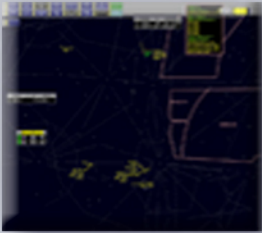




FAA Lesson Plan



En Route Stage 4 Radar Controller Training

H	DEPT	
JFK		
AAL321	60	
SWA123	150	
LGA		
N2234	340	
PHL		
UAL167	50	
N133A	120	
N12A	UFR	
N11A	0TP	

Student

Radar Data Display Lesson 2



55055
V.1.06



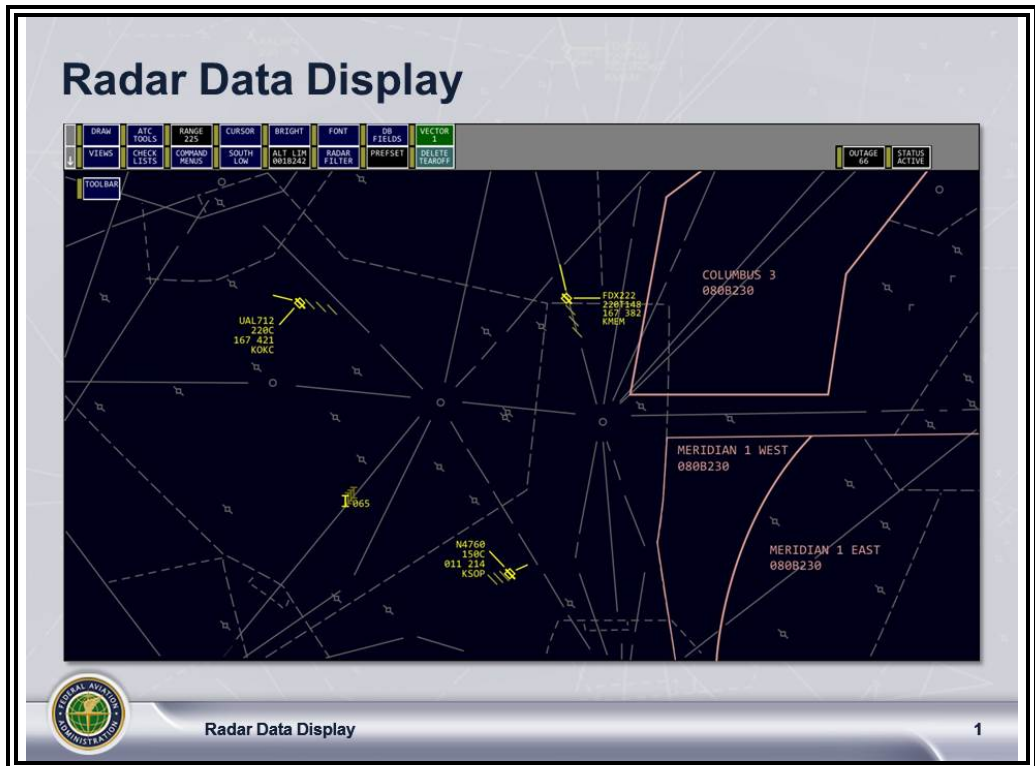
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LESSON PLAN DATA SHEET

COURSE NAME:	RADAR CONTROLLER TRAINING
COURSE NUMBER	55055
LESSON TITLE:	RADAR DATA DISPLAY
DATE REVISED:	2014-04
VERSION	V.1.06
REFERENCES:	TI 6110.100, En Route Automation Modernization (ERAM) Air Traffic Manual (ATM): R-Position User Manual; JO7110.311B, Procedural Guidance for FAA Order JO 7110.65 following En Route Automation Modernization (ERAM) Implementation; JO 7110.65V, Air Traffic Control; ERAM EDSM SRS 210.04 V1B1, En Route Automation Modernization (ERAM) En Route Display Management (EDSM) R-Position and General EDSM Requirements Volume 1, Book 1; ERAM EDSM SRS 210.04 V1B2, En Route Automation Modernization (ERAM) En Route Display Management Appendices for R-Position and General EDSM Requirements Volume 1, Book 2; ERAM SURV SRS 210.24, En Route Automation Modernization (ERAM) Surveillance (SURV); PRED 1370 (PR E65313), Remove UBC from FDB and Set AHI Caret Regardless of UBC Status
HANDOUTS:	55055-HO2, REFERENCE GUIDE
EXERCISES:	NONE
END-OF-LESSON TEST:	YES
PERFORMANCE TEST:	NONE
MATERIALS:	NONE
OTHER PERTINENT INFORMATION:	THIS LESSON IS BASED ON ERAM BUILD EAC1500. THE LESSON HAS BEEN REVIEWED AND REFLECTS CURRENT ORDERS AND MANUALS AS OF APRIL 2014.

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INTRODUCTION



Purpose

The Situation Display conveys important information to you through the use of numerous symbols.

Job Relevance

- ⦿ As a radar controller, you will be responsible for the safe, orderly, and expeditious movement of all air traffic in your sector.
 - To do this, you must be able to use the Situation Display effectively and to read and interpret all the data on the Situation Display and associated equipment.

INTRODUCTION *(Continued)*

Objectives

Objectives

At the end of this lesson, you will be able to identify selected data on the Situation Display, including:

1. Radar Symbols
2. Full Data Block (FDB)
3. Limited Data Block (LDB)
4. Weather Displays
5. Miscellaneous Displays
6. Outages



Radar Data Display


2

RADAR SYMBOLS

Map Symbols

TI 6110.100, par.
3.2; ERAM EDSM
SRS 210.04 V1B2,
Appendix A.8

Map Symbols	
Map Symbol	Description
○	VOR
⊙	TACAN
+	Intersections and Waypoints
□	Major Airport
└	Satellite Airport
◻	Emergency Airport
✕	Obstructions

 Radar Data Display 3

- ⦿ You can adjust the brightness of the various map elements and features. You will learn how to do this in a later lesson.

RADAR SYMBOLS *(Continued)*

Tracking and Pairing

Terminology

ERAM EDSM SRS
210.04 V1B1, par.
3.2.2.1; ERAM
SURV SRS
210.24, par. 5.3


- ⊙ **Target:** An object present in a volume of airspace that is detected and reported by a surveillance source. An aircraft is one example of a target.
 - ⊙ **Track:** A collection of reported and derived information associated with a sequence of surveillance reports from the same aircraft.
 - Track data includes position, and if available, Mode C altitude and beacon code.
 - ⊙ **Pairing:** Automatic or manual association of flight data within a track.
 - ⊙ **Track-All Tracker:** The tracker resolves targets into tracks independently from the presence of flight data, and in that sense tracks everything it sees.
-

RADAR SYMBOLS *(Continued)*

Target Symbols

TI 6110.100, par. 4.1; ERAM EDSM SRS 210.04 V1B1, par. 3.2.2.1

Target Symbols	
Target Symbol	Description
X	Primary target paired to a flight plan
●	Beacon target paired to a flight plan, eligible for reduced separation
/	Unpaired beacon or unpaired beacon not MCI eligible
\	Beacon target paired to a flight plan
+	Primary target of good quality, not paired to a flight plan
•	Primary target not of good quality, not paired to a flight plan
≡	Identifying beacon
V	1200 beacon code paired or unpaired to a flight plan not eligible for MCI alert
I	Beacon target not paired to a flight plan and eligible for MCI alert






 Radar Data Display 4


- ⦿ Nine target symbols are used to display radar data.

RADAR SYMBOLS *(Continued)*

Position Symbols

TI 6110.100,
par. 4.3.3

Position Symbols	
Position Symbol	Description
	Flat Track – Used to indicate a flight is paired to a track that is receiving radar data, not in hold and in conformance with its flight plan
	Free Track – Used to indicate a flight is paired to a track that is receiving radar data, not in hold and not in conformance with its flight plan
	Coast Track – Used to indicate that radar data is not being received for a flight, the flight is unpaired or manually entered into coast status
	Frozen Track – Used to indicate an FDB or suppressed format FDB that is eligible for display has been commanded frozen
	Hold Track – Used to indicate a flight that is in hold and is receiving radar data

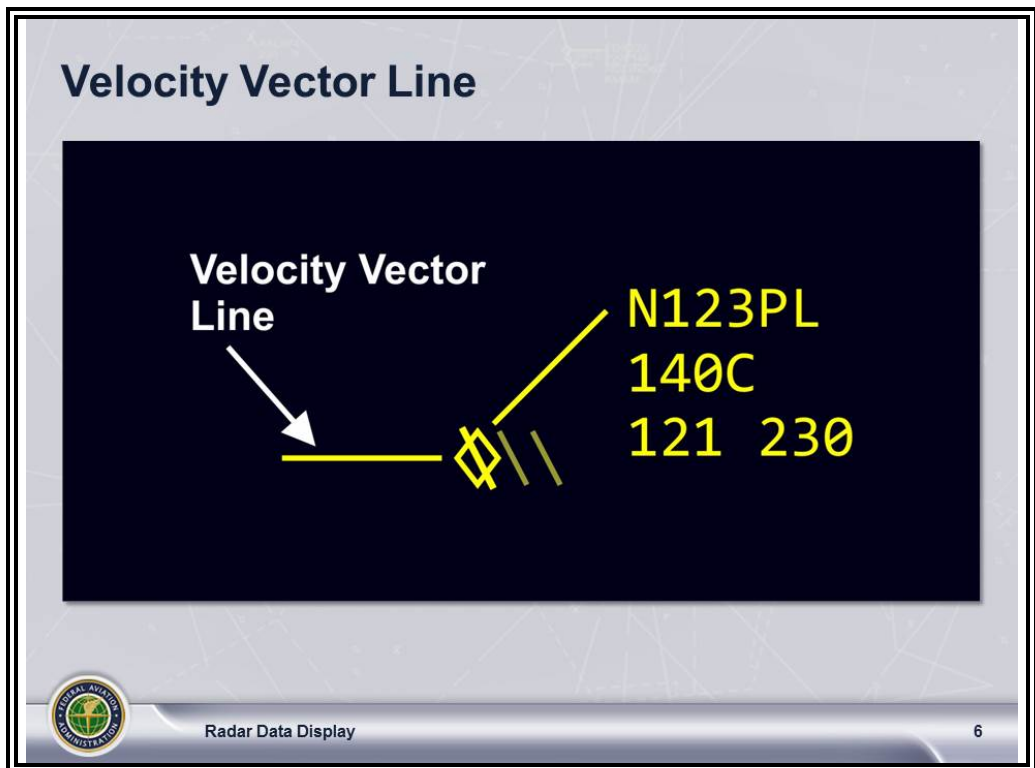
 Radar Data Display 5

- ⦿ Position symbols are used only with Full Data Blocks (FDBs).

RADAR SYMBOLS *(Continued)*

Velocity Vector

TI 6110.100,
par. 4.13

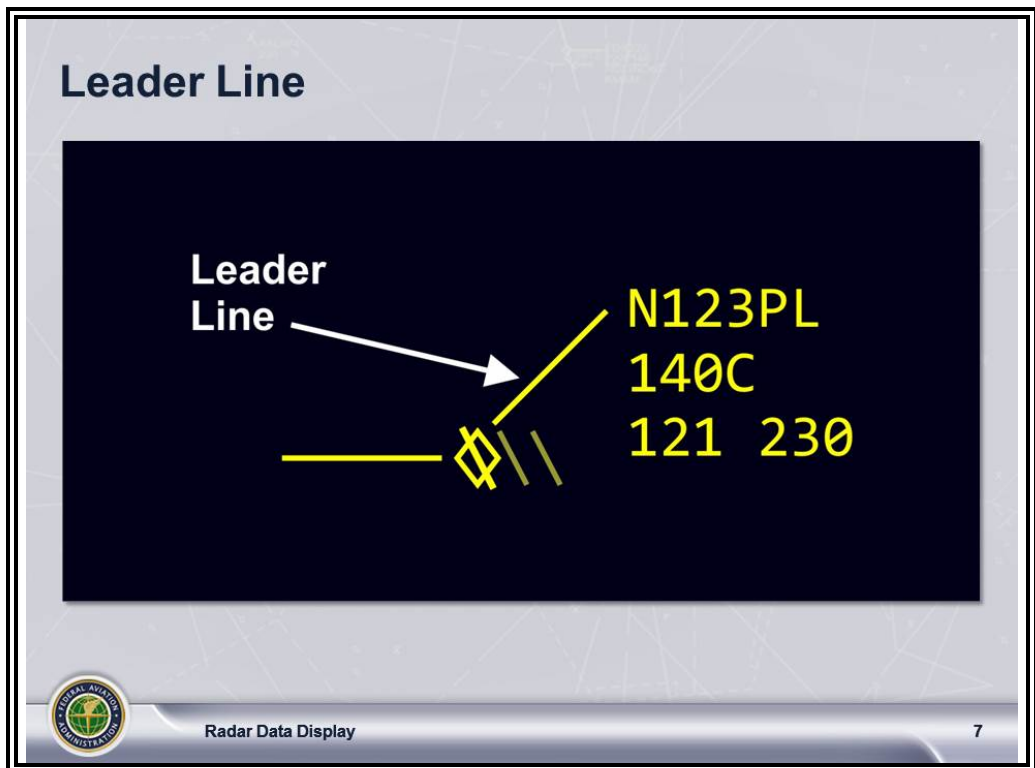


- ⦿ Represents the distance and direction of travel
 - Locally adaptable to be either minutes of 0, 1, 2, 4 or 8, or miles of 0, 5, 10, 20 or 40
 - Based on computer ground speed and track
 - Line is plotted in proportion to aircraft speed rounded to the nearest 15 knots

RADAR SYMBOLS *(Continued)*

Leader Line

TI 6110.100,
par. 4.13



- ⦿ Connects the position symbol with the Full Data Block (FDB)
 - You can control leader line length and offset for data blocks.
 - FDBs can be offset to any of eight compass directions; NW=1, N=2, NE=3, W=4, E=6, SW=7, S=8, SE=9.
 - The format for requesting a FDB offset is d space FLID ENTER.
 - /d determines the length of the leader. Leader length options are:
 - /0 - No leader
 - /1 - .625 inches
 - /2 - 1.25 inches
 - /3 - 2.5 inches
 - d/d offsets the data block and changes the leader length simultaneously.

RADAR SYMBOLS *(Continued)*


Review

❖ **QUESTION:** Describe the meanings of track and pairing.

Response Item

The ◁ is a _____ symbol.

- A. position
- B. radar
- C. target

Radar Data DisplayClick to Show Answer8

Continued on next page


RADAR SYMBOLS *(Continued)*

Review (Cont'd)

Response Item

The symbol for a paired primary target is _____.

- A. •
- B. X
- C. +



Radar Data Display

Click to Show Answer

9

Continued on next page

RADAR SYMBOLS *(Continued)*

Review (Cont'd)

Response Item

An unpaired primary target is displayed as _____.

- A. /
- B. X
- C. +



Radar Data Display

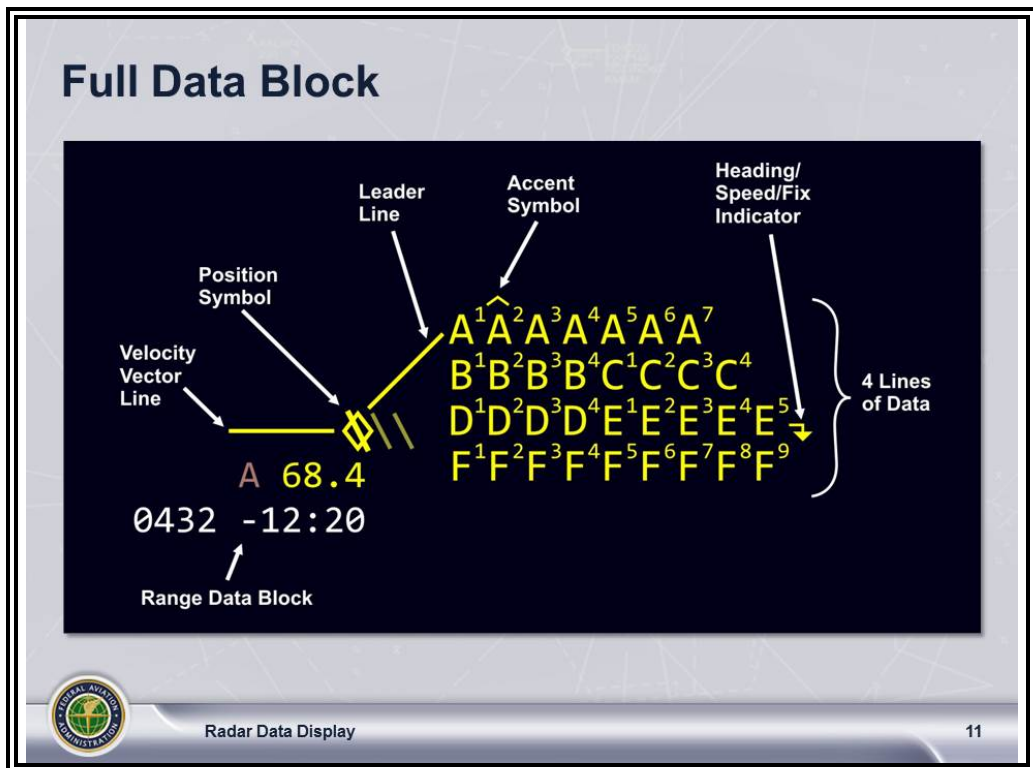
[Click to Show Answer](#)

10

FULL DATA BLOCK (FDB)

Full Data Block

TI 6110.100, par.
4.3; ERAM EDSM
SRS 210.04 V1B2
Appendix E.2



Full Data Block:

- A four line by 11 character array
- First line displays Aircraft Identification (AID)
- Second line displays altitude information:
 - Interim altitude indicated by a T
 - Local interim altitude (if present) indicated by an L
- Third line displays the Computer Identification (CID), Field E-type data and the Heading/Speed/Free Form Text (HSF) Indicator
- Fourth line displays HSF, aircraft and destination data
- Has a position symbol, leader line and velocity vector
- Displayed at FDB brightness

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Full Data Block (Cont'd)

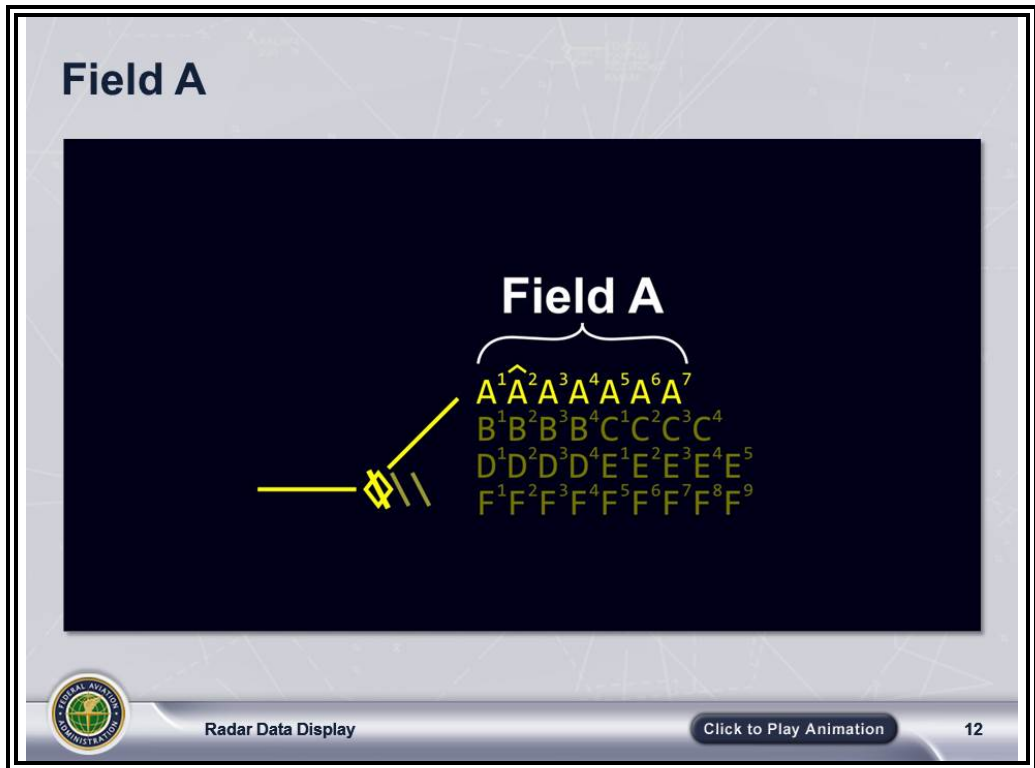
TI 6110.100, 4.3.1;
ERAM EDSM SRS
210.04 V1B2
Appendix E.2

- Provides access to Altitude, Speed and Heading pop-up menus
 - Can display a Range Data Block (RDB) below the target symbol
 - May include Non-ADS-B, CRR and STA/DCT indicators
 - ⊙ The FDB text array, including the leader line, velocity vector and the track position symbol, blinks when the flight is eligible for conflict alert display at the sector.
-

FULL DATA BLOCK (FDB) (Continued)

Field A

TI 6110.100,
pars. 4.3.1, 4.3.9;
PRED 1370
(PR E65313)



- ⦿ Field A is located on the 1st line of the data block and may be up to 7 characters long.
- ⦿ Contains the Aircraft Identification (AID)
- ⦿ An accent symbol (^) is displayed over the second character:
 - If the flight object indicates that automatic handoff initiation has been inhibited
- ⦿ Field A will blink on Mode C Intruder Conflict Data Blocks.

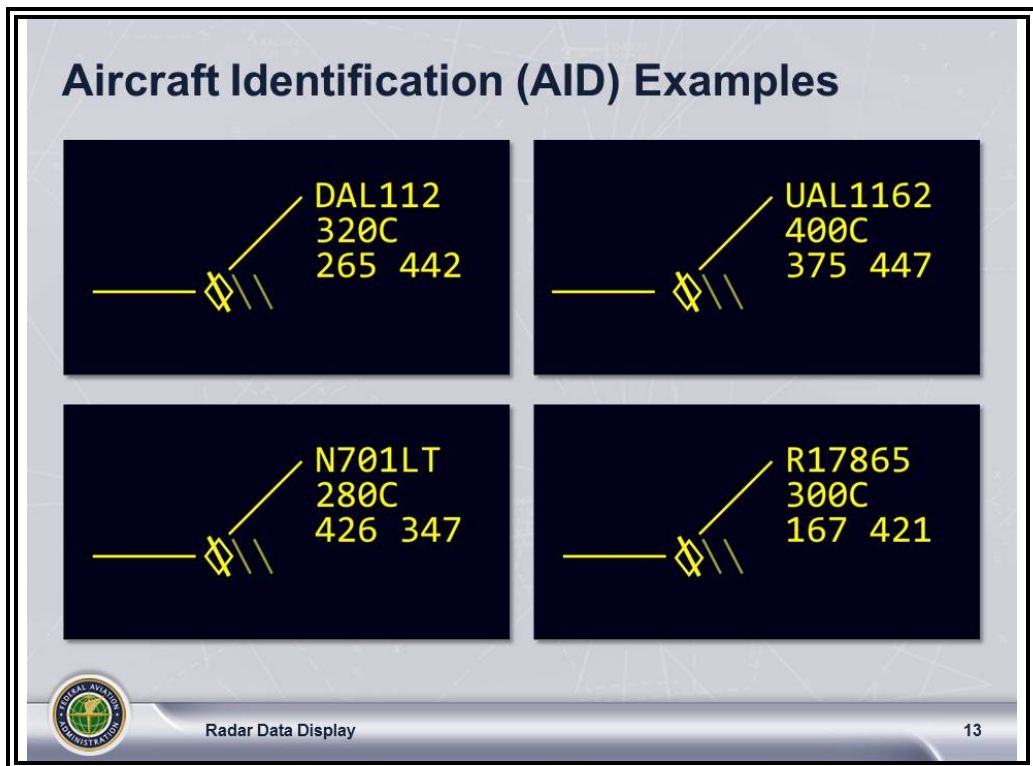
Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field A

(Cont'd)

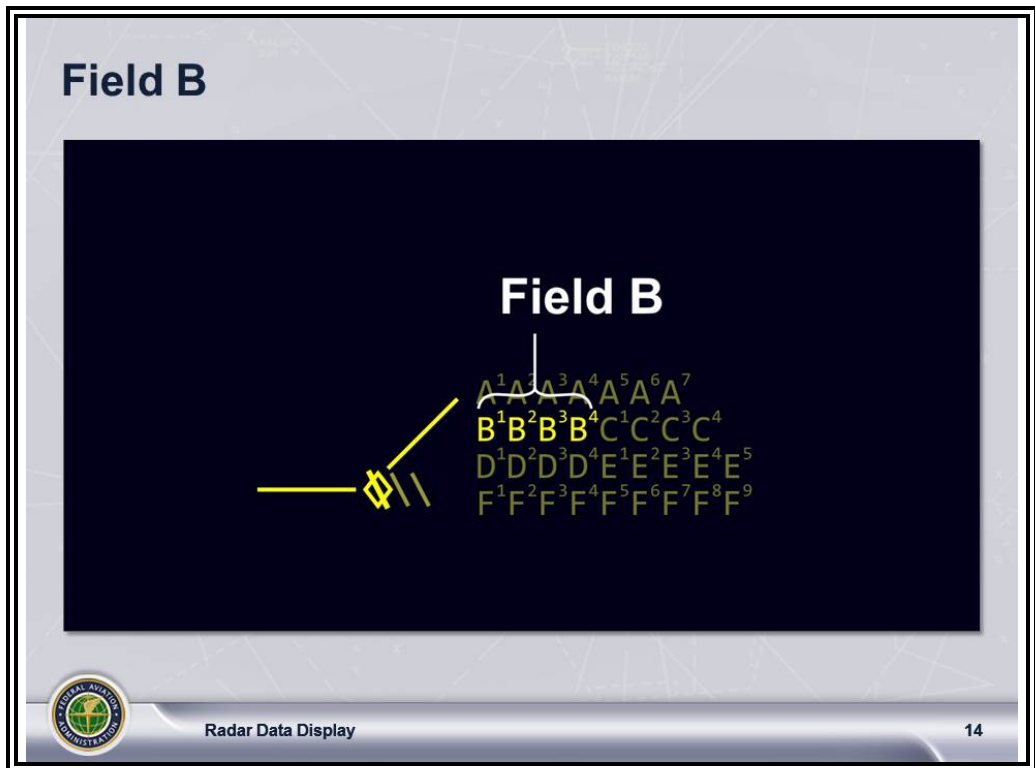
TI 6110.100,
pars. 4.3.1, 4.3.9;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2



FULL DATA BLOCK (FDB) (Continued)

Field B

TI 6110.100,
par. 4.3.1;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2



- ⦿ Field B is located on the 2nd line of the data block and may be up to four characters long.
 - Characters B1 through B3 contain either:
 - Assigned altitude information (digits representing hundreds of feet), or
 - The letters OTP, VFR or ABV
 - B4 contains one of the computer generated altitude qualifiers on the slides that follow.

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B (Cont'd)

TI 6110.100,
par. 4.3.1;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2

Field B (Cont'd)



Controller-entered reported altitude equals single assigned altitude.

(Field C will be vacant.)



Radar Data Display

15

Field B (Cont'd)



No controller or Mode C reported altitude has been received for aircraft.

(Field C will be vacant.)



Radar Data Display

16

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B (Cont'd)

TI 6110.100,
par. 4.3.1;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2

Field B (Cont'd)



Controller-entered or Mode C reported altitude is below assigned altitude when flight is climbing.



Radar Data Display

17

Field B (Cont'd)



Non-RVSM indicator is a coral box around the B4 character.



Radar Data Display

18

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B (Cont'd)

TI 6110.100,
par. 4.3.1;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2

Field B (Cont'd)



Controller-entered or Mode C reported altitude is above assigned altitude when flight is descending.



Radar Data Display

19

Field B (Cont'd)



Mode C reported altitude is within ± 200 feet of single assigned altitude.

(Field C will be vacant.)



Radar Data Display

20

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B (Cont'd)

TI 6110.100,
par. 4.3.1;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2

Field B (Cont'd)



Mode C previously reported aircraft at assigned altitude, and either:

- Aircraft has deviated 300 feet or more above assigned altitude, or
- Controller-entered reported altitude is above assigned altitude



Radar Data Display

21

Field B (Cont'd)



Mode C previously reported aircraft at assigned altitude, and either:

- Aircraft has deviated 300 feet or more below assigned altitude, or
- Controller-entered reported altitude is below assigned altitude



Radar Data Display

22


Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B (Cont'd)


TI 6110.100,
par. 4.3.1;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2

Field B (Cont'd)



The diagram shows a radar data display with a dark background. On the left, there is a yellow line representing a track, ending in a yellow aircraft symbol (a triangle with a tail). A yellow arrow points from the aircraft symbol to the text 'TUFF78'. To the right of the aircraft symbol, the text '210B200' is displayed, with a white arrow pointing to the 'B'. Below this, the text '104 440' is displayed.

Mode C reported altitude is within ± 200 feet of upper or lower limit of the block altitude or the controller-entered reported altitude is within the block altitude.
(Field C will contain the upper limit.)

 Radar Data Display 23

NOTE: An aircraft climbing or descending to a block altitude will display the highest altitude of the block when climbing and the lowest altitude of the block when descending, until the aircraft is in the block.


Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B (Cont'd)

TI 6110.100,
par. 4.3.1;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2


Field B (Cont'd)



The diagram shows a radar data display with a dark background. A yellow line represents an aircraft track, ending in a yellow diamond symbol. To the right of the track, the text 'N390GW' is displayed in yellow. Below it, '130F' is displayed in yellow, with a white arrow pointing left towards it. Below '130F', the text '175 160' is displayed in yellow.

Controller-entered or beacon-reported altitude indicates either the aircraft has reached the first altitude or Mode C reported altitude is within ± 200 feet of the first altitude.

If the aircraft has been cleared altitude/fix/altitude, the first altitude will be displayed in fields B1 to B3.

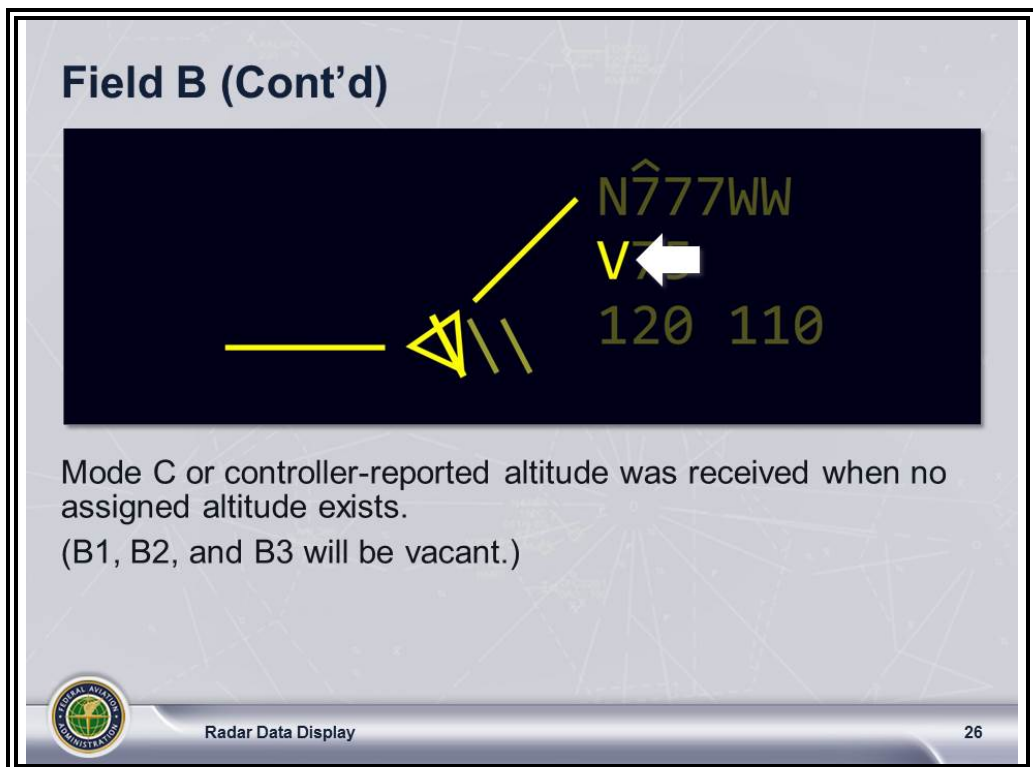
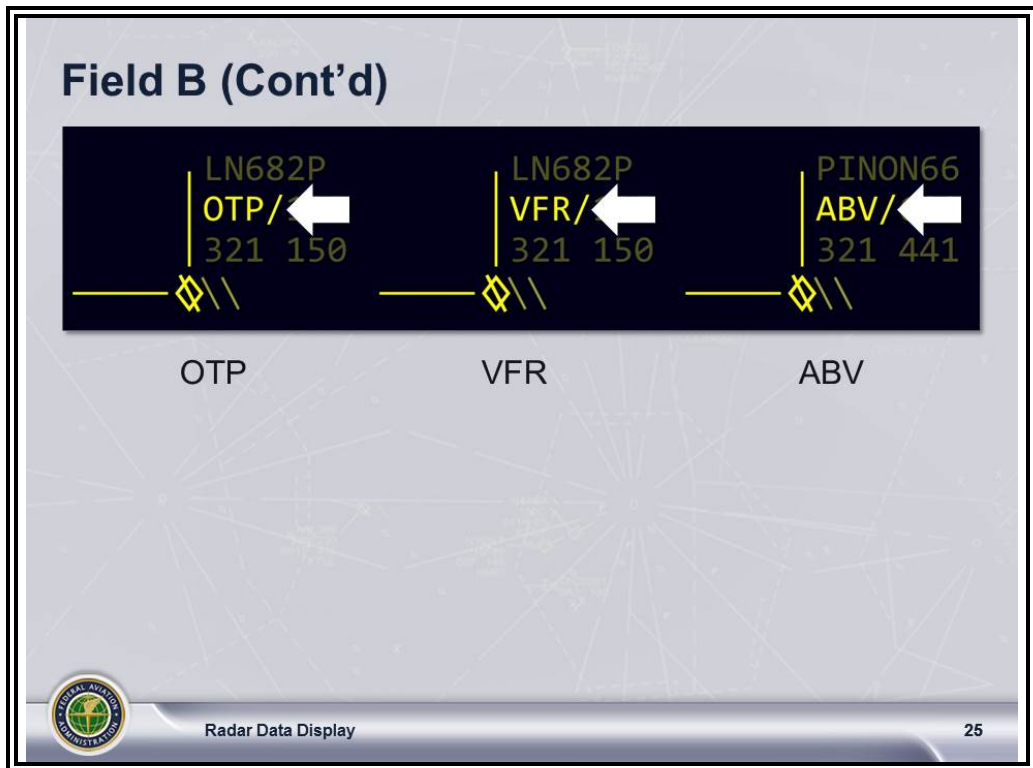
 Radar Data Display 24

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B (Cont'd)

TI 6110.100,
par. 4.3.1;
ERAM EDSM SRS
210.04 V1B2
Appendix E.2



Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B (Cont'd)

TI 6110.100,
par. 4.3.1;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2

Field B (Cont'd)



Mode C is unreliable or not being received for an aircraft that had previously been radar-beacon reported at an altitude.



Radar Data Display

27

Field B (Cont'd)



Interim altitude is displayed in B1, B2, and B3.



Radar Data Display

28

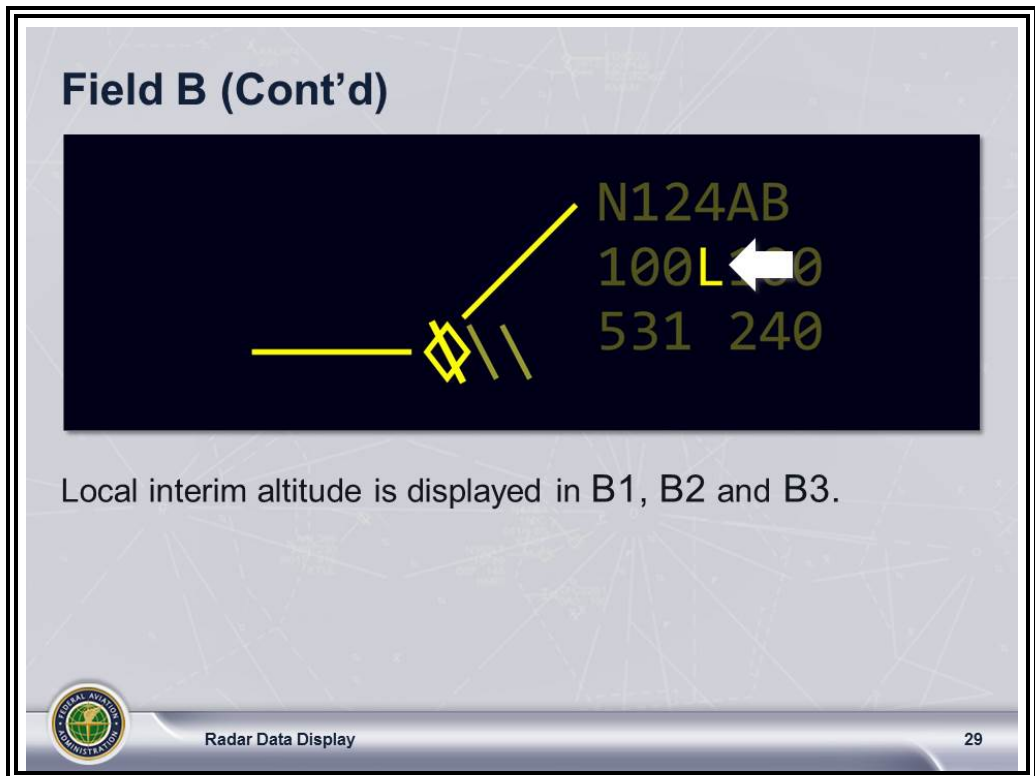
Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field B

(Cont'd)

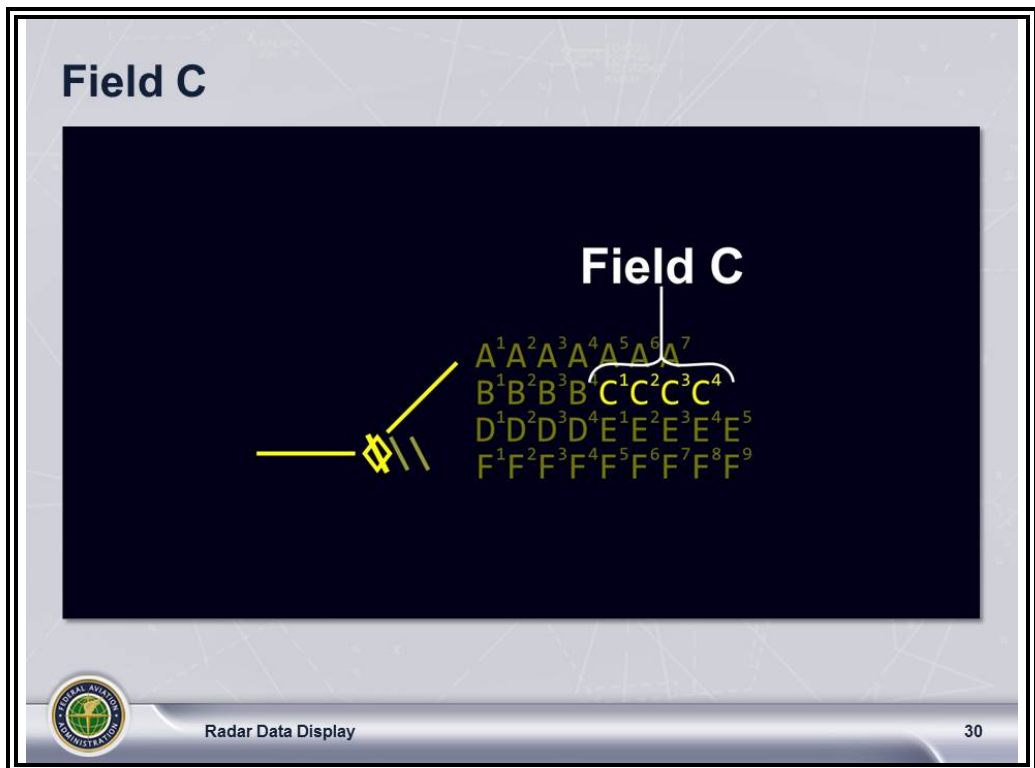
TI 6110.100,
par. 4.3.1;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2



FULL DATA BLOCK (FDB) *(Continued)*

Field C

TI 6110.100,
par. 4.3.1;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2



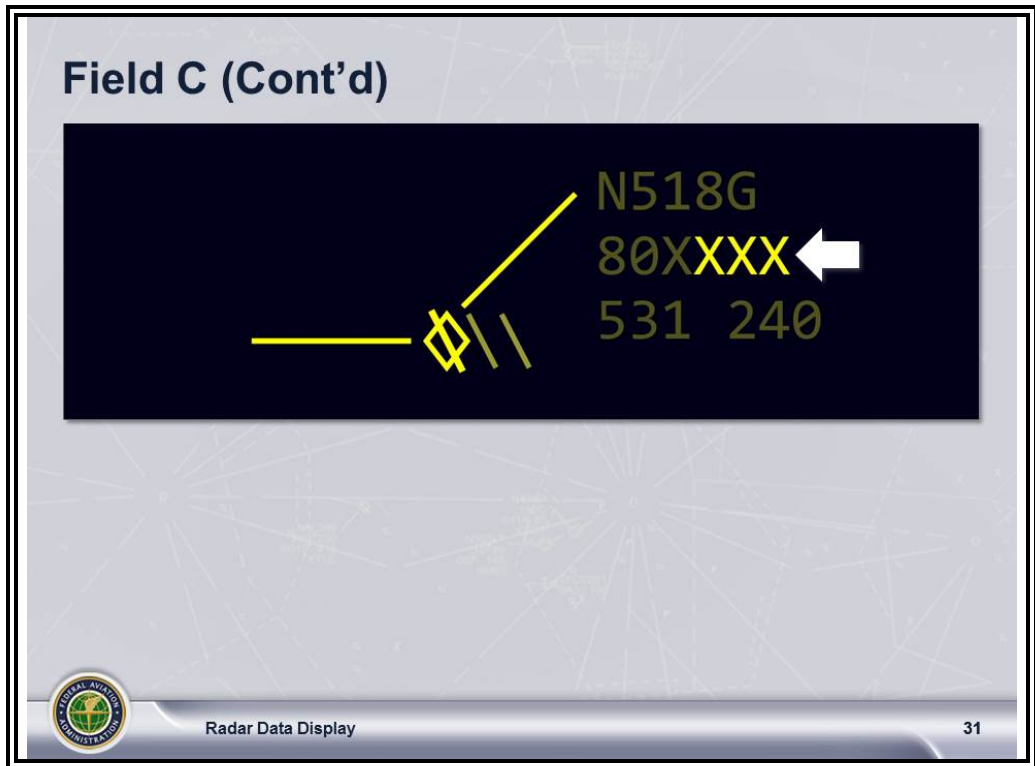
- ⦿ Four character positions
 - C1 through C3 contain:
 - Mode C or controller-reported altitude
 - Upper altitude of a block altitude

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field C (Cont'd)

TI 6110.100,
par. 4.3.7



- ⦿ Four Xs (XXXX) indicate Lost Mode C (B4, C1-3).
 - Displayed for an aircraft that previously had Mode C when an adapted number of returns have been received with no Mode C
 - Removed once Mode C is received


Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*


Field C (Cont'd)

ERAM EDSM SRS
210.04 V1B2
Appendix E.2

Field C (Cont'd)



Controller-entered reported altitude does **NOT** equal single assigned altitude.

 Radar Data Display 32

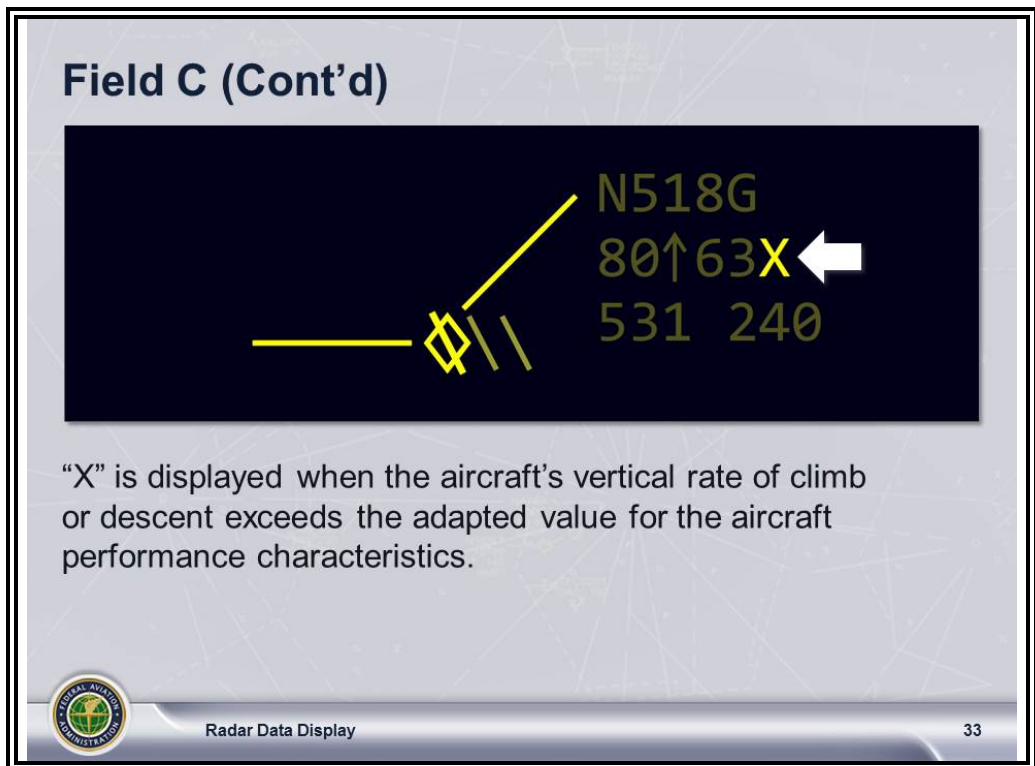
- ⦿ C4 position contains a pound sign (#) to indicate:
 - Aircraft is **NOT** responding with Mode C altitude.
 - Controller-entered altitude does **NOT** equal the single assigned altitude.
- ⦿ If Mode C is being received, CERA entry has to be within an adapted parameter or it will not be overridden by Mode C.

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field C (Cont'd)

TI 6110.100,
par. 4.3.8;
JO 7110.311B,
par. 5-2-17



- ⦿ A single X following the Mode C altitude value serves as the Exceptional Vertical Rate Indicator (EVRI):
 - Indicates the aircraft's vertical rate of climb or descent exceeds the adapted value for the aircraft performance characteristics
 - Once the aircraft returns to its expected climb or descent rate, the EVRI will be removed
- ⦿ The display of the EVRI is an invalid Mode C and cannot be used for separation.
- ⦿ The Mode C altitude readout must be validated after the X is no longer displayed in the data block.
- ⦿ Field C is blank if Mode C or controller-entered altitude equals assigned altitude.

ERAM EDSM SRS
210.04 V1B1,
par. 3.2.2.3.2.1;
ERAM EDSM SRS
210.04 V1B2,
Section C.1

FULL DATA BLOCK (FDB) *(Continued)*

Field D

(Cont'd)

ERAM EDSM SRS
210.04 V1B1,
par. 3.2.2.3;
ERAM EDSM SRS
210.04 V1B2,
Appendix E.2

Field D (Cont'd)

Diagram illustrating Field D (Cont'd) data for two radar tracks. The left track is labeled N1765, 120C, R641, and the right track is labeled N1765, 120C, 641. Both tracks have a white arrow pointing left and a yellow diamond symbol. Below the tracks, the text reads: "Your sector does **NOT** have track control." and "Your sector has track control."

35

FULL DATA BLOCK (FDB) *(Continued)*

Field E

TI 6110.100,
par. 4.3.4;
ERAM EDSM SRS
210.04 V1B1,
3.2.2.3.2.1



- ⦿ Field E data may contain up to five characters.
- ⦿ Certain display objects blink on and off.
- ⦿ The Heading/Speed/Free Form Text (HSF) Indicator follows Field E.

Continued on next page

FULL DATA BLOCK (FDB) (Continued)

Field E (Cont'd)

TI 6110.100,
par. 4.3.4

Field E (Cont'd)



Certain display objects in Field E blink for the duration of the condition:

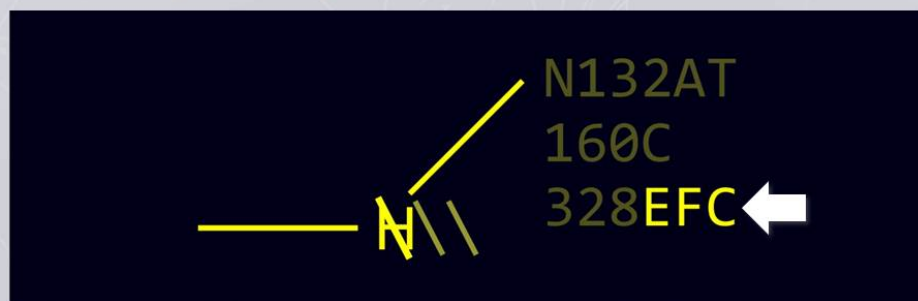
- Alert Beacon Codes 7700 (EMRG) and 7600 (RDOF)
- Two adapted special beacon codes



Radar Data Display

37

Field E (Cont'd)



EFC displays for an aircraft in Hold when the EFC is within a locally adapted number of minutes.



Radar Data Display

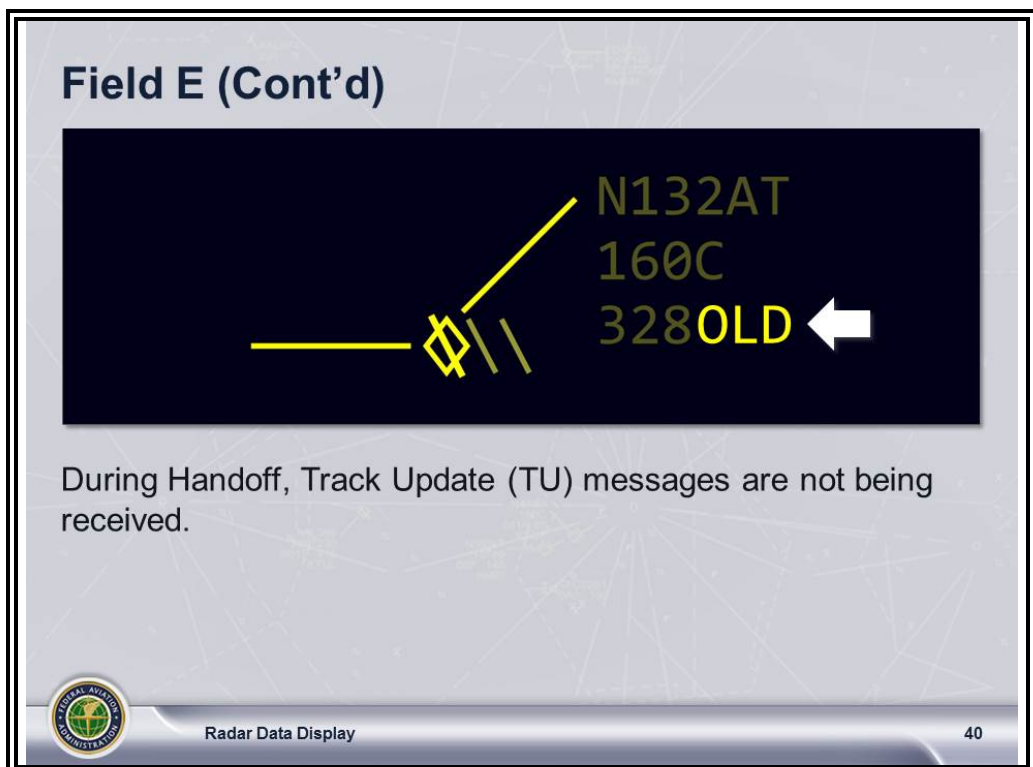
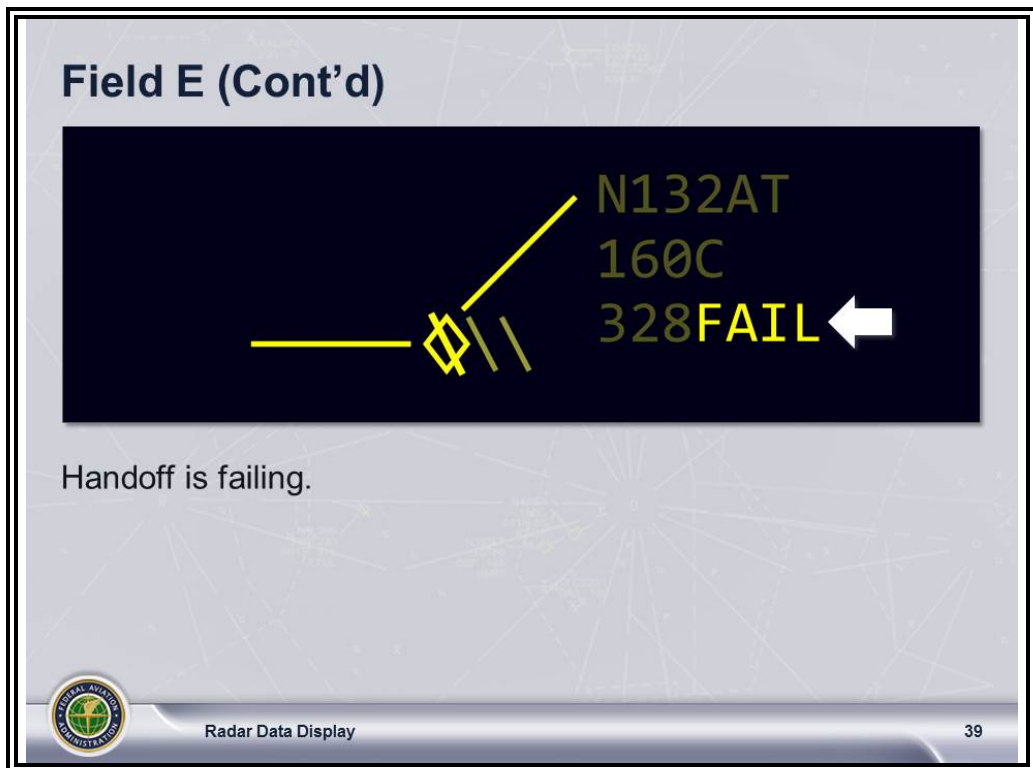
38

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)

TI 6110.100,
par. 4.3.4




Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)


TI 6110.100,
par. 4.3.4

Field E (Cont'd)




The radar display shows a track with a yellow diamond symbol. To the right of the track, the text "N132AT" is displayed in green, "160C" in green, and "328MIFF" in yellow. A white arrow points to the "328MIFF" text.

E-MSAW alert is indefinitely suppressed.


 Radar Data Display 41

Field E (Cont'd)



The radar display shows a track with a yellow diamond symbol. To the right of the track, the text "N132AT" is displayed in green, "160C" in green, and "328MOFF" in yellow. A white arrow points to the "328MOFF" text.

E-MSAW alert is suppressed on a track for a specific alert.

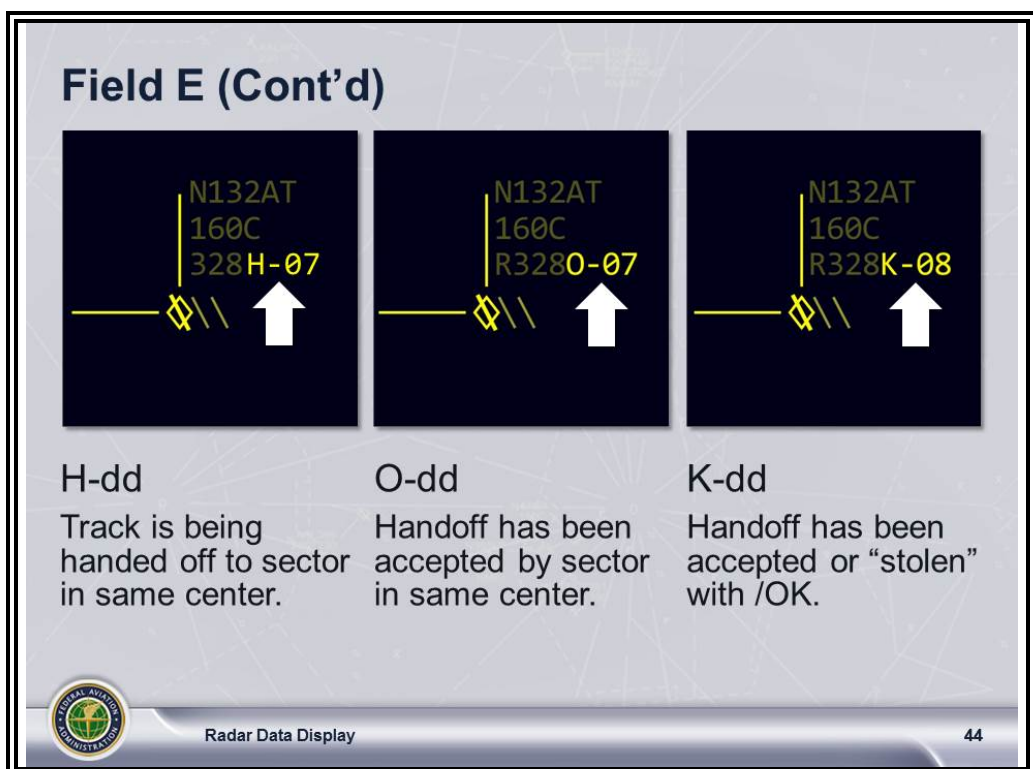
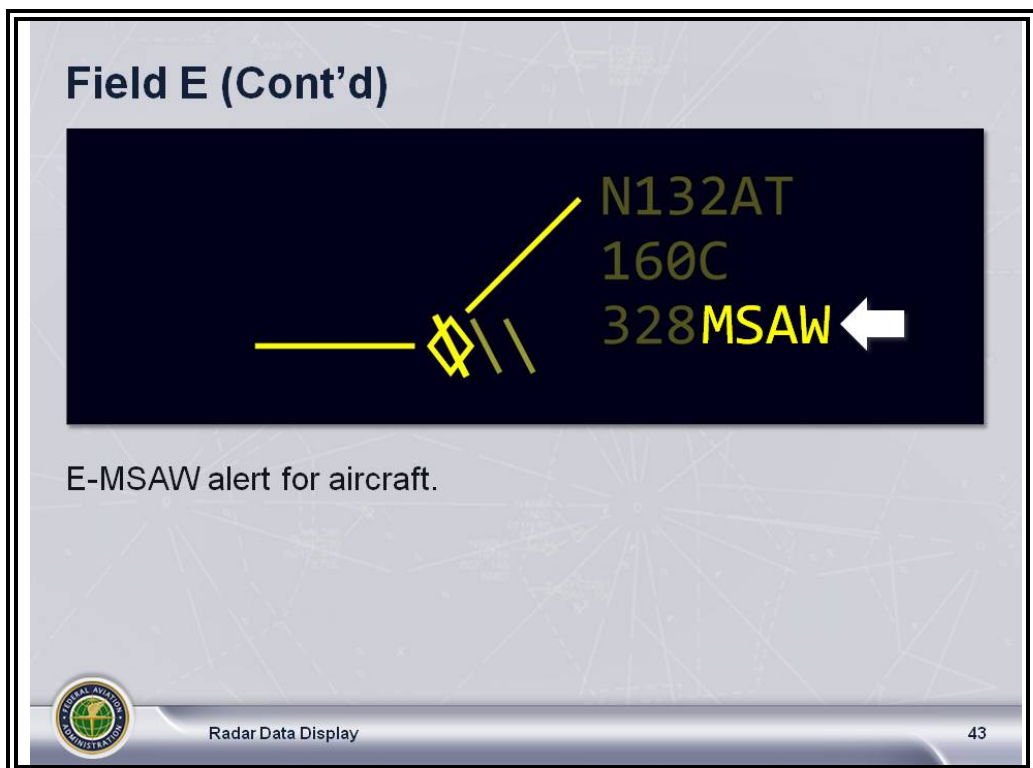
 Radar Data Display 42

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)

TI 6110.100,
par. 4.3.4




Continued on next page

FULL DATA BLOCK (FDB) (Continued)

Field E (Cont'd)


TI 6110.100,
par. 4.3.4

Field E (Cont'd)




HLdd

Track is being handed off intercenter or from an ARTS facility.




OLdd

Handoff has been accepted or retracted.



KLdd


Handoff has been accepted or "stolen" with /OK.



Radar Data Display


45

Field E (Cont'd)




HLLL

Track is being handed off to ARTS facility.



OLLL

Handoff has been accepted by ARTS facility.



Radar Data Display

46


Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)


TI 6110.100,
par. 4.3.4

Field E (Cont'd)

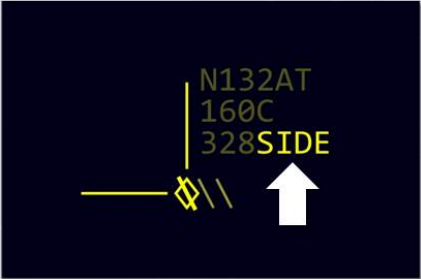


HL

Automated handoff being made to another center.

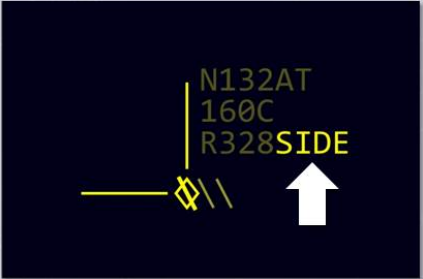
 Radar Data Display 47

Field E (Cont'd)




SIDE

Side Stream handoff being made to another facility.



SIDE

Side Stream handoff has been accepted by the other facility.

 Radar Data Display 48


Continued on next page

FULL DATA BLOCK (FDB) (Continued)

Field E (Cont'd)

TI 6110.100,
par. 4.3.4


Field E (Cont'd)



N132AT
160C
328HUNK

HUNK


Track is being handed off to an unknown facility.



N132AT
160C
R328OUNK

OUNK


Handoff has been accepted by an unknown facility.



Radar Data Display

49

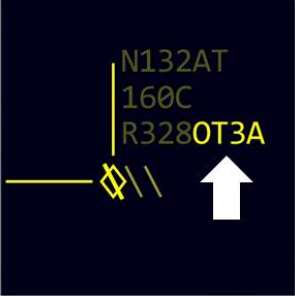
Field E (Cont'd)



N132AT
160C
328HT3A

HLdL

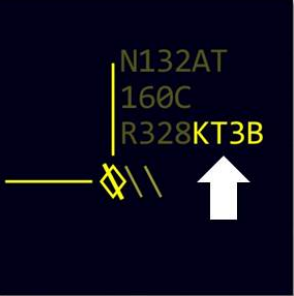
Track is being handed off to a specific position dL in an ARTS facility.



N132AT
160C
R328OT3A

OLdL


Handoff has been accepted by a position dL in an ARTS facility.



N132AT
160C
R328KT3B

KLdL

Handoff has been accepted by a position LdL (different from the position addressed in handoff) in an ARTS facility.



Radar Data Display

50




Continued on next page


FULL DATA BLOCK (FDB) (Continued)

Field E (Cont'd)




TI 6110.100, par.
4.3.4; ERAM EDSM
SRS 210.04 V1B2,
Appendix E.2


Field E (Cont'd)

		
HLLdL Track is being handed off to a specific position dL in an ARTS facility (first L).	OLLdL Handoff has been accepted by ARTS where LL is the ARTS ID and dL is the position.	KLLdL Handoff has been accepted by ARTS where LL is the ARTS ID and dL is the position that accepted the handoff.

 Radar Data Display 51

Field E (Cont'd)

		
HLLx Track is being handed off to a position x in an ARTS facility LL.	OLLx Handoff has been accepted by a position x in an ARTS facility LL.	KLLx Handoff has been accepted by position x (different from the position addressed in handoff) in an ARTS facility LL.

 Radar Data Display 52


Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)


TI 6110.100,
par. 4.3.4

Field E (Cont'd)




The radar display shows a yellow line representing the aircraft's path, ending in a yellow 'N' with two diagonal slashes. To the right, the text 'N132AT' is displayed in yellow, followed by '160C' in yellow and '328HOLD' in yellow with a white arrow pointing left.

Aircraft is in hold status.


 Radar Data Display 53

Field E (Cont'd)



The radar display shows a yellow line representing the aircraft's path, ending in a yellow '#'. To the right, the text 'AAL523' is displayed in yellow, followed by '170N' in yellow and '722CST' in yellow with a white arrow pointing left.

Aircraft is in coast status, radar data is not being received, or the flight is unpaired.

 Radar Data Display 54

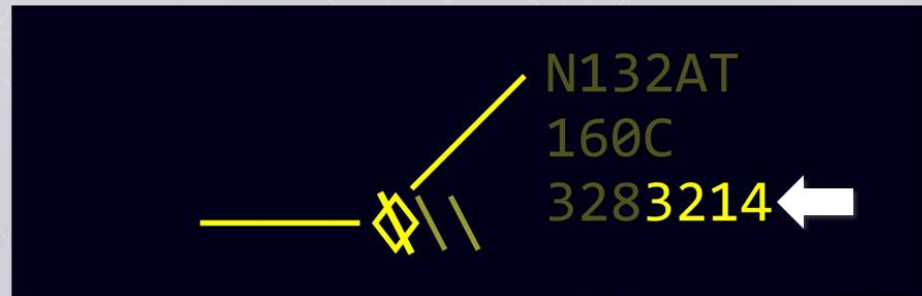
Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)

TI 6110.100,
par. 4.3.4

Field E (Cont'd)



Aircraft has an assigned beacon code, but the code received is not the proper code.

(Field E will display the code received.)



Radar Data Display

55

Field E (Cont'd)



Aircraft has an assigned beacon code, but none is received.



Radar Data Display

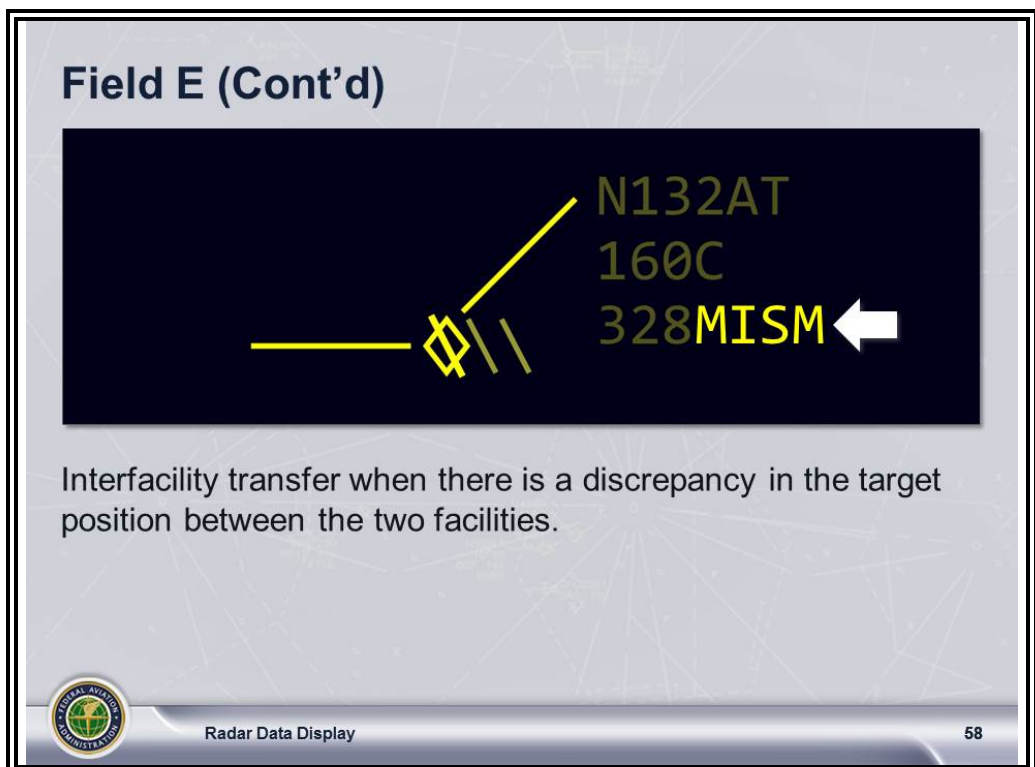
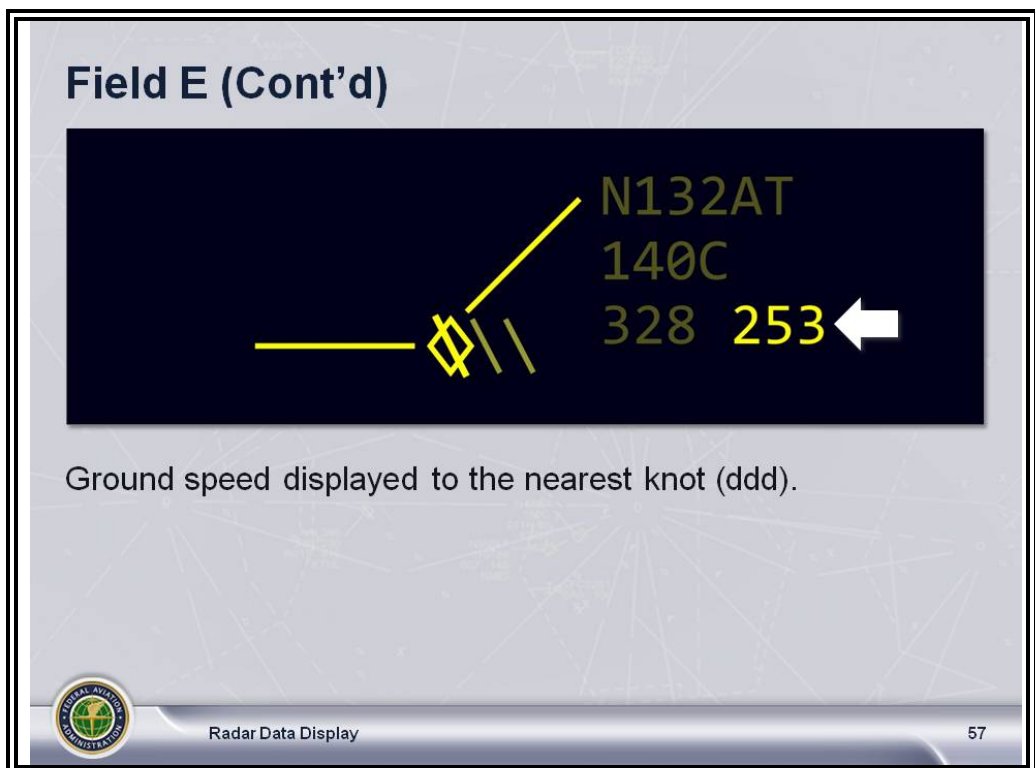
56

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)

TI 6110.100,
par. 4.3.4; ERAM
EDSM SRS 210.04
V1B2, Table 53




Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field E (Cont'd)


TI 6110.100,
pars. 4.3.4, 4.3.6

Field E (Cont'd)




N132AT
160C
328DATA

Interfacility transfer of FDB when either a transferring or receiving facility or both do not have radar data.


 Radar Data Display 59

Field E (Cont'd)



AAL523
170N
722FRZN

Displayed when the data block is in frozen (FRZN) status indicating that the data block is unpaired from the target.

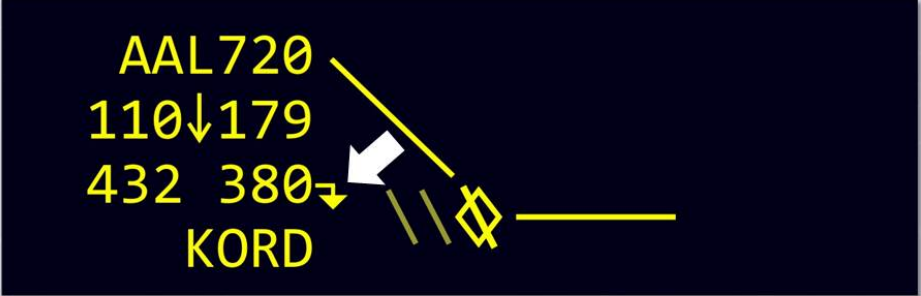
 Radar Data Display 60

FULL DATA BLOCK (FDB) *(Continued)*


Field E (Cont'd)

TI 6110.100,
pars. 4.3.4, 4.3.6

Field E (Cont'd)



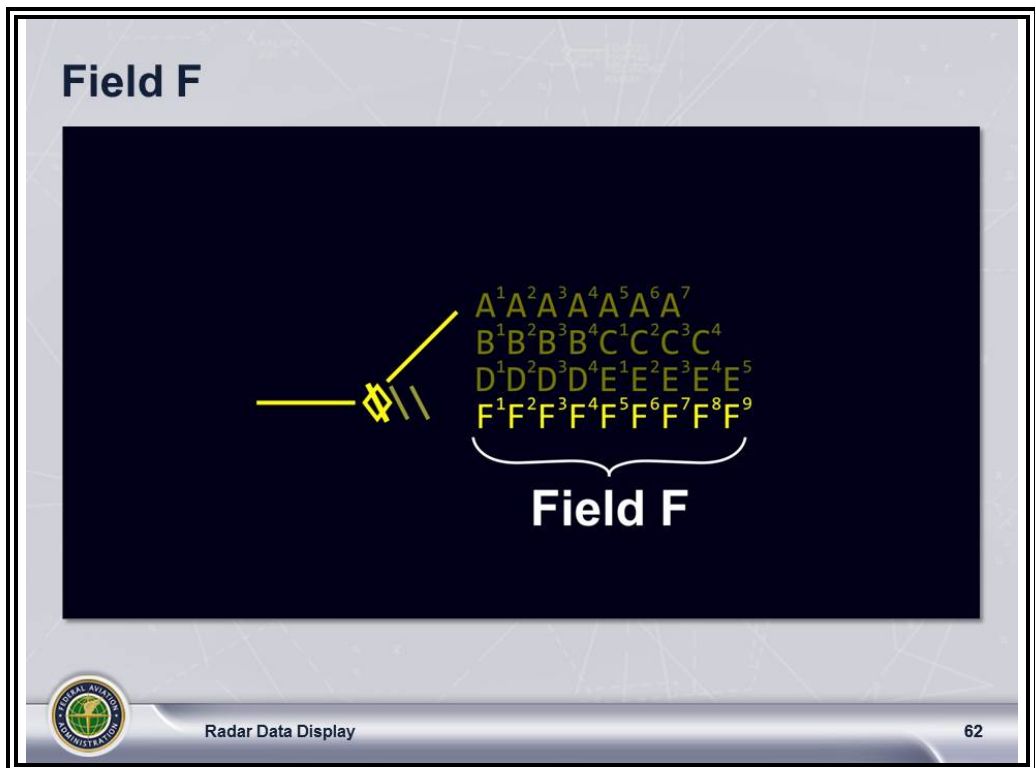
The HSF indicator toggles the heading, speed, and free form text in the associated FDB.

 Radar Data Display [Click to Play Animation](#) 61

FULL DATA BLOCK (FDB) *(Continued)*

Field F

JO 7110.65,
pars. 2-6-4,
5-4-11;
TI 6110.100,
pars. 4.3.1, 4.9,
4.22



- ⦿ Field F is located on the 4th line and may contain up to 9 characters.
 - Can display the following data items:
 - Heading
 - Speed
 - Both heading and speed
 - Free Form Text
 - Aircraft data (aircraft type and equipment suffix)
 - Destination


Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field F (Cont'd)

JO 7110.65,
pars. 2-6-4,
5-4-11;
TI 6110.100,
pars. 4.3.1, 4.9,
4.22

Field F (Cont'd)	
Fourth Line Data Examples	
Heading	H140, PH, 20R, 35L
Speed	S300, S230+, S250- M78, M80+, M82-
Heading and Speed	H240 M75
Weather Deviations	D20L, D080+120, DL/ATL D20R/ONL, D090/F

 Radar Data Display 63

- ⊙ The following Field F entries are approved for use without verbal coordination:

- Headings - the letter H followed a three-digit number
- Present Heading - the letters PH

Examples: H050, PH, H180/JAX, H300/J79, H240/V157, PH/CHA

- Assigned Speeds - the letter S followed by a three-digit number, or M (Mach) followed by the two-digit assigned value
 - The symbol (+) (maintain a specified speed or greater), or the symbol (-) (maintain a specified speed or less) may follow the assigned speed or Mach number.

Examples: S250, S210+, S230-, M82, M76+, M80-

Continued on next page

FULL DATA BLOCK (FDB) *(Continued)*

Field F

(Cont'd)

JO 7110.65,
pars. 2-6-4,
5-4-11;
TI 6110.100,
pars. 4.3.1, 4.9,
4.22

- Weather deviations:
 - Must use the designated characters:
 - D – deviation
 - L – left
 - R – right
 - N – north
 - E – east
 - S – south
 - W – west
 - /F - direct next NAVAID/waypoint
 - D+2 headings - deviate between
 - Two digits specify turns in degrees and must include direction characters. Three digits specify headings.

Examples: DN, D20L, D080+120

- The inclusion of a /NAVAID, /waypoint, or /F indicates that the pilot has been authorized to deviate for weather and must rejoin the route at the next NAVAID, waypoint, or fix in the route of flight.

Examples: DL/ATL, D20R/ONL, D090/F

- The absence of a NAVAID, waypoint, or /F indicates that the pilot has been authorized to deviate for weather only, and the receiving controller must provide a clearance to rejoin the route.

NOTE: If the weather deviation instructions exceeds the nine characters limit, verbal coordination is required.

- Aircraft authorized to conduct celestial navigation

Example: CELNAV


Continued on next page

FULL DATA BLOCK (FDB) (Continued)

Field F (Cont'd)

JO 7110.65,
pars. 2-6-4,
5-4-11;
TI 6110.100,
pars. 4.3.1, 4.9,
4.22

Field F (Cont'd)	
Fourth Line Data Examples	
Free Form Text	H090/FSM, PH/CHA, RQ/WENDY, RQ090, RQ270, CELNAV
Aircraft Data	B737/L
Destination	KORD

 Radar Data Display 64

- Request for altitude change – the letters RQ followed by the requested altitude in three-digits

Examples: RQ090, RQ150, RQ350

- Request for route change – the letters RQ, followed by a slant (/), followed by a specific fix identifier

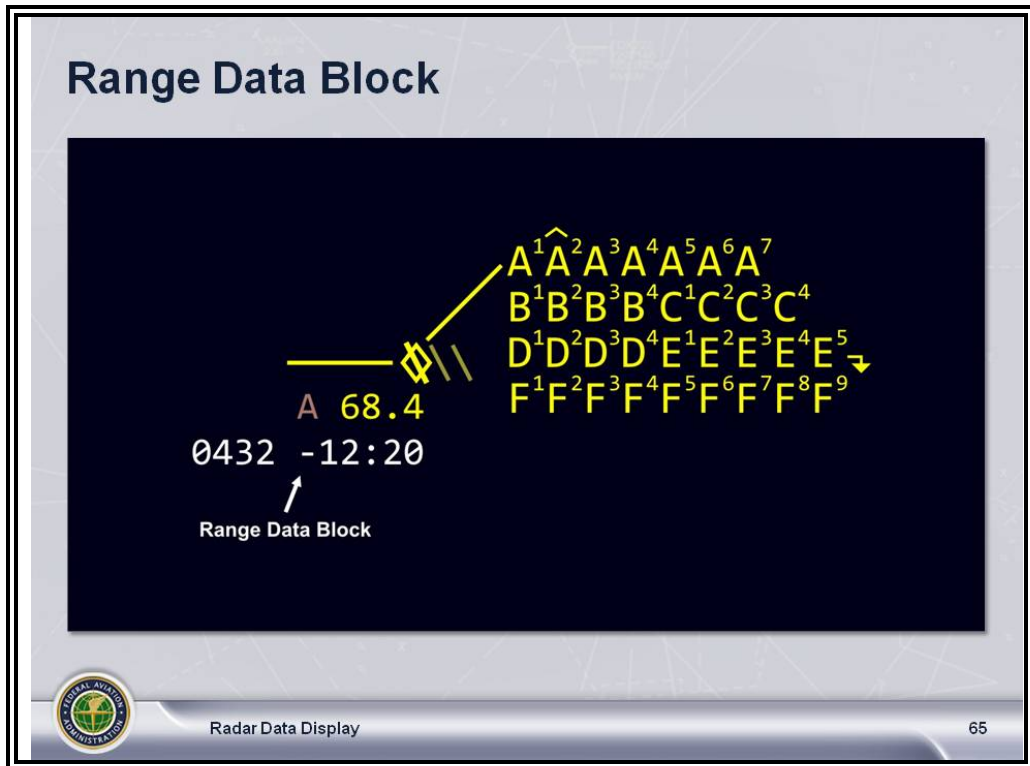
Examples: RQ/ICT, RQ/TUL, RQ/TRUMP

- ⦿ Free Form Text Area may be used by individual sector teams for recording any additional information the team deems appropriate for managing the sector.
 - Must be removed prior to initiation of identification transfer
- ⦿ Free Form Text Area must be used for coordination purposes only in association with radar identified aircraft.

RANGE DATA BLOCK (RDB)

Range Data Block

TI 6110.100,
par. 9.6

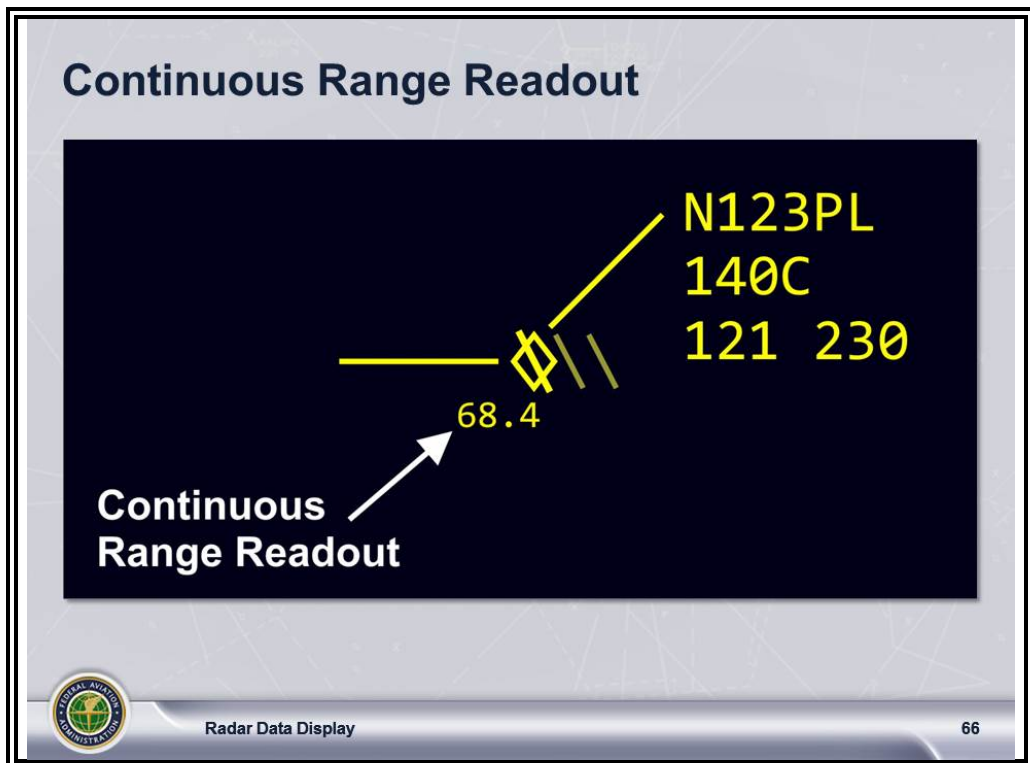


- ⦿ The Range Data Block (RDB) is a special data block linked to the target position symbol that provides continuous range read-out data.
- ⦿ Other information can also be displayed, including Non-ADS-B Indicator, Scheduled Time of Arrival (STA) and/or Delayed Countdown Time (DCT).

RANGE DATA BLOCK (RDB) *(Continued)*

Continuous Range Readout

TI 6110.100,
par. 9.6

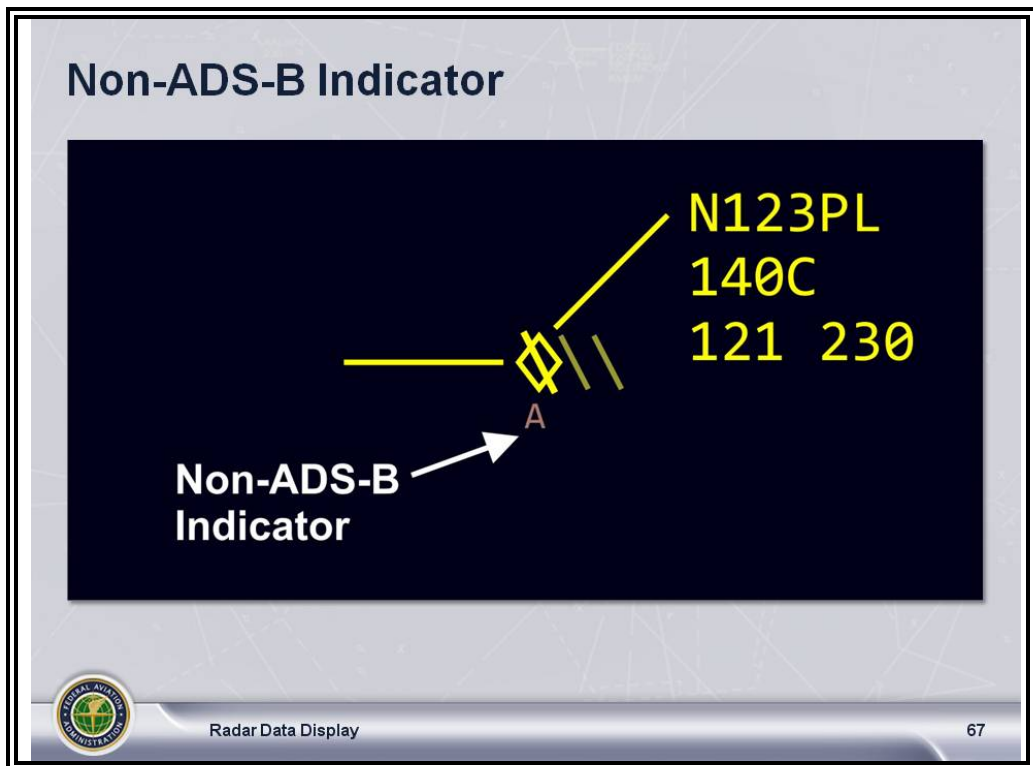


- ⦿ Continuous Range Readout (CRR) indicates the distance in nautical miles from the selected target to a controller determined fix.
 - Displays in Range Data Block (RDB) next to the target symbol of the aircraft
 - Displays only in FDBs, not in LDBs or ELDBs
- ⦿ Left/middle-click the CRR RDB button in the DB Fields Toolbar to toggle on/off the display of CRR in the FDB.

RANGE DATA BLOCK (RDB) (Continued)

Non-ADS-B Indicator

ERAM EDSM SRS
210.04 V1B1,
3.2.2.3.2;
TI 6110.100,
par. 4.2.5

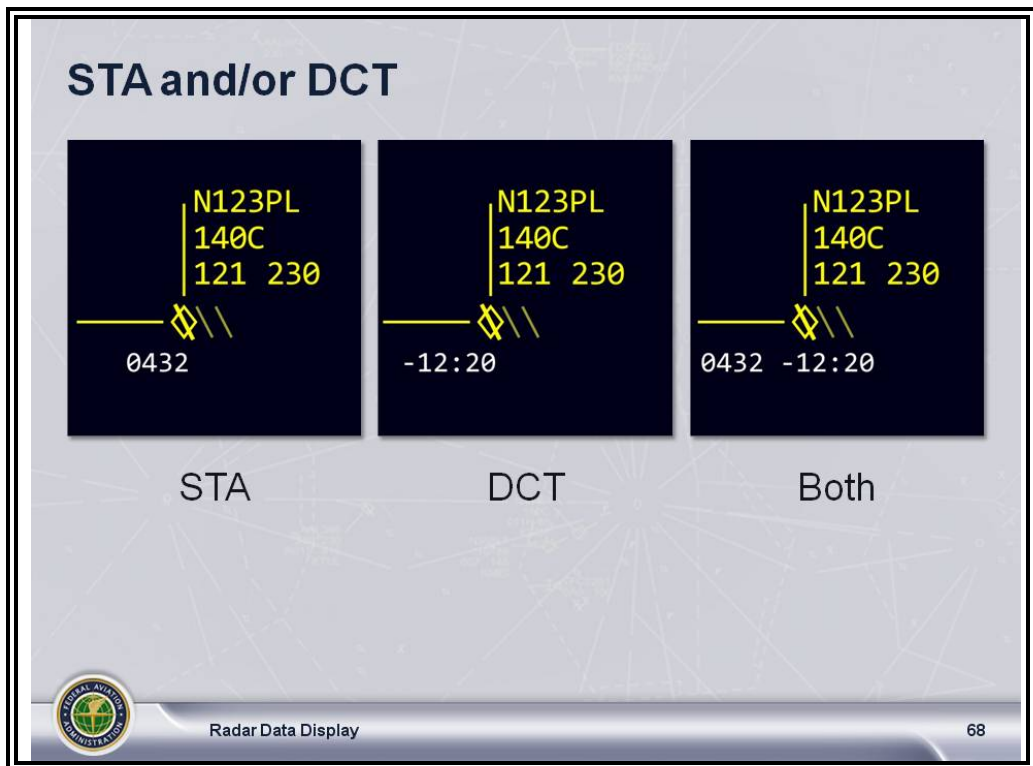


- ⦿ The Non-ADS-B Indicator indicates that an aircraft is not ADS-B (Automatic Dependent Surveillance Broadcast) equipped or that its ADS-B equipment is not operating properly, and that the target position is based on radar data, not ADS-B data.
 - Displays only in RDB of FDBs, not in LDBs or ELDBs
 - Brightness controlled by the NON-ADS-B button in the DB Fields Toolbar
- ⦿ If ADS-B is operating for all participants, no indicator displays.

RANGE DATA BLOCK (RDB) (Continued)

STA and/or DCT

TI 6110.100,
par. 9.6



- ⦿ The Range Data Block can display Scheduled Time of Arrival (STA) and/or Delayed Countdown Time (DCT).
 - Display only in FDBs, not in LDBs or ELDBs
 - DCT displays in minutes and tens of seconds
 - Display of tens of seconds is facility adaptable
 - Minus sign indicates a negative delay time
 - Zero indicates delay time is less than one minute
- ⦿ Left/middle-click STA RDB and/or DELAY button in the DB Fields Toolbar to toggle on/off STA and DCT respectively.

REVIEW: FDB AND RDB

Review

❖ **QUESTION:** How many feet must an aircraft deviate from its assigned altitude before the deviation is indicated in fields B4 and C?

❖ **QUESTION:** What data block information indicates that Mode C is unreliable or not being received?

❖ **QUESTION:** When an aircraft has a computer-assigned beacon code but the received code is not the one assigned, how is this indicated and in what field?

Continued on next page


REVIEW: FDB AND RDB *(Continued)*

Review (Cont'd)

Review

Identify these computer-generated altitude qualifiers in Field B4.

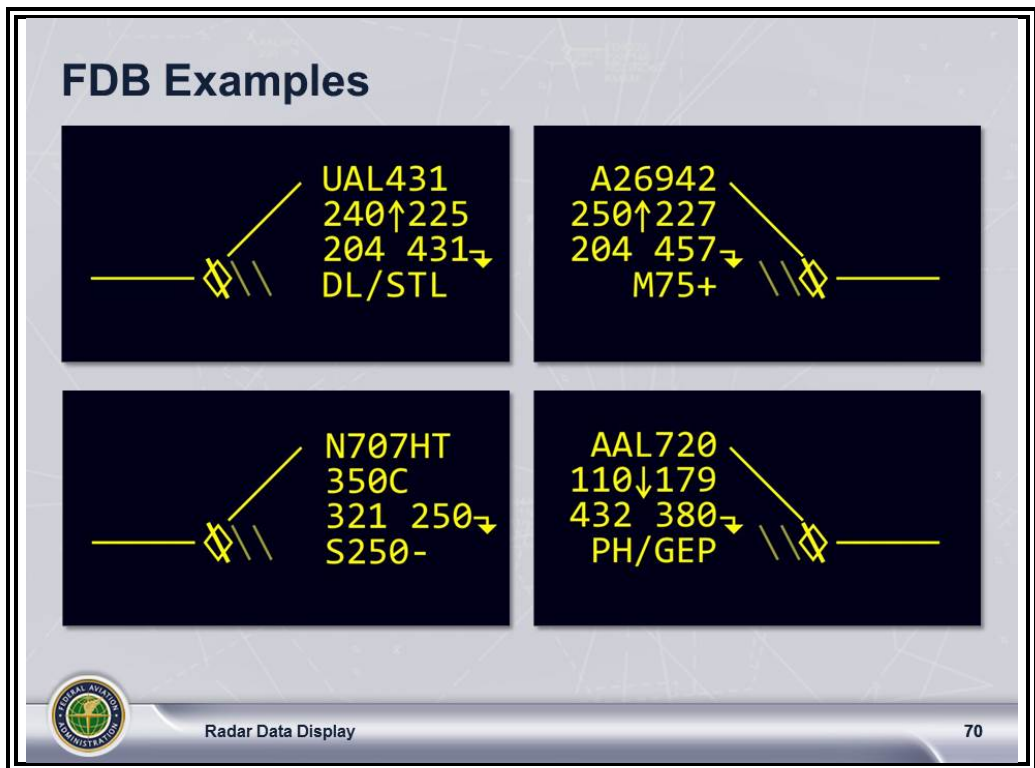
↑	B	+	V	
↓	C	-	/	
A	F	N	T	L

 Radar Data Display [Click to Play Animation](#) 69

Continued on next page

REVIEW: FDB AND RDB (Continued)

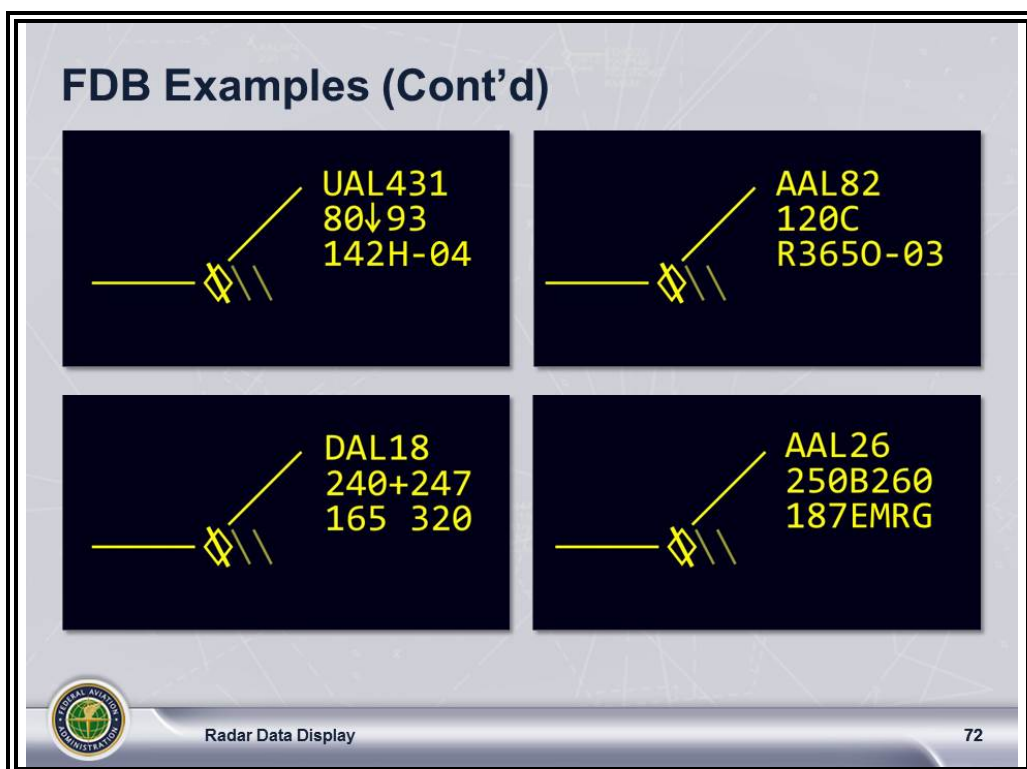
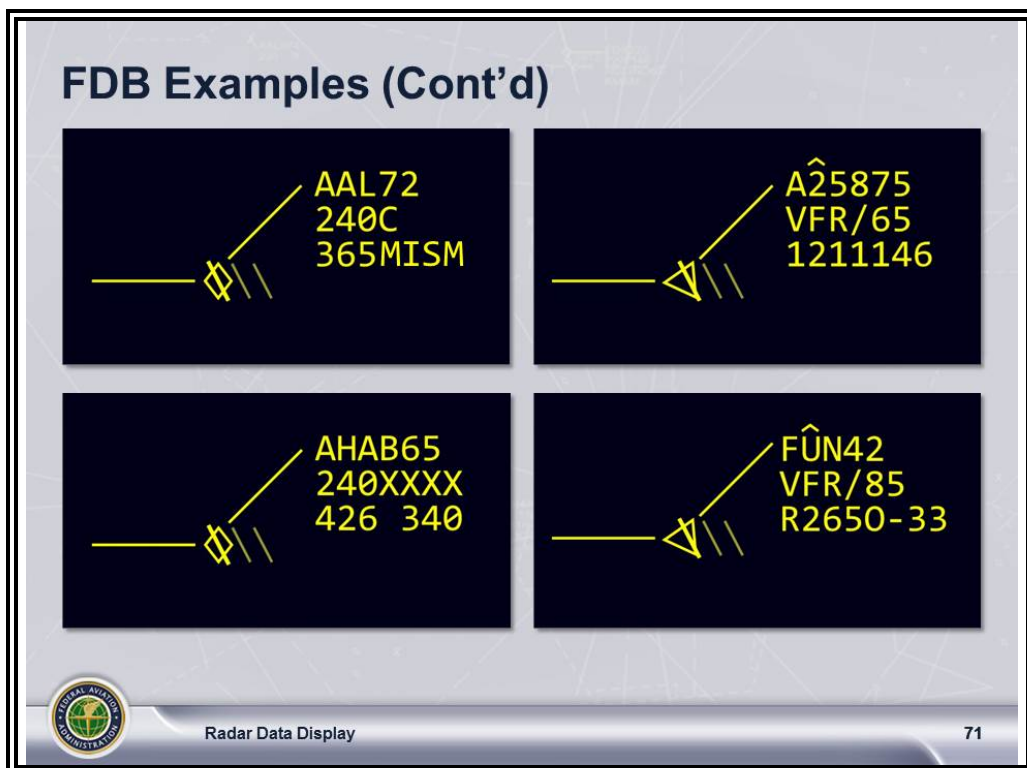
Review
(Cont'd)



Continued on next page

REVIEW: FDB AND RDB (Continued)

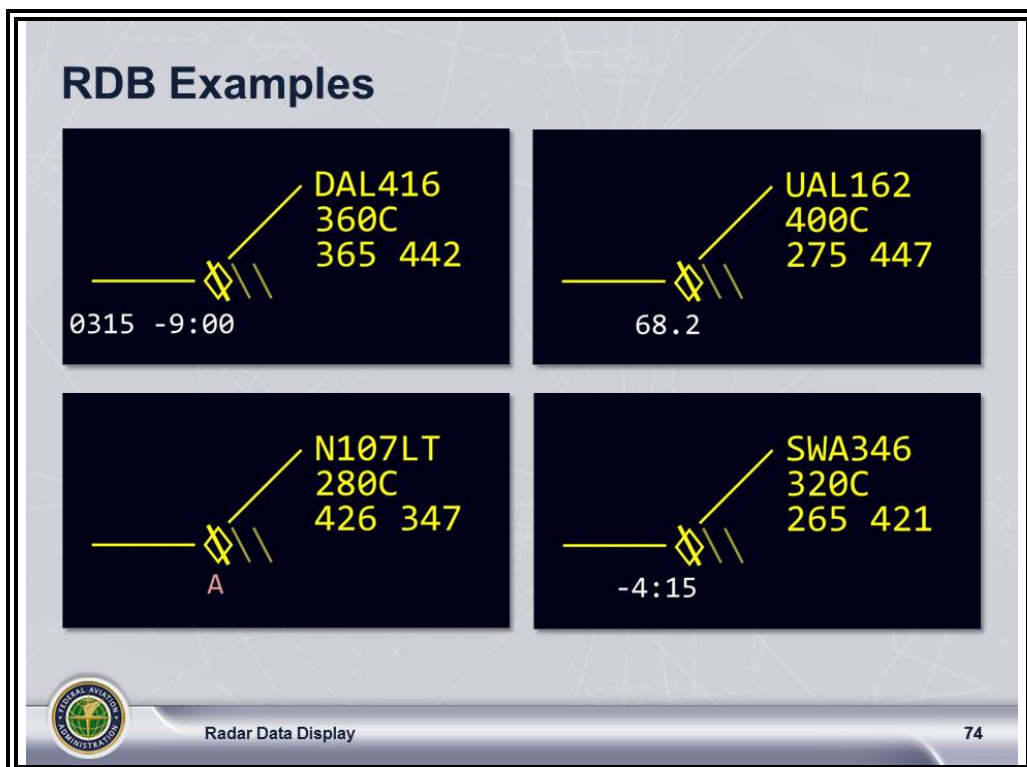
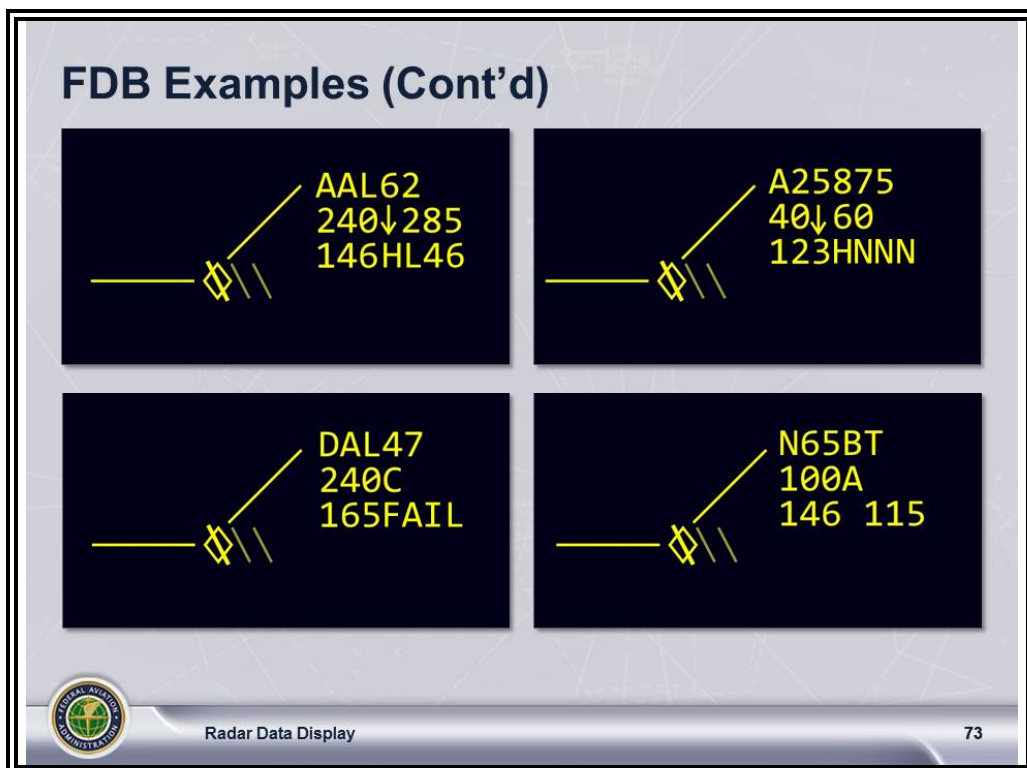
Review
(Cont'd)



Continued on next page

REVIEW: FDB AND RDB (Continued)

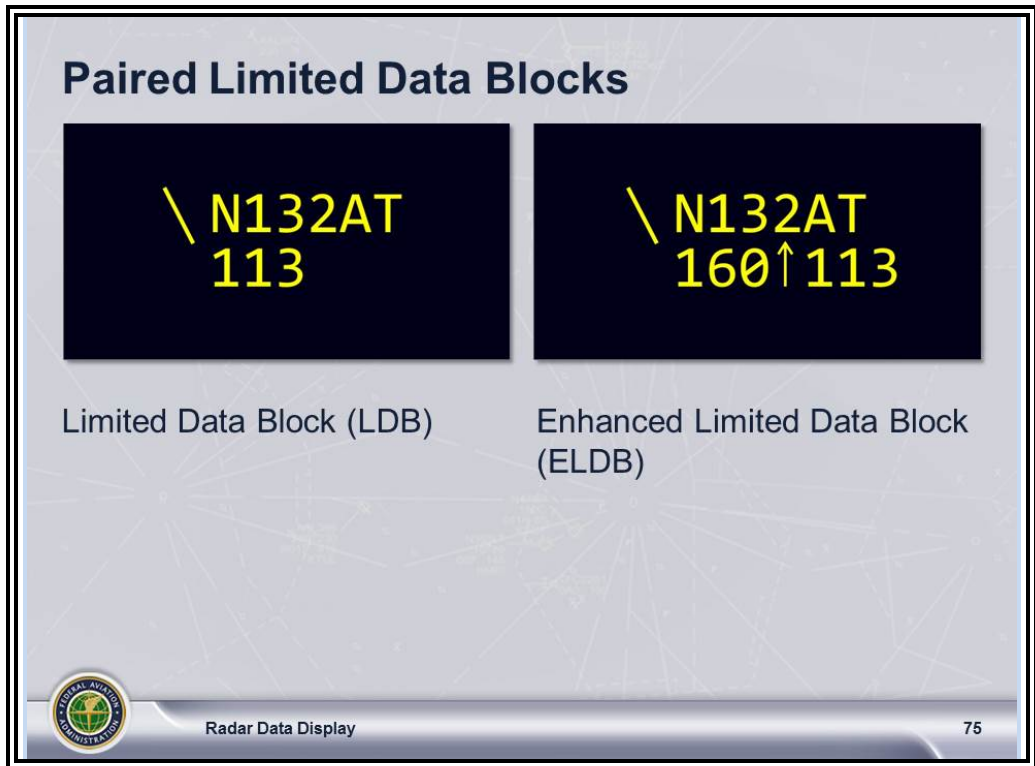
Review (Cont'd)



LIMITED DATA BLOCK (LDB)

Paired Limited Data Blocks

TI 6110.100,
pars. 4.3, 4.3.2



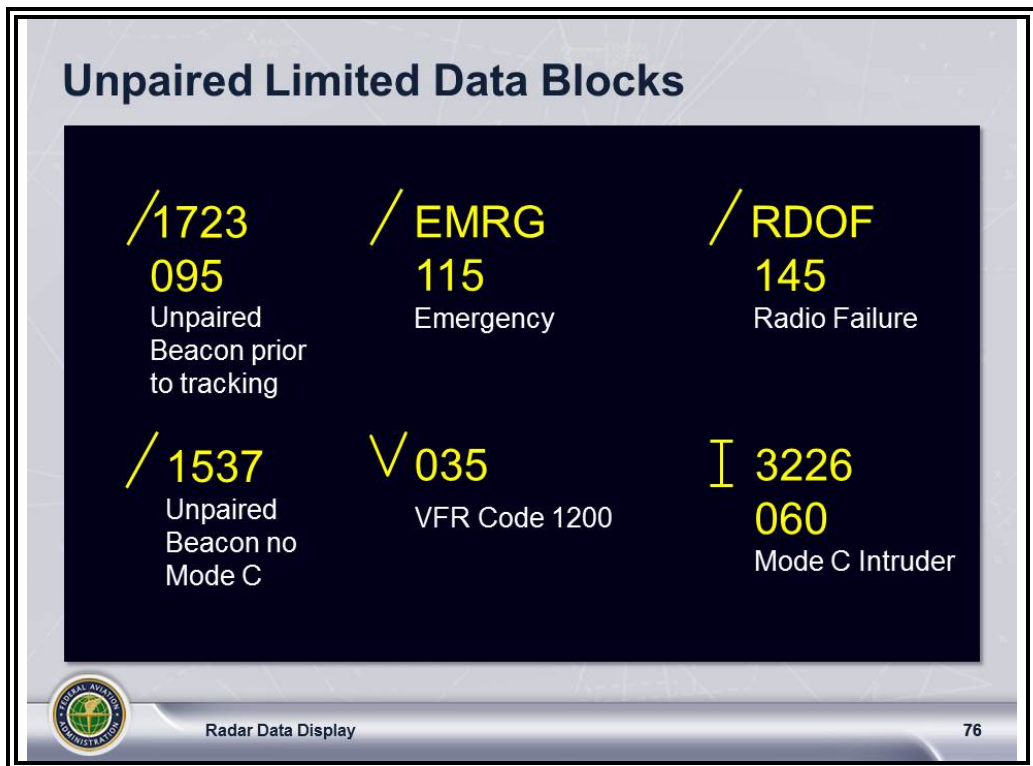
⦿ Paired Limited Data Blocks:

- Display Aircraft Identification (AID) and Mode C altitude
- NO position symbol, leader line, or velocity vector line
- Display at LDB brightness

LIMITED DATA BLOCK (LDB) *(Continued)*

Unpaired Limited Data Blocks

TI 6110.100,
pars. 4.3, 4.3.2



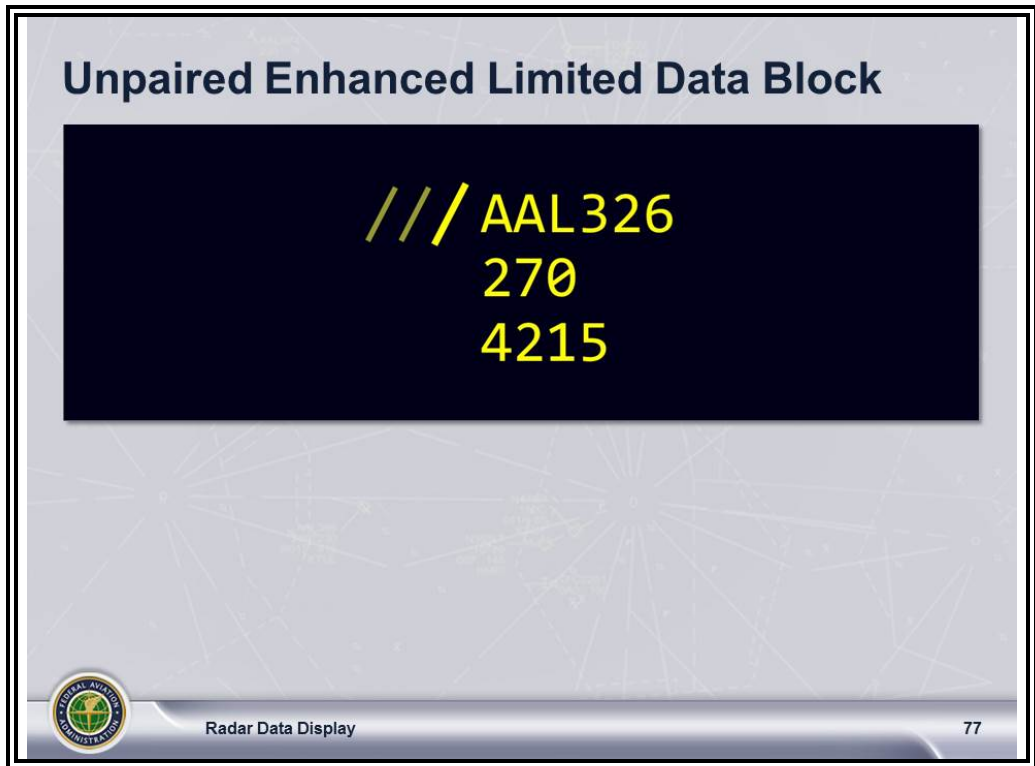
⦿ Unpaired Limited Data Blocks:

- Display beacon code and Mode C altitude
- NO position symbol, leader line, or velocity vector line
- Displayed at LDB brightness

LIMITED DATA BLOCK (LDB) *(Continued)*

Unpaired Enhanced Limited Data Blocks

TI 6110.100,
par. 4.3.2

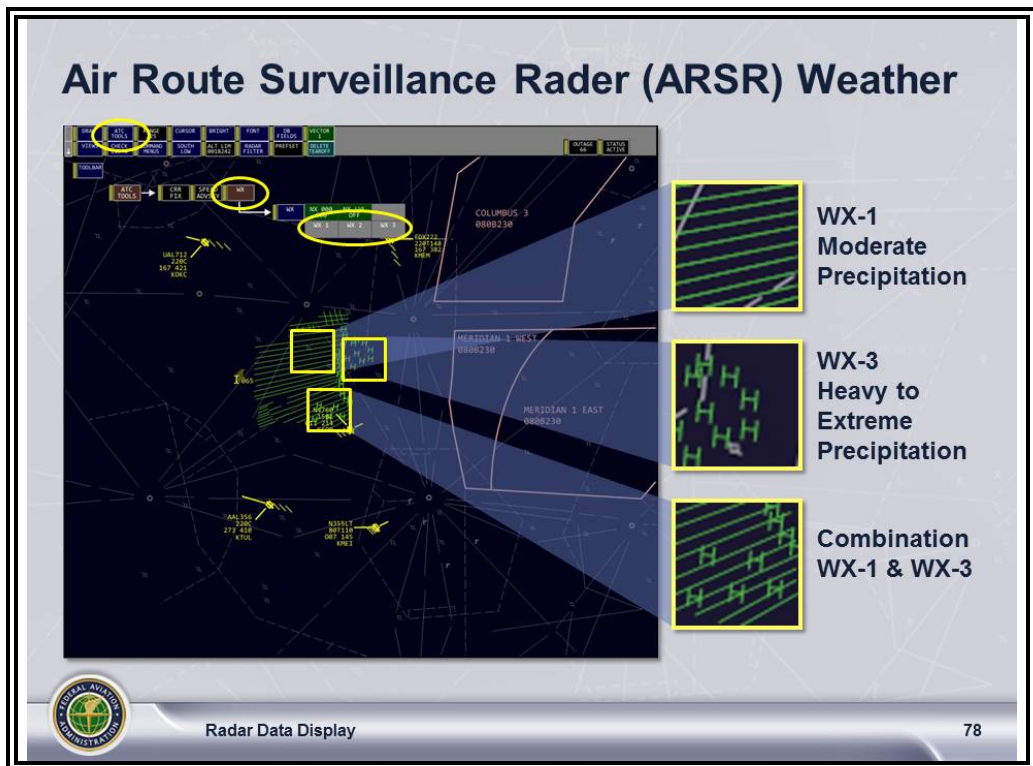


- ⦿ Unpaired Enhanced Limited Data Blocks:
 - The user has requested Enhanced format for the LDB (i.e., the BCAST FLID display filter setting is selected).
 - The aircraft is ADS-B equipped, under ADS-B surveillance and broadcasting its flight ID.

WEATHER DISPLAYS

Weather Displays

TI 6110.100,
par. 3.4;
JO 7110.65,
par. 2-6-4

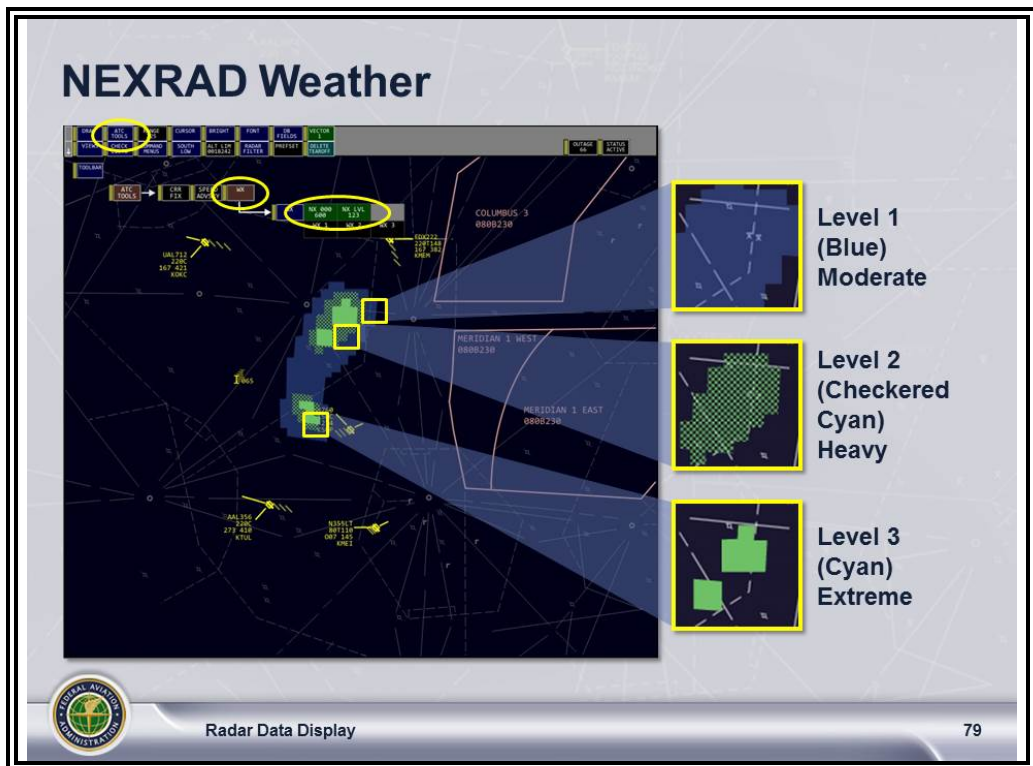


- ⦿ You can adjust the display for weather; this includes NEXRAD altitudes and levels, and Air Route Surveillance Radar (ARSR) weather intensities.
 - Lines depict areas of low-intensity weather.
 - The letter H depicts areas of high-intensity weather.

WEATHER DISPLAYS (Continued)

Next-Generation Radar (NEXRAD)

TI 6110.100,
par. 3.4;
ERAM EDMS SRS
210.04 V1B1,
par. 3.2.3.1.2.27

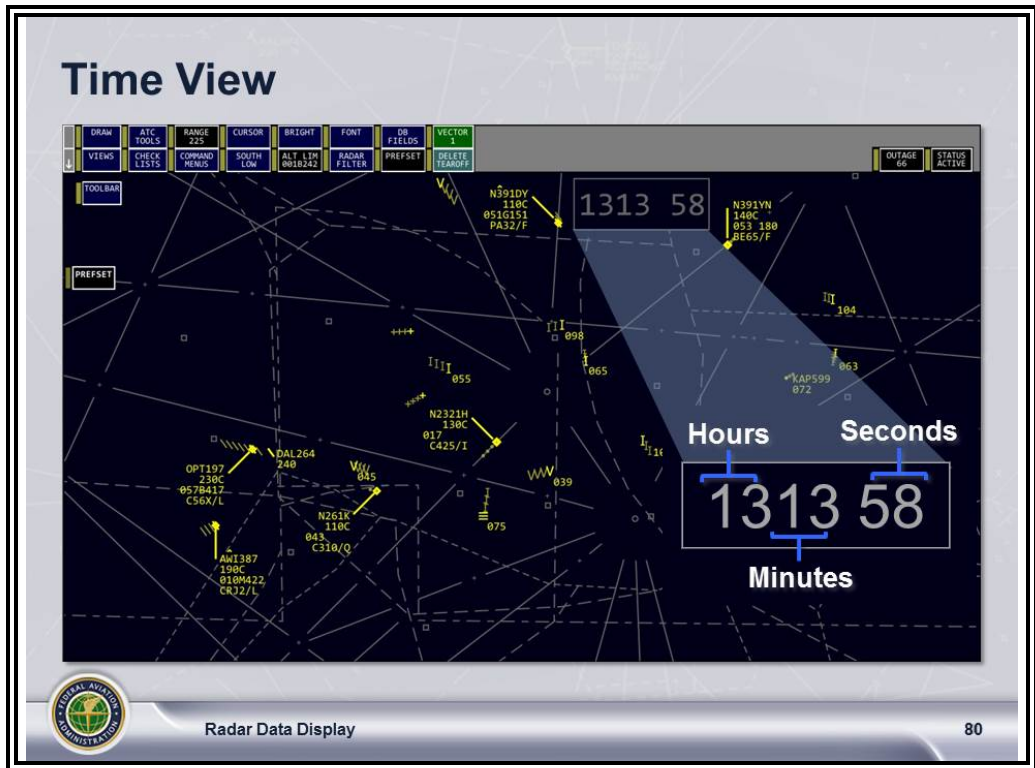


- ⊙ Displays a combination of up to three levels of precipitation intensity (precipitation):
 - Level 1, moderate, (blue)
 - Level 2, heavy, (checkered cyan)
 - Level 3, extreme, (cyan)
- ⊙ Left/middle-click the NX LVL button to decrement/ increment through NEXRAD levels.
- ⊙ Three altitude strata are available, plus a composite of these strata:
 - 000-240
 - 240-600
 - 330-600
 - 000-600 (composite)

MISCELLANEOUS DISPLAYS

Time View

TI 6110.100,
par. 3.5;
ERAM EDSM SRS
210.04 V1B1,
par. 3.2.3.1.2.22



- ⦿ The Time View displays the current Coordinated Universal Time (UTC).
- The Time View can be customized and located anywhere on the Situation Display, but cannot be suppressed.

MISCELLANEOUS DISPLAYS

Time View (Cont'd)

TI 6110.100,
par. 3.5;
ERAM EDSM SRS
210.04 V1B1,
par. 3.2.3.1.2.22

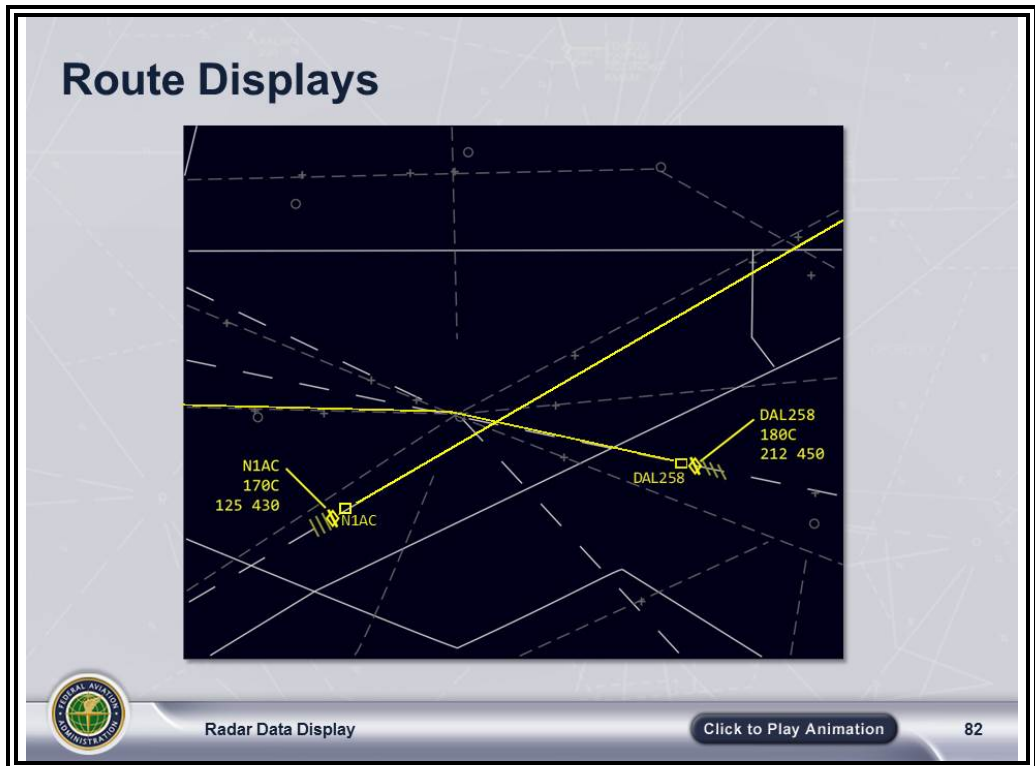


- ⊙ A sector message can be sent from the AT Specialist workstation to an individual R-Position Situation Display or all R-Position Situation Displays.
- ⊙ The Sector Message Notification Area appears automatically below the Time View.
 - The message contains free text information that may affect your sector.
 - When the message first appears, it will be underlined and yellow to indicate that it needs to be acknowledged.
- ⊙ Click on the message to acknowledge it.
 - The message will turn white.
 - If you don't accept the message in an adapted period of time, the message will turn white automatically (default is 10 seconds).

MISCELLANEOUS DISPLAYS *(Continued)*

Route Displays

ERAM EDSM SRS
210.04 V1B1,
par. 3.2.2.4.2



- ⦿ The route display program displays the route of a flight on the radar display, beginning with the position of the aircraft specified in the route display keyboard entry, and ending with the point on the route segment, which consists of keyboard-entered minutes, or a facility parameter amount of time in the future.
 - The route is depicted by a sequence of line segments beginning with the flight plan position symbol (□).
 - The aircraft identification is displayed immediately below the position symbol.
 - A number of routes can be displayed simultaneously on a radar display.

OUTAGES

Outages TI 6110.107



○ Controller Responses to Outages

- Controller responds immediately to the four outages presented in this lesson without FLM/CIC guidance using *Full ERAM Job Aid* (TI 6110.107)

Position Failure TI 6110.107

○ Position Failure

- A red X, blank screen, or BARCO screen indicates a single R-Position failure.
 - *Settings Not In Sync* displayed on other channel
 - No updates on display and no command inputs accepted on channel with the failure
- Switch immediately to backup channel and report outage. (Press and hold MULTI-FUNC and select A/B.)

Continued on next page

OUTAGES (Continued)

Not Receiving Surveillance Data

TI 6110.107



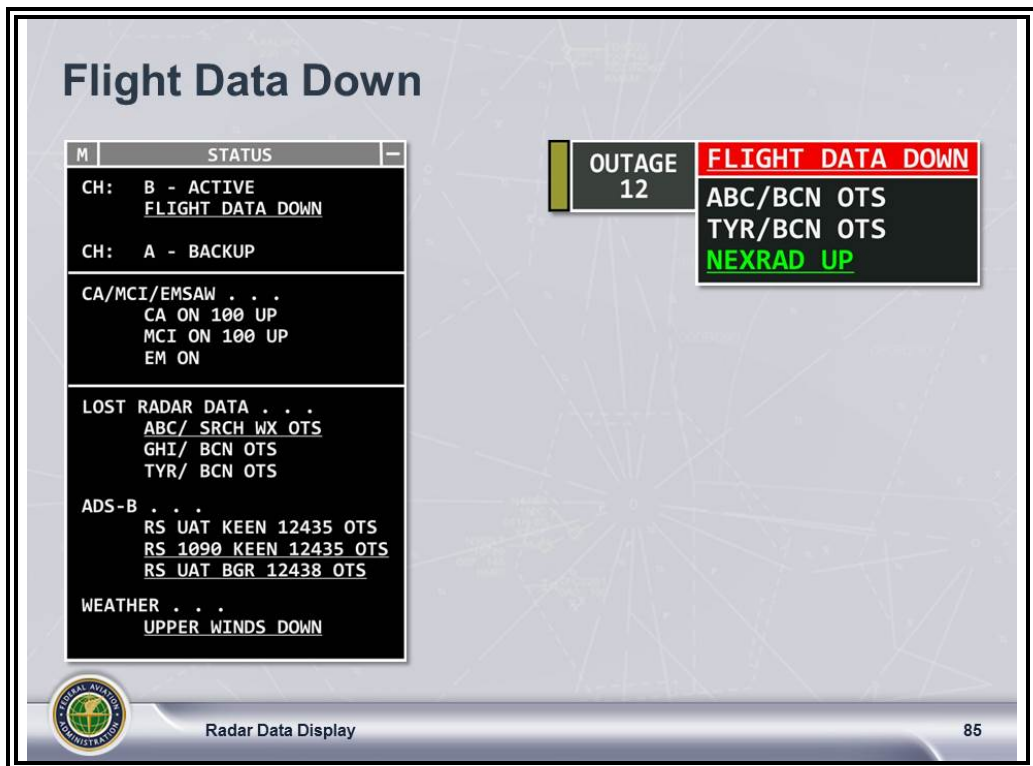
⦿ Not Receiving Surveillance Data

- A red banner is displayed on the Situation Display.
- SURV Down, CA Down, MCI Down, EM Down are displayed in the STATUS View.
- All targets are removed from R-Position display. Data blocks un-pair, flash CST, and remain at last known location.
 - On the Backup Channel, previously paired tracks remain paired, but new tracks will not auto-pair and manual pairing is not available.
 - Automated handoffs will fail regardless of channel.
- Switch immediately to backup channel and report outage. (Press and hold MULTI-FUNC and select A/B.)

Continued on next page

OUTAGES (Continued)

Flight Data Down TI 6110.107



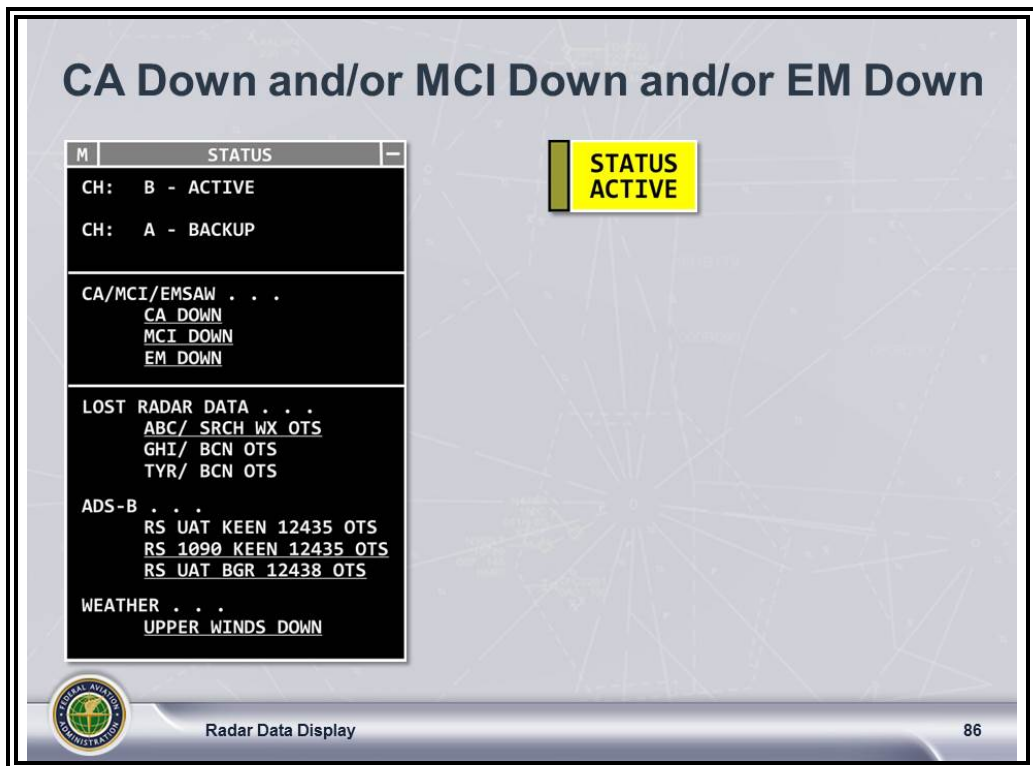
⦿ Flight Data Down

- Coding is displayed in the Outage and Status Views.
- Flight data processing is lost until the Backup Channel is promoted to Active.
- Auto pairing and manual pairing are not available.
- Automated handoffs and point-outs are unavailable.
- Flight data cannot be entered or updated.
- Data blocks cannot be changed or started.
- Switch immediately to backup channel and report outage. (Press and hold MULTI-FUNC and select A/B.)
 - FDP available once Tech Ops promotes Backup to Active.
 - *Flight Data Standby* will be displayed in the Outage and Status Views until Backup is promoted to Active.

Continued on next page

OUTAGES (Continued)

**CA/MCI/EM
Down**
TI 6110.107



- ⦿ Conflict Alert (CA), Mode C Intruder (MCI) and/or E-MSAW (EM) processing down
 - Coding appears only in the Status View (no indication in the Outage View).
 - Safety alerts will not update.
 - No new alerts, including immediate alerts
 - Active alerts at time of failure continue to flash, even when no longer applicable
 - Switch immediately to backup channel and report outage. (Press and hold MULTI-FUNC and select A/B.)

Continued on next page


OUTAGES *(Continued)*

Outage Reminders TI 6110.107

Outage Reminder

If you see these outages you should take action prior to receiving direction from the FLM/CIC.

- BIG RED **X** or BARCO Screen – R-position Display Application Failure
- Not Receiving Surveillance Data
- Flight Data Down
- CA DOWN / MCI DOWN / EM DOWN

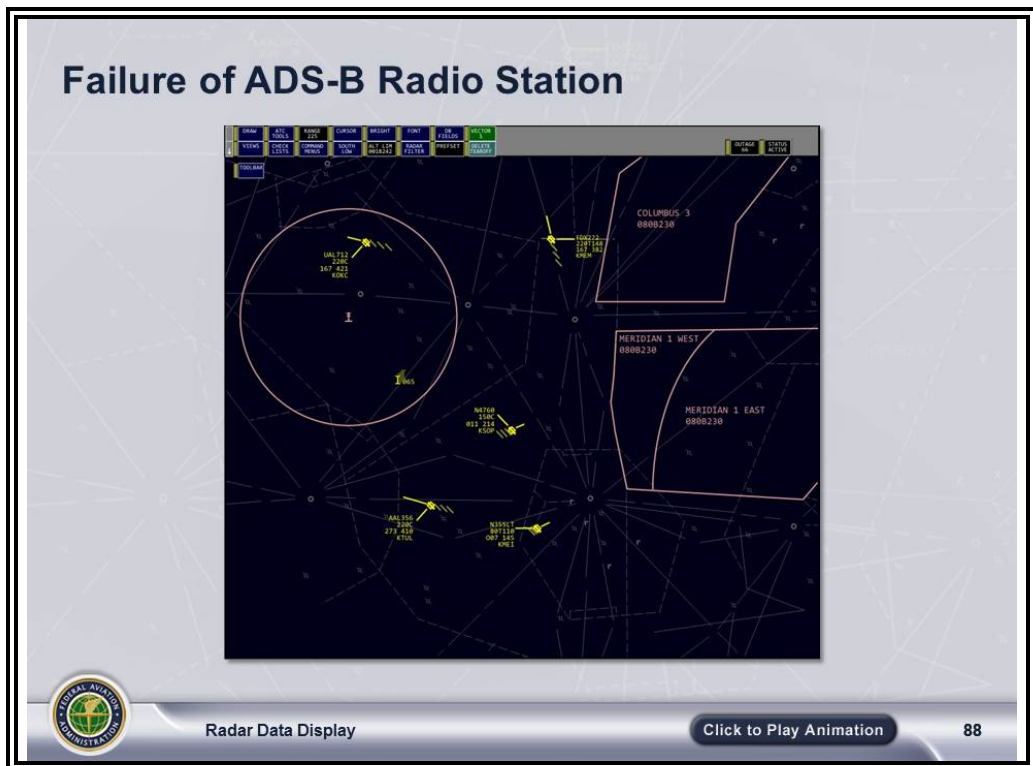
Radar Data Display87


- ⦿ Acknowledge and report your outages.
 - Relatively minor outages, if left unresolved, can have major impacts to the system.
 - Do not assume:
 - Someone else has reported the outage.
 - Tech Ops is already aware of the outage.
 - Keep your Outage View up-to-date so that you will know when a new outage occurs.
- ⦿ When one of the "Big 4" outages occurs, take immediate action.
 - Switch immediately to backup channel and report outage to the FLM/CIC. (Press and hold MULTI-FUNC and select A/B.)

Continued on next page

OUTAGES (Continued)

**Failure of
ADS-B Radio**
TI 6110.100,
par. 14.2;
ERAM EDSM SRS
210.04 V1B1,
pars. 3.2.2.1.3.3,
3.2.2.1.3.4



- ⦿ The telephone pole symbol () is the ADS-B Radio Station Outage Indicator on the Situation Display.
 - The indicator is forced to the Situation Display if an outage for that station exists and the ADS-B Service Volume is up.
 - An outage for the station occurs with one of the following conditions:
 - The Universal Access Transceiver (UAT) link is down
 - UAT link status is unknown
 - 1090ES link is down
 - 1090ES link is degraded
 - 1090ES link status is unknown
- ⦿ Select the ADS-B Radio Station Outage Indicator with the trackball to toggle the display of the radio station coverage area circle for the radio station.

OUTAGES *(Continued)*

Outages TI 6110.107


- ⦿ There are additional outages where the FLM/CIC will guide controller responses:
 - FLM/CIC coordinates with Operations Manager (OM)
 - FLM/CIC guides controller response using *Full ERAM Job Aid* (TI 6110.107)
 - ⦿ For all other outages, controller action is to inform the FLM/CIC
-

Review

Response Item

How many outages require immediate action from the controller?

- A. Two
- B. Four
- C. Five
- D. Seven

Radar Data DisplayClick to Show Answer89

CONCLUSION

Summary

- ⦿ Radar Symbols
- ⦿ Full Data Block (FDB)
- ⦿ Range Data Block (RDB)
- ⦿ Limited Data Block (LDB)
- ⦿ Weather Displays
- ⦿ Miscellaneous Displays
- ⦿ Outages

End-of-Lesson Test

- ⦿ Your instructor will now administer the End-of-Lesson Test.
-