Procedures for Air Navigation Services (Pans-Ops)

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Standards and recommended practices of ICAO

Design and promulgation of instrument procedures

ICAO documentation

- Doc. 8168, Vol. I and Vol. II
- Annex 15 (AIS / AIM)
- Annex 4 (Aeronautical Charts)
- Annex 10 (Aeronautical Telecommunications)
- Annex 11 (Air Traffic Services)
- Annex 14 (aerodromes)
- WGS-84 (Doc. 9674) Manual, eTOD Manual (Doc. 9881), Documents
- quality (Doc. 9839), Aeronautical Chart Manual (Doc. 8697), and
- Other Related Manuals

GENERAL INFORMATION

Procedures for **A**ir **N**avigation **S**ervices and **Op**erations**s**

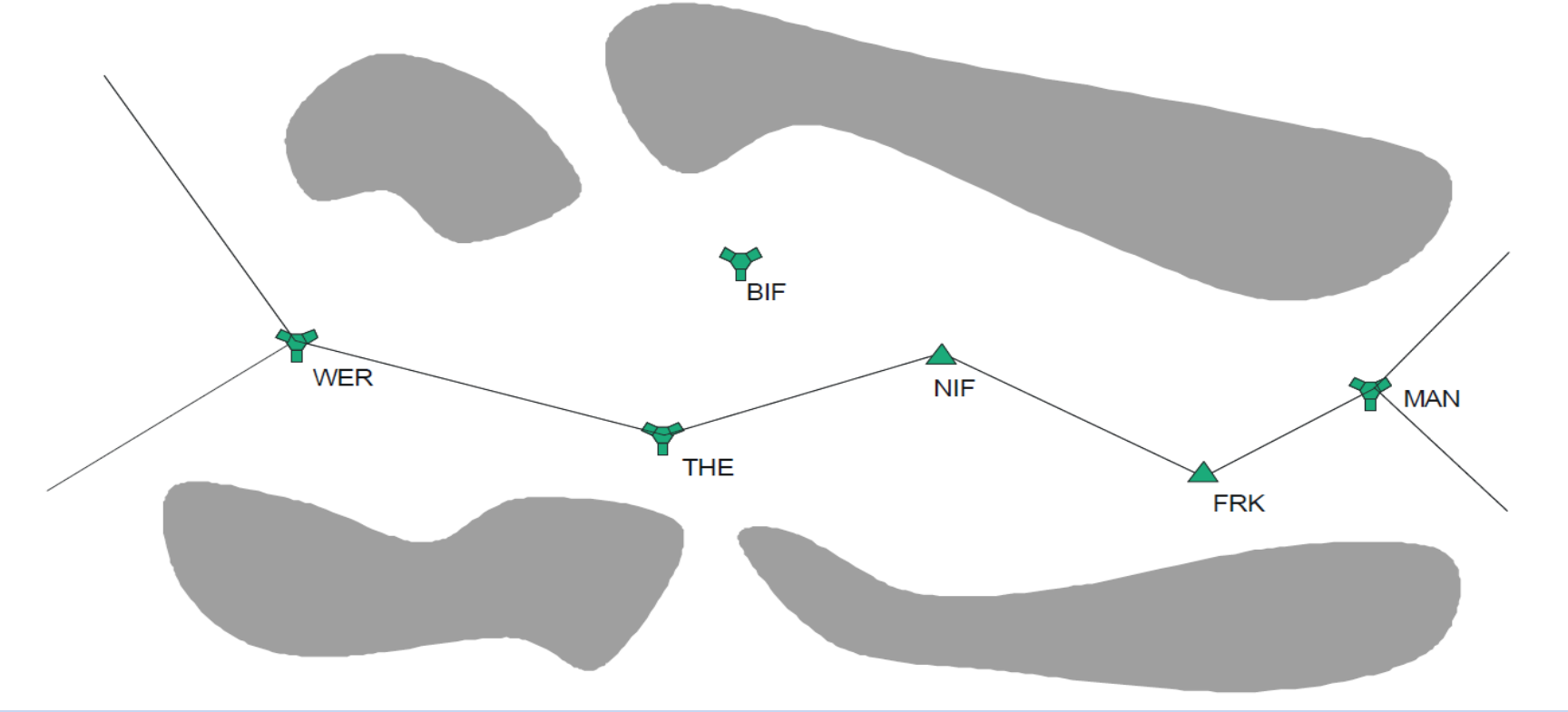
- **Aircraft Operations Volume I** Contains operational assumptions

- **Aircraft Operations Volume II**

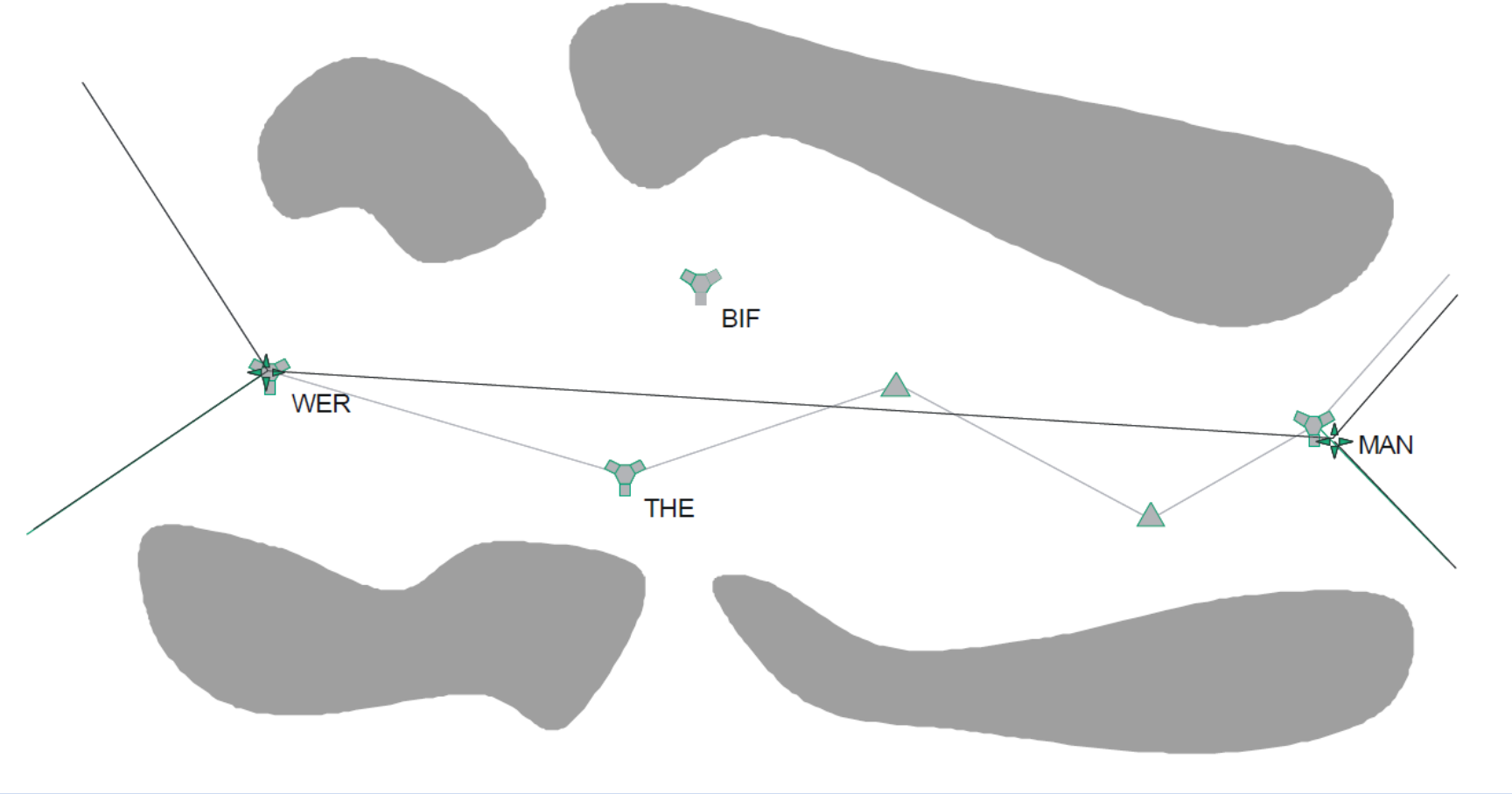
Contains the instrument procedure design criteria and application guidance for the specialist designing the procedure. Contains the standards, criteria and in some cases, application guidance.

Conventional Navigation

NDB
VOR
VOR/DME
ILS



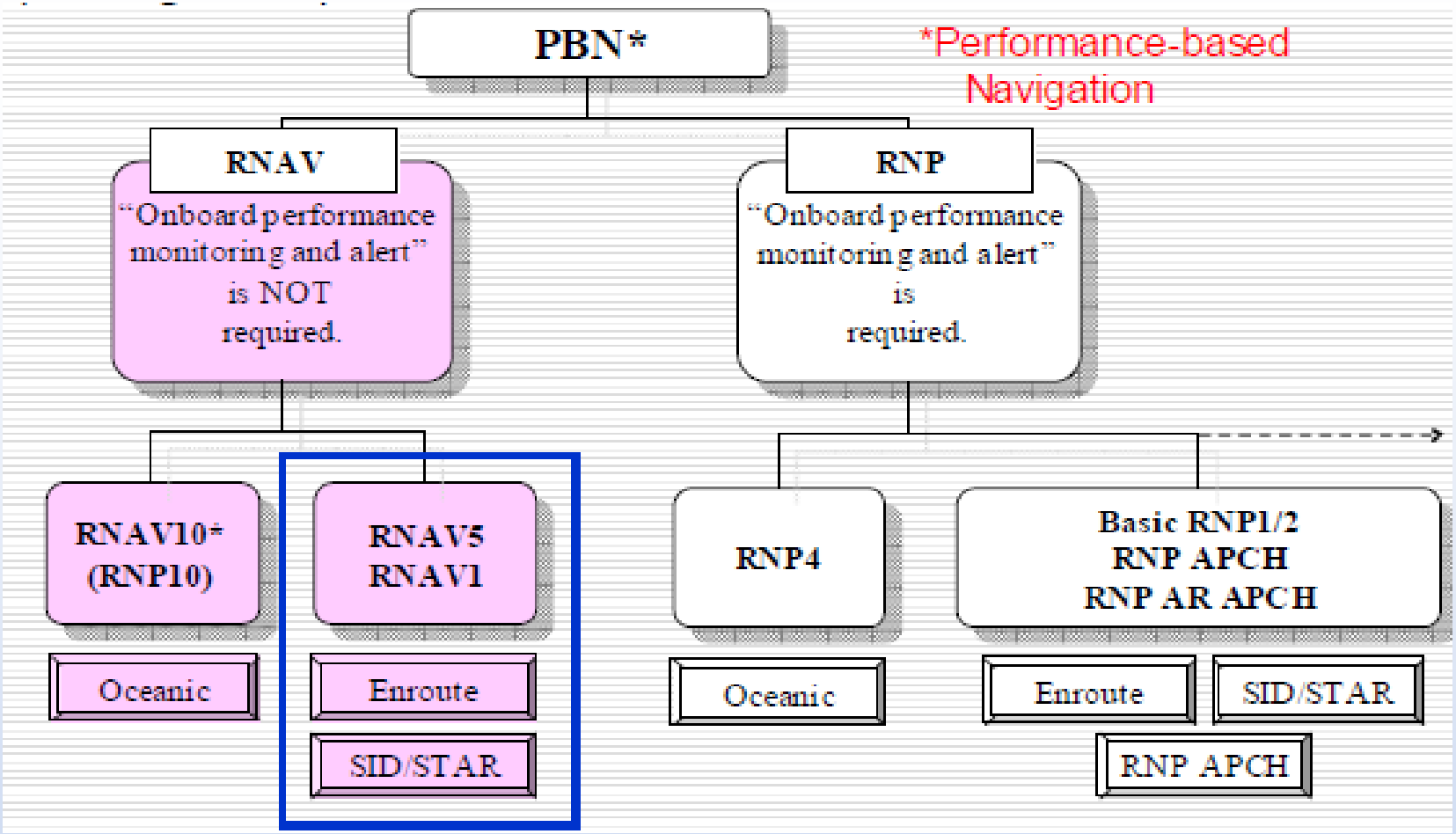
RNAV Navigation



There are two types of navigation specifications:

- a)RNAV specification.
- A navigation specification designation that does not include requirements for on-board performance monitoring and alerting.
- b) RNP specification.
- A navigation specification designation that includes requirements for on-board performance monitoring and alerting.

Performance-Based Navigation



GENERAL INFORMATION

- **Definitions**
- **Procedure: Instrument approach procedure is a process, using navigation, to transition an aircraft from the en-route phase of flight to a position, *and in a state,* from which a normal landing can be initiated, or from which a missed approach can be conducted.**

May have 5 segments

- **ARRIVAL Connects en-route & terminal structures**
- **INITIAL Transitions from en-route to terminal phase of flight**
- **INTERMEDIATE Prepares aircraft for final descent**
- **FINAL Delivers aircraft to position, *and state*, for landing**
- **MISSED APPROACH Delivers the aircraft to a holding, or en-route, or a position to execute another approach**

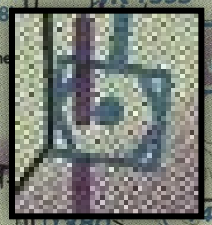
GENERAL INFORMATION

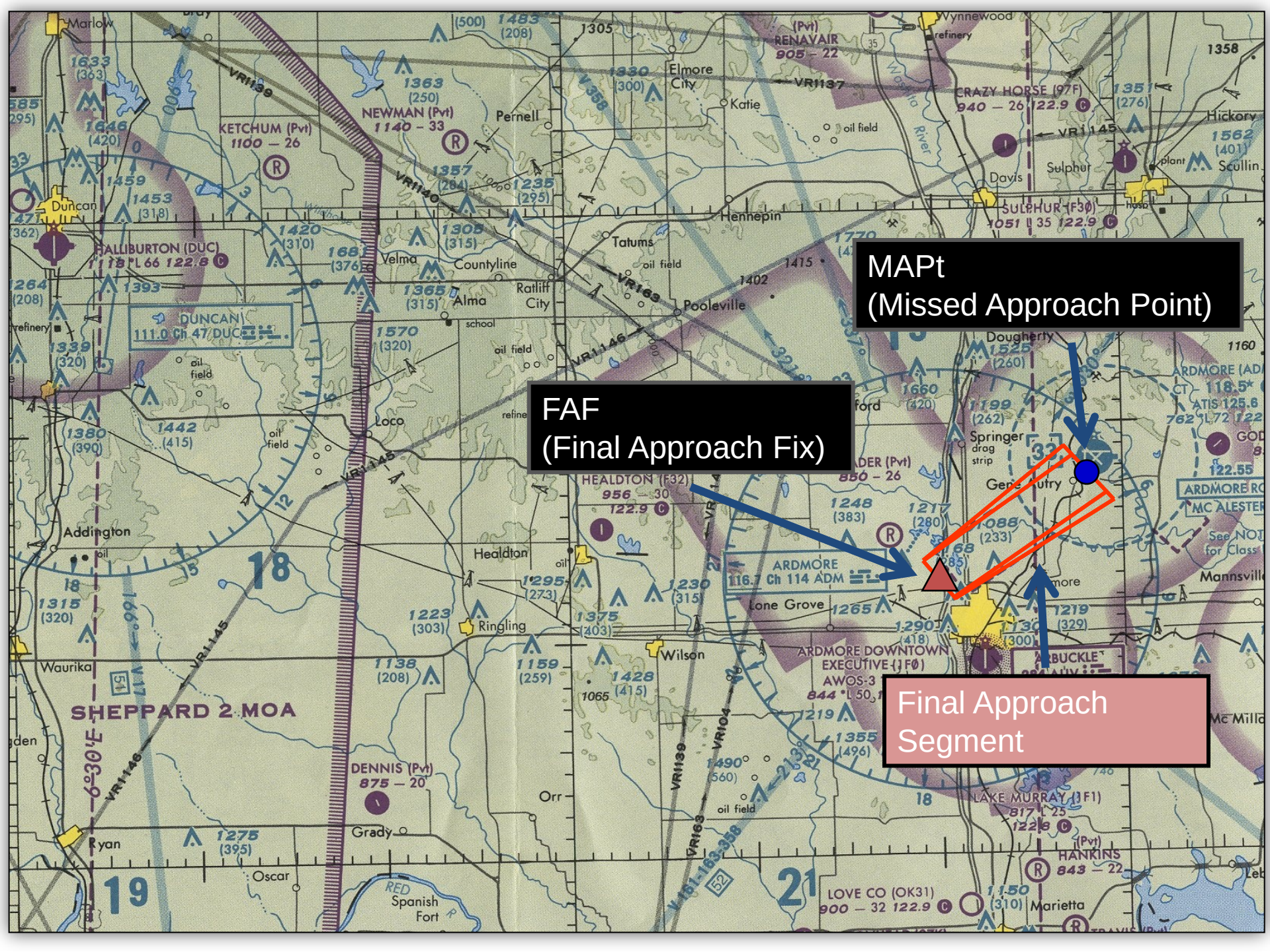
Terminal area fixes include, but are not limited to:

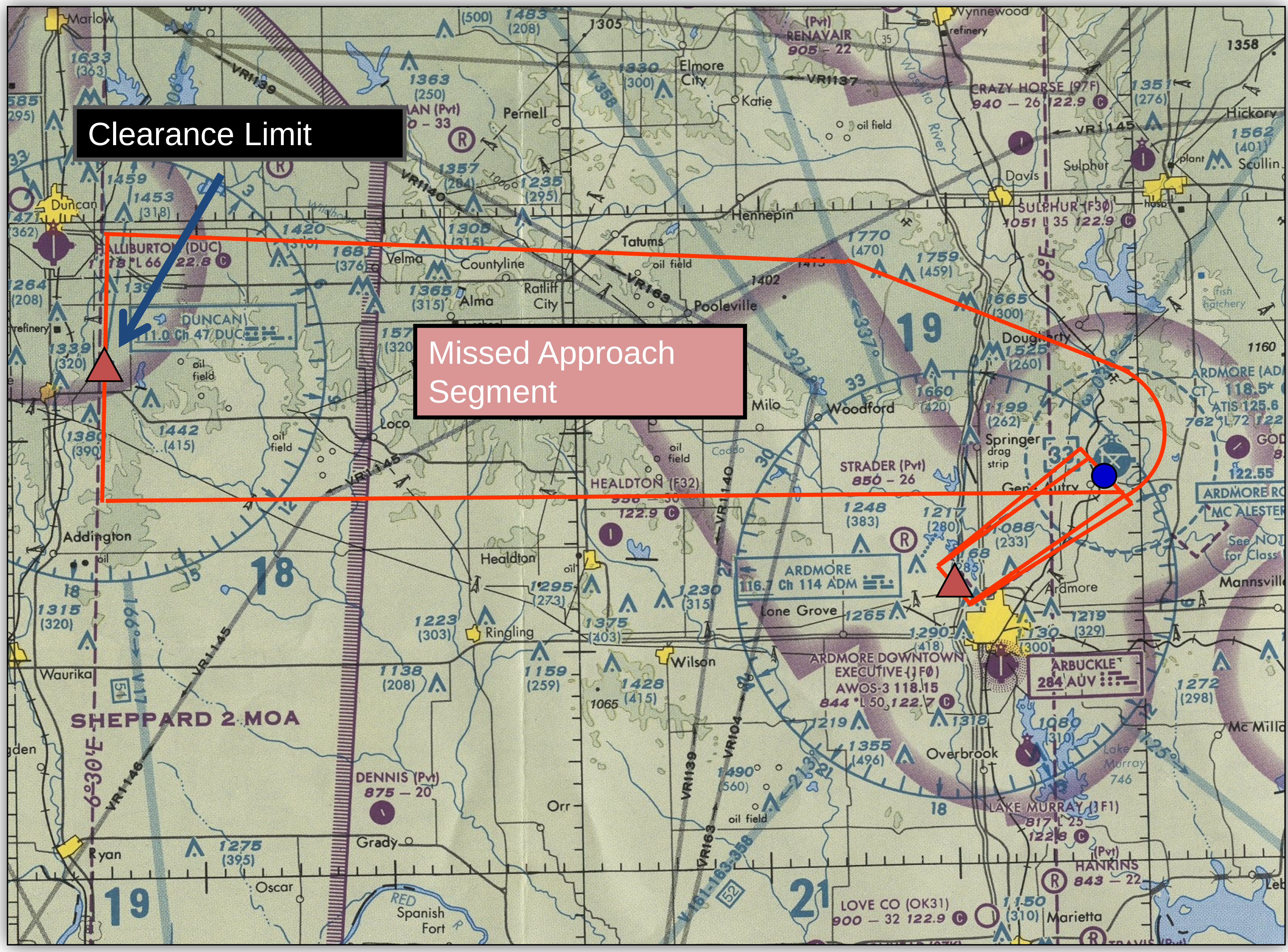
- **initial approach fix (IAF)**
- **intermediate approach fix (IF)**
- **final approach fix (FAF)**
- **holding fix,**

When necessary, a fix to mark the missed approach point (MAPt), or the turning point (TP)

How we Design ?




MAPt
(Missed Approach Point)
FAF
(Final Approach Fix)
Final Approach
Segment
ARDMORE
116.7 Ch 114 ADM
DUNCAN
111.0 Ch 47 DUC
HALLIBURTON (DUC)
HEALDTON (F32)
ARDMORE DOWNTOWN
EXECUTIVE (JF0)
SHEPPARD 2 MOA
LOVE CO (OK31)
LAKE MURRAY (3F1)
CRAZY HORSE (97F)
SULPHUR (F30)
NEWMAN (Pvt)
KETCHUM (Pvt)
RENAVAIR
DENNIS (Pvt)
HANKINS
Marlow
Duncan
Addington
Waurika
Ryan
Grady
Oscar
Spanish Fort
Velma
Countyline
Alma
Ratliff City
Loco
Healdton
Ringling
Wilson
Orr
Pernell
Elmore City
Katie
Tatums
Pooleville
Hennepin
Davis
Sulphur
Hickory
Scullin
Springer
Dougherty
Lone Grove
Marietta
Wynnewood
VR1139
VR1140
VR1145
VR1146
VR1137
VR163
VR1104


Clearance Limit
Missed Approach Segment
Marlow
Duncan
HALLIBURTON (DUC)
DUNCAN
111.0 Ch 47 DUC
Velma
Countyline
Alma
Ratliff City
Tatums
Pooleville
Hennepin
Pernell
Elmore City
Katie
RENAVAIR (Pvt)
905 – 22
CRAZY HORSE (97F)
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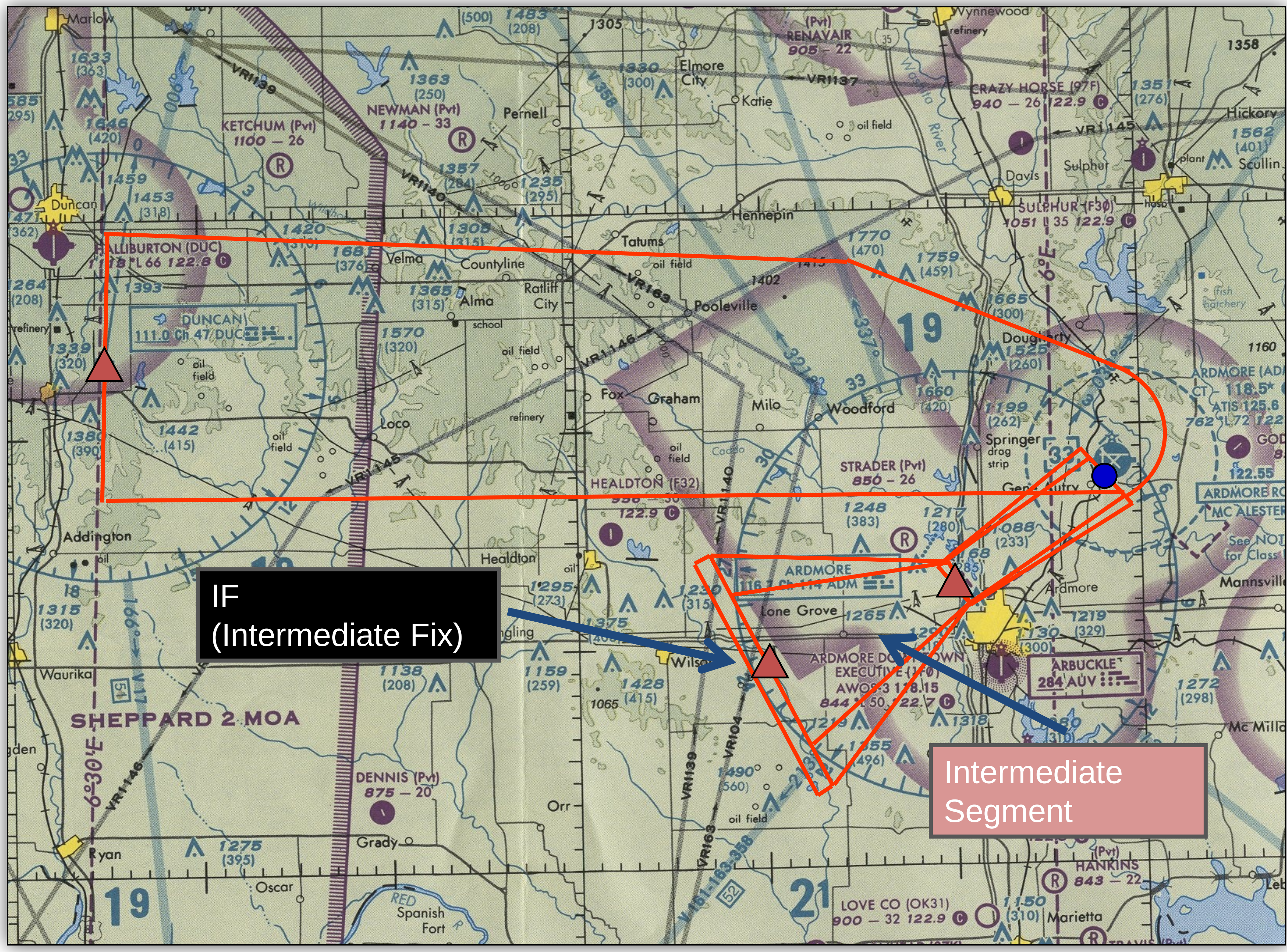
Wynnewood
Davis
Sulphur
SULPHUR (F30)
1051 35 122.9
Hickory
Dougherty
Springer
drag strip
Gene Autry
Milo
Woodford
STRADER (Pvt)
850 – 26
HEALDTON (F32)
122.9
Healdton
Loco
Addington
Ringling
Wilson
Lone Grove
ARDMORE
116.7 Ch 114 ADM
Ardmore
ARDMORE DOWNTOWN EXECUTIVE (1F0)
AWOS-3 118.15
844 L 50 122.7
ARBUCKLE
284 AUV
Overbrook
LAKE MURRAY (1F1)
Lake Murray
Mannsville
SHEPPARD 2 MOA
Waurika
Ryan
DENNIS (Pvt)
875 – 20
Orr
Grady
Oscar
RED
Spanish Fort
LOVE CO (OK31)
900 – 32 122.9
Marietta
HANKINS
843 – 22
18
19
21



IF
(Intermediate Fix)
Intermediate
Segment
SHEPPARD 2 MOA
Duncan
HALLIBURTON (DUC)
DUNCAN
111.0 Ch 47 DUC
KETCHUM (Pvt)
NEWMAN (Pvt)
Pernell
Elmore City
Katie
RENAVAIR
CRAZY HORSE (97F)
Hickory
Davis
Sulphur
SULPHUR (F30)
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Ratliff City
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STRADER (Pvt)
Springer
Gene Autry
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Addington
Healdton
Lone Grove
ARDMORE DOWNTOWN EXECUTIVE
Ardmore
ARBUCKLE
Waurika
Wilson
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Oscar
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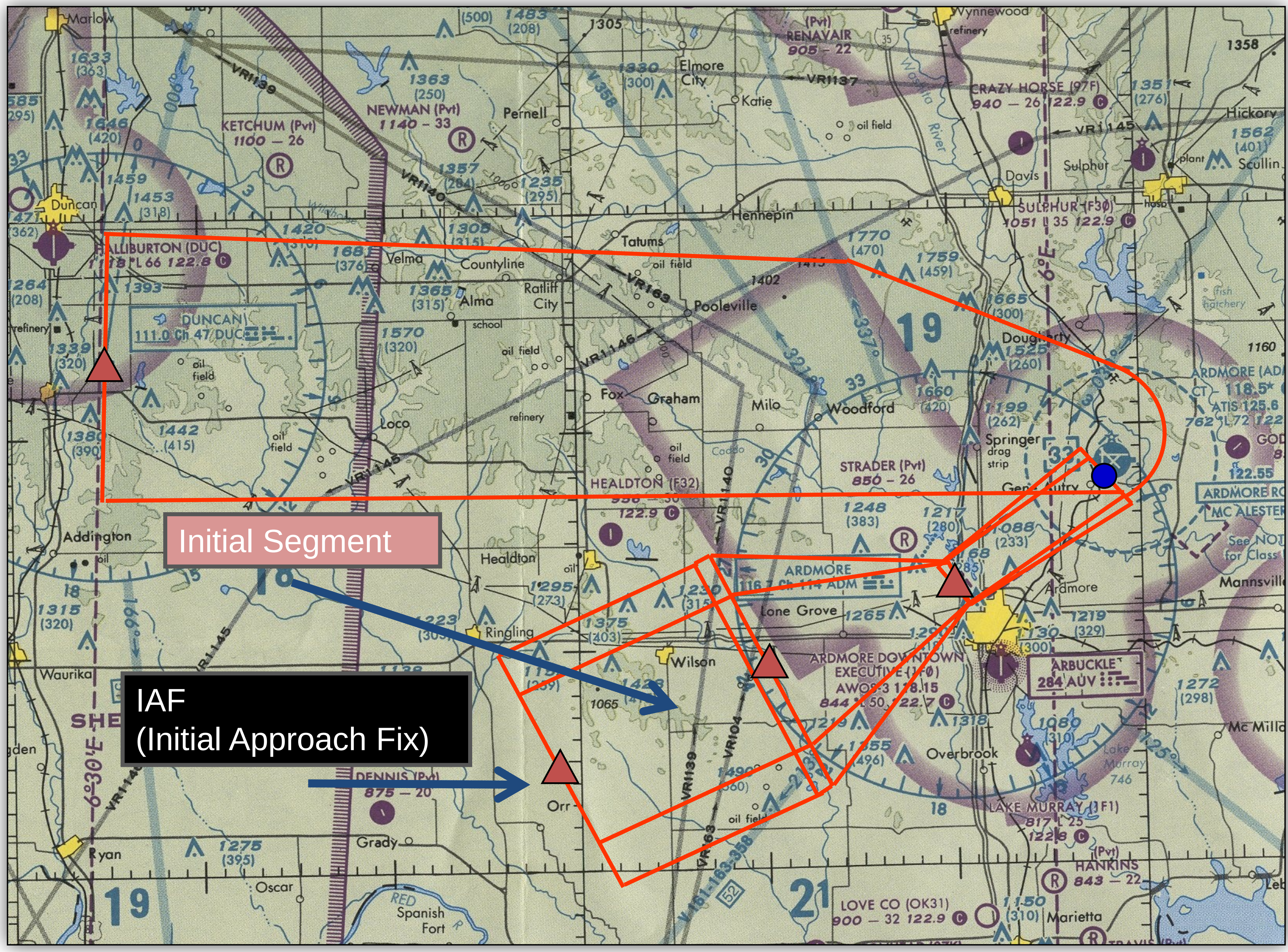
LOVE CO (OK31)
Marietta
HANKINS
Mannsville
Marlow
Wynnewood


Initial Segment
IAF
(Initial Approach Fix)
DUNCAN
111.0 Ch 47 DUC
HALLIBURTON (DUC)
ARDMORE
116.7 Ch 114 ADM
ARDMORE DOWNTOWN EXECUTIVE (1F0)
HEALDTON (F32)
STRADER (Pvt)
DENNIS (Pvt)
LAKE MURRAY (1F1)
SULPHUR (F30)
LOVE CO (OK31)
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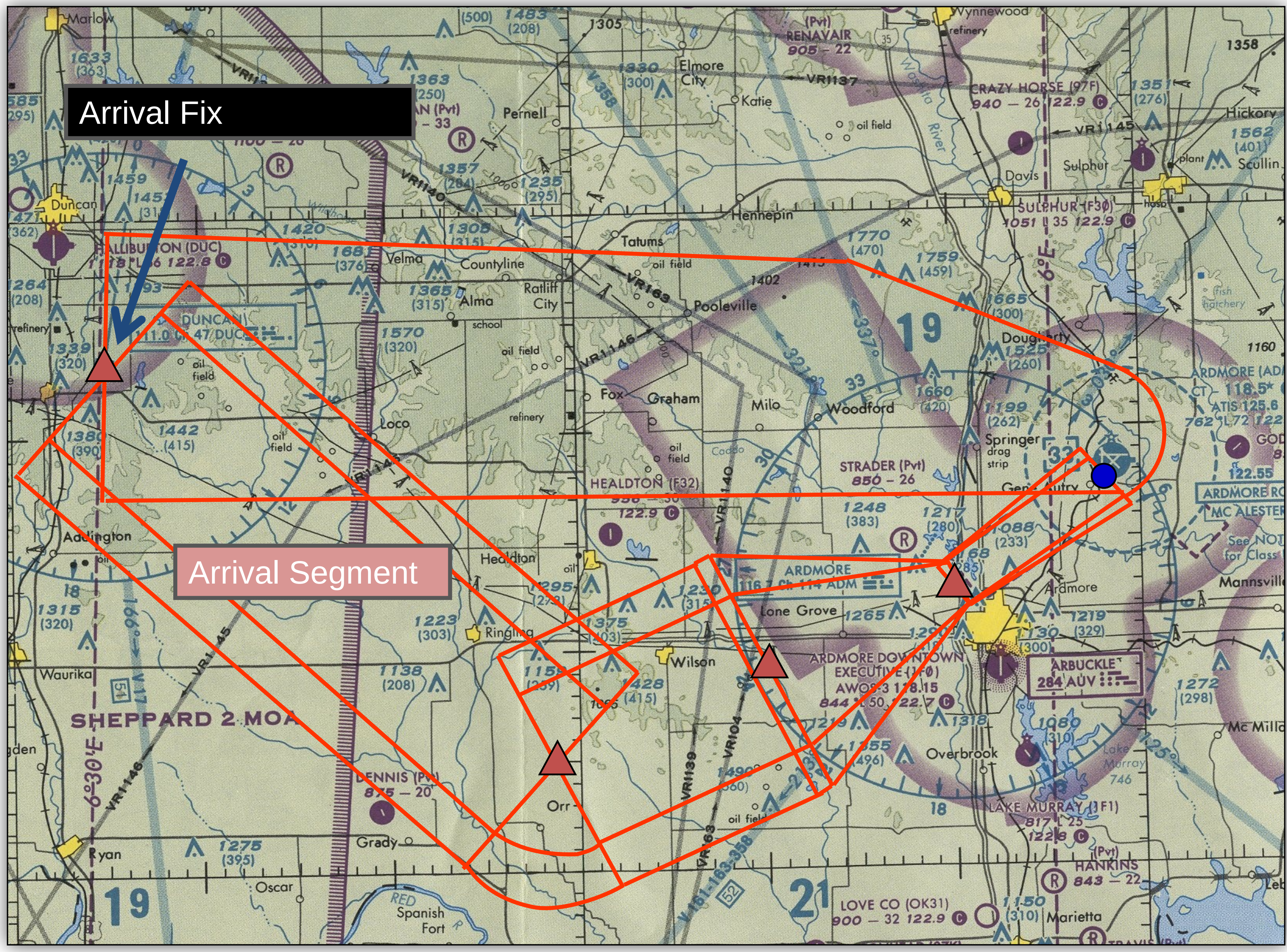
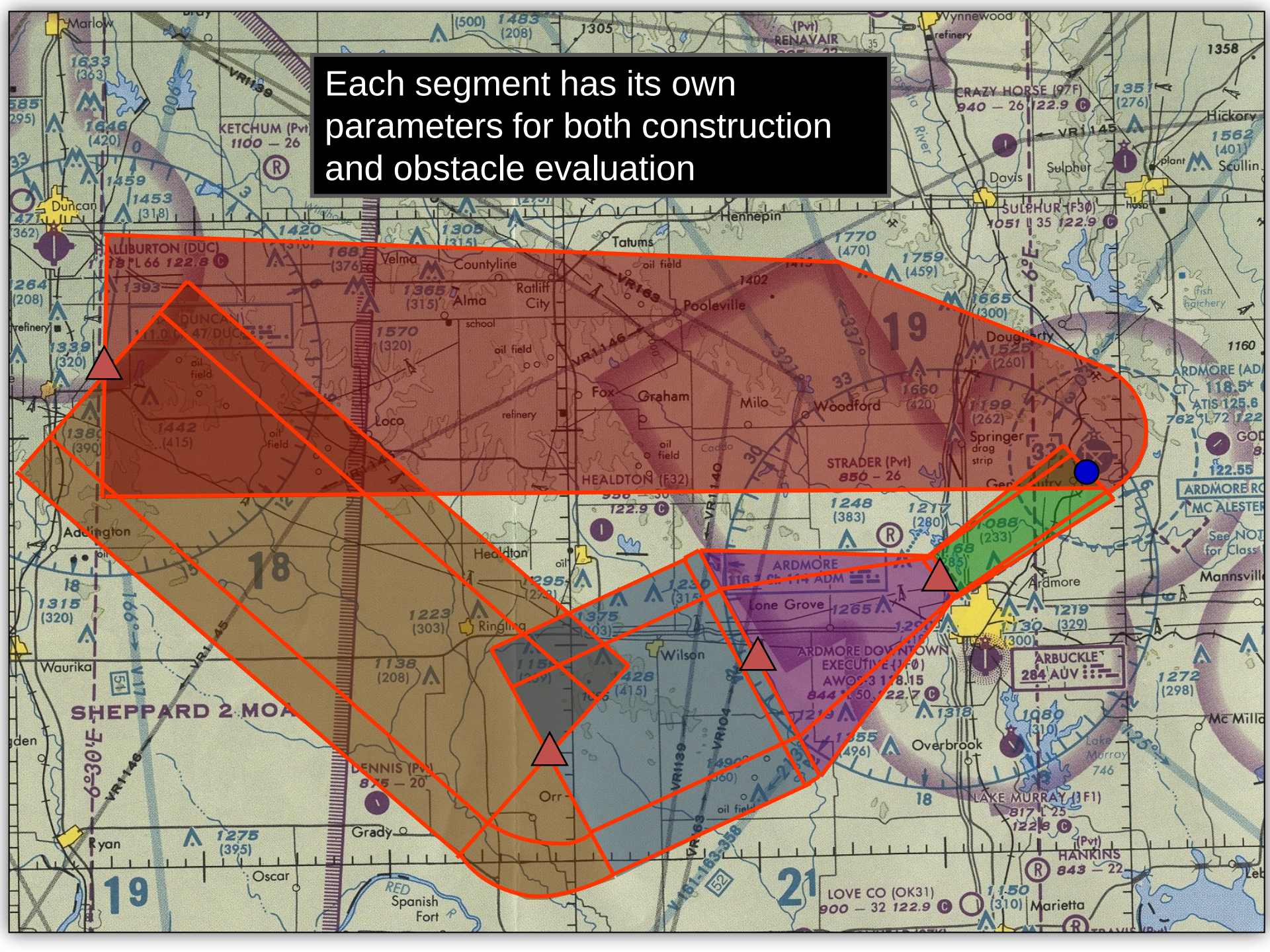
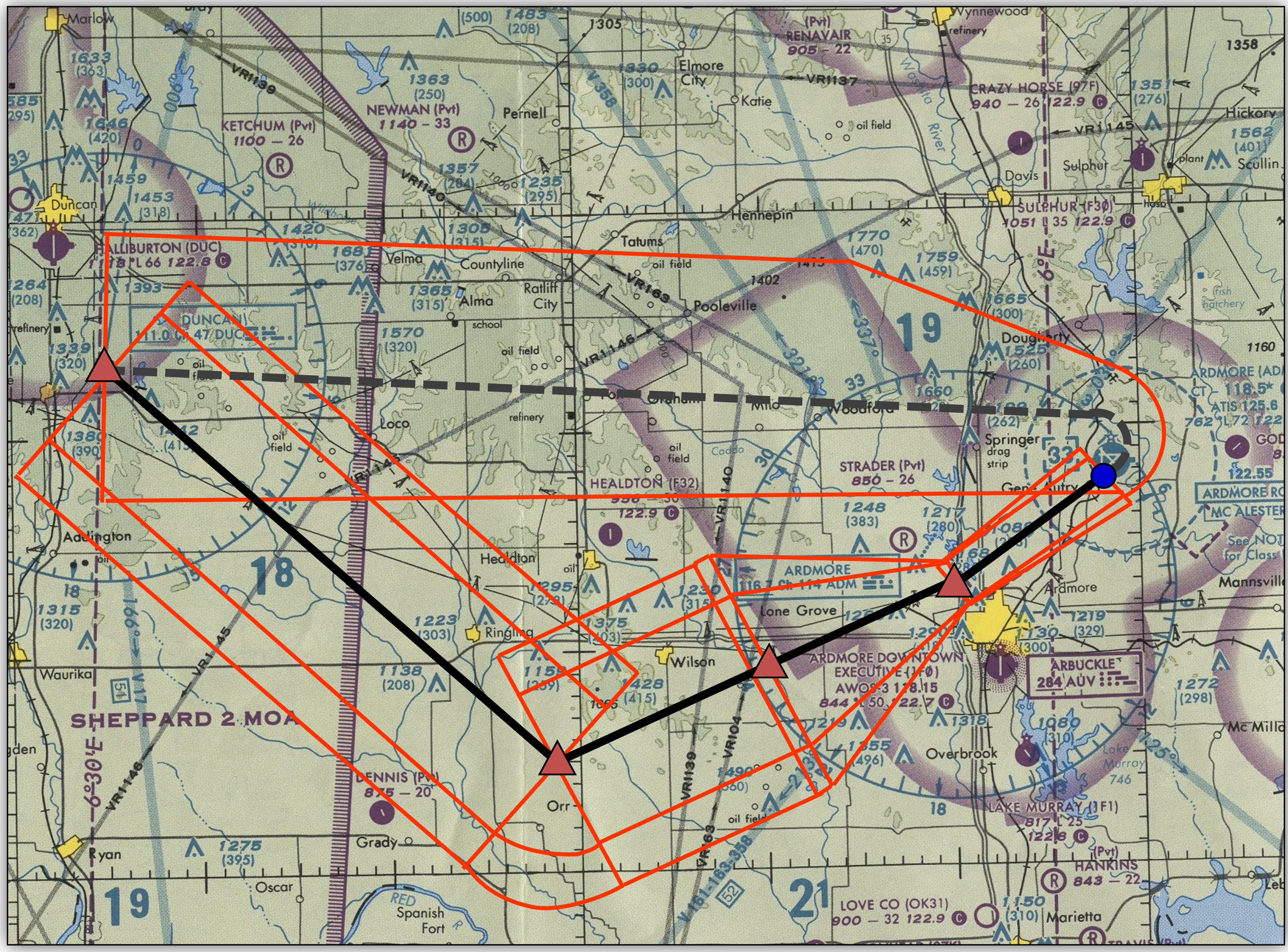
Oscar
Overbrook
Ardmore
Marietta
Hennepin
Davis
Sulphur
Elmore City
Pernell
Loco
Mannsville


Arrival Fix
Arrival Segment
Marlow
Duncan
Elmore City
Katie
Pernell
Wynnewood
RENAVAIR
CRAZY HORSE (97F)
Hickory
Sulphur
Davis
Scullin
SULPHUR (F30)
Hennepin
HALLIBURTON (DUC)
DUNCAN
Velma
Countyline
Tatums
Ratliff City
Alma
Pooleville
Dougherty
Fox
Graham
Milo
Woodford
Loco
Springer
STRADER (Pvt)
HEALDTON (F32)
Healdton
ARDMORE
Lone Grove
Addington
Ringling
Wilson
ARDMORE DOWNTOWN EXECUTIVE (1F0)
ARBUCKLE
Ardmore
Mannsville
Waurika
SHEPPARD 2 MOA
DENNIS (Pvt)
Orr
Overbrook
LAKE MURRAY (1F1)
Grady
Ryan
Oscar
Spanish Fort
LOVE CO (OK31)
Marietta
HANKINS
Mc Millan
Lake Murray


Each segment has its own parameters for both construction and obstacle evaluation



Marlow
Duncan
HALLIBURTON (DUC)
DUNCAN
KETCHUM (Pvt)
1100 – 26
NEWMAN (Pvt)
1140 – 33
Pernell
Elmore City
Katie
RENAVAIR
905 – 22
Wynnewood
CRAZY HORSE (97F)
940 – 26 122.9
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Sulphur
SULPHUR (F30)
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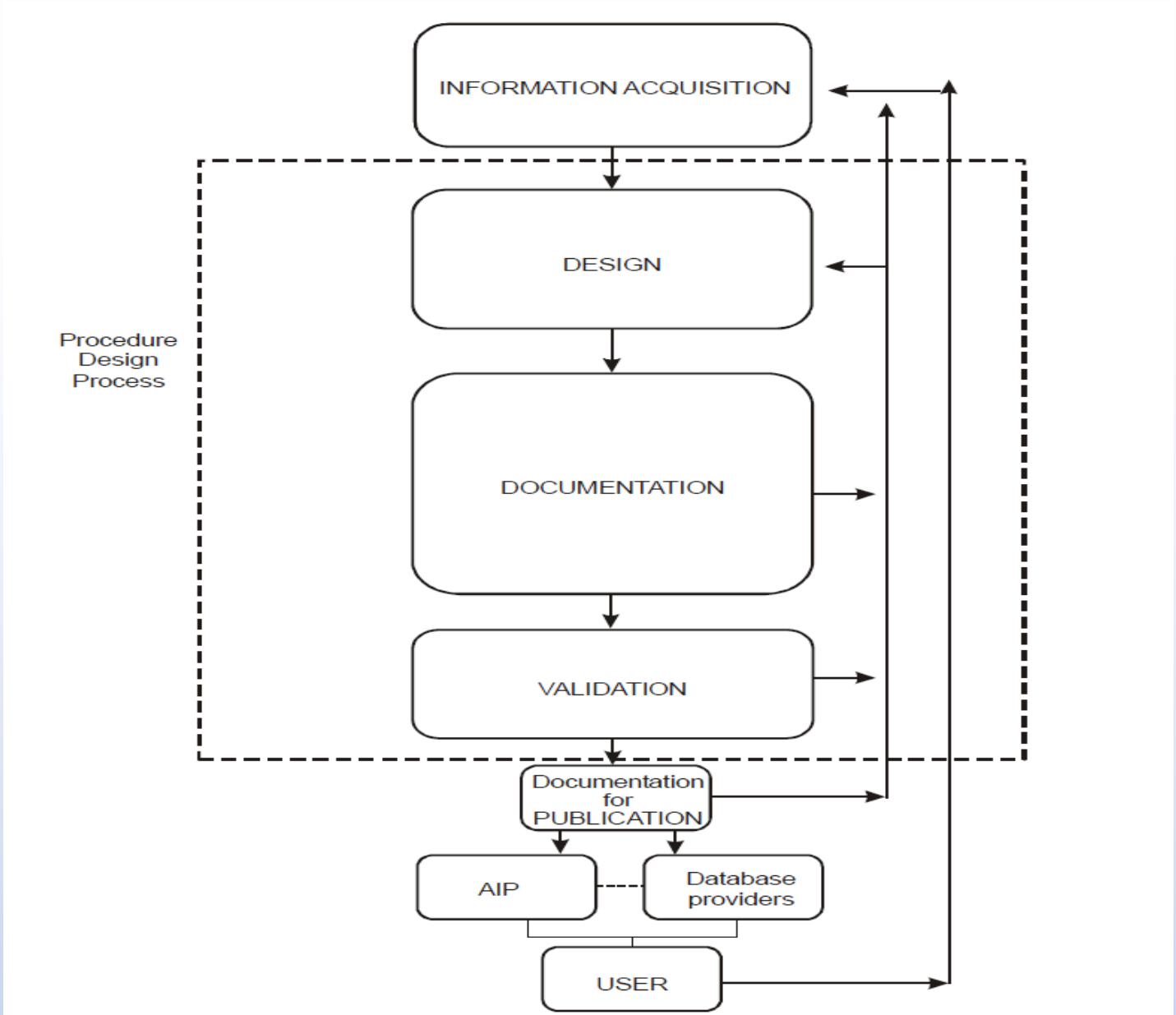
INFORMATION ACQUISITION
DESIGN
DOCUMENTATION
VALIDATION
Procedure Design Process
Documentation for PUBLICATION
AIP
Database providers
USER

BACKGROUND

Since 1996 the Dominican Republic has **GPS approaches** at Cibao International Airport MDST, being one of the few countries throughout the region to have this kind of approach 20 years ago, when conventional procedures where the usual and more common type of arrival approaches.

Since 2003 the Dominican Republic has **86 percent** of PBN implementation, missing just two international airports to implement RNAV procedures which are El Higuero and Barahona.

BACKGROUND

The result of this development was the **reduction of fuel consumption and CO2 emissions** by creating more direct paths not have been possible to draw with conventional navigation sensors.

Today in Santo Domingo FIR/UIR we have **17 RNAV** routes.

THANKS