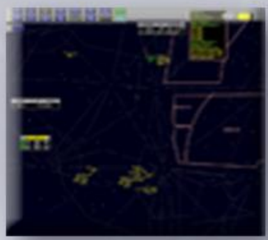
FAA Lesson Plan



En Route Stage 4
Radar Controller Training

Instructor

Radar Controller Scan
Lesson 15

55055
V.1.06

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LESSON PLAN DATA SHEET

COURSE NAME:	RADAR CONTROLLER TRAINING
COURSE NUMBER:	55055
LESSON TITLE:	RADAR CONTROLLER SCAN
DATE REVISED:	2014-04
VERSION:	V.1.06
REFERENCES:	JO 7110.65V, Air Traffic Control; JO 7110.311B Procedural Guidance For FAA ORDER JO 7110.65 Following En Route Automation Modernization (ERAM) Implementation; JO 7210.3Y, Facility Operation and Administration; TI 6110.100, En Route Automation Modernization (ERAM) Air Traffic Manual (ATM): R-Position User Manual; TI 6110.101, En Route Automation Modernization (ERAM) Air Traffic Manual (ATM): RA-Position User Manual
HANDOUTS:	55055-HO15, SCANNING
EXERCISES/ ACTIVITIES:	YES *ACTIVITY 1: GROUP DISCUSSION, PAGE 33* *ACTIVITY 2: SCANNING, PAGE 33, REFER TO 55055-HO15B.PDF [BLACK/WHITE] OR 55055-HO15C.PDF [COLOR].*
END-OF-LESSON TEST:	YES *(REFER TO 55055-ELT15.PDF)*
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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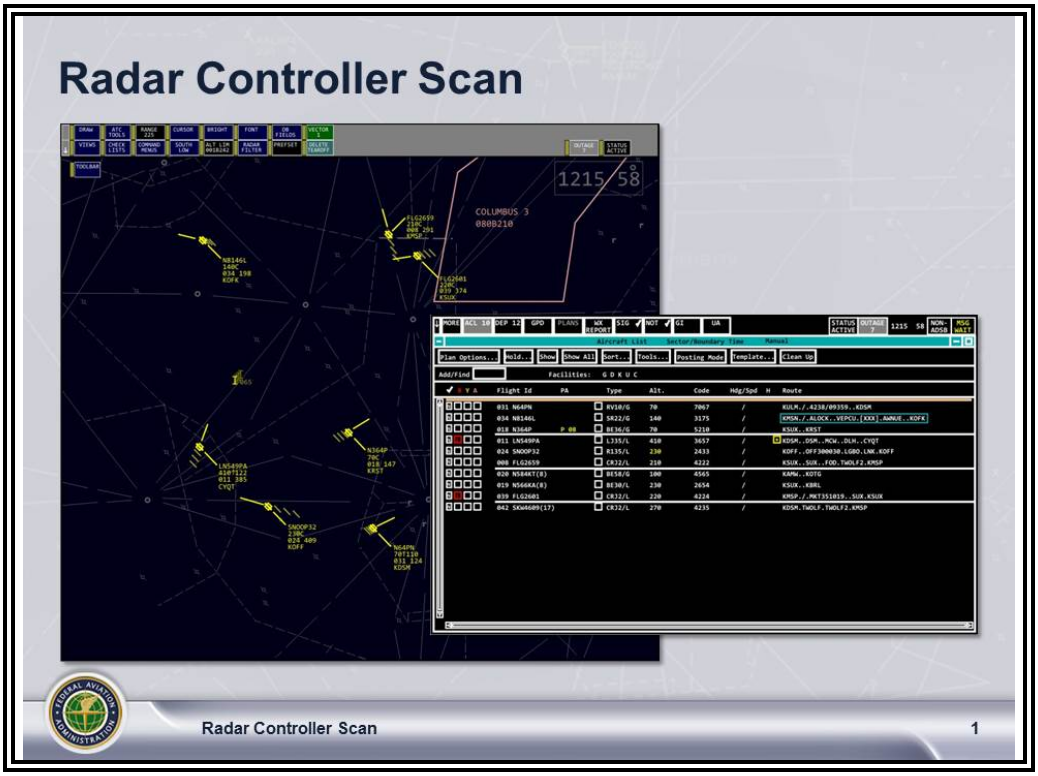
INTRODUCTION



An efficient method of scanning saves time. You should develop a method of scanning that will allow you to make sound control decisions in a timely manner.

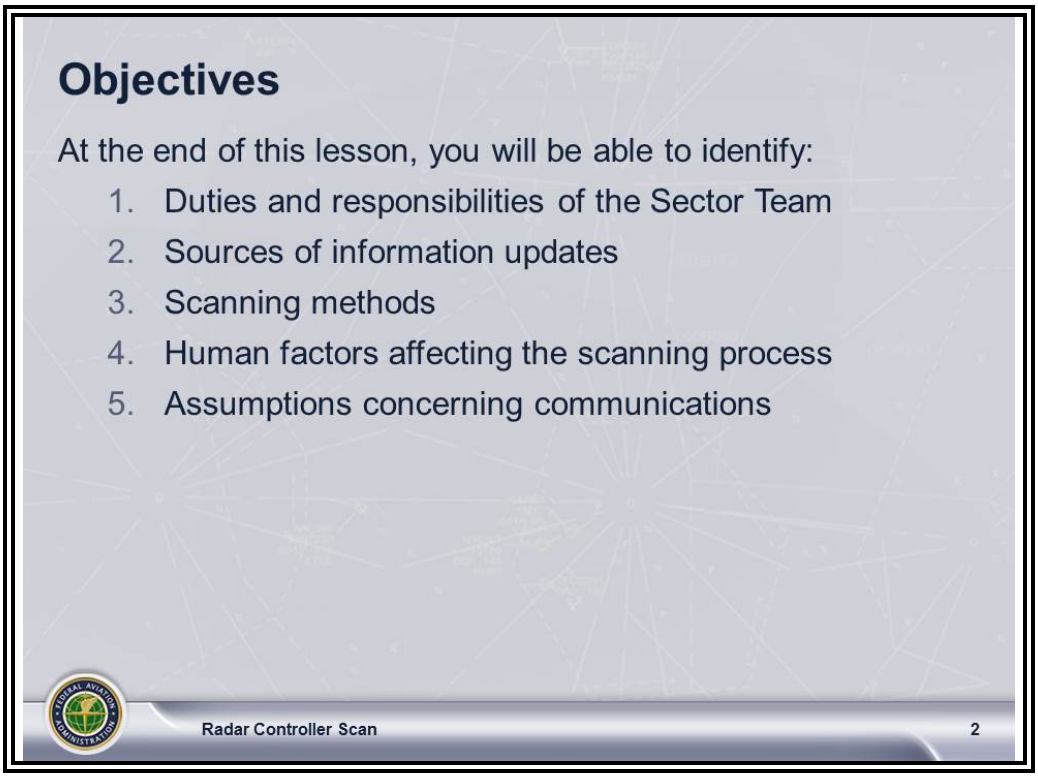
Purpose

This lesson will give you some basic procedures that can be used to develop a method of scanning. Terms and definitions associated with scanning a position will be discussed, along with factors associated with the decision process.

☞ ***NOTE:*** *The method outlined in this lesson is only one possible technique for developing a scan, and is by no means the only way to accomplish this task. Each individual must find the process that works for him/her, and continually strive for increased awareness of all aspects of the events which take place at their radar position.*

INTRODUCTION *(Continued)*

Objectives



☞ ***NOTE:*** *Review the lesson objectives.*

SECTOR TEAM RESPONSIBILITIES

Sector Team

Definitions
JO 7110.65,
par. 2-10-1

Scanning is to examine systematically in order to obtain data. Scanning allows us to determine if the sector is free of conflict and meets the objectives of a safe, orderly, and expeditious flow of traffic.

A **sector** is the area of control responsibility (delegated airspace) of the en route sector team and the team as a whole.

Sector Team
JO 7110.65,
par. 2-10-1

⊙ Team members

- Radar (R) Position
- Radar Associate (RA) Position
- Radar Coordination (RC) Position
- Radar Flight Data (A) Position
- Non-Radar Position

NOTE: The A-Position and Non-Radar Position responsibilities are not covered in this lesson.

SECTOR TEAM RESPONSIBILITIES *(Continued)*

Radar (R) Position Definition
JO 7110.65, par. 2-10-1

The **Radar (R) Position** is in direct communication with the aircraft and uses radar information as the primary means of separation.

Radar (R) Position Responsibilities
JO 7110.65, par. 2-10-1; JO 7110.311B, par. 2-10-1

⊙ Responsibilities

- Responsible for the overall sector operation.
- Ensure separation.
- Initiate control instructions.
- Monitor and operate radios.
- Accept and initiate automated handoffs.
- Assist the Radar Associate Position with nonautomated handoff actions, when needed.
- Assist the Radar Associate Position in coordination, when needed.
- Scan Situation Display.
  - Correlate with flight progress strip information or EDST data, as applicable.
- Ensure computer entries are completed on instructions or clearances you issue or receive.
- Ensure strip marking and/or electronic flight data entries are completed on instructions or clearances you issue or receive.
- Adjust equipment at R-Position to be usable by all members of the team.
- The Radar Controller must not be responsible for G/G communications when precluded by VSCS split functionality.
- Ensure the Situation Display accurately reflects the status of all SAAs that impact their area of control responsibility.

SECTOR TEAM RESPONSIBILITIES *(Continued)*

Radar Associate (RA) Position Definition
JO 7110.65, par. 2-10-1

📖 The **Radar Associate (RA) Position** is sometimes referred to as D-Side or Manual Controller.

Radar Associate (RA) Position Responsibilities
JO 7110.65, par. 2-10-1; JO 7110.311B, par. 2-10-1

⊙ Responsibilities

- Ensure separation.
- Where available, use EDST to plan, organize, and expedite the flow of traffic.
- Initiate control instructions.
- Operate interphones.
- Accept and initiate nonautomated handoffs.
  - Ensure Radar Position is made aware of the actions.
- Assist the Radar Position by accepting or initiating automated handoffs, which are necessary for the continued smooth operation of the sector.
  - Ensure that the Radar Position is made immediately aware of any action taken.
- Coordinate.
  - Including point outs
- Monitor radios.
  - When not performing higher priority duties
- Scan flight progress strips and/or EDST data. Correlate with radar data.
- Manage flight progress strips and/or electronic flight data.
- Ensure computer entries are completed on instructions issued or received.
  - Enter instructions issued or received by the Radar Position when aware of those instructions.

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SECTOR TEAM RESPONSIBILITIES *(Continued)*

Radar Associate (RA) Position Responsibilities (Cont'd)
JO 7110.65, par. 2-10-1; JO 7110.311B, par. 2-10-1

- Ensure strip marking and/or EDST data entries are completed on instructions issued or received.
  - Record instructions issued or received by the Radar Position when aware of them.
- Adjust equipment at Radar Associate Position to be usable by all members of the team.
- Where authorized, perform EDST data entries to keep the activation status of designated EDST Airspace Configuration Elements current. Ensure the Situation Display accurately reflects the status of all SAAs.
- Scan the Radar Associate Display for electronically distributed information, evaluate the information, and take action as appropriate.

Radar Coordinator (RC) Position Definition
JO 7110.65, par. 2-10-1

📖 **Radar Coordinator (RC) Position** is sometimes referred to as Coordinator, Tracker, or Handoff Controller.

Radar Coordinator (RC) Position Responsibilities
JO 7110.65, par. 2-10-1

⊙ Responsibilities

- Perform interfacility/intrafacility/sector/position coordination of traffic actions.
- Advise Radar and Radar Associate Positions of sector actions required to accomplish overall objectives.
- Perform any of the functions of the en route sector team that will assist in meeting situation objectives.

NOTE: When staffed, assumes responsibility for managing traffic flows. The R-Position retains separation responsibility.

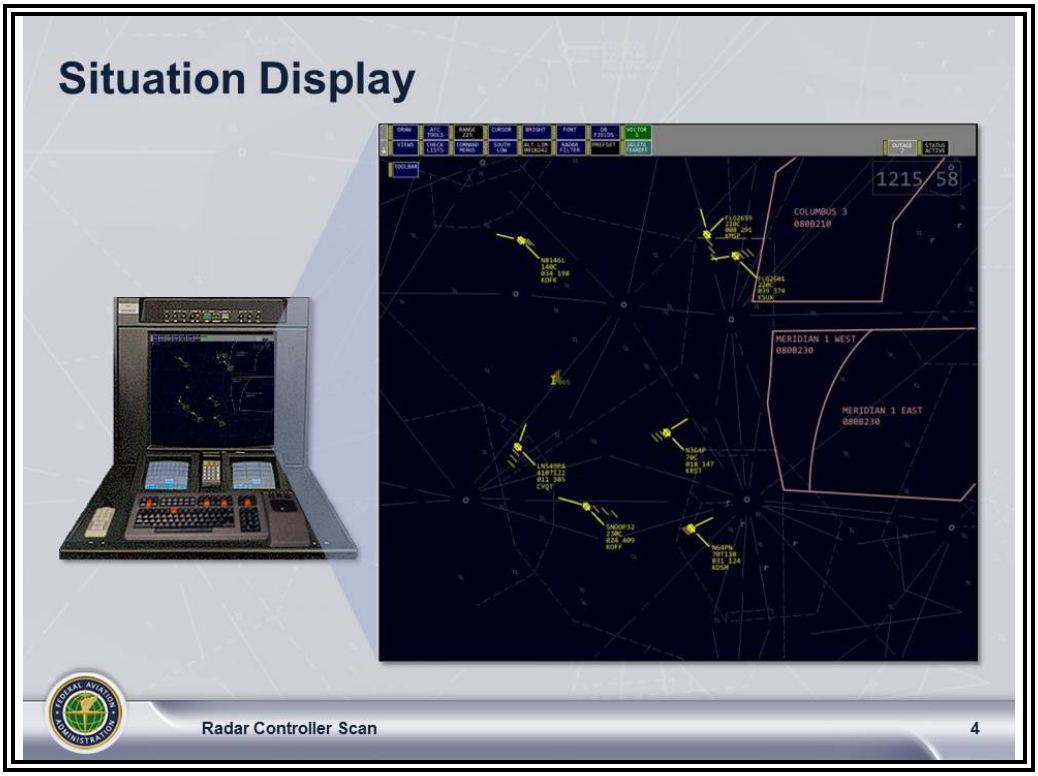
Review

◈ **QUESTION:** What position is responsible for the overall sector operations?

ANSWER: *The Radar Position*

EQUIPMENT

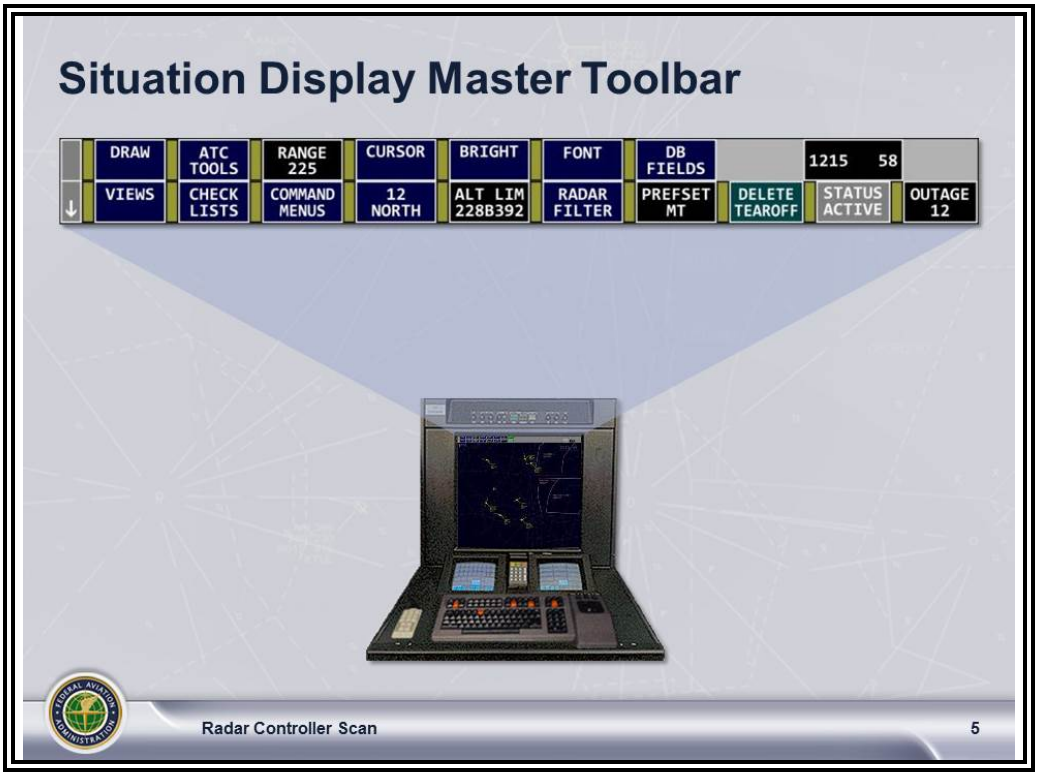
Situation Display
TI 6110.100, par. 2



- The Situation Display is used to display a geographic area of concern (map data) as selected by the controller with sector boundaries, airways, fixes, airports, targets, track data, weather data, and other controller-selected information. It also displays toolbars for user interface.
- The R-Position Situation Display supports:
  - Dynamic situation and weather presentations
  - Command entry and system response functions via the Message Composition Area (MCA) and the Response Area (RA)
  - Numerous views and additional functions and controls through the Master Toolbar
  - Time
  - Outage and Status buttons

EQUIPMENT *(Continued)*

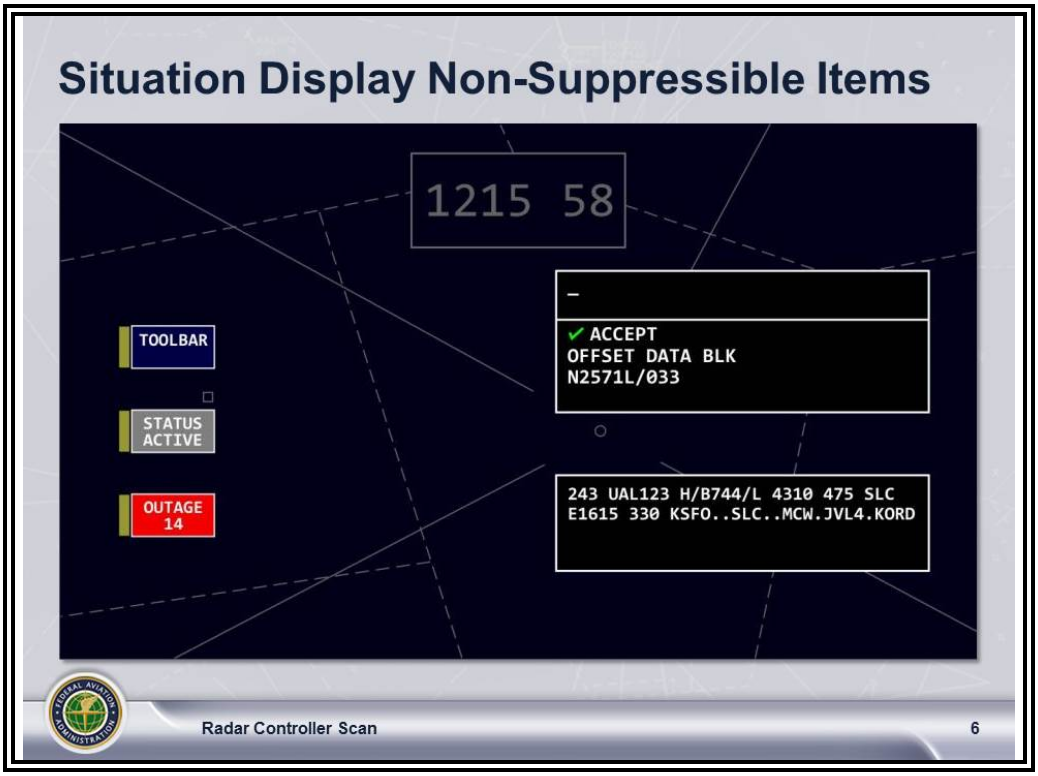
Situation Display Master Toolbar
TI 6110.100, par. 2.2.2;
JO 7210.3, par. 8-3-3



- The Master Toolbar:
  - Contains a core set of tear-off buttons:
    - Views Menu
    - Altitude Limits
    - Radar Filters
    - Continuous Range Readout
    - Altimeter Settings
    - Position Relief Checklist
    - Data Block Fields Menu
    - Auto Handoff Inhibit List
    - Map Display Settings (cursor, brightness, and font controls)
  - Used to access associated views, commands and lists
- Sectors must ensure the display of Mode C targets and data blocks by entering appropriate altitude limits and display filters to include, as a minimum, the altitude stratum of the sector plus:
  - 1,200 feet above the highest and below the lowest altitude flight level of the sector where 1,000 feet vertical separation is applicable; and
  - 2,200 feet above the highest and below the lowest flight level of the sector where 2,000 feet vertical separation is applicable

EQUIPMENT *(Continued)*

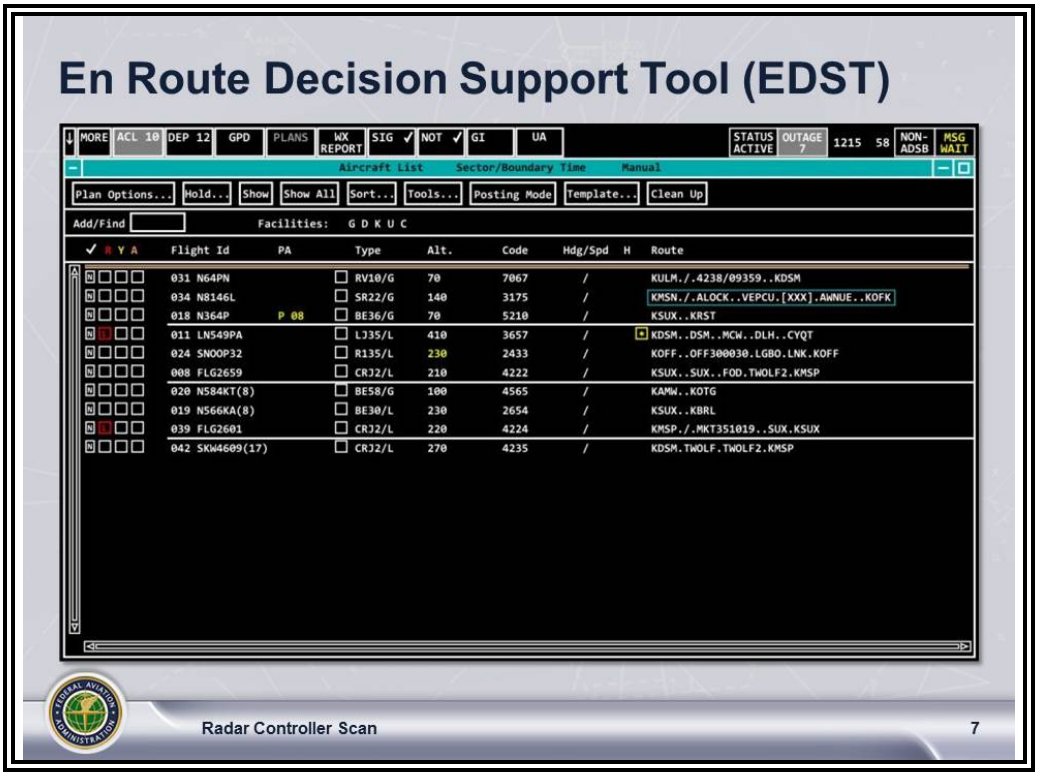
Situation Display Non-Suppressible Items
TI 6110.100, pars. 2.4.3, 3.5, 14.1, 14.2



- Some buttons and views on the Situation Display cannot be suppressed.
  - Buttons
    - The Toolbar button is always displayed.
    - The Status View and Outage List View are accessed through independent buttons. These buttons cannot be suppressed.
  - The following views can be located anywhere on the display, but cannot be suppressed:
    - Time View
    - Message Composition Area (MCA)
    - Response Area (RA)

EQUIPMENT *(Continued)*

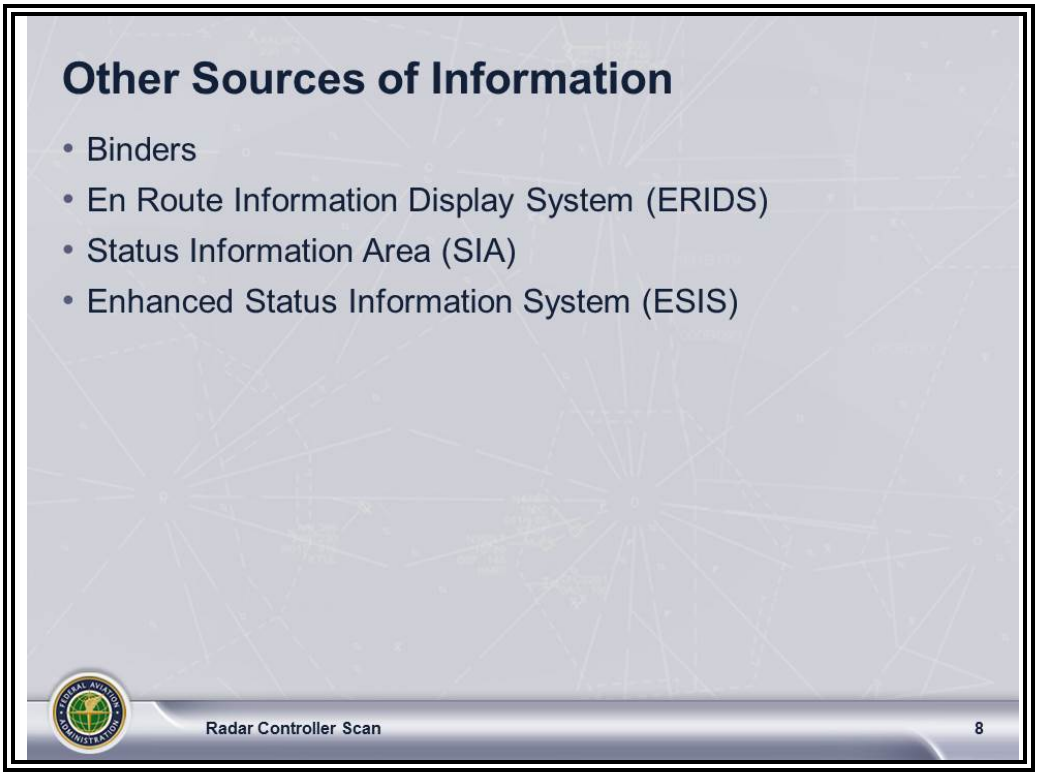
EDST
TI 6110.101,
par. 2.1



- The RA-Position Toolbar displays views at the RA-Position. It also provides:
  - A current count of the number of flights in the Aircraft List and Departure List
  - The current time
  - A Message Waiting Indicator
  - A Channel Mode Banner
- The RA-Position Toolbar is always displayed and no other display can overlap it.

EQUIPMENT *(Continued)*

Other Sources of Information
JO 7210.3, pars. 2-1-3, 2-2-4, 6-10-1



- ⊙ Binders
  - Supervisor Position Binder
    - Contains procedures related to scanning, coordination, phraseology, and proficiency/remedial training
  - Position/sector binder
    - Contains specific information for the safe and efficient operation of each sector/position
- ⊙ En Route Information Display System (ERIDS)
  - Real time, interactive, electronic information display system
  - Provides access to aeronautical data, NOTAMs, PIREPs, and other sources of ATC information

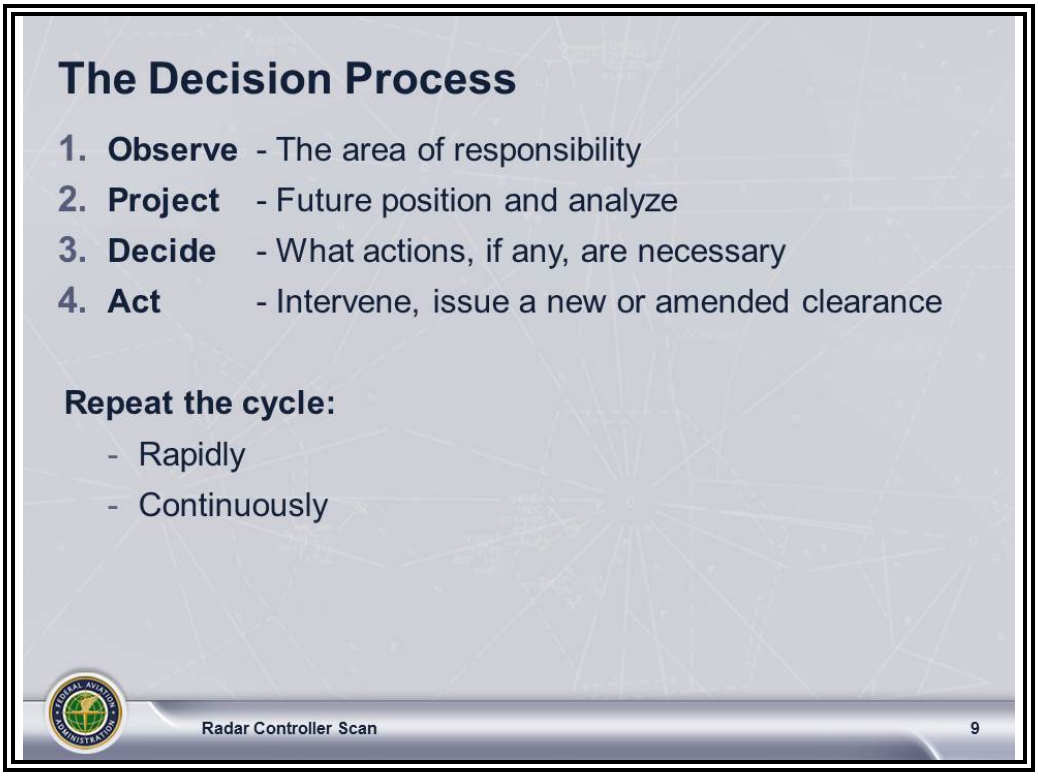
EQUIPMENT *(Continued)*

Other Sources of Information (Cont'd)
JO 7210.3, pars. 2-1-3, 2-2-4, 6-10-1

- Status Information Area (SIA)
  - Provides information that assists in controlling aircraft within your area
  - Should be scanned occasionally for manual or automatic updates
- Enhanced Status Information System (ESIS)
  - Contains route advisories, airways closures, and other pertinent data
  - Should be scanned occasionally for updates

SCANNING

The Decision Process



- The air traffic control decision process has four steps and begins with observation and progresses to act.
  - Observe
    - Area of responsibility
  - Project
    - The future position and analyze data to form a current mental picture
  - Decide
    - Are actions, if any, necessary
  - Act
    - Intervene, issue a new or amended clearance
- Occasionally you will decide no action is necessary and the observation cycle begins again.

☞ ***NOTE:*** *Emphasize that the process returns continually to scan.*

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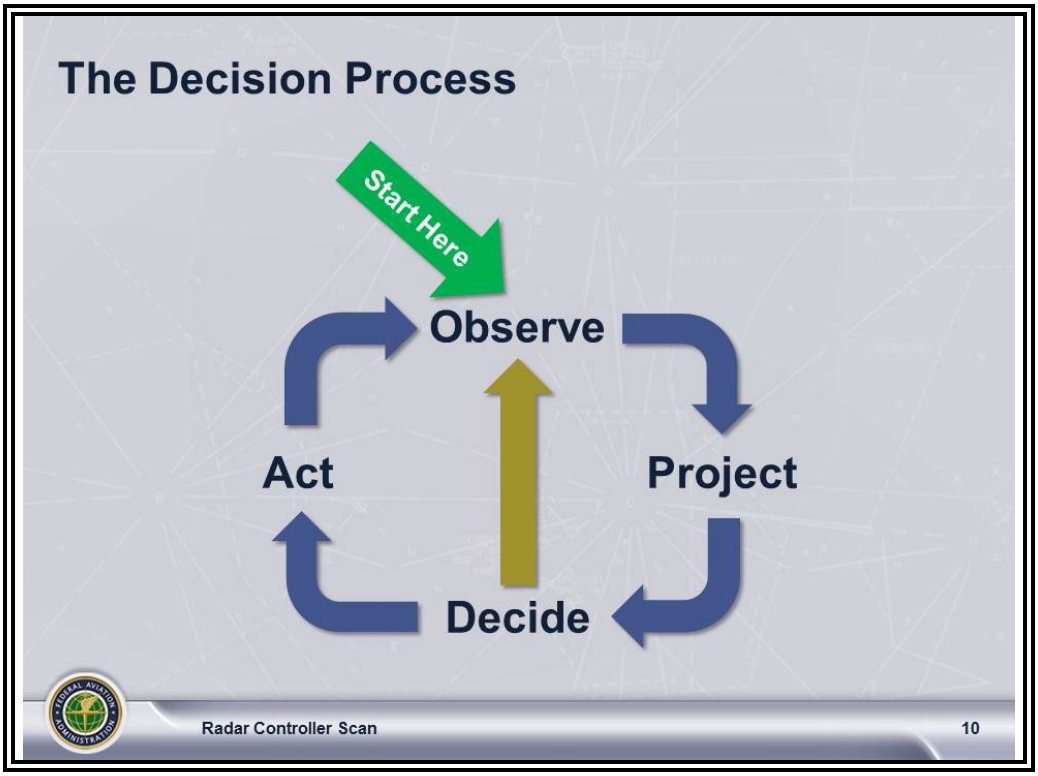
SCANNING *(Continued)*

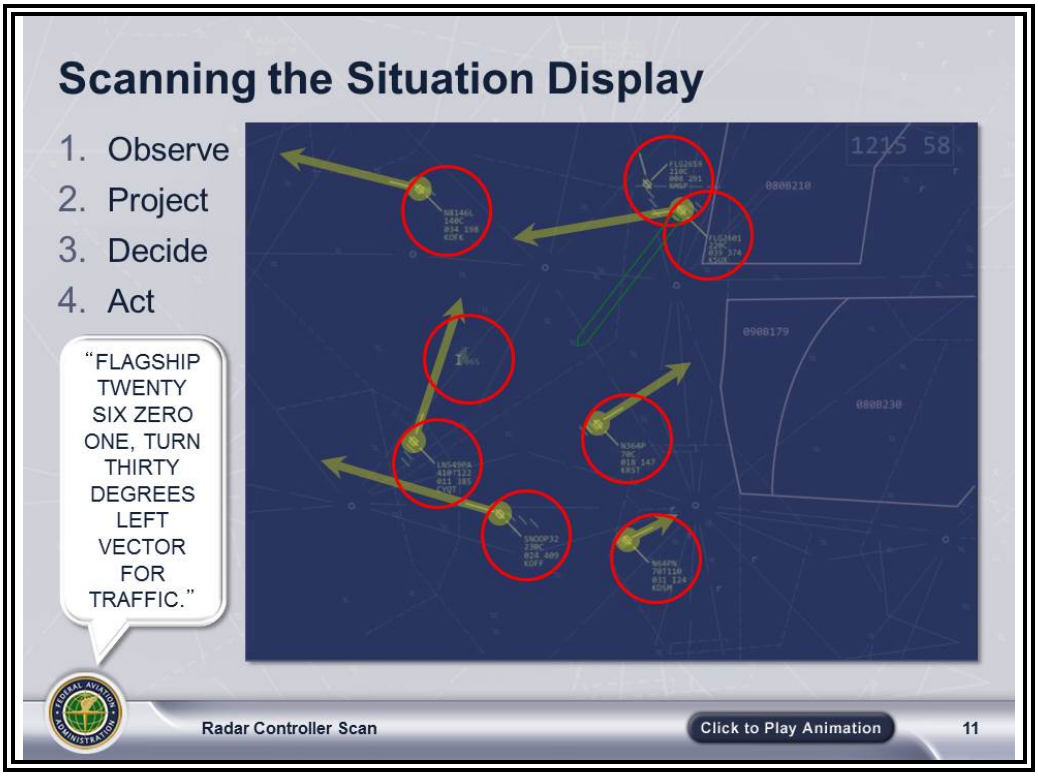
The Decision Process (Cont'd)



- The situation is fluid and is constantly changing.
  - New information is appearing on the displays
    - WX
    - Traffic
    - TM initiatives
- It may be necessary to amend a planned action in order to incorporate the new information noted during the observation phase.
- The decision cycle is a loop. We use the current information to maintain our awareness of the current and future situation.

SCANNING *(Continued)*

How to Scan
JO 7110.65,
pars. 2-4-2, 2-10-1



⊙ Observe – Area of responsibility

☞ ***NOTE:*** *Click 1 to play animation, discuss stage.*

- Continuously scan radar information on the Situation Display.
- Develop a pattern that from start to finish covers your entire area of responsibility. This pattern may be any of the following;
  - Priority driven
  - Clockwise/circular
  - Top to bottom
  - Left to right
- Monitor frequencies continuously.
- Recognize the unusual and give it additional scrutiny.
- Observe:
  - Targets and target symbols
  - Data blocks
  - Weather
  - Color can emphasize new or amended information

Continued on next page

SCANNING *(Continued)*

How to Scan (Cont'd)
JO 7110.65, pars. 2-4-2, 2-10-1

- ⊙ Project – Future Positions and Analyze

☞ ***NOTE:*** *Click 2 to play animation, discuss stage.*

  - Free of conflict:
    - Meeting objective of a safe, orderly, and expeditious traffic flow
  - Potential conflict:
    - What maneuvers are available to resolve
    - EDST Conflict Probe can help

- ⊙ Decide – What actions, if any, are necessary

☞ ***NOTE:*** *Click 3 to play animation, discuss stage.*

  - Ideal clearance solves both:
    - Separation problem, meeting established minima
    - Control problem – complying with LOA, SOP, and TM initiatives

- ⊙ Act – Intervene

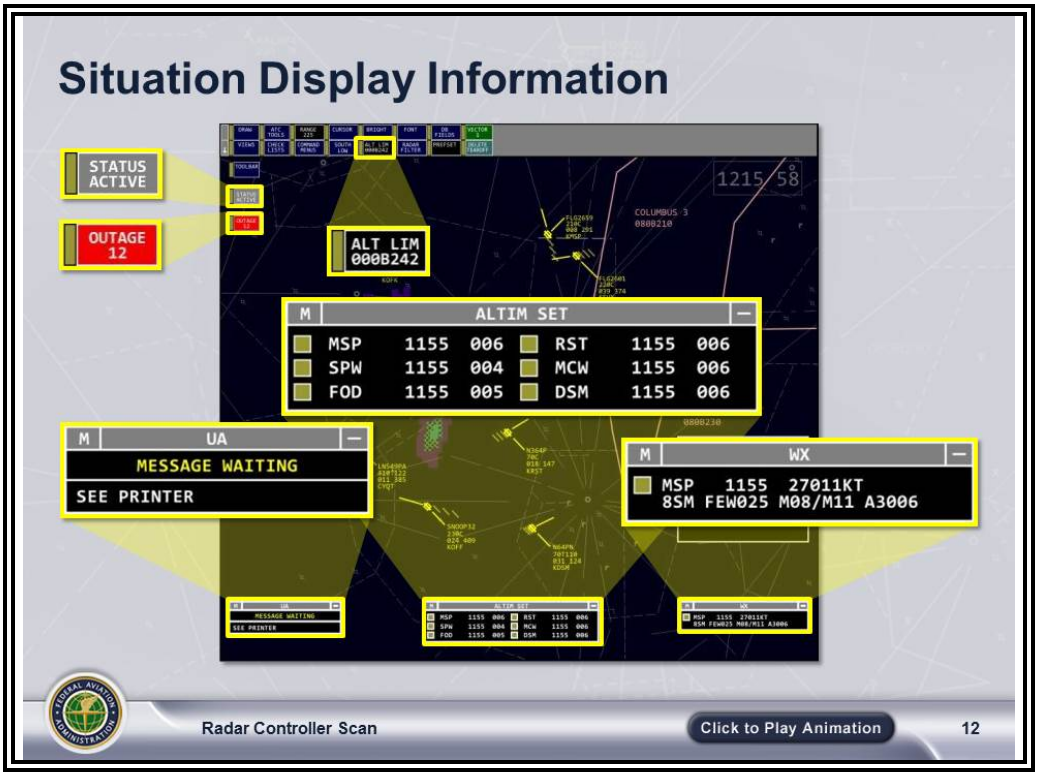
☞ ***NOTE:*** *Click 4 to play animation, discuss stage.*

  - Issue a new or amended clearance to:
    - Eliminate conflict
    - Meet objectives
    - Weather
    - Color can emphasize new or amended information

- ⊙ Conflict Alert is not a planning and projection tool.
  - Don't rely on it to remind you to issue a safety alert or traffic advisory.

SCANNING *(Continued)*

How to Scan (Cont'd)
JO 7110.65,
pars. 2-4-2, 2-10-1



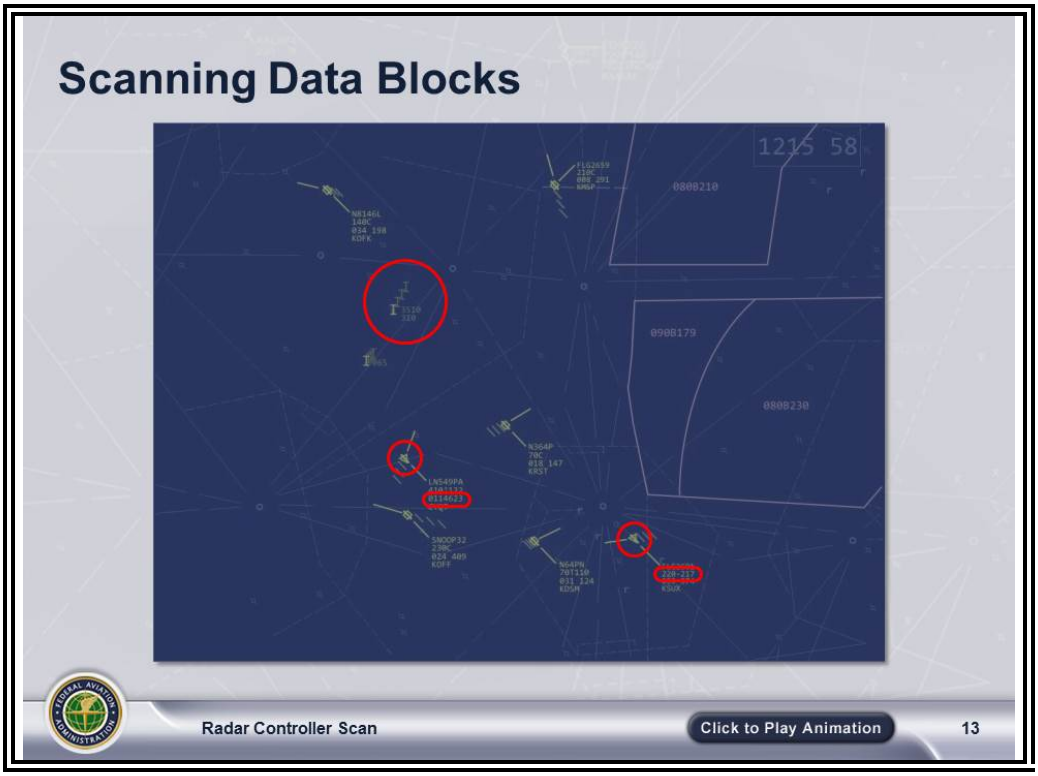
- ⊙ Observe the entire area of responsibility.
  - Radar has a data cycle.
  - Targets will not move for several seconds.
- ⊙ Take time to observe:
  - Low activity areas
  - Situation Display views
    - Status View
    - Outage List View
    - GIs and SIGMETs
    - EDST
    - Weather and Altimeter Settings
- ⊙ Occasionally scan system status and outages.
  - Pay close attention to safety critical alert settings and critical outages.
  - Acknowledge messages on the Outage List.

Click 6 times to animate various items.

☞ ***NOTE:*** *Discuss each item and review how new information is displayed.*

SCANNING *(Continued)*

Scanning Data Blocks
JO 7110.311B, par. 5-3-8;
TI 6110.100, pars. 1.2.2, 4.3



Click to animate.

In the observation phase, we also strive to detect the unusual.

- Target Symbols
  - FLAT vs. Free
    - FLAT – Conflict probe will be more accurate
    - Free – Less accurate probe
  - Paired vs. Unpaired
    - Few unpaired non-discrete codes in sector
    - MCI **I** with beacon code
  - Reduced Separation
    - Is reduced separation applicable?
    - Are both targets within the reduced separation area?

Continued on next page

SCANNING *(Continued)*

Scanning Data Blocks (Cont'd)
JO 7110.311B, par. 5-3-8;
TI 6110.100, pars. 1.2.2, 4.3

⊙ Data Blocks

- B4 character – tells us about the quality and content of Mode C
  - Nominal

    → **↑, ↓, A, B, C, V**

  - Unusual – something is wrong

    → **+, -, N, X**
    → Coral Box – non-RVSM

☞***NOTE:*** *Discuss Exceptional Vertical Rate Indicator (EVRI), climbing, descending, invalid Mode C, altitude reporting, etc.*

- Field E beacon code
- Flashing to get your attention
  - Conflict Alert/MCI Alerts
  - E-MSAW Alerts
  - Special Codes

    → EMRG – Emergency
    → RDOF – Radio Failure
    → HIJK – Hijack

- Handoffs
- Field F – 4th line data
  - Destination, or
  - Aircraft data, or
  - Vector, speed, or other control information

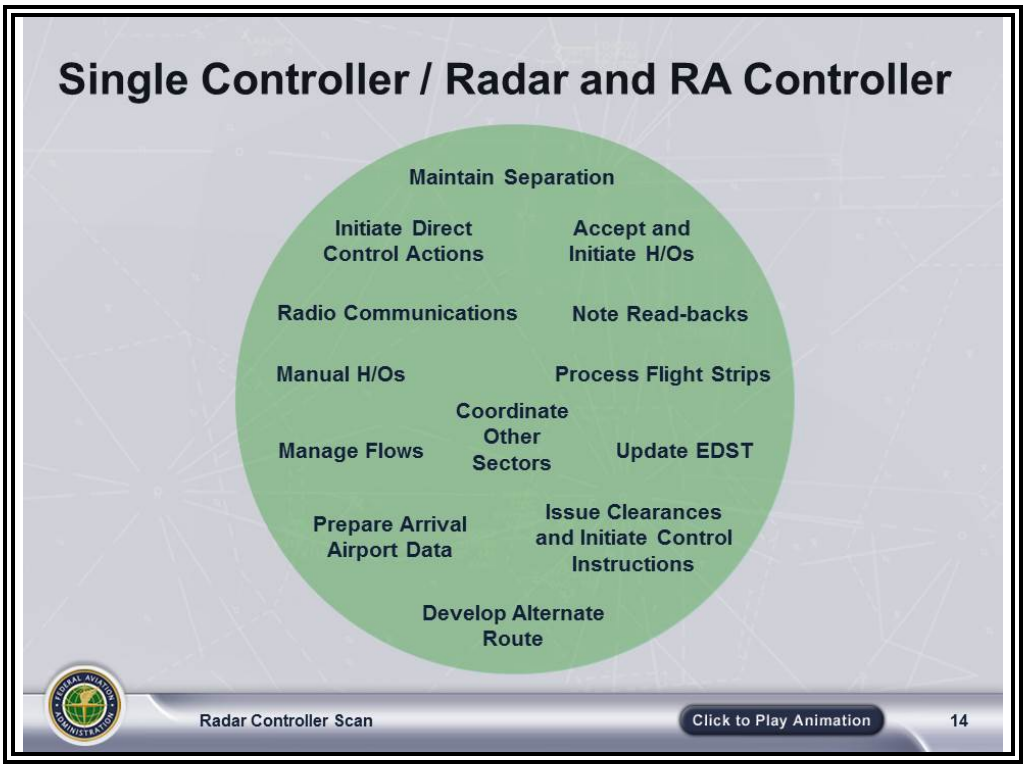
⊙ Enhanced Limited Data Blocks/Limited Data Blocks (ELDBs/LDBs)

- Aircraft not in your sector
  - In Area of Interest (AOI)
  - May become a point out

⊙ Ensure all FDBs can be seen. (Avoid data block overlap.)

SCANNING *(Continued)*

Position Responsibilities
JO 7110.65, pars. 2-1-2, 2-1-6, 2-10-1;
JO 7210.3, par. 6-2-1



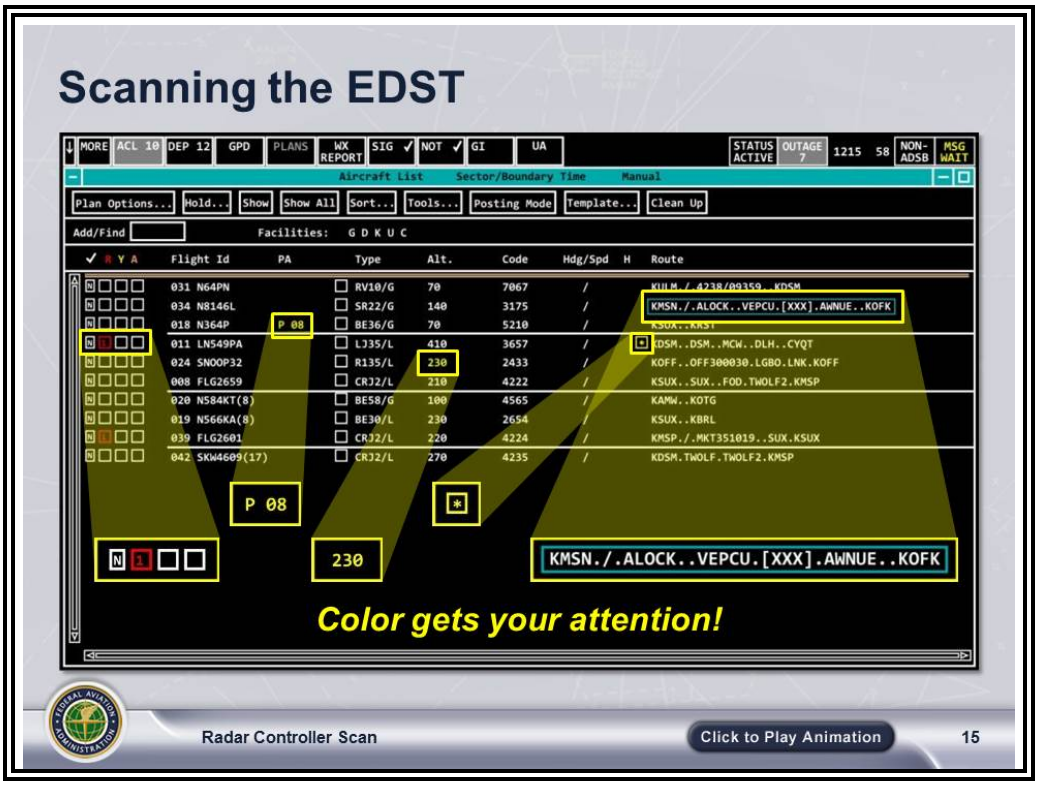
- A unique and crucial facet is tempo; that is, the cycle time.

Click to animate.

- In order to control effectively, we should operate at a faster tempo or rhythm than the information arrives.
  - If this is not possible, ask for assistance.
  - It's important for the Radar Controller to shed tasks to other controllers.
  - Task shedding allows you to maintain an efficient and accurate sector scan.

SCANNING *(Continued)*

Scanning the EDST
JO 7110.311B, par. 2-10-1;
JO 7110.65, ch. 13



Click 6 times to animate.

⊙ Observe the EDST to aid in projecting and analyzing the traffic situation.

- Alert Boxes
- Point Out Indicator Field
- Altitude Field
- Remarks field of flight plan **must** be reviewed indicated by an asterisk
  - Indicated by an asterisk (*)
- Aircraft List (ACL)
  - Uses color coding
  - Cyan color coding
    - → Route Action Notification (RAN) – blue dept. point
    - → Incomplete route indicator within the AOR – XXX in route
    - → Incomplete route indicator outside the AOR – ??? in route
    - → Embedded Route Text (ERT) – outlined in route display with a blue box

Continued on next page

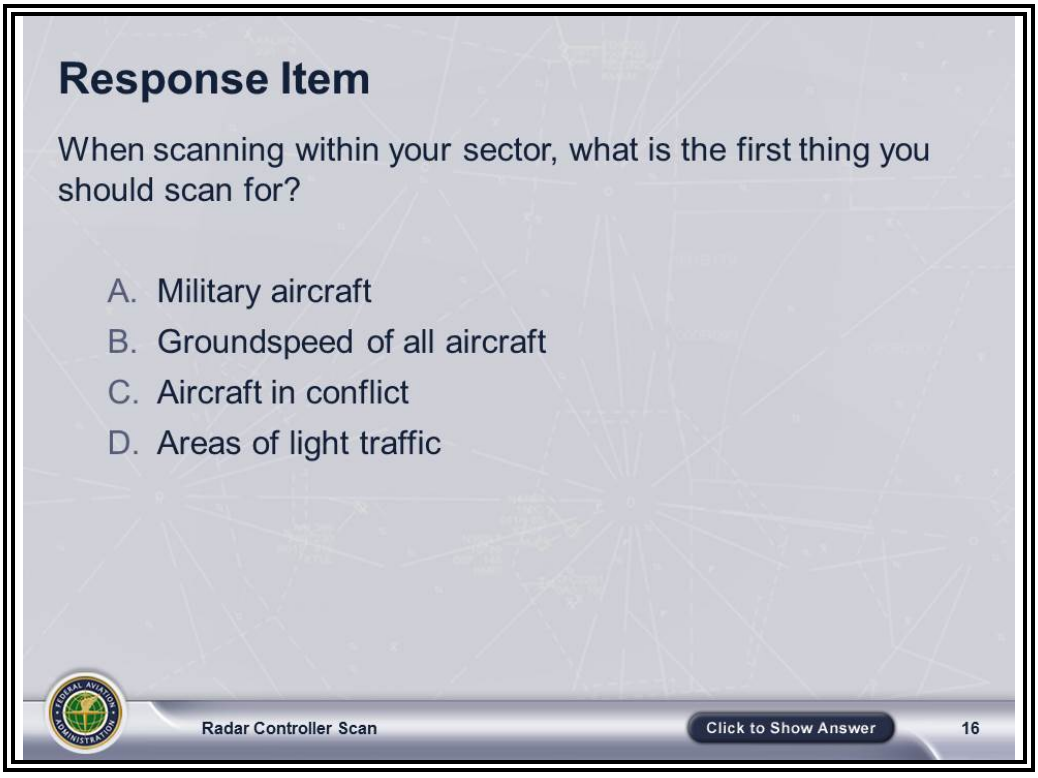
SCANNING *(Continued)*

Scanning the EDST (Cont'd)
JO 7110.311B, par. 2-10-1;
JO 7110.65, ch. 13
TI 6110.101, par. 3.1.3.10

- Other views to scan for updates
  - Departure List
  - Response Area
  - MCA (view commands as you type them)
  - SIG (SIGMETs)

SCANNING *(Continued)*

Review



SLIDE ANSWER: C

QUESTION: What is the purpose of scanning your area of responsibility?

ANSWER: *To determine if it is free of conflict and meets the objectives of a safe, orderly, and expeditious flow of traffic*

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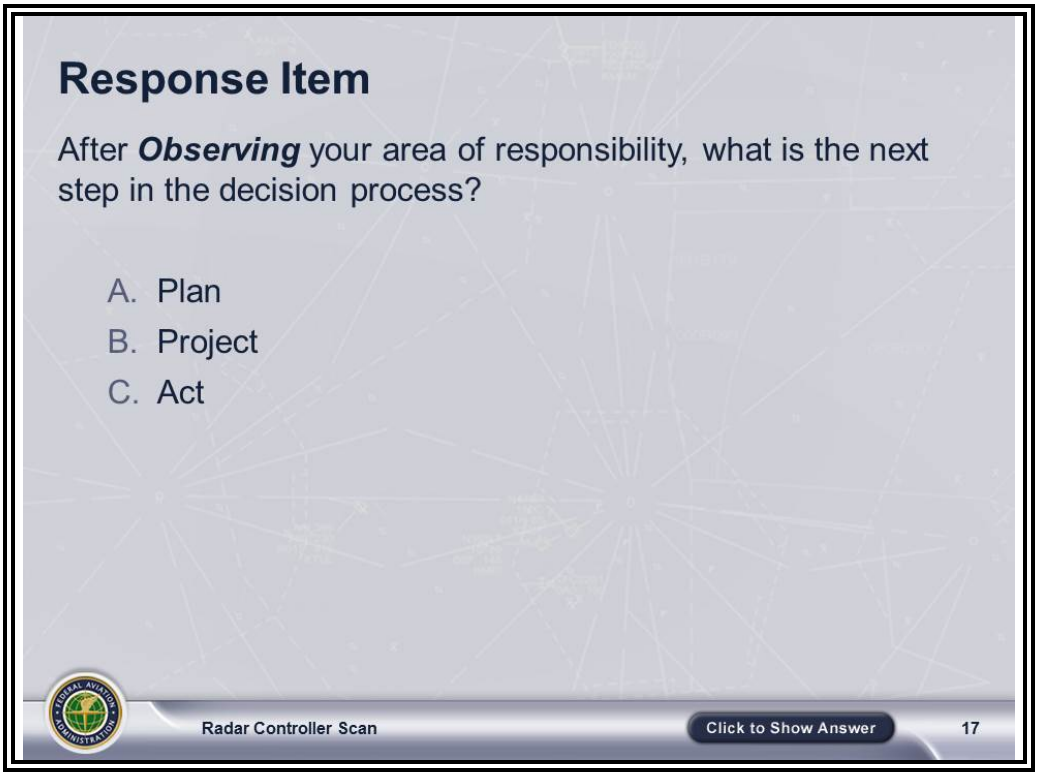
SCANNING *(Continued)*

Review (Cont'd)



SLIDE ANSWER: B

QUESTION: How often should the system status and outage views be scanned?

ANSWER: *Occasionally*

QUESTION: What does a yellow asterisk next to the Route in the ACL indicate?

ANSWER: *The remarks section of the flight plan contains data which must be read by the Sector team.*

DANGERS OF A LIGHT WORKLOAD

Necessity of Constant Scanning

- Continuous scanning and attention to detail is necessary to prevent:
  - Complacency
    - Lack of activity
  - Laxness
    - Treat each situation as unique.
    - Traffic may be similar but it's up to you to determine what is different or unusual.

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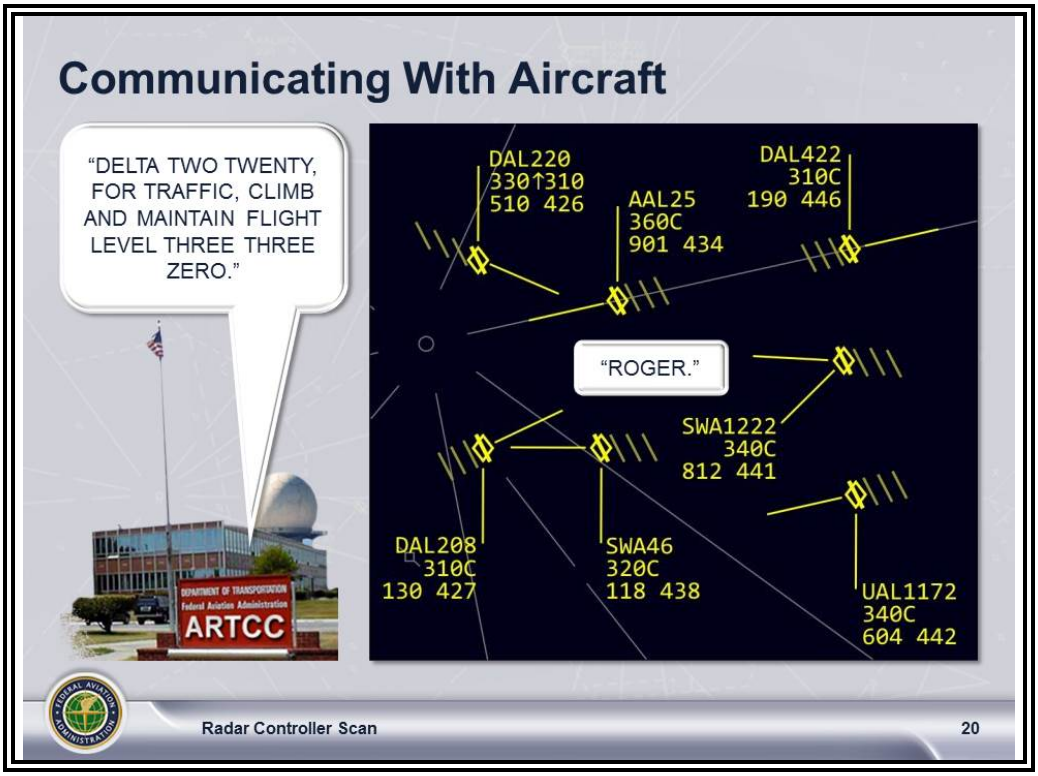
DANGERS OF A LIGHT WORKLOAD *(Continued)*

Necessity of Constant Scanning (Cont'd)

- Do not allow your attention to be diverted by:
  - Conversations not related to the job
  - Distractions from facility tours
  - Other personnel in the area
- Be aware of situations that can cause your scan to break down:
  - Tunnel vision
    - Keep your scan moving.
    - Make time to observe low activity areas.
  - Inaccurate data
    - Update the EDST and flight strips promptly.
    - Complete coordination in a timely manner.

COMMUNICATING WITH AIRCRAFT

Verify Information (Cont'd)
JO 7110.65, pars. 2-4-3, 2-10-1, 5-2-14, 5-2-17 thru 5-2-19



- Always use proper phraseology when communicating with pilots.
- Always ensure correct readbacks and replies.
  - Hear what is said not what you expect to hear.
  - If readback is incorrect or incomplete, make corrections.

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COMMUNICATING WITH AIRCRAFT *(Continued)*

Verify Information (Cont'd)
JO 7110.65, pars. 2-4-3, 2-10-1, 5-2-14, 5-2-17 thru 5-2-19

⊙ Do **not** assume clearance is received. Obtain another readback or reissue the clearance for confirmation if the readback was:

- Blocked or garbled
- **NOT** as expected (make corrections if appropriate)
- Without a callsign

NOTE: If a clearance is issued and no readback is received, best practice is to protect for that clearance until communications are reestablished and the clearance can be verified.

⊙ Always observe changes after computer input.

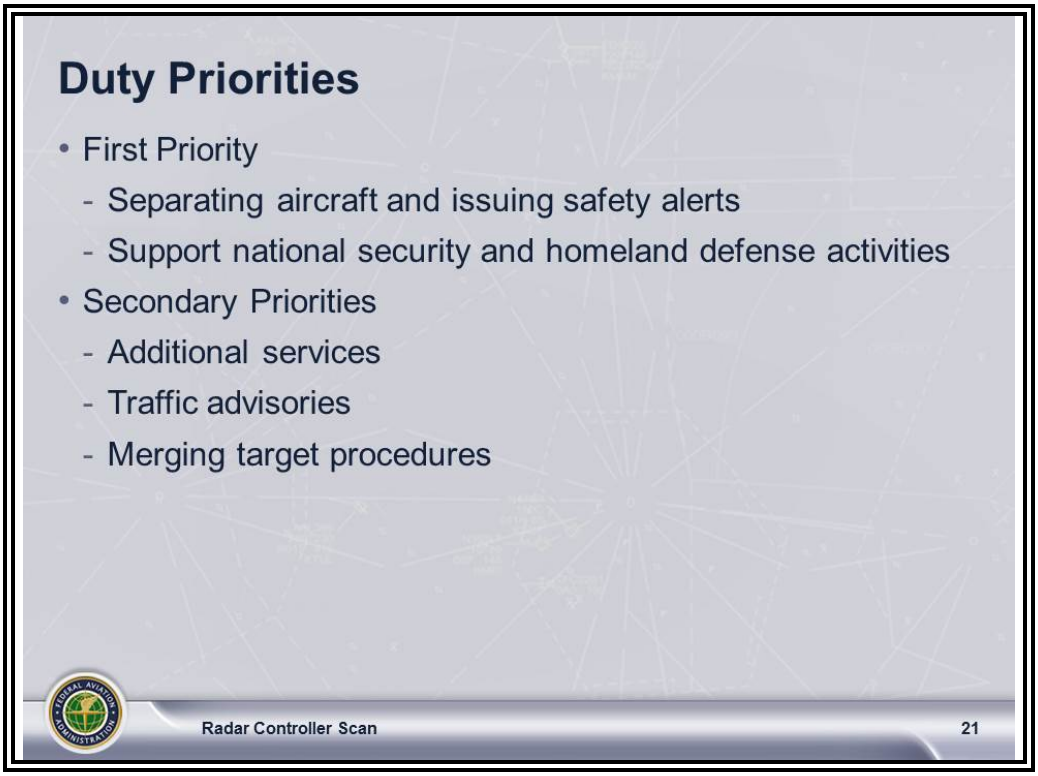
- Data blocks
- R-Position views
- Flight progress strips

Review

QUESTION: What should you do if an aircraft reports at other than the assigned altitude?

ANSWER: *Confirm assigned altitude.*

Prioritization of Information
JO 7110.65, pars. 2-1-2, 2-1-4, 2-1-21, 5-1-8



- First priority
  - Separating aircraft **and** issuing safety alerts
    - Because there are many variables involved, it is virtually impossible to develop a standard list of duty priorities that would apply uniformly to every conceivable situation.
    - Each set of circumstances must be evaluated on its own merit, and when more than one action is required, controllers must exercise their best judgment based on the facts and circumstances known to them.
    - The action that is most critical from a safety standpoint is performed first.
  - National security and homeland defense activities
    - Provide support to national security and homeland defense activities to include, but not be limited to, reporting of suspicious and/or unusual aircraft/pilot activities.

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COMMUNICATING WITH AIRCRAFT *(Continued)*

Prioritization of Information (Cont'd)
JO 7110.65, pars. 2-1-2, 2-1-4, 2-1-21, 5-1-8

- Secondary priorities
  - Additional services
    - Traffic advisories
    - Merging target procedures
    - Other

  Examples: Deviation advisories, HIWAS, PIREPs, weather and chaff services, bird activity information

Continued on next page

Prioritization of Information (Cont'd)
JO 7110.65, pars. 2-1-2, 2-1-4, 2-1-21, 5-1-8

⊙ Operational priorities

- First come, first served
- Exceptions:
  - Aircraft in distress
    - → Has right of way over all other air traffic
    - → Render any assistance possible
  - Medivac - civilian air ambulance
  - AIR EVAC/MED EVAC - military air evacuation
  - Search and Rescue - when on SAR mission
  - Presidential - including entourage and support aircraft
  - Flight check - NAVAID flight inspection
  - Night watch - if NAOC ("NA-YOCK") is used

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COMMUNICATING WITH AIRCRAFT *(Continued)*

Prioritization of Information (Cont'd)
JO 7110.65, pars. 2-1-2, 2-1-4, 2-1-21, 5-1-8

- FLYNET - nuclear emergency/disaster control
- Garden Plot - National Guard troop movement (if coordinated in advance)
- SAMP - atmospheric sampling for nuclear contamination
- Interceptor aircraft - when on an active air defense mission
- SCOOT - senior level personnel (used in remarks section of the flight plan or in air/ground communications)
- TEAL and NOAA - weather reconnaissance flight
- IFR aircraft must have priority over SVFR
- Open skies - observation and demonstration flights

  → Has priority over all air traffic except emergencies, aircraft involved in presidential movement, actual combat forces or activities, and MED EVAC, AIR EVAC, and active SAR

- Aircraft operating under the North American Route Program and in airspace identified in the High Altitude Redesign (HAR) Program

  → Not subject to route limiting restrictions

- DVRSN – diverted flights (used in remarks section of the flight plan)

CONCLUSION

Summary

☞ ***NOTE:*** *Review and elaborate briefly on the following items:*

- ⊙ Duties and responsibilities of the Sector Team
- ⊙ Sources of information updates (equipment)
- ⊙ Scanning methods
- ⊙ Human factors affecting the scanning process
- ⊙ Assumptions concerning communications

☞ ***NOTE:*** *Ask students if there are any questions*

Activity 1: Group Discussion

- ⊙ Discuss whether the following items should be scanned continuously or occasionally:
  - Situation Display Information
  - Weather
  - Altimeter
  - EDST
  - Status Information Area
  - MCA View
  - System Status/Outage View
  - ERIDS
  - ESIS

Activity 2: Scanning

- ⊙ You will now complete Activity 2, Scanning, located in 55055-HO15.

☞ ***NOTE:*** *The activity includes traffic situations depicted on a Situation Display. Instruct students to select the best answer. Discuss the answers. Where there is more than one solution, emphasize controller judgment.*

End-of-Lesson Test

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

☞ ***NOTE:*** *Distribute and administer the End-of-Lesson Test located in 55055-ELT15.*