Ms. Margaret Gilligan  
Associate Administrator for Aviation Safety  
Federal Aviation Administration  
800 Independence Avenue  
Washington, DC 20591  

Dear Peggy:

The Performance Based Aviation Rulemaking Committee (PARC) is pleased to submit the enclosed report entitled, *Constant Radius Arc to a Fix (RF) Navigation Leg Types in Public RNP Procedures.*

This brief report summarizes the tasking and activities of the PARC’s RNP Concepts and Benefits Action Team to support widespread use of the RF navigation leg type in RNP procedures that are not in the Approval Required (AR) arena. Previous to AC 90-105, *Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace System,* the RF leg type was restricted to AR procedures as defined in AC 90-101, *Approval Guidance for RNP Procedures with Special Aircrew and Aircraft Authorization Required.* AC 90-105 now provides guidance criteria for operators and equipment to utilize RNP procedures that are designed with the RF leg type. Additionally, FAA Order 8260.54A, *The United States Standard for Area Navigation (RNAV),* provides criteria for RNAV procedure design, including the use of RF legs in the designs. Subsequently, the manager of AFS-470, Performance Based Flight Systems Branch, recommended that the PARC research the utility of RF legs for procedures that would provide benefit to a greater segment of the aviation community and then identify candidate locations for the initial approvals.

The benefits of a fixed radius leg with a defined ground path have been substantiated in the many AR procedures currently in operation. In fact, the RF leg contributes to one or more of the Performance Based Navigation (PBN) benefits (Safety, Capacity, Operating Efficiency, Environmental, Financial) in each of the designs in which it is used. The procedure at Attachment 1 of the report is the first submission for an RNAV (GPS) instrument approach procedure (IAP) that contains RF legs in the intermediate segment. The proposed procedure is the Savannah / Hilton Head International Airport RNAV (GPS) X Rwy 28. Note that the intermediate segments provide for an efficient transition to the final approach segment from either the north or south. The primary benefits of this procedure are environmental (avoids noise sensitive areas), financial and efficiency (reduced fuel burn and emissions).

Following Savannah, procedures at the following locations will be submitted:

- Frederick, MD  
  General Aviation
- Teterboro, NJ  
  Business Jet
- Manhattan NY Heliport  
  Helicopter
- Fargo, ND  
  Standard Terminal Arrival (STAR), Regionals
- Boston, MA  
  Regionals
Note that each location addresses a specific aviation sector. Following these locations, it is hoped that subsequent procedures will be implemented to leverage the benefits of the RF leg type.

It is important to note that an IAP approval process obviously already exists. However, AFS-470 and AJR-37 believe that there are questions on operator qualifications and appropriate equipage for these procedures that are yet to be fully resolved. Therefore, these initial procedures with RF legs will be submitted directly to the ATO RNAV and RNP Office for initial coordination. Subsequently, the procedures are designed to both introduce the capability in the NAS and also exercise the FAA’s IAP approval process for such procedures.

The PARC appreciates your continued support of our activities and invites you to join us in a discussion of these recommendations at your convenience. Please call me if you have any questions or would like to set up a briefing on the subject.

Sincerely,

Dave Nakamura
Chairman, PARC

cc: J. Hickey
    J. McGraw
    B. DeCleene
    J. McCarthy
    S. Miller
CONSTANT RADIUS ARC TO A FIX (RF) NAVIGATION LEG TYPES IN PUBLIC RNP PROCEDURES

RNP Concepts and Benefits Action Team

September 2010
Introduction

Special Aircrew and Aircraft Authorization Required (SAAAR) procedures have been in existence for some time now and many have incorporated the Constant Radius ARC to a Fix (RF) navigation leg into the procedure design. RTCA DO-236B, Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation, defines the RF leg as a “constant radius circular path about a defined turn center that terminates at a fix.” Unlike the DME ARC, the RF leg is computed around a fix (lat/long) and does not require a ground-based navaid such as the DME. Modern area navigation systems can compute the radius and track the curved path with the same accuracy as the straight leg types. Subsequently, the RF leg provides the procedure designer with the capability to define a curved ground track that can avoid environmentally sensitive areas or terrain, or enhance operational efficiency and capacity. Previous to AC 90-105, Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace System, the RF leg type was restricted to AR procedures as defined in AC 90-101, Approval Guidance for RNP Procedures with Special Aircrew and Aircraft Authorization Required. AC 90-105 now provides guidance criteria for operators and equipment to utilize RNP procedures that are designed with the RF leg type. Additionally, FAA Order 8260.54A, The United States Standard for Area Navigation (RNAV), provides criteria for RNAV procedure design, including the use of RF legs in the designs. At this time, however, no public procedures with RF legs have been approved under the AC 90-105 criteria.

Purpose and Scope

The PARC was tasked by the Manager, Performance Based Flight Systems Branch AFS-470, to research the utility of RF legs for procedures that would provide benefit to a greater segment of the aviation community and then identify candidate locations for the initial approvals. The recommendation to use of RF legs in public procedures was also noted in the RTCA NextGen Mid-Term Implementation Taskforce (Taskforce 5) to deconflict arrivals to closely spaced airports and also to realize the PBN efficiencies for single as well as parallel runway operations. The PARC’s RNP Concepts and Benefits Action Team quickly determined that the benefits of the RF leg type could easily be utilized in public RNP procedures, and specifically procedures which do not require an AR approval. The task was then to identify a small number of locations that would benefit from such a procedure while concurrently introducing the capability to various aviation sectors (GA, business, helicopter, etc.). The action team also accepted the responsibility to conduct the preliminary procedure design work for each location, provide that submission to the FAA, and then support the FAA through the approval process for the initial approvals.
Benefits

The benefits of the RF leg type are well known as a result of operational experience with the existing AR procedures. When incorporated in an RNP procedure design, an RF leg is capable of contributing significant benefit in terms of Safety, Capacity, Operating Efficiency, Environmental and Financial. No other navigation leg type provides the design flexibility to safely avoid obstacles or noise-sensitive areas while concurrently enhancing airplane performance by reducing track miles flown. In addition to AR and now public RNP procedures, the RF leg type is being considered for other applications such as the FMS visuals (at several locations), independent and dependent parallel operations, and the Greener Skies Initiative at Seattle, among others.

Recommendation

1. Begin implementing public RNP procedures which incorporate RF legs in the design.

The procedure at Attachment 1 of this report is the first submission for an RNAV (GPS) instrument approach procedure (IAP) that contains RF legs. The procedure is the Savannah / Hilton Head International Airport RNAV (GPS) X Rwy 28. The primary benefits of this procedure are environmental (avoids noise sensitive areas), financial and efficiency (reduced fuel burn and emissions).

Following Savannah, approach procedures at the following locations will be submitted by the action team. Note that each location is specifically targeted to provide benefit for that location while concurrently introducing the RF capability to a different aviation sector.

Frederick, MD General Aviation
Teterboro, NJ Business Jet
Manhattan NY Heliport Helicopter
Fargo, ND Regionals (Standard Terminal Arrival - STAR
Boston, MA Regionals

Since the major US operators are already well aware of the benefits of the RF leg, specifically the RNP operators, it is expected that they will also consider such procedures following this initial approval, particularly where efficiencies can be gained.

It is important to note that these initial procedures will be submitted directly to the ATO RNAV and RNP office as opposed to the normal IAP submission process. As sponsors for this effort, AFS-470 and AJR-37 want to ensure that appropriate operator and equipment approvals are in effect and any additional charting requirements (if necessary) are considered prior to implementation into the normal IAP process.
Performance-based Operations
Aviation Rulemaking Committee
RNP Benefits Action Team

Proposal for
RNAV (GPS) X Rwy 28

September 8, 2010
Overview

The Performance-based Operations Aviation Rulemaking Committee (PARC), Required Navigation Performance (RNP) Concepts and Benefits Action Team, was tasked by FAA AFS-470 to investigate the benefits of incorporating Constant Radius Arc to a Fix (RF) navigation leg types in RNP procedures that did not require special approval (e.g., AC 90-101, Approval Guidance for RNP Procedures with Special Aircrew and Aircraft Authorization Required). Since some flight management systems (FMS) are not capable of computing an RF leg turn center and radius, the leg type had previously been implemented only in Approval Required (AR) procedures. However, AC 90-105, Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace System, provided guidance on equipment and aircrew eligibility for operating RNP procedures that contained RF legs. Until this submission, no procedures have been approved using the AC 90-105 criteria.

The benefits of the RF leg type are well known. When incorporated in an RNP procedure design, an RF leg is capable of contributing benefit to the procedure through:

- Safety
- Capacity
- Operating Efficiency
- Environmental
- Financial

The primary benefits for this proposed RNAV (GPS) procedure at Savannah are environmental (avoids noise sensitive areas), efficiency and financial (reduced fuel burn and emissions).

The required submission forms for the IAP consideration are attached. The PARC RNP Concepts and Benefits Action Team wishes to recognize Jeppesen Inc. for their assistance with the procedure design and required forms.

Attachments:

A. KSAV RNAV GPS X RWY 28
B. RNAV X 28 8260-3
C. RNAV X 28 8260-9 PG1
D. RNAV X 28 8260-9 PG2
E. RNAV X 28 8260-10
F. RADIO FIX AND HOLDING DATA RECORD - ATEYO
G. RADIO FIX AND HOLDING DATA RECORD - CARIK
H. RADIO FIX AND HOLDING DATA RECORD - CFJVS
I. RADIO FIX AND HOLDING DATA RECORD - DUCAN
J. RADIO FIX AND HOLDING DATA RECORD - FEXEM
K. RADIO FIX AND HOLDING DATA RECORD - FFMGN
L. RADIO FIX AND HOLDING DATA RECORD - GRILO
M. RADIO FIX AND HOLDING DATA RECORD - HANGI
N. RADIO FIX AND HOLDING DATA RECORD - HOTAN
O. RADIO FIX AND HOLDING DATA RECORD - MAYAR
P. RADIO FIX AND HOLDING DATA RECORD - MODAE
Q. RADIO FIX AND HOLDING DATA RECORD - KELER
R. RADIO FIX AND HOLDING DATA RECORD - OSANE
S. RADIO FIX AND HOLDING DATA RECORD - RLENE
T. RADIO FIX AND HOLDING DATA RECORD - TYBEE
U. RADIO FIX AND HOLDING DATA RECORD - UCETA
V. RADIO FIX AND HOLDING DATA RECORD - ZELGI
Atch A

KSAV RNAV GPS X RWY 28

---

Atch A

KSAV/SAV
SAVANNAH/HILTON HEAD INTL
DRAFT
RAVVN/Approach, R.
JAX Center
SAVANNAH Tower
FNS - 202

Final Apch Cre
Minimum Alt
OSANE
OSANE (Da) (Conditions)
Apr Elev 50'
RW28 46'

MISSAP: Climb to 2500' on 277° track to HANGI and hold.

Atch A

Procedure not authorized for arrivals at MAYAK on V154 northwest bound.

Procedure not authorized for arrivals at KELEN on VAS644 southbound.

INAV only.

RW28 1.7 NM to RW28

TCH 55'

RW28 46'

Ground speed-Kts
70 90 120 160 200
Mach
7.4 3.4 2.0 7.4

MAP at RW28

Straight-in Landing RWY 28

With Local Altimeter Setting

DAH

LNAV

DAM

DAH

LNAV

246° (300°)

302' (256')

640' (594')

1

1/4

1/2

1/3/4

163

700' (650')

1

1/2

1/3/4

163

720' (670°)

1

1/2

1/3/4

163

780' (730')

1/4

Changes: New procedure.

Draft Copy Only

R. Jeppesen, 2015. All rights reserved.
### Terminal Routes

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1. DIST TO THLD FROM OM: MM: IM: 150 HAT: 100 HAT: GS AN: OM: MM: IM: |
2. GS ANGLE: 3.00 | TCH: 52.0 | 34:1 IS CLEAR |
3. DIST FAF TO MAP: 5.34 | THLD: 5.34 |
4. MIN ALT: DUCAN 2006, OSANE 1800 |
5. MIN GS INCPT: 1800 | GS ALT AT: OSANE 1800 |
6. MIN GS AN: 3.00 | TCH: 52.0 |
7. GS ANGLE: 3.00 | TCH: 52.0 |
8. MIN MSA FROM RWY 28 2500 |

### Minimums

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### Notes
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- CHART NOTE: FOR UNCOMPENSATED BARO-VNAV SYSTEMS, PROCEDURE NA BELOW -6C (22F) OR ABOVE 45C (120F).
- CHART NOTE: WHEN LOCAL ALTIMETER SETTING NOT RECEIVED, USE HILTON HEAD ISLAND, SC, ALTIMETER SETTING AND INCREASE ALL DA 60 FEET AND ALL MDA 80 FEET AND LNAVNAV ALL CATS. LNAV CATS C/D, AND CIRCLING CATS C/D VISIBILITIES 1/4 MILE.
- CHART PLAN VIEW NOTE: PROCEDURE NA FOR ARRIVALS AT TBYE ON V1; SOUTHBOUND AND AT KELER ON V137-441 SOUTHBOUND AND AT MAYAR ON V154 NORTHWEST BOUND.
- SAVANNAH, GA
- AIRPORT NAME: SAVANNAH/HILTON HEAD INTL
- ID: RNAV
- PROCEDURE NO./AMDT NO./EFFECTIVE DATE: RCNAV (GP) X RWY 28, ORIG.
- ELEVATION: 102
- TOC: RWY 28
- AMDT: NONE
- DATED: April 2006

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**NOTES (CONT'D)**

- CHART PLANVIEW NOTE AT RLENE, ATEYO, UCETA, ZELGI: RF REQUIRED.
- CHART PLANVIEW NOTE AT HOTAN, GRIL, CARIK, MODAE: MAX 200 KIAS.
- CHART PLANVIEW NOTE: RADAR REQUIRED FOR ARRIVALS FROM UCETA AND FEXEM.
RADIO FIX AND HOLDING DATA RECORD

NAME: ATEYO
STATE: GA
COUNTRY: US

LATITUDE/LONGITUDE: 320227.59N/0805803.65W
TYPE: WP

AIRSPACE DOCKET:
FIX TYPE OF ACTION: NO CHANGE

FIX USE:
USE TYPE | USE TITLE       | FAC | PAT | AIRPORT IDENT | CITY     | STATE
---------|-----------------|-----|-----|----------------|----------|------
IAP      | RNAV (RNP) Y RWY 28 |     |     | KSAV          | SAVANNAH | GA
IAP      | RNAV (GPS) X RWY 28 |     |     | KSAV          | SAVANNAH | GA

REQUIRED CHARTING: IAP

COMPULSORY REPORTING POINT: NO

RECORD REVISION NUMBER: 1
DATE OF REVISION: xxxxxxx
REASON FOR REVISION: ADDED IAP KSAV RNAV (GPS) X RWY 28

ATC COORDINATION:
DATE: 1/29/2009
FACILITY: SAV ATCT
NAME: David Bretherick

INITIATED BY:
DATE: 5/26/2009
ORGANIZATION: JEPPESEN
NAME: JAY S. ROGERS

DEVELOPED BY:
DATE: 5/26/2009
OFFICE: JEPPESEN
NAME: JAY S. ROGERS

AVN APPROVAL:
DATE: 6/22/2009
OFFICE: JEPPESEN
NAME: JEFF BRUCE

SIGNATURE:

DISTRIBUTION: NFDC
FIFO
FPO:
ARTCC:
ATC FACILITY:
OTHER:
### RADIO FIX AND HOLDING DATA RECORD

**NAME:** CARIK  
**STATE:** SC  
**COUNTRY:** US

**LATITUDE/LONGITUDE:** 321042.21N/0805819.05W  
**TYPE:** WP

**AIRSPACE DOCKET:**  
**FIX TYPE OF ACTION:** NO CHANGE

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**REQUIRED CHARTING:** IAP  
**COMPULSORY REPORTING POINT:** NO  
**RECORD REVISION NUMBER:** 1  
**DATE OF REVISION:** xxxxx  
**REASON FOR REVISION:** ADDED IAP KSAV RNAV (GPS) X RWY 28

**ATC COORDINATION:**  
**DATE:** 1/29/2009  
**FACILITY:** SAV ATCT  
**NAME:** David Bretherick

**INITIATED BY:**  
**DATE:** 5/26/2009  
**ORGANIZATION:** JEPPESEN  
**NAME:** JAY S. ROGERS

**DEVELOPED BY:**  
**DATE:** 5/26/2009  
**OFFICE:** JEPPESEN  
**NAME:** JAY S. ROGERS

**AVN APPROVAL:**  
**DATE:** 6/22/2009  
**OFFICE:** JEPPESEN  
**NAME:** JEFF BRUCE

**SIGNATURE:**

**DISTRIBUTION:** NFDC  
FIFO  
FPO:
ARTCC:
ATC FACILITY:
OTHER:
RADIO FIX AND HOLDING DATA RECORD

NAME: CFJVS
STATE: SC
COUNTRY: US

LATITUDE/LONGITUDE: 321119.78N/0810236.85W

AIRSPACE DOCKET: 

FIX TYPE OF ACTION: NO CHANGE

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REQUIRED CHARTING: NO

COMPULSORY REPORTING POINT: NO

RECORD REVISION NUMBER: 1
DATE OF REVISION: xxxxx

REASON FOR REVISION: ADDED IAP KSAV RNAV (GPS) X RWY 28

ATC COORDINATION: 
DATE: 1/29/2009 
FACILITY: SAV ATCT

INITIATED BY: 
DATE: 5/26/2009 
ORGANIZATION: JEPPESEN

DEVELOPED BY: 
DATE: 5/26/2009 
OFFICE: JEPPESEN

AVN APPROVAL: 
DATE: 6/22/2009 
OFFICE: JEPPESEN

SIGNATURE:

DISTRIBUTION: NFDC 
FIFO

FPO:
ARTCC:
ATC FACILITY:
OTHER:
RADIO FIX AND HOLDING DATA RECORD

NAME: DUCAN  
STATE: SC  
COUNTRY: US

LATITUDE/LONGITUDE: 320737.36N/0810240.08W  
TYPE: WP

AIRSPACE DOCKET:  
FIX TYPE OF ACTION: NO CHANGE

FIX USE:  
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IAP  RNAV (RNP) Y RWY 28  KSAV  SAVANNAH  GA
IAP  RNAV (GPS) X RWY 28  KSAV  SAVANNAH  GA

REQUIRED CHARTING: IAP

COMPULSORY REPORTING POINT: NO

RECORD REVISION NUMBER: 1  
DATE OF REVISION: xxxxx

REASON FOR REVISION: ADDED IAP KSAV RNAV (GPS) X RWY 28

ATC COORDINATION:  
DATE: 1/29/2009  
FACILITY: SAV ATCT  
NAME: David Bretherick

INITIATED BY:  
DATE: 5/26/2009  
ORGANIZATION: JEPPESEN  
NAME: JAY S. ROGERS

DEVELOPED BY:  
DATE: 5/26/2009  
OFFICE: JEPPESEN  
NAME: JAY S. ROGERS

AVN APPROVAL:  
DATE: 6/22/2009  
OFFICE: JEPPESEN  
NAME: JEFF BRUCE

SIGNATURE:

DISTRIBUTION: NFDC  
FIFO  
FPO:  
ARTCC:  
ATC FACILITY:  
OTHER:
RADIO FIX AND HOLDING DATA RECORD

NAME: FEXEM
STATE: SC
COUNTRY: US

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TYPE: WP

AIRSPACE DOCKET:
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REQUIRED CHARTING: IAP

COMPULSORY REPORTING POINT: NO

RECORD REVISION NUMBER: 1
DATE OF REVISION: xxxx

REASON FOR REVISION: ADDED IAP KSAV RNAV (GPS) X RWY 28

ATC COORDINATION: DATE: 1/29/2009
FACILITY: SAV ATCT
NAME: David Bretherick

INITIATED BY: DATE: 5/26/2009
ORGANIZATION: JEPPESEN
NAME: JAY S. ROGERS

DEVELOPED BY: DATE: 5/26/2009
OFFICE: JEPPESEN
NAME: JAY S. ROGERS

OFFICE: JEPPESEN
NAME: JEFF BRUCE

SIGNATURE:

DISTRIBUTION: NFDC
FIFO
FPO:
ARTCC:
ATC FACILITY:
OTHER:
RADIO FIX AND HOLDING DATA RECORD

NAME: FFMGN
STATE: GA
COUNTRY: US

LATITUDE/LONGITUDE: 320354.93N/0810243.30W

AIRSPACE DOCKET:

FIX TYPE OF ACTION: NO CHANGE

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REQUIRED CHARTING: NO

COMPULSORY REPORTING POINT: NO

RECORD REVISION NUMBER: 1
DATE OF REVISION: xxxxxxx

REASON FOR REVISION: ADDED IAP KSAV RNAV (GPS) X RWY 28

ATC COORDINATION: DATE: 1/29/2009
FACILITY: SAV ATCT
NAME: David Bretherick

INITIATED BY: DATE: 5/26/2009
ORGANIZATION: JEPPESSEN
NAME: JAY S. ROGERS

DEVELOPED BY: DATE: 5/26/2009
OFFICE: JEPPESSEN
NAME: JAY S. ROGERS

OFFICE: JEPPESSEN
NAME: JEFF BRUCE

SIGNATURE:

DISTRIBUTION: NFDC
FIFO
FPO:
ARTCC:
ATC FACILITY:
OTHER:
**RADIO FIX AND HOLDING DATA RECORD**

**NAME:** GRILO  
**STATE:** GA  
**COUNTRY:** US  

**LATITUDE/LONGITUDE:** 32°04'27.94"N/080°58'24.96"W  
**TYPE:** WP  

**AIRSPACE DOCKET:**  
**FIX TYPE OF ACTION:** NO CHANGE  

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**REQUIRED CHARTING:** IAP  
**COMPULSORY REPORTING POINT:** NO  
**RECORD REVISION NUMBER:** 1  
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**REASON FOR REVISION:** ADDED IAP KSAV RNAV (GPS) X RWY 28

**ATC COORDINATION:**  
**DATE:** 1/29/2009  
**FACILITY:** SAV ATCT  
**NAME:** David Bretherick  

**INITIATED BY:**  
**DATE:** 5/26/2009  
**ORGANIZATION:** JEPPESEN  
**NAME:** JAY S. ROGERS  

**DEVELOPED BY:**  
**DATE:** 5/26/2009  
**OFFICE:** JEPPESEN  
**NAME:** JAY S. ROGERS  

**AVN APPROVAL:**  
**DATE:** 6/22/2009  
**OFFICE:** JEPPESEN  
**NAME:** JEFF BRUCE

**SIGNATURE:**

**DISTRIBUTION:** NFDC  
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**FPO:**  
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**OTHER:**
**RADIO FIX AND HOLDING DATA RECORD**

- **NAME:** HANGI
- **STATE:** GA
- **COUNTRY:** US
- **LATITUDE/LONGITUDE:** 320750.55N/0812728.21W
- **TYPE:** WP
- **AIRSPACE DOCKET:**
- **FIX TYPE OF ACTION:** MODIFY
- **HOLDING:**
- **HOLDING TYPE OF ACTION:** NO CHANGE

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### REQUIRED CHARTING:

- IAP

### COMPULSORY REPORTING POINT:

- NO

### RECORD REVISION NUMBER:

- 1

### DATE OF REVISION:

- xxxxx

### REASON FOR REVISION:

- ADDED IAP KSAV RNAV (GPS) X RWY 28

### ATC COORDINATION:

- **DATE:** 1/29/2009
- **FACILITY:** SAV ATCT
- **NAME:** David Bretherick

### INITIATED BY:

- **DATE:** 5/26/2009
- **ORGANIZATION:** JEPPESSEN
- **NAME:** JAY S. ROGERS

### DEVELOPED BY:

- **DATE:** 5/26/2009
- **OFFICE:** JEPPESSEN
- **NAME:** JAY S. ROGERS

### AVN APPROVAL:

- **DATE:** 6/22/2009
- **OFFICE:** JEPPESSEN
- **NAME:** JEFF BRUCE

### DISTRIBUTION:

- NFDC
- FIFO
- FPO:
- ARTCC:
- ATC FACILITY:
- OTHER:
### RADIO FIX AND HOLDING DATA RECORD

**NAME:** HOTAN  
**STATE:** GA  
**COUNTRY:** US  

**LATITUDE/LONGITUDE:** 32°00′45.52″N/081°00′26.37″W  
**TYPE:** WP  

**AIRSPACE DOCKET:**  
**FIX TYPE OF ACTION:** NO CHANGE  

**FIX USE:**  
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**REQUIRED CHARTING:** IAP  

**COMPULSORY REPORTING POINT:** NO  

**RECORD REVISION NUMBER:** 1  
**DATE OF REVISION:** xxxxxx  
**REASON FOR REVISION:** ADDED IAP KSAV RNAV (GPS) X RWY 28

**ATC COORDINATION:**  
**DATE:** 1/29/2009  
**FACILITY:** SAV ATCT  
**NAME:** David Bretherick

**INITIATED BY:**  
**DATE:** 5/26/2009  
**ORGANIZATION:** JEPPESEN  
**NAME:** JAY S. ROGERS

**DEVELOPED BY:**  
**DATE:** 5/26/2009  
**OFFICE:** JEPPESEN  
**NAME:** JAY S. ROGERS

**AVN APPROVAL:**  
**DATE:** 6/22/2009  
**OFFICE:** JEPPESEN  
**NAME:** JEFF BRUCE

**SIGNATURE:**

**DISTRIBUTION:** NFDC  
FIFO  
FPO:  
ARTCC:  
ATC FACILITY:  
OTHER:
**RADIO FIX AND HOLDING DATA RECORD**

**NAME:** MAYAR  
**STATE:** GA  
**COUNTRY:** US

**LATITUDE/LONGITUDE:** 321438.62N/0813203.96W  
**TYPE:** INT, DME

**AIRSPACE DOCKET:**  
**FIX TYPE OF ACTION:** NO CHANGE

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**REQUIRED CHARTING:** MILITARY IAP, IAP, CONTROLLER, EN ROUTE LOW

**COMPULSORY REPORTING POINT:** NO

**RECORD REVISION NUMBER:** 12  
**DATE OF REVISION:** xxxxxx

**REASON FOR REVISION:** ADDED IAP KSAV RNAV (GPS) X RWY 28

**DEVELOPED BY:**  
**DATE:** 10/24/2008  
**OFFICE:** AVN-140  
**NAME:** BRIAN BERUBEE

**NFPO APPROVAL:**  
**DATE:** 04/13/2009  
**OFFICE:** AVN-140  
**NAME:** PETER GETZ

**SIGNATURE:**

**DISTRIBUTION:** NFDC  
**FPO:** ATL  
**ARTCC:** ZJX  
**ATC FACILITY:** SAV APP CON  
**OTHER:** USAASA
### RADIO FIX AND HOLDING DATA RECORD

**NAME:** MODAE  
**STATE:** SC  
**COUNTRY:** US

**LATITUDE/LONGITUDE:** 321502.20N/0810240.38W  
**TYPE:** WP

**AIRSPACE DOCKET:**  
**FIX TYPE OF ACTION:** NO CHANGE

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**REQUIRED CHARTING:** IAP  
**COMPULSORY REPORTING POINT:** NO  
**RECORD REVISION NUMBER:** 1  
**DATE OF REVISION:** xxxxxxx  
**REASON FOR REVISION:** ADDED IAP KSAV RNAV (GPS) X RWY 28

**ATC COORDINATION:**  
**DATE:** 1/29/2009  
**FACILITY:** SAV ATCT  
**NAME:** David Bretherick

**INITIATED BY:**  
**DATE:** 5/26/2009  
**ORGANIZATION:** JEPPESEN  
**NAME:** JAY S. ROGERS

**DEVELOPED BY:**  
**DATE:** 5/26/2009  
**OFFICE:** JEPPESEN  
**NAME:** JAY S. ROGERS

**AVN APPROVAL:**  
**DATE:** 6/22/2009  
**OFFICE:** JEPPESEN  
**NAME:** JEFF BRUCE

**SIGNATURE:**

**DISTRIBUTION:** NFDC  
FIFO  
FPO:  
ARTCC:  
ATC FACILITY:  
OTHER:
RADIO FIX AND HOLDING DATA RECORD

NAME: KELER
STATE: GA
COUNTRY: US

LATITUDE/LONGITUDE: 315507.40N/0811109.14W
TYPE: DME

AIRSPACE DOCKET:
FIX TYPE OF ACTION: NO CHANGE

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HOLDING:
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CONTROLLING OBSTRUCTIONS:

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REMARKS:
HOLDING LIMITED TO ESTABLISHED PATTERN.

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REQUIRED CHARTING: MILITARY IAP, IAP, CONTROLLER, EN ROUTE LOW

COMPULSORY REPORTING POINT: NO

RECORD REVISION NUMBER: 8
DATE OF REVISION: xxxxxx

REASON FOR REVISION: ADDED IAP KSAV RNAV (GPS) X RWY 28

DEVELOPED BY: DATE: 05/19/2005 OFFICE: AVN-110 NAME: DAVID DOWLING

NFPO APPROVAL: DATE: OFFICE: AVN-110 NAME:

SIGNATURE:

 DISTRIBUTION: NFDC
FPO: ATL
 ARTCC: ZJX
 ATC FACILITY: SAV APP CON
OTHER:
RADIO FIX AND HOLDING DATA RECORD

NAME: OSANE  STATE: SC  COUNTRY: US

LATITUDE/LONGITUDE: 32.0738.82N/081.0501.38W  TYPE: WP

AIRSPACE DOCKET:  FIX TYPE OF ACTION: NO CHANGE

FIX USE:

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REQUIRED CHARTING: IAP

COMPULSORY REPORTING POINT: NO

RECORD REVISION NUMBER: 1  DATE OF REVISION: 5/26/2009

REASON FOR REVISION: ADDED IAP KSAV RNAV (GPS) X RWY 28

ATC COORDINATION:  DATE: 1/29/2009  FACILITY: SAV ATCT  NAME: David Bretherick


SIGNATURE:

DISTRIBUTION: NFDC  FIFO  FPO:  ARTCC:  ATC FACILITY:  OTHER:
RADIO FIX AND HOLDING DATA RECORD

NAME: RLENE
STATE: GA
COUNTRY: US

LATITUDE/LONGITUDE: 315823.53N/0810456.63W
TYPE: WP

AIRSPACE DOCKET: NO CHANGE

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REQUIRED CHARTING: IAP

COMPULSORY REPORTING POINT: NO

RECORD REVISION NUMBER: 1
DATE OF REVISION: xxxxxx
REASON FOR REVISION: ADDED IAP KSAV RNAV (GPS) X RWY 28

ATC COORDINATION: DATE: 1/29/2009
FACILITY: SAV ATCT
NAME: David Bretherick

INITIATED BY: DATE: 5/26/2009
ORGANIZATION: JEPPESEN
NAME: JAY S. ROGERS

DEVELOPED BY: DATE: 5/26/2009
OFFICE: JEPPESEN
NAME: JAY S. ROGERS

OFFICE: JEPPESEN
NAME: JEFF BRUCE

SIGNATURE:

DISTRIBUTION: NFDC
FIFO
FPO:
ARTCC:
ATC FACILITY:
OTHER:
**RADIO FIX AND HOLDING DATA RECORD**

**NAME:** TYBEE  
**STATE:** GA  
**COUNTRY:** US  

**LATITUDE/LONGITUDE:** 315017.02N/0805212.82W  
**TYPE:** DME  

**AIRSPACE DOCKET:**  
**FIX TYPE OF ACTION:** NO CHANGE  

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<td>VORTAC</td>
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<td>95.61</td>
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**EXPANDED SERVICE VOLUME (ESV):**

FAC IDENT FAC TYPE RADIAL/BEARING DISTANCE MIN ALTITUDE MAX ALTITUDE  
ON FILE FOR CRG AND CHS.  

**REMARKS:**

FIX COLLOCATED AT DOGLEG COP.  

### FIX USE:

**USE TYPE** | **USE TITLE** | **FAC** | **PAT** | **AIRPORT IDENT** | **CITY** | **STATE** (US) |
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**REQUIRED CHARTING:** CONTROLLER, EN ROUTE LOW  
**COMPULSORY REPORTING POINT:** NO  

**RECORD REVISION NUMBER:** 1  
**DATE OF REVISION:** xxxxxxxx  

**REASON FOR REVISION:** ADDED IAP KSAV RNAV (GPS) X RWY 28  

**DEVELOPED BY:**  
**DATE:** 07/10/1996  
**OFFICE:** AVN-150  
**NAME:** GENE DOSER  

**NFPO APPROVAL:**  
**DATE:** 07/11/1996  
**OFFICE:** AVN-150  
**NAME:**  

**SIGNATURE:**  

**DISTRIBUTION:** NFDC  
**FPO:** ATL  
**ARTCC:** ZJX  
**ATC FACILITY:** OTHER:
RADIO FIX AND HOLDING DATA RECORD

NAME: UCETA
STATE: SC
COUNTRY: US

LATITUDE/LONGITUDE: 321241.41N/0805755.13W
TYPE: WP

AIRSPACE DOCKET: NO CHANGE

FIX USE:
- USE TYPE: IAP
- USE TITLE: RNAV (RNP) Y RWY 28
- FAC: KSAV
- PAT: SAVANNAH
- AIRPORT IDENT: GA
- CITY: SAVANNAH
- STATE: GA

REQUIRED CHARTING: IAP

COMPULSORY REPORTING POINT: NO

RECORD REVISION NUMBER: 1
DATE OF REVISION: xxxx
REASON FOR REVISION: ADDED IAP KSAV RNAV (GPS) X RWY 28

ATC COORDINATION: DATE: 1/29/2009
FACILITY: SAV ATCT
NAME: David Bretherick

INITIATED BY: DATE: 5/26/2009
ORGANIZATION: JEPPESEN
NAME: JAY S. ROGERS

DEVELOPED BY: DATE: 5/26/2009
OFFICE: JEPPESEN
NAME: JAY S. ROGERS

OFFICE: JEPPESEN
NAME: JEFF BRUCE

SIGNATURE:

DISTRIBUTION: NFDC
FIFO
FPO:
ARTCC:
ATC FACILITY:
OTHER:
RADIO FIX AND HOLDING DATA RECORD

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**REQUIRED CHARTING:** IAP

**COMPULSORY REPORTING POINT:** NO

**RECORD REVISION NUMBER:** 1 **DATE OF REVISION:** xxxxxx

**REASON FOR REVISION:** ADDED IAP KSAV RNAV (GPS) X RWY 28

**ATC COORDINATION:** DATE: 1/29/2009 FACILITY: SAV ATCT NAME: David Bretherick

**INITIATED BY:** DATE: 5/26/2009 ORGANIZATION: JEPPESEN NAME: JAY S. ROGERS

**DEVELOPED BY:** DATE: 5/26/2009 OFFICE: JEPPESEN NAME: JAY S. ROGERS

**AVN APPROVAL:** DATE: 6/22/2009 OFFICE: JEPPESEN NAME: JEFF BRUCE

**SIGNATURE:**

**DISTRIBUTION:** NFDC FIFO FPO: ARTCC: ATC FACILITY: OTHER: