terminate on a 050° heading after WHDRW intersection. Regardless of landing direction, CLT satellite arrivals terminate at WHDRW and expect vectors to the airport.

The procedure provides a more direct routing than the original conventional arrival from IRQ. The ATL transition on the conventional arrival includes a longer routing to GRD in order to de-conflict from two ATL departures flows and the CLT departure flow over CHOPZ. In addition to Charlotte Douglas International (CLT) this STAR will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52), Stanly County (VUJ), Concord Regional (JQF), and Anson County (AFP). Holding is established at GRD (right turns 10 NM legs) and EYPAD (right turns 10 NM legs). The following fixes were designed on the procedure:

- ATL                   ATL transition initial fix
- PENFI               Fix to de-conflict from ATL departure traffic and currently is defined intersection
- GRD                   VOR used to define the route

# CLT OAPM Design Package

## CLT STARs, SW CHPTR

- EYPAD Merge fix for the ATL and IRQ transitions and beginning of the common route
- CHPTR Transfer of control fix from ZTL to CLT. End of procedure for CLT arrivals in a North Operation.
- IRQ IRQ transition initial fix
- SYMCO Fix for altitude restriction to mimic the profile of the BANKR STAR
- WHDRW End of the procedure for CLT arrivals in South Operation. End of procedure for all satellite arrivals.

Figure 2 depicts the Proposed Final Design.

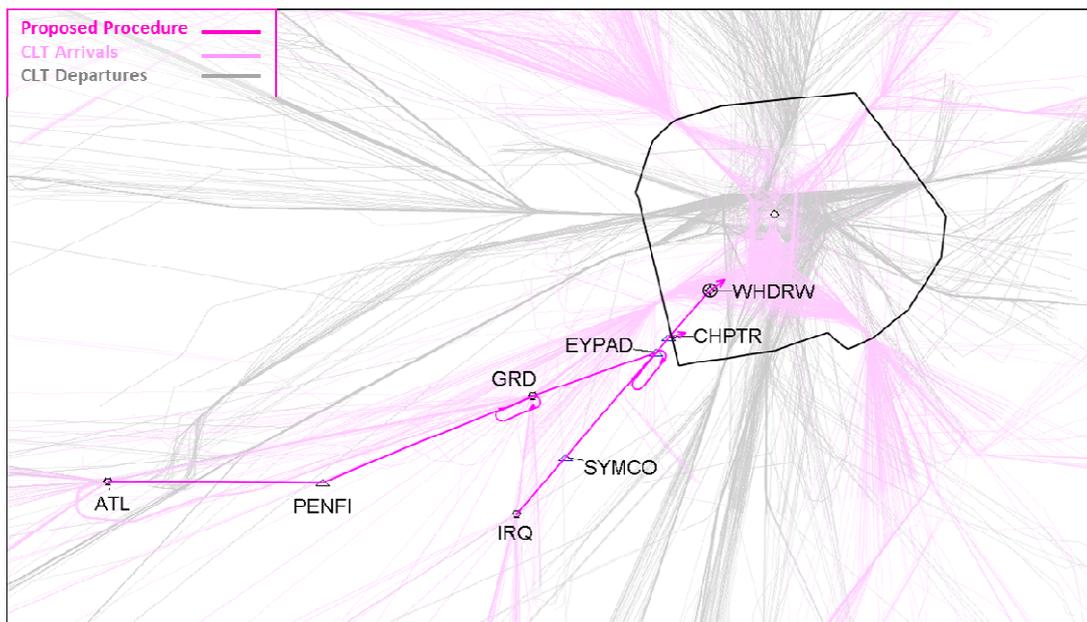


Figure 2. Proposed Final Design

### Additional Design Considerations

A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure. CHS TRTLS/OSPRI STARs were redesigned to de-conflict with the new BANKR STAR and CHPTR STAR.

### Implementation Dependencies

UNARM STAR must be implemented at the same time to ensure lateral separation and to ensure arrival flow continuity

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZTL/ZJX Letter of Agreement (LOA)
- ZTL/CLT Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2

# CLT OAPM Design Package

## CLT STARs, SW CHPTR

- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARs Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedure (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

### Attachments

- None

This procedure will be tracked, but not implemented via the OAPM process. This design package will be forwarded to the Eastern Service Center Operations Support Group for incorporation into the National Airspace System. The OAPM team will track its progress due to its correlation with the CLT BANKR and JONZE RNAV STARs, and other CLT airspace design issues.

# CLT OAPM Design Package

CLT STARs, SW JONZE

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
02/09/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Changed Implementation Date</li> </ul>		
10/09/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Updated Related/Dependent Submissions per the ATL and CLT OAPM Airspace and Procedures Dependencies v4</li> <li>Added the following statement: In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52), Stanly County (VUJ), Concord Regional (JQF), and Anson County (AFP).</li> <li>Editorial Changes</li> </ul>		
10/31/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Added for jet aircraft only</li> </ul>		
05/01/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Amended Proposed Date</li> <li>Changed BESST to BESTT</li> </ul>		
05/21/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Removed references to NOOOK (going away)</li> <li>Added UNARM to dependencies</li> </ul>		
05/30/2014	<ul style="list-style-type: none"> <li>Updated Figure 3</li> </ul>		
06/25/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed proposed date</li> <li>Changed current to original</li> <li>Removed phone numbers</li> </ul>		
09/02/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Added CNTLR transition per SRMP meeting 6/18</li> </ul>		
11/05/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed altitude from at or above 100 to 100B160 at WHYLE. This change ensures aircraft on the JONZE STAR will descend into CLT airspace prior to entering ZTL30 airspace. A safety analysis meeting determined this change presented no hazard or risk.</li> </ul>		
11/12/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Editorial changes made to Related/Dependent Submissions and</li> </ul>		

# CLT OAPM Design Package

CLT STARs, SW JONZE

	Implementation Dependencies		
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# CLT OAPM Design Package

CLT STARs, SW JONZE

Name of Change	Date
JONZE ARRIVAL (RNAV)	12 November 2014
Change Classification	Current Phase of Design
Terminal Procedure (RNAV STAR)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
Southwest Arrivals Proposed	26 July 2016
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Charlotte ATCT (CLT) Position: Arrival Radar West (ARW, Departure Radar West (DRW) Atlanta ARTCC (ZTL) Sectors: 31, 32 and 34 Greenville Spartanburg ATCT (GSP)	ZTL: Roger Cerovsky, Bill Wise CLT: Roland Alexander, James Williams GSP: Richard Phillips, James Fleming
Related/Dependent Submissions	Associated Data Files
<b>Airspace Design Packages</b> <ul style="list-style-type: none"> <li>• CLT: ARW, DRW</li> <li>• GSP Shelf</li> </ul> <b>Procedure Design Packages</b> <ul style="list-style-type: none"> <li>• CLT STARs: BANKR, CHPTR, UNARM</li> </ul>	Master TARGETS File

## Purpose

The Study Team concluded that several opportunities existed for optimizing descent profiles. This included optimizations specific to the arrivals from each corner post of operation. The ATC facilities also expressed a need for the modification, addition, or removal of arrival transitions for existing STARs and the need for a new dual RNAV STAR to efficiently accommodate arrival traffic from the southwest. The JONZE STAR provides a more direct routing to the CLT boundary, while providing a possible preferential route from ATL airport.

This RNAV STAR will incorporate decreased track miles flown, reduced level-offs, reduced delay vectoring, and increased arrival efficiency.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

CLT STARs, SW JONZE

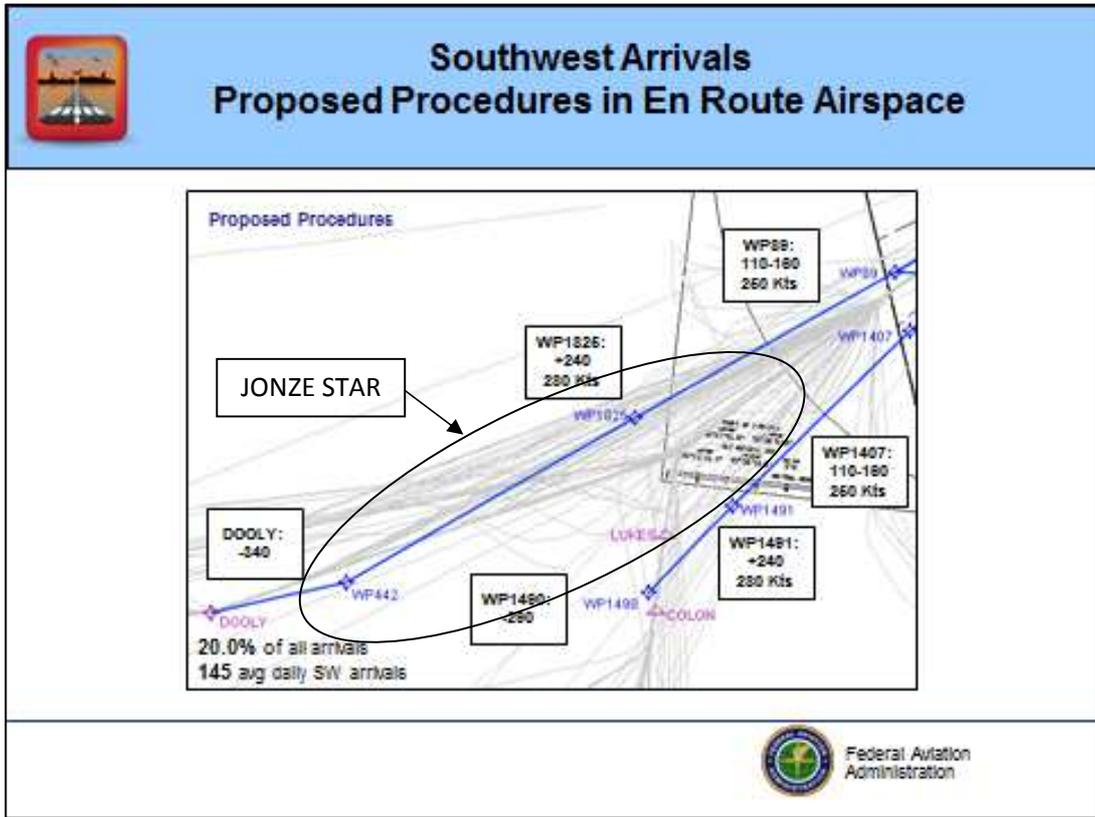


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT STARs, SW JONZE

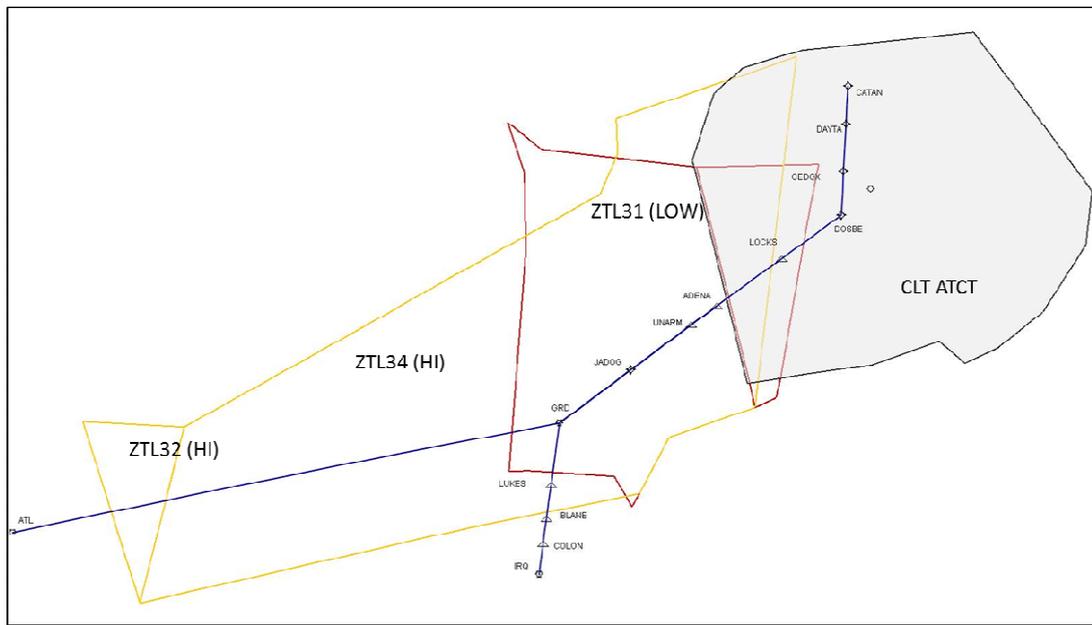


Figure 2. Original Procedure/Route/Airspace

### **Proposed Final Design**

The Design Team proposal includes changes to the Study Team recommendation, which resulted in a more direct routing to the CLT boundary. The final design, which has transitions for all Charlotte runways, is the result of collaboration and consultation with ZTL, CLT, ZIX, GSP, CAE, our industry partner U.S. Airways and the Atlanta OAPM Team. The final design required several airspace changes in the Center environment and a redesign of CLT TRACON airspace.

On a South Operation the procedure ends at JRDEN for Runway 18R/C/L, and W0000 for Runway 23. The last altitude on the procedure is JRDEN at 6000 feet and W0000 at 7,000 feet.

On a North Operation the last altitude on the procedure is CHELE at 7,000 feet on Base Leg. The position of the base is such that aircraft can be easily be flowed to runways 36L/C/R and is approximately 9 miles north of the BANKR base leg.

In order to accommodate the OPD, a 10,000 foot airspace shelf from GSP is required on a north operation. The team determined this shelf would be delegated to CLT on both north and south operations in order to maintain consistency and reduce coordination. CLT and GSP airspace changes are discussed in their respective airspace design packages.

In order to simplify the transition from the ATL PHIL SID to the JONZE STAR a transition was added beginning at CNTLR for ATL departures only.

Table 1 depicts the additional track miles saved compared to the Study Team recommendation.

# CLT OAPM Design Package

## CLT STARs, SW JONZE

Table 1. Additional Track Mile Savings from the Design Team Proposal

	RWY 18	RWY 23	RWY 36
<b>Additional Savings (NM) As Compared To Study Team Recommendation</b>	<b>4.77</b>	<b>2.67</b>	<b>0.8</b>

This STAR is designed for jet aircraft only. In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52), Stanly County (VUJ), Concord Regional (JQF), and Anson County (AFP). After coordination with the ATL OAPM the routing was moved further east to de-conflict with ATL departures. BESTT is the initial point on the procedure. Holding is established at JONZE (left turns 10 NM legs) and KUPPP (left turns 10 NM legs). GRD VOR (right turns 10 NM legs) and BANKR (right turns 10 NM legs) will be used for offload holding. The following waypoints were designed on the procedure:

- BESTT Is the initial point of the STAR
- CNTLR Beginning of transition for ATL departures only. Initiates divergence from ATL PHILL SID.
- EVRRR De-conflicts JONZE from the JACCC and PHILL SIDs
- KUPPP AOA 24,000 @ 270 knots
- CAAKE 17,000/FL260 @270 knots
- JONZE 11,000/FL210 @ 250 knots
- DUBBB AOA 10,000
- CHELE 7,000/8,000 @ 210 knots (North Operation)
- WHYLE 10,000/16,000
- FREEK 10,000/11,000
- DOSBE Defines downwind turn
- AAIRE 9,000/10,000 @ 210 knots
- JRDEN At 6,000
- RRICK 9,000/10,000 @ 210 knots
- FLAIR At 7,000
- WOOOO Aircraft remain at 7,000 until alternate instructions are provided by ATC

Figure 3 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT STARs, SW JONZE

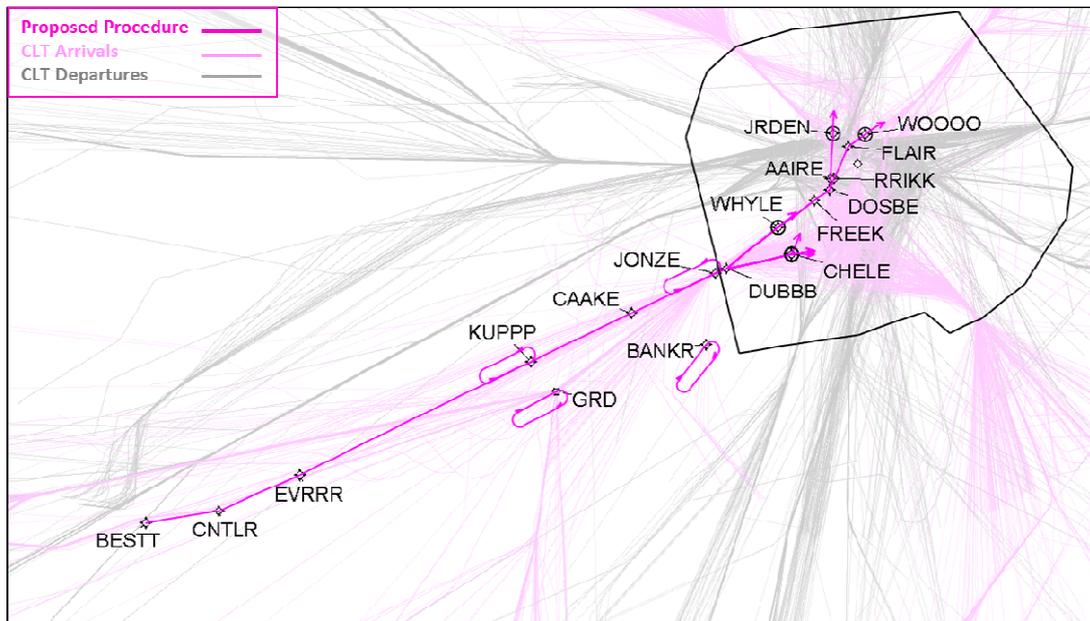


Figure 3. Proposed Final Design

### Additional Design Considerations

A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure.

A 10,000 foot GSP shelf is required to permit aircraft to cross CHELE at 7,000 and 210 KTS on a north operation. This issue was identified during USA sim testing. This shelf's lateral boundary is 3 NM from JONZE.

To reduce confusion for pilots and to insure users build the correct transition departing from ATL, a chart note is to be added:

CHART NOTE: CNTRL transition for ATL departures only

CHS OSPRI and TRTLS STARs were redesigned to de-conflict with the new JONZE STAR

### Implementation Dependencies

- BANKR, CHPTR and UNARM STARs have to be implemented at the same time to insure lateral separation and arrival flows are compatible
- Airspace sector modifications
  - CLT Arrival Radar West and Departure Radar West airspace was changed to accommodate the new OPD from the southwest
- The PHIIL SID must be implemented concurrently to insure lateral separation between ATL departures and aircraft on the JONZE STAR.

# CLT OAPM Design Package

## CLT STARs, SW JONZE

To maximize arrival capacity utilizing all CLT OPD STARs, a robust traffic management metering tool should be developed, evaluated and incorporated into the Traffic Management System.

Issues identified include: PDs are relatively new with regard to Traffic Management. There are no definitive standards regarding miles-in-trail (MIT) or time requirement to initiate an OPD and still maintain appropriate separation to terminal airspace. Additionally, current Traffic Management Advisory (TMA) adaptation does not provide a seamless merge of dual arrival flows at a corner post or multiple flows in the approach environment to a single runway to the finite degree needed to allow aircraft to take full advantage of an OPD. Discussion with the National TMA/Time Based Flow Management (TBFM) Operations Team has advised that future enhancements to TMA/TBFM should address these concerns.

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZTL/CLT Letter of Agreement (LOA)
- ZTL/GSP Letter of Agreement (LOA)
- GSP/CLT Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- GSP ATCT Standard Operating Procedures (SOP)
- CLT ATCT Standard Operating Procedures (SOP)
- ERAM and STARs Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedures (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- Enroute Decision Support Tool (EDST)

### Attachments

- JONZE TARGETS Distribution Package
- JONZE RNAV PRO results
- JONZE RNAV 7100-3
- JONZE RNAV 7100-4
- JONZE RNAV 8260.2 Worksheets

# CLT OAPM Design Package

CLT STARs, NW BTSEY

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/02/2013	<ul style="list-style-type: none"> <li>• Changed Current Date</li> <li>• Changed Implementation Date</li> <li>• In addition to Charlotte Douglas (CLT) this star will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawaba (DCM), Jaars-Townsend (N52) and Anson County (AFP).</li> </ul>		
10/09/2013	<ul style="list-style-type: none"> <li>• Added Current Date</li> <li>• Updated Related/Dependent Submissions per the ATL and CLT OAPM Airspace and Procedures Dependencies v4</li> <li>• Editorial Changes</li> </ul>		
12/11/2013	<ul style="list-style-type: none"> <li>• Changed current date</li> <li>• Changed proposed date</li> </ul>		
05/16/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Changed proposed date</li> <li>• Editorial changes</li> </ul>		
06/25/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Changed proposed date</li> <li>• Changed current to original</li> <li>• Removed phone numbers</li> <li>• Removed lat/lon</li> </ul>		
07/30/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Removed BWALL from related dependent submissions</li> <li>• Removed BWALL from implementation dependencies</li> <li>• Removed Rowan County</li> <li>• Corrected airport names</li> <li>• Added expect to cross at 11,000 and 250 KIAS to BTSEY</li> </ul>		
10/21/2014	<ul style="list-style-type: none"> <li>• Amended Current Date</li> <li>• Added LIINN to Related/Dependent Submissions</li> <li>• Editorial change to Proposed Final Design</li> <li>• Added LIINN to Implementation Dependencies</li> </ul>		
11/12/2014	<ul style="list-style-type: none"> <li>• Amended Current Date</li> <li>• Editorial changes to Implementation Dependencies</li> </ul>		

# CLT OAPM Design Package

CLT STARs, NW BTSEY

Name of Change	Date
<b>BTSEY ARRIVAL</b>	<b>12 November 2014</b>
Change Classification	Current Phase of Design
Terminal Procedure (Conventional STAR)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Northwest Arrivals Proposed Procedures</b>	<b>15 October 2015</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Charlotte ATCT (CLT) Positions: Departure Radar West (DRW) and Arrival Radar West (ARW), Satellite North (SATN) Indianapolis ARTCC (ZID) Sectors: 86 and 96 Atlanta ARTCC (ZTL) Sectors: 42,44, 43, 47 and 48	CLT: Roland Alexander, James Williams ZID: Tom Dury, John Pierce ZTL: Roger Cerovsky, Bill Wise
Related/Dependent Submissions	Associated Data Files
<b>Airspace Design Packages</b> <ul style="list-style-type: none"> <li>• CLT: ARW, DRW, SATN</li> <li>• ZTL: Sectors 42 (ATL OAPM), 43, 44, 45, 47, 48</li> </ul> <b>Procedure Design Packages</b> <ul style="list-style-type: none"> <li>• CLT SID: JOJJO</li> <li>• CLT STARs: FILPZ, PARQR, LIINN</li> <li>• GSP SID: BIMMR</li> </ul>	Master TARGETS File

## Purpose

New OPD RNAV STARs require conventional STARs for non-RNAV aircraft to efficiently accommodate arrival traffic from the north.

The Study Team recommended at least one conventional arrival be created at each corner post.

Figure 1 depicts the Original Procedures, Route and Airspace.

# CLT OAPM Design Package

## CLT STARs, NW BTSEY

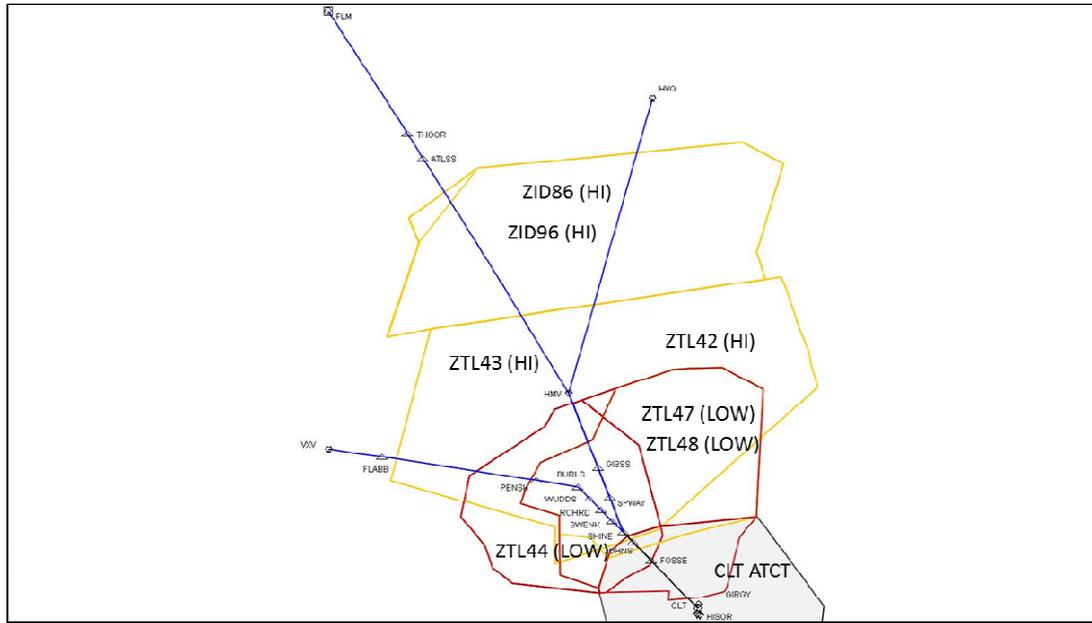


Figure 1. Original Procedure/Route/Airspace

### Proposed Final Design

The Design Team created the BTSEY conventional STAR (Turbojet Only) to replace the existing SHINE STAR. It will serve the same airports as currently served by the SHINE STAR. The proposed BTSEY STAR moved east and closely aligns with the lateral path of the proposed PARQR STAR. In addition to Charlotte Douglas International (CLT) this star will serve the following airports: Charlotte-Monroe Executive (EQY), Rock Hill/York County/Bryant Field (UZA), Gastonia Municipal (AKH), Lancaster County/McWhirter Field (LKR), Lincolnnton-Lincoln County Regional (IPJ), Shelby-Cleveland County Regional (EHO), Chester Catawaba Regional (DCM), Jaars-Townsend (N52) and Anson County-Jeff Cloud Field (AFP). Holding is established at BTSEY (left turns, 10NM legs). The following fixes were designed on the procedure

GZG	Initial arrival fix
JTEEA	Located 10NM south of Q-40. Lateral separation fix from Q-40
BTSEY	Holding fix, expect to cross at 11,000 and 250 KIAS
CLT	Arrival termination fix

Figure 2 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT STARs, NW BTSEY

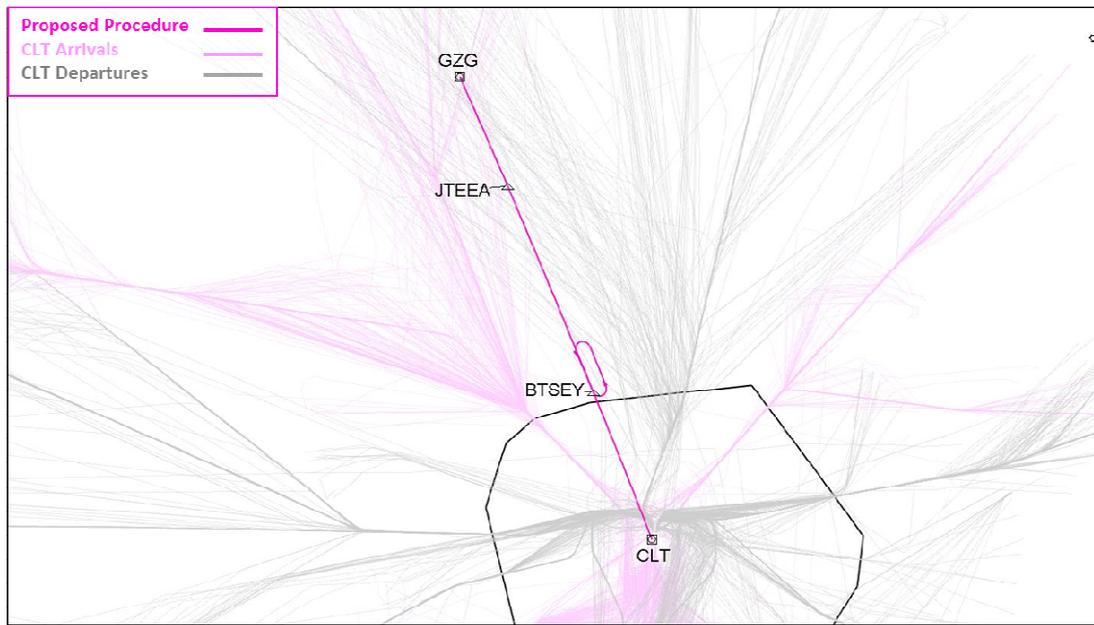


Figure 2. Proposed Final Design

### Additional Design Considerations

A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure.

### Implementation Dependencies

- The FILPZ, PARQR and LIINN STARs and the JOJJO SID must be implemented at the same time to ensure lateral separation
- The GSP BIMMR SID is designed to be laterally separated from the BTSEY STAR and must be implemented concurrently.
- Airspace sector modifications
  - CLT Departure Radar West and Arrival Radar West airspace were modified to accommodate the new arrival
  - ZTL Sector 42, ZTL Sector 43, ZTL Sector 44, ZTL Sector 45 and ZTL Sector 47 airspace boundaries were modified to accommodate the BTSEY STAR
  - ZTL Sector 48 boundary was modified and the southern shelf was re-stratified down to 5,000 feet

# CLT OAPM Design Package

## CLT STARs, NW BTSEY

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZID sector boundary maps
- ZTL/ZID Letter of Agreement (LOA)
- ZTL/CLT Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- ERAM and STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedure (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- Enroute Decision Support Tool (EDST)

### Attachments

- None

This procedure will be tracked, but not implemented via the OAPM process. This design package will be forwarded to the Eastern Service Center Operations Support Group for incorporation into the National Airspace System. The OAPM team will track its progress due to its correlation with the CLT PARQR RNAV STAR and other CLT airspace design issues.

# CLT OAPM Design Package

CLT STARs, NW FILPZ

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
02/09/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Changed Implementation Date</li> </ul>		
10/09/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Updated Related/Dependent Submissions per the ATL and CLT OAPM Airspace and Procedures Dependencies v4</li> <li>Added the following statement : In addition to Charlotte Douglas (CLT) this star will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP). Holding is established at BTSEY (left turns).</li> <li>Editorial Changes</li> </ul>		
10/31/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Added for jet aircraft only</li> </ul>		
02/11/2014	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Changed altitude constraints at JJENY to between FL190 and FL270</li> </ul>		
04/22/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Changed Implementation Date</li> <li>Editorial Changes</li> </ul>		
05/13/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Added 10 NM legs to holding</li> </ul>		
06/25/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed proposed date</li> <li>Changed current to original</li> <li>Removed phone numbers</li> </ul>		
10/14/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Removed BWALL from Related/Dependent Submissions</li> <li>Amended Figure 3, Changed MINDE to JOBOT</li> </ul>		
11/12/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Made editorial changes to the Proposed Final Design and Implementation Dependencies</li> </ul>		

# CLT OAPM Design Package

CLT STARs, NW FILPZ

Name of Change	Date
FILPZ ARRIVAL (RNAV)	12 November 2014
Change Classification	Current Phase of Design
Terminal Procedure (RNAV SID)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
Northwest Arrivals Proposed Procedures	15 October 2015
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Atlanta ARTCC (ZTL) Sectors: 31, 42, 43, 44, 47, 48 and 50 Charlotte ATCT (CLT) Positions: Arrival Radar West (ARW), Departure Radar West (DRW), Satellite North (SATN) Indianapolis ARTCC (ZID) Sectors: 86 and 96	ZTL: Roger Cerovsky, Bill Wise CLT: Roland Alexander, James Williams ZID: Tom Dury, John Pierce
Related/Dependent Submissions	Associated Data Files
<b>Airspace Design Packages</b> <ul style="list-style-type: none"> <li>• CLT: ARW, DRW, SATN</li> <li>• ZTL: Sectors 42, 43, 44, 47, 48, 49 (ATL OAPM), 50</li> </ul> <b>Procedure Design Packages</b> <ul style="list-style-type: none"> <li>• CLT SID: JOJJO</li> <li>• CLT STARs: BTSEY, LIINN, PARQR</li> <li>• GSP SIDs: BIMMR</li> </ul>	Master TARGETS File

# CLT OAPM Design Package

## CLT STARs, NW FILPZ

### Purpose

The northwest STAR was designed to reduce track miles, minimize level-offs and allow flexibility for multiple runway transitions. The procedure reduces controller complexity and adds optimization for the user.

The proposed northwest RNAV OPD STAR provides more direct routing to the CLT boundary when compared with the en route transitions on the currently published STAR from Volunteer (VXV), Charleston WV (HVQ), Holston Mountain (HMV), and Falmouth (FLM) to maximize efficiency of the airport arrival flows while reducing controller workload complexity.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

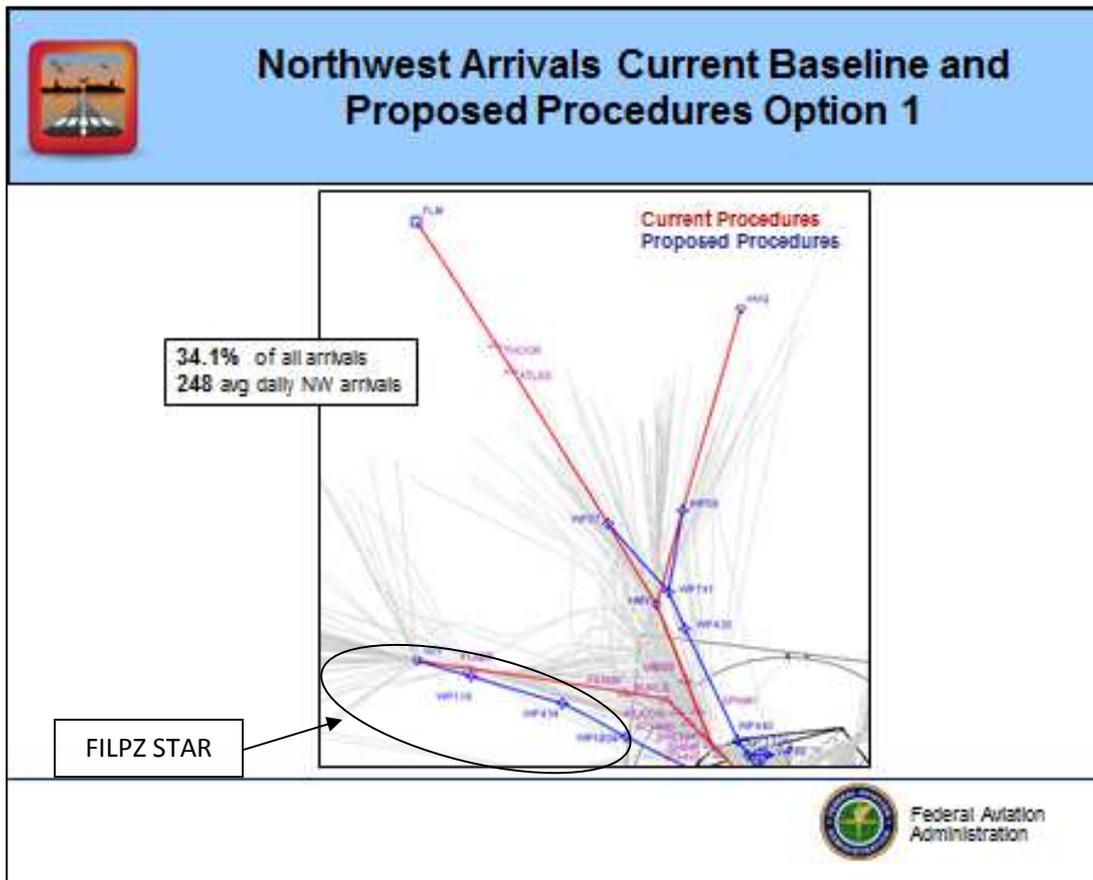


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT STARs, NW FILPZ

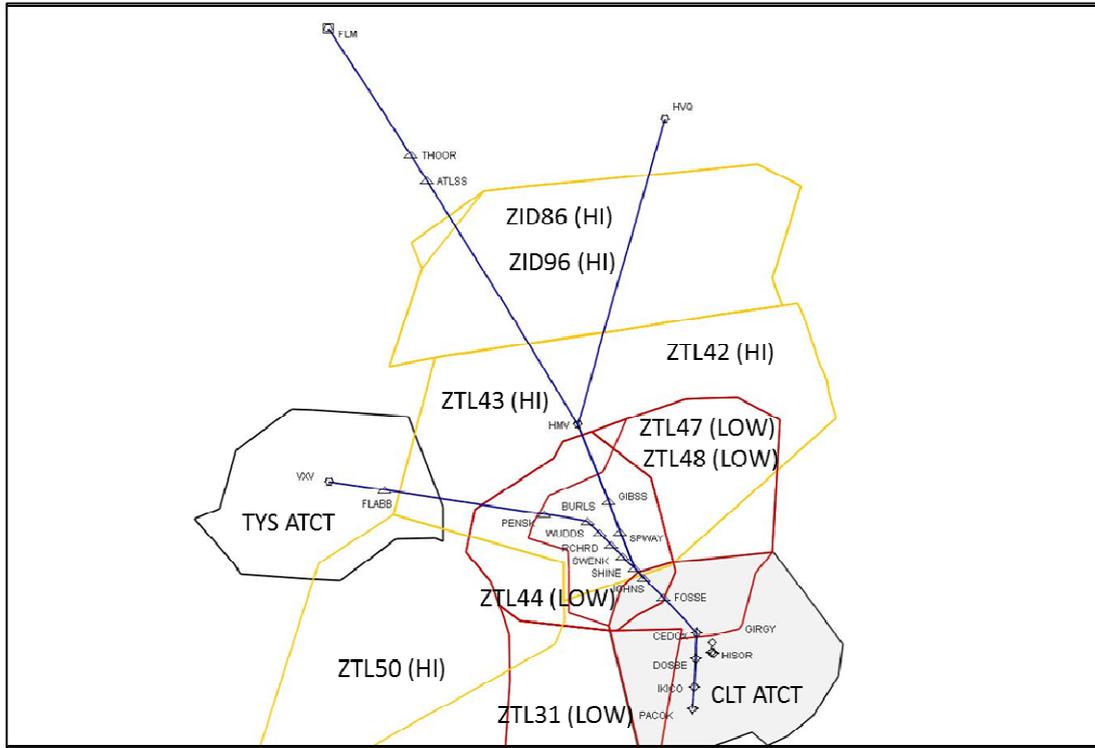


Figure 2. Original Procedure, Route, and Airspace

### Proposed Final Design

The Design Team developed the FILPZ STAR with multiple en route transitions to replace the existing SHINE STAR. In a south operation, there is an increase in track miles over the Design Team procedure versus the notional Study Team procedure. This increase in track miles is a direct result of the Design Team's charter to transcribe the notional Study Team procedure into a viable procedure through a consensus between the Air Traffic facilities and Industry. The aggregate of the Design Team's northwest STARs and SIDs track mile savings were determined to outweigh the slight reduction in the Study Team's notional procedures. Overall, the new northwest procedures reduce track miles, simplify airspace and reduce controller task complexity. Table 1 depicts the additional track miles reduction and track miles increase compared to the Study Team recommendation.

# CLT OAPM Design Package

## CLT STARs, NW FILPZ

Table 1. Estimated Mileage Reduction/Increase as Compared to Study Team

	Study Team Route	RWY 18	RWY 23	RWY 36
Additional Savings (NM) As Compared To Study Team Route From SKYWA	Option 1	-2.38	--	2.66
	Option 2	-2.06	--	3.86
Additional Savings (NM) As Compared To Study Team Route From TAZZA	Option 1	-1.75	--	3.3
	Option 2	-1.43	--	4.5

The FILPZ incorporates a profile descent. This procedure, in conjunction with the PARQR STAR, replaces the existing SHINE STAR. This design enables more efficient lateral paths which provide reduction in miles flown. This design also reduces task complexity by segregating diverse arrival flows. The Design Team determined that two en route transitions were necessary to better manage the traffic flows. The SKYWA transition is used to serve traffic from the western side of Indianapolis ARTCC (ZID). The TAZZA transition will serve traffic routed from Memphis ARTCC (ZME).

The final design, which has transitions for all Charlotte runways, is the result of collaboration and consultation with ZTL, CLT, ZID, GSP, AVL, our industry partner U.S. Airways and the Atlanta OAPM Team. The final design required several airspace changes in the Center environment and a redesign of CLT TRACON airspace.

On a North Operation the procedure ends at DOSBE at 6000' for Runway 36L/C/R.

On a South Operation the procedure ends at FISHN at 7,000' on Base Leg. The position of the base is such that aircraft can be easily flowed to 18R/C/L and is approximately 7 miles south of the PARQR base leg.

This STAR is designed for jet aircraft only. In addition to Charlotte Douglas (CLT) this star will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP). Holding is established at FILPZ (left turns 10 NM legs) or at PHAYE (left turns 10 NM legs). The following waypoints were designed on the procedure.

- SKYWA - Initial point for traffic from the western side of Indianapolis ARTCC (ZID)
- TAZZA - Initial point for traffic routed from Memphis ARTCC (ZME)
- COMDY - Start of the common route
- BLAYQ - Waypoint to protect for Q-40 AOA FL240 @ 270 knots
- PHAYE - AOA FL240 @ 270 knots
- JJENY - Between FL190 and FL270
- FLIPZ - AOA 17,000
- CHLOW- AOA 12,000 @ 260 knots (South Operation)
- JOBOT - Between 11,000 and 12,000 @ 250 (South Operation)
- ERHRT - AOB 10,000 (South Operation)

# CLT OAPM Design Package

## CLT STARs, NW FILPZ

- FISHN - At 7,000 @ 210 knots (South Operation)
- BACKK - Between 12,000 and FL190 @ 260 knots
- INWAL - Between 11,000 and 15,000 @ 250 knots
- JELNO - Between 10,000 and 12,000
- WELKY- Between 10,000 and 11,000 @220 knots
- CEDOX - Between 9,000 and 11,000@ 210 knots
- DOSBE - At 6,000 @ 210 knots

Figure 3 depicts the Proposed Final Design.

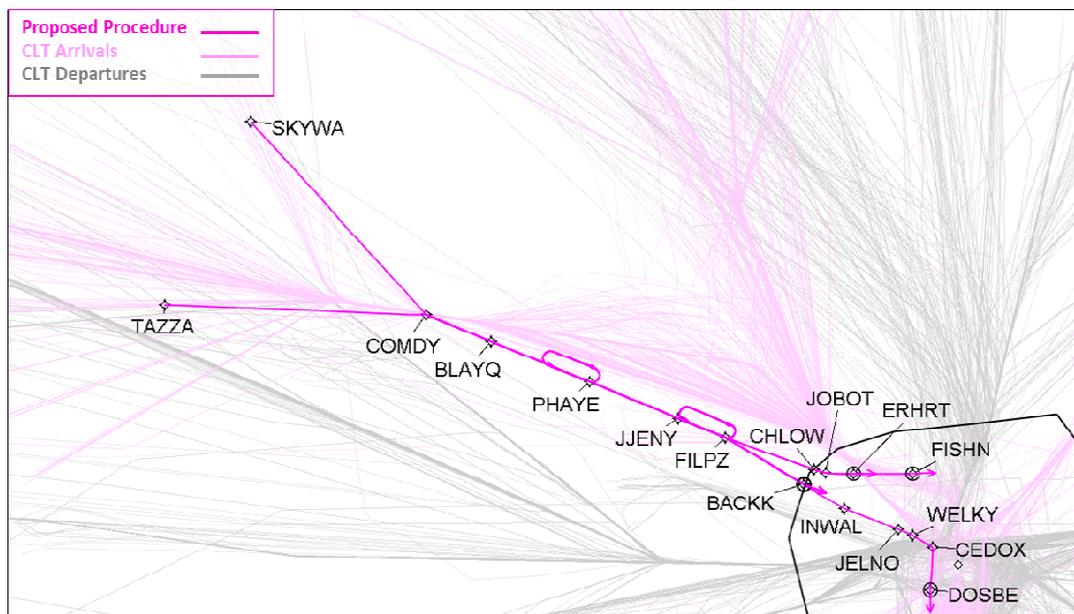


Figure 3. Proposed Final Design

### Additional Design Considerations

A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure.

### Implementation Dependencies

- The BTSEY, PARQR, and LIINN STARs and the JOJJO SID must be implemented at the same time to insure lateral separation
- Airspace sector modifications
  - CLT Arrival Radar West, Departure Radar West, and Satellite Radar North were modified to accommodate the FILPZ STAR
  - ZTL Sectors 42, 43, 44, 47, 48, 49, and 50
    - ZTL Sector 44 accommodates the arrival holding pattern

# CLT OAPM Design Package

## CLT STARs, NW FILPZ

- ZTL Sector 42, ZTL Sector 43 and ZTL Sector 50 permits track mileage savings and allows the STARs to remain within a single sector's airspace
- ZTL 47 aligns with ZTL 42 and 43 airspace changes
- ZTL 48 allows a lower shelf in CLT airspace for the new NW STARs
- ZTL 49 aligns with the ZTL 44 airspace change
- ZTL Sector 42 and ZTL Sector 43 changes permit higher tops of descent

To maximize arrival capacity utilizing all CLT OPD STARs, a robust traffic management metering tool should be developed, evaluated and incorporated into the Traffic Management System. OPDs are relatively new with regard to Traffic Management. There are no definitive standards regarding miles-in-trail (MIT) or time requirement to initiate an OPD and still maintain appropriate separation to terminal airspace. Additionally, current Traffic Management Advisory (TMA) adaptation does not provide a seamless merge of dual arrival flows at a corner post or multiple flows in the approach environment to a single runway to the finite degree needed to allow aircraft to take full advantage of an OPD. Discussion with the National TMA/Time Based Flow Management (TBFM) Operations Team has advised that future enhancements to TMA/TBFM should address these concerns.

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZID sector boundary maps
- ZTL/ZID Letter of Agreement (LOA)
- ZTL/ZME Letter of Agreement (LOA)
- ZTL/CLT Letter of Agreement (LOA)
- ZID Standard Operating Procedures (SOP)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- ERAM and STARs Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedure (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- Enroute Decision Support Tool (EDST)

### Attachments

- FILPZ TARGETS Distribution Package
- FILPZ RNAV PRO results
- FILPZ RNAV 7100-3
- FILPZ RNAV 7100-4
- FILPZ RNAV 8260.2 Worksheets

# CLT OAPM Design Package

CLT STARs, NW LIINN

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/02/2013	<ul style="list-style-type: none"> <li>• Changed Current Date</li> <li>• Changed implementation date</li> <li>• In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP).</li> </ul>		
10/09/2013	<ul style="list-style-type: none"> <li>• Added Current Date</li> <li>• Updated Related/Dependent Submissions per the ATL and CLT OAPM Airspace and Procedures Dependencies v4</li> <li>• Editorial Changes</li> </ul>		
12/11/2013	<ul style="list-style-type: none"> <li>• Changed current date</li> <li>• Changed proposed date</li> </ul>		
01/23/2014	<ul style="list-style-type: none"> <li>• Changed current date</li> <li>• Added BECKUM and LOONE intersections</li> </ul>		
05/14/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Amended proposed implementation date</li> <li>• Editorial changes</li> </ul>		
05/30/2014	<ul style="list-style-type: none"> <li>• Updated Figure 2</li> </ul>		
06/17/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Amended proposed implementation date</li> </ul>		
06/25/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Changed proposed date</li> <li>• Changed current to original</li> <li>• Removed phone numbers</li> </ul>		
10/21/2014	<ul style="list-style-type: none"> <li>• Amended Current Date</li> <li>• Removed BWALL from Related/Dependent Submissions</li> <li>• Added the GSP BIMMR SID to the Implementation Dependencies</li> </ul>		
11/12/2014	<ul style="list-style-type: none"> <li>• Amend current date</li> <li>• Updated Implementation Dependencies</li> </ul>		

# CLT OAPM Design Package

CLT STARs, NW LIINN

Name of Change	Date
<b>LIINN ARRIVAL</b>	<b>12 November 2014</b>
Change Classification	Current Phase of Design
Terminal Procedure (Conventional STAR)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Northwest Arrivals Proposed Procedures</b>	<b>15 October 2015</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Charlotte ATCT (CLT) Positions: Departure Radar West (DRW), Arrival Radar West (ARW), Satellite North (SATN) Atlanta ARTCC (ZTL) Sectors: 42, 43, 44, 47, 48 and 50	CLT: Roland Alexander, James Williams ZTL: Roger Cerovsky, Bill Wise 770.210.7622
Related/Dependent Submissions	Associated Data Files
<b>Airspace Design Packages</b> <ul style="list-style-type: none"> <li>• CLT: ARW, DRW, SATN</li> <li>• ZTL: Sectors 42 , 43, 44, 47, 48, 49, 50</li> </ul> <b>Procedure Design Packages</b> <ul style="list-style-type: none"> <li>• CLT SID: JOJJO</li> <li>• CLT STARs: BTSEY, FILPZ, PARQR</li> <li>• GSP SIDs: BIMMR</li> </ul>	Master TARGETS File

## Purpose

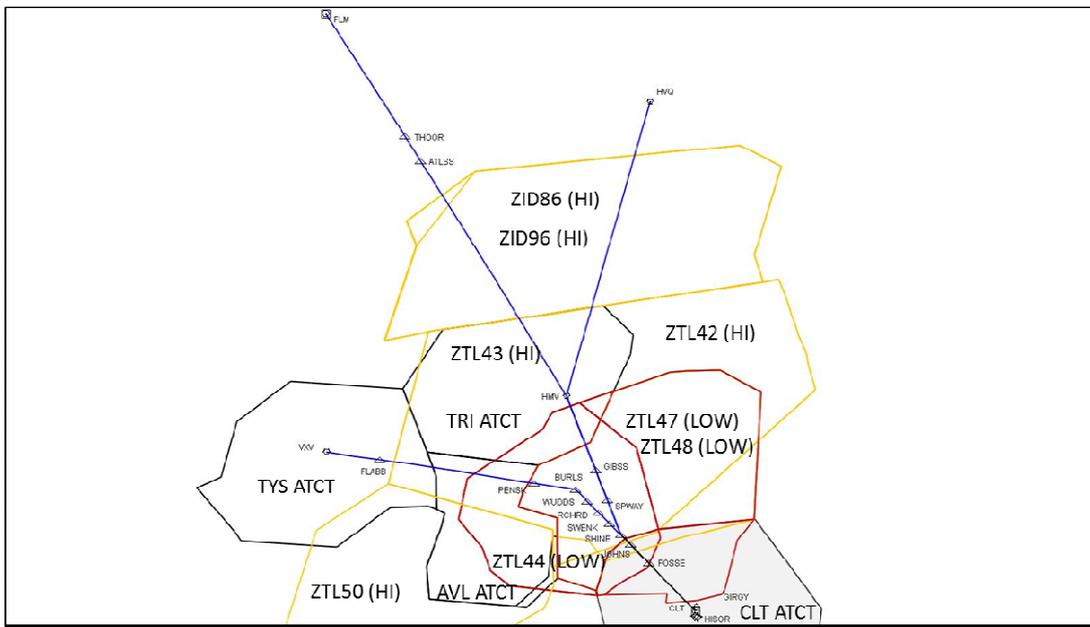
New OPD RNAV STARs require conventional STARs for non-RNAV aircraft to efficiently accommodate arrival traffic from the northwest.

The Charlotte OAPM Study Team recommended at least one conventional arrival be created at each corner post.

Figure 1 below depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CLT STARs, NW LIINN



### Proposed Final Design

The Design Team created the LIINN conventional STAR that closely aligns the lateral paths of the proposed FILPZ STAR. There are three transitions: the VXV transition for turbojets and the HMV and SOT transitions for turboprop and prop aircraft only. The original Design Team design was unusable for turbojets because of interference from the SOT VOR and the need to avoid the Linville Gorge. This procedure still provides a more direct routing than the current conventional arrival from VXV. In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP). Holding depicted at LIINN (right turns 10NM legs). The following fixes were designed on the procedure:

- VXV                    VXV transition initial fix; turbojets only
- HMV                    HMV transition initial fix; turboprop and prop aircraft only
- SOT                    SOT transition initial fix; turboprop and prop aircraft only
- WUUTN                Fix to permit altitude crossing restrictions to protect for GSP BWALL SID
- BECKM                Merge fix for all transitions and fix used for MEA
- CLRRY                Fix used for MEA
- LOOIE                Fix used for MEA
- LIINN                Holding fix
- CLT                    STAR termination fix

Figure 2 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT STARs, NW LIINN

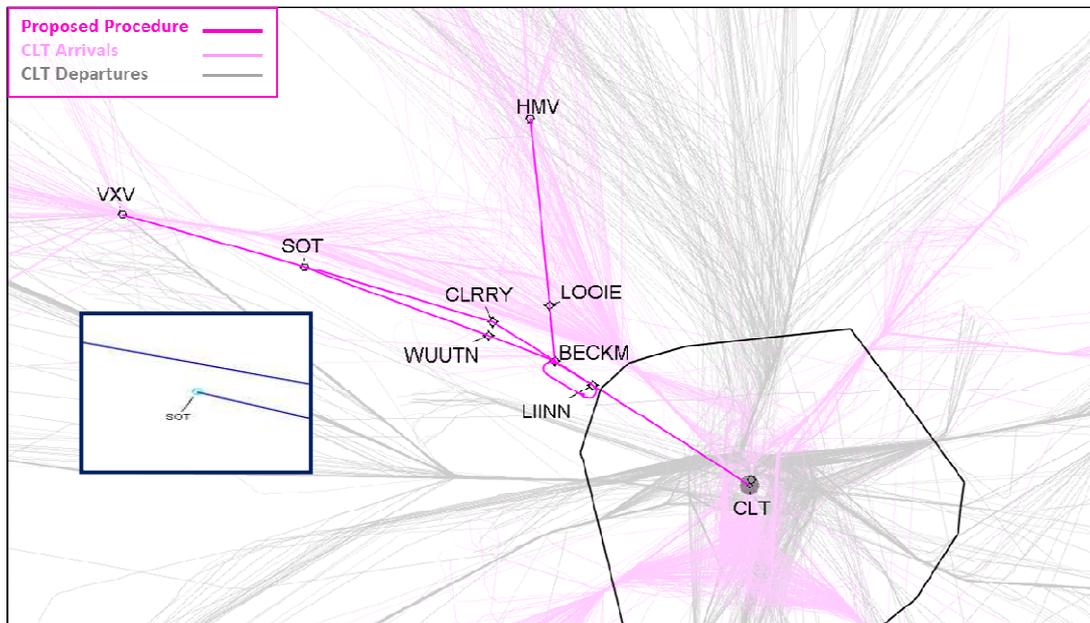


Figure 2. Proposed Final Design

### Additional Design Considerations

A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure.

Asheville ATCT (AVL), Tri-Cities ATCT (TRI) and ZID must be advised of the STAR change.

### Implementation Dependencies

- The BTSEY, PARQR, and FILPZ STARs and the JOJJO SID must be implemented at the same time to ensure lateral separation
- GSP BIMMR SID must be implemented at the same time to ensure lateral separation from the CLT northwest STARs
- Airspace sector modifications
  - CLT Arrival Radar West, Departure Radar West, and Satellite North were modified to accommodate the LIINN STAR
  - ZTL Sectors 42, 43, 44, 47, 48, 49, and 50
    - ZTL Sector 44 accommodates the STAR holding pattern
    - ZTL Sector 42, ZTL Sector 43 and ZTL Sector 50 changes permit track mileage savings and allows the STARs to remain within a single sector's airspace
    - ZTL 47 aligns with ZTL 42 and 43 airspace changes
    - ZTL 48 allows a lower shelf in CLT airspace for the new NW STARs
    - ZTL 49 aligns with the ZTL 44 airspace change
    - ZTL Sector 42 and ZTL Sector 43 changes permit higher tops of descent

# CLT OAPM Design Package

## CLT STARs, NW LIINN

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZTL/CLT Letter of Agreement (LOA)
- ZTL/ZID Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- ERAM and STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedure (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- En route Information Display System (ERIDS)
- Enroute Decision Support Tool (EDST)

### **Attachments**

- None

This procedure will be tracked, but not implemented via the OAPM process. This design package will be forwarded to the Eastern Service Center Operations Support Group for incorporation into the National Airspace System. The OAPM team will track its progress due to its correlation with the CLT FILPZ RNAV STAR and other CLT airspace design issues.

# CLT OAPM Design Package

CLT STARs, NW PARQR

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
02/09/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Changed Implementation Date</li> </ul>		
10/09/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Updated Related/Dependent Submissions per the ATL and CLT OAPM Airspace and Procedures Dependencies v4</li> <li>Added the following statement: In addition to Charlotte Douglas (CLT) this star will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP).</li> <li>Editorial Changes</li> </ul>		
10/31/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Added for jet aircraft only</li> </ul>		
04/22/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Editorial Changes</li> <li>Amended Implementation Date</li> </ul>		
05/13/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Added 10 NM holding</li> </ul>		
06/25/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed proposed date</li> <li>Changed current to original</li> <li>Removed phone numbers</li> </ul>		
07/31/2014	<ul style="list-style-type: none"> <li>Amended current Date</li> <li>Editorial changes</li> <li>Removed RUQ from airports served</li> </ul>		
10/14/2014	<ul style="list-style-type: none"> <li>Amended current Date</li> <li>Removed BWALL from Related/Dependent Submissions</li> </ul>		
11/12/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Minor editorial changes to proposed final design and implementation dependencies</li> </ul>		

# CLT OAPM Design Package

CLT STARs, NW PARQR

Name of Change	Date
<b>PARQR ARRIVAL (RNAV)</b>	<b>12 November 2014</b>
Change Classification	Current Phase of Design
Terminal Procedure (RNAV STAR)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
Northwest Arrivals Proposed Procedures – Option 1	15 October 2015
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Charlotte ATCT (CLT) Positions: Departure Radar West (DRW), Arrival Radar West (ARW), and Satellite North (SATN) Indianapolis ARTCC (ZID) Sectors: 86 and 96 Atlanta ARTCC (ZTL) Sectors: 42, 43, 44, 47 and 48	CLT: Roland Alexander, James Williams ZID: Tom Dury, John Pierce ZTL: Roger Cerovsky, Bill Wise
Related/Dependent Submissions	Associated Data Files
Airspace Design Packages <ul style="list-style-type: none"> <li>• CLT: ARW, DRW, SATN</li> <li>• ZTL: Sectors 42, 43, 44, 47, 48, 49, 50</li> </ul> Procedure Design Packages <ul style="list-style-type: none"> <li>• CLT SID: JOJJO</li> <li>• CLT STARs: BTSEY, FILPZ, LIINN</li> <li>• GSP SIDs: BIMMR</li> </ul>	Master TARGETS File

# CLT OAPM Design Package

## CLT STARs, NW PARQR

### Purpose

The northwest STAR was designed to reduce track miles and minimize level-offs and allow flexibility for multiple runway transitions. The procedure reduces controller complexity and adds optimization for the user. This arrival procedure will require coordination between ZID, the Atlanta Design Team, and Charlotte Design Team.

The proposed north STAR provides more direct routing to the CLT boundary when compared with the en route transitions on the currently published STAR from Volunteer (VXV), Charleston WV (HVQ), Holston Mountain (HMV), and Falmouth (FLM) to maximize efficiency of the airport arrival flows while reducing controller workload complexity.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

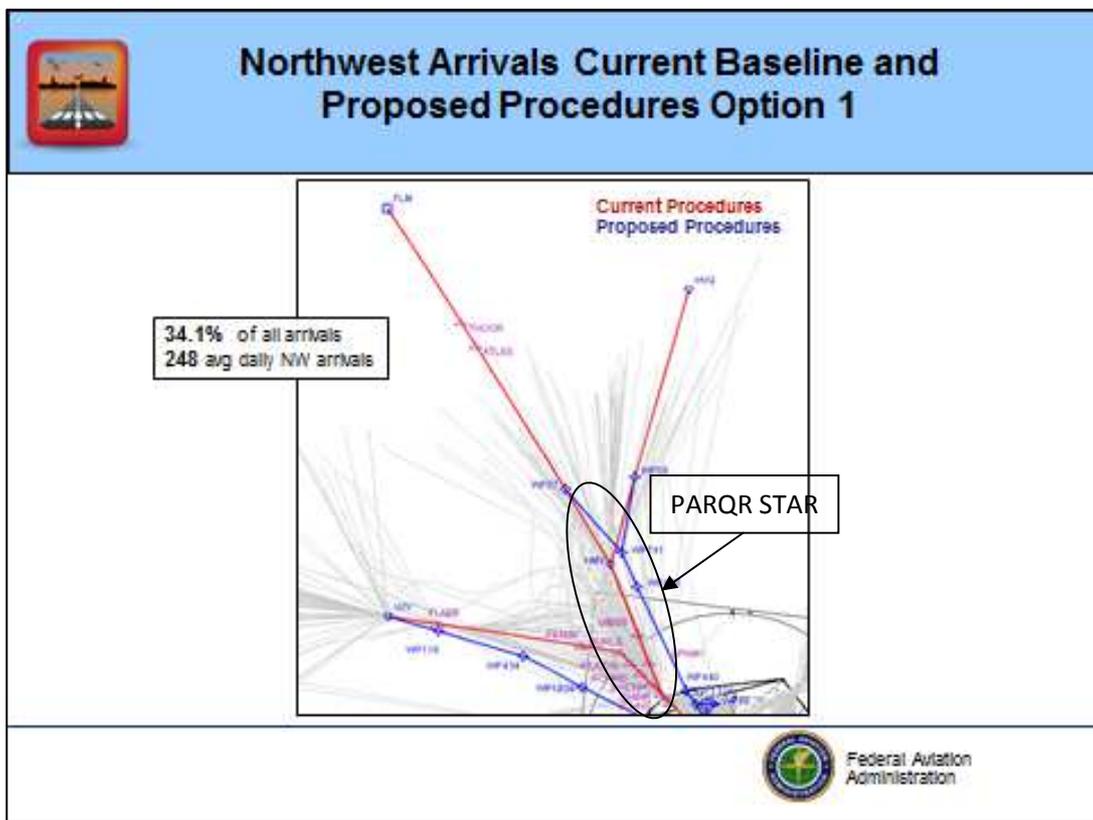


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT STARs, NW PARQR

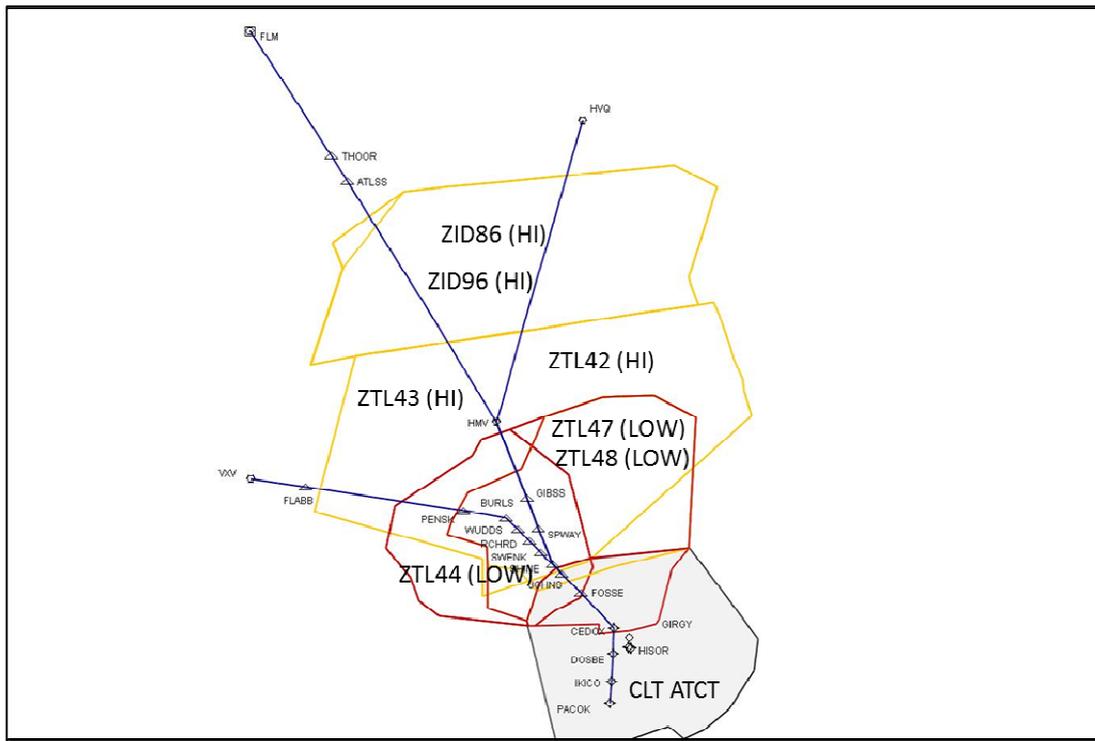


Figure 2. Original Procedure/Route/Airspace

### **Proposed Final Design**

The PARQR STAR begins at the ZID boundary with multiple en route transitions and replaces the existing SHINE STAR. In a south operation there is an increase in track miles in the Design Team procedure versus the notional Study Team procedure. This increase in track miles is a direct result of the Design Team's charter to transcribe the notional Study Team procedure into a viable procedure through a consensus between the Air Traffic facilities and Industry. The aggregate of the Design Team's northwest STARs and SIDs track mile savings were determined to outweigh the slight reduction in the Study Team's notional procedures. Overall, the new northwest procedures reduce track miles, simplify airspace and reduce controller task complexity.

Table 1 depicts the additional track miles reduction and track miles increase compared to the Study Team recommendation.

# CLT OAPM Design Package

## CLT STARs, NW PARQR

Table 1. Estimated Mileage Reduction/Increase as Compared to Study Team

	Study Team Route	RWY 18	RWY 23	RWY 36
<b>Additional Savings (NM) As Compared To Study Team Route From TAFTT</b>	<b>Option 1</b>	<b>-0.03</b>	--	<b>4.1</b>
	<b>Option 2</b>	<b>-0.12</b>	--	<b>4.19</b>
<b>Additional Savings (NM) As Compared To Study Team Route From LNDIZ</b>	<b>Option 1</b>	<b>3.62</b>	--	<b>5.54</b>
	<b>Option 2</b>	<b>7.24</b>	--	<b>9.34</b>

This procedure incorporates an optimized profile descent. This procedure, in conjunction with the FILPZ STAR, replaces the existing SHINE STAR. This design enables more optimized lateral paths which provide reduction in miles flown. This design also reduces task complexity by segregating diverse arrival flows. The LNDIZ transition is used to serve CLT arrival traffic from over the HVQ VOR. The TAFTT transition will serve CLT arrival traffic routed over FLM VOR.

The final design, which has transitions for all Charlotte runways, is the result of collaboration and consultation with ZTL, CLT, ZID, GSP, AVL, our industry partner U.S. Airways and the Atlanta OAPM Team. The final design required several airspace changes in the Center environment and a redesign of CLT TRACON airspace.

On a South Operation the procedure is optimized to CAMPR at 9000' on Base Leg. The position of the base is such that aircraft can be easily flowed to 18R/C/L and is in an excellent position to serve 18C in a triple ILS configuration. This base is approximately 7 miles north of the FILPZ base. In order to accommodate the OPD, CLT ATCT will acquire a 10,000' shelf in Sector 48 airspace.

On a North Operation the procedure ends at DOSBE but is only optimized to BBQEE at 12,000. This decision was made so as to ensure separation from the FILPZ OPD.

This STAR is designed for jet aircraft only. In addition to Charlotte Douglas (CLT) this star will serve the following airports: Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP). Holding is established at PARQR (left turns 10 NM legs), SUZNN (left turns 10 NM legs) and at WILUM (left turns 10 NM legs). LIINN (right turns 10 NM legs) will be used for offload holding.

The following waypoints were designed on the procedure:

- TAFTT - Is the initial point of the transition on the STAR for aircraft arriving over FLM VOR
- MAHAF – Between FL240 and FL330 @ 270 knots
- SCRZA - Vector return point and altitude crossing fix to protect ZID and ZTL airspace
- LNDIZ – Is the initial point of the transition on the STAR for aircraft arriving over HVQ VOR with an altitude constraint between FL240 and FL330 @ 270 knots
- CITUS- Vector return point and altitude crossing fix to protect ZID and ZTL airspace
- WILUM – Between FL240 and FL330 @ 270 knots, Holding fix

# CLT OAPM Design Package

## CLT STARs, NW PARQR

- SUZNN - AOA FL190 @ 270 knots, Holding fix
- PARQR - End of common route between 12,000 and FL200 @ 250 knots, Holding fix
- NCOMA - AOA 11,000, defines CLT 10,000 shelf on a south operation and protects V20
- BOATN - Waypoint for base leg on south operation between 9,000 and 10,000
- CAMPR - 9,000 @ 220 KNOTS(South Operation)
- PAYKN - Between 12,000 and 16,000 @ 250 KNOTS
- BBQEE - 12,000 @ 220 knots
- HIKNG - Waypoint to provide lateral separation from FILPZ STAR
- CEDOX - Waypoint to provide vertical separation from FLIPZ STAR
- DOSBE - Termination point of the STAR on a North Operation
- BLAKE - 7000 @ 210 knots (runway 23)

Figure 3 depicts the Proposed Final Design.

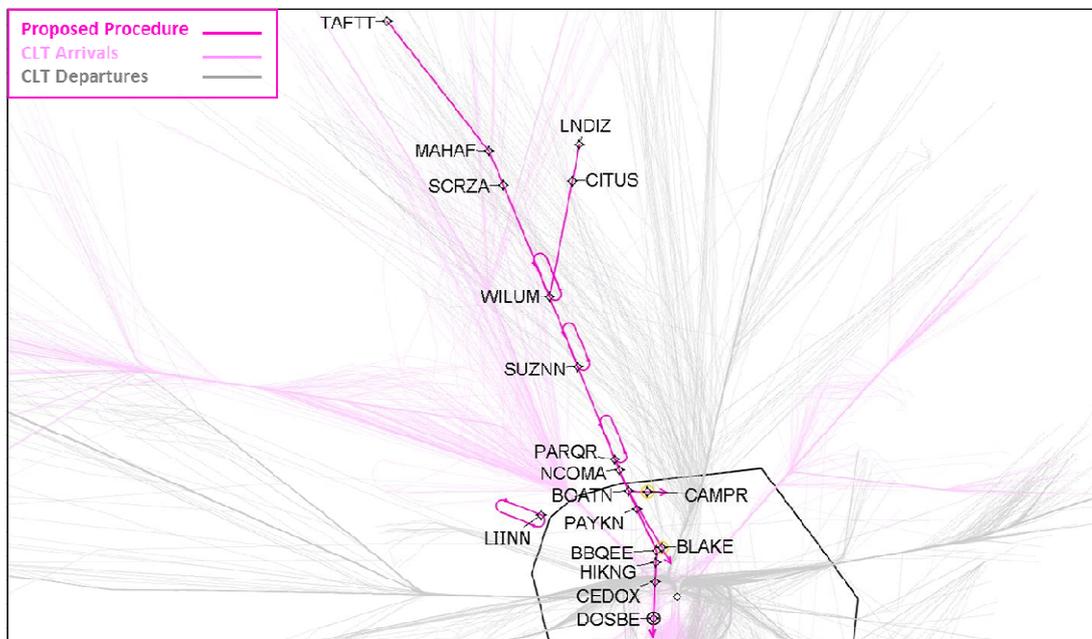


Figure 2. Proposed Final Design

### Additional Design Considerations

A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure.

### Implementation Dependencies

- The BTSEY, FILPZ, and LIINN STARs and the JOJJO SID must be implemented at the same time to ensure lateral separation
- Airspace sector modifications

# CLT OAPM Design Package

## CLT STARs, NW PARQR

- CLT Arrival Radar West, Departure Radar West, and Satellite Radar North were modified to accommodate the northwest STARs
- ZTL Sectors 42, 43, 44, 47, 48, 49, and 50
  - ZTL Sector 44 accommodates the arrival holding pattern
  - ZTL Sector 42, ZTL Sector 43 and ZTL Sector 50 permits track mileage savings and allows the STARs to remain within a single sector's airspace
  - ZTL 47 aligns with ZTL 42 and 43 airspace changes
  - ZTL 48 allows a lower shelf in CLT airspace for the new NW STARs
  - ZTL 49 aligns with the ZTL 44 airspace change
  - ZTL Sector 42 and ZTL Sector 43 changes permit higher tops of descent

To maximize arrival capacity utilizing all CLT OPD STARs, a robust traffic management metering tool should be developed, evaluated and incorporated into the Traffic Management System. OPDs are relatively new with regard to Traffic Management. There are no definitive standards regarding miles-in-trail (MIT) or time requirement to initiate an OPD and still maintain appropriate separation to terminal airspace. Additionally, current Traffic Management Advisory (TMA) adaptation does not provide a seamless merge of dual arrival flows at a corner post or multiple flows in the approach environment to a single runway to the finite degree needed to allow aircraft to take full advantage of an OPD. Discussion with the National TMA/Time Based Flow Management (TBFM) Operations Team has advised that future enhancements to TMA/TBFM should address these concerns.

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZID sector boundary maps
- ZTL/ZID Letter of Agreement (LOA)
- ZTL/CLT Letter of Agreement (LOA)
- ZID Standard Operating Procedures (SOP)
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- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- Enroute Decision Support Tool (EDST)

### Attachments

- PARQR TARGETS Distribution Package
- PARQR RNAV PRO results
- PARQR RNAV 7100-3
- PARQR RNAV 7100-4
- PARQR RNAV 8260.2 Worksheets

# CLT OAPM Design Package

CLT STARs, NE CHSLY

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/02/2013	<ul style="list-style-type: none"> <li>Changed Current Date</li> <li>Changed Implementation date</li> </ul>		
09/18/2013	<ul style="list-style-type: none"> <li>Need to add NUUMN (36° 9' 53.78" 79° 23' 38.70") as a charted WP to accommodate traffic to transition between FKN and LYH transitions</li> <li>Need to add CLT charted WP and HEELZ WP charted</li> </ul>		
09/19/2013	<ul style="list-style-type: none"> <li>SLPOH- 10,000/FL210</li> <li>JOHSN- 8,000/10,000 @ 210 knots</li> <li>CHINZ- Charted WP ATC use for traffic landing RWY18C/18R</li> <li>HEELZ- Charted WP ATC use</li> </ul>		
10/09/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Updated Related/Dependent Submissions per the ATL and CLT OAPM Airspace and Procedures Dependencies v4</li> <li>Added the following statement: In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP).</li> <li>Editorial Changes</li> <li>Changed LIB to FKN</li> <li>Changed altitude at FEDOX from FL240B260 to FL240B270</li> <li>Removed LISAW</li> <li>Removed speed from BLNCO and changed to AOA 7,000</li> <li>JAMGO changed to 10,000/16,000</li> </ul>		
10/31/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Added for jet aircraft only</li> </ul>		
12/11/2013	<ul style="list-style-type: none"> <li>Changed Current Date</li> <li>Changed Proposed Date</li> </ul>		
12/20/2013	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Removed 210 Speed Restriction at JEPHS</li> </ul>		
01/09/2014	<ul style="list-style-type: none"> <li>Added holding altitudes</li> </ul>		
01/14/2014	<ul style="list-style-type: none"> <li>Updated Figure 3</li> <li>Added Figure 4</li> </ul>		
06/25/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed Proposed Implementation Date</li> </ul>		

# CLT OAPM Design Package

CLT STARs, NE CHSLY

7/30/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Added GSO Shelf as a consideration to Implementation Dependencies</li><li>• Editorial changes</li></ul>		
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# CLT OAPM Design Package

CLT STARs, NE CHSLY

Name of Change	Date
CHSLY ARRIVAL (RNAV)	30 July 2014
Change Classification	Current Phase of Design
Terminal Procedure (RNAV STAR)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
Northeast Arrivals Proposed	Proposed 31 May 2016
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Charlotte ATCT Positions: Arrival Radar East (ARE), Departure Radar East (DRE), Departure Radar West (DRW) Atlanta ARTCC (ZTL) Sectors: 29, 33 and 47 Washington ARTCC (ZDC) Sectors: 07, 27, 32, 36	ZTL: Roger Cerovsky, Bill Wise 770.210.7622 ZDC: Joe Keimig, Curt Johnson 703.771.3435 CLT: Roland Alexander, James Williams 704.359.1020
Related/Dependent Submissions	Associated Data Files
Airspace Design Packages <ul style="list-style-type: none"> <li>• CLT: ARE, DRE, DRW</li> <li>• ZDC: Sectors 27, 32, 36</li> <li>• ZTL: Sectors 29, 30, 33, 47</li> </ul>	Master TARGETS File

## Purpose

The NE STAR was designed to minimize level-offs and allow flexibility for multiple runway transitions. The procedure reduces controller complexity and adds optimization for the user. This arrival procedure will require coordination between ZDC, ZTL and CLT.

The proposed STAR will be an Optimized Profile Descent (OPD). It will allow for less verbiage between controllers and pilots, therefore reducing the possibility of hear back/read back errors. The advantage for the user is that not only are there less level offs but there will be a chance for significant fuel savings flying the profile.

Figure 1 below depicts the Study Team Recommendation. Figure 2 below depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

CLT STARs, NE CHSLY

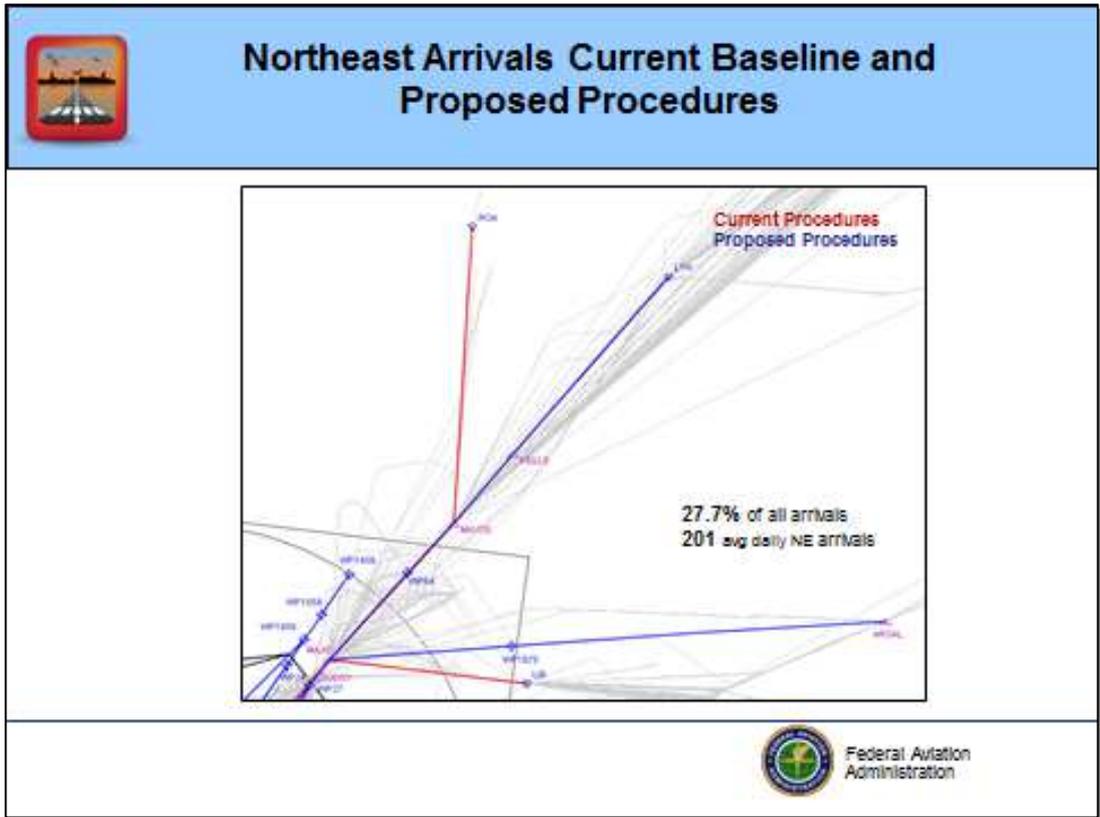


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT STARs, NE CHSLY

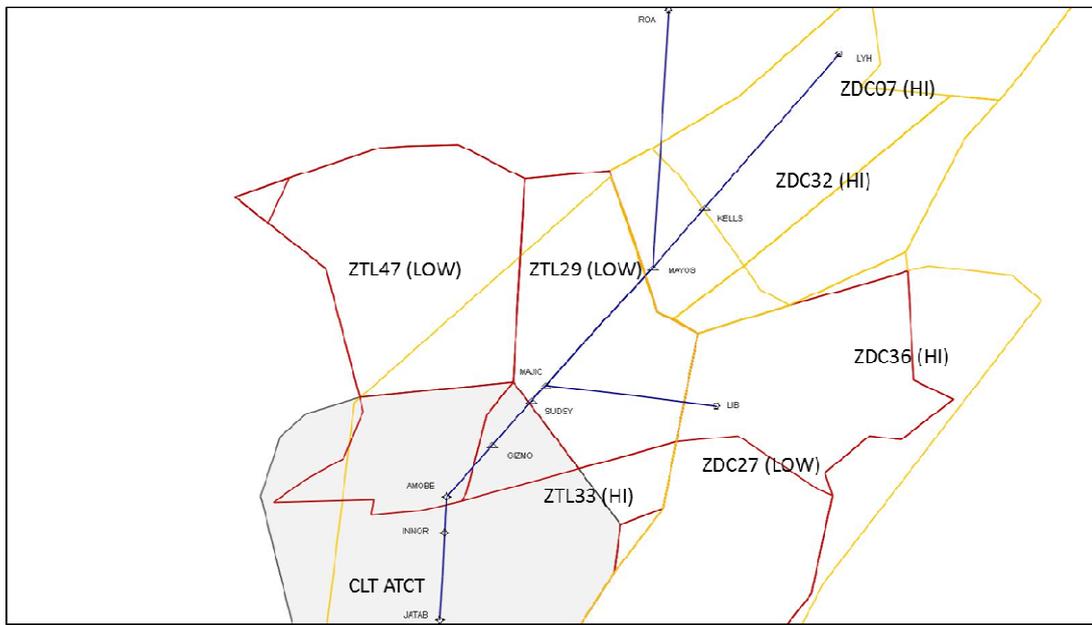


Figure 2. Original Procedure/Route/Airspace

### Proposed Final Design

The Design Team improved on the Study Team proposal by raising altitude constraints on the optimized procedure. Currently aircraft filed over FKN are capped at FL220 to de-conflict with the Washington Metro traffic; with the new procedure the arrival aircraft will be at a much higher altitude. In a south operation there is a reduction in benefit in the Design Team procedure versus the notional Study Team procedure. This reduction in benefits is a direct result of the Design Team’s charter to transcribe the notional Study Team procedure into a viable procedure through a consensus between the Air Traffic facilities and Industry. The aggregate of the Design Team’s northeast STAR’s track mile savings were determined to outweigh the slight reduction in the Study Team’s notional procedures. Overall, the new northeast procedures save track miles, simplify airspace and reduces controller task complexity. Table 1 depicts the additional track miles saved compared to the Study Team recommendation.

Table 1. Additional Track Mile Savings from the Design Team Proposal

	RWY 23	RWY 36
<b>Additional Savings (NM) As Compared To Study Team Route From LYH/SAGGY</b>	<b>-0.4</b>	<b>3.91</b>
<b>Additional Savings (NM) As Compared To Study Team Route From FKN</b>	<b>-0.13</b>	<b>5.43</b>

# CLT OAPM Design Package

## CLT STARs, NE CHSLY

The final design, which has transitions for all Charlotte runways, is the result of collaboration and consultation with ZTL, CLT, ZDC, GSO, our industry partner U.S. Airways and the Atlanta OAPM Team. The final design required several airspace changes in the Center environment, an airspace shelf from GSO and a redesign of CLT TRACON airspace.

On a North Operation the procedure ends at EPAYE at 6000' for Runway 36R/C/L.

On a South Operation for Runway 23, the procedure ends at JEPHS at or above 6,000' and provides a transition to the Runway 23 ILS. Aircraft landing on the south parallels fly the JOHSN transition, which aims the aircraft at the "normal" location where aircraft are generally vectored during Runway 18 ILS approaches. The Design Team spent countless sessions attempting to design a Runway 18 procedure which ended near the CLT final airspace at 6,000' and 210 knots. Issues with the 10 NM requirement for controllers assigning runway transitions and the need to acquire additional airspace from GSO in order to meet the altitude and speed requirements for a 6,000' and 210 knot waypoint proved too difficult to overcome. The Design Team deliberated between the proposed design and a design similar to the current IVANE, which would add track miles in order to meet the speed and altitude constraints for a waypoint near CLT Final Airspace. The team agreed the proposed design is the best option.

Stand-alone waypoints are charted for the following reasons:

- NUUMN for aircraft transitioning from the LYH transition to the FKN transition
- HEELZ for aircraft transitioning from the Runway 18 transition(s) to Runway 18L
- CHINZ for aircraft transitioning from the Runway 18 transition(s) to Runway 18C/18R.

Ancillary to the changes on the new arrival, RDU arrival and departure traffic will have higher altitude constraints.

This STAR is designed for jet aircraft only. In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP). Aircraft on the LYH transition will hold at WRLLD (right turns, AOA FL220) and BLUEJ (right turns, AOA FL220). Aircraft on the FKN transitions will hold at FEDOX (right turns, AOA 16,000) or PELTS (right turns, AOA FL240). Aircraft on both transitions can hold at CHSLY (left turns, AOA 13,000). All holding patterns have 10 NM leg lengths. The following waypoints were designed on the procedure:

- LYH Initial fix on the transition
- BEMOH No altitude or speed restrictions
- WRLLD Holding fix
- BLUEJ Holding fix AOA FL270
- BURRZ FL240/FL270 @ 280knots
- SKLES AOA220 @ 280 knots
- DENTT AOA 16,000 @ 270 knots
- CHSLY Holding fix 13,000/FL220 @ 250 knots

# CLT OAPM Design Package

## CLT STARs, NE CHSLY

- FKN Initial fix on the transition
- ARGAL No altitude or speed restrictions
- PELTS Holding fix
- FEDOX Holding fix FL240/FL270 @ 280 knots
- SDAIL AOA FL230 @280 knots
- WLLSH AOA 160 @ 270 knots
- SUDSY AOA 11,000
- SLPOH 10,000/FL210, start of runway transitions
- NODEW 8,000/9,000 @ 230 knots (runway 23)
- BLNCO AOA 7,000 (runway 23)
- JEPHS AOA 6,000 (runway 23)
- JAMGO 10,000/16,000 @ 250 knots
- CAATT 9,000 @ 210 knots
- EPAYE AOA 6000
- JOHSN 8,000/10,000 @ 230 knots
- CHINZ Charted WP ATC use for traffic landing RWY18C/18R
- HEELZ Charted WP ATC use
- NUUMN Charted WP ATC use for weather reroute from LYH transition to FKN transition

Figures 3 and 4 below depict the proposed final design.

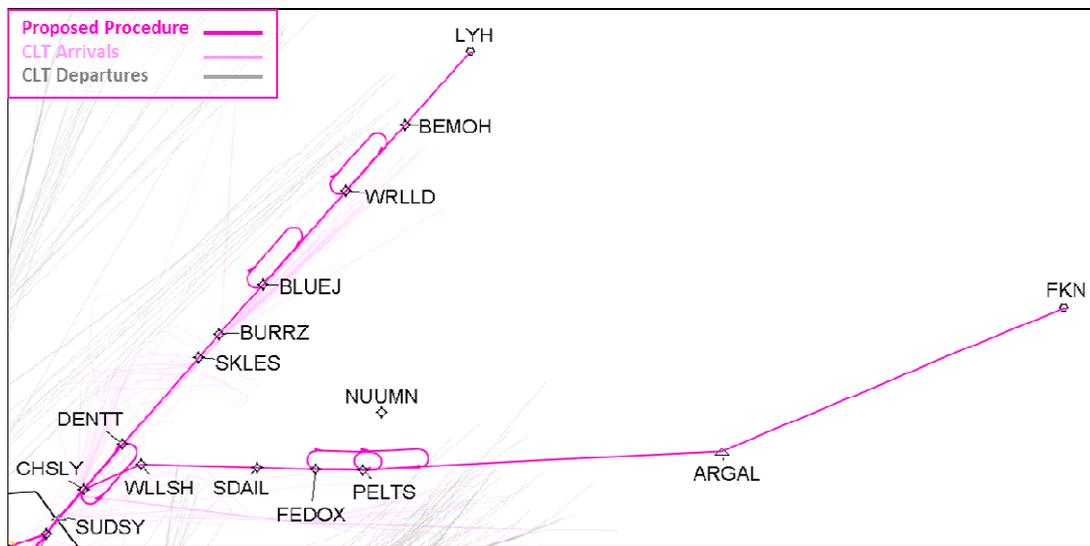


Figure 3. Proposed Final Design En route Segments

# CLT OAPM Design Package

## CLT STARs, NE CHSLY

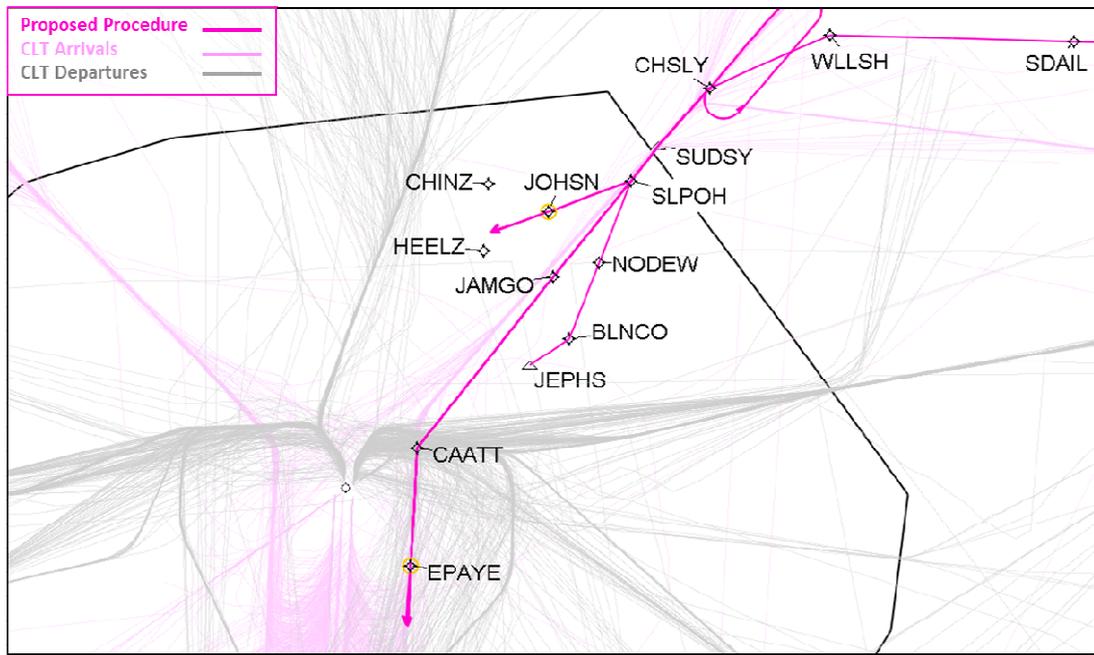


Figure 4. Proposed Final Design Terminal Segments

### Additional Design Considerations

A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure.

Letter of Agreement must specifically detail the RDU Shelf dimensions.

### Implementation Dependencies

The RDU Shelf will be defined by altitude and assigned to ZTL Sector 29 in the ZTL/ZDC Letter of Agreement.

Airspace sector modifications include:

- CLT Departure Radar East and Arrival Radar East airspace was realigned to accommodate the CHSLY STAR
- ZTL29, ZTL33 and ZTL47 airspace were realigned to accommodate the CHSLY STAR
- ZDC22 and ZDC32 (GVE shelf) was redesigned to accommodate higher altitude constraints for RDU departures and higher altitude constraints for the CHSLY STAR
- ZDC27 and ZDC36 (RDU shelf) was realigned to accommodate the CHSLY STAR

While not required the implementation of the GSO shelf would facilitate descents for aircraft that have been vectored off route.

To maximize arrival capacity utilizing all CLT OPD STARs, a robust traffic management metering tool should be developed, evaluated and incorporated into the Traffic Management System. OPDs are

# CLT OAPM Design Package

## CLT STARs, NE CHSLY

relatively new with regard to Traffic Management. There are no definitive standards regarding miles-in-trail (MIT) or time requirement to initiate an OPD and still maintain appropriate separation to terminal airspace. Additionally, current Traffic Management Advisory (TMA) adaptation does not provide a seamless merge of dual arrival flows at a corner post or multiple flows in the approach environment to a single runway to the finite degree needed to allow aircraft to take full advantage of an OPD. Discussion with the National TMA/Time Based Flow Management (TBFM) Operations Team has advised that future enhancements to TMA/TBFM should address these concerns.

Document changes/modifications include:

- STAR filings with airline dispatchers
- ZTL Facility Operations and Administration Order 7230.2
- ZTL/ZDC Letter of Agreement (LOA)
- ZLT/CLT ATCT LOA
- CLT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARs Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- Standard Instrument Approach Procedures (SIAP) publication
- National Route Program (NRP) Database
- Airport Facility Directory (AFD) Preferential Routings verification (Green Book)
- Information Display and Dissemination System (IDS) updates
- Enroute Information Display System (ERIDS) updates
- User Request and Evaluation Tool (URET) updates

### Attachments

- CHSLY TARGETS Distribution Package
- CHSLY RNAV PRO results
- CHSLY RNAV 7100-3
- CHSLY RNAV 7100-4
- CHSLY RNAV 8260.2 Worksheets
- TMA Recommendations for CLT

# CLT OAPM Design Package

CLT STARs, SE STOCR

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
02/09/2013	<ul style="list-style-type: none"> <li>Added current date</li> <li>Changed Implementation Date</li> </ul>		
10/09/2013	<ul style="list-style-type: none"> <li>Added current date</li> <li>Updated Related/Dependent Submissions per the ATL and CLT OAPM Airspace and Procedures Dependencies v4</li> <li>Added the following statement: In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP).</li> <li>Editorial Changes</li> </ul>		
10/31/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Added for jet aircraft only</li> <li>Added ZJX 72 to Related/Dependent submissions</li> </ul>		
05/21/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended Proposed Implementation Date</li> <li>Editorial changes</li> </ul>		
06/11/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Added 10 nm legs to holding</li> </ul>		
06/25/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed proposed date</li> <li>Changed current to original</li> <li>Removed phone numbers</li> </ul>		

# CLT OAPM Design Package

CLT STARs, SE STOCR

Name of Change	Date
<b>STOCR ARRIVAL (RNAV)</b>	<b>25 June 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV STAR)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Southeast Arrival Proposed Procedures</b>	<b>Proposed 26 July 2016</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Positions: Arrival Radar East (ARE), Departure Radar East (DRE), Satellite Radar South (SRS)</b> <b>Jacksonville ARTCC (ZJX) Sectors: 47, 48, 66, 67, 68, 71, 72 and 74</b>	<b>ZTL: Roger Cerovsky, Bill Wise</b> <b>ZJX: Evan Darby, Jeff Wood</b> <b>CLT: Roland Alexander, James Williams</b>
Related/Dependent Submissions	Associated Data Files
<b>Airspace Design Packages</b> <ul style="list-style-type: none"> <li>• CLT: ARE, DRE, SRS</li> <li>• ZJX: Sectors 71, 72, 74</li> </ul> <b>Procedure Design Packages</b> <ul style="list-style-type: none"> <li>• CLT STARs: KABEE, MLLLET, RASLN</li> </ul>	<b>Master TARGETS File</b>

## Purpose

The Study Team proposed two options for a southeast OPD STAR which generally overlays the en route transitions on the currently published STAR from SAV and CHS. The Study Team designed a southeast STAR to reduce track miles, minimize level-offs and allow flexibility for multiple runway transitions. The procedure reduces controller complexity and adds optimization for the user. This arrival procedure will require coordination between ZTL, ZJX and CLT.

Figure 1 depicts the Study Team Recommendation. Figure 2 below depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

CLT STARs, SE STOCR

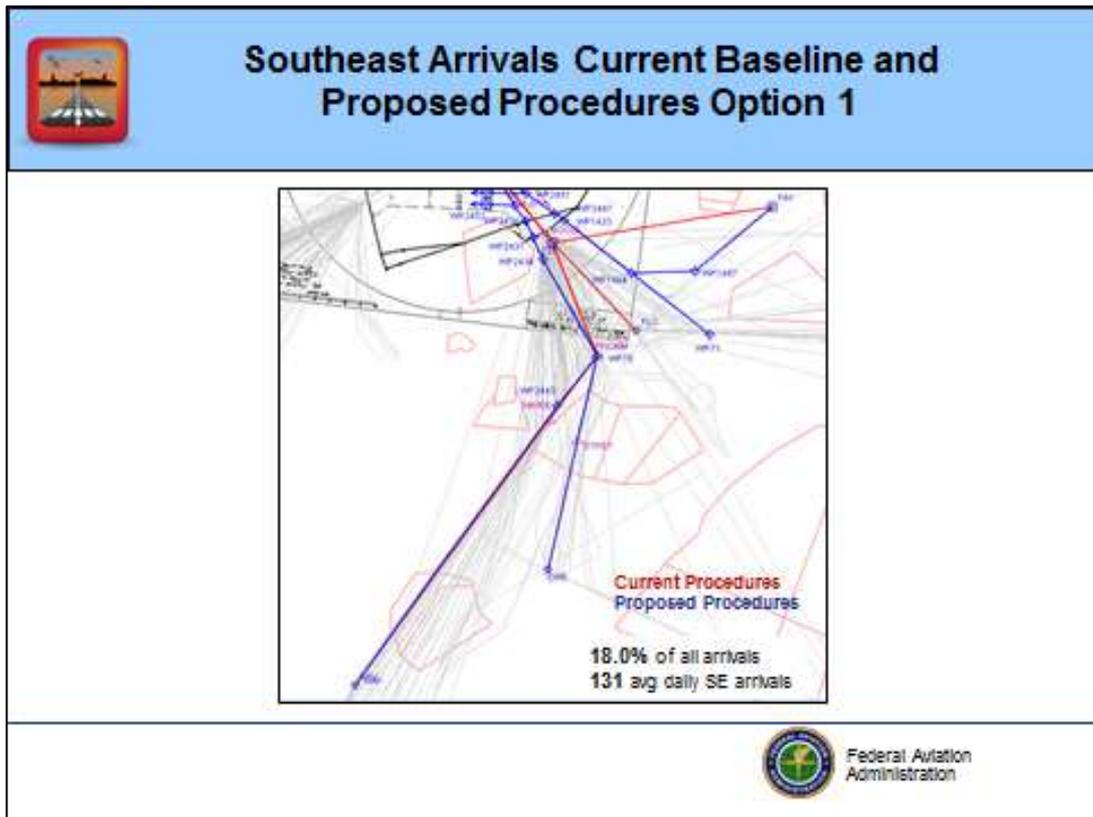


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT STARs, SE STOCR

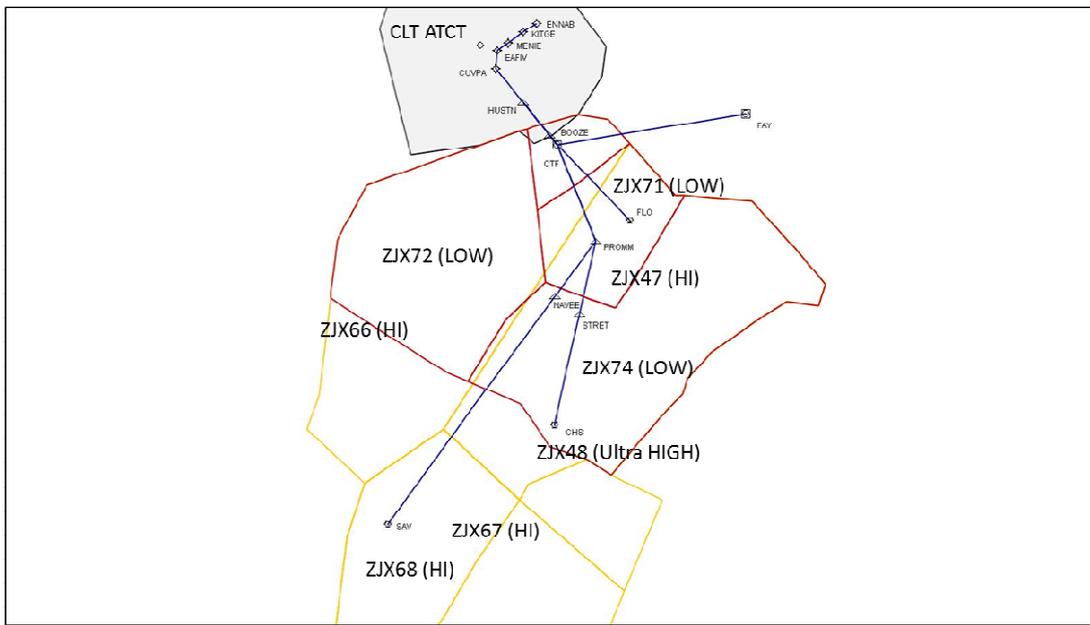


Figure 2. Original Procedure/Route/Airspace

### **Proposed Final Design**

The Study Team proposed two options for a southeast OPD STAR which generally overlays the en route transitions on the currently published STAR. Current operations allow controllers to shortcut arrival aircraft once they have descended below ZJX Sector 66. Aircraft performance criteria and ZJX concerns limited the ability to fully optimize the OPD; therefore, the Design Team opted for a hybrid of the two Study Team Options.

The design does add additional track miles when compared to the Study Team recommendation. This increase in track miles is a direct result of the Design Team's charter to transcribe the notional Study Team procedure into a viable procedure through a consensus between the Air Traffic facilities and Industry. The aggregate of the Design Team's southeast STARs and SIDs track mile savings were determined to outweigh the slight reduction in the Study Team's notional procedures. Overall, the new southeast procedures reduce track miles, simplify airspace and reduce controller task complexity. Table 1 depicts the additional track miles reduction and track miles increase compared to the Study Team recommendation.

# CLT OAPM Design Package

## CLT STARs, SE STOCR

Table 1. Estimated Mileage Reduction/Increase as Compared to Study Team

	Study Team Route	RWY 18	RWY 23	RWY 36
Additional Savings (NM) As Compared To Study Team Route From SAV	Option 1	9.69	9.83	7.17
	Option 2	0.14	0.29	-2.83
Additional Savings (NM) As Compared To Study Team Route From CHS	Option 1	8.33	8.48	5.81
	Option 2	2.89	3.03	-0.08

The Design Team developed the STOCR STAR with three en route transitions. The SAV transition replaces the existing HUSTN STAR. The CHS transition will be an ATC assigned procedure when AR600 (aerial refueling route) is active (along the SAV transition). The PITRW transition will provide connectivity with AR7, AR12 and AR25 5 miles outside of W161, which will allow for additional track mile savings and de-conflict from W161. Additionally, FLLGG which replaces the current PROMM was moved south to reduce track miles.

The final design, which has transitions for all Charlotte runways, is the result of collaboration and consultation with ZTL, CLT, ZJX, ZDC and our industry partner U.S. Airways. The final design required several airspace changes in the Center environment and a redesign of CLT TRACON airspace.

On a South Operation the last altitude constraint is 7,000 feet at HANDO for Runway 18L/C/R and to LOURY at 6,000 feet for Runway 23.

On a North Operation the last altitude constraint is 6,000 feet at GATEE at 6,000 feet on Base Leg. The position of the base is such that aircraft can be easily flowed to 36R/C/L.

This STAR is designed for turbojet aircraft only. In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP). Holding is designed at STOCR (right turns 10 NM legs) and on the SAV transition at FLLGG (right turns 10 NM legs). The following waypoints were designed on the procedure.

- PITRW Initial point on the PITRW transition
- FFORD Return vector point
- SHLBI Between FL240 and FL290 @ 280 knots
- FLLGG Between FL210 and FL230 @ 280 knots, Holding fix
- CHS Initial point on CHS transition
- MOPPR Return vector point
- CHRGR Between FL240 and FL290 @ 280 knots
- SAV Initial point on the SAV transition
- CHECR Return vector point - last point where ZJX can clear aircraft on arrival

# CLT OAPM Design Package

## CLT STARs, SE STOCR

- CHVEE Return vector point
- CRVET Between FL240 and FL290 @ 280 knots
- FFNSH Between 16,000 and FL230 @ 280 knots. Fix was placed to allow for Arrivals and departures from SSC and MMT
- STOCR Between 12,000 and FL190 @ 270 knots, Holding fix
- FIBBR Between 11,000 and 16,000 @250 knots (Short side speed)
- LLAPP Between 11,000 and 16,000 @ 270 knots (Long side speed)
- TYMER Between 8,000 and 11,000
- ZYMKO Between 11,000 and 13,000 @ 250 knots
- TERIE Between 6,000 and 8,000
- GATEE 6,000 @ 210 knots (36 base)
- DOOMY Between 9,000 and 11,000
- POORE Waypoint defines the downwind to RWY 18L, 18R and 18C
- LEEKS 9,000 @ 210 knots
- INNOR Waypoint defines the downwind to RWY 23
- LOURY 6,000 (23 Downwind)
- HANDO 7,000 (18 Downwind)

Figure 3 depicts the Proposed Final Design.

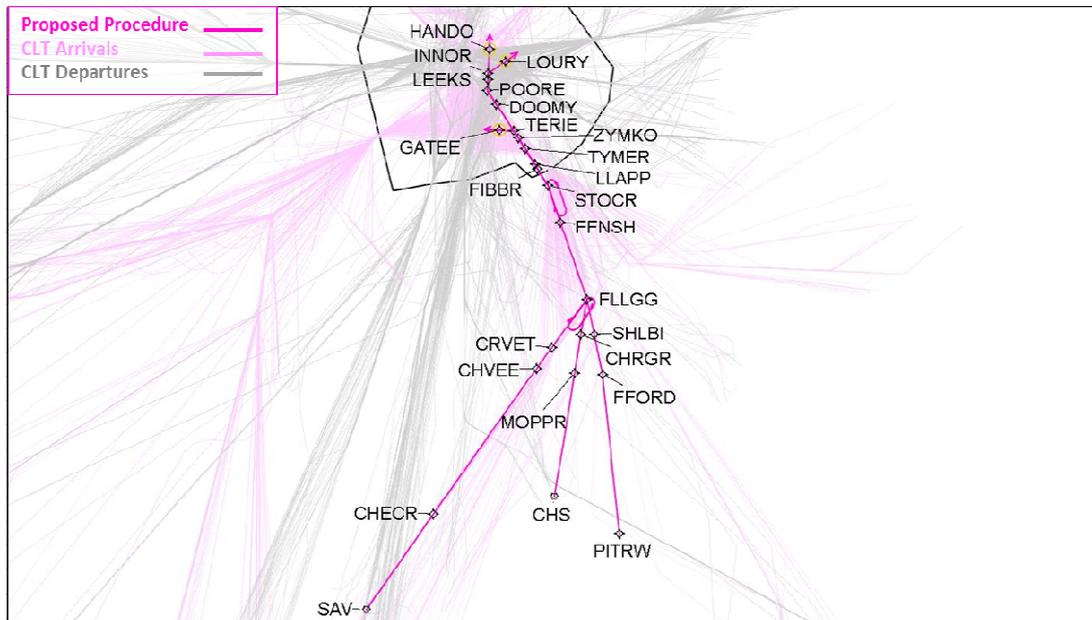


Figure 3. Proposed Final Design

# CLT OAPM Design Package

## CLT STARs, SE STOCR

### Additional Design Considerations

A Human-in-the-Loop Simulation validation was conducted during October 2012 and found this to be a viable procedure.

### Implementation Dependencies

Airspace modifications include:

- CLT Departure Radar East airspace was modified to accommodate the STOCR STAR with a wider shelf
- CLT Arrival Radar East airspace was modified to accommodate the STOCR STAR with a wider shelf
- ZJX Sector 71 gave up airspace for the wider Arrival Radar East shelf
- ZJX Sector 71, ZJX Sector 72 and ZJX Sector 74 sector boundaries were moved to facilitate the new track mile saving route of the STOCR. This realignment also reduced inter-facility coordination

To maximize arrival capacity utilizing all CLT OPD STARs, a robust traffic management metering tool should be developed, evaluated and incorporated into the Traffic Management System. OPDs are relatively new with regard to Traffic Management. There are no definitive standards regarding miles-in-trail (MIT) or time requirement to initiate an OPD and still maintain appropriate separation to terminal airspace. Additionally, current Traffic Management Advisory (TMA) adaptation does not provide a seamless merge of dual arrival flows at a corner post or multiple flows in the approach environment to a single runway to the finite degree needed to allow aircraft to take full advantage of an OPD. Discussion with the National TMA/Time Based Flow Management (TBFM) Operations Team has advised that future enhancements to TMA/TBFM should address these concerns.

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZJX sector boundary maps
- ZTL/ZJX Letter of Agreement (LOA)
- ZTL/CLT Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedure (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

## CLT STARs, SE STOCR

### Attachments

- STOCR TARGETS Distribution Package
- STOCR RNAV PRO results
- STOCR RNAV 7100-3
- STOCR RNAV 7100-4
- STOCR RNAV 8260.2 Worksheets
- TMA Recommendations for CLT

# CLT OAPM Design Package

CLT STARs, SE MLLET

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/02/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Changed Implementation Date</li> </ul>		
10/09/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Updated Related/Dependent Submissions per the ATL and CLT OAPM Airspace and Procedures Dependencies v4</li> <li>Added the following statement: In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP).</li> <li>Editorial Changes</li> </ul>		
10/31/2013	<ul style="list-style-type: none"> <li>Added current date</li> <li>Added for turbojet and turboprop aircraft only</li> </ul>		
05/21/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Editorial changes</li> <li>Amended Proposed Implementation Date</li> </ul>		
06/11/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Added Landing north expect to cross MLLET at 12,000 feet</li> <li>Added Landing south expect to cross MLLET at 14,000 feet</li> </ul>		
06/25/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed proposed date</li> <li>Changed current to original</li> <li>Removed phone numbers</li> </ul>		

# CLT OAPM Design Package

CLT STARs, SE MLLET

Name of Change	Date
<b>MLLET ARRIVAL (RNAV)</b>	<b>25 June 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV STAR)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Southeast Arrival Proposed Procedures Option 1</b>	<b>Proposed 26 July 2016</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Positions: Arrival Radar East (ARE), Departure Radar East (DRE), Satellite Radar South (SRS)</b> <b>Atlanta ARTCC (ZTL) Sector: 30</b> <b>Jacksonville ARTCC (ZJX) Sectors: 47, 48, 71 and 74</b> <b>Washington ARTCC (ZDC) Sectors: 26 and 27</b>	<b>ZTL: Roger Cerovsky, Bill Wise</b> <b>ZJX: Evan Darby, Jeff Wood</b> <b>CLT: Roland Alexander, James Williams</b> <b>ZDC: Joe Keimig, Curt Johnson</b>
Related/Dependent Submissions	Associated Data Files
<b>Airspace Design Packages</b> <ul style="list-style-type: none"> <li>• CLT: ARE, DRE, SRS</li> <li>• ZDC: Sectors 26, 27</li> <li>• ZJX: Sectors 71, 74</li> </ul> <b>Procedure Design Packages</b> <ul style="list-style-type: none"> <li>• CLT STARs: KABEE, RASLN, STOCR</li> </ul>	<b>Master TARGETS File</b>

## Purpose

An additional southeast STAR was designed to reduce track miles and minimize level-offs and allow flexibility for multiple runway transitions. The procedure reduces controller complexity and adds optimization for the user. This arrival procedure will require coordination between ZTL and CLT.

The Study Team proposed two options for the Southeast RNAV STARs. The only change in the two options occurs in the CLT airspace on routings from the ZTL/ZJX boundary to the CLT runways. A stand-alone RNAV southeast STAR was designed from over FAY and near the FLO VOR area. The additional southeast OPD STAR allows a more direct route between FLO and the CLT boundary. The new FAY transition is now assignable (it should be noted that aircraft are not assigned the current FAY transition due to airspace conflicts) while reducing mileage.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

CLT STARs, SE MLLET

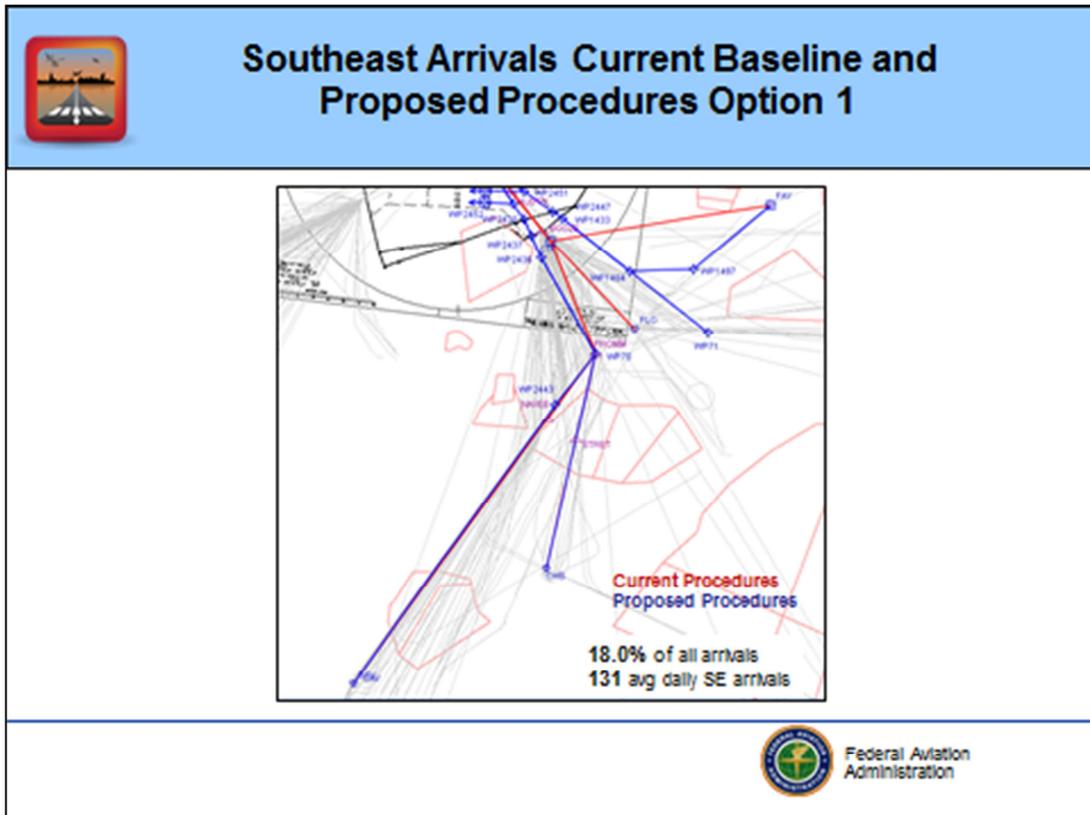


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT STARs, SE MLLET

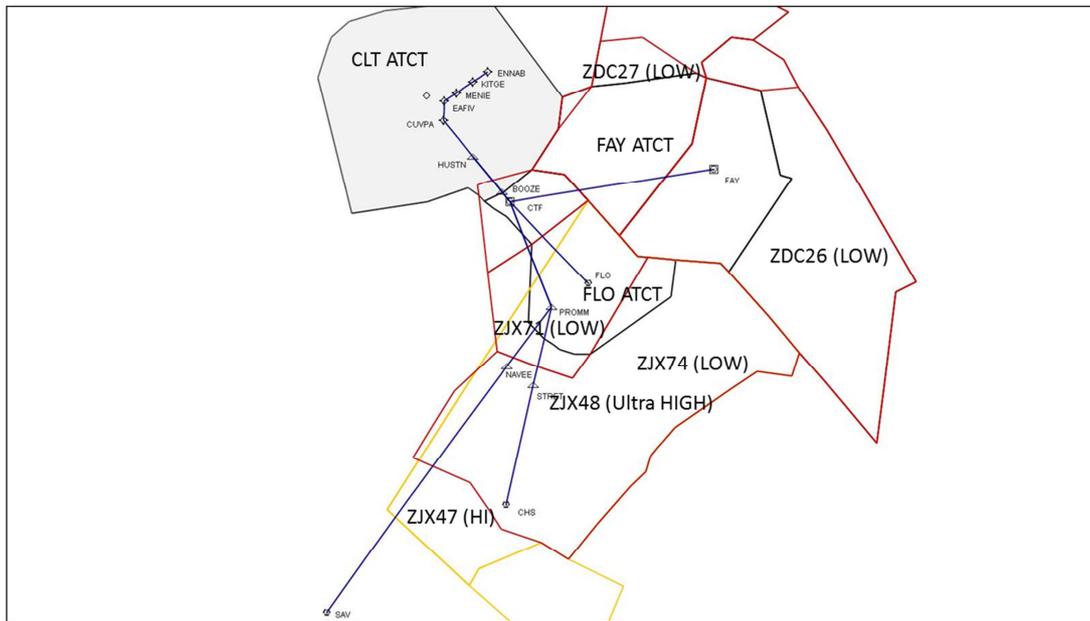


Figure 2. Original Procedure/Route/Airspace

### Proposed Final Design

The Design Team developed the MLLET STAR with two en route transitions to replace the existing HUSTN STAR. The Design Team opted for a hybrid of the Study Team's two options that were proposed.

Table 1 depicts the additional track miles reduction and track miles increase compared to the Study Team recommendation. In a north operation there is a reduction in benefit in the Design Team procedure versus the notional Study Team procedure. This increase in track miles is a direct result of the Design Team's charter to transcribe the notional Study Team procedure into a viable procedure through a consensus between the Air Traffic facilities and Industry. The aggregate of the Design Team's southeast STARs and south SIDs track mile savings were determined to outweigh the slight reduction in the Study Team's notional procedures. Overall, the new southeast procedures reduce track miles, simplify airspace and reduce controller task complexity

# CLT OAPM Design Package

## CLT STARs, SE MLLET

Table 1. Estimated Mileage Reduction/Increase as Compared to Study Team

	Study Team Route	RWY 18	RWY 23	RWY 36
Additional Savings (NM) As Compared To Study Team Route From TWSTD	Option 1	3.92	4.07	-0.19
	Option 2	N/A	N/A	N/A
Additional Savings (NM) As Compared To Study Team Route From OKNEE	Option 1	5.1	5.25	0.99
	Option 2	5.1	5.25	4.1

The airspace delegated to ZJX from ZDC provides ZJX more options and will reduce track miles by allowing the aircraft to proceed direct to MLLET or RASLN intersections earlier. This change also reduces/eliminates coordination between ZJX/ZDC controllers for traffic filed on the TORQD transition. The airspace delegated to CLT from ZJX provides the opportunity to further reduce the track miles on the MLLET ONE.

The final design, which has transitions for all Charlotte runways, is the result of collaboration and consultation with ZTL, CLT, ZJX, ZDC and our industry partner U.S. Airways. The final design required several airspace changes in the Center environment and a redesign of CLT TRACON airspace.

On a South Operation the procedure ends HANDB Runway 18L/C/R and at LOURY for Runway 23. In a South Operation turbojet aircraft will cross MLLET at 14,000 feet

On a North Operation the procedure ends at GATEE on Base Leg. The position of the base is such that aircraft can be easily flowed to 36R/C/L. In a North Operation turbojet aircraft will cross MLLET at 12,000 feet.

This procedure is not an OPD and is expected to have approximately thirty arrivals per day. Additionally, it will be used as an off-load for arrivals from the northeast when weather is blocking the NE arrival corridor.

This STAR is designed for turbojet and turboprop aircraft only. In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52) and Anson County (AFP). Holding is established at RYFLE (left turns 10 NM legs) and YELLS (left turns 10 NM legs). The following waypoints were designed on the procedure.

- OKNEE Initial waypoint on the arrival
- RYFLE Beginning of common route and a holding waypoint
- TORQD Initial waypoint for TORQD transition
- YELLS Holding waypoint
- MLLET Return vector waypoint
- RASLN Waypoint de-conflicts arrival from the STOCR
- MANGY Waypoint defines base leg for north operation
- CEZUN Waypoint de-conflicts arrival from the STOCR on a south operation

# CLT OAPM Design Package

## CLT STARs, SE MLEET

- GATEE Termination waypoint for arrival on a north operation
- DOOMY Waypoint defines the downwind and de-conflicts from CLT Departure airspace
- POORE Waypoint defines the downwind and de-conflicts from CLT Departure airspace
- LEEKS Waypoint defines the downwind and de-conflicts from CLT Departure airspace
- INNOR Waypoint defines downwind leg for RWY 23
- LOURY Termination waypoint for arrival for RWY 23
- HANDO Termination waypoint for arrival for south operation

Figure 3 below depicts the Proposed Final Design.

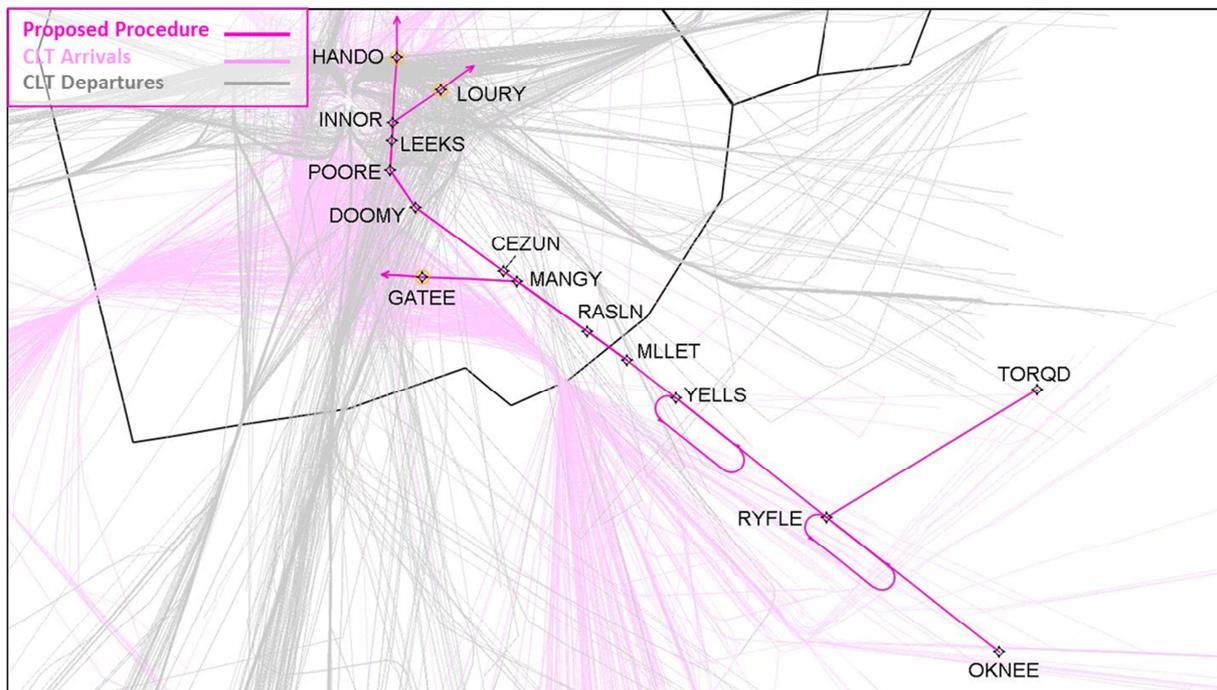


Figure 3. Proposed Final Design

### Additional Design Considerations

A Human-in-the-Loop Simulation validation was conducted during October 2012 and found this to be a viable procedure.

# CLT OAPM Design Package

## CLT STARs, SE MLLET

### Implementation Dependencies

Airspace sector modifications include:

- CLT Departure Radar East was modified to own airspace that would allow the new southeast arrival
- CLT Arrival Radar East was modified to own airspace that would allow for the new southeast arrival route
- CLT Satellite Radar South in a north operation gives up airspace to Arrival Radar East
- ZJX71 and ZJX74 sector boundaries were moved to accommodate the MLLET STAR and reduce inter-facility coordination.
- ZDC26 and ZDC27 southern boundary was straightened to eliminate inter-facility coordination on arrival traffic filed over the OKNEE Transition.
- ZDC26 western boundary was moved east into ZDC27 to allow earlier shortcuts for MLLET arrivals and to eliminate inter-facility coordination on FAY operations.

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZJX sector boundary maps
- ZTL/ZJX Letter of Agreement (LOA)
- ZTL/CLT Letter of Agreement (LOA)
- ZJX/CLT Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARs Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedure (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- En route Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

### Attachments

- MLLET TARGETS Distribution Package
- MLLET RNAV PRO results
- MLLET RNAV 7100-3
- MLLET RNAV 7100-4
- MLLET RNAV 8260.2 Worksheets

# CLT OAPM Design Package

CLT STARs, SE RASLN

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
08/27/2013	<ul style="list-style-type: none"> <li>Updated Figure 2</li> </ul>		
09/02/2013	<ul style="list-style-type: none"> <li>In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawaba (DCM), Jaars-Townsend (N52) and Anson County (AFP).</li> <li>Added Current Date</li> <li>Changed Implementation Date</li> </ul>		
10/09/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Updated Related/Dependent Submissions per the ATL and CLT OAPM Airspace and Procedures Dependencies v4</li> <li>Removed RUQ as an airport served</li> <li>Editorial Changes</li> </ul>		
12/11/2013	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Changed proposed date</li> </ul>		
05/21/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended Proposed Implementation Date</li> <li>Editorial changes</li> <li>Added 10 NM legs to holding fixes</li> </ul>		
06/25/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed proposed date</li> <li>Changed current to original</li> <li>Removed phone numbers</li> </ul>		

# CLT OAPM Design Package

CLT STARs, SE RASLN

Name of Change	Date
RASLN ARRIVAL	25 June 2014
Change Classification	Current Phase of Design
Terminal Procedure (Conventional STAR)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
Southeast Arrivals En Route Structure Connectivity Option 1	Proposed 26 July 2016
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Jacksonville ARTCC (ZJX) Sectors: 47, 48, 71 and 74 Charlotte ATCT (CLT) Positions: Arrival Radar East (ARE), Departure Radar East (DRE), Satellite South (SATS)	ZTL: Roger Cerovsky, Bill Wise ZJX: Evan Darby, Jeff Wood CLT: Roland Alexander, James Williams
Related/Dependent Submissions	Associated Data Files
Airspace Design Packages <ul style="list-style-type: none"> <li>CLT: ARE, DRE, SRS</li> </ul> Procedure Design Packages <ul style="list-style-type: none"> <li>CLT STARs: KABEE, MLLET, STOCR</li> </ul>	Master TARGETS File

## Purpose

The Study Team recommended the creation of at least one conventional arrival procedure to mimic RNAV SIDs.

Figure 1 depicts the Study Team recommendation. Figure 2 depicts the original procedure, route and airspace.

# CLT OAPM Design Package

CLT STARs, SE RASLN

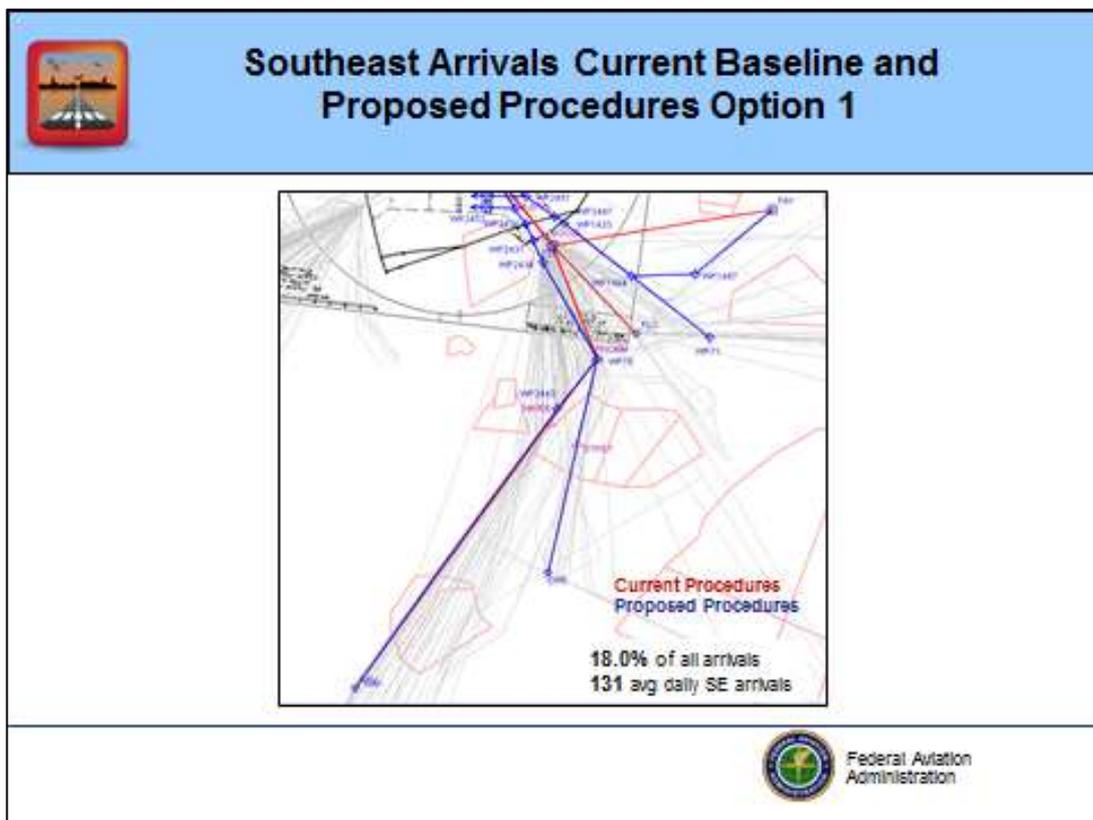


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT STARs, SE RASLN

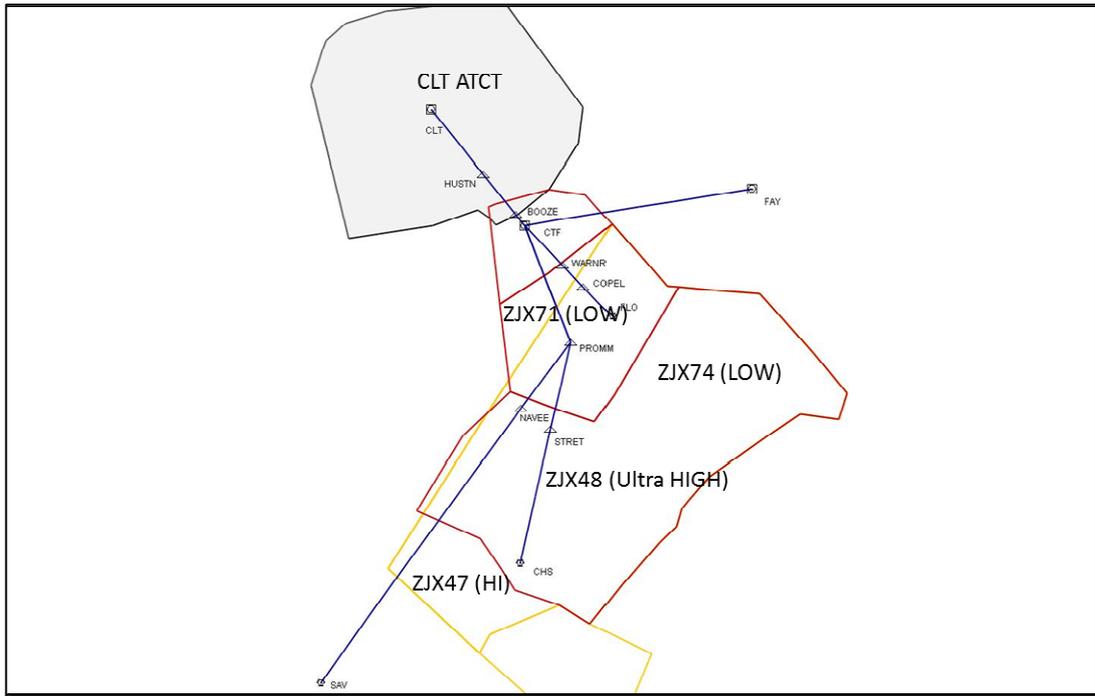


Figure 2. Original Procedure/Route/Airspace

### **Proposed Final Design**

The Design Team created a conventional arrival that closely aligns the lateral paths of the proposed STOCR ARRIVAL (RNAV). In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawaba (DCM), Jaars-Townsend (N52) and Anson County (AFP). Holding is established at FLO VOR (left turns 10 NM legs). The following fixes were designed on the procedure.

- FLO STAR initial/holding fix
- RASLN Changeover fix from ZJX to CLT
- CLT STAR termination fix

Figure 3 depicts the proposed final design.

# CLT OAPM Design Package

## CLT STARs, SE RASLN

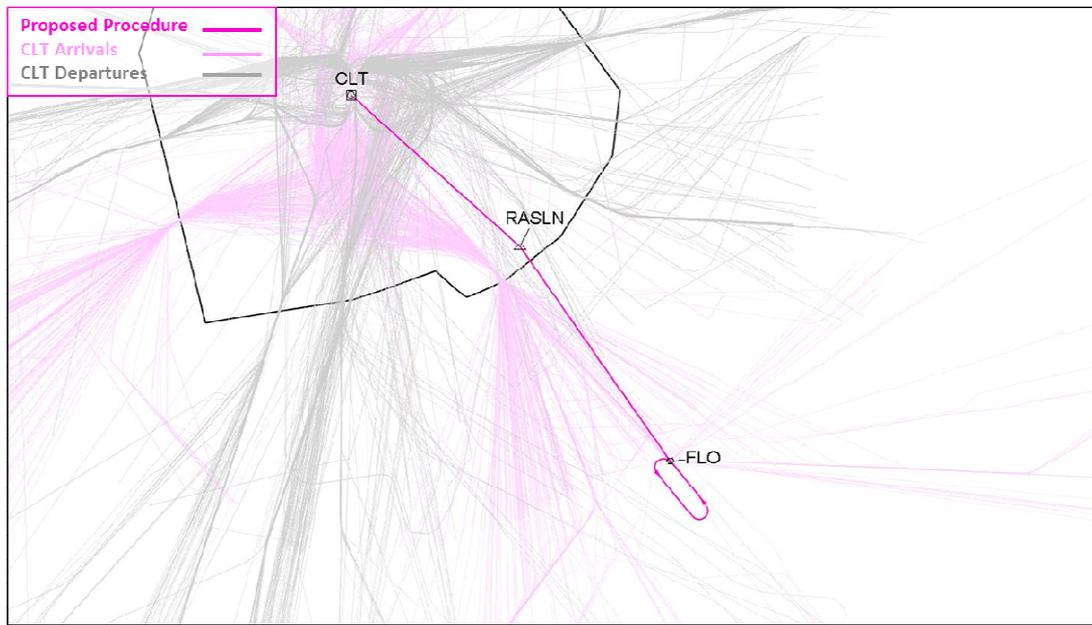


Figure 3. Proposed Final Design

### Additional Design Considerations

A Human-In-The-Loop Simulation validation was conducted during October 2012 and found this to be a viable procedure.

### Implementation Dependencies

The KABEE, MLLET, and STOCR STARs must be implemented concurrently as part of the southwest cornerpost design. These changes affect internal CLT airspace.

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZJX sector boundary maps
- ZTL/ZJX Letter of Agreement (LOA)
- ZTL/CLT Letter of Agreement (LOA)
- ZJX/CLT Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedures (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

CLT STARs, SE RASLN

## Attachments

- None

This procedure will be tracked, but not implemented via the OAPM process. This design package will be forwarded to the Eastern Service Center Operations Support Group for incorporation into the National Airspace System. The OAPM team will track its progress due to its correlation with the CLT MLEET and STOCR RNAV STARs, and other CLT airspace design issues.

# CLT OAPM Design Package

CLT STARs, SW UNARM

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
05/30/2014	<ul style="list-style-type: none"><li>• Inserted Figure 2</li></ul>		
06/20/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Removed proposed</li><li>• Amended implementation</li></ul>		
06/25/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Changed proposed date</li><li>• Changed current to original</li><li>• Removed phone numbers</li></ul>		
09/04/2014	<ul style="list-style-type: none"><li>• Changed Holding Pattern at UNARM to right turns</li></ul>		
10/21/2014	<ul style="list-style-type: none"><li>• Amended Current Date</li><li>• Removed Airspace changes and BANKR and JONZE from Related/Dependent Submissions</li><li>• Removed Airspace Sector Modifications and BANKR from Implementation Dependencies</li></ul>		

# CLT OAPM Design Package

CLT STARs, SW UNARM

Name of Change	Date
<b>UNARM ARRIVAL</b>	<b>21 October 2014</b>
Change Classification	Current Phase of Design
Terminal Procedure (Conventional STAR)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
Southwest Arrivals Proposed General Recommendations	5 January 2017
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Charlotte ATCT (CLT) Positions: Arrival Radar West, Departure Radar West and Departure Radar East Atlanta ARTCC (ZTL) Sectors: 24 and 31 Greer ATCT (GSP) Augusta ATCT (AGS)	CLT: Roland Alexander, James Williams ZTL: Roger Cerovsky, Bill Wise GSP: Richard Phillips, James Fleming AGS: Darin Buck, Mike Shepard
Related/Dependent Submissions	Associated Data Files
Procedure Design Packages <ul style="list-style-type: none"> <li>CLT STARs: CHPTR</li> </ul>	Master TARGETS File

## Purpose

New OPD RNAV STARs require conventional STARs, for non-RNAV and low performance turboprop aircraft, to efficiently accommodate arrival traffic from the southwest.

Figure 1 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CLT STARs, SW UNARM

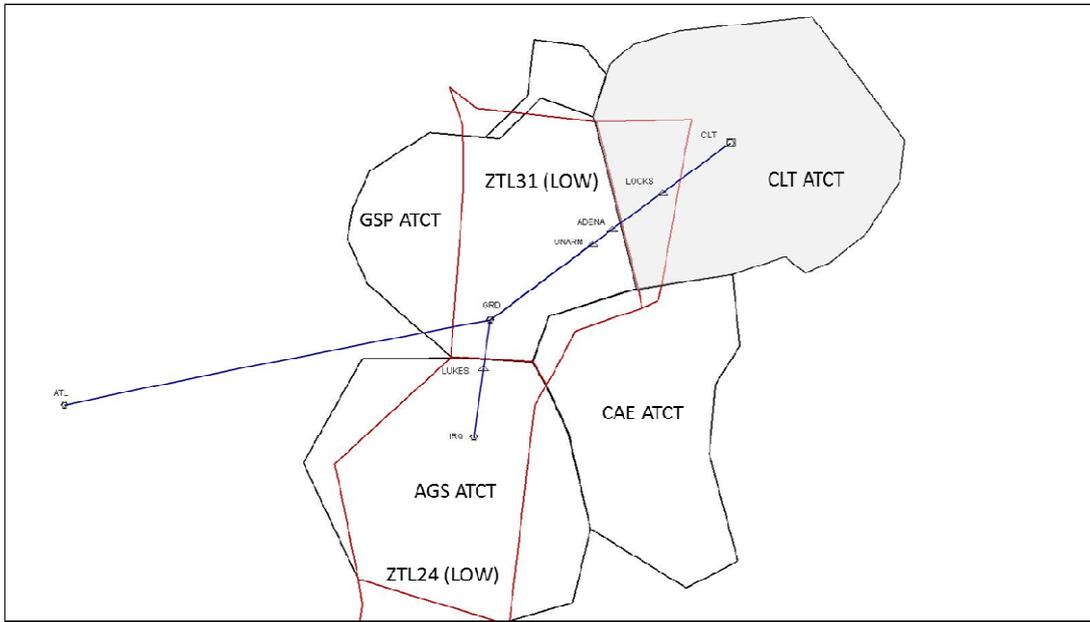


Figure 1. Original Procedure/Route/Airspace

### **Proposed Final Design**

The Design Team in collaboration with GSP ATCT proposed a conventional STAR for Turbo Prop/Prop aircraft, from the southwest to CLT. The original proposed final design (NOOOK) had to be reworked because the CLT VOR/DME is unusable from the CLT203 radial to the CLT220 radial. The lateral path was designed to emulate the BANKR STAR and enter CLT TRACON airspace at CHPTR. The aircraft will be routed through GSP ATCT's airspace below 10,000 feet. In addition to Charlotte Douglas (CLT) this STAR will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Shelby-Cleveland County (EHO), Chester Catawba (DCM), Jaars-Townsend (N52), Stanly County (VUJ), Concord Regional (JQF), and Anson County (AFP). Holding fixes are established at GRD (right turns 10NM legs) and UNARM (right turns, 10NM legs). The following fixes were designed on the procedure.

- ATL Initial fix on the arrival
- PENFI Fix that de-conflicts from the GSP WORXS STAR
- GRD Holding fix
- UNARM Holding fix
- ADENA Transfer control point
- LOCKS Holding fix
- IRQ Initial fix on the arrival
- LUKES Crossing point
- CLT Termination fix on the arrival

Figure 2 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT STARs, SW UNARM

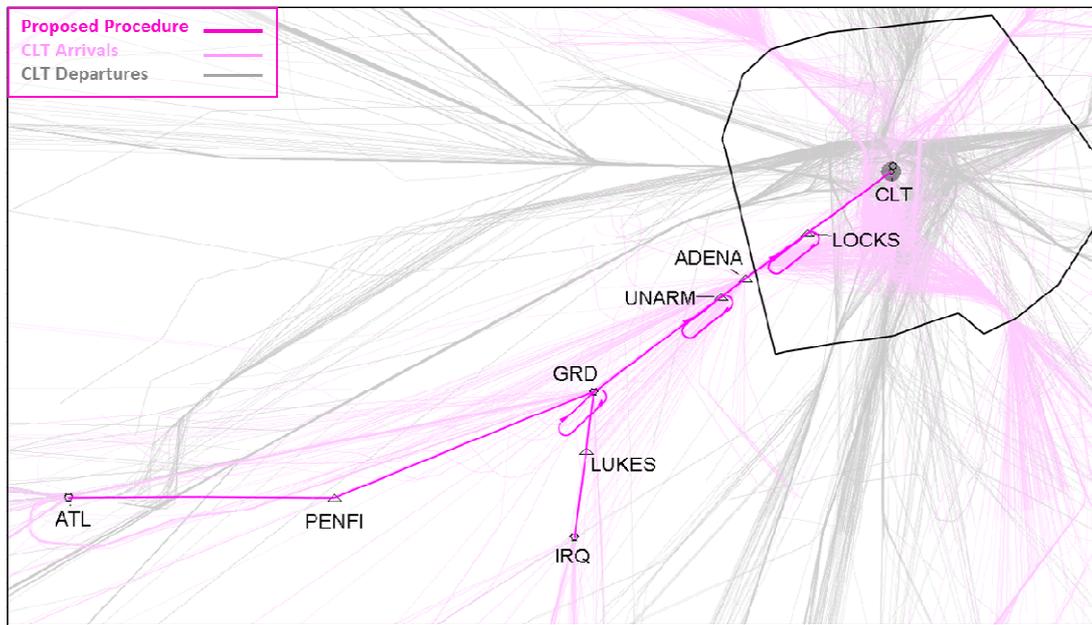


Figure 2. Proposed Final Design

### Additional Design Considerations

- Validation through Human-in-the-Loop Simulation was not required
- CAE ATCT to be made aware of the new STAR

### Implementation Dependencies

CHPTR and UNARM STARs must be implemented at the same time to ensure arrival flows are compatible

Document changes/modifications include:

- STAR filings with airline dispatchers
- ZTL/ZJX Letter of Agreement (LOA)
- ZTL/CLT Letter of Agreement (LOA)
- CLT/GSP Letter of Agreement (LOA)
- CAE/CLT Letter of Agreement (LOA)
- CAE/GSP Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- GSP ATCT Standard Operating Procedures (SOP)
- CLT ATCT Standard Operating Procedures (SOP)
- CAE ATCT Standard Operating Procedures (SOP)
- AGS ATCT Standard Operating Procedures (SOP)
- Standard Instrument Approach Procedure (SIAP)
- HOST/ERAM and ARTS/STARs Automation Changes (PDARS, PARS, Fix Pairs, etc.)

# CLT OAPM Design Package

## CLT STARs, SW UNARM

- National Route Program (NRP) Database Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

### Attachments

- None

This procedure will be tracked, but not implemented via the OAPM process. This design package will be forwarded to the Eastern Service Center Operations Support Group for incorporation into the National Airspace System. The OAPM team will track its progress due to its correlation with the CLT BANKR and JONZE RNAV STARs, and other CLT airspace design issues.

# CLT OAPM Design Package

CLT SIDs, NW WEAZL

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/18/2013	<ul style="list-style-type: none"> <li>In additional design considerations added: A note will be charted stating, "upon reaching 10,000 feet increase speed to 280 knots if unable advise ATC".</li> </ul>		
10/24/2013	<ul style="list-style-type: none"> <li>Added Satellite airports</li> <li>Changed current date</li> <li>Amended Dependencies</li> </ul>		
10/30/2013	<ul style="list-style-type: none"> <li>Removed KRITR as Dependency</li> </ul>		
11/13/2013	<ul style="list-style-type: none"> <li>Amended date</li> <li>Added turbojets only</li> </ul>		
03/15/2014	<ul style="list-style-type: none"> <li>Updated Figure 3</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Changed Proposed Implementation date</li> <li>Added: Chart notes: "accelerate to 250 knots, if unable advise ATC"; "upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC"</li> </ul>		
11/18/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Removed phone numbers from Facility POC</li> <li>Editorial changes and added verbiage to Implementation Dependencies for the ESTRR, JOJJO, BOBZY and KRITR SIDs</li> <li>Removed unneeded attachments</li> <li>Added ESTRR, JOJJO, BOBZY and WEAZL to Related/Dependent Submissions</li> </ul>		

# CLT OAPM Design Package

CLT SIDs, NW WEAZL

Name of Change	Date
<b>WEAZL ONE DEPARTURE (RNAV)</b>	<b>18 November 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>North Departures Proposed Procedures Option 1</b>	<b>15 October 2015</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Positions: Departure Radar West and Arrival Radar West Atlanta ARTCC (ZTL) Sectors: 43, 47 and 48</b>	<b>ZTL: Roger Cerovsky, Bill Wise CLT: Roland Alexander, James Williams</b>
Related/Dependent Submissions	Associated Data Files
<b>CLT SIDs</b> • <b>ESTRR, JOJJO, BOBZY and KRITR</b>	<b>Master TARGETS File</b>

## Purpose

The original RNAV procedure was redesigned to reduce track miles and minimize level-offs. The north departure will require coordination between Indianapolis ARTCC and Charlotte D&I.

The Study Team identified several areas where miles could be saved and level-offs minimized. The Study Team recommended optimization of lateral paths of current RNAV SIDs, as well as the creation of additional RNAV SIDs to support CLT departure flows. This SID will incorporate earlier route divergence, decreased track miles flown, reduced level-offs and departure delays, increased departure efficiency and create “destination specific” routings.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CLT SIDs, NW WEAZL

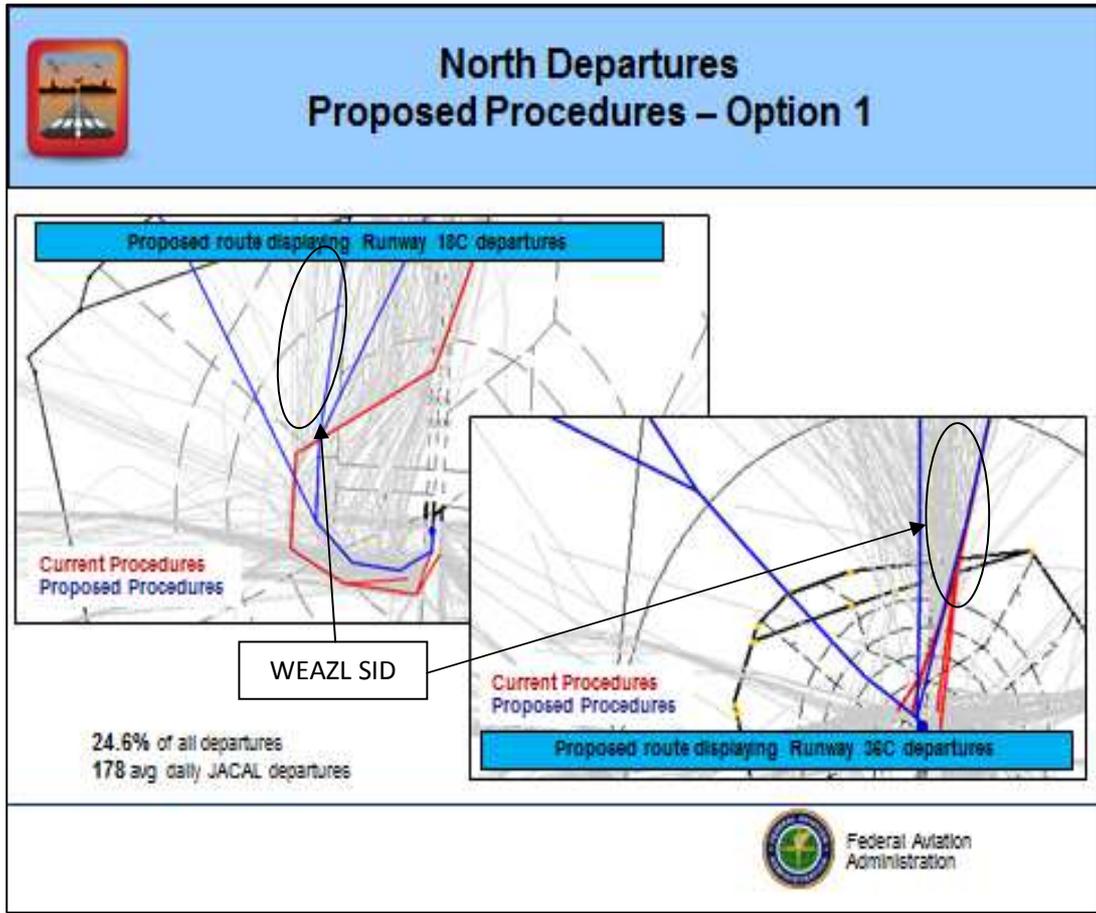


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT SIDs, NW WEAZL

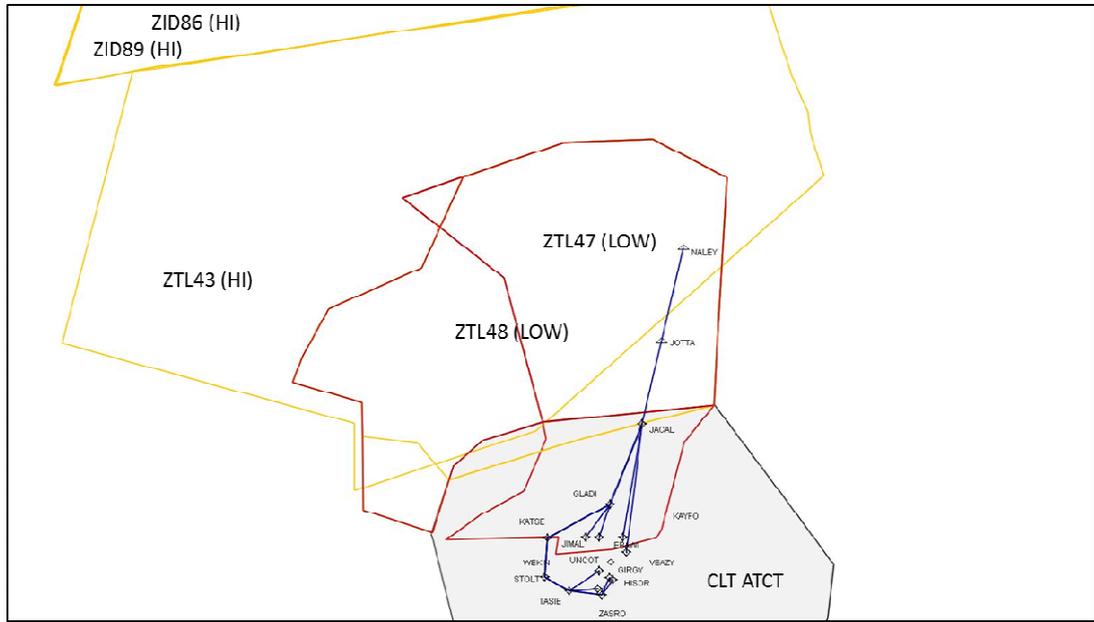


Figure 2. Original Procedure/Route/Airspace

### Proposed Final Design

The Design Team proposes a north departure procedure (turbojets only) with one en route transition for traffic routed towards HVQ VOR. This procedure incorporates radar vectoring which allows for quicker course divergence as close to the airport as possible, while creating flexibility and minimizing level-offs. In addition to Charlotte Douglas International (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County/Bryant Field (UZA), Gastonia Municipal (AKH), Lancaster County-McWhirter Field (LKR), Lincoln-ton-Lincoln County Regional (IPJ), Stanly County (VUJ) and Concord Regional (JQF). The following waypoints were designed on the procedure:

- WHFRD Initial common route waypoint and point where satellite departures will join the SID
- WEAZL End of the SID and aircraft must be established on the procedure at this waypoint. It is also the initial en route transition fix.
- CLAWD Termination waypoint of the CLAWD transition

Figure 3 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT SIDs, NW WEAZL

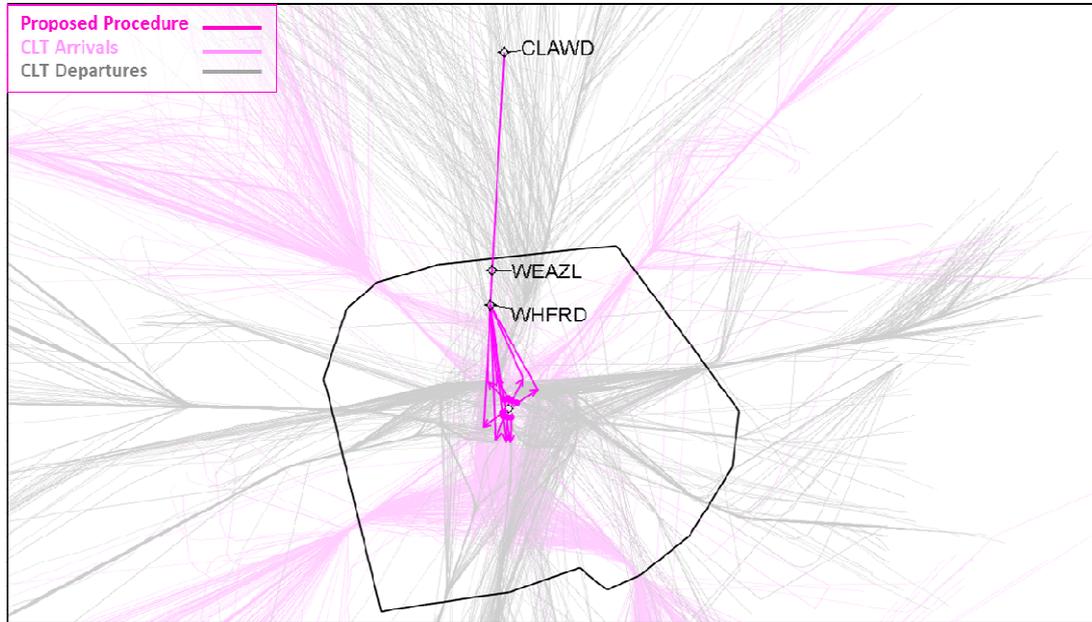


Figure 3. Proposed Final Design

### Additional Design Considerations

- A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure
- Coordinate the implementation of the new design with Indianapolis ARTCC (ZID)
- Chart notes: “accelerate to 250 knots, if unable advise ATC”; “upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC”
- In addition to CLT the WEAZL SID will be a preferred departure routing for the following airports:
  - UZA
  - EQY
  - AKH
  - IPJ
  - JQF
  - LKR
  - RUQ
  - VUJ

# CLT OAPM Design Package

## CLT SIDs, NW WEAZL

### Implementation Dependencies

The KRITR SID is laterally separated from the WEAZL SID and is part of the overall north departure airspace design and should be implemented concurrently with the WEAZL SID.

In order to prevent the potential safety/operational issue with a mixture of RNAV off the ground and radar vector procedures for Local Control and Departure Radar West, the north and west SIDs must be implemented at the same time.

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL sector boundary maps
- ZID sector boundary maps
- ZTL/CLT Letter of Agreement (LOA)
- ZTL/ZID Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- ERAM and STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- En route Information Display System (ERIDS)
- En route Decision Support Tool (EDST)

### Attachments

- WEAZL ONE DEPARTURE RNAV Distribution Package
- WEAZL ONE DEPARTURE RNAV\_8260-15C
- WEAZL ONE DEPARTURE RNAV\_Graphic\_DP\_Worksheet

# CLT OAPM Design Package

CLT SIDs, West BOBZY

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/18/2013	<ul style="list-style-type: none"> <li>In additional design considerations added: A note will be charted stating, "upon reaching 10,000 feet increase speed to 280 knots if unable advise ATC".</li> </ul>		
10/24/2013	<ul style="list-style-type: none"> <li>Added Satellite airports</li> <li>Changed current date</li> <li>Amended Dependencies</li> </ul>		
11/13/2013	<ul style="list-style-type: none"> <li>Added (turbojet only)</li> <li>Changed current date</li> </ul>		
02/18/2014	<ul style="list-style-type: none"> <li>Changed FLCON to WINNG</li> <li>Amended current date</li> <li>Changed Implementation Date</li> <li>Removed Signature Page</li> <li>Minor edits</li> </ul>		
02/24/2014	<ul style="list-style-type: none"> <li>Updated Figure 3</li> </ul>		
03/20/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Added VUJ to airports served</li> <li>Amended proposed implementation date</li> </ul>		
03/25/2014	<ul style="list-style-type: none"> <li>Updated Figure 3</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Changed Proposed Implementation date</li> <li>Added: Chart notes: "accelerate to 250 knots, if unable advise ATC"; "upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC"</li> </ul>		
10/11/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Revised Implementation Date</li> <li>Added WEAZL, KRITR and JOJJO to Related/Dependent Submissions and explained the change in the Implementation Dependencies Section</li> <li>Added "Although this procedure was originally slotted for 26 July 2016, issues with a mixture of RNAV off the ground and radar vector procedures caused a potential safety/operational issue at CLT. Eric Rutherford was contacted and after coordinating with Rich Silva and Eddie Tucker, ZTL approved moving this procedure and the ESTRR SID up to chart date 15 August 2015 and it will be implemented 15 October 2015."</li> <li>Removed the 8260-2 Worksheets and RNAV Pro Runs from the Attachments Section</li> </ul>		
11/18/2014	<ul style="list-style-type: none"> <li>Amended current date</li> </ul>		

# CLT OAPM Design Package

CLT SIDs, West BOBZY

	<ul style="list-style-type: none"><li>• Editorial changes to Implementation Dependencies</li></ul>		
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# CLT OAPM Design Package

CLT SIDs, West BOBZY

Name of Change	Date
<b>BOBZY DEPARTURE (RNAV)</b>	<b>18 November 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Departure Radar West Proposed Procedures</b>	<b>15 October 2015</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte TRACON (CLT) Positions: Departure Radar West and Arrival Radar West</b> <b>Atlanta ARTCC (ZTL) Sectors: 31, 37, 39, 44, and 49</b> <b>Memphis Center (ZME)</b>	<b>CLT: Roland Alexander, James William</b> <b>ZTL: Roger Cerovsky, Bill Wise</b> <b>ZME: James Courtney, Brian Paysinger</b>
Related/Dependent Submissions	Associated Data Files
<b>ZTL Airspace Changes</b> <b>ZTL Sector 31</b> <b>ZTL Sector 44</b> <b>WINNG STAR</b> <b>ESTRR SID</b> <b>KRITR SID</b> <b>WEAZL SID</b> <b>JOJJO SID</b>	<b>Master TARGETS File</b>

## Purpose

The original RNAV procedure was redesigned to reduce track miles and minimize level-offs. The west departure will require coordination between the Atlanta and Charlotte D&I Teams.

The Study Team identified several areas where miles could be saved and level-offs minimized. The Study Team recommended optimization of lateral paths of original RNAV SIDs, as well as the creation of additional RNAV SIDS to support CLT departure flows. This departure SID will incorporate earlier route divergence, decreased track miles flown, reduced level-offs and departure delays, increased departure throughput and create “destination specific” routings.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CLT SIDs, West BOBZY

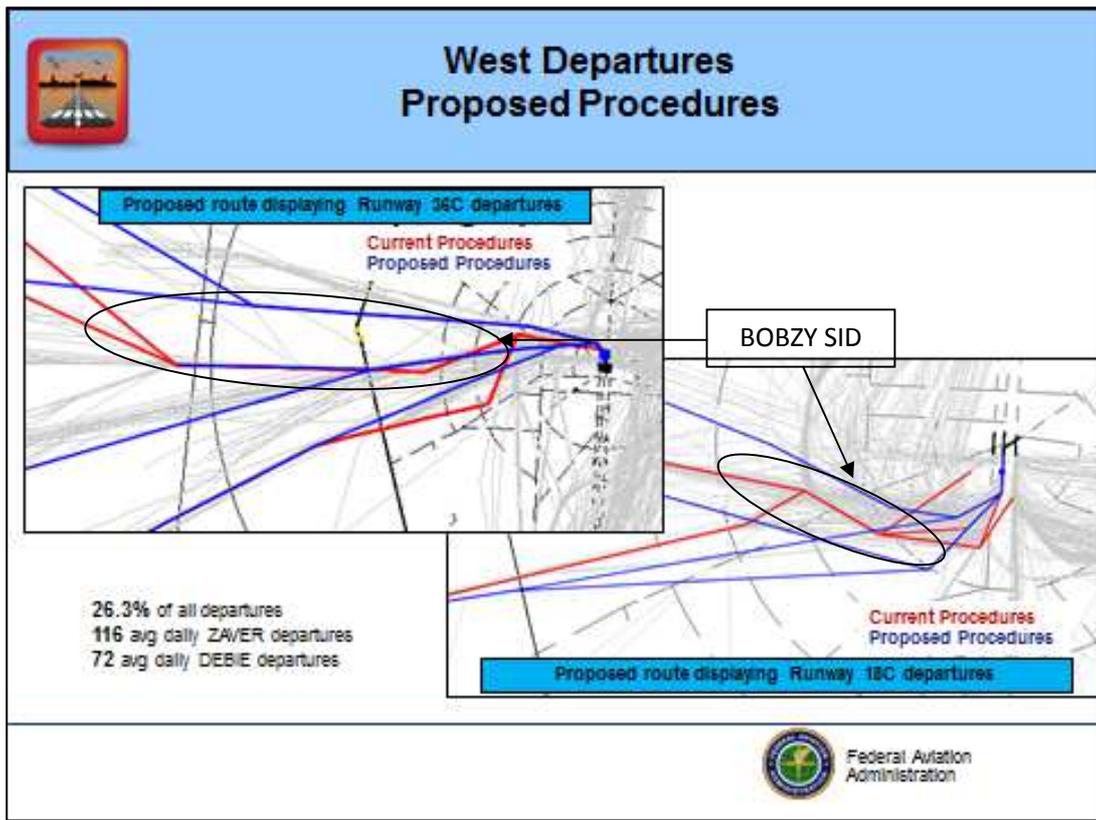


Figure 1. Study Team Recommendation

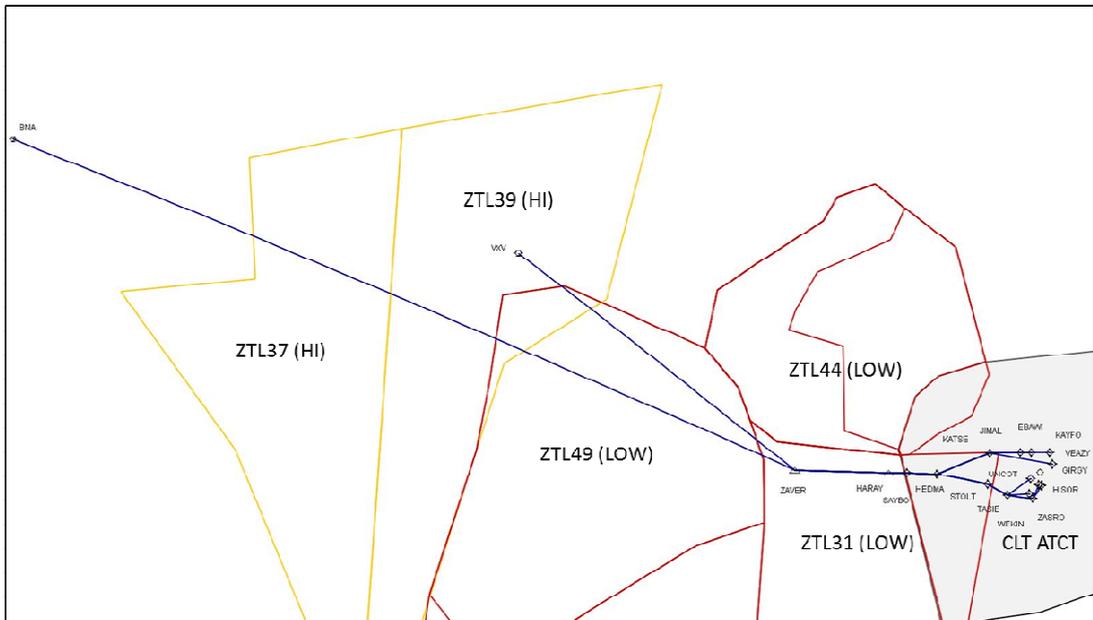


Figure 2. Original Procedure/Route/Airspace

# CLT OAPM Design Package

## CLT SIDs, West BOBZY

### Proposed Final Design

The Design Team developed the BOBZY SID (turbojet only) with two en route transitions for traffic routed westbound and to ATL. This procedure incorporates radar vectoring which allows for quicker course divergence as close to the airport as possible, while creating flexibility and minimizing level-offs. The TNSLY transition was designed for CLT departures destined ATL. The Nashville (BNA) transition offers connectivity to the en route flows through ZME airspace and de-conflict these routes from the northeast ATL STARs and the northwest CLT STARs. The current speed notes and restrictions will be incorporated on the SID. In addition to Charlotte Douglas International (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County/Bryant Field (UZA), Gastonia Municipal (AKH), Lancaster County-McWhirter Field (LKR), Lincolnton-Lincoln County Regional (IPJ), Stanley County (VUJ) and Concord Regional (JQF). The following waypoints were designed on the procedure:

- LACHN Initial common route waypoint and point where satellite departures will join the SID
- YNGUN Vector return waypoint in CLT airspace prior to the end of the common route
- BOBZY End of the SID and aircraft must be established on the procedure at this waypoint. It is also the initial en route transition fix.
- TNSLY Termination waypoint of the TNSLY transition. This transition ties into the ATL WINNG STAR.
- BRAYN Waypoint laterally de-conflicts the BOBZY SID and the FILPZ STAR
- REWET Waypoint to de-conflict from the ATL PECHY and WINNG STARS
- HALLS Vector return waypoint prior to the end of ZTL airspace
- BAZOO Intersection of Q66 and the BOBZY SID
- BNA Termination waypoint of the BNA transition

Figure 3 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT SIDs, West BOBZY

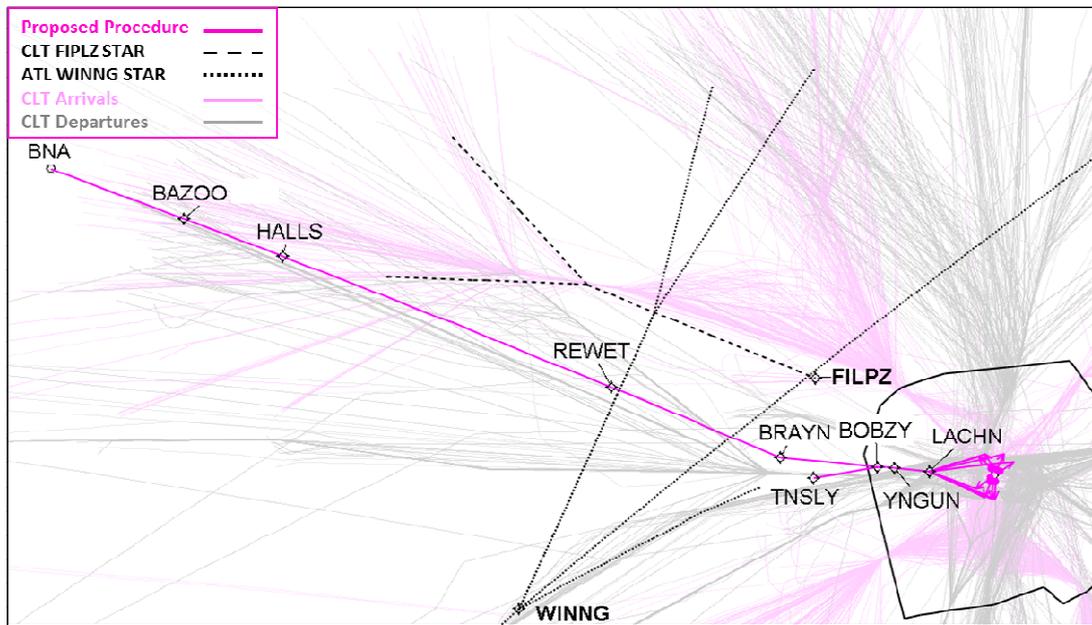


Figure 3. Proposed Final Design

### Additional Design Considerations

- A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure
- Incorporate original speed notes and restrictions on the SIDs.
- Chart notes: “accelerate to 250 knots, if unable advise ATC”; “upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC”

### Implementation Dependencies

Although this procedure was originally slotted for 26 July 2016, issues with a mixture of RNAV off the ground and radar vector procedures caused a potential safety/operational issue at CLT. Eric Rutherford was contacted and after coordinating with Rich Silva and Eddie Tucker, ZTL approved moving this procedure and the ESTRR SID up to chart date 15 August 2015 and it will be implemented 15 October 2015.

In order to prevent the potential safety/operational issue with a mixture of RNAV off the ground and radar vector procedures for Local Control and Departure Radar West, the north and west SIDs must be implemented at the same time.

#### Airspace sector modifications

- ZTL Sector 31 has to be modified at the same time to eliminate continuous point outs
- ZTL 31, 44 and 49
  - ZTL 31 and 44 were realigned to accommodate the BOBZY SID
- ZTL 49 boundary was moved west to accommodate BOBZY SID

# CLT OAPM Design Package

## CLT SIDs, West BOBZY

- In addition to CLT the BOBZY SID will be a preferred departure routing for the following airports:
  - UZA
  - EQY
  - VUJ
  - AKH
  - IPJ
  - JQF
  - LKR
  - RUQ

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL/CLT Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- ZME Facility Operations and Administration Order
- CLT ATCT Standard Operating Procedures (SOP)
- ZTL/ZME LOA
- ERAM and STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- En route Information Display System (ERIDS)
- En route Decision Support Tool (EDST)

### Attachments

- BOBZY DEPARTURE RNAV Distribution Package
- BOBZY DEPARTURE RNAV\_8260-15C
- BOBZY DEPARTURE RNAV Graphic DP Worksheet

# CLT OAPM Design Package

CLT SIDs, NW JOJO

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/05/2013	<ul style="list-style-type: none"> <li>• Changed current date</li> <li>• Removed Proposed from implementation date</li> <li>• Replaced Michael P Richardson with George Peurifoy</li> <li>• Replaced DOOGI with DOOGE</li> </ul>		
09/18/2013	<ul style="list-style-type: none"> <li>• In additional design considerations added : A note will be charted stating, "upon reaching 10,000 feet increase speed to 280 knots if unable advise ATC".</li> </ul>		
10/24/2013	<ul style="list-style-type: none"> <li>• Added Satellite airports</li> <li>• Changed current date</li> <li>• Amended Dependencies</li> </ul>		
11/13/2013	<ul style="list-style-type: none"> <li>• Added (turbojet only)</li> <li>• Changed current date</li> </ul>		
03/25/2014	<ul style="list-style-type: none"> <li>• Updated Figure 3</li> </ul>		
05/16/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Changed NOOON to NOONN</li> </ul>		
05/23/2014	<ul style="list-style-type: none"> <li>• Updated Figure 3</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>• Changed current date</li> <li>• Changed Proposed Implementation date</li> <li>• Added Chart notes: "accelerate to 250 knots, if unable advise ATC"; "upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC"</li> </ul>		
10/14/2014	<ul style="list-style-type: none"> <li>• Amended current Date</li> <li>• Removed GSP BWALL SID from Related/Dependent Submissions</li> </ul>		
11/17/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Removed phone numbers from Facility Points of Contact</li> <li>• Editorial changes and added verbiage to Implementation Dependencies for the ESTRR, KRITR, BOBZY and WEAZL SIDs</li> <li>• Removed unneeded attachments</li> <li>• Added ESTRR, KRITR, BOBZY and WEAZL to Related/Dependent Submissions</li> </ul>		

# CLT OAPM Design Package

CLT SIDs, NW JOJJO

Name of Change	Date
JOJJO DEPARTURE (RNAV)	17 November 2014
Change Classification	Current Phase of Design
Terminal Procedure (RNAV SID)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
North Departure Proposed Procedures Option 1	15 October 2015
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Charlotte ATCT (CLT) Positions: Departure Radar West, Arrival Radar West and Satellite Radar North Atlanta ARTCC (ZTL) Sectors: 39, 42, 43, 44, 47 and 48 Indianapolis ARTCC (ZID) Sectors: 86 and 96	ZTL: Roger Cerovsky, Bill Wise CLT: Roland Alexander, James Williams ZID: Tom Dury, James Larson
Related/Dependent Submissions	Associated Data Files
CLT STARS <ul style="list-style-type: none"> <li>FILPZ, PARQR, LIINN, BTSEY</li> </ul> CLT SIDs <ul style="list-style-type: none"> <li>ESTRR, KRITR, WEAZL and BOBZY</li> </ul> GSP BIMMR SID ZTL Airspace Changes <ul style="list-style-type: none"> <li>ZTL Sector 42</li> <li>ZTL Sector 43</li> <li>ZTL Sector 44</li> <li>ZTL Sector 47</li> </ul> CLT Airspace Changes <ul style="list-style-type: none"> <li>Arrival Radar West</li> <li>Departure Radar West</li> <li>Satellite Radar North</li> </ul>	Master TARGETS File

## Purpose

The Study Team identified several areas where miles could be saved and level-offs minimized. The Study Team recommended optimization of lateral paths of original RNAV Standard Instrument Departures (SIDs), as well as the creation of additional RNAV SIDS to support CLT departure flows. An additional "out-the-center" departure SID was developed. [The "out-the-center" designation was used to describe the geographical orientation of the new SID which will lie between two new Standard Terminal Arrival Route procedures (STAR)].

# CLT OAPM Design Package

## CLT SIDs, NW JOJO

This departure SID will incorporate earlier route divergence, decreased track miles flown, reduced level-offs and departure delays, increased departure efficiency and create “destination specific” routings.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Arrival Procedure (there is no Current SID), Route and Airspace.

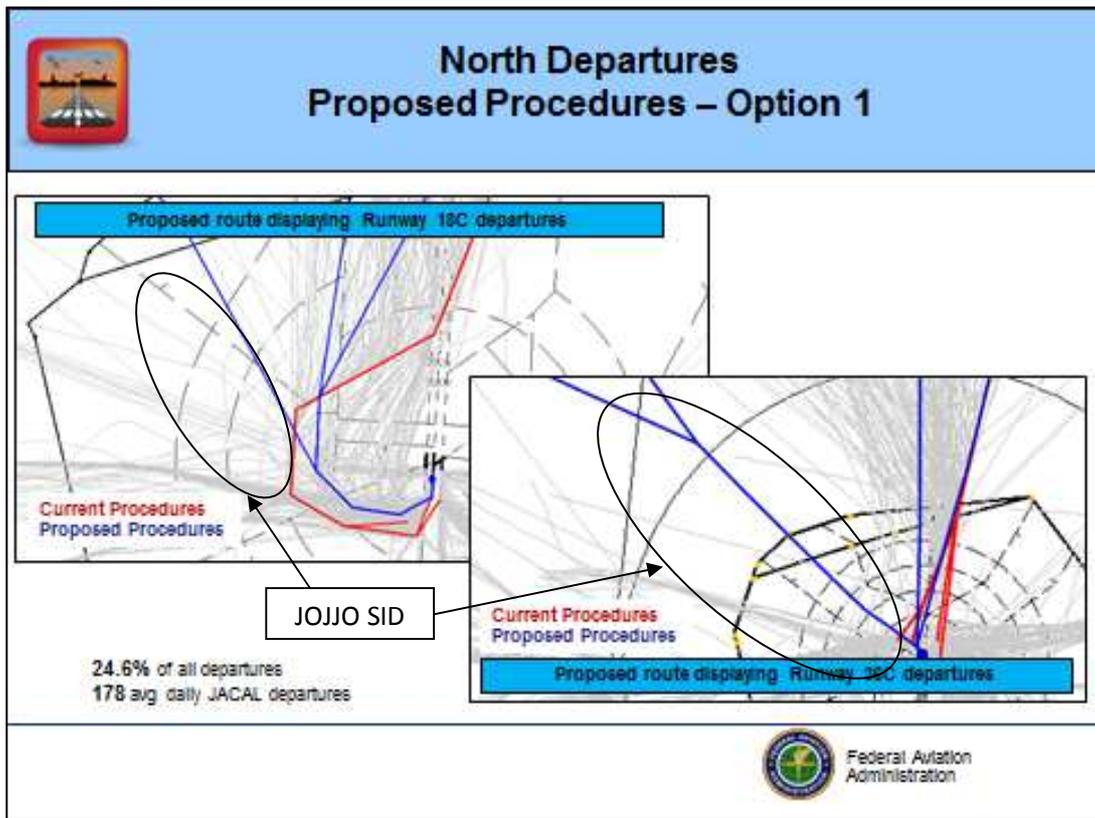


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT SIDs, NW JOJJO

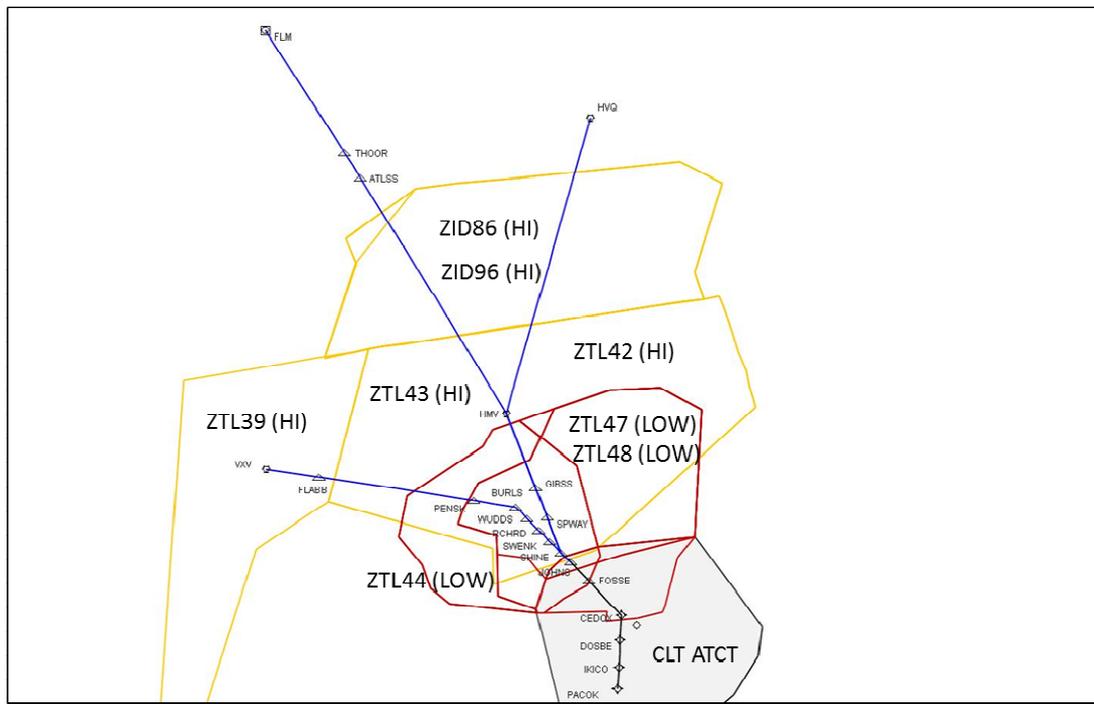


Figure 2. Shine Arrival Procedure (there is no current SID)/Route and Airspace

### Proposed Final Design

The JOJJO departure procedure (turbojet only) was designed to reduce track miles and minimize level-offs. The JOJJO was designed along the same track that the SHINE STAR is located. The SHINE STAR was replaced with two RNAV STARs that flank the JOJJO SID. This departure SID will incorporate earlier route divergence, decreased track miles flown, reduced level-offs and departure delays, increased departure efficiency and create “destination specific” routings. In addition to Charlotte Douglas International (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County/Bryant Field (UZA), Gastonia Municipal (AKH), Lancaster County-McWhirter Field (LKR), Lincolnton-Lincoln County Regional (IPJ), Stanley County (VUJ) and Concord Regional (JQF).

The JOJJO procedure has three en route transitions: DOOGE, CUBIM and NOONN. The DOOGE transition is designed for traffic routed over FLM. The CUBIM transition is designed for traffic routed west of FLM. The CUBIM transition terminates in ZID86. An additional transition was added over NOONN as an ATC assigned route for weather events and other special activities; but, may be considered for a limited amount of city-pair traffic routed via Nashville VOR (BNA). The following waypoints were designed on the procedure:

- WAYDS Initial common route waypoint and point where satellite departures will join the SID
- LONEE Return waypoint for the SID prior to the ZTL boundary
- JOJJO End of the SID. Aircraft must be established on procedure at this waypoint. It is also the initial en route transition fix.
- MTCHL Waypoint laterally separates the CUBIM and DOOGE transitions
- DOOGE Termination waypoint of the DOOGE transition

# CLT OAPM Design Package

## CLT SIDs, NW JOJJO

- WLLGO Waypoint laterally separates the CUBIM and DOOGE transitions
- BENBY Waypoint defines the turn for the CUBIM transition
- TIELR Return waypoint in ZTL airspace prior to the ZID boundary
- CUBIM Termination waypoint of the CUBIM transition
- SLEPP Waypoint to laterally separate from holding airspace
- BFORE Shortcut waypoint when holding airspace is inactive
- NOONN Termination waypoint of the NOONN transition

Figure 3 depicts the Proposed Final Design.

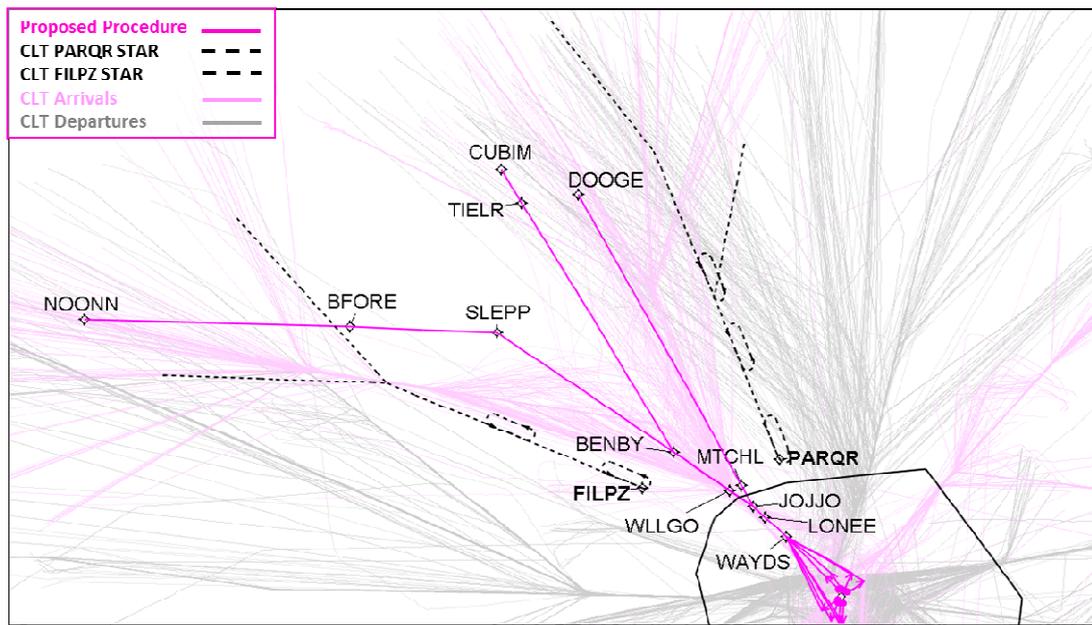


Figure 3. Proposed Final Design

### Additional Design Considerations

- A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure
- Chart notes: “accelerate to 250 knots, if unable advise ATC”; “upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC”
- In addition to CLT the JOJJO SID will be a preferred departure routing for the following airports:
  - UZA
  - EQY
  - AKH
  - IPJ
  - JQF
  - LKR
  - RUQ
  - VUJ

# CLT OAPM Design Package

## CLT SIDs, NW JOJJO

### Implementation Dependencies

The JOJJO SID is laterally de-conflicted from the PARQR, LINNN and FILPZ STARs and is part of the overall northwest arrival/departure airspace design. It must be implemented concurrently with these STARs.

In order to prevent the potential safety/operational issue with a mixture of RNAV off the ground and radar vector procedures for Local Control and Departure Radar West, the north and west SIDs must be implemented at the same time.

#### Airspace sector modifications

- CLT Arrival Radar West, Departure Radar West and Satellite Radar North were modified to accommodate the JOJJO SID
- ZTL44 and ZTL07 were modified to accommodate the JOJJO SID
- ZTL42 and ZTL43 were modified to accommodate the JOJJO SID

#### Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL/ZID sector boundary maps
- ZTL/CLT Letter of Agreement (LOA)
- ZTL/ZID Letter of Agreement LOA
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- ERAM and STARs Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- En route Information Display System (ERIDS)
- En route Decision Support Tool (EDST)

### Attachments

- JOJJO DEPARTURE RNAV Distribution Package
- JOJJO DEPARTURE RNAV\_8260-15C
- JOJJO DEPARTURE RNAV\_Graphic\_DP\_Worksheet

# CLT OAPM Design Package

CLT SIDs, NW KRITR

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/18/2013	<ul style="list-style-type: none"> <li>In additional design considerations added: A note will be charted stating, "upon reaching 10,000 feet increase speed to 280 knots if unable advise ATC".</li> </ul>		
10/24/2013	<ul style="list-style-type: none"> <li>Added Satellite airports</li> <li>Changed current date</li> <li>Amended Dependencies</li> </ul>		
11/13/2013	<ul style="list-style-type: none"> <li>Added (turbojet only)</li> <li>Changed current date</li> <li>Added J53 departures will be routed LUNND Q69</li> </ul>		
01/23/2013	<ul style="list-style-type: none"> <li>Added SMIAM to the NEWTN transition</li> </ul>		
03/20/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended proposed implementation date</li> <li>Added VUJ to airports served</li> <li>Editorial changes</li> </ul>		
03/25/2014	<ul style="list-style-type: none"> <li>Updated Figure 3</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Changed Proposed Implementation date</li> <li>Added; Chart notes: "accelerate to 250 knots, if unable advise ATC"; "upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC"</li> </ul>		
11/18/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Removed phone numbers from Facility POC</li> <li>Editorial changes and added verbiage to Implementation Dependencies for the ESTRR, JOJJO, BOBZY and WEAZL SIDs</li> <li>Removed un-needed Attachments</li> <li>Added ESTRR, JOJJO, BOBZY and WEAZL to Related/Dependent Submissions</li> </ul>		

# CLT OAPM Design Package

CLT SIDs, NW KRITR

Name of Change	Date
<b>KRITR DEPARTURE (RNAV)</b>	<b>18 November 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>North Departures Proposed Procedures Option 1</b>	<b>15 October 2015</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Positions: Departure Radar West and Arrival Radar West Atlanta ARTCC (ZTL) Sectors: 43, 47 and 48</b>	<b>ZTL: Roger Cerovsky, Bill Wise CLT: Roland Alexander, James Williams</b>
Related/Dependent Submissions	Associated Data Files
<b>CLT SIDs</b> • <b>ESTRR, BOBZY, JOJJO and WEAZL</b>	<b>Master TARGETS File</b>

## Purpose

The current RNAV procedure was redesigned to reduce track miles and minimize level-offs. The north/northeast departure will require coordination between Indianapolis ARTCC and Charlotte D&I.

The Study Team identified several areas where miles could be saved and level-offs minimized. The Study Team recommended optimization of lateral paths of current RNAV SIDs, as well as the creation of additional RNAV SIDs to support CLT departure flows. This departure SID will incorporate earlier route divergence, decreased track miles flown, reduced level-offs and departure delays, increased departure efficiency and create “destination specific” routings.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CLT SIDs, NW KRITR

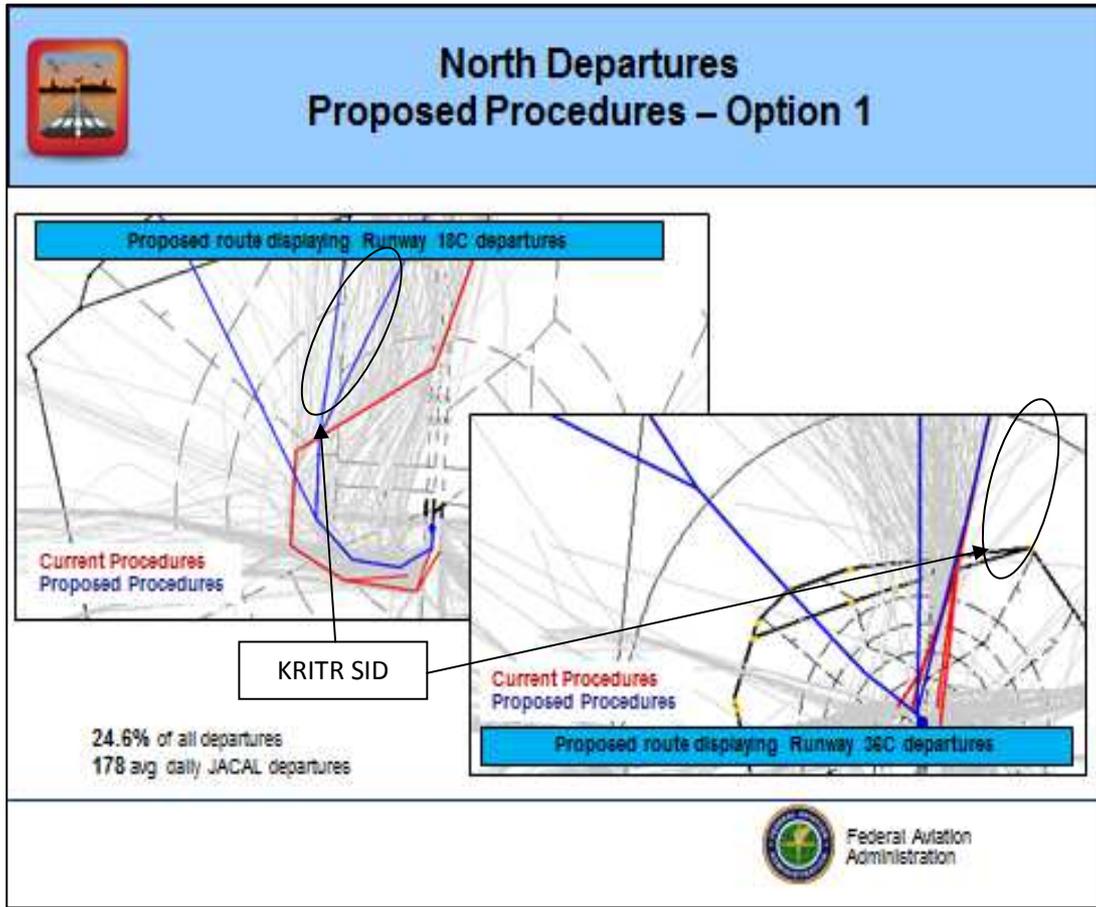


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT SIDs, NW KRITR

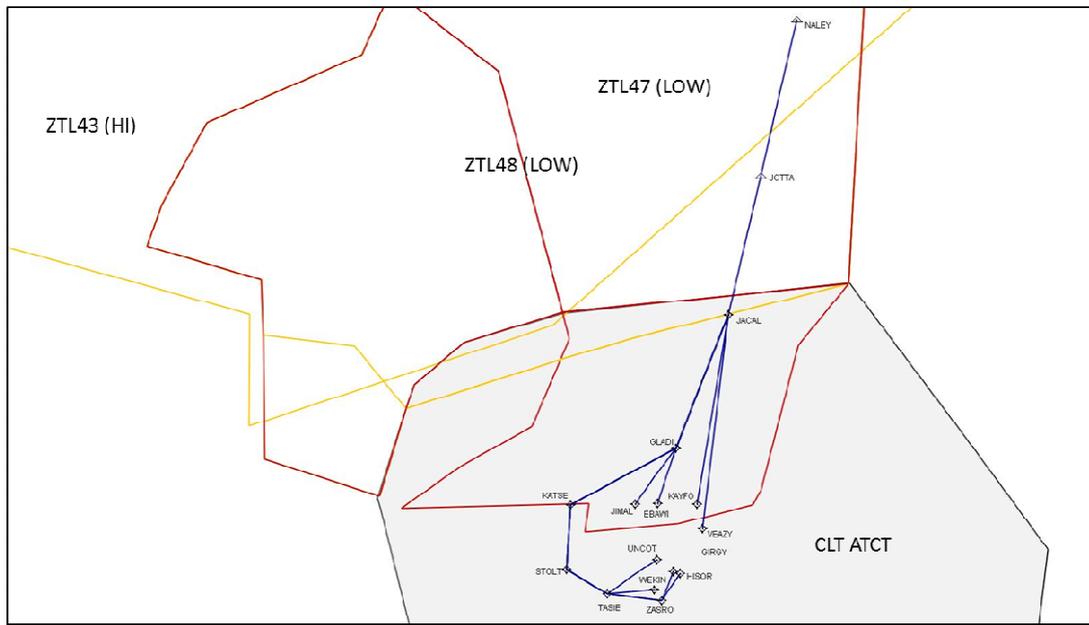


Figure 2. Original Procedure/Route/Airspace

### Proposed Final Design

The Design Team proposes a north/northeast departure procedure (turbojet only) with two en route transitions, the NEWTN transition for traffic routed over the Pulaski VORTAC (PSK) and the SMIAM transition for traffic routed over the Lynchburg VORTAC (LYH). To avoid confusion on charting SMIAM was left on the NWETN transition as an interim waypoint. The new procedure incorporates radar vectoring which allows for quicker course divergence as close to the airport as possible, while creating flexibility and minimizing level-offs. In addition to Charlotte Douglas International (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County/Bryant Field (UZA), Gastonia Municipal (AKH), Lancaster County-McWhirter Field (LKR), Lincolnton-Lincoln County Regional (IPJ), Stanly County (VUJ) and Concord Regional (JQF). Departure aircraft filed J53 will be routed NWETN direct LUNND Q69. The following waypoints were designed on the procedure:

- JDEAN Initial waypoint where CLT controllers can join the procedure and the beginning of the common route and where satellite departures will join the SID
- KRITR End of the SID and aircraft must be established on the procedure at this waypoint. It is also the initial en route transition fix
- SMIAM Is the termination waypoint of the SMIAM transition (LYH traffic)
- NWETN Is the termination waypoint of the NWETN transition (PSK traffic)

Figure 3 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT SIDs, NW KRITR

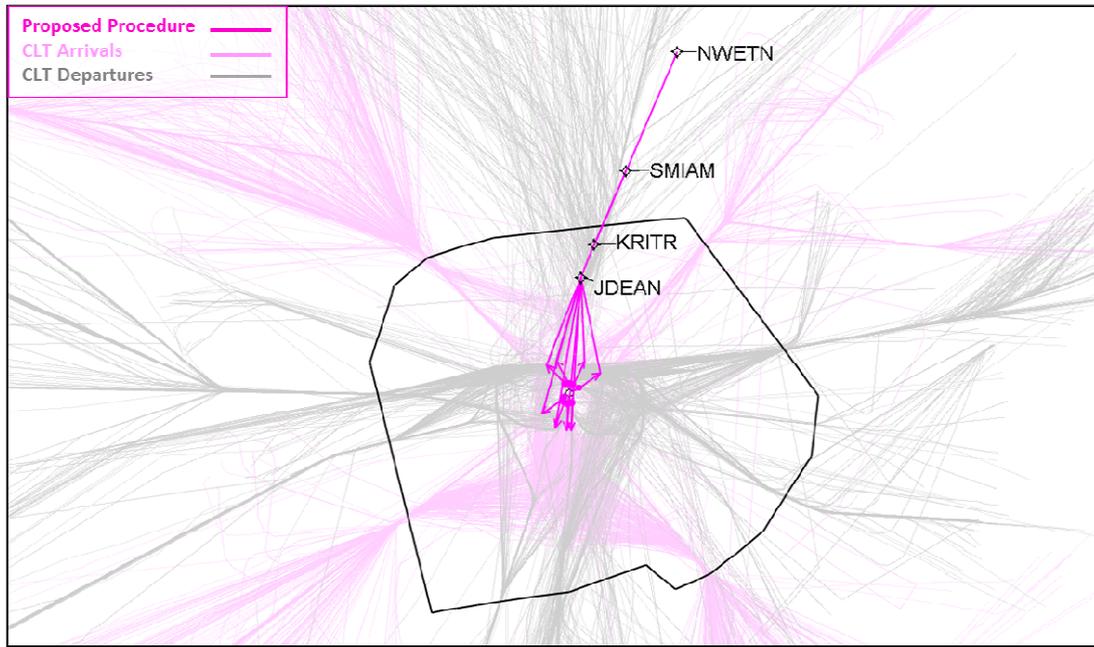


Figure 3. Proposed Final Design

### Additional Design Considerations

- A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure.
- Incorporate original speed notes and restrictions on the SIDs.
- Chart notes: “accelerate to 250 knots, if unable advise ATC”; “upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC”
- In addition to CLT the KRITR SID will be a preferred departure routing for the following airports:
  - UZA
  - EQY
  - AKH
  - IPJ
  - JQF
  - LKR
  - RUQ
  - VUJ

### Implementation Dependencies

In order to prevent the potential safety/operational issue with a mixture of RNAV off the ground and radar vector procedures for Local Control and Departure Radar West, the north and west SIDs must be implemented at the same time.

# CLT OAPM Design Package

## CLT SIDs, NW KRITR

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL sector boundary maps
- ZTL/CLT Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- ERAM and STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- En route Information Display System (ERIDS)
- En route Decision Support Tool (EDST)

### Attachments

- KRITR ONE DEPARTURE RNAV Distribution Package
- KRITR ONE DEPARTURE RNAV\_8260-15C
- KRITR ONE DEPARTURE RNAV\_Graphic\_DP\_Worksheet

# CLT OAPM Design Package

## CLT SIDs, West ESTRR

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
08/27/2013	<ul style="list-style-type: none"> <li>BGRED renamed CHOPZ</li> <li>ANGEY renamed ESTRR</li> </ul>		
09/02/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Changed Implementation Date</li> </ul>		
09/06/2013	<ul style="list-style-type: none"> <li>Replaced figure 3</li> </ul>		
09/18/2013	<ul style="list-style-type: none"> <li>In additional design considerations added: A note will be charted stating, "upon reaching 10,000 feet increase speed to 280 knots if unable advise ATC".</li> </ul>		
10/24/2013	<ul style="list-style-type: none"> <li>Added Satellite airports</li> <li>Changed current date</li> <li>Amended Dependencies</li> </ul>		
11/13/2013	<ul style="list-style-type: none"> <li>Added (turbojet only)</li> <li>Changed current date</li> </ul>		
03/20/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended proposed implementation date</li> <li>Added VUJ to airports served</li> <li>Editorial changes</li> </ul>		
03/25/2014	<ul style="list-style-type: none"> <li>Updated Figure 3</li> </ul>		
04/29/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Editorial changes</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Changed Proposed Implementation date</li> <li>Added: Chart notes: "accelerate to 250 knots, if unable advise ATC"; "upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC"</li> </ul>		
10/11/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Revised Implementation Date</li> <li>Added WEAZL, KRITR and JOJJO to Related/Dependent Submissions and explained the change in the Implementation Dependencies Section</li> <li>Removed the ARRNI and JACCC SIDs from the Related/Dependent Submissions and explained the change in the Implementation Dependencies Section</li> <li>Added "Although this procedure was originally slotted for 26 July 2016, issues with a mixture of RNAV off the ground and radar vector procedures caused a potential safety/operational</li> </ul>		

# CLT OAPM Design Package

## CLT SIDs, West ESTRR

	<p>issue at CLT. Eric Rutherford was contacted and after coordinating with Rich Silva and Eddie Tucker, ZTL approved moving this procedure and the BOBZY SID up to chart date 15 August 2015 and it will be implemented 15 October 2015.”</p> <ul style="list-style-type: none"><li>• Removed the 8260-2 Worksheets and RNAV Pro Runs from the Attachments Section</li></ul>		
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# CLT OAPM Design Package

CLT SIDs, West ESTRR

Name of Change	O
<b>ESTRR DEPARTURE (RNAV)</b>	<b>11 October 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>West Departure Proposed Procedures</b>	<b>Proposed 15 October 2015</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Positions: Departure Radar West and Arrival Radar West Atlanta ARTCC (ZTL) Sectors: 31, 32 and 34</b>	<b>CLT: Roland Alexander, James Williams ZTL: Roger Cerovsky, Bill Wise</b>
Related/Dependent Submissions	Associated Data Files
<b>BOBZY SID KRITR SID WEAZL SID JOJJO SID</b>	<b>Master TARGETS File</b>

## Purpose

The Study Team identified several areas where miles could be saved and level-offs minimized. The Study Team recommended optimization of lateral paths of current RNAV Standard Instrument Departures (SIDs), as well as the creation of additional RNAV SIDS to support CLT departure flows.

This procedure incorporates radar vectors off the ground which allows for quicker course divergence as close to the airport as possible, while creating flexibility and minimizing level-offs.

Figure 1 depicts the Study Team’s Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CLT SIDs, West ESTRR

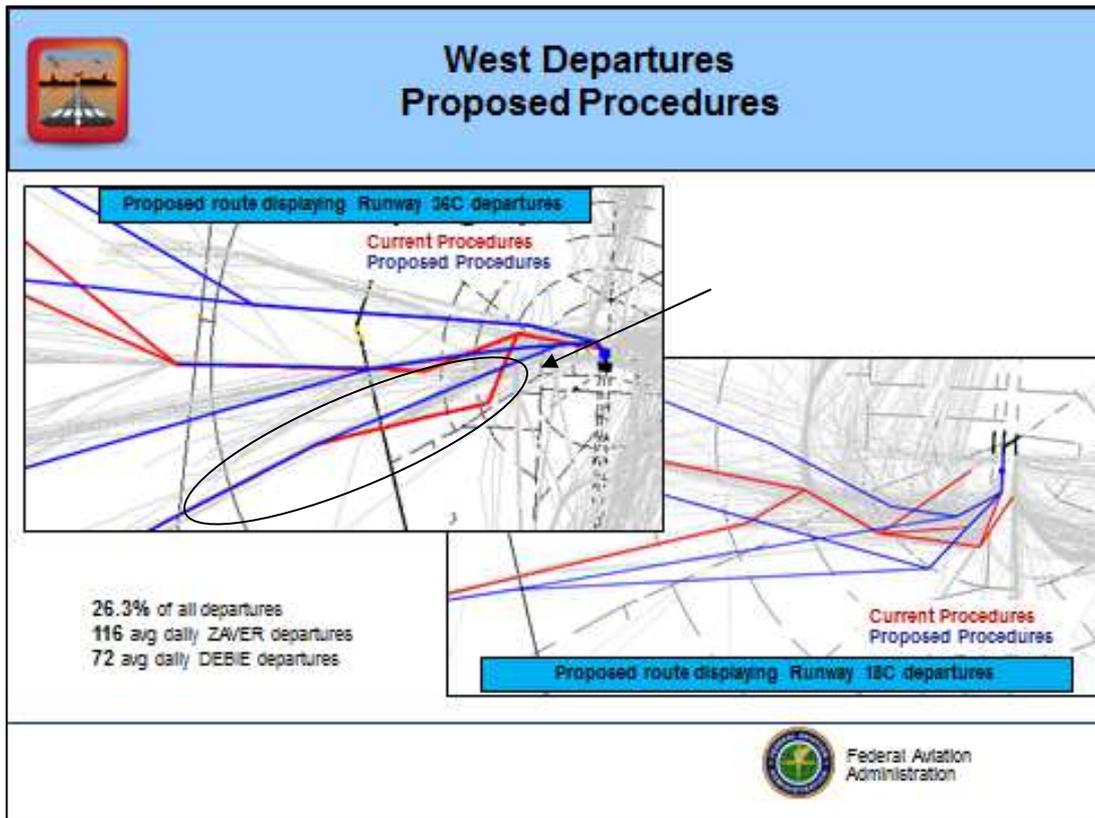


Figure 1. Study Team Recommendation

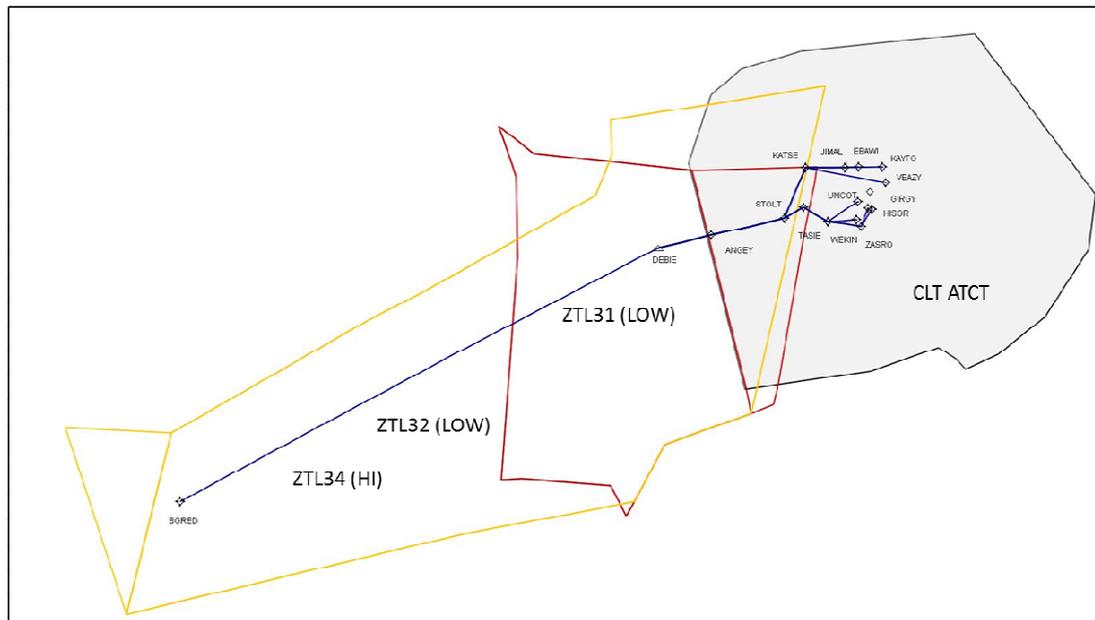


Figure 2. Original Procedure/Route/Airspace

# CLT OAPM Design Package

## CLT SIDs, West ESTRR

### Proposed Final Design

The Design Team developed the ESTRR SID that closely aligns with the original DEBIE SID. The proposed SID has one enroute transition for traffic routed westbound. The ESTRR SID is designed to de-conflict CLT west departures from ATL east departure flows. The ESTRR SID is designed for turbojet aircraft only.

This procedure incorporates radar vectoring which allows for quicker course divergence as close to the airport as possible, while creating flexibility and minimizing level-offs. In addition to Charlotte Douglas International (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County/Bryant Field (UZA), Gastonia Municipal (AKH), Lancaster County-McWhirter Field (LKR), Lincolnton-Lincoln County Regional (IPJ), Stanley County (VUJ) and Concord Regional (JQF). The following waypoints were designed on the procedure:

- GINNN Initial common route waypoint and point where satellite departures will join the SID
- ESTRR End of the SID and aircraft must be established on the procedure at this waypoint. It is also the initial enroute transition fix.
- DEBIE Waypoint de-conflicts with the GSP JUNNR STAR and GSP BIMMR SID
- IPTAY RNAV waypoint for automation use with west GSP PDRs
- CHOPZ Termination waypoint of the CHOPZ transition. It provides separation with the ATL ARRNI and JACCC SIDs.

Figure 3 depicts the Proposed Final Design.

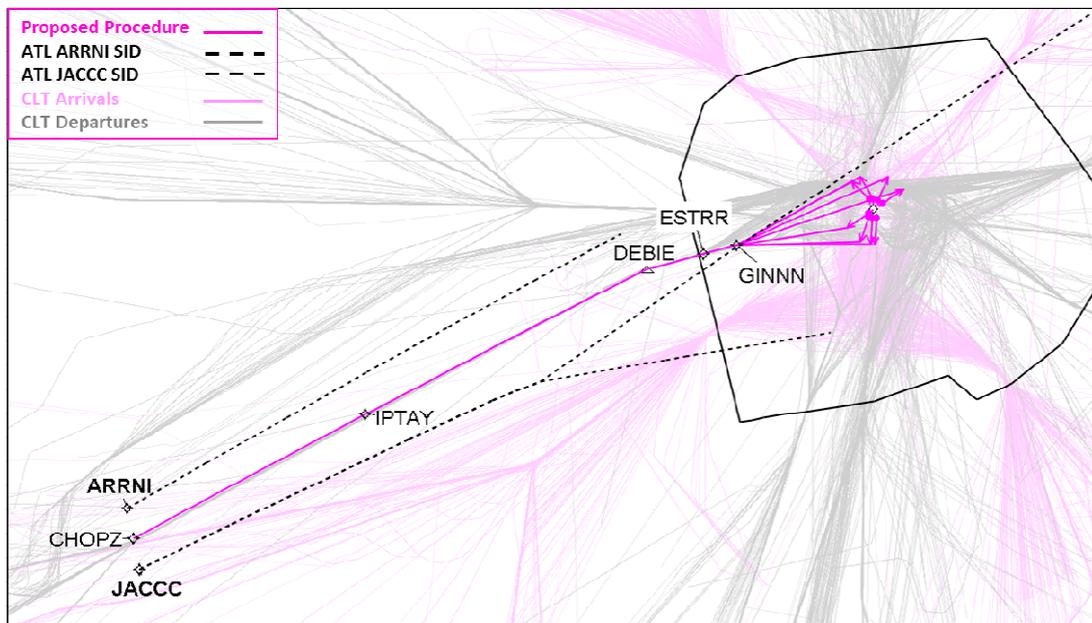


Figure 3. Proposed Final Design

# CLT OAPM Design Package

## CLT SIDs, West ESTRR

### Additional Design Considerations

- A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure.
- Incorporate original speed notes and restrictions on the SIDs
- Chart notes: “accelerate to 250 knots, if unable advise ATC”; “upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC”
- In addition to CLT the ESTRR SID will be a preferred departure routing for the following airports:
  - UZA
  - EQY
  - AKH
  - IPJ
  - JQF
  - LKR
  - RUQ
  - VUJ

### Implementation Dependencies

After much discussion regarding the dependency of the ESTRR SID and the ATL ARRNI and JACCC SIDs, ZTL Area 2 SMEs determined the ESTRR SID could be implemented prior to the implementation of ARRNI and JACCC.

Although this procedure was originally slotted for 26 July 2016, issues with a mixture of RNAV off the ground and radar vector procedures caused a potential safety/operational issue at CLT. Eric Rutherford was contacted and after coordinating with Rich Silva and Eddie Tucker, ZTL approved moving this procedure and the BOBZY SID up to chart date 15 August 2015 and it will be implemented 15 October 2015.

In order to prevent the potential safety/operational issue with a mixture of RNAV off the ground and radar vector procedures for Local Control and Departure Radar West, the north and west SIDs must be implemented at the same time.

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL sector boundary maps
- ZTL/CLT Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

CLT SIDs, West ESTRR

## Attachments

- ESTRR DEPARTURE RNAV Distribution Package
- ESTRR DEPARTURE RNAV 8260-15C
- ESTRR DEPARTURE RNAV Graphic DP Worksheet

# CLT OAPM Design Package

CLT SIDs, East BARMY

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/18/2013	<ul style="list-style-type: none"> <li>In additional design considerations, added: A note will be charted stating, "upon reaching 10,000 feet increase speed to 280 knots if unable advice ATC".</li> </ul>		
10/24/2013	<ul style="list-style-type: none"> <li>Added Satellite airports</li> <li>Changed current date</li> <li>Amended Dependencies</li> </ul>		
11/13/2013	<ul style="list-style-type: none"> <li>Added (turbojet only)</li> <li>Changed current date</li> </ul>		
11/21/2013	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Added VUJ</li> <li>Added HISOR and GIRGY on WP list</li> </ul>		
02/21/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Added LILLS as dependency</li> <li>Removed language referring to KNIGHTS as a dependency</li> <li>Amended implementation date</li> <li>Minor edits</li> </ul>		
03/22/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended implementation date</li> <li>Corrected airports</li> <li>Removed HISOR and GIRGY</li> <li>Editorial changes</li> </ul>		
03/25/2014	<ul style="list-style-type: none"> <li>Updated Figure 3</li> </ul>		
05/16/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Amended implementation date</li> <li>Editorial changes</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed Implementation Date</li> <li>Changed current to original</li> <li>Editorial changes</li> </ul>		

# CLT OAPM Design Package

CLT SIDs, East BARMY

Name of Change	Date
<b>BARMY DEPARTURE (RNAV)</b>	<b>24 June 2014</b>
Change Classification	Current Phase of Design
Terminal Procedure (RNAV SID)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>East Departure Proposed Procedures</b>	<b>Proposed 31 May 2016</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Charlotte TRACON Position: Departure Radar East Atlanta ARTCC (ZTL) Sector: 30 Washington ARTCC (ZDC) Sectors: 27 and 36	CLT: Roland Alexander, James Williams 704.359.1020 ZTL: Roger Cerovsky, Bill Wise 770.210.7622 ZDC: Joe Keimig, Curt Johnson 703.771.3435
Related/Dependent Submissions	Associated Data Files
<b>KILNS SID, LILLS SID</b>	<b>Master CLT OAPM Airspace.air5</b>

## Purpose

The Study Team identified several areas where miles could be saved and level-offs minimized. The Study Team recommended optimization of lateral paths of original RNAV Standard Instrument Departures (SIDs), as well as the creation of additional RNAV SIDS to support CLT departure flows.

This departure SID will incorporate earlier route divergence, decreased track miles flown, reduced level-offs and departure delays, increased departure efficiency and create “destination specific” routings.

Figure 1 below depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CLT SIDs, East BARMY

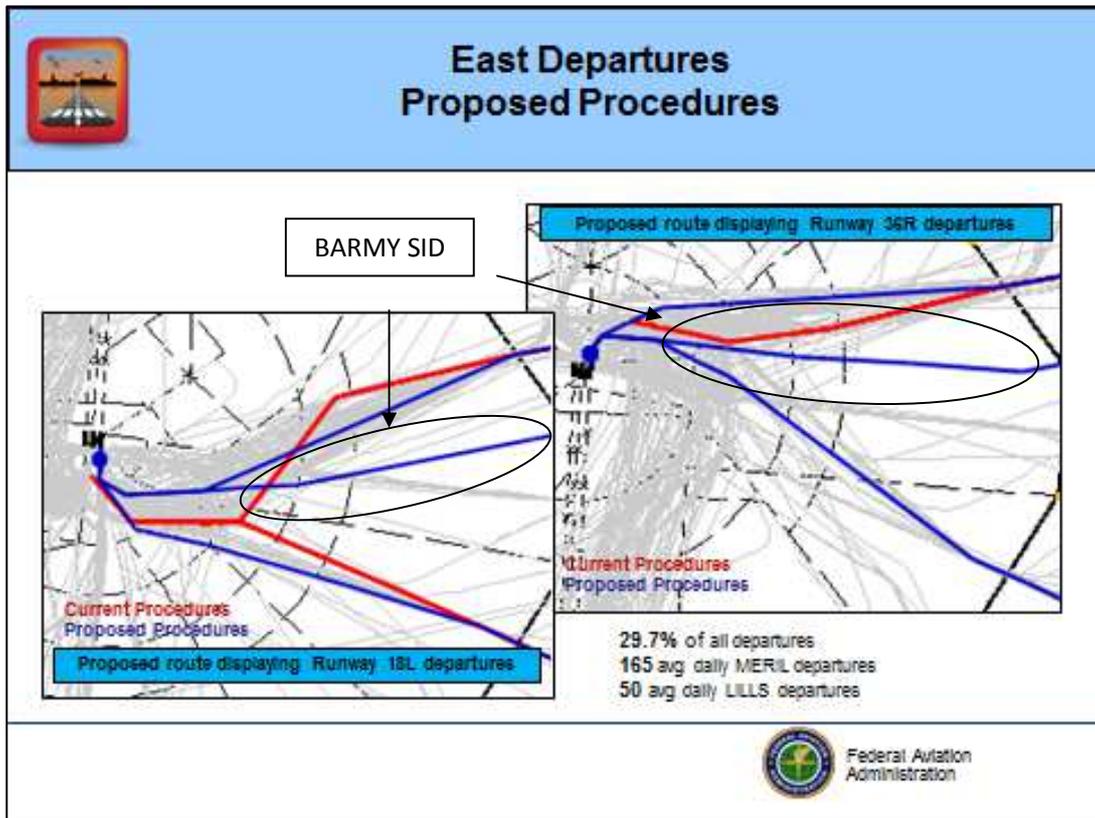


Figure 1. Study Team Recommendation

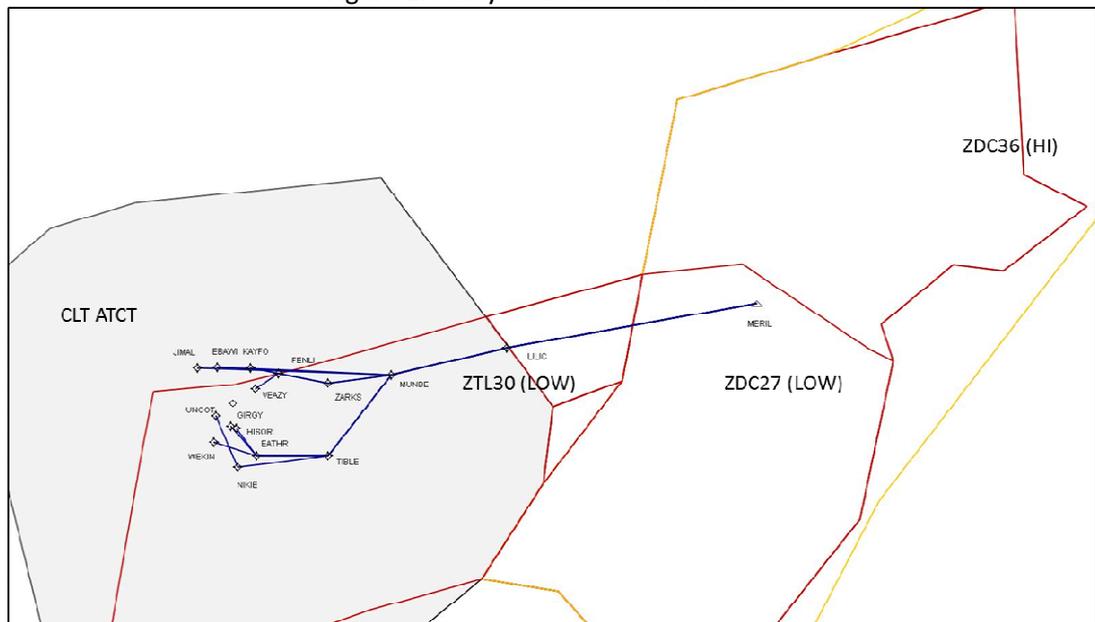


Figure 2. Original Procedure/Route/Airspace

# CLT OAPM Design Package

## CLT SIDs, East BARMY

### Proposed Final Design

The Design Team developed the BARMY SID (turbojet only) with three enroute transitions: RDU (Raleigh Durham VORTAC); TYI (Tar River VORTAC); and NUTZE. The BARMY SID was designed as a parallel departure with the KILNS SID. This procedure incorporates radar vectors which allows for quicker course divergence as close to the airport as possible, while creating flexibility and minimizing level-offs. In addition to Charlotte Douglas International (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County/Bryant Field (UZA), Gastonia Municipal (AKH), Lancaster County-McWhirter Field (LKR), Lincolnton-Lincoln County Regional (IPJ), Stanley County (VUJ) and Concord Regional (JQF). The following waypoints were designed on the procedure:

- MESHY Initial common route waypoint and point where satellite departures will join the SID
- GULFY Vector return waypoint
- BARMY End of the SID and the initial en route transition waypoint
- BATA Beginning of common route
- RDU Termination waypoint of the RDU transition
- TYI Termination waypoint of the TYI transition
- NUTZE Termination waypoint of the NUTZE transition

### Floating Waypoints:

- DATTO For use during severe weather events for off course vectors
- OLUBE For use during severe weather events for off course vectors
- EBOOK For use during severe weather events for off course vectors

Figure 3 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT SIDs, East BARMY

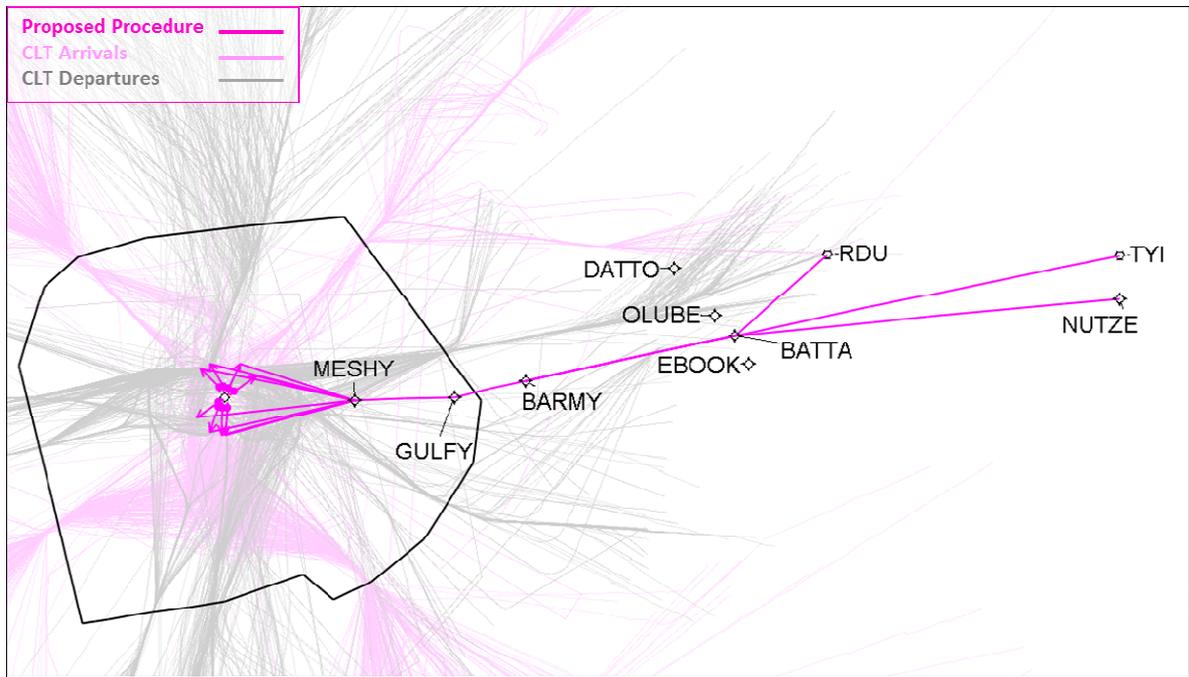


Figure 3. Proposed Final Design

### Additional Design Considerations

- A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure
- It is preferred that the KERMIT SID be done at the same time but is not required
- Incorporate original speed notes and restrictions on the SID
- Three floating fixes DATTO, EBOOK and OLUBE are to be charted as “ATC Request” A note will be charted stating, “upon reaching 10,000 feet increase speed to 280 knots if unable advice ATC”.
- In addition to CLT the BARMY SID will be a preferred departure routing for the following airports:
  - UZA
  - EQY
  - AKH
  - IPJ
  - JQF
  - LKR
  - RUQ
  - VUJ

### Implementation Dependencies

- The BARMY and LILLS SIDs are laterally separated from the KILNS SID and must be implemented concurrently

# CLT OAPM Design Package

## CLT SIDs, East BARMY

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL and ZDC sector boundary maps
- ZTL/CLT Letter of Agreement (LOA)
- ZDC/CLT LOA
- ZTL/ZDC LOA
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

### Attachments

- BARMY DEPARTURE RNAV Distribution Package
- BARMY DEPARTURE RNAV TARGETS File
- BARMY DEPARTURE RNAV\_8260-15C
- BARMY DEPARTURE RNAV\_8260-2\_Worksheet
- BARMY DEPARTURE RNAV\_Graphic\_DP\_Worksheet
- RNAV PRO Results

# CLT OAPM Design Package

CLT SIDs, East KILNS

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/18/2013	<ul style="list-style-type: none"> <li>In additional design considerations added: A note will be charted stating, "upon reaching 10,000 feet increase speed to 280 knots if unable advice ATC".</li> </ul>		
10/24/2013	<ul style="list-style-type: none"> <li>Added Satellite airports</li> <li>Changed current date</li> <li>Amended Dependencies</li> </ul>		
11/13/2013	<ul style="list-style-type: none"> <li>Added (turbojet only)</li> <li>Changed current date</li> </ul>		
11/21/2013	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Added VUJ to additional design considerations</li> <li>Added HISOR and GIRGY to WP list</li> </ul>		
02/21/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed implementation date</li> <li>Added LILLS as dependency</li> <li>Minor edits</li> </ul>		
03/22/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended proposed implementation date</li> <li>Added VUJ to airports served</li> <li>Removed GIRGY and HISOR</li> <li>Editorial changes</li> </ul>		
03/25/2014	<ul style="list-style-type: none"> <li>Updated Figure 3</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed Implementation Date</li> <li>Changed current to original</li> <li>Editorial changes</li> </ul>		

# CLT OAPM Design Package

CLT SIDs, East KILNS

Name of Change	Date
<b>KILNS DEPARTURE (RNAV)</b>	<b>24 June 2014</b>
Change Classification	Current Phase of Design
Terminal Procedure (RNAV SID)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>East Departure Proposed Procedures</b>	<b>Proposed 31 May 2016</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Position: Departure Radar East</b> <b>Atlanta ARTCC (ZTL) Sector: 30</b> <b>Washington ARTCC (ZDC) Sectors: 27 and 36</b>	<b>CLT: Roland Alexander, James Williams 704.359.1020</b> <b>ZTL: Roger Cerovsky, Bill Wise 770.210.7622</b> <b>ZDC: Joe Keimig, Curt Johnson 703.771.3435</b>
Related/Dependent Submissions	Associated Data Files
<b>BARMY SID, LILLS SID</b>	<b>Master TARGETS File</b>

## Purpose

The Study Team identified several areas where miles could be saved and level-offs minimized. The Study Team recommended optimization of lateral paths of original RNAV Standard Instrument Departures (SIDs), as well as the creation of additional RNAV SIDs to support CLT departure flows. This departure SID will incorporate earlier route divergence, decreased track miles flown, reduced level-offs and departure delays, increased departure efficiency and create “destination specific” routings.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CLT SIDs, East KILNS

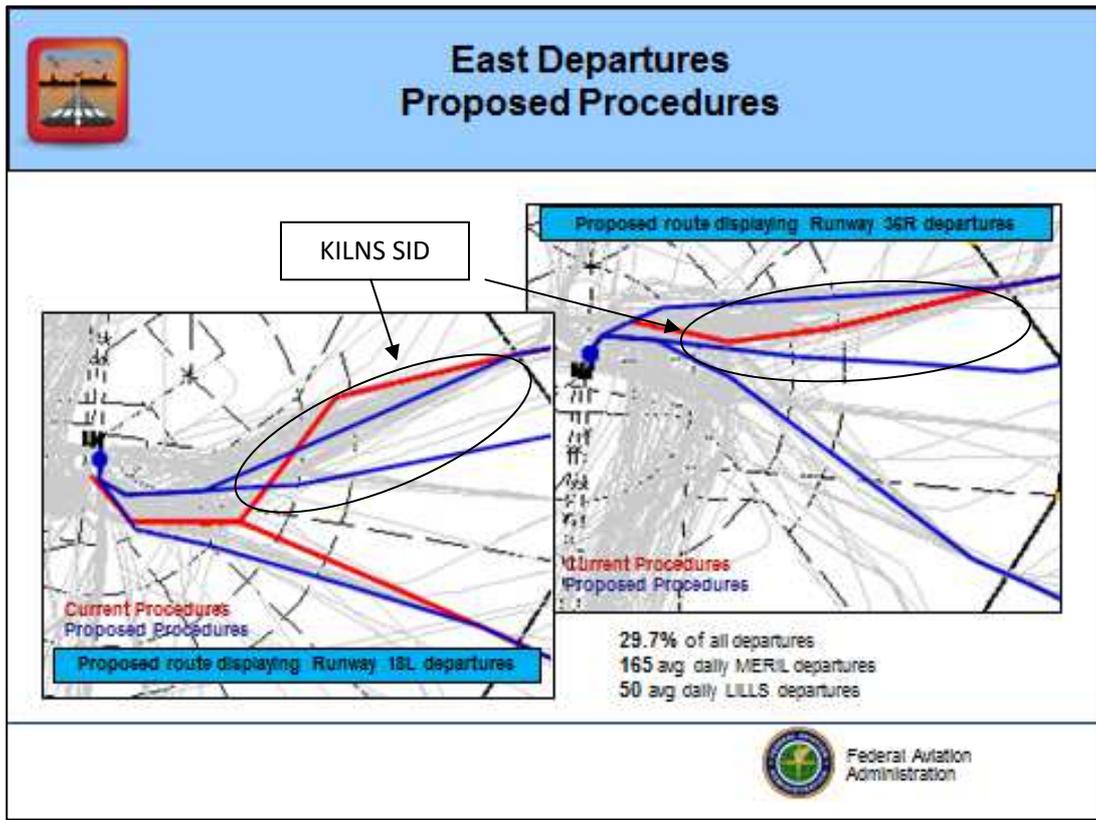


Figure 1. Study Team Recommendation

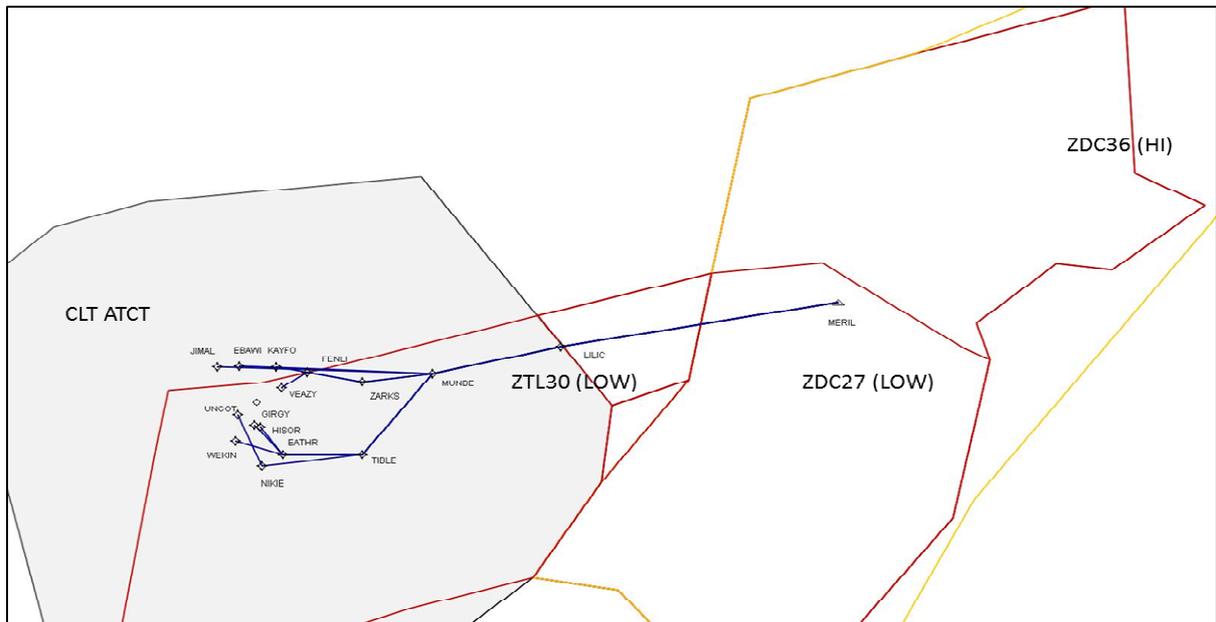


Figure 2. Original Procedure/Route/Airspace

# CLT OAPM Design Package

## CLT SIDs, East KILNS

### Proposed Final Design

The Design Team developed the KILNS SID (turbojet only) with one en route transition for traffic routed north of RDU to serve east coast city-pairs to and north of Washington D.C. This procedure incorporates radar vectors which allows for quicker course divergence as close to the airport as possible, while creating flexibility and minimizing level-offs. In addition to Charlotte Douglas International (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County/Bryant Field (UZA), Gastonia Municipal (AKH), Lancaster County-McWhirter Field (LKR), Lincolnton-Lincoln County Regional (IPJ), Stanly County (VUJ) and Concord Regional (JQF). The following waypoints were designed on the procedure:

- MUNBE Initial common route waypoint and point where satellite departures will join the SID
- LILIC Vector to waypoint for CLT controllers in the event they do not clear aircraft to MUNBE. Aircraft must be established on the procedure at this waypoint.
- KILNS End of the common route and a vector to waypoint for ZTL. The waypoint is located west of the ZTL/ZDC boundary. Aircraft must be established on the procedure at this waypoint.
- DURST De-conflicts the CHSLY STAR and the BARMY SID from the KILNS SID
- AUDII Termination waypoint of the AUDII transition

#### Floating Waypoints:

- DATTO For use during severe weather events for off course vectors
- OLUBE For use during severe weather events for off course vectors
- EBOOK For use during severe weather events for off course vectors

Figure 3 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT SIDs, East KILNS

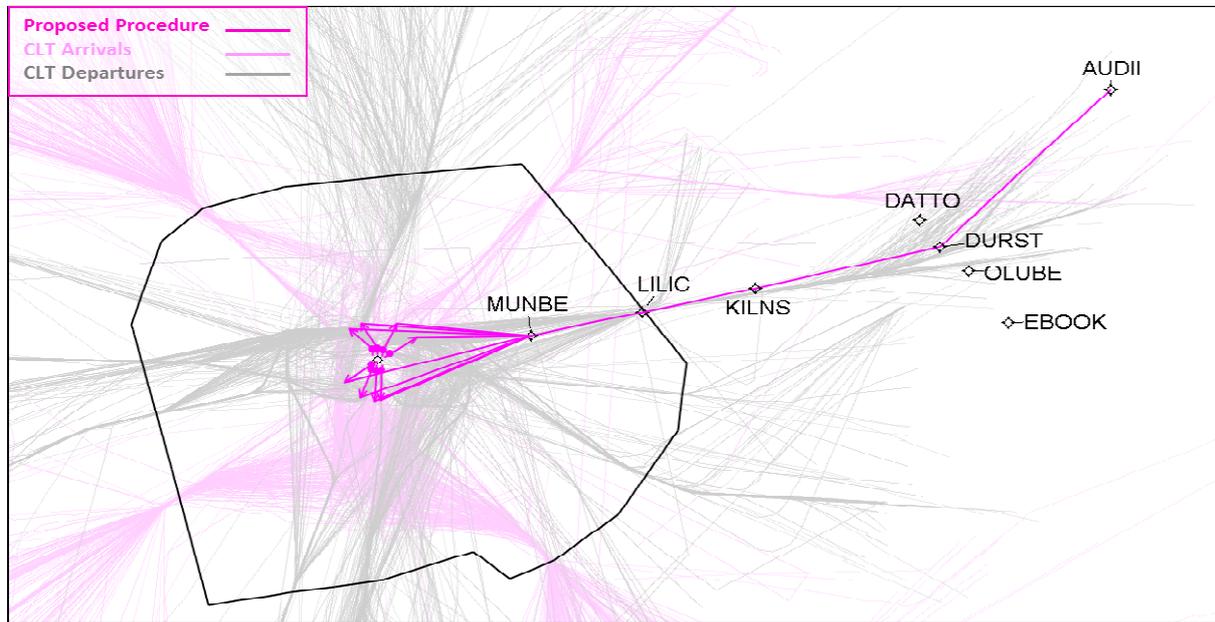


Figure 3. Proposed Final Design

### Additional Design Considerations

- Validation through Human-in-the-Loop Simulation was not required
- It is preferred that the BRUWR SID and the TRIAD SID CARWN TRANSITION be implemented at the same time but is not necessary
- Incorporate original speed notes and restrictions on the SID
- For severe weather three floating waypoints DATTO, EBOOK and OLUBE to be charted for "ATC REQUEST"
- A note will be charted stating, "upon reaching 10,000 feet increase speed to 280 knots if unable advice ATC"
- In addition to CLT the KILNS SID will be a preferred departure routing for the following airports:
  - UZA
  - EQY
  - AKH
  - IPJ
  - JQF
  - LKR
  - RUQ
  - VUJ

### Implementation Dependencies

The KILNS and LILLS SIDs are laterally separated from the BARMY SID and must be implemented concurrently.

# CLT OAPM Design Package

## CLT SIDs, East KILNS

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL sector boundary maps
- ZTL/CLT Letter of Agreement (LOA)
- ZDC/ZTL Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

### Attachments

- KILNS DEPARTURE RNAV Distribution Package
- KILNS DEPARTURE RNAV\_8260-15C
- KILNS DEPARTURE RNAV\_8260-2\_Worksheet
- KILNS DEPARTURE RNAV\_Graphic\_DP\_Worksheet
- RNAV PRO Results

# CLT OAPM Design Package

CLT SIDs, South ICONS

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/18/2013	<ul style="list-style-type: none"> <li>In additional design considerations added: A note will be charted stating, "upon reaching 10,000 feet increase speed to 280 knots if unable advise ATC".</li> </ul>		
10/24/2013	<ul style="list-style-type: none"> <li>Added Satellite airports</li> <li>Changed current date</li> <li>Amended Dependencies</li> </ul>		
11/13/2013	<ul style="list-style-type: none"> <li>Added (turbojet only)</li> <li>Changed current date</li> </ul>		
11/21/2013	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Added VUJ to additional design considerations</li> <li>Added HISOR and GIRGY to WP list</li> </ul>		
03/22/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended proposed implementation date</li> <li>Removed HISOR and GIRGY</li> <li>Editorial changes</li> </ul>		
03/25/2014	<ul style="list-style-type: none"> <li>Update Figure 3</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Changed Proposed Implementation date</li> <li>Added: Chart notes: "accelerate to 250 knots, if unable advise ATC"; "upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC"</li> </ul>		

# CLT OAPM Design Package

CLT SIDs, South ICONS

Name of Change	Date
<b>ICONS DEPARTURE (RNAV)</b>	<b>24 June 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>South Departures Proposed Procedures</b>	<b>Proposed 26 July 2016</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Positions: Departure Radar East and Arrival Radar East</b> <b>Atlanta ARTCC (ZTL) Sector: 30</b> <b>Jacksonville ARTCC (ZJX) Sectors: 65, 66 and 72</b>	<b>ZTL: Roger Cerovsky, Bill Wise 770.210.7622</b> <b>ZJX: Evan Darby, Jeff Wood 904.430.7271</b> <b>CLT: Roland Alexander, James Williams 704.359.1020</b>
Related/Dependent Submissions	Associated Data Files
<b>BEAVY SID</b> <b>KWEEN SID</b>	<b>Master TARGETS File</b>

## Purpose

The Study Team identified several areas where miles could be saved and level-offs minimized. The Study Team recommended optimization of lateral paths of current RNAV SIDs, as well as the creation of additional RNAV SIDs to support CLT departure flows. South departure routes share common paths for approximately 27 miles when departing north, which decreases efficiency due to increased off-the-runway separation. This Study Team procedure incorporates course divergence as close to the airport as possible. This will allow for earlier divergence on the BUCKL procedure. The proposed RNAV SID closely overlays the currently flown tracks, proceduralizing some of the shortcut benefits gained by today's operations. This departure SID will incorporate earlier route divergence, decreased track miles flown, reduced level-offs and departure delays, increased departure efficiency and create "destination specific" routings.

Figure 1 depicts the Study Team recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

CLT SIDs, South ICONS

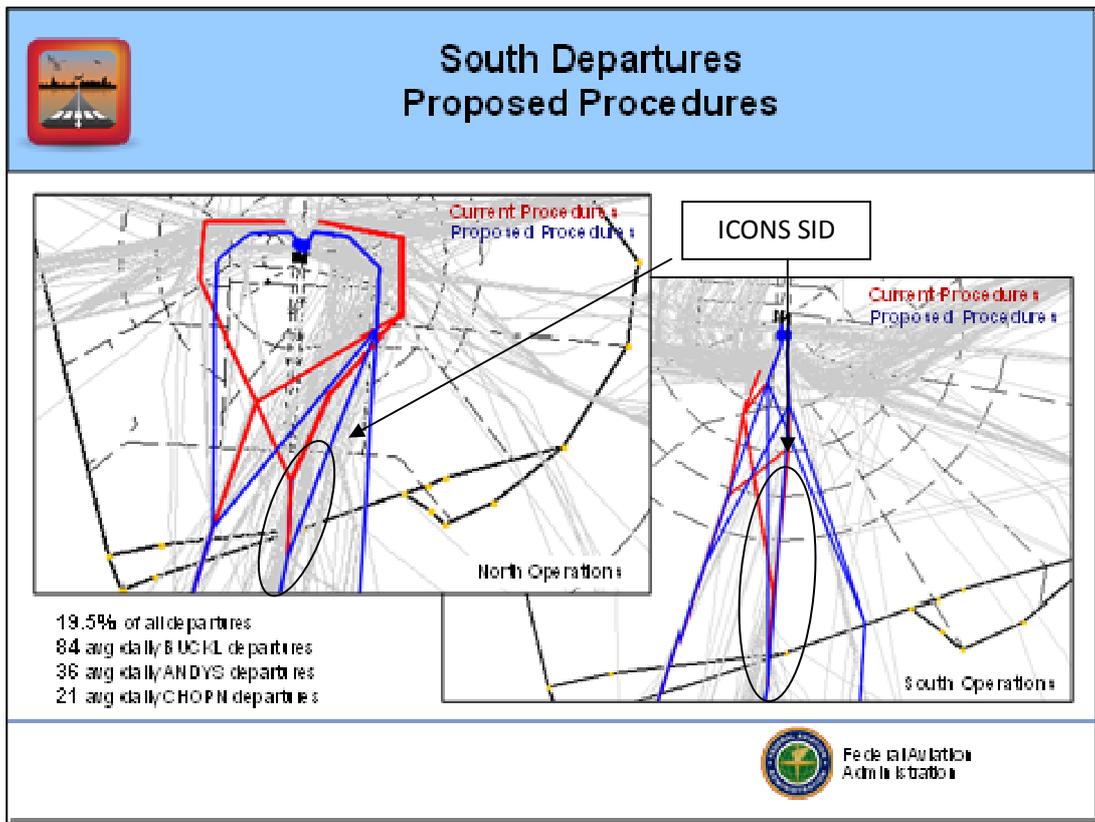


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT SIDs, South ICONS

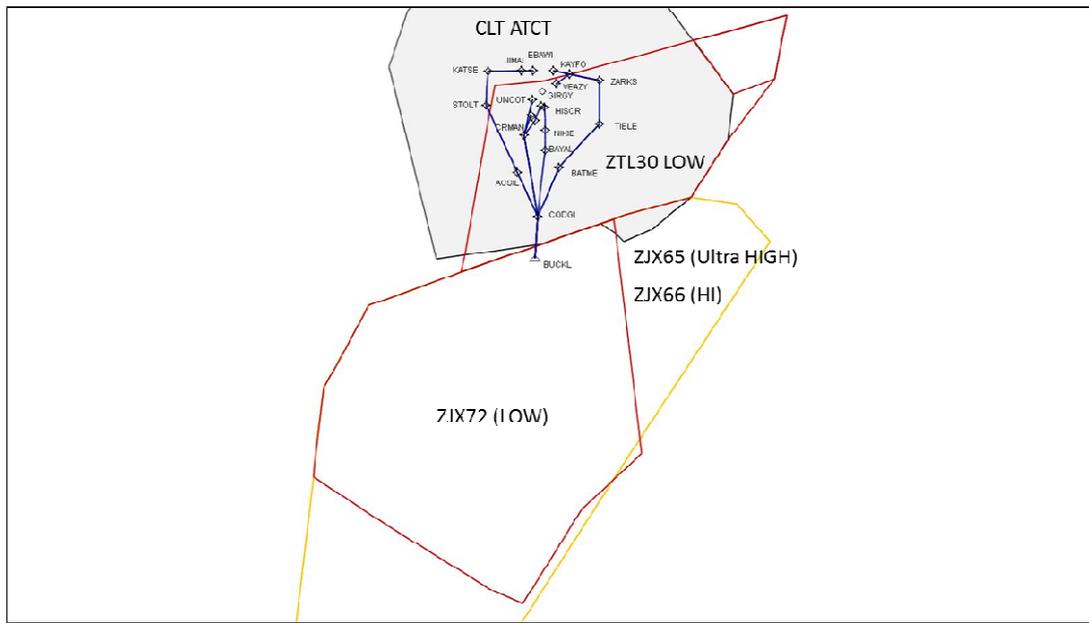


Figure 2. Original Procedure/Route/Airspace

### **Proposed Final Design**

The Design Team moved the path west of the Study Team proposed route to reduce track miles on the new KWEEN SID. This procedure (turbojet only) incorporates radar vectors which allows for quicker course divergence as close to the airport as possible, while creating flexibility and minimizing level-offs. In addition to In addition to Charlotte Douglas International (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County/Bryant Field (UZA), Gastonia Municipal (AKH), Lancaster County-McWhirter Field (LKR), Lincoln-ton-Lincoln County Regional (IPJ), Stanley County (VUJ) and Concord Regional (JQF). The following waypoints were designed on the procedure:

- GILFN            Initial common route waypoint and point where satellite departures will join the SID
- ICONS           End of the SID and aircraft must be established on the procedure at this waypoint. It is also the initial enroute transition fix.
- BLDWN        Termination waypoint of the BLDWN transition

Figure 3 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT SIDs, South ICONS

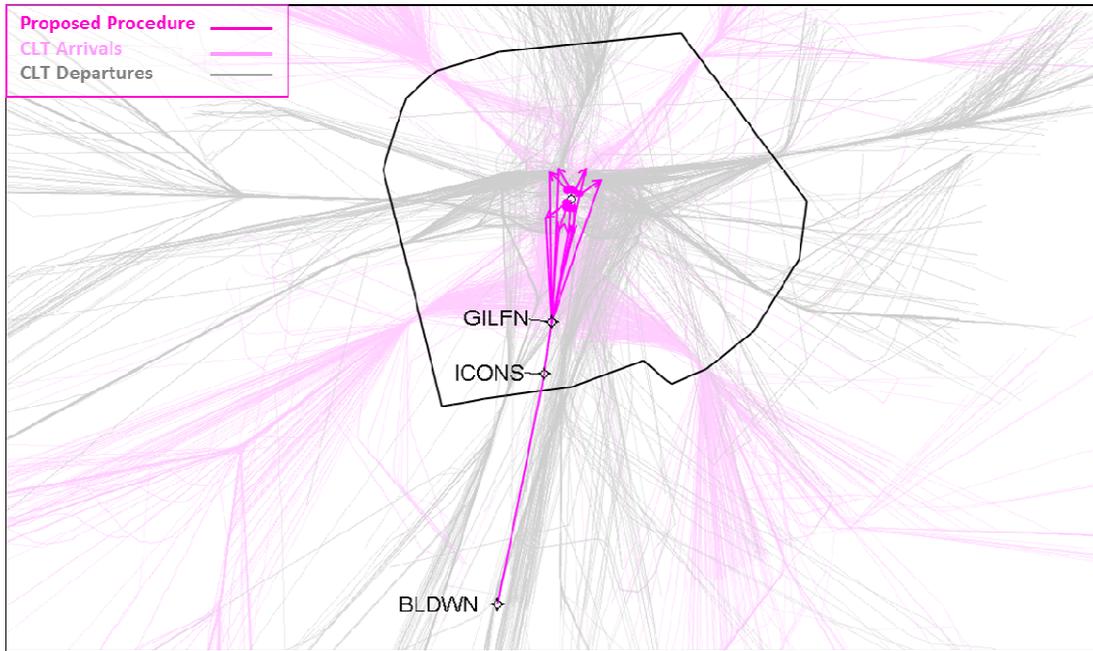


Figure 3. Proposed Final Design

### **Additional Design Considerations**

- A Human-in-the-Loop Simulation validation was conducted during October 2012 and found this to be a viable procedure.
- Incorporate original speed notes and restrictions on the SID.
- Coordinate the implementation of the new design with Columbia ATCT (CAE)
- Chart notes: “accelerate to 250 knots, if unable advise ATC”; “upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC”
- In addition to CLT the ICONS SID will be a preferred departure routing for the following airports:
  - UZA
  - EQY
  - AKH
  - IPJ
  - JQF
  - LKR
  - RUQ
  - VUJ

# CLT OAPM Design Package

## CLT SIDs, South ICONS

### Implementation Dependencies

The ICONS SID is laterally separated from the ANDYS and KWEEN SIDs and must be implemented concurrently. These three SIDs are part of the overall south departure airspace design and must be implemented concurrently.

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL/ZJX sector boundary maps
- ZTL/CLT Letter of Agreement (LOA)
- ZJX/CLT Letter of Agreement (LOA)
- ZTL and ZJX Facility Operations and Administration Order 7230.2
- CLT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

### Attachments

- ICONS DEPARTURE RNAV Distribution Package
- ICONS DEPARTURE RNAV\_8260-15C
- ICONS DEPARTURE RNAV\_8260-2\_Worksheet
- ICONS DEPARTURE RNAV\_Graphic\_DP\_Worksheet
- RNAV PRO Results

# CLT OAPM Design Package

CLT SIDs, South KWEEN

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/17/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Changed Implementation Date</li> </ul>		
09/18/2013	<ul style="list-style-type: none"> <li>In additional design considerations added: A note will be charted stating, "upon reaching 10,000 feet increase speed to 280 knots if unable advise ATC".</li> </ul>		
10/24/2013	<ul style="list-style-type: none"> <li>Added Satellite airports</li> <li>Changed current date</li> <li>Amended Dependencies</li> </ul>		
11/13/2013	<ul style="list-style-type: none"> <li>Changed current date</li> </ul>		
11/21/2013	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Added VUJ to additional design considerations</li> <li>Added HISOR and GIRGY to WP list</li> </ul>		
03/22/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended proposed implementation date</li> <li>Removed HISOR and GIRGY</li> <li>Editorial changes</li> </ul>		
03/25/2014	<ul style="list-style-type: none"> <li>Updated Figure 3</li> </ul>		
05/16/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Corrected spelling of Stanly County</li> <li>Changed reference to ANDYS to BEAVY</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Changed Proposed Implementation date</li> <li>Added: Chart notes: "accelerate to 250 knots, if unable advise ATC"; "upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC"</li> </ul>		

# CLT OAPM Design Package

CLT SIDs, South KWEEN

Name of Change	Date
<b>KWEEN DEPARTURE (RNAV)</b>	<b>24 June 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>South Departures Proposed Procedures</b>	<b>Proposed 26 July 2016</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Positions: Departure Radar East and Arrivals Radar East</b> <b>Atlanta ARTCC (ZTL) Sector: 30</b> <b>Jacksonville ARTCC (ZJX) Sectors: 47, 48, 65, 66 and 72</b>	<b>CLT: Roland Alexander, James Williams 704.359.1020</b> <b>ZTL: Roger Cerovsky, Bill Wise 770.210.7622</b> <b>ZJX: Evan Darby, Jeff Wood 904.430.7271</b>
Related/Dependent Submissions	Associated Data Files
<b>BEAVY SID</b> <b>ICONS SID</b> <b>KNIGHTS SID</b> <b>OSPRI STAR</b> <b>TRTLS STAR</b>	<b>Master TARGETS File</b>

## Purpose

The Study Team identified several areas where miles could be saved and level-offs minimized. The Study Team recommended optimization of lateral paths of original RNAV SIDs, as well as the creation of additional RNAV SIDs to support CLT departure flows. South departure routes share common paths for approximately 27 miles when departing north, which decreases efficiency due to increased off-the-runway separation. This Study Team procedure incorporates course divergence as close to the airport as possible. This will allow for earlier divergence on the KWEEN procedure. The proposed RNAV SID closely overlay the currently flown tracks, proceduralizing some of the shortcut benefits gained by today's operations. This departure SID will incorporate earlier route divergence, decreased track miles flown, reduced level-offs and departure delays, increased departure efficiency and create "destination specific" routings.

Figure 1 depicts the Study Team proposal. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CLT SIDs, South KWEEN

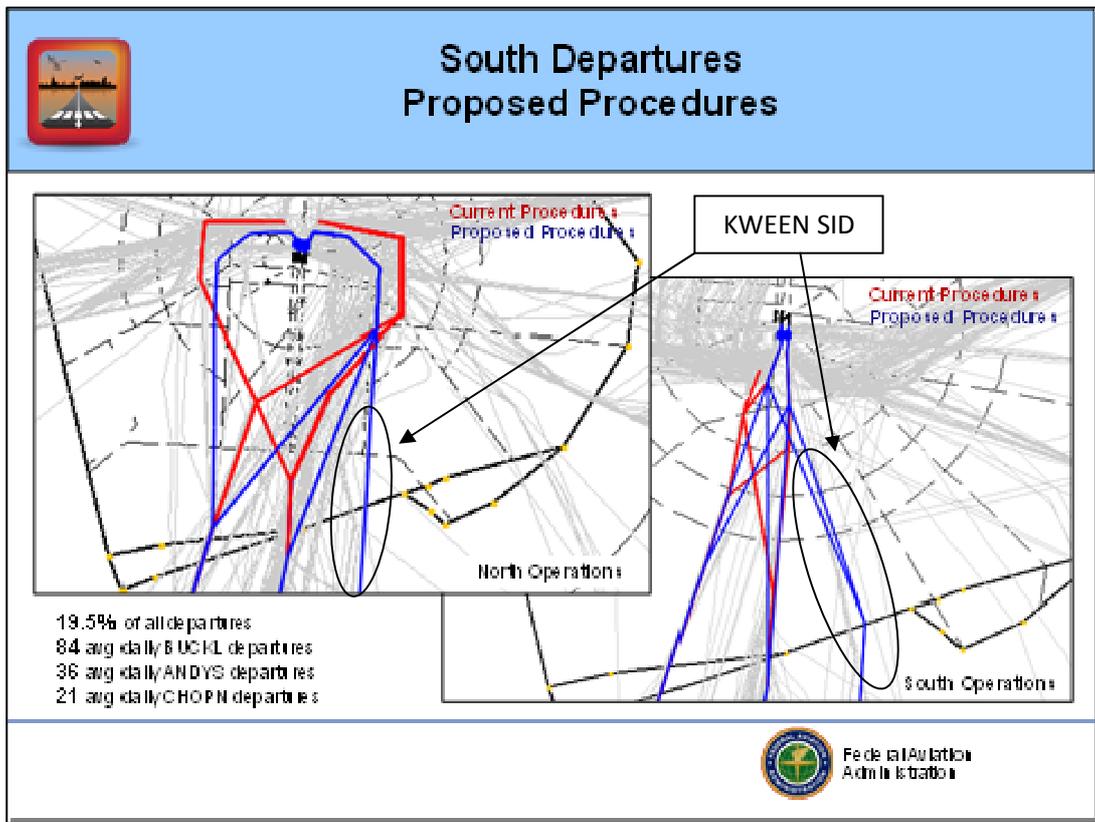


Figure 1. Study Team Recommendation

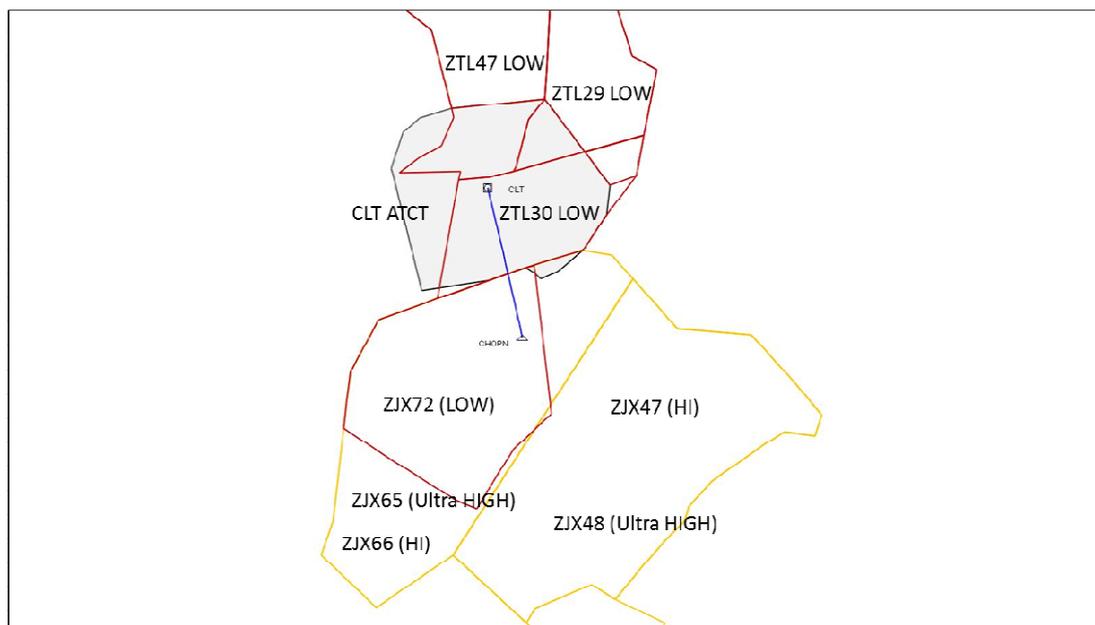


Figure 2. Original Procedure/Route/Airspace

# CLT OAPM Design Package

## CLT SIDs, South KWEEN

### Proposed Final Design

The Design Team moved the track west of the Study Team proposal to provide lateral separation for the CAE arrivals filed over GSO and reduce track miles. International departures will join ARX (Atlantic Route) at PITRW. The KWEEN SID is designed for both jets and turboprops.

This procedure incorporates radar vectors which allows for quicker course divergence as close to the airport as possible, while creating flexibility and minimizing level-offs. In addition to Charlotte Douglas International (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County/Bryant Field (UZA), Gastonia Municipal (AKH), Lancaster County-McWhirter Field (LKR), Lincolnton-Lincoln County Regional (IPJ), Stanly County (VUJ) and Concord Regional (JQF). The following waypoints were designed on the procedure:

- HMMPY Initial common route waypoint and point where satellite departures will join the SID
- KWEEN End of the SID and aircraft must be established on the procedure at this waypoint. It is also the initial enroute transition fix.
- UNJAM Shares waypoint with the OSPRI/TRTLS STARs
- TASTY Waypoint defines turn
- PITRW Termination waypoint of the PITRW transition. The transition joins AR-X at PITRW

Figure 3 depicts the Proposed Final Design.

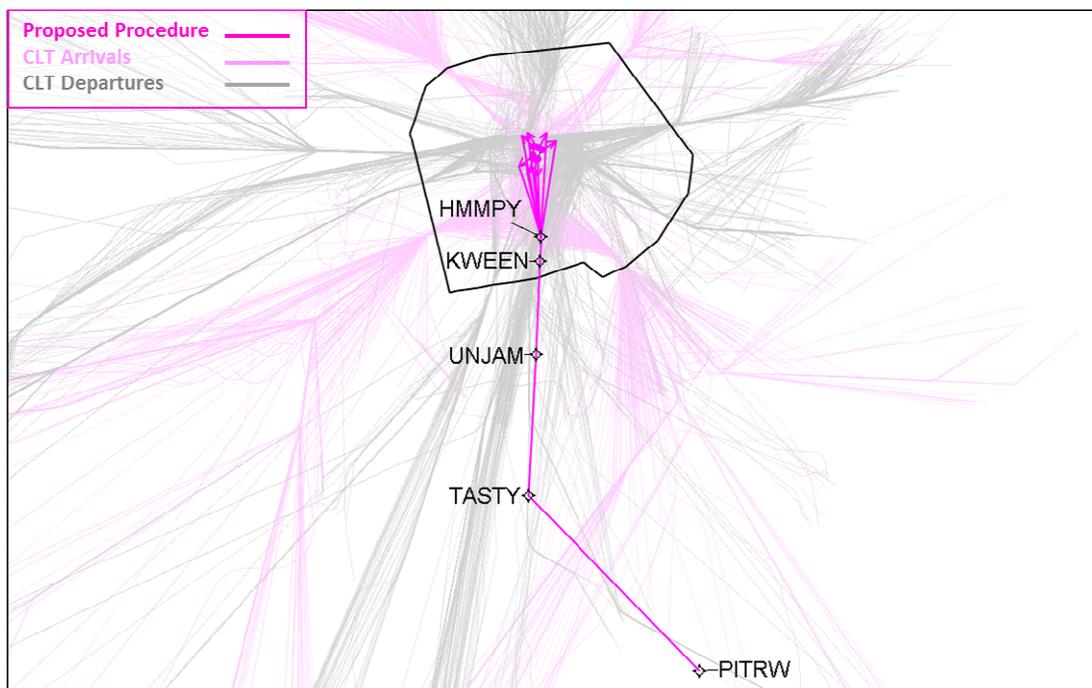


Figure 3. Proposed Final Design

# CLT OAPM Design Package

## CLT SIDs, South KWEEN

### Additional Design Considerations

- A Human-in-the-Loop Simulation validation was conducted during October 2012 and found this to be a viable procedure
- Coordinate the implementation of the new design with Columbia ATCT (CAE)
- Chart notes: “accelerate to 250 knots, if unable advise ATC”; “upon reaching 10,000 feet, increase speed to 280 knots, if unable advise ATC”
- It is anticipated CLT will assign turboprops 12,000 feet
- In addition to CLT the KWEEN SID will be a preferred departure routing for the following airports:
  - Rock Hill, SC Airport (UZA)
  - Monroe, NC Airport (EQY)
  - Gastonia, NC Airport (AKH)
  - Lincolnton, NC Airport (IPJ)
  - Concord, NC Airport (JQF)
  - Lancaster, SC Airport (LKR)
  - Rowan County, NC Airport (RUQ)
  - Stanly County, NC Airport (VUJ)

### Implementation Dependencies

- The TRTLS and OSPRI STARs are connected to the KWEEN SID and must be implemented concurrently
- The KWEEN SID is laterally separated from the ICONS SID and must be implemented concurrently
- The KWEEN, ICONS, and BEAVY SIDs are part of the overall south departure airspace design and must be implemented concurrently
- The KWEEN SID and KNIGHTS SID WALUT Transition overlap each other and must be implemented concurrently

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL/ZJX sector boundary maps
- ZTL/CLT Letter of Agreement (LOA)
- ZJX/CLT LOA
- ZTL and ZJX Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARs Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

CLT SIDs, South KWEEN

## Attachments

- KWEEN DEPARTURE RNAV Distribution Package
- KWEEN DEPARTURE RNAV TARGETS PACKAGE
- KWEEN DEPARTURE RNAV\_8260-15C
- KWEEN DEPARTURE RNAV\_8260-2\_Worksheet
- KWEEN DEPARTURE RNAV\_Graphic\_DP\_Worksheet
- RNAV PRO Results

# CLT OAPM Design Package

CLT SIDS, KERMIT

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/02/2013	<ul style="list-style-type: none"> <li>Added Current Date</li> <li>Changed Implementation Date</li> </ul>		
09/18/2013	<ul style="list-style-type: none"> <li>In additional design considerations added: A note will be charted stating, "upon reaching 10,000 feet increase speed to 280 knots if unable advice ATC".</li> </ul>		
10/24/2013	<ul style="list-style-type: none"> <li>Added Satellite airports</li> <li>Changed current date</li> <li>Amended Dependencies</li> </ul>		
12/11/2013	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Editorial changes</li> <li>Changed proposed date</li> </ul>		
2/11/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Changed reference from ANDYS SID to BEAVY SID</li> <li>Changed reference from ANGEY SID to ESTRR SID</li> <li>Editorial changes</li> </ul>		
5/14/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Amended Proposed Implementation Date</li> <li>Editorial changes</li> <li>Changed Stanley County to Stanly County</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed Implementation Date</li> <li>Changed current to original</li> <li>TAY removed from procedure</li> <li>Editorial changes</li> <li>Removed Lat/Lon</li> </ul>		
07/01/2014	<ul style="list-style-type: none"> <li>Updated Figure 2</li> </ul>		

# CLT OAPM Design Package

CLT SIDS, KERMIT

Name of Change	Date
<b>KERMIT ONE DEPARTURE</b>	<b>24 June 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (Conventional SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>South and West Departures Proposed Procedures General Recommendations</b>	<b>Proposed 5 January 2017</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Positions: Departure Radar East, East Arrival, Departure Radar West and Arrival Radar West; Satellite Radar North, Satellite Radar South and Satellite Radar Concord</b> <b>Atlanta ARTCC (ZTL) Sectors: 30, 31, 44, and 49</b> <b>Jacksonville ARTCC (ZJX) Sector: 72</b> <b>Washington ARTCC (ZDC) Sectors: 27 and 36</b>	<b>CLT: Roland Alexander, James Williams 704.359.1020</b> <b>ZTL: Roger Cerovsky, Bill Wise 770.210.7622</b> <b>ZJX: Evan Darby, Jeff Wood 904.430.7271</b> <b>ZDC: Joe Keimig, Curt Johnson 703.771.3435</b>
Related/Dependent Submissions	Associated Data Files
<b>N/A</b>	<b>Master TARGETS File</b>

## Purpose

New RNAV SIDs requires conventional SIDs for non-RNAV aircraft to efficiently accommodate departure traffic. The Study Team recommended the creation of at least one conventional departure procedure to mimic RNAV SIDs.

# CLT OAPM Design Package

## CLT SIDS, KERMIT

Figure 1 depicts the Original Procedure, Route and Airspace.

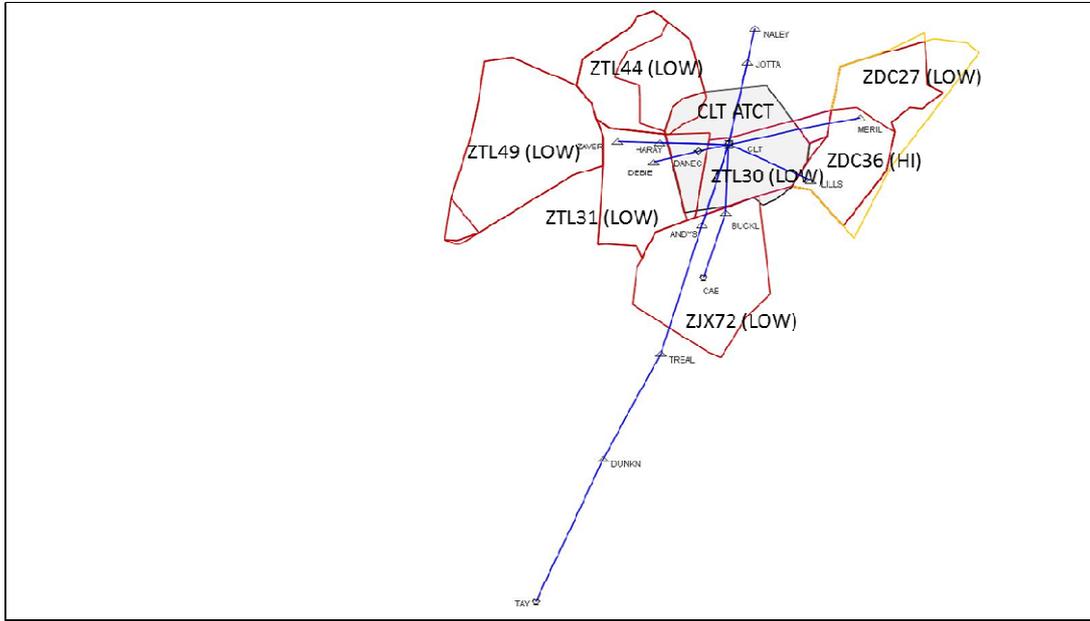


Figure 1. Original Procedure/Route/Airspace

### Proposed Final Design

The Design Team combined the existing BOBCAT, HORNET and PANTHER SIDs to fulfill the Study Team requirement for a conventional departure procedure.

The Design Team retained the ANDYS/TAYLOR and DEBIE transitions to serve conventional turbojet departures to the south and west and the LILLS, MERIL and JOTTA/NALEY transitions to serve conventional turbojet departures to the east and north.

The Design Team created two en route transitions that closely align the lateral paths of the BOBZY SID (RNAV). As with the BOBZY SID, the en route transitions are for ZTL and ZME traffic.

The Design Team created the WALUT transition that closely aligns the lateral paths of the proposed KWEEN SID (RNAV) to serve departures to the southeast. In addition to Charlotte Douglas (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Stanly County (VUJ) and Concord Regional (JQF).

The following fixes were designed on the procedure:

- CLT                      SID initial fix an
- JOTTA                 Transition fix for LYH traffic, aligns with KRITR (RNAV) SID
- NALEY                SID termination fix, Transition fix for PSK traffic, aligns with KRITR (RNAV) SID
- MERIL                SID termination fix, aligns with KILNS (RNAV) SID
- LILLS                 SID termination fix, carryover from the previous Panther SID, OAPM proposed RNAV SIDs , aligns with the LILLS (RNAV) SID

# CLT OAPM Design Package

## CLT SIDS, KERMIT

- WALUT Aligns transition with KWEEN (RNAV) SID
- HAMLN SID termination fix, Aligns transition with KWEEN (RNAV) SID
- ANDYS Transition fix for AGS traffic, Aligns transition with BEAVY (RNAV) SID
- TREAL Aligns transition with BEAVY (RNAV) SID
- TYDOE Aligns transition with BEAVY (RNAV) SID
- DUNKN SID termination fix. Aligns transition with BEAVY (RNAV) SID
- DEBIE Aligns transition with ESTRR (RNAV) SID
- HUNNY Aligns transition with BOBZY (RNAV) SID
- NEANO SID termination fix, Aligns transition with BOBZY (RNAV) SID
- HAIT SID termination fix, Aligns transition with BOBZY (RNAV) SID

Figure 2 below depicts the Proposed Final Design.

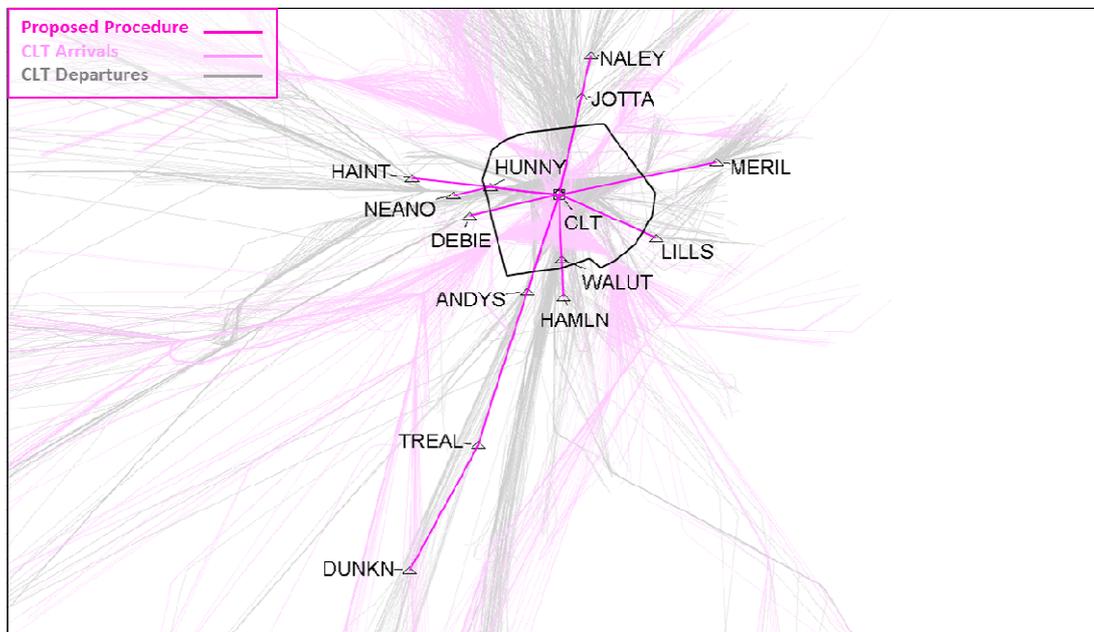


Figure 2. Proposed Final Design

# CLT OAPM Design Package

## CLT SIDS, KERMIT

### Additional Design Considerations

- A Human-in-the-Loop Simulation validation was conducted during July and October 2012 and found this to be a viable procedure
- The existing BOBCAT, HORNET and PANTHER SIDs must be decommissioned upon publication of the KERMIT SID
- East Departure frequency will be noted on the chart for the MERIL, LILLS, WALUT and ANDYS transitions
- West Departure frequency will be noted on the chart for the DEBIE, HUNNY and NALEY/JOTTA transitions
- A note will be charted stating, “upon reaching 10,000 feet increase speed to 280 knots if unable advice ATC”.

### Implementation Dependencies

- Letter of Agreement and Standard Operating Procedure changes for Atlanta, Jacksonville and Washington ARTCCs and Charlotte ATCT
- In addition to CLT the KERMIT SID will be a preferred departure routing for the following airports:
  - Rock Hill, SC Airport (UZA)
  - Monroe, NC Airport (EQY)
  - Gastonia, NC Airport (AKH)
  - Lincolnton, NC Airport (IPJ)
  - Concord, NC Airport (JQF)
  - Lancaster, SC Airport (LKR)
  - Rowan County, NC Airport (RUQ)
  - Stanly County, NC Airport (VUJ)

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL/CLT Letter of Agreement (LOA)
- ZDC/CLT Letter of Agreement (LOA)
- ZJX/CLT Letter of Agreement (LOA)
- GSP/CLT Letter of Agreement (LOA)
- GSO/CLT Letter of Agreement (LOA)
- CAE/CLT Letter of Agreement (LOA)
- FAY/CLT Letter of Agreement (LOA)
- FLO/CLT Letter of Agreement (LOA)
- SSC/CLT Letter of Agreement (LOA)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- En route Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# **CLT OAPM Design Package**

## **CLT SIDS, KERMIT**

### **Attachments**

None

This procedure will be tracked, but not implemented via the OAPM process. This design package will be forwarded to the Eastern Service Center Operations Support Group for incorporation into the National Airspace System. The OAPM team will track its progress due to its correlation with the CLT RNAV SIDs and other CLT airspace design issues.

# CLT OAPM Design Package

## CLT SIDs, KNIGHTS Propeller Aircraft Only

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
03/26/2013	<ul style="list-style-type: none"> <li>• Current date added</li> <li>• Old naming convention removed</li> <li>• Impacted changed to affected</li> <li>• Proposed final design was amended</li> <li>• Implementation Dependencies and Document Changes were amended</li> <li>• In Review Signatures: Michael P. Richardson replaced Lyndon M. Bertke</li> </ul>		
04/10/2013	<ul style="list-style-type: none"> <li>• In Review Signatures: James Williams replaced Greg Jones</li> <li>• Editorial changes</li> </ul>		
07/02/2013	<ul style="list-style-type: none"> <li>• Updated Figure 2</li> </ul>		
07/03/2013	<ul style="list-style-type: none"> <li>• Signature page changed to George and Bob</li> </ul>		
07/09/2013	<ul style="list-style-type: none"> <li>• Added tracking statement</li> <li>• Changed proposed date</li> <li>• Added fix coordinates</li> </ul>		
10/24/2013	<ul style="list-style-type: none"> <li>• Added Satellite airports</li> <li>• Changed current date</li> <li>• Amended Dependencies</li> </ul>		
12/11/2013	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Changed proposed date</li> <li>• Editorial changes</li> </ul>		
12/19/2013	<ul style="list-style-type: none"> <li>• Changed Stanley to Stanly</li> <li>• Ammended current date</li> </ul>		
05/14/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Amended proposed implementation date</li> <li>• Editorial changes</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Changed Implementation Date</li> <li>• Changed current to original</li> <li>• Editorial changes</li> <li>• Removed intersection (Lat/Lon)</li> </ul>		

# CLT OAPM Design Package

## CLT SIDs, KNIGHTS Propeller Aircraft Only

Name of Change	Date
<b>KNIGHTS ONE DEPARTURE</b>	<b>24 June 2014</b>
Change Classification	Current Phase of Design
Terminal Procedure (Conventional SID Propeller Aircraft Only)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
North, East, South, West Departures Proposed Procedures and En Route Structure Connectivity Option 1 General Recommendations	Proposed 5 January 2017
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Charlotte ATCT Positions: Departure Radar East, East Arrival, Departure Radar West and Arrival Radar West; Satellite Radar North, Satellite Radar South and Satellite Radar Concord  Atlanta ARTCC (ZTL) Sectors: 30, 31, 44, and 49  Jacksonville ARTCC (ZJX) Sector: 72  Washington ARTCC (ZDC) Sectors: 27 and 36	ZTL: Roger Cerovsky, Bill Wise 770.210.7622 ZJX: Evan Darby, Jeff Wood 904.430.7271 ZDC: Joe Keimig, Curt Johnson 703.771.3435 CLT: Roland Alexander, James Williams 704.359.1020
Related/Dependent Submissions	Associated Data Files
KWEEN SID	Master TARGETS File

### Purpose

New RNAV SIDs requires conventional SIDs for non-RNAV aircraft to efficiently accommodate departure traffic. The Study Team recommended the creation of at least one conventional departure procedure to mimic RNAV SIDs.

Figure 1 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CLT SIDs, KNIGHTS Propeller Aircraft Only

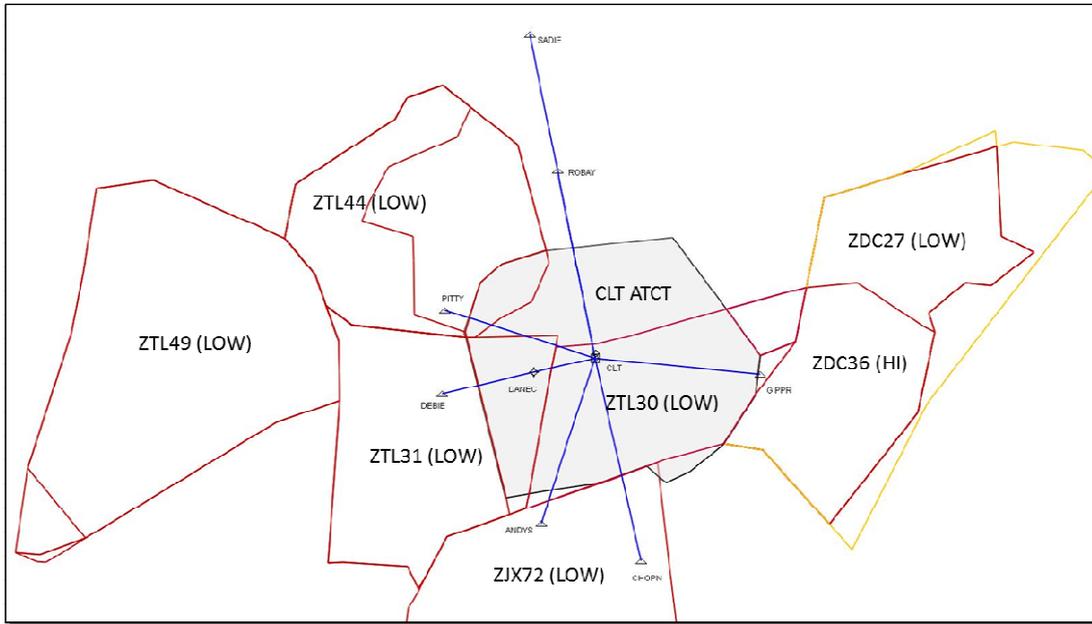


Figure 1. Original Procedure/Route/Airspace

### **Proposed Final Design**

This procedure is designed for propeller aircraft only.

The Design Team modified the existing HUGO SID to fulfill the Study Team requirement for a conventional departure procedure.

The Design team extended the existing GIPPR beyond its present terminus (GIPPR) into FAY airspace, terminating at PEKNN, to prevent props turning on course early and impacting with the new KILNS and BARMY departures.

The Design Team created two en route transitions; HAINTE transition for ZME traffic, and the NEANO transition for ZTL traffic. These transitions closely align with the lateral paths of the BOBZY SID. HUNNY.

The Design Team retained the ANDYS and DEBIE transitions to serve conventional prop and turboprop departures to the south and west and the ROBAY and SADIE transitions to serve conventional prop and turboprop departures to the north.

The Design Team created the WALUT transition that closely aligns the lateral paths of the proposed KWEEN SID (RNAV) to serve departures to the southeast.

In addition to Charlotte Douglas (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County (UZA), Gastonia (AKH), Lancaster County (LKR), Lincoln County (IPJ), Stanly County (VUJ) and Concord Regional (JQF). Figure 2 below depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT SIDs, KNIGHTS Propeller Aircraft Only

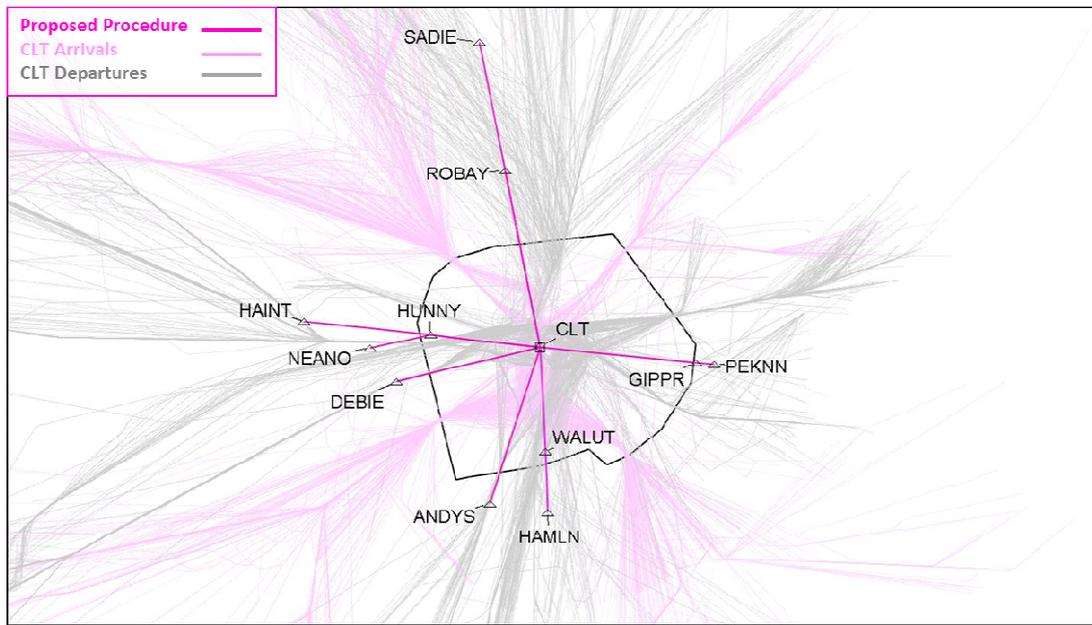


Figure 2. Proposed Final Design

### Additional Design Considerations

- A Human-in-the-Loop Simulation validation was conducted during July and October 2012 and found this to be a viable procedure
- The existing HUGO SID must be decommissioned upon publication of the KNIGHTS SID
- Satellite Radar Concord frequency will be noted on the chart for the GIPPR/PEKNN, WALUT and ANDYS transitions
- Satellite Radar North frequency will be noted on the chart for the DEBIE, HUNNY and ROBAY/SADIE transitions
- In addition to CLT the KERMIT SID will be a preferred departure routing for the following airports:
  - Rock Hill, SC Airport (UZA)
  - Monroe, NC Airport (EQY)
  - Gastonia, NC Airport (AKH)
  - Lincolnton, NC Airport (IPJ)
  - Concord, NC Airport (JQF)
  - Lancaster, SC Airport (LKR)
  - Rowan County, NC Airport (RUQ)
  - Stanly County (VUJ)

# CLT OAPM Design Package

## CLT SIDs, KNIGHTS Propeller Aircraft Only

### Implementation Dependencies

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL/CLT Letter of Agreement (LOA)
- ZDC/CLT Letter of Agreement (LOA)
- ZJX/CLT Letter of Agreement (LOA)
- GSP/CLT Letter of Agreement (LOA)
- GSO/CLT Letter of Agreement (LOA)
- CAE/CLT Letter of Agreement (LOA)
- FAY/CLT Letter of Agreement (LOA)
- FLO/CLT Letter of Agreement (LOA)
- SSC/CLT Letter of Agreement (LOA)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

### Attachments

- None

This procedure will be tracked, but not implemented via the OAPM process. This design package will be forwarded to the Eastern Service Center Operations Support Group for incorporation into the National Airspace System. The OAPM team will track its progress due to its correlation with the CLT RNAV SIDs and other CLT airspace design issues.

# CLT OAPM Design Package

CLT SIDs, East LILLS

Change Control Sheet			
Date	Description		
06/24/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Changed Implementation Date</li><li>• Changed current to original</li><li>• Editorial changes</li></ul>		

# CLT OAPM Design Package

## CLT SIDs, East LILLS

Name of Change	Date
<b>LILLS DEPARTURE (RNAV)</b>	<b>24 June 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>N/A</b>	<b>Proposed 31 May 2016</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte TRACON Position: Departure Radar East</b> <b>Atlanta ARTCC (ZTL) Sector: 30</b> <b>Washington ARTCC (ZDC) Sectors: 27 and 36</b>	<b>CLT: Roland Alexander, James Williams 704.359.1020</b> <b>ZTL: Richard Silva, Joey Tinsley 770.210.7622</b> <b>ZDC: Joe Keimig, Curt Johnson 703.771.3435</b>
Related/Dependent Submissions	Associated Data Files
<b>KILNS SID, BARMY SID</b>	<b>Master CLT OAPM Airspace.air5</b>

### Purpose

The purpose of the proposed procedure is to address issues identified by the Charlotte OAPM Design Team. This issue was not identified by the Charlotte OAPM Study Team. Due to criteria issues and CLT ATCTs desire to make all the SIDs consistent, the LILLS SID was modified from an RNAV off the ground to a VA VM DF procedure.

### Proposed Final Design

The LILLS SID was designed to be used in conjunction with the BARMY and KILNS SIDs. This procedure incorporates radar vectors which allows for quicker course divergence as close to the airport as possible, while creating flexibility and minimizing level-offs. In addition to Charlotte Douglas International (CLT) this SID will serve the following airports: Rowan County (RUQ), Charlotte-Monroe Executive (EQY), Rock Hill/York County/Bryant Field (UZA), Gastonia Municipal (AKH), Lancaster County-McWhirter Field (LKR), Lincoln-Lincoln County Regional (IPJ), Stanly County (VUJ) and Concord Regional (JQF). The following waypoints were designed on the procedure:

- LAMDE Initial common route waypoint and point where satellite departures will join the SID
- LILLS Termination waypoint for the procedure

Figure 1 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT SIDs, East LILLS

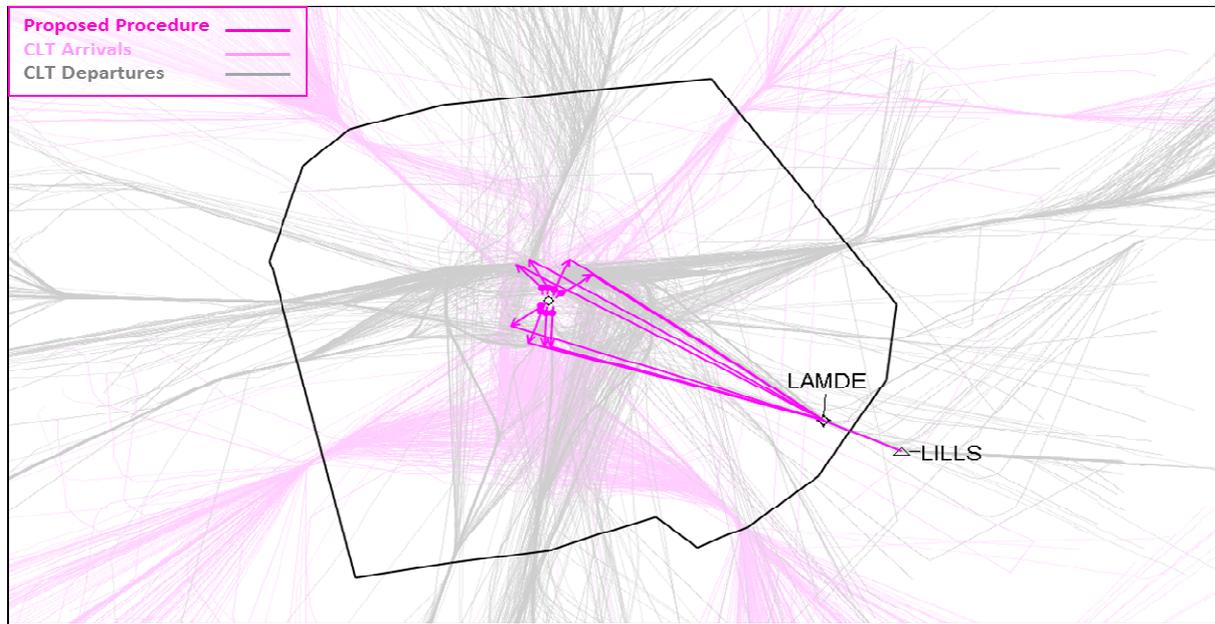


Figure 1. Proposed Final Design

### Additional Design Considerations

- It is preferred that the KERMIT SID be done at the same time but is not required
- Chart notes: “accelerate to 250 knots, if unable advise”; “upon reaching 10,000 feet increase speed to 280 knots if unable advise ATC”
- In addition to CLT the LILLS SID will be a preferred departure routing for the following airports:
  - UZA
  - EQY
  - AKH
  - IPJ
  - JQF
  - LKR
  - RUQ
  - VUJ

### Implementation Dependencies

The LILLS SID is laterally separated from the BARMY and KILNS SID and must be implemented concurrently

Document changes/modification include:

- Departure SID filings with airline dispatchers
- ZTL and ZDC sector boundary maps
- ZTL/CLT Letter of Agreement (LOA)
- ZDC/CLT LOA
- ZTL/ZDC LOA

# CLT OAPM Design Package

## CLT SIDs, East LILLS

- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

### Attachments

- LILLS DEPARTURE RNAV Distribution Package
- LILLS DEPARTURE RNAV TARGETS File
- LILLS DEPARTURE RNAV\_8260-15C
- LILLS DEPARTURE RNAV\_8260-2\_Worksheet
- LILLS DEPARTURE RNAV\_Graphic\_DP\_Worksheet
- LILLS PRO Results

# CLT OAPM Design Package

CLT Satellite, SE KABEE

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
08/26/2013	<ul style="list-style-type: none"> <li>Added JQF, RUQ and SVH</li> </ul>		
09/18/2013	<ul style="list-style-type: none"> <li>Added holding at KABEE WP</li> <li>The STAR ends at NASCR and a note will be added to the publication, "Expect radar vectors after NASCR to destination airport's approach".</li> <li>Modified the route to comply with criteria by adding a common route that terminates with a VM leg 340° heading toward PEGTE</li> <li>Added the following terminology "Termination waypoint on the STAR, now a flyover WP followed by a vector to a Manual termination leg (VM). This VM leg aims towards the PEGTE WP"</li> </ul>		
09/30/2013	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Added VUJ as an airport served</li> </ul>		
11/22/2013	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Changed wording in proposed final design to read: The KABEE STAR was originally designed to replace the southern transition on the conventional NASCR STAR, however, the design team created an RNAV STAR and decided to keep the current NASCR STAR unchanged in order to accommodate non RNAV aircraft.</li> <li>Need Figure 3 need holding depicted at KABEE</li> </ul>		
12/31/2013	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended implementation date</li> <li>Add 10 NM legs to holding patterns</li> <li>Minor edits</li> </ul>		
01/15/2014	<ul style="list-style-type: none"> <li>Updated Figure 3</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed Implementation Date</li> <li>Changed current to original</li> <li>Editorial changes</li> </ul>		

# CLT OAPM Design Package

CLT Satellite, SE KABEE

Name of Change	Date
<b>KABEE ONE ARRIVAL (RNAV)</b>	<b>24 June 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV STAR)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Proposed Satellite STAR</b>	<b>Proposed 26 July 2017</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Positions: Arrival Radar East, Departure Radar East, Satellite Radar Concord, Satellite Radar South and Satellite Radar North)</b> <b>Jacksonville ARTCC (ZJX) Sectors: 47, 48, 71 and 74</b>	<b>ZJX: Evan Darby, Jeff Wood 904.430.7271</b> <b>CLT: Roland Alexander, Greg Jones 704.359.1020</b>
Related/Dependent Submissions	Associated Data Files
<b>N/A</b>	<b>Master TARGETS File</b>

## Purpose

A replacement for the current NASCR procedure from the south is needed to reduce track miles and minimize level-offs and allow flexibility for multiple runway transitions. The procedure reduces controller complexity and adds optimization for the user. This arrival procedure will require coordination between ZJX ARTCC and CLT ATCT.

To address these issues, the Study Team recommends that the southern transition on the existing NASCR STAR be replaced with a proposed new STAR from the southeast that will serve Concord (JQF), Rowan County (RUQ), Stanly County (VUJ) and Statesville (SVH) airports.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

CLT Satellite, SE KABEE

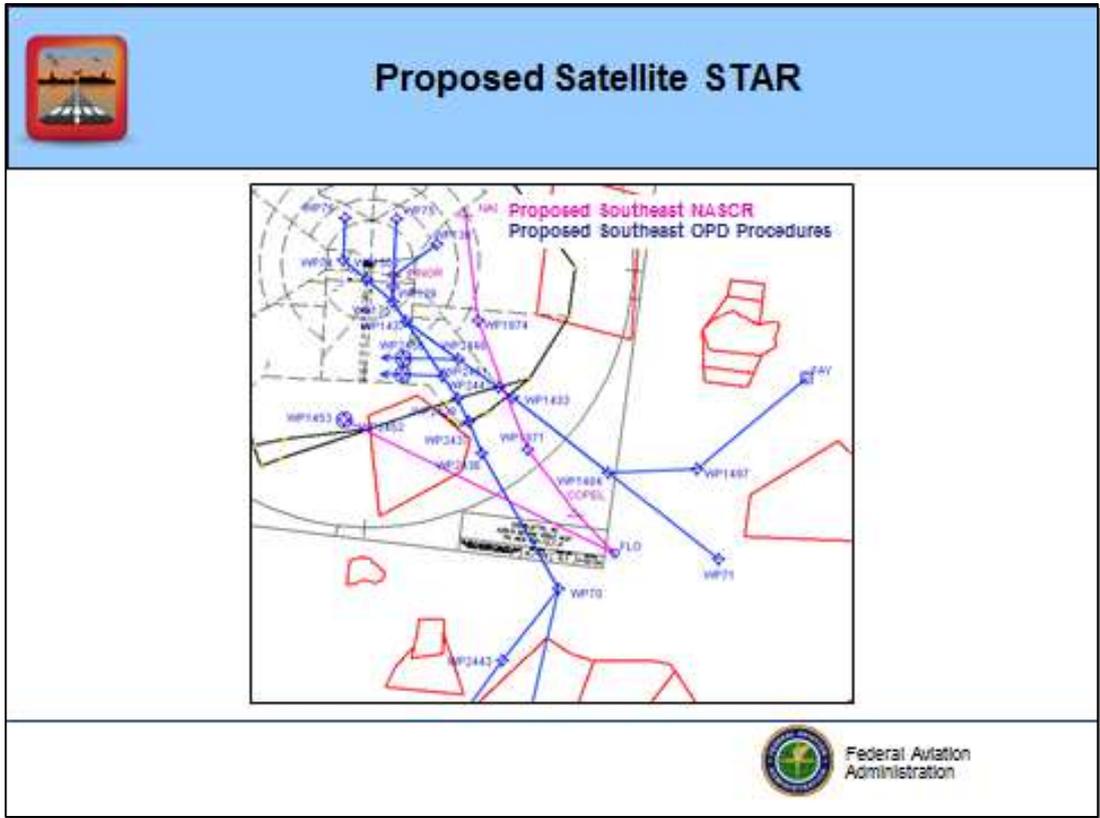


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## CLT Satellite, SE KABEE

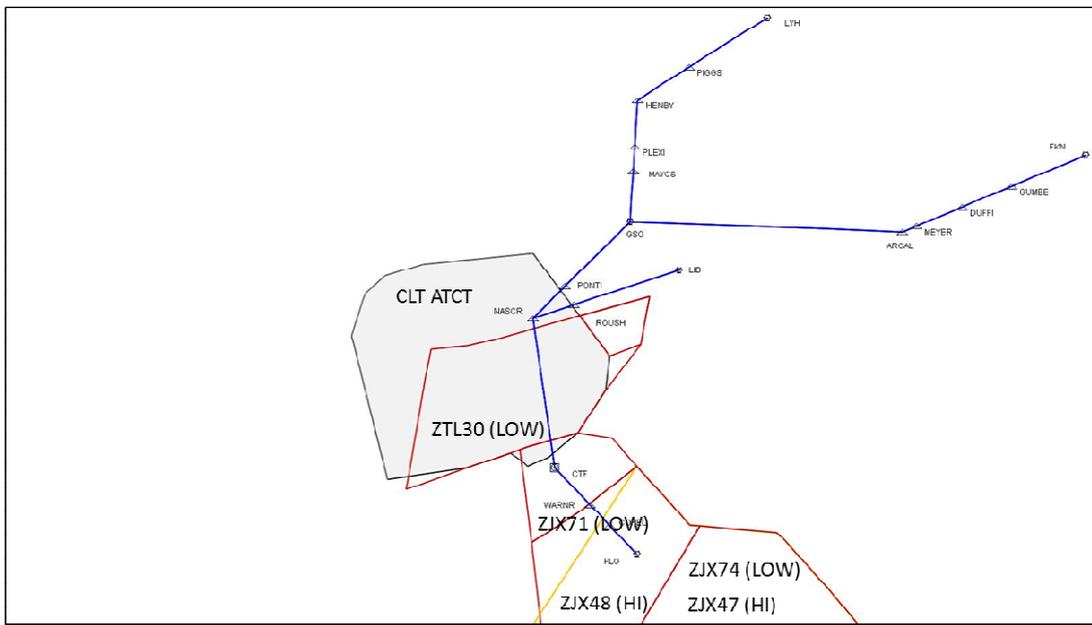


Figure 2. Original Procedure/Route/Airspace

### Proposed Final Design

The KABEE STAR was originally designed to replace the southern transition on the conventional NASCR STAR; however, the design team created the KABEE RNAV STAR and decided to keep the current NASCR STAR unchanged in order to accommodate non RNAV aircraft. The original transition begins at the FLO VOR and ends at the NASCR fix. This procedure is designed to work in conjunction with the proposed RNAV STARs to CLT. The design segregates satellite arrival flow from CLT arrivals which will reduce track miles and controller task complexity. The KABEE STAR remains laterally separated from the southeast STARs as long as feasible to provide distinct descent corridors. This STAR will serve Statesville (SVH), Concord (JQF), Stanly County (VUJ), and Rowan County (RUQ) airports. Holding patterns were established at KABEE and FLO. Both holding patterns are left turns with 10 NM legs. The following waypoints were designed on the procedure.

- FLO Initial waypoint on the approach and holding fix
- COPEL Step-down waypoint to de-conflict with the RASLN and MLEET STARs
- KABEE Step-down waypoint to de-conflict with the RASLN and MLEET STARs and holding fix
- BIFFL Step-down waypoint to de-conflict with the RASLN and MLEET STARs
- NASCR Flyover WP followed by a vector to a manual termination leg (VM). This VM leg aims towards the PEGTE WP

Figure 3 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CLT Satellite, SE KABEE

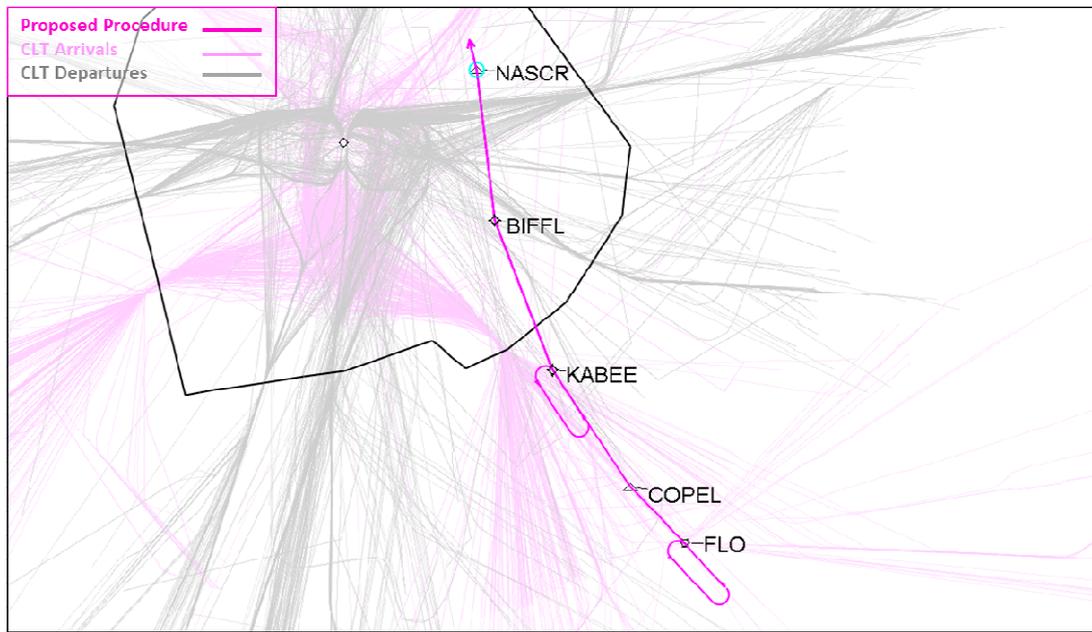


Figure 3. Proposed Final Design

### Additional Design Considerations

- A Human-in-the-Loop Simulation validation was conducted during October 2012 and found this to be a viable procedure.
- The STAR ends at NASCR and a note will be added to the publication, “Expect radar vectors after NASCR to destination airport’s approach”.

### Implementation Dependencies

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZJX sector boundary maps
- ZJX/CLT Letter of Agreement (LOA)
- ZJX Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

CLT Satellite, SE KABEE

## Attachments

- KABEE TARGETS Distribution Package
- KABEE RNAV PRO results
- KABEE RNAV 7100-3
- KABEE RNAV 7100-4
- KABEE RNAV 8260.2 Worksheets

# CLT OAPM Design Package

GSP STARS, South MCHLN (Jets and Turboprops Only)

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/26/2013	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Added (Jets and Turboprops Only) added to header and added to Additional design considerations</li> <li></li> </ul>		
02/11/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Swapped MCHLN and PROVN</li> <li>Publish expect 11,000 feet at MCHLN instead of PROVN</li> <li>Figure 2 will need to be replaced to reflect the change</li> <li>Editorial Changes</li> </ul>		
06/26/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed Proposed Implementation Date</li> <li>Removed phone numbers</li> </ul>		
07/01/2014	<ul style="list-style-type: none"> <li>Updated Figure 2</li> </ul>		

# CLT OAPM Design Package

## GSP STARs, South MCHLN (Jets and Turboprops Only)

Name of Change	Date
<b>GSP MCHLN ARRIVAL (RNAV)</b>	<b>26 June 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV STAR)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Adjacent Airport Operations - GSP</b>	<b>Proposed 5 January 2017</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Atlanta ARTCC (ZTL) Sectors 24 and 31 Greer ATCT (GSP)</b>	<b>ZTL: Roger Cerovsky, Bill Wise GSP: Richard Phillips, James Fleming</b>
Related/Dependent Submissions	Associated Data Files
<b>N/A</b>	<b>Master TARGETS File</b>

### Purpose

The Study Team identified the need for an RNAV STAR for GSP. GSP southwest arrivals interact with CLT southwest arrivals. GSP northeast arrivals interact with CLT west departures and CLT northwest arrivals. GSP northbound departures interact with CLT northwest arrivals. GSP northwest arrivals interact with CLT northwest arrivals.

Routes were designed in conjunction with ZTL and CLT to determine placement to improve interaction with current en route flows and proposed CLT and satellite operations. The proposed design lays the groundwork for PBN procedures, including vertical navigation, for future GSP operations.

Figure 1 below depicts the Study Team Recommendation.

# CLT OAPM Design Package

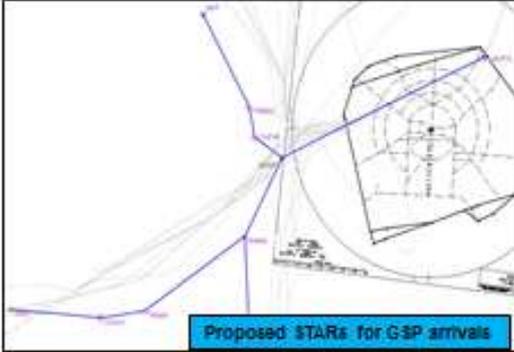
GSP STARs, South MCHLN (Jets and Turboprops Only)



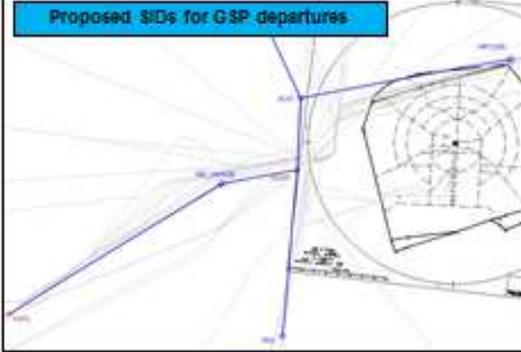
## CLT Operational Issues Identified: Adjacent Airport Operations - GSP

**Considerations:**

- PBN procedures for GSP arrivals/departures will improve interaction with CLT arrivals/departures



Proposed STARs for GSP arrivals



Proposed SIDs for GSP departures



Federal Aviation  
Administration

Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## GSP STARs, South MCHLN (Jets and Turboprops Only)

### Proposed Final Design

The Design Team developed an RNAV STAR for arrivals from the south to GSP ATCT airspace. This procedure was designed for jet and turboprop aircraft only. The location of the route is east of current arrival tracks and alleviates opposite direction departure interaction. This STAR will serve multiple airports in GSP airspace. Handoff altitude to GSP will remain the same, 11,000 feet. The new STAR allows the aircraft to stay at a higher altitude longer. This procedure serves Greer (GSP), Greenville Downtown (GMU), Spartanburg (SPA) and Donaldson Center (GYH) airports. The following waypoints were designed on the procedure:

- PROVN Initial waypoint on the procedure
- MCHLN Designed as a crossing restriction
- TYRES Termination point ends in a present heading VM

Figure 2 below depict the Proposed Final Design.

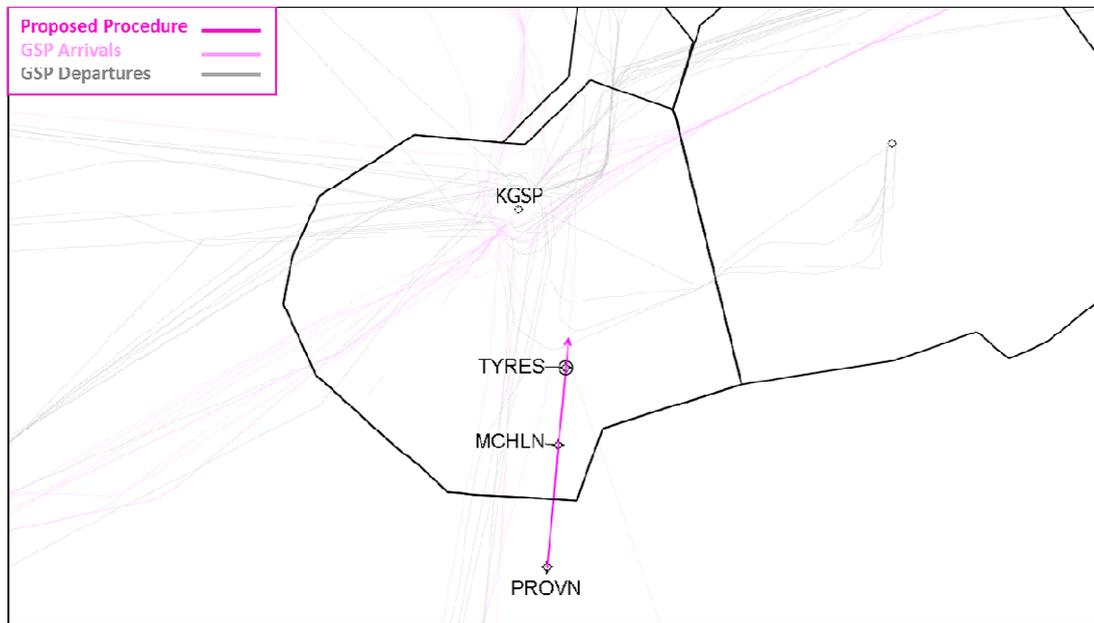


Figure 2. Proposed Final Design

### Additional Design Considerations

- Validation through Human-in-the-Loop Simulations was not required
- The procedure should be charted with the following statement, “For Jets and Turboprops Only”
- Publish expect 11,000 feet at MCHLN

# **CLT OAPM Design Package**

## **GSP STARS, South MCHLN (Jets and Turboprops Only)**

### **Implementation Dependencies**

Document changes/modifications include:

- STAR filings with airline dispatchers
- ZTL/GSP Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- GSP ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedure (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

### **Attachments**

- MCHLN TARGETS Distribution Package
- MCHLN RNAV PRO results
- MCHLN RNAV 7100-3
- MCHLN RNAV 7100-4
- MCHLN RNAV 8260.2 Worksheets

# CLT OAPM Design Package

GSP STARS, SW WORXS (Jets and Turboprops Only)

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/26/2013	<ul style="list-style-type: none"><li>• Changed Current Date</li><li>• Added (Jets and Turboprops Only) added to header and added to Additional design considerations</li></ul>		
10/30/2013	<ul style="list-style-type: none"><li>• Added PHIL SID as a dependency</li></ul>		
05/21/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Amended Proposed Implementation Date</li><li>• Changed BESST to BESTT</li></ul>		
05/23/2014	<ul style="list-style-type: none"><li>• Updated Figure 2</li></ul>		
06/26/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Removed phone numbers</li><li>• Changed current to original</li></ul>		

# CLT OAPM Design Package

GSP STARs, SW WORXS (Jets and Turboprops Only)

Name of Change	Date
<b>GSP WORXS ONE ARRIVAL (RNAV)</b>	<b>26 June 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV STAR)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Adjacent Airport Operations - GSP</b>	<b>Proposed 5 January 2017</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Atlanta ARTCC (ZTL) Sectors: 16, 22 and 32 Greer ATCT (GSP)</b>	<b>ZTL: Roger Cerovsky, Bill Wise GSP: Richard Phillips, James Fleming</b>
Related/Dependent Submissions	Associated Data Files
<b>PHIL SID</b>	<b>Master TARGETS File</b>

## Purpose

The Study Team identified the need for a RNAV STAR for GSP. Routes were designed in conjunction with ZTL and CLT to determine placement and to improve interaction with current en route flows and proposed CLT and satellite operations. The proposed design lays the groundwork for Performance Based Navigation (PBN) procedures, including vertical navigation, for future GSP operations.

Figure 1 below depicts the Study Team Recommendation.

# CLT OAPM Design Package

GSP STARs, SW WORXS (Jets and Turboprops Only)

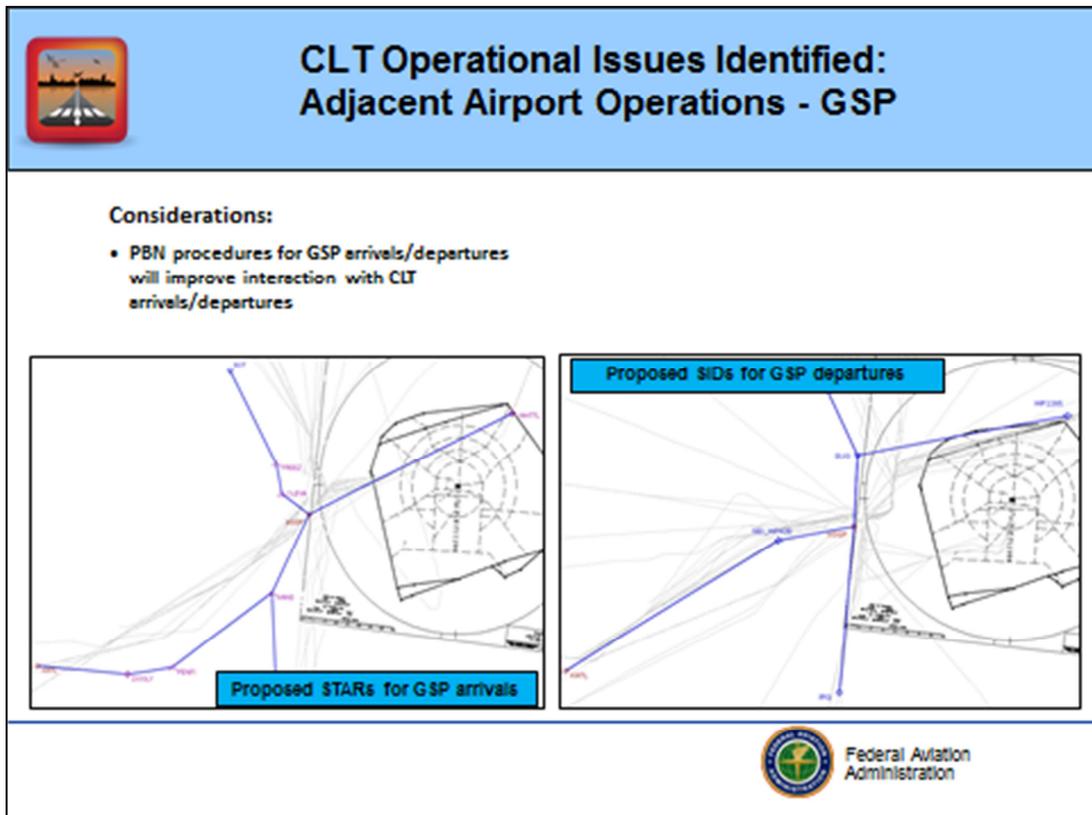


Figure 1. Study Team Recommendation

## Proposed Final Design

The Design Team developed an RNAV STAR for arrivals from the southwest to GSP ATCT airspace. The location of the route is west of current arrival tracks and alleviates opposite direction departure interaction. The new STAR allows the aircraft to stay at a higher altitude longer. This procedure serves Greer (GSP), Greenville Downtown (GMU), Spartanburg (SPA) and Donaldson Center (GYH) airports. Handoff altitude to GSP will remain same, 11,000 feet. This procedure was designed for jet and turboprop aircraft only.

GSP WORXS STAR originates off the JONZE STAR and shares the following way points:

- BESTT Is the initial point of the JONZE STAR
- CNTRL Initiates divergence from ATL PHILL SID
- EVRRR De-conflicts WORXS from the JACCC and PHILL SIDs

# CLT OAPM Design Package

## GSP STARS, SW WORXS (Jets and Turboprops Only)

The following waypoints were designed on the procedure:

- WORXS Establishes lateral separation from the JONZE STAR
- ANGR1 Designed for crossing restriction
- TDAAY Termination waypoint ends on a present heading VM leg

Figure 2 below depict the Proposed Final Design.

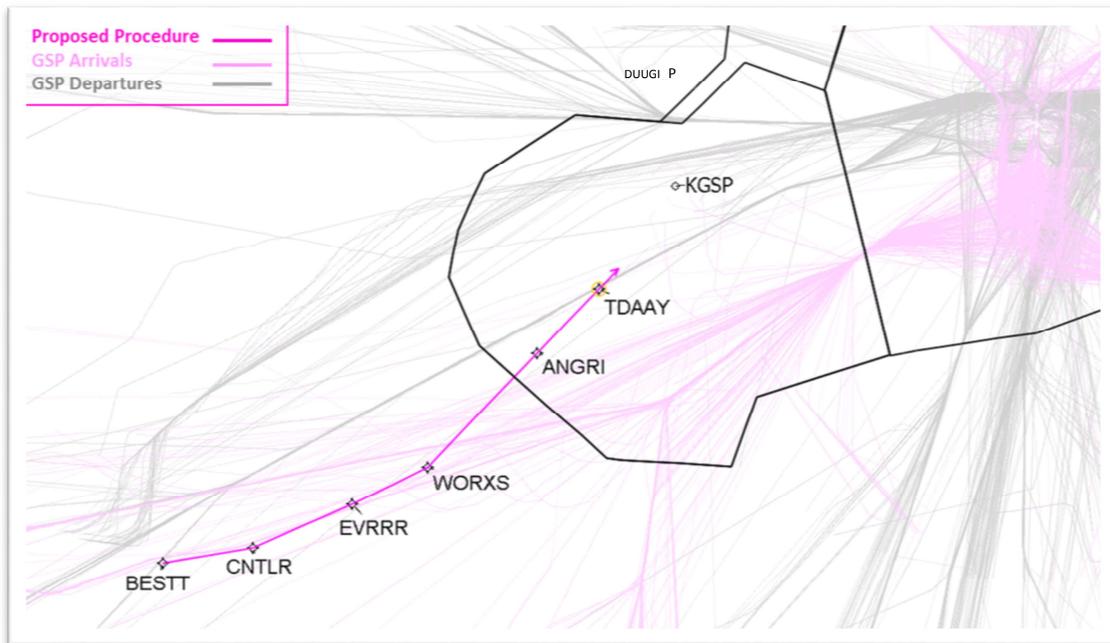


Figure 2. Proposed Final Design

### Additional Design Considerations

- Validation through Human-in-the-Loop Simulation was not required
- Charted with note stating (Jets and Turboprop Only)
- Publish expect 11,000 feet at ANGR1

### Implementation Dependencies

Document changes/modifications include:

- ZTL/GSP Letter of Agreement (LOA)
- STAR filings with airline dispatchers
- ZTL Facility Operations and Administration Order 7230.2
- GSP ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- Standard Instrument Approach Procedures (SIAP) publication
- National Route Program (NRP) Database

# **CLT OAPM Design Package**

## **GSP STARs, SW WORXS (Jets and Turboprops Only)**

- Airport Facility Directory (AFD) Preferential Routings verification (Green Book)
- Information Display and Dissemination System (IDS) updates
- En route Information Display System (ERIDS) updates
- User Request and Evaluation Tool (URET) updates

### **Attachments**

- WORXS TARGETS Distribution Package
- WORXS RNAV PRO results
- WORXS RNAV 7100-3
- WORXS RNAV 7100-4
- WORXS RNAV 8260.2 Worksheets

# CLT OAPM Design Package

GSP STARS, East JUNNR

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/26/2013	<ul style="list-style-type: none"> <li>Changed Current Date</li> <li>Added (Jets and Turboprops Only) added to header and added to Additional design considerations</li> </ul>		
10/30/2013	<ul style="list-style-type: none"> <li>Removed KRITR and WEAZL SIDs as dependencies and added BOBZY SID as dependency</li> </ul>		
02/11/2014	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Changed Donaldson Center to Donaldson Field</li> <li>Changed Greer to Greenville Spartanburg International Roger Milliken</li> <li>Added fix at 37181151/79141107 to be named DEVLZ</li> <li>Old DEVLZ now GMONY</li> <li>Added reason for additional fix</li> <li>Need to update Figure 3</li> </ul>		
06/26/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed Proposed Implementation Date</li> <li>Removed phone numbers</li> <li>Changed current to original</li> </ul>		
07/01/2014	<ul style="list-style-type: none"> <li>Updated Figure 2</li> </ul>		
08/22/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed order of fixes to match the procedure</li> </ul>		
11/18/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Telcon with CLT POCs and determined that the BOBZY dependency could be removed and concerns will be addressed through an LOA</li> <li>Removed BOBZY from Related/Dependent Submissions and Implementation Dependencies</li> </ul>		

# CLT OAPM Design Package

GSP STARs, East JUNNR

Name of Change	Date
<b>JUNNR ARRIVAL (RNAV)</b>	<b>18 November 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV STAR)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Adjacent Airport Operations - GSP</b>	<b>5 January 2017</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Atlanta ARTCC (ZTL) Sectors: 29, 33 and 47</b> <b>Charlotte ATCT (CLT) Position: Departure Radar West</b> <b>Greer ATCT (GSP)</b>	<b>ZTL: Roger Cerovsky, Bill Wise</b> <b>CLT: Roland Alexander, James Williams</b> <b>GSP: Richard Phillips, James Fleming</b>
Related/Dependent Submissions	Associated Data Files
<b>N/A</b>	<b>Master TARGETS File</b>

## Purpose

The Study Team identified the need for an RNAV STAR for GSP from the northeast. It was recommended to serve several airports in the GSP ATCT airspace, and should be designed to de-conflict flight paths with CLT's northeast arrival area, current en route flows and proposed CLT and satellite operations. The proposed design lays the groundwork for PBN procedures, including vertical navigation, for future GSP operations.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## GSP STARs, East JUNNR

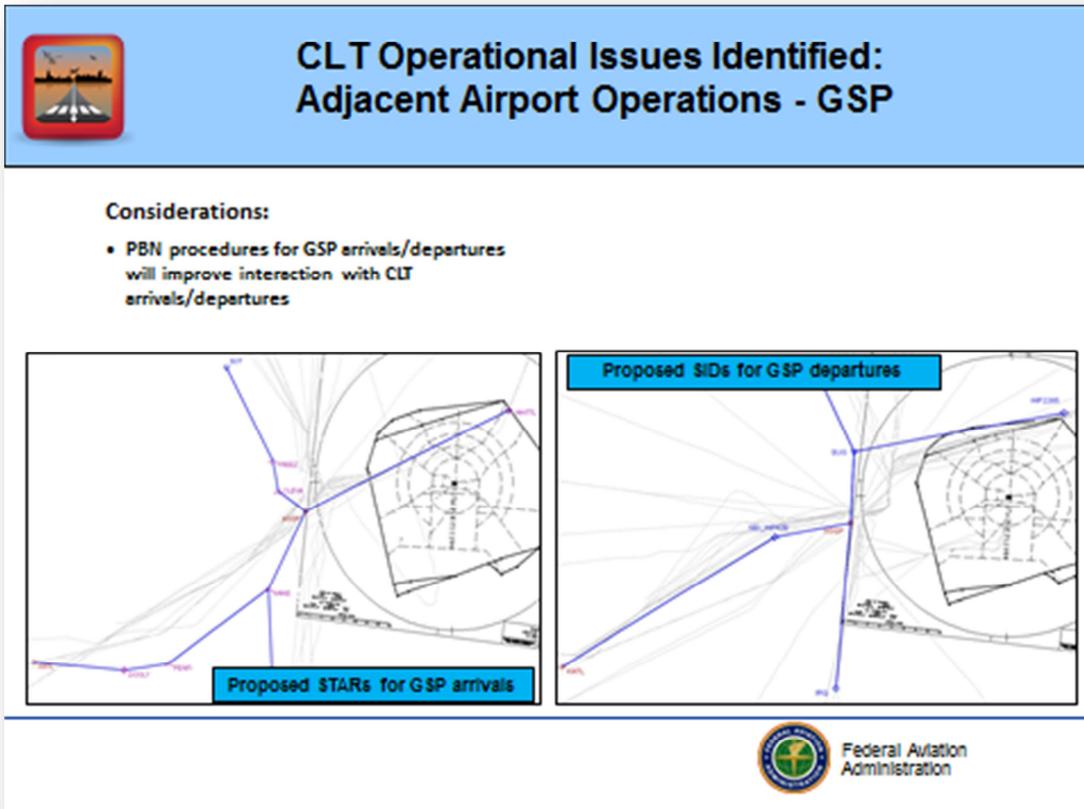


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## GSP STARS, East JUNNR

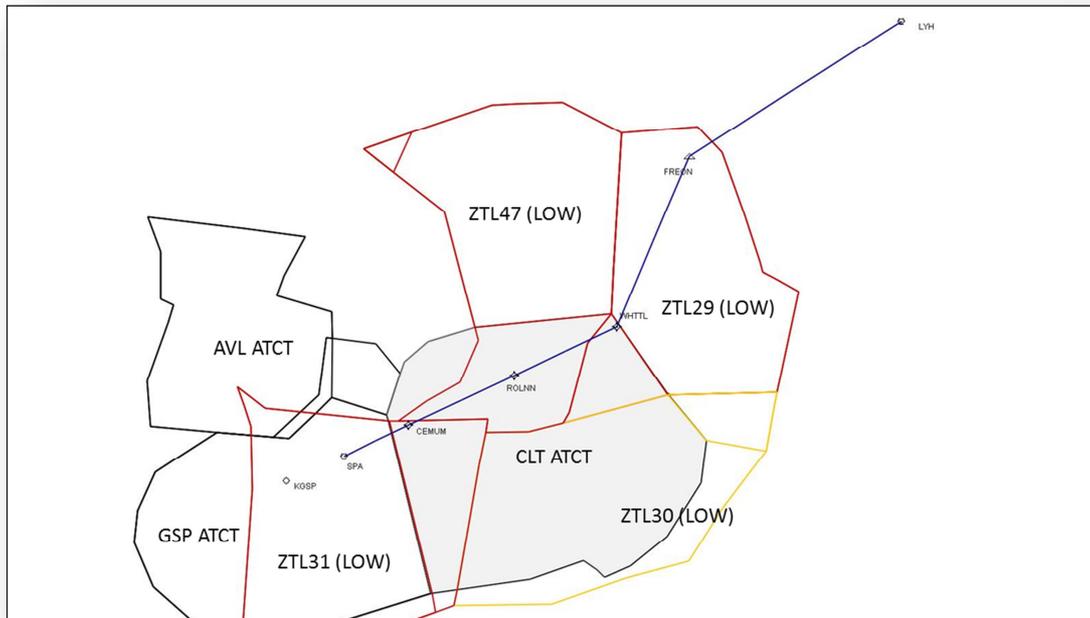


Figure 2. Original Procedure/Route/Airspace

### **Proposed Final Design**

The Design Team moved the JUNNR STAR to the northwest, away from WHITL, to de-conflict from the CLT CHSLY STAR. This procedure was designed for jet and turboprop aircraft only. The western half of the arrival was moved south toward CLT to de-conflict from the CLT BOBZY SID and the CLT ANGEY SID. An additional fix was added north of LYH (DEVLZ) to increase divergence from the CHSLY STAR in ZDC airspace. The new STAR allows the aircraft to stay at a higher altitude longer. This procedure serves Greenville Spartanburg International Roger Milliken (GSP), Greenville Downtown (GMU), Spartanburg (SPA) and Donaldson Field (GYH) airports. The following waypoints were designed on the procedure:

- DEVLZ Start of the procedure
- GMONY Waypoint for airspace separation
- WAMUR Waypoint for airspace separation
- JUNNR Waypoint for airspace separation
- MKWIR Waypoint for airspace separation
- YELKS Waypoint for airspace separation

# CLT OAPM Design Package

## GSP STARs, East JUNNR

- KWOOD Waypoint designed as a crossing fix to have aircraft clear ZTL airspace as they descend into CLT airspace
- TANCE Waypoint designed as a crossing fix to have aircraft clear ZTL airspace as they descend into GSP airspace
- SPA Termination waypoint of STAR ends on a VM leg.

Figure 3 depicts the Proposed Final Design.

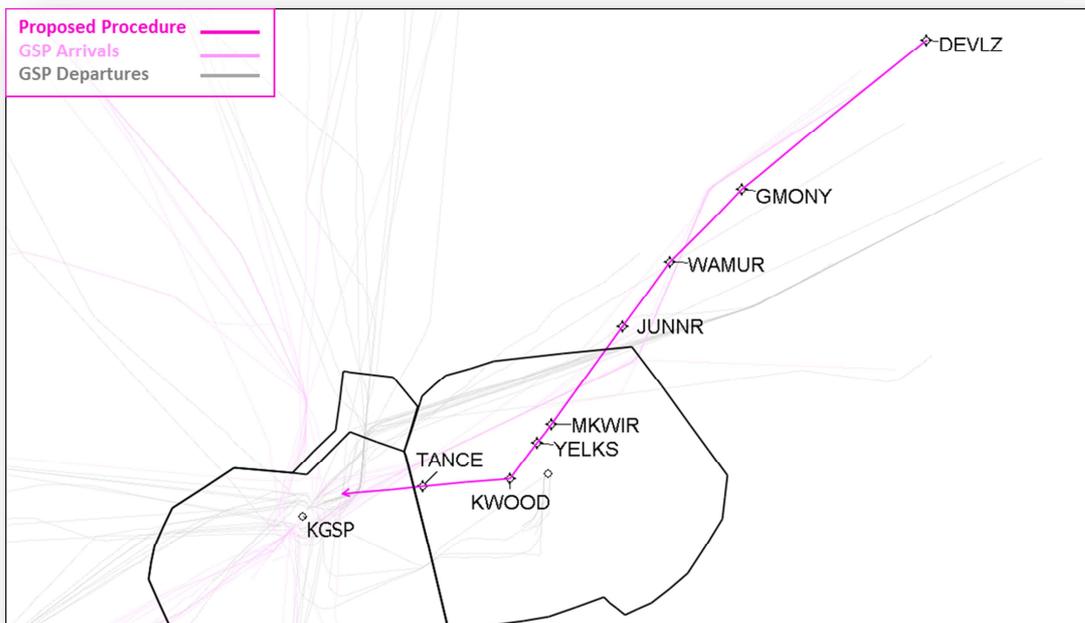


Figure 3. Proposed Final Design

### Additional Design Considerations

- Validation through Human-in-the-Loop Simulation validation was not required
- The procedure should be charted with the following statement, “For Jets and Turboprops Only”

### Implementation Dependencies

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZTL/GSP Letter of Agreement (LOA)
- ZTL/CLT Letter of Agreement (LOA)
- ZTL/ZDC Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- GSP ATCT Standard Operating Procedures (SOP)

# CLT OAPM Design Package

## GSP STARs, East JUNNR

- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARs Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedures (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- En route Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

### Attachments

- JUNNR RNAV Distribution Package
- JUNNR RNAV\_8260-15C
- JUNNR RNAV\_8260-2\_Worksheet
- JUNNR RNAV\_Graphic\_DP\_Worksheet
- RNAV PRO Results

# CLT OAPM Design Package

GSP STARS, North RCTOR (Jet and Turboprop Only)

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/26/2013	<ul style="list-style-type: none"><li>• Changed Current Date</li><li>• Added (Jets and Turboprops Only) added to header and added to Additional design considerations</li></ul>		
10/30/2013	<ul style="list-style-type: none"><li>• Added AVL Airspace as a dependency</li></ul>		
05/21/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Amended Proposed Implementation Date</li><li>• Editorial changes</li></ul>		
06/26/2104	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Removed phone numbers</li><li>• Changed current to original</li></ul>		

# CLT OAPM Design Package

## GSP STARS, North RCTOR (Jet and Turboprop Only)

Name of Change	Date
<b>RCTOR ARRIVAL (RNAV)</b>	<b>26 June 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV STAR)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Adjacent Airport Operations - GSP</b>	<b>Proposed 5 January 2017</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Atlanta ARTCC (ZTL) Sectors: 31 and 44 Greer ATCT (GSP) Asheville ATCT (AVL)</b>	<b>ZTL: Roger Cerovsky, Bill Wise GSP: Richard Phillips, James Fleming AVL: Grey Pelkey, Jon Cohen</b>
Related/Dependent Submissions	Associated Data Files
<b>GSP BWALL SID AVL Airspace</b>	<b>Master TARGETS File</b>

### Purpose

The Study Team identified the need for an RNAV STAR for GSP from the north. It was recommended to serve several airports in the GSP ATCT airspace, and should be designed to de-conflict flight paths with CLT's northwest arrival area.

The Study Team recommended the development of a GSP southbound STAR that would not conflict with the proposed CLT Northwest Arrival. Routes were designed in collaboration with ZTL and CLT to determine placement and to improve interaction with current en route flows and proposed KCLT and satellite operations. The proposed design lays the groundwork for PBN procedures, including vertical navigation, for future GSP operations.

Figure 1 depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## GSP STARS, North RCTOR (Jet and Turboprop Only)

### CLT Operational Issues Identified: Adjacent Airport Operations - GSP

**Considerations:**

- PBN procedures for GSP arrivals/departures will improve interaction with CLT arrivals/departures

Proposed STARs for GSP arrivals

Proposed SIDs for GSP departures

Federal Aviation Administration

Figure 1. Study Team Recommendation

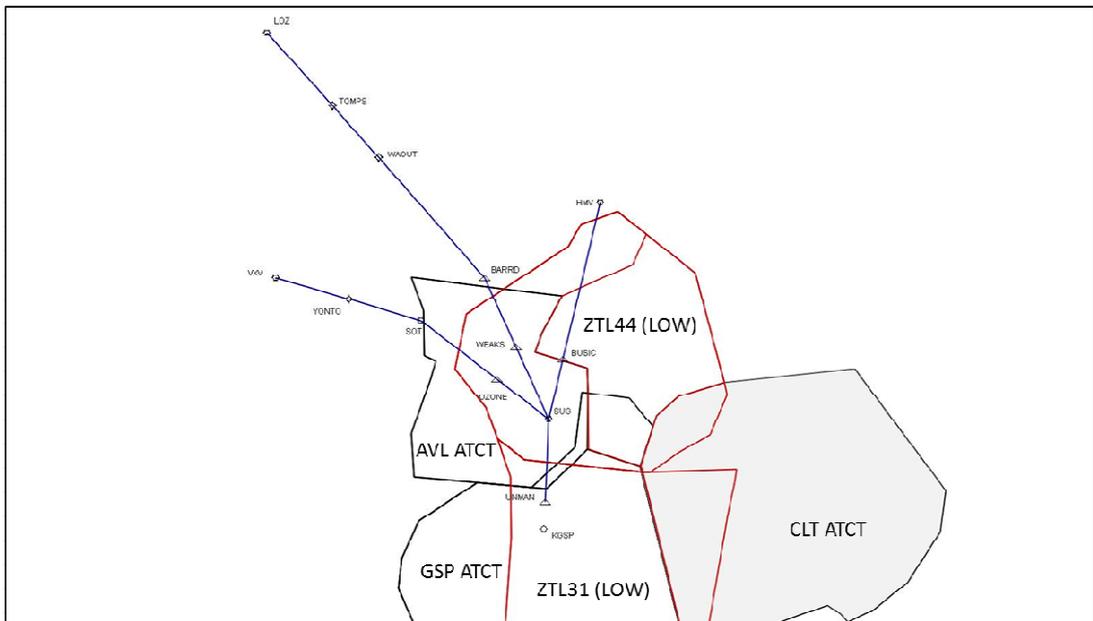


Figure 2. Original Procedure/Route/Airspace

# CLT OAPM Design Package

## GSP STARS, North RCTOR (Jet and Turboprop Only)

### Proposed Final Design

The Design Team developed the RCTOR ONE ARRIVAL (RNAV) for arrivals from the north into GSP ATCT airspace. This procedure was designed for jets and turboprop aircraft only. The location of the route is west of current arrival tracks, designed to ensure de-confliction from opposite direction departure tracks. DAJPI, on the RCTOR ARRIVAL (RNAV), de-conflicts from the FILPZ ARRIVAL. It was necessary to move this procedure east of the Study Team design due to traffic conflicts on the west side of AVL airspace. This STAR will serve Greer (GSP), Greenville Downtown (GMU), Spartanburg (SPA) and Donaldson Center (GYH) airports. The following waypoints were designed on the procedure:

- DAJPI Initial waypoint on the procedure and provides separation from CLT FILPZ arrival
- LUVVT Waypoint will be published with a note to expect clearance to cross at 11,000 feet and 250 knots
- RCTOR Waypoint will be published with a note to expect clearance to cross at 7,000 feet
- UNMAN Termination waypoint ends on a present heading VM leg

Figure 3 depicts the Proposed Final Design.

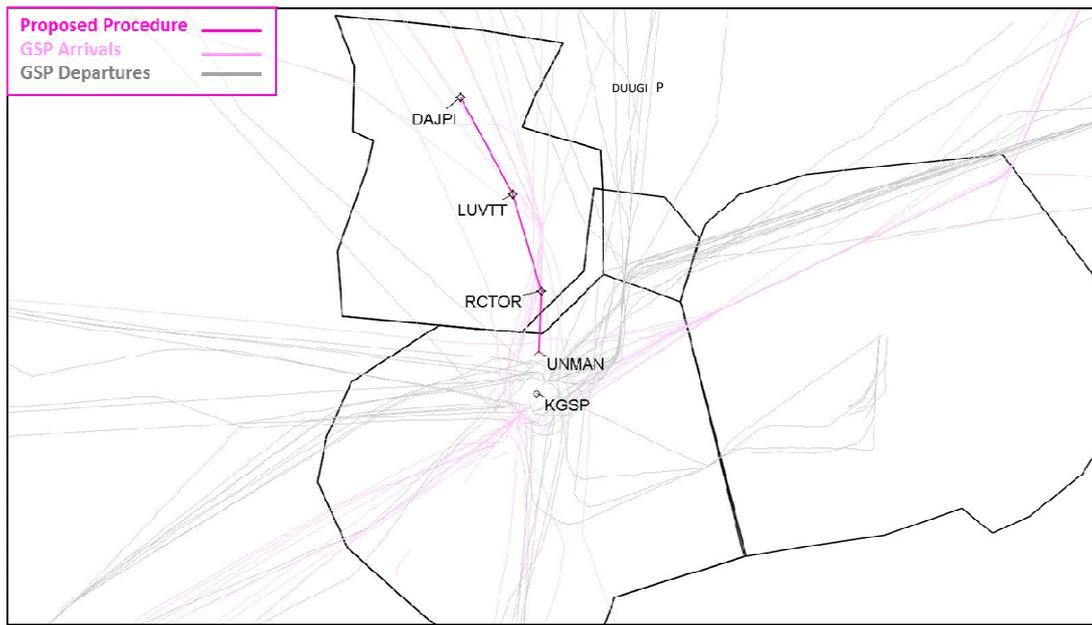


Figure 3. Proposed Final Design

### Additional Design Considerations

Validation through Human-in-the-Loop was not required.

# CLT OAPM Design Package

## GSP STARS, North RCTOR (Jet and Turboprop Only)

### Implementation Dependencies

- Letter of Agreement and Standard Operating Procedure changes for Atlanta ARTCC, Asheville ATCT and Greer ATCT
- The procedure needs to be charted with a note stating, "For Jets and Turboprops Only"
- It is necessary that the BWALL SID be completed at the same time
- Airspace change between AVL and GSP

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZTL/AVL Letter of Agreement (LOA)
- AVL/GSP Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- AVL ATCT Standard Operating Procedures (SOP)
- GSP ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedure (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

### Attachments

- RCTOR TARGETS Distribution Package
- RCTOR RNAV PRO results
- RCTOR RNAV 7100-3
- RCTOR RNAV 7100-4
- RCTOR RNAV 8260.2 Worksheets

# CLT OAPM Design Package

## GSO STAR, NW TRAKS

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
09/18/2013	<ul style="list-style-type: none"> <li>Chart note saying, "Add RWY14/32 to RWY23B transition. Expect vector to final approach course at KVILL."</li> <li>Chart note saying, "Expect to cross TRAKS at 11,000 feet and 250 knots."</li> </ul>		
02/12/2014	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Removed chart note saying, "Add RWY14/32 to RWY23B transition. Expect vector to final approach course at KVILL." There will be no transition for RWY 14/32.</li> <li>Added Turbojets to chart note: Turbojets expect to cross TRAKS at 11,000 feet and 250 knots."</li> <li>Although JEVEN is being removed from procedure, there is no reference to it in the design package so no changes were needed</li> </ul>		
05/21/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended Proposed Implementation Date</li> <li>Editorial changes</li> </ul>		
06/20/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Removed proposed</li> <li>Amended implementation date</li> <li>Amended RWY 23 GLFRD to 060° FM leg</li> </ul>		
06/26/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Removed phone numbers</li> <li>Changed current to original</li> <li>Removed signature page</li> </ul>		
07/01/2014	<ul style="list-style-type: none"> <li>Updated Figure 2</li> </ul>		

# CLT OAPM Design Package

## GSO STAR, NW TRAKS

Name of Change	Date
TRAKS ARRIVAL (RNAV)	26 June 2014
Change Classification	Current Phase of Design
Terminal Procedure (RNAV STAR)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
Adjacent Airport Operations - GSO	5 January 2017
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Atlanta ARTCC (ZTL) Sectors: 33 and 47 Charlotte ATCT (CLT) Position: Departure Radar East Greensboro TRACON (GSO)	ZTL: Roger Cerovsky, Bill Wise 770.210.7622 CLT: Roland Alexander, James Williams 704.359.1020 GSO: Scott Watson, Keith Thomas 336.358.3444
Related/Dependent Submissions	Associated Data Files
N/A	Master TARGETS File

### Purpose

The Designed Team created an RNAV STAR to GSO that will have less track miles than the existing conventional BROOK STAR.

Figure 1 below depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## GSO STAR, NW TRAKS

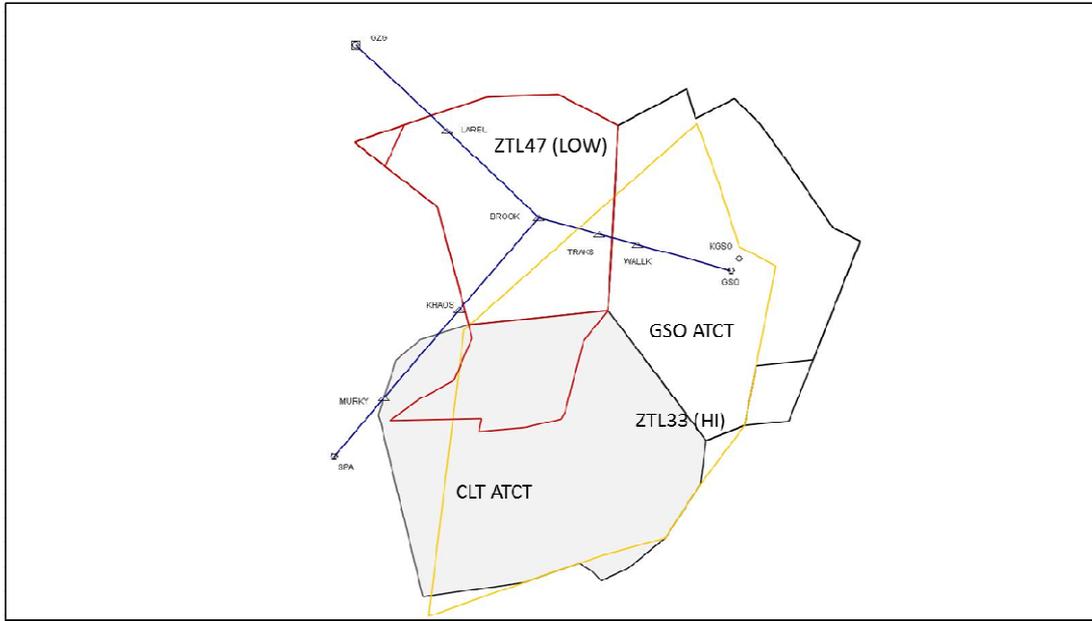


Figure 1. Original Procedure and Airspace

### **Proposed Final Design**

The Design Team developed the TRAKS STAR to closely align with the lateral paths of the existing conventional BROOK STAR. Track mile reductions were realized by short cutting the SPA transition and shortening the procedure from the northwest. The GZG transition was moved to the southeast to the WMPLR transition to de-conflict from the BTSEY STAR, the PARQR STAR, the KRITR SID and the WEAZL SID. TRACON entry points remain unchanged. The approach and runway transitions were designed in the procedure.

- Runway 5R runway transition ends at PDMNT waypoint on a 080° VM leg
- Runway 5L approach transition ends at DEAKN waypoint on a 098° VM leg
- Runway 23L and Runway 23R runway transitions end at GLFRD waypoint on a 060° FM leg

Figure 2 depicts the Proposed Final Design.

# CLT OAPM Design Package

## GSO STAR, NW TRAKS

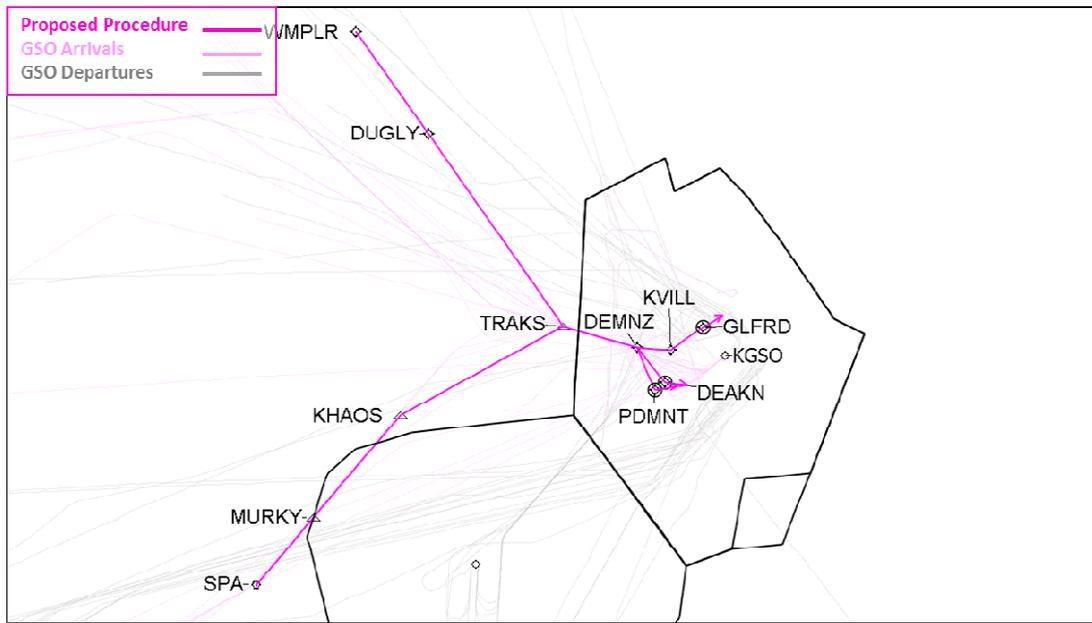


Figure 2. Proposed Final Design

### Additional Design Considerations

- A Human-in-the-Loop simulation validation was conducted during July 2012 and found this to be a viable procedure
- Chart note saying, "Turbojets expect to cross TRAKS at 11,000 feet and 250 knots."

### Implementation Dependencies

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZTL/GSO Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedures (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

## GSO STAR, NW TRAKS

### Attachments

- TRAKS TARGETS Distribution Package
- TRAKS RNAV PRO results
- TRAKS RNAV 7100-3
- TRAKS RNAV 7100-4
- TRAKS RNAV 8260.2 Worksheets

# CLT OAPM Design Package

RDU STAR, West MALNR

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
03/09/2013	<ul style="list-style-type: none"> <li>Added current date</li> <li>Changed implementation date</li> </ul>		
06/11/2014	<ul style="list-style-type: none"> <li>Added current date</li> <li>Added FLO transition ATC assigned only</li> <li>Added 10NM leg to holding</li> </ul>		
07/02/2014	<ul style="list-style-type: none"> <li>Added current date</li> <li>Amended proposed implementation date</li> <li>Changed current to original</li> <li>Editorial changes</li> </ul>		
10/8/2014	<ul style="list-style-type: none"> <li>Amended Current Date</li> <li>Amended Figure 2; Replaced NULIE with TREAL</li> <li>Removed RNAV PRO and 8260-2 Worksheets from Attachments Section</li> </ul>		

# CLT OAPM Design Package

RDU STAR, West MALNR

Name of Change	Date
<b>MALNR ARRIVAL (RNAV)</b>	<b>8 October 2014</b>
Change Classification	Current Phase of Design
Terminal procedure (RNAV STAR)	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
General Considerations for Conceptual STARs and SIDs	Proposed 05 January 2017
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
Washington ARTCC (ZDC): Sectors: 27 and 36 Jacksonville ARTCC (ZJX) Sectors: 66 and 71	ZDC: Joe Keimig, Curt Johnson 703.779.3811 ZJX: Evan Darby, Jeff Wood 904.549.1537
Related/Dependent Submissions	Associated Data Files
ZJX Airspace Changes ZJX Sector 66 ZJX Sector 71 ZDC Airspace Changes ZDC Sector 27	Master TARGETS File

## Purpose

The Design Team realized a need to revise the existing RDU BUZZY STAR to provide a more optimized descent profile, reduce track miles and de-conflict with CLT's new south departure procedures. Additionally the MALNR was designed to de-conflict with the STOCR STAR and the new CAE departure procedure.

Figure 1 depicts the Current Procedure, Route and Airspace.

# CLT OAPM Design Package

## RDU STAR, West MALNR

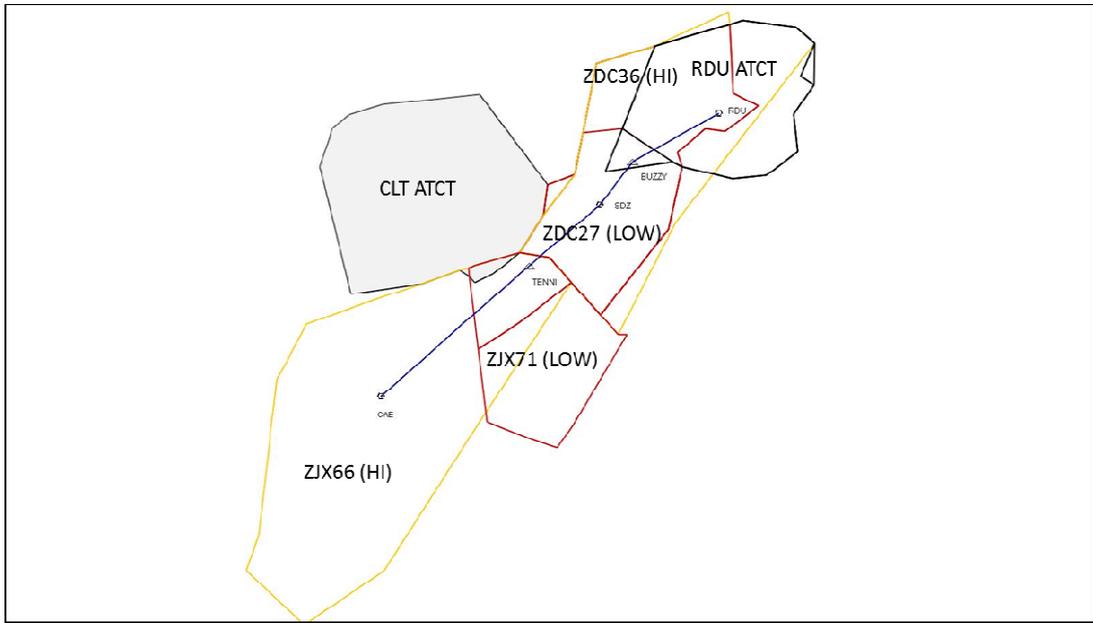


Figure 1. Original/Procedure/Route/Airspace

### Proposed Final Design

The Design Team proposed a new RNAV STAR to RDU that will allow for a more direct routing to RDU by reducing track miles on the IRQ and SAV transitions. The FLO transition will be ATC assigned only. The new procedure will improve optimization by raising the altitude constraint at JURDI from FL210 to FL230 for arrivals into RDU. This procedure was designed south of the existing BUZZY STAR to ensure de-confliction with the new south departure procedures off CLT. Traffic will hold at BUZZY right turns 10 nm legs.

Figure 2 depicts the Proposed Final Design.

# CLT OAPM Design Package

## RDU STAR, West MALNR

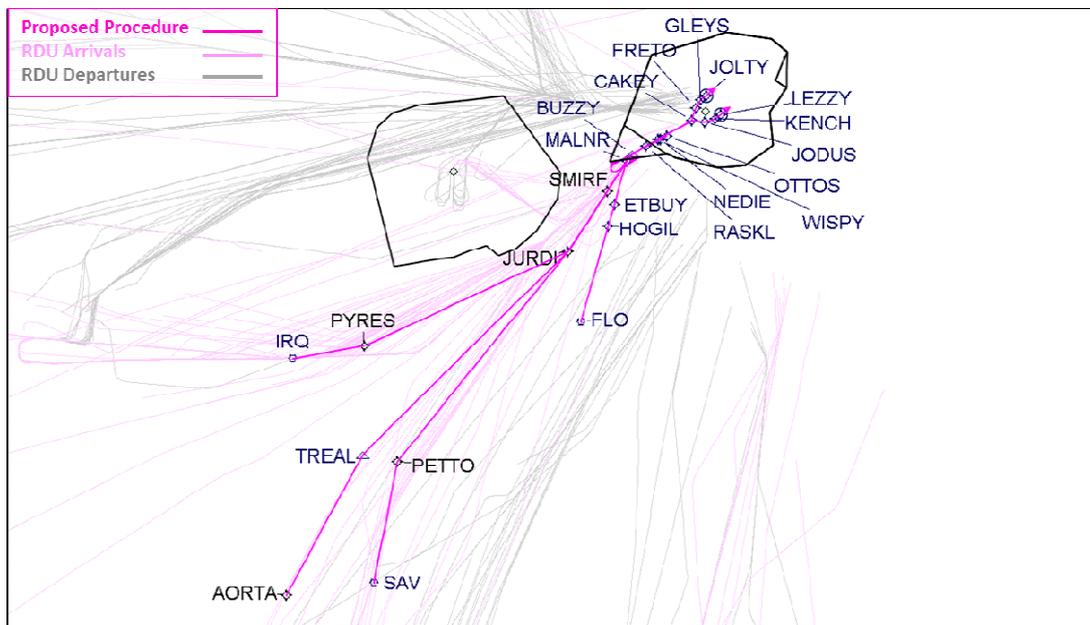


Figure 2. Proposed Final Design

### Additional Design Considerations

Validation through a Human-In-The-Loop Simulation is not required.

### Implementation Dependencies

- Airspace sector modifications
  - ZJX66 and ZJX71 were modified to accommodate the new CLT southeast arrivals, CLT south departures and the MALNR
  - ZDC27 was realigned with the changes made to ZJX airspace changes

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZJX sector boundary maps
- ZDC/ZJX Letter of Agreement (LOA)
- ZDC/RDU Letter of Agreement (LOA)
- RDU Standard Operating Procedure (SOP)
- ZDC Facility Operations and Administration Order 7230.2
- ZJX Facility Operations and Administration Order 7230.2
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedure (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)

# CLT OAPM Design Package

RDU STAR, West MALNR

- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

## Attachments

- MALNR TARGETS Distribution Package
- MALNR RNAV 7100-3
- MALNR RNAV 7100-4

# CLT OAPM Design Package

## GSP SIDs, West BIMMR

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
01/25/13	<ul style="list-style-type: none"> <li>Renamed ZFIVE to ZZCAR, and CAARZ changed to DRIVN</li> </ul>		
02/27/13	<ul style="list-style-type: none"> <li>BIMMR and ZNTRM names were swapped for naming convention</li> <li>ZNTRM to BIMMR was coded as a common route to all GSP runways and GMU, SPA and GYH airports</li> <li>BIMMR-ACERS coded as an en route transition</li> <li>BIMMR-DRIVN coded as an en route transition</li> <li>Route now defined as ZNTRM-ZZCAR-BIMMR-ACERS-DRIVN</li> <li>Turbojets added in the description in the Proposed Final Design</li> <li>In Proposed Final Design section changed to reflect the procedure changes the sentences</li> <li>Add "This SID will serve Greer (GSP), Greenville Downtown (GMU), Spartanburg (SPA) and Donaldson Center (GYH) airports."</li> <li>Figure 2 depicts the new WP names</li> </ul>		
02/28/13	<ul style="list-style-type: none"> <li>Current date added to header</li> <li>Impacted facilities changed to Affected facilities</li> <li>Related/Dependent Submission updated</li> <li>Implementation Dependencies updated</li> </ul>		
03/18/2013	<ul style="list-style-type: none"> <li>In Proposed Final Design updated to show design waypoints</li> <li>In Review Signatures Michael P. Richardson replaced Lyndon M. Bertke</li> <li>Implementation Dependencies changed to include necessary coordination and documents</li> <li>GSP POC Jim Royer replaced with James Fleming</li> </ul>		
03/19/2013	<ul style="list-style-type: none"> <li>Correct spelling of ACERB</li> <li>Added at or above to ZZCAR and BIMMR</li> </ul>		
04/12/2013	<ul style="list-style-type: none"> <li>Editorial changes</li> </ul>		
04/22/2013	<ul style="list-style-type: none"> <li>Updated Figure 2</li> </ul>		
07/11/2013	<ul style="list-style-type: none"> <li>SPA was removed from the procedure.</li> </ul>		

# CLT OAPM Design Package

## GSP SIDs, West BIMMR

02/11/2014	<ul style="list-style-type: none"><li>• Changed current date</li><li>• Put SPA back in procedure</li><li>• Corrected GYH to Donaldson Field</li><li>• Corrected GSP to Greenville Spartanburg International Roger Milliken</li><li>• May need to update Figure 2</li></ul>		
02/21/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Added note "Do not exceed 250 KIAS until advised by ATC"</li><li>• Removed speed restriction portion of notes at ZZCAR and BIMMR, but left altitude restriction</li><li>• Amended proposed date</li></ul>		
04/29/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Editorial changes</li></ul>		
06/26/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Amended Proposed Implementation Date</li><li>• Removed phone numbers</li><li>• Changed current to original</li></ul>		
08/22/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Removed signature sheet</li></ul>		

# CLT OAPM Design Package

## GSP SIDs, West BIMMR

Name of Change	Date
<b>GSP BIMMR DEPARTURE (RNAV)</b>	<b>22 August 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Adjacent Airport Operations - GSP</b>	<b>Proposed 5 January 2017</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Charlotte ATCT (CLT) Positions: Arrival Radar West and Departure Radar West</b> <b>Atlanta ARTCC (ZTL) Sectors: 29, 30, 31, 33 and 47</b> <b>Greer ATCT (GSP)</b>	<b>CLT: Roland Alexander, James Williams</b> <b>ZTL: Roger Cerovsky, Bill Wise</b> <b>GSP: Richard Phillips, James Fleming</b>
Related/Dependent Submissions	Associated Data Files
<b>N/A</b>	<b>Master TARGETS File</b>

### Purpose

The Study Team identified the need for a GSP RNAV SID for destinations to the northeast. GSP southwest arrivals interact with CLT southwest arrivals. GSP northeast arrivals interact with CLT departures and CLT northwest arrivals. GSP northbound departures interact with CLT northwest arrivals. GSP northwest arrivals interact with CLT northwest arrivals. Routes were designed in collaboration with ZTL and CLT to determine placement and to improve interaction with current en route flows and proposed CLT and satellite operations. The proposed design lays the groundwork for Performance Based Navigation (PBN) procedures, including vertical navigation, for future GSP operations.

Figure 1 depicts the Study Team Recommendation

# CLT OAPM Design Package

## GSP SIDs, West BIMMR

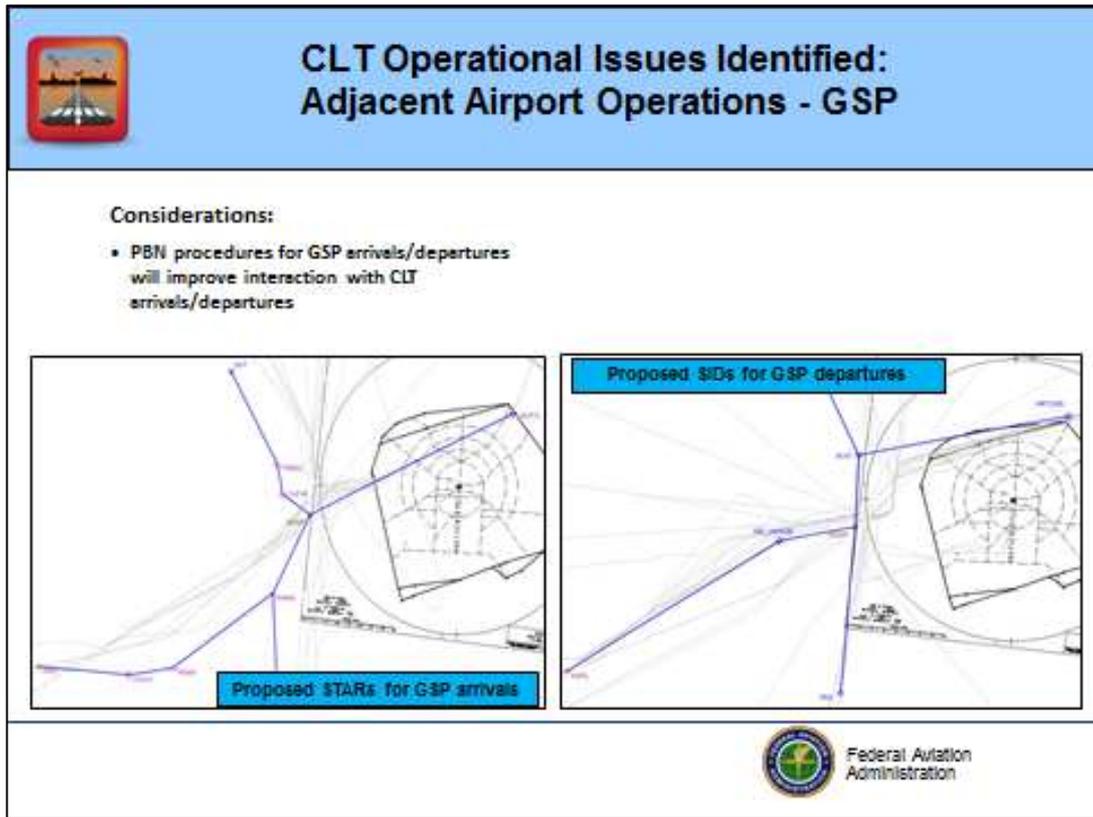


Figure 1. Study Team Recommendation

### Proposed Final Design

The Design Team developed an RNAV departure procedure for eastbound turbojet departures from GSP airspace. The route is located south of the current departure tracks. The SID overflies CLT ATCT airspace and replaces the current point-to-point routing north and east of GSP. This SID will serve multiple airports in GSP airspace. BIMMR was placed outside of CLT airspace as an aiming point and a crossing restriction for eastbound departures. The BIMMR (expect) crossing restriction is at or above 17,000 feet - this restriction will ensure aircraft will top CLT airspace (CLT ceiling raised to 16,000 feet). In addition a 250 KIAS speed restriction will be applied to all departures to insure that aircraft can comply with altitude restrictions. This SID will serve Greenville Spartanburg International Roger Milliken (GSP), Greenville Downtown (GMU), Spartanburg (SPA), and Donaldson Field (GYH) airports. The following waypoints were designed on the procedure.

- ZNTRM Coded as a common route to BIMMR for all GSP runways and for GMU, SPA and GYH departures
- ZZCAR Waypoint will have a note with an expect clearance to cross at 10,000 feet
- BIMMR Waypoint will have a note with an expect clearance to cross at 17,000 feet
- ACERB End of the enroute transition for aircraft departing northbound
- DRIVN End of the enroute transition for aircraft departing eastbound

# CLT OAPM Design Package

## GSP SIDs, West BIMMR

Figure 2 below depicts the Proposed Final Design.

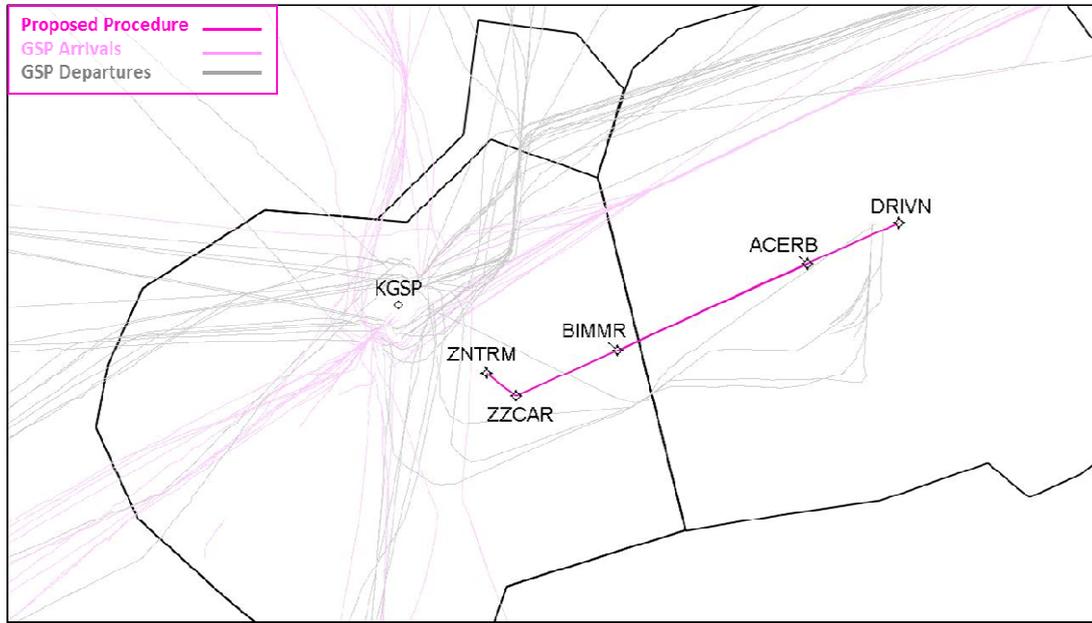


Figure 2. Proposed Final Design

### Additional Design Considerations

- A Human-in-the-Loop Simulation validation was conducted during July 2012 and found this to be a viable procedure
- Procedure to be published with an expect altitude of at or above 10,000 feet at ZZCAR and at or above 17,000 feet at BIMMR.
- Include a note “Do not exceed 250 KIAS until advised by ATC”
- Need to design a PDR from SPA to mimic the BIMMR and BWALL SIDs

### Implementation Dependencies

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL/GSP Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- GSP ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

## GSP SIDs, West BIMMR

### Attachments

- BIMMR DEPARTURE RNAV Distribution Package
- BIMMR DEPARTURE RNAV\_8260-15C
- BIMMR DEPARTURE RNAV\_8260-2\_Worksheet
- BIMMR DEPARTURE RNAV\_Graphic\_DP\_Worksheet
- RNAV PRO Results

# CLT OAPM Design Package

## GSP SIDs, North BWALL

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
01/25/2013	<ul style="list-style-type: none"> <li>GSP ATCT needed an initial leg segment added to allow compliance to 8260.53, initial departure fixes</li> <li>3 fixes were renamed BWALL changed to HALJO, JALLN changed to JLENA</li> <li>New WP named to BWALL</li> </ul>		
02/27/2013	<ul style="list-style-type: none"> <li>BWALL and HALJO names were swapped for naming convention</li> <li>SPA VOR was removed from the procedure and a new. WP4148 was placed north of SPA VOR on a line that extends from JLENA to BWALL southeast bound</li> <li>Route between HALJO and BWALL was coded as a common route in order to code procedure for all GSP runways and GMU, SPA and GYH airports</li> <li>WP4148 renamed ALYSA</li> <li>Route now defined as HALJO, ALYSA(WP4148), BWALL, JLENA</li> <li>Turbojets added in the description in the Proposed Final Design</li> <li>Updated Proposed Final Design to reflect multiple airports</li> </ul>		
02/28/13	<ul style="list-style-type: none"> <li>Current date added to header</li> <li>Impacted facilities changed to Affected facilities</li> <li>Related/Dependent Submission updated</li> <li><u>Implementation Dependencies</u> added RCTOR STAR</li> </ul>		
03/18/2013	<ul style="list-style-type: none"> <li>In Proposed Final Design added waypoint description</li> <li>In Review Signatures Michael P. Richardson replaced Lyndon M. Bertke</li> <li>In GSP POC and in Review Signature James Fleming replaced Jim Royer</li> <li>Updated Implementation Dependencies and Attachments</li> <li>Attachment list was updated</li> </ul>		
04/09/2013	<ul style="list-style-type: none"> <li>GSP/AVL Airspace Change added to related dependent submissions</li> </ul>		
04/12/2013	<ul style="list-style-type: none"> <li>Editorial changes</li> </ul>		
04/22/2013	<ul style="list-style-type: none"> <li>Updated Figure 2</li> </ul>		
07/11/2013	<ul style="list-style-type: none"> <li>SPA was removed from procedure.</li> </ul>		

# CLT OAPM Design Package

## GSP SIDs, North BWALL

05/27/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Amended Proposed Implementation Date</li><li>• Editorial changes</li><li>• Removed signature page</li></ul>		
06/26/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Removed phone numbers</li></ul>		
7/29/2014	<ul style="list-style-type: none"><li>• Added SPA to airports served</li></ul>		
7/30/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Changed JALLN to JLENA</li><li>• Corrected spelling of RCTOR</li><li>• Corrected airport names of GSP and SPA</li></ul>		

# CLT OAPM Design Package

## GSP SIDs, North BWALL

Name of Change	Date
<b>BWALL DEPARTURE (RNAV)</b>	<b>30 July 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Adjacent Airport Operations - GSP</b>	<b>Proposed 5 January 2017</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Atlanta ARTCC (ZTL) Sectors: 31, 44 and 48</b> <b>Greer ATCT (GSP)</b> <b>Asheville ATCT (AVL)</b>	<b>ZTL: Roger Cerovsky, Bill Wise</b> <b>GSP: Richard Phillips, James Fleming</b> <b>AVL: Grey Pelkey, Jon Cohen</b>
Related/Dependent Submissions	Associated Data Files
<b>GSP RCTOR STAR</b> <b>AVL Airspace Change</b>	<b>Master TARGETS File</b>

### Purpose

The Study Team identified the need for an RNAV SID for GSP. It was recommended to serve several airports in the GSP ATCT airspace and should be designed to de-conflict flight paths with CLT's northwest arrival area.

The Study Team recommended the development of a GSP northbound RNAV SID that would not conflict with the Study Team proposed northwest arrival. Routes were designed in conjunction with ZTL and CLT to determine placement and to improve interaction with current en route flows and proposed CLT and satellite operations. The proposed design lays the groundwork for PBN procedures, including vertical navigation, for future GSP operations.

Figure 1 depicts the Study Team Recommendation.

# CLT OAPM Design Package

## GSP SIDs, North BWALL

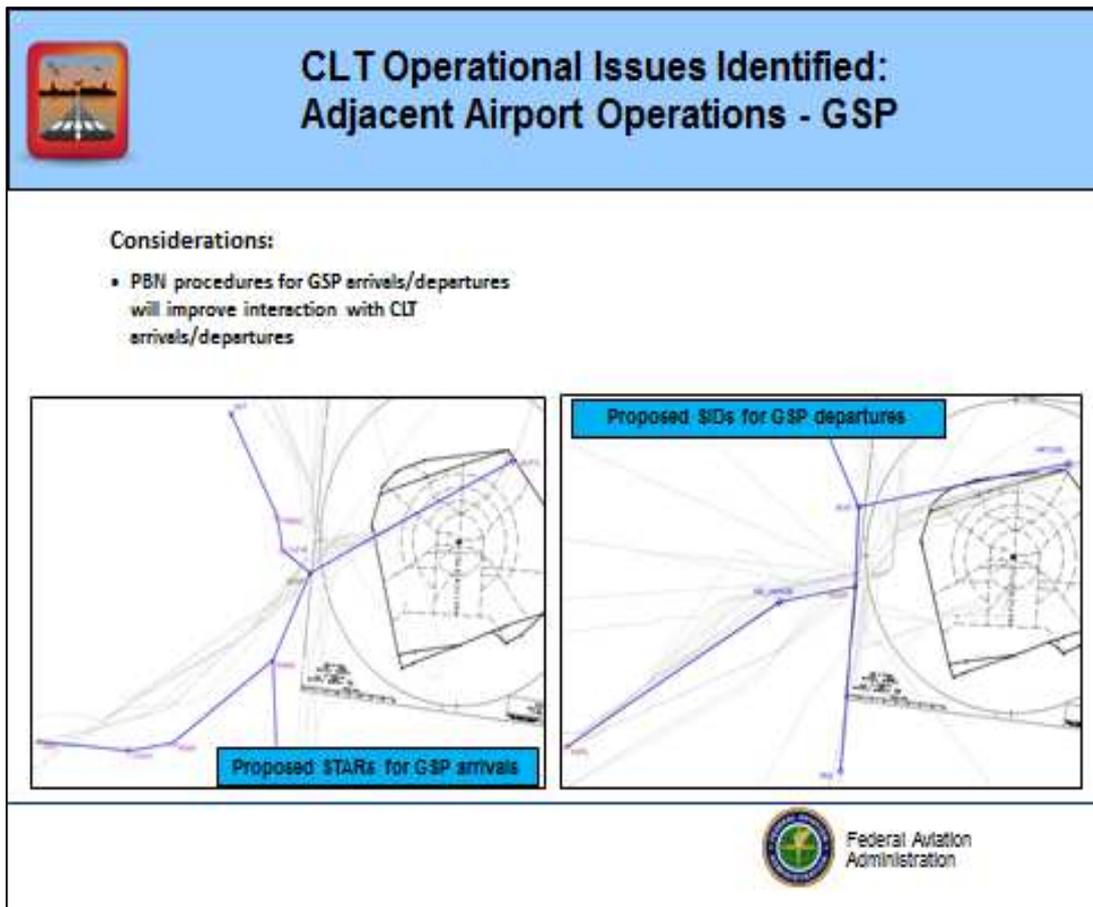


Figure 1. Study Team Recommendation

### Proposed Final Design

The Design Team developed the BWALL ONE DEPARTURE (RNAV) for northbound turbojet departures from airports served by the Greer Terminal Radar Approach Control (TRACON). The BWALL ONE is located west of the current departure tracks and terminates at JLENA. The new location helps de-conflict from the FILPZ ONE ARRIVAL (RNAV) and serves north and east departures. It was necessary to move the proposed procedure east of the Study Team design to accommodate CLT arrivals from the northwest. This SID will serve Greenville Spartanburg International Roger Milliken Field (GSP), Spartanburg Downtown Memorial (SPA), Greenville Downtown (GMU), and Donaldson Center (GYH) airports. The following waypoints were designed on the procedure:

- HALJO Beginning of the common route
- ALYSA Waypoint added to facilitate the 45° turn on for departing aircraft
- BWALL End of the common route
- JLENA Termination waypoint of SID

Figure 2 depicts the Proposed Final Design.

# CLT OAPM Design Package

## GSP SIDs, North BWALL

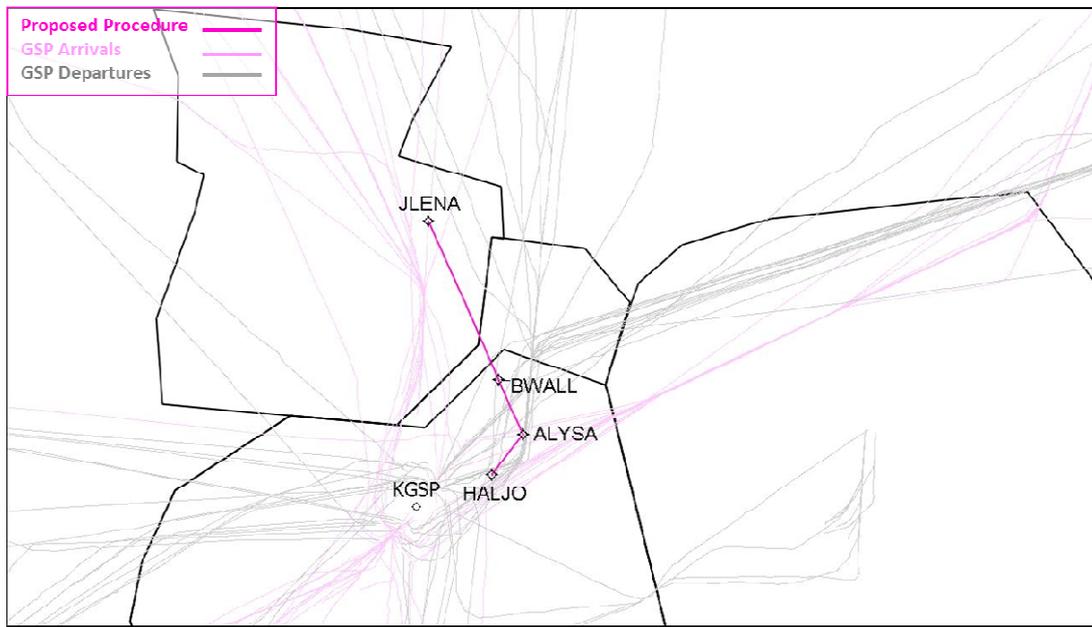


Figure 2. Proposed Final Design

### Additional Design Considerations

- Validation through Human-in-the-Loop Simulation was not required
- Need to design a PDR from SPA to mimic the BIMMR and BWALL SIDs

### Implementation Dependencies

It is necessary that the RCTOR STAR be completed at the same time to ensure lateral separation

Airspace sector modifications

- GSP and AVL airspace was modified to eliminate potential point-outs with AVL

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL/GSP Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- GSP ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

## GSP SIDs, North BWALL

### Attachments

- BWALL RNAV\_8260-15C
- BWALL RNAV\_8260-2\_Worksheet
- BWALL RNAV\_Graphic\_DP\_Worksheet
- RNAV PRO Results

# CLT OAPM Design Package

## GSO SIDs, North TRSHA

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
02/26/2013	<ul style="list-style-type: none"> <li>• See 20130226 Evaluation notes for additional design considerations</li> <li>• SIDs defined for jet departures only</li> <li>• Figure 3 depicts the new vectors off the runway to the common route.</li> </ul>		
02/28/2013	<ul style="list-style-type: none"> <li>• Current date added to header</li> <li>• Impacted facilities changed to Affected facilities</li> <li>• Related/Dependent Submissions were amended</li> </ul>		
03/19/2013	<ul style="list-style-type: none"> <li>• In the Proposed Final Design the following was added</li> <li>• DASSH waypoint was renamed BAWDS</li> <li>• The following waypoints were added to the procedure.                             <ul style="list-style-type: none"> <li>○ TRSHA</li> <li>○ WHAYN</li> <li>○ RUFFN</li> <li>○ BAWDS</li> <li>○ GEEPS</li> <li>○ TAARZ</li> </ul> </li> <li>• Implementation Dependencies were amended</li> <li>• Attachments were amended</li> <li>• In Review Signatures Michael P. Richardson replaced Lyndon M. Bertke</li> </ul>		
04/12/2013	<ul style="list-style-type: none"> <li>• Editorial changes</li> </ul>		
07/02/2013	<ul style="list-style-type: none"> <li>• Format change</li> </ul>		
08/26/2013	<ul style="list-style-type: none"> <li>• Removed multiple airports served</li> </ul>		
09/18/2013	<ul style="list-style-type: none"> <li>• Added INT as an airport served</li> </ul>		
02/11/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Editorial changes</li> </ul>		
05/27/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Amended Proposed Implementation Date</li> <li>• Removed signature page</li> </ul>		

# CLT OAPM Design Package

## GSO SIDs, North TRSHA

06/26/2014	<ul style="list-style-type: none"> <li>• Amended current date</li> <li>• Changed Proposed Implementation date</li> <li>• Removed phone numbers</li> <li>• Changed current to original</li> </ul>		
Name of Change		Date	
TRSHA DEPARTURE (RNAV)		26 June 2014	
Change Classification		Current Phase of Design	
Terminal Procedure (RNAV SID)		<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)	
OAPM Study Team Reference(s)		Implementation Date	
Adjacent Airport Operations - GSO		Proposed 5 January 2017	
Affected Facilities and Positions, Areas, and/or Sectors		Facility Points of Contact	
Atlanta ARTCC (ZTL) Sectors: 29, 45, and 47 Greensboro ATCT (GSO)		ZTL: Roger Cerovsky, Bill Wise 770.210.7622 GSO: Scott Watson, Keith Thomas 336.358.3444	
Related/Dependent Submissions		Associated Data Files	
N/A		Master TARGETS File	

### Purpose

GSO north departures interact with CLT's proposed KRITR SID, TRAKS STAR and RDU's arrival and departures. The proposed SID was designed to facilitate unrestricted climbs, earlier turn on course and de-conflict with the KRITR STAR, TRAKS STAR, ALDEN STAR and LWOOD SID. The Design Team will integrate remaining routes in and out of GSO's surrounding airspace and lay the groundwork for PBN procedures, including vertical navigation.

Figure 1 below depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## GSO SIDs, North TRSHA

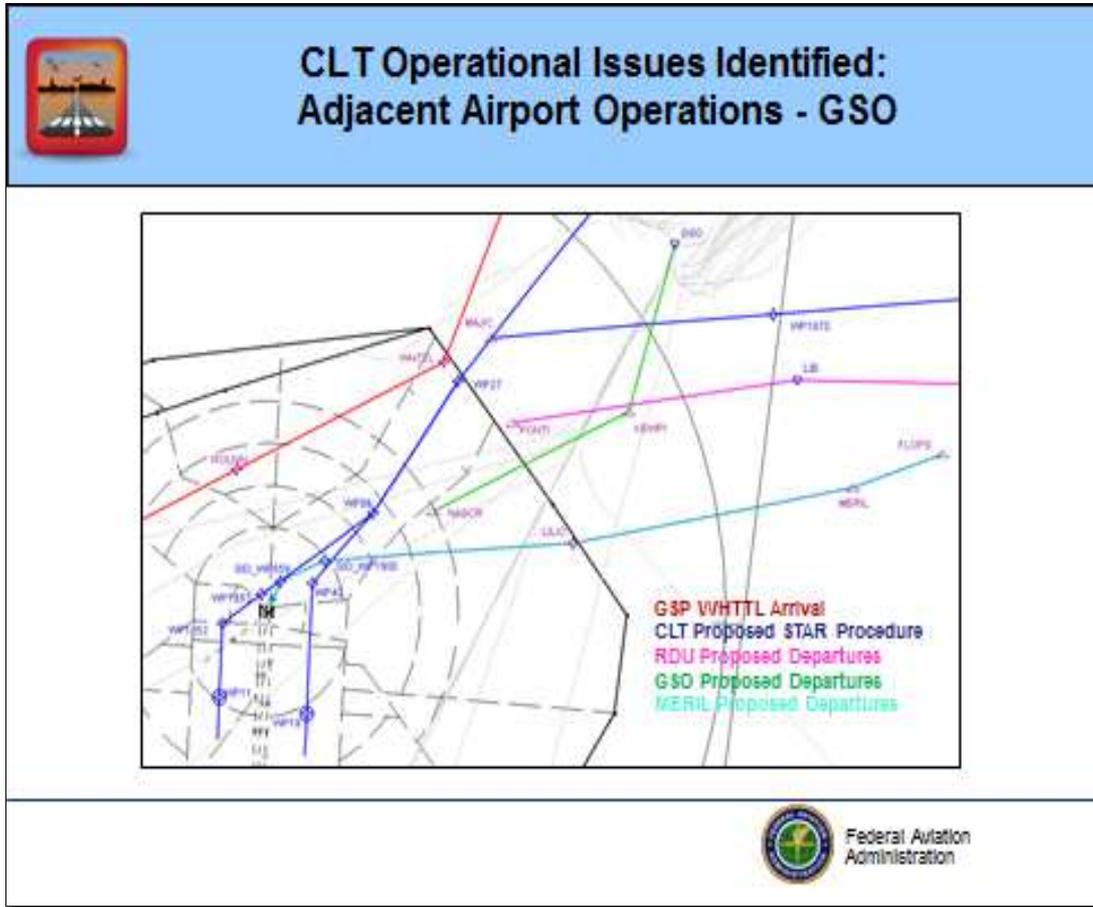


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## GSO SIDs, North TRSHA

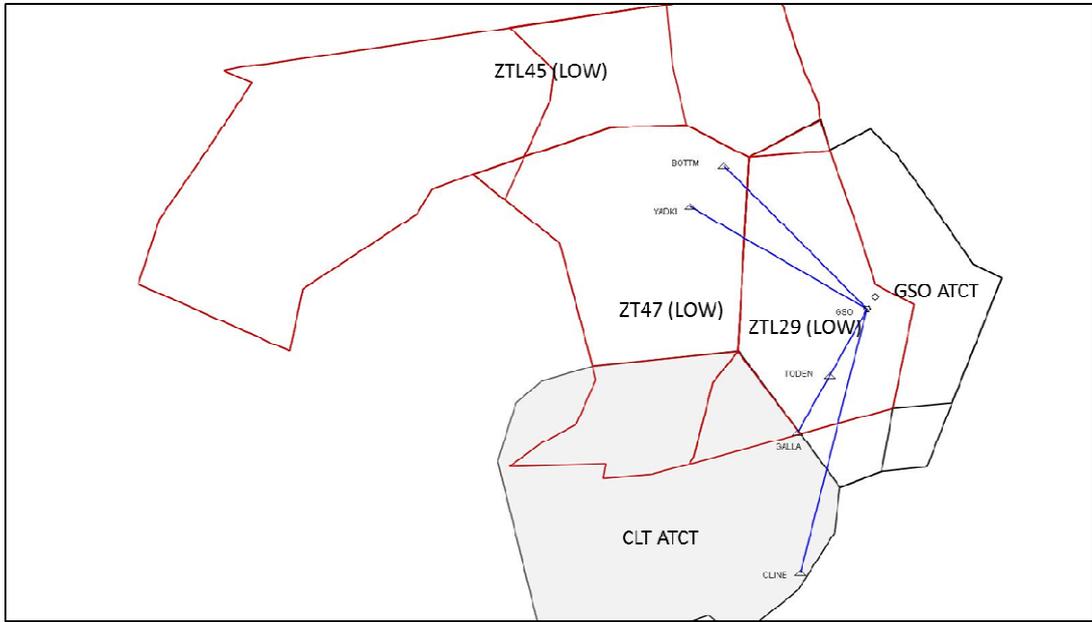


Figure 2. Original Procedure/Route/Airspace

### **Proposed Final Design**

The Design Team developed the TRSHA SID for jet northbound departures from GSO with two transitions. The BAWDS transition was designed for traffic routed over HVM and points west. The TAARZ transition was designed for traffic routed over FLM and points east. The following waypoints were added to the procedure.

- WHAYN Initial waypoint and the beginning of the common route
- TRSHA End of the common route
- RUFFN Designed to allow GSO controllers to vector aircraft to join the departure and be established prior to entering ZTL airspace
- BAWDS Termination waypoint for the south transition of the departure
- GEEPS Designed to allow GSO controllers to vector aircraft to join the departure and be established prior to entering ZTL airspace
- TAARZ Termination waypoint for the north transition of the departure

Figure 3 depicts the Proposed Final Design.

# CLT OAPM Design Package

## GSO SIDs, North TRSHA

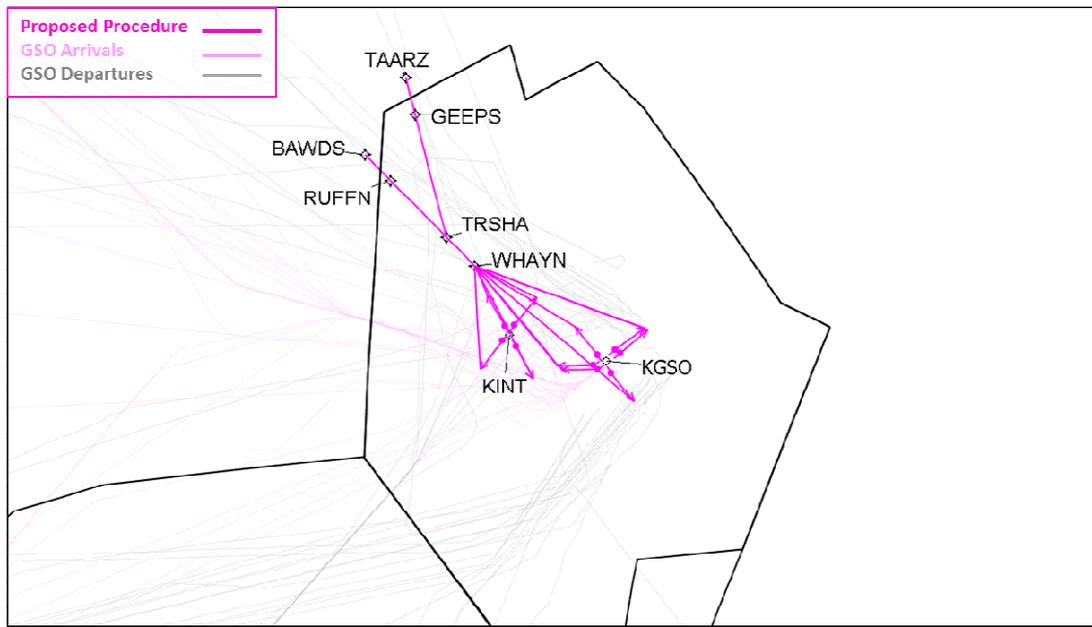


Figure 3. Proposed Final Design

### Additional Design Considerations

- Validation through Human-in-the-Loop Simulation was not required
- INT will also be served by TRSHA SID

### Implementation Dependencies

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL/GSO Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- GSO ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

## GSO SIDs, North TRSHA

### Attachments

- TRSHA RNAV Distribution Package
- TRSHA RNAV\_8260-15C
- TRSHA RNAV\_8260-2\_Worksheet
- TRSHA RNAV\_Graphic\_DP\_Worksheet
- RNAV PRO Results

# CLT OAPM Design Package

## GSO SIDs, South BOLTT

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
02/26/2013	<ul style="list-style-type: none"> <li>CARWN SID renamed BOLTT SID</li> <li>BRUWR WP was moved left to align the BOLTT SID with the TRIAD SID CARWN TRANSITION. Change depicted in Figure 3</li> <li>BOLTT SID to be defined as:               <ul style="list-style-type: none"> <li>BOLTT intersection to the BRUWR intersection to the CARWN intersection</li> </ul> </li> </ul>		
03/01/2013	<ul style="list-style-type: none"> <li>Current date added to header</li> <li>Impacted facilities changed to Affected facilities</li> <li>In Related/Dependent Submission the following was deleted:               <ul style="list-style-type: none"> <li>GSP BIMMR SID (CLT Design Package 1i)</li> <li>GSP JUNNR STAR (CLT Design Package 2l)</li> <li>CHSLY STAR (CLT Design Package 4a)</li> <li>GSO BRUWR SID (CLT Design Package 4e)</li> <li>KILNS SID (CLT Design Package 5a)</li> <li>BARMY SID (CLT Design Package 5b)</li> </ul> </li> </ul>		
03/19/2013	<ul style="list-style-type: none"> <li>Proposed Final Design the following was amended</li> <li>Implementation Dependencies were amended</li> <li>Attachment List amended</li> <li>In the Review Signatures Michael P. Richardson replaced Lyndon M. Bertke</li> </ul>		
04/12/2013	<ul style="list-style-type: none"> <li>Editorial changes</li> </ul>		
08/26/2013	<ul style="list-style-type: none"> <li>Removed multiple airports served</li> </ul>		
09/18/2013	<ul style="list-style-type: none"> <li>Added INT as an airport served</li> </ul>		
05/27/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended Proposed Implementation Date</li> <li>Removed signature page</li> <li>Editorial changes</li> </ul>		
06/26/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Removed phone numbers</li> <li>Changed current to original</li> </ul>		
07/01/2014	<ul style="list-style-type: none"> <li>Updated Figure 2</li> </ul>		

# CLT OAPM Design Package

## GSO SIDs, South BOLTT

08/20/2014	<ul style="list-style-type: none"><li>• Amended current date</li><li>• Added to description of BOLTT, "also depicted in the TRIAD SID"</li></ul>		
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# CLT OAPM Design Package

## GSO SIDs, South BOLTT

Name of Change	Date
<b>BOLTT DEPARTURE (RNAV)</b>	<b>20 August 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Adjacent Airport Operations - GSO</b>	<b>Proposed 5 January 2017</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Atlanta ARTCC (ZTL) Sectors: 29, 30, 33 and 47</b> <b>Charlotte ATCT (CLT) Positions: Arrival Radar East and Departure Radar East</b> <b>Greensboro ATCT (GSO)</b>	<b>ZTL: Roger Cerovsky, Bill Wise</b> <b>CLT: Roland Alexander, James Williams</b> <b>GSO: Scott Watson, Keith Thomas</b>
Related/Dependent Submissions	Associated Data Files
<b>N/A</b>	<b>Master TARGETS File</b>

### Purpose

GSO south departures impact GSP east departures, GSP east arrivals, CLT northeast arrivals, and RDU arrivals and departures: these considerations requires the Design Team to design a new GSO SID which would de-conflict with the above mentioned procedures and allow for greater optimization of climb while facilitating routes in and out of GSO’s surrounding airspace. The new SID lays the groundwork for future PBN procedures to include vertical navigation.

Figure 1 below depicts the Study Team Recommendation. Figure 2 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## GSO SIDs, South BOLTT

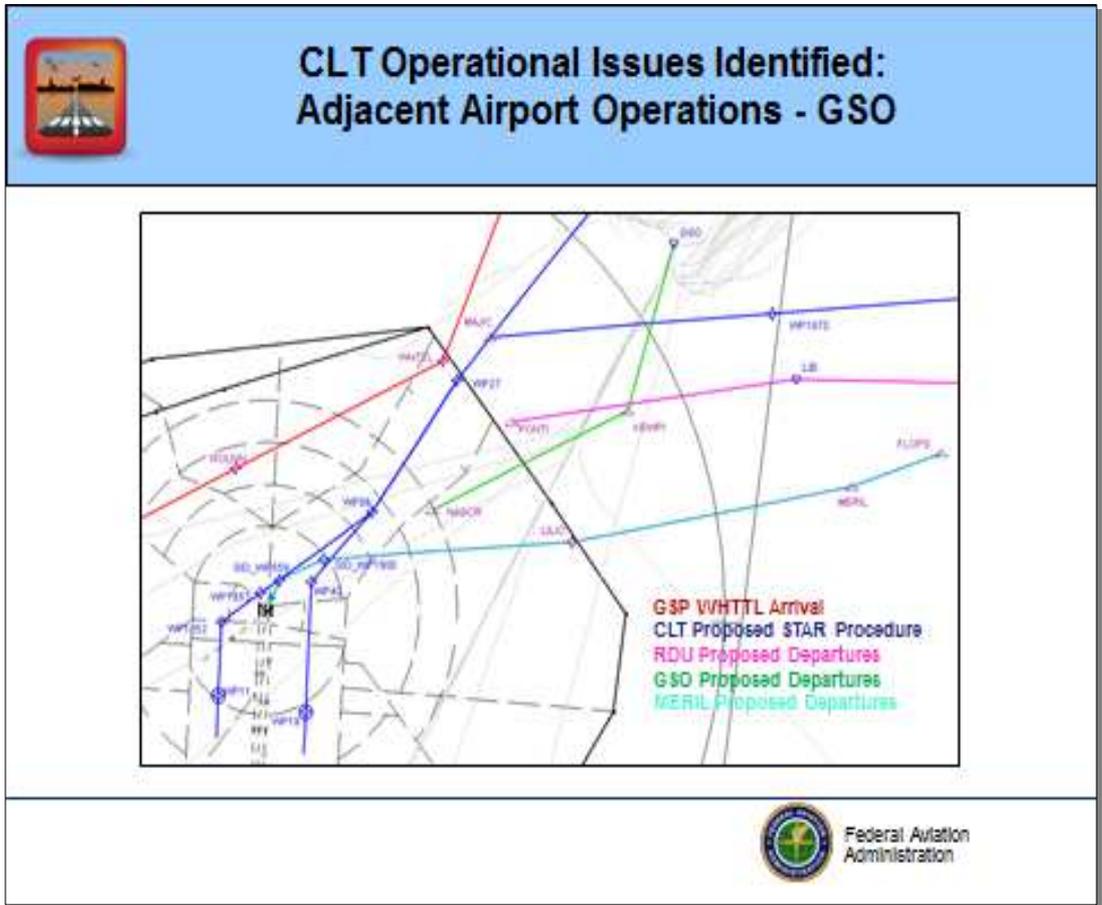


Figure 1. Study Team Recommendation

# CLT OAPM Design Package

## GSO SIDs, South BOLTT

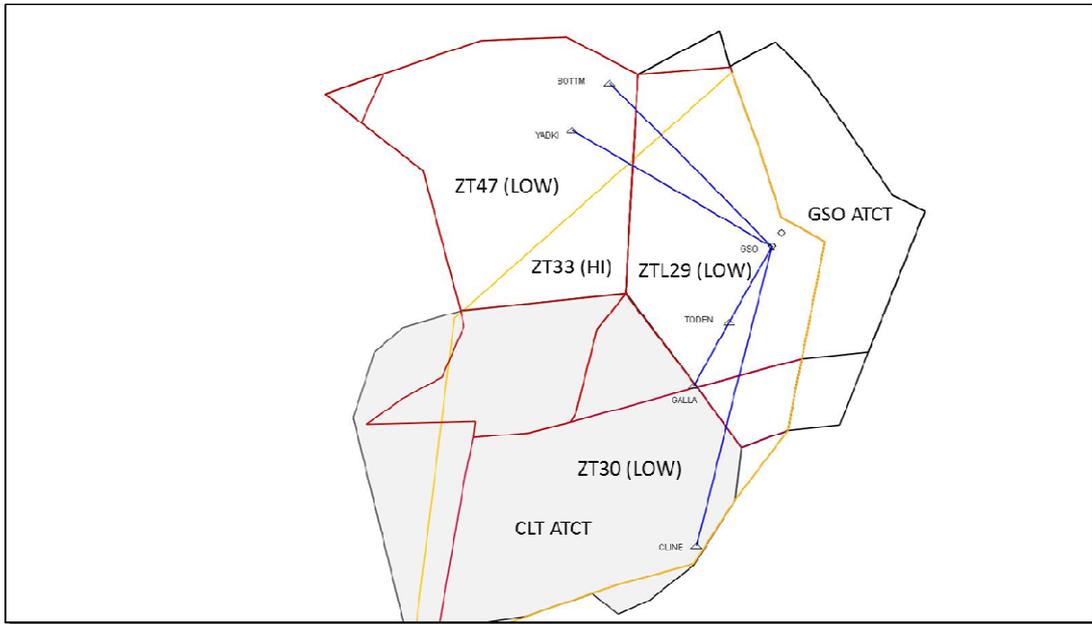


Figure 2. Original Procedure/Route/Airspace

### **Proposed Final Design**

The Design Team developed the BOLTT SID for southbound departures from GSO airspace. The location of the route is west of current departure tracks. The SID terminates at CARWN to de-conflict from CHLSY STAR, KILNS SID, BARMY SID, RDU SHPRD SID, GSP JUNNR STAR and the GSP BIMMR SID. The following waypoints were designed in the procedure.

- BRUWR Initial waypoint on the procedure
- BOLTT Waypoint will be defined by GSO 205°R to a Fix Radial Distance then a turn to 240° to the CARWN waypoint, which is also depicted in the TRIAD SID (CONVENTIONAL)
- CARWN Termination waypoint of the SID

Figure 3 depicts the Proposed Final Design.

# CLT OAPM Design Package

## GSO SIDs, South BOLTT

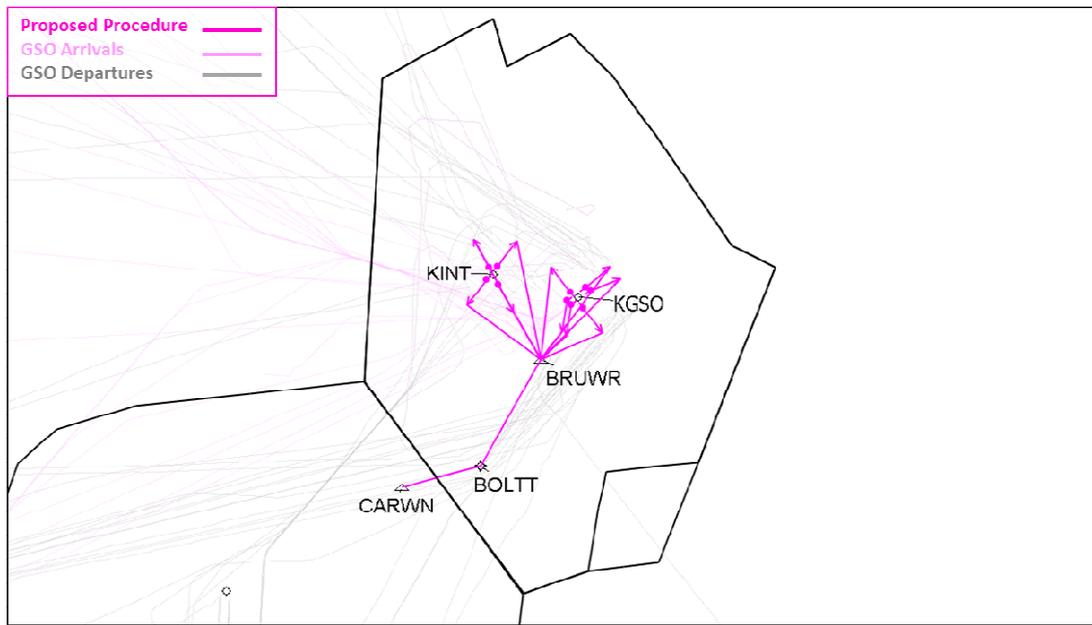


Figure 3. Proposed Final Design

### Additional Design Considerations

- Validation through Human-in-the-Loop Simulation was not required
- INT will also be served by BOLTT SID

### Implementation Dependencies

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- GSO/ZTL Letter of Agreement (LOA)
- GSO/CLT Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CLT ATCT Standard Operating Procedures (SOP)
- GSO ATCT Standard Operating Procedures (SOP)
- ZTL Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

## GSO SIDs, South BOLTT

### Attachments

- BOLTT RNAV Distribution Package
- BOLTT RNAV\_8260-15C
- BOLTT RNAV\_8260-2\_Worksheet
- BOLTT RNAV\_Graphic\_DP\_Worksheet
- RNAV PRO Results

# CLT OAPM Design Package

GSO SIDs, TRIAD SID CARWN

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
02/26/2013	<ul style="list-style-type: none"> <li>• See 20130225 Evaluation notes for additional design considerations BRUWR to be defined by the GSO205° and the LIB255° radial, then southwest to the CARWN intersection (defined by a LIB FRD) this procedure will be added to the existing TRIAD SID as the CARWN transition. The GALLA transition will need to be removed since it extends too far south and conflicts with CLT departures.</li> <li>• BRUWR will be changed from a WP to an intersection</li> <li>• CARWN intersection was added as a LIB FRD. Change depicted in FIGURE 2</li> <li>• In Proposed final design props and turboprops were removed and a description of the final procedure was added</li> <li>• <u>Current</u>: The Design Team developed a conventional departure procedure for southbound departures from GSO ATCT airspace for low performance prop and turboprop aircraft. The location of the route is west of current departure tracks and closely aligns with the lateral path of the GSO CARWN SID. The SID termination over SPA de-conflicts from the CLT CHLSY STAR, the CLT KILNS SID, the CLT BARMY SID, the RDU SHPRD SID and the GSP BIMMR SID. This SID will serve multiple airports within GSO airspace.</li> <li>• <u>Revised</u>: The Design Team developed a conventional departure procedure for southbound departures from GSO ATCT airspace for turbojet aircraft. This procedure would be a new transition on the existing TRIAD SID. The procedure was designed to depart GSO on a 205° R until the BRUWR intersection (defined by the intersection of the GSO205°R and the LIB255°R) then will proceed west southwest to the CARWN intersection. The procedure was designed to clear the CLT NE CHSLY STAR before turning southwest bound. The southwest bound leg was designed to be laterally separated and parallel to the CLT E KILNS and BARMY SIDs This SID will serve multiple airports within GSO airspace.</li> <li>• This procedure will be named the TRIAD 7(?) CARWN transition</li> </ul>		

# CLT OAPM Design Package

## GSO SIDs, TRIAD SID CARWN

03/19/2013	<ul style="list-style-type: none"> <li>• In Proposed Final Design the following was added</li> <li>• The follow waypoints were designed on the procedure.</li> <li>• GSO is the initial fix on the SID</li> <li>• BRUWR intersection will be defined by GSO and LIB radials for the turn southwest bound, which keep the SID parallel to and opposite direction to the CLT KILNS and BARMY SIDs</li> <li>• SPA is the termination fix on the SID</li> <li>• Implementation dependencies and Attachments were amended</li> <li>• In Review Signatures Michael P. Richardson replaced Lyndon M. Bertke</li> </ul>		
04/12/2013	<ul style="list-style-type: none"> <li>• Editorial changes</li> <li>• In POC and Review Signature James Williams replaced Greg Jones</li> </ul>		
05/01/2013	<ul style="list-style-type: none"> <li>• Added INT as an airport served</li> </ul>		
07/02/2013	<ul style="list-style-type: none"> <li>• Signature page changed to George Peurifoy and Robert Szymkiewicz</li> <li>• Minor format and editorial changes</li> </ul>		
7/12/2013	<ul style="list-style-type: none"> <li>• Changed Implementation Date</li> <li>• Added lat/longs</li> <li>• Added tracking statement</li> <li>• Removed attachments</li> </ul>		
02/12/2014	<ul style="list-style-type: none"> <li>• Changed current date</li> <li>• Changed BRUWR to DME fix and added "DME required for this procedure"</li> </ul>		
06/26/2014	<ul style="list-style-type: none"> <li>• Changed current date</li> <li>• Changed Proposed Implementation Date</li> <li>• Removed phone numbers</li> </ul>		
07/09/2014	<ul style="list-style-type: none"> <li>• Updated Figure 2 – changed BRUWR to BOLTT</li> </ul>		

# CLT OAPM Design Package

GSO SIDs, TRIAD SID CARWN

Name of Change	Date
<b>TRIAD DEPARTURE CARWN Transition (Conventional)</b>	<b>9 July 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (Conventional SID)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Adjacent Airport Operations - GSO</b>	<b>Proposed 5 January 2017</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Greensboro ATCT (GSO)</b> <b>Atlanta ARTCC (ZTL) Sectors: 29, 30, 33 and 47</b> <b>Charlotte ATCT (CLT) Positions: Departure Radar East and Departure Radar West</b> <b>Washington ARTCC (ZDC) Sector: 27</b>	<b>GSO: Scott Watson, Keith Thomas</b> <b>ZTL: Roger Cerovsky, Bill Wise</b> <b>CLT: Roland Alexander, James Williams</b> <b>ZDC: Joe Keimig, Curt Johnson</b>
Related/Dependent Submissions	Associated Data Files
<b>N/A</b>	<b>Master TARGETS File</b>

## Purpose

GSO south departures impact GSP east departures, GSP east arrivals, CLT northeast arrivals, and RDU arrivals and departures: these considerations requires the Design Team to redesign a new GSO SID which would de-conflict with the above mentioned procedures and allow for greater optimization of climb while facilitating routes in and out of GSO's surrounding airspace.

Figure 1 depicts the Study Team Recommendation.

# CLT OAPM Design Package

GSO SIDs, TRIAD SID CARWN

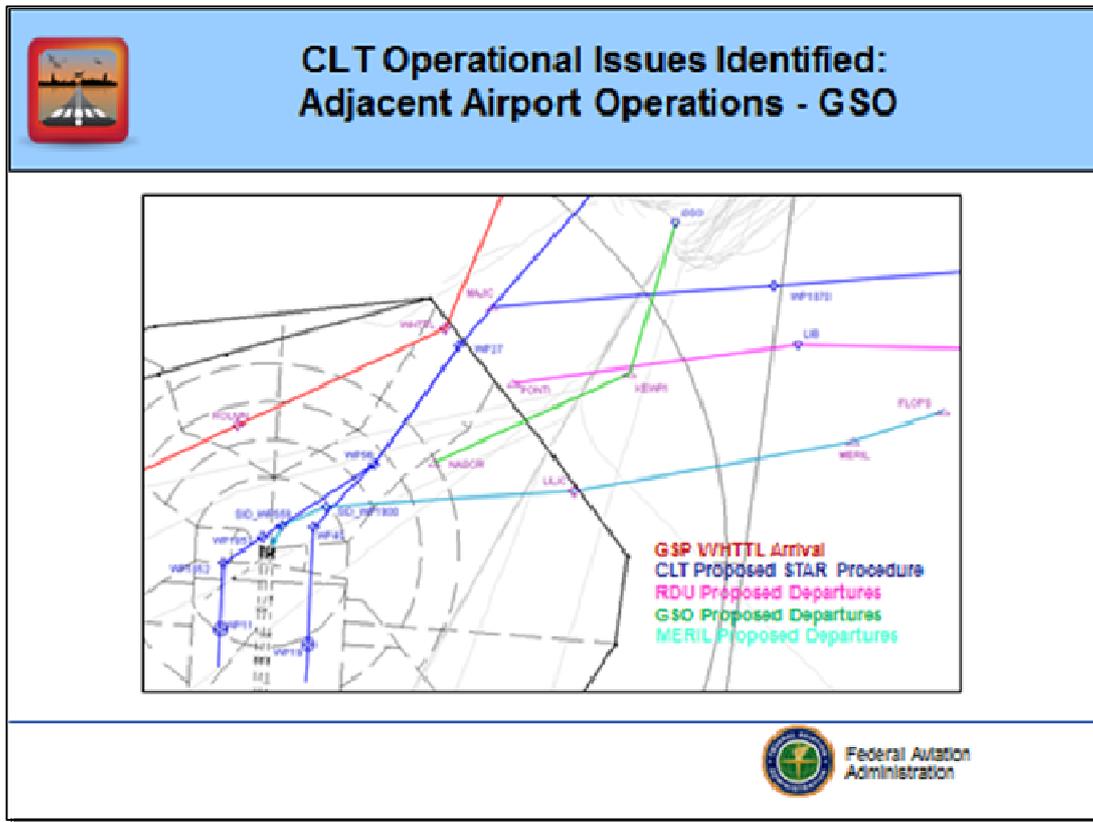


Figure 1. Study Team Recommendation

## Proposed Final Design

The Design Team developed a conventional departure procedure for southbound departures from GSO ATCT airspace for turbojet aircraft. This procedure is a new transition on the existing TRIAD SID. The procedure is designed to depart GSO on a 205° radial (R) until the BRUWR intersection (defined by the intersection of the GSO205°R and the LIB255°R) then will proceed west southwest to the CARWN intersection (defined by the LIB FRD). The procedure is designed to clear the CLT NE CHSLY STAR before turning southwest bound. The southwest bound leg is designed to be laterally separated and parallel to the CLT KILNS and BARMY SIDs This SID will also serve Winston Salem airport (INT). The follow waypoints were designed on the procedure.

- GSO Initial fix on the SID
- BOLTT Intersection will be a DME fix, DME required for this procedure. Initiates a southwest turn, keeping the SID parallel to and opposite direction to the CLT KILNS and BARMY SIDs N 35° 37' 28.83" W 80° 11' 4.13"
- CARWN Termination fix on the SID N 35° 32' 37.87" W 80° 25' 43.52"

# CLT OAPM Design Package

## GSO SIDs, TRIAD SID CARWN

Figure 2 below depicts the Proposed Final Design.

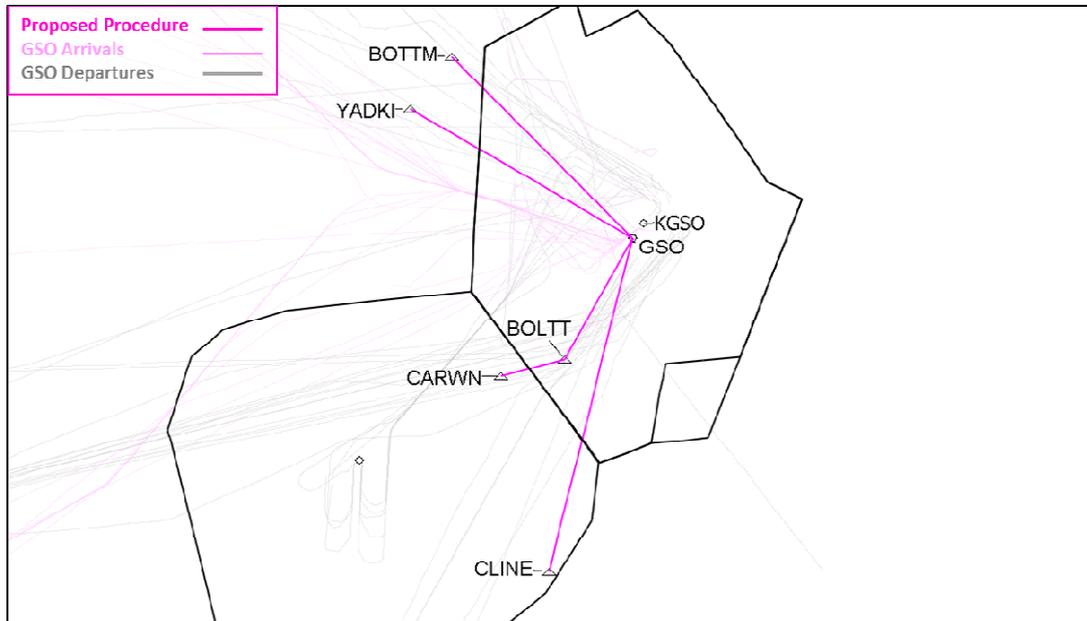


Figure 2. Proposed Final Design

### Additional Design Considerations

- Validation through Human-in-the-Loop Simulation was not required
- INT will also be served by TRIAD SID

### Implementation Dependencies

Document changes/modifications include:

- Departure SID filings with airline dispatchers
- ZTL/GSO Letter of Agreement (LOA)
- CLT/GSO Letter of Agreement (LOA)
- ZTL/CLT Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- GSO ATCT Standard Operating Procedures (SOP)
- CLT ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARS Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database including Coded Departure Routes (CDRs)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

## GSO SIDs, TRIAD SID CARWN

### Attachments

- None

This procedure will be tracked, but not implemented via the OAPM process. This design package will be forwarded to the Eastern Service Center Operations Support Group for incorporation into the National Airspace System. The OAPM team will track its progress due to its correlation with other CLT OAPM airspace design issues.

# CLT OAPM Design Package

CHS STARS, North OSPRI

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
04/11/2013	<ul style="list-style-type: none"> <li>Added current date</li> <li>In Review Signatures Michael P. Richardson replaced Lyn Bertke; Roger Cerovsky replaced Joe Ricks</li> <li>Editorial changes</li> </ul>		
09/04/2013	<ul style="list-style-type: none"> <li>Changed current date</li> <li>Changed implementation date</li> </ul>		
04/02/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed implementation date</li> <li>Changed GSO transition to OBNEE transition</li> <li>Removed signature page</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed Implementation Date</li> <li>Changed current to original</li> <li>Editorial changes</li> </ul>		
07/01/2014	<ul style="list-style-type: none"> <li>Updated Figure 2</li> </ul>		
07/02/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Removed phone numbers</li> <li>Editorial changes</li> </ul>		

# CLT OAPM Design Package

CHS STARS, North OSPRI

Name of Change	Date
<b>OSPRI ARRIVAL (RNAV)</b>	<b>02 July 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV STAR)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
OAPM Study Team Reference(s)	Implementation Date
<b>Adjacent Airport Operation - CHS</b>	<b>Proposed 5 January 2017</b>
Affected Facilities and Positions, Areas, and/or Sectors	Facility Points of Contact
<b>Atlanta ARTCC (ZTL) Sectors: 15, 28, 30, 32, 33, 34 and 50</b> <b>Jacksonville ARTCC (ZJX) Sectors: 66 and 72</b> <b>Columbia ATCT</b>	<b>ZTL: Roger Cerovsky, Bill Wise</b> <b>ZJX: Evan Darby, Jeff Wood</b> <b>CAE: Chris Rickenbaker, Eric Slater</b>
Related/Dependent Submissions	Associated Data Files
<b>N/A</b>	<b>Master TARGETS File</b>

## Purpose

The Charlotte OAPM Design Team concluded it is necessary to modify the existing OSPRI STAR to accommodate new procedures built within the CLT OAPM process. Two transitions were modified and one transition was added on the OSPRI STAR to accommodate these proposals and will realize an overall reduction in track miles, reduced level-offs, reduced delay vectoring, reduced task complexity and increase arrival efficiency.

Figure 1 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CHS STARs, North OSPRI

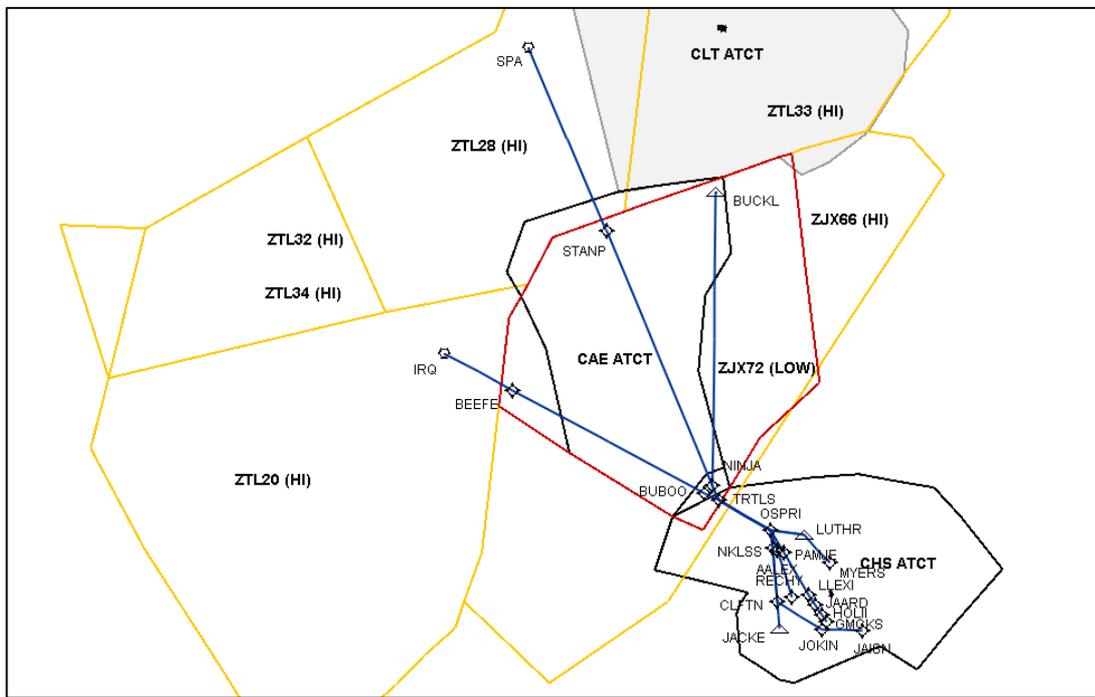


Figure 1. Original Procedure/Route/Airspace

### **Proposed Final Design**

The SPA/STANP transition was moved west (renamed the DEFFN transition) to reduce track miles for arrival traffic from MDW and to de-conflict traffic currently filed over the SPA VOR. The DEFFN transition allows for higher altitudes into the Jacksonville ARTCC airspace and facilitates greater optimization of CLT's JONZE, BANKR and CHPTR STARs. Additionally the new transition de-conflicts from CLT's ANDYS and ICONS SIDs.

The OBNEE transition was added to reduce track miles and provide a predictable route from the north/northeast.

The BUCKL transition was modified and renamed the UNJAM transition to accommodate the new CLT departures and ties directly into the CLT KWEEN SID.

The IRQ transition remains unchanged.

Figure 2 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CHS STARs, North OSPRI

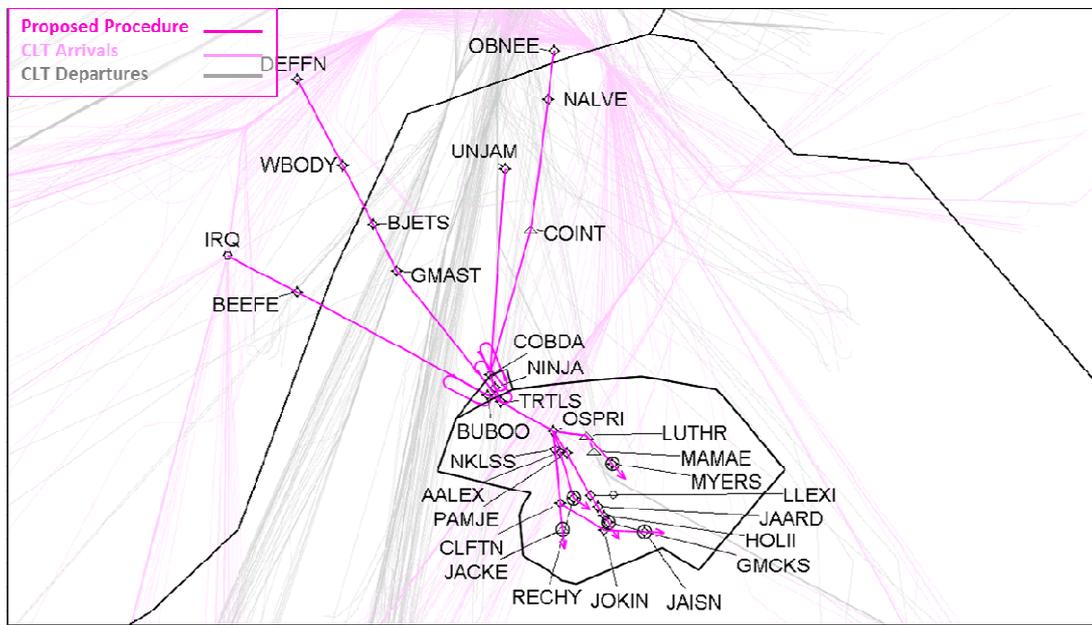


Figure 2. Proposed Final Design

### Additional Design Considerations

A Human-in-the-Loop Simulation validation was conducted during October 2012 and found this to be a viable procedure.

### Implementation Dependencies

- Coordination with Military Authority

Document changes/modifications include:

- Arrival STAR filings with airline dispatchers
- ZTL/CHS Letter of Agreement (LOA)
- ZTL Facility Operations and Administration Order 7230.2
- CHS ATCT Standard Operating Procedures (SOP)
- HOST/ERAM and ARTS/STARs Automation Changes (PDARS, PARS, Fix Pairs, etc.)
- National Route Program (NRP) Database
- Standard Instrument Approach Procedure (SIAP)
- Airport Facility Directory (AFD) Preferential Routings (Green Book)
- Information Display System (IDS)
- Enroute Information Display System (ERIDS)
- User Request Evaluation Tool (URET)

# CLT OAPM Design Package

CHS STARS, North OSPRI

## Attachments

- TRTLS TARGETS Distribution Package
- TRTLS RNAV PRO results
- TRTLS RNAV 7100-3
- TRTLS RNAV 7100-4
- TRTLS RNAV 8260.2 Worksheets

# CLT OAPM Design Package

CHS STARS, North TRTLS

OAPM Design Package Change Control Sheet			
Date	Description	FAA Co-Lead Initials	NATCA Co-Lead Initials
04/11/2013	<ul style="list-style-type: none"> <li>Added current date</li> <li>In Review Signatures Michael P. Richardson replaced Lyn Bertke; Roger Cerovsky replaced Joe Ricks</li> <li>Editorial changes</li> </ul>		
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05/21/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Amended proposed implementation date</li> <li>Editorial changes</li> </ul>		
06/24/2014	<ul style="list-style-type: none"> <li>Amended current date</li> <li>Changed Implementation Date</li> <li>Changed current to original</li> <li>Editorial changes</li> </ul>		
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# CLT OAPM Design Package

CHS STARs, North TRTLS

Name of Change	Date
<b>TRTLS ONE ARRIVAL (RNAV)</b>	<b>02 July 2014</b>
Change Classification	Current Phase of Design
<b>Terminal Procedure (RNAV STAR)</b>	<input type="checkbox"/> Preliminary Design (PD) <input type="checkbox"/> Operational Design (OD) <input type="checkbox"/> Operational Design Complete (ODC) <input type="checkbox"/> Proposed Final Design (PFD) <input checked="" type="checkbox"/> Final Design (FD)
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Related/Dependent Submissions	Associated Data Files
<b>N/A</b>	<b>Master TARGETS File</b>

## Purpose

The Design Team concluded it was necessary to modify the existing TRTLS STAR to accommodate new procedures built within the CLT OAPM process. Two transitions were modified and one transition was added on the TRTLS STAR to accommodate these proposals and will realize an overall reduction in track miles, reduced level-offs, reduced delay vectoring, reduced task complexity and increase arrival efficiency.

Figure 1 depicts the Original Procedure, Route and Airspace.

# CLT OAPM Design Package

## CHS STARs, North TRTLS

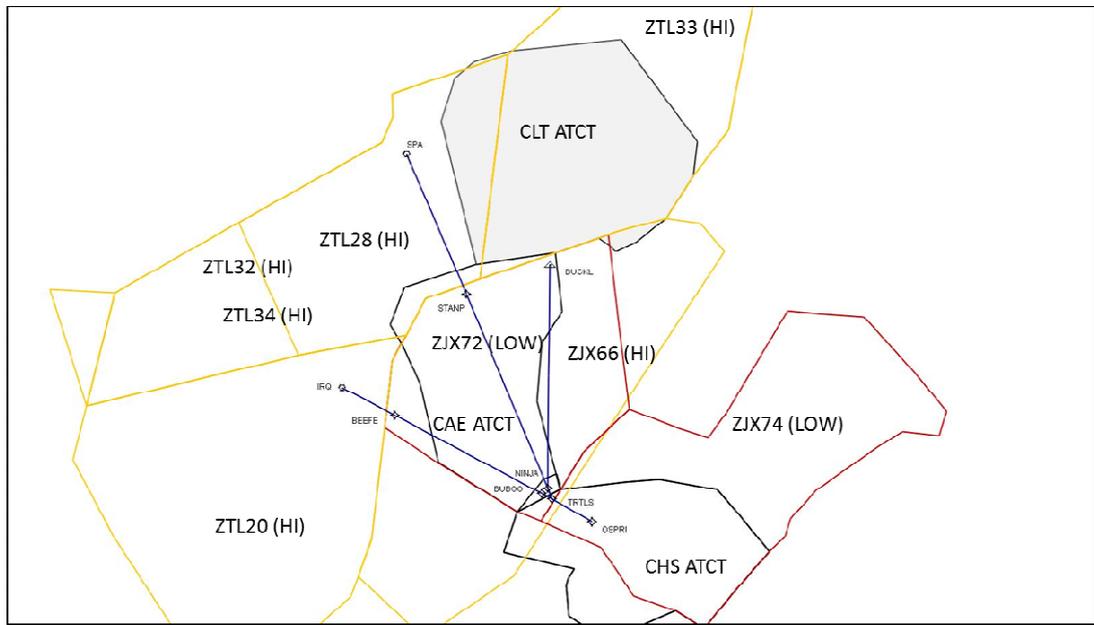


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The IRQ transition remains unchanged.

Figure 2 depicts the Proposed Final Design.

# CLT OAPM Design Package

## CHS STARs, North TRTLS

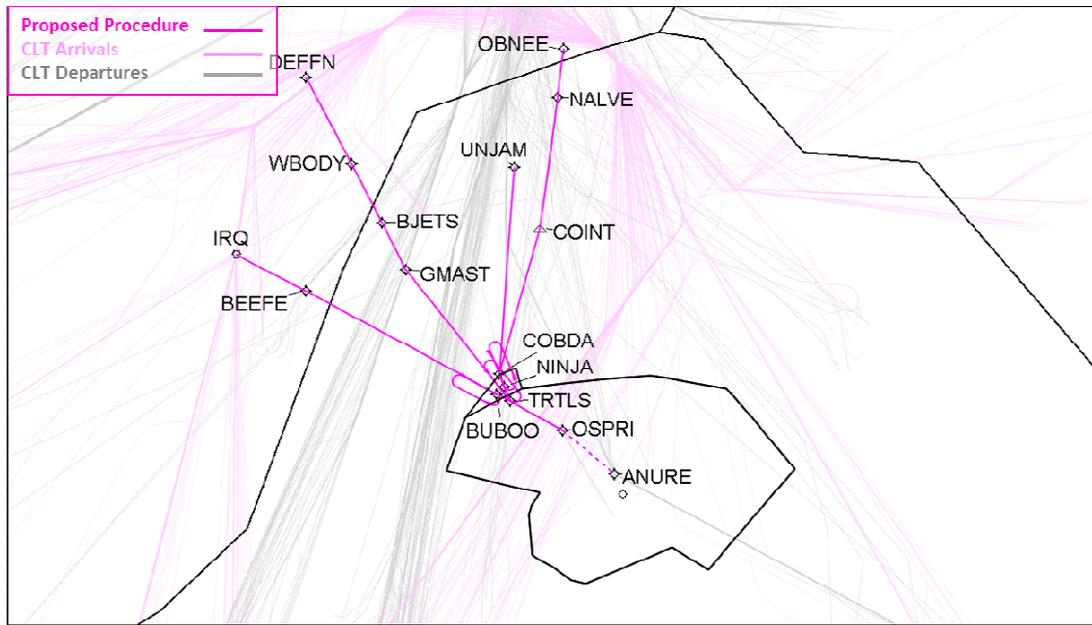


Figure 2. Proposed Final Design

### Additional Design Considerations

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### Implementation Dependencies

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# CLT OAPM Design Package

## CHS STARS, North TRTLS

### Attachments

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