Federal Aviation Administration

55054003 EN ROUTE RADAR ASSOCIATE CONTROLLER TRAINING PART C: ADVANCED CONCEPTS

Lesson 6: Altitude Amendments

Version: 1.0 2022.08

INSTRUCTOR LESSON PLAN

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LESSON PLAN DATA SHEET

Course Name	En Route Radar Associate Controller Training Part C: Advanced Concepts
Course Number	55054003
Lesson Title	Altitude Amendments
Duration	3 hours, 30 minutes (includes lesson, ELT and part-task exercise)
Version	1.0 2022.08
Reference(s)	JO 7110.65, Air Traffic Control; TI 6110.100, En Route Automation Modernization R-Position User Manual; TI 6110.101, En Route Automation Modernization RA-Position User Manual; TI 6110.108, En Route Automation Modernization Quick Reference Controller Card; TI 6110.146, En Route Automation Modernization Parameters Document; JO 7110.125, Controller Pilot Data Link Communications (CPDLC) in the ERAM Environment
Prerequisites	NONE
Handout(s)	⊙ Part-Task Exercise, HO01_L06 *(Print prior to class)* ⊙ TI 6110.108, ERAM Quick Reference Controller Card
Exercise / Activity	Refer to handout for: ⊙ Part-Task Exercise: Altitude Amendments
Scenario	⊙ Scenario 55054003_L06_S## in TTL
Assessments	⊙ YES - Written *(Refer to ELT01_L06, print prior to class)*
Materials and Equipment	⊙ Pencil and/or pen ⊙ TI 6110.108, En Route Automation Modernization Quick Reference Card
Other Pertinent Information	⊙ **Ensure lesson materials are downloaded to the classroom computer** ⊙ This lesson is based on ERAM EAE410 ⊙ The lesson has been reviewed and reflects current orders and manuals as of April 2022

As you prep for this lesson, recall and be prepared to talk about examples and personal experiences that illustrate or explain the teaching points in the lesson.

LESSON ICON LEGEND

	Description
	The Activity icon indicates an exercise, lab, or hands-on activity.
	The Discussion Question icon signals a discussion question to be asked to the students.
	The Handout icon indicates a handout is to be distributed to the students.
	The Instructor Note icon is in hidden text and indicates text that is for the instructor only.
	The Multimedia icon indicates a video or audio clip is in the presentation.
	The Phraseology icon indicates that phraseology is in the content.
	The WBT icon indicates a component of web-based training.
	The Click icon indicates a PPT slide with click-based functionality to present additional information.
	The Definition icon indicates a published definition.

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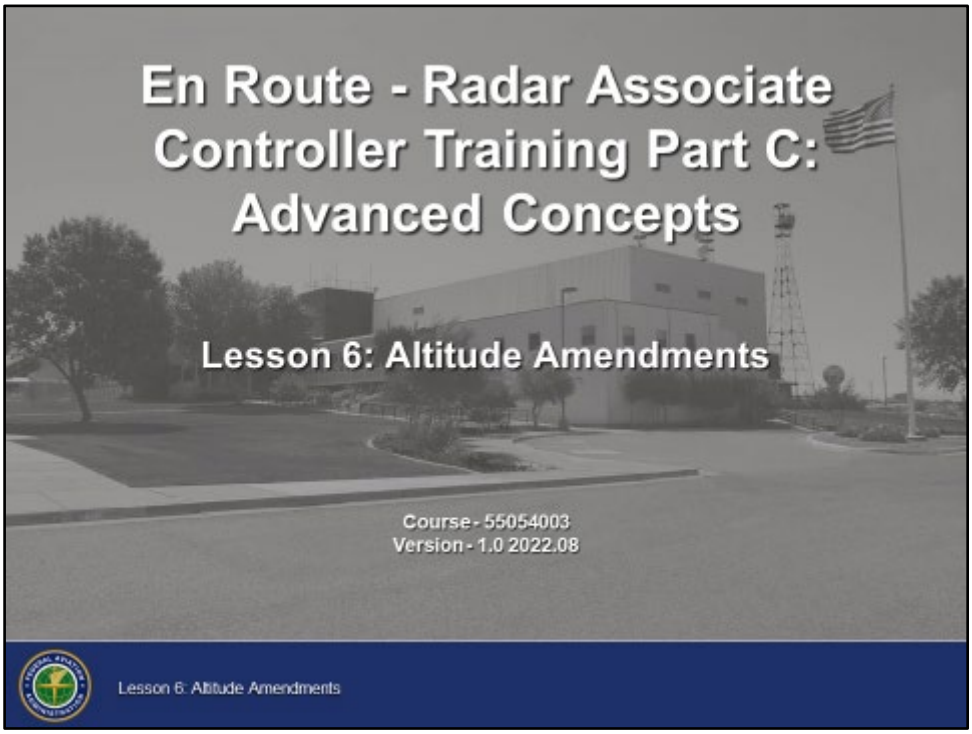
LESSON INTRODUCTION

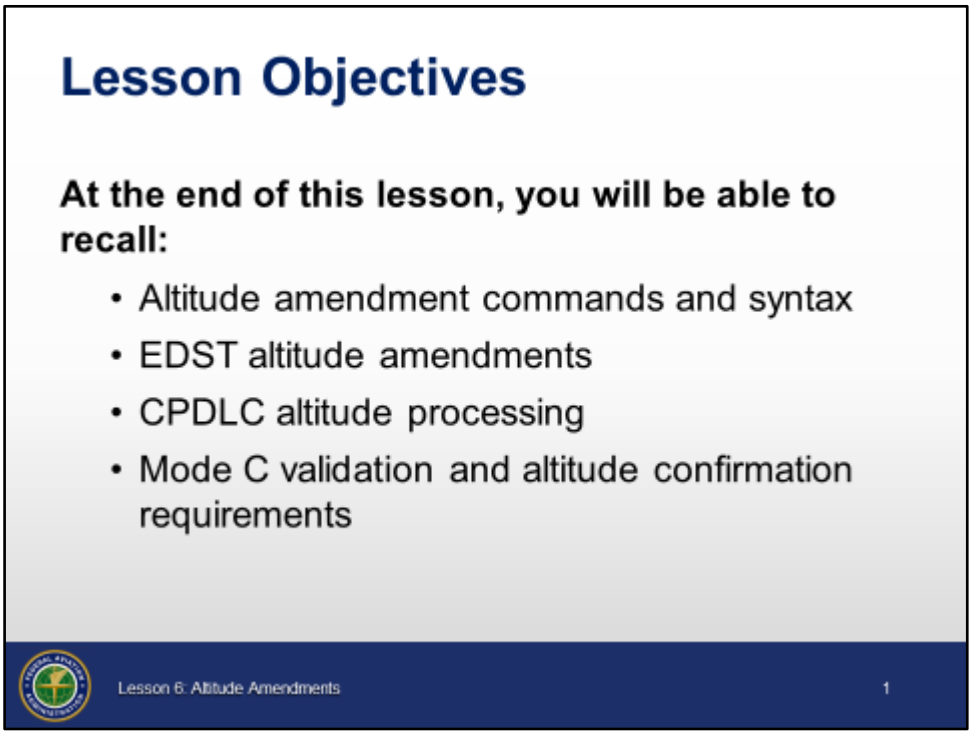
Overview



This lesson introduces making and uplinking altitude amendments using ERAM keyboard commands and EDST. CPDLC altitude processing and validation of Mode C altitude are also addressed.

LESSON INTRODUCTION *(CONT'D)*

Lesson Objectives



Review the lesson objectives.

⊙ At the end of this lesson, you will be able to recall:

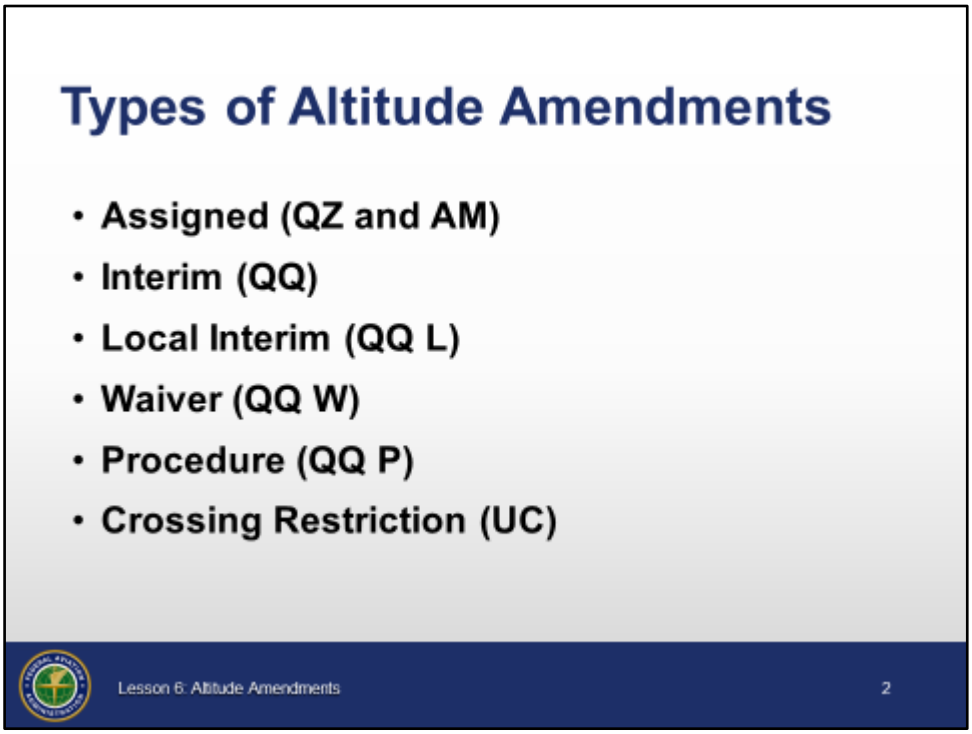
- Altitude amendment commands and syntax
- EDST altitude amendments
- CPDLC altitude processing
- Mode C validation and altitude confirmation requirements

NOTE: There will be a graded end-of-lesson test upon completion of the lesson. The passing score is 70%. If you do not achieve a score of 70%, you will be provided study time and one retake of an alternate end-of-lesson test.

ALTITUDE AMENDMENTS

Types of Altitude Amendments

TI 6110.101, sec. 8



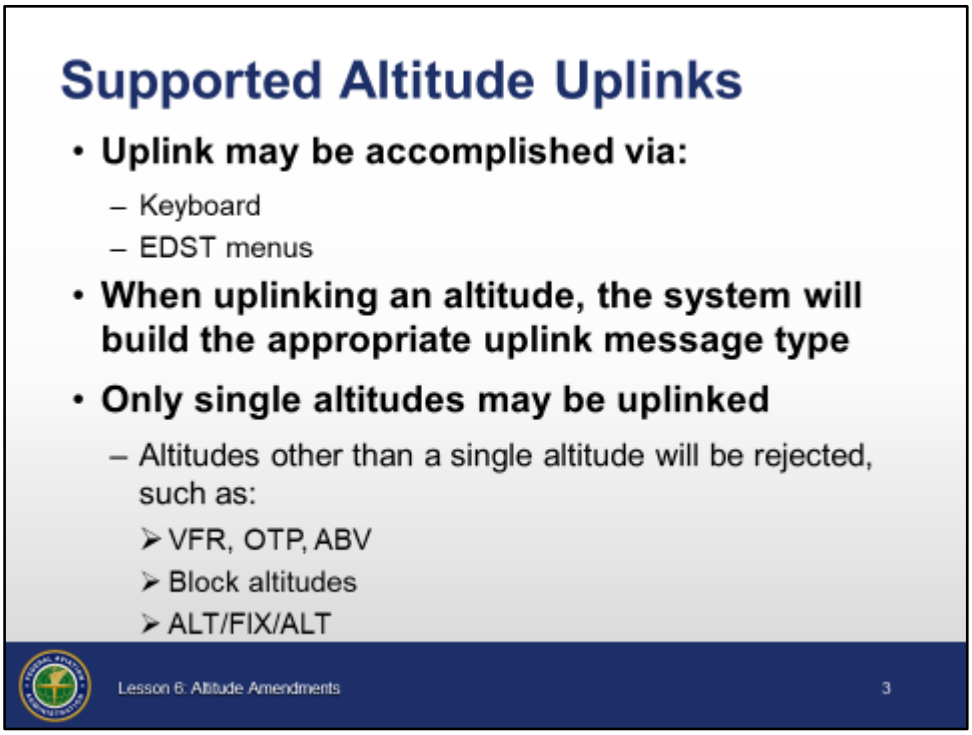
- Types of altitude amendments:
  - Assigned (QZ and AM)
  - Interim (QQ)
  - Local interim (QQ L)
  - Waiver (QQ W)
  - Procedure (QQ P)
  - Crossing Restriction (UC)

ALTITUDE AMENDMENTS *(CONT'D)*

Supported Altitude Uplinks

TI 6110.101, sec. 8

JO 7110.65, par.13-1-1

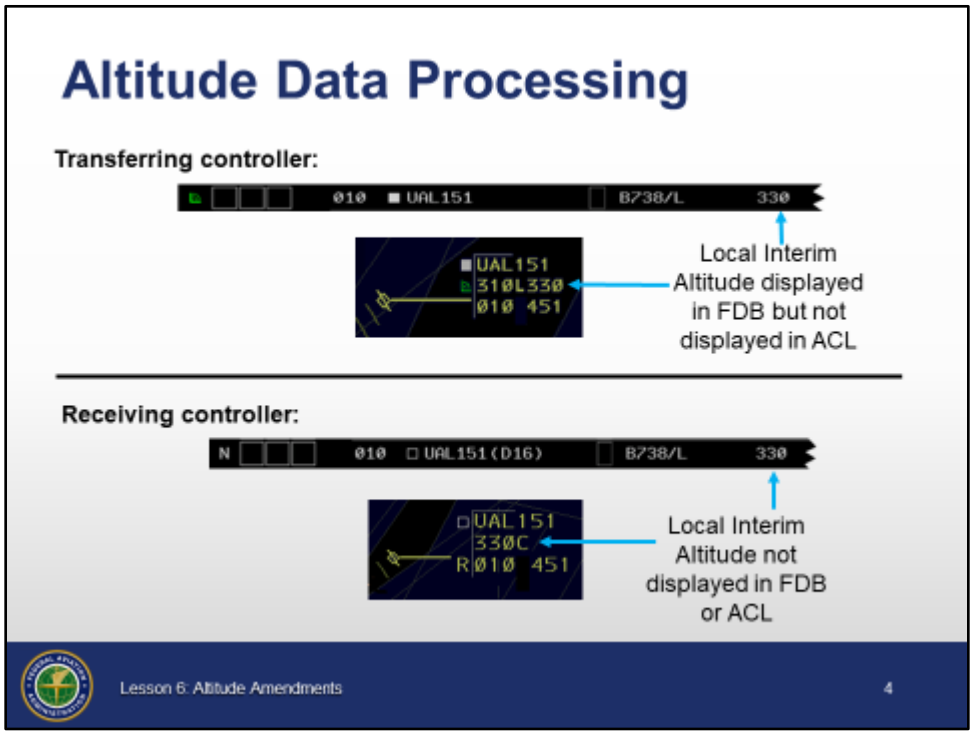


- Uplink may be accomplished via:
  - Keyboard
    - /U may be added to any command eligible for uplink
  - EDST
    - Menus allow altitude uplinks
- When uplinking an altitude, the system will compare current displayed altitude to the new altitude and build the appropriate uplink message type:
  - MAINTAIN
  - CLIMB TO AND MAINTAIN
  - DESCEND AND MAINTAIN
- Only single altitudes may be uplinked
  - Altitudes other than a single altitude will be rejected, such as:
    - VFR, OTP, ABV
    - Block altitudes
    - ALT/FIX/ALT

ALTITUDE AMENDMENTS *(CONT'D)*

Altitude Data Processing

TI 6110.100, sec. 8.1

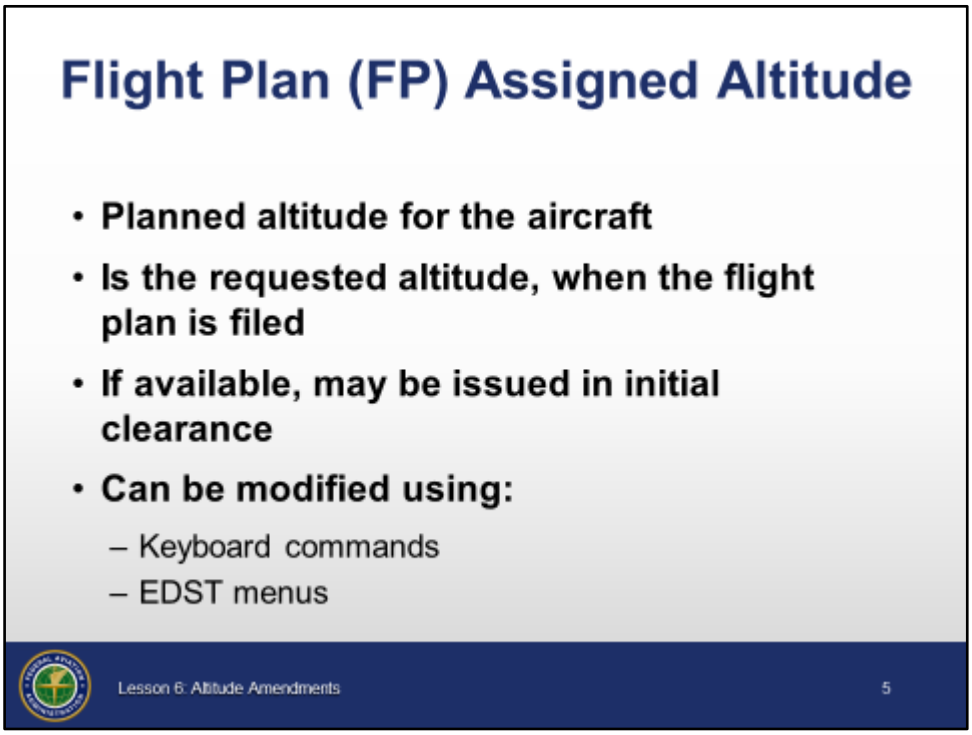


- Altitudes displayed in the FDB
  - Reflect current status of aircraft, unless:
    - Otherwise specified in an appropriate facility directive, e.g. waiver altitude
  - Not always coordinated with adjacent facilities, e.g. local interim altitudes
  - Contains Mode C altitude readout, if available, or
  - Contains a controller reported altitude, if entered
- Altitudes displayed in the ACL
  - Used for coordination with other facilities
  - Does not always match what is shown in the FDB, e.g. ACL does not display local interim altitudes
  - Does not depict Mode C or reported altitude
  - Does not depict Mode C data characters, e.g. XXXX for lost Mode C

ALTITUDE AMENDMENTS *(CONT'D)*

Flight Plan (FP) Assigned Altitude

TI 6110.100, sec. 8.1



- ⊙ Flight Plan (FP) assigned altitude
  - Planned altitude for the aircraft
  - Is the requested altitude, when the flight plan is filed
  - If available, may be issued in initial clearance
  - Can be modified using:
    - Keyboard commands
    - EDST menus

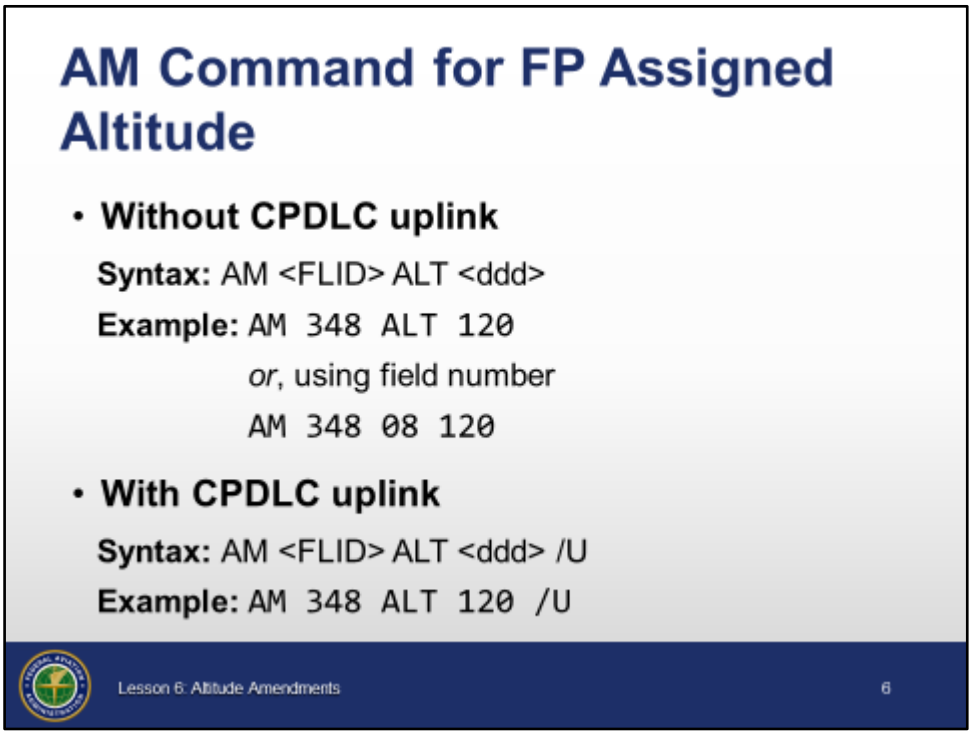
NOTE: The FP assigned altitude designates an altitude within flight plan data and may be different from the altitude the aircraft is actually assigned, e.g., local interim, interim, waiver, or procedure.

ALTITUDE AMENDMENTS *(CONT'D)*

AM Command for FP Assigned Altitude

TI 6110.100, sec. 8.1.1

JO 7110.65, par. 5-14-6



- ⊙ AM command for FP assigned altitude
  - Without CPDLC uplink

    Syntax: AM <FLID> ALT <ddd>

    Example: `AM 348 ALT 120`
  - With CPDLC uplink

    Syntax: AM <FLID> ALT <ddd> /U

    Example: `AM 348 ALT 120 /U`
- ⊙ Sector eligibility override
  - Altitudes may be entered when your sector does not have track control of the FDB by using the /OK function

    Syntax: AM <FLID> /OK ALT <ddd>

    Example: `AM 348 /OK ALT 120`

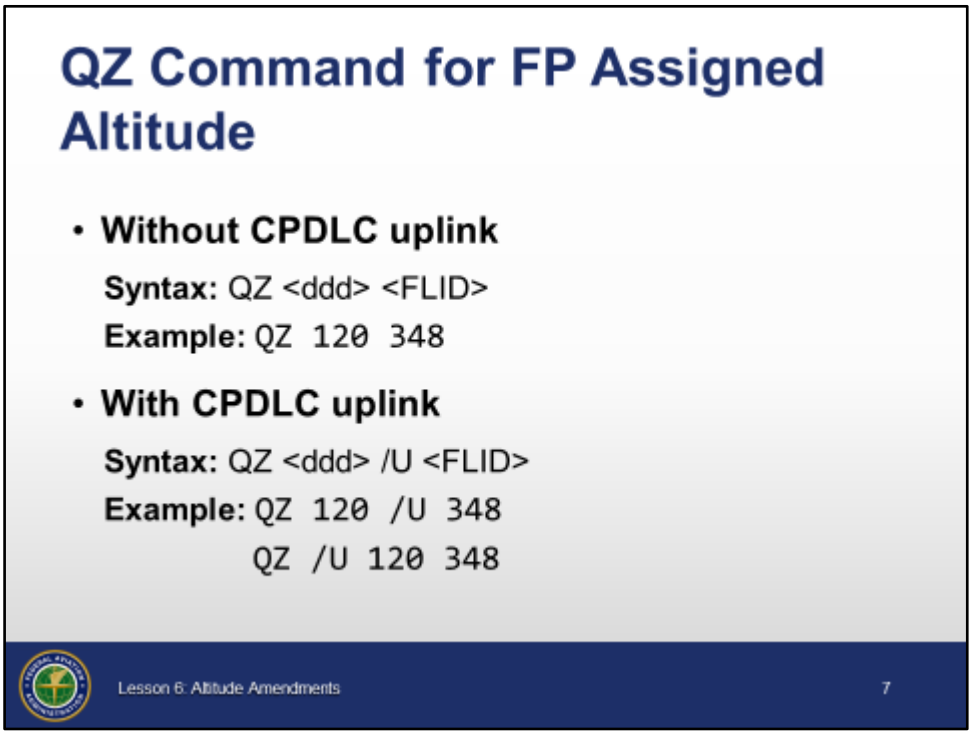
NOTE: Use caution when using an eligibility override, check that the entry is being made for the correct aircraft.

ALTITUDE AMENDMENTS *(CONT'D)*

QZ Command for Assigned Altitude

TI 6110.101, sec. 8.1.1

JO 7110.65, par. 5-14-6



- QZ command for FP assigned altitude
  - Without CPDLC uplink

    Syntax: QZ <ddd> <FLID>

    Example: `QZ 120 348`
  - With CPDLC uplink
    - The CPDLC uplink indicator may be entered anywhere between the QZ command and the FLID

      Syntax: QZ <ddd> /U <FLID>

      Examples: `QZ 120 /U 348`

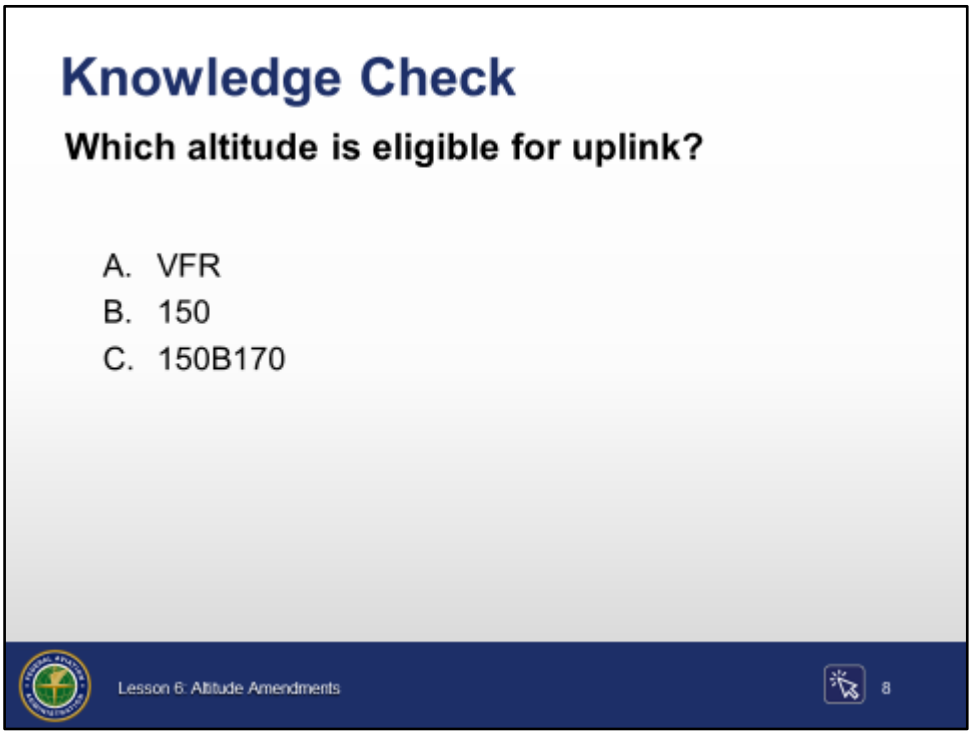
      `QZ /U 120 348`
- Track control override
  - Altitudes may be entered when your sector does not have track control of the FDB by using the /OK function

    Syntax: QZ /OK <ddd> <FLID>

    Example: `QZ /OK 120 348`

ALTITUDE AMENDMENTS *(CONT'D)*

Knowledge Check



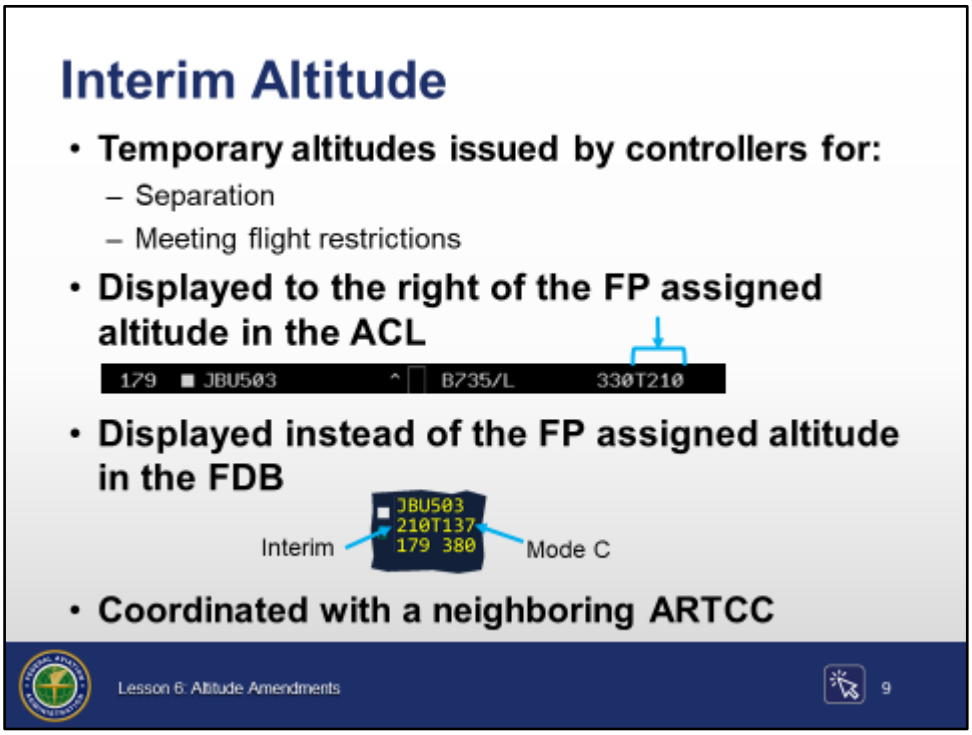
Question: Which altitude is eligible for uplink?

Answer: *B. 150*

ALTITUDE AMENDMENTS *(CONT'D)*

Interim Altitude

TI 6110.100, sec. 8.2



Slide is animated, 3 clicks. Click where indicated by click icons.

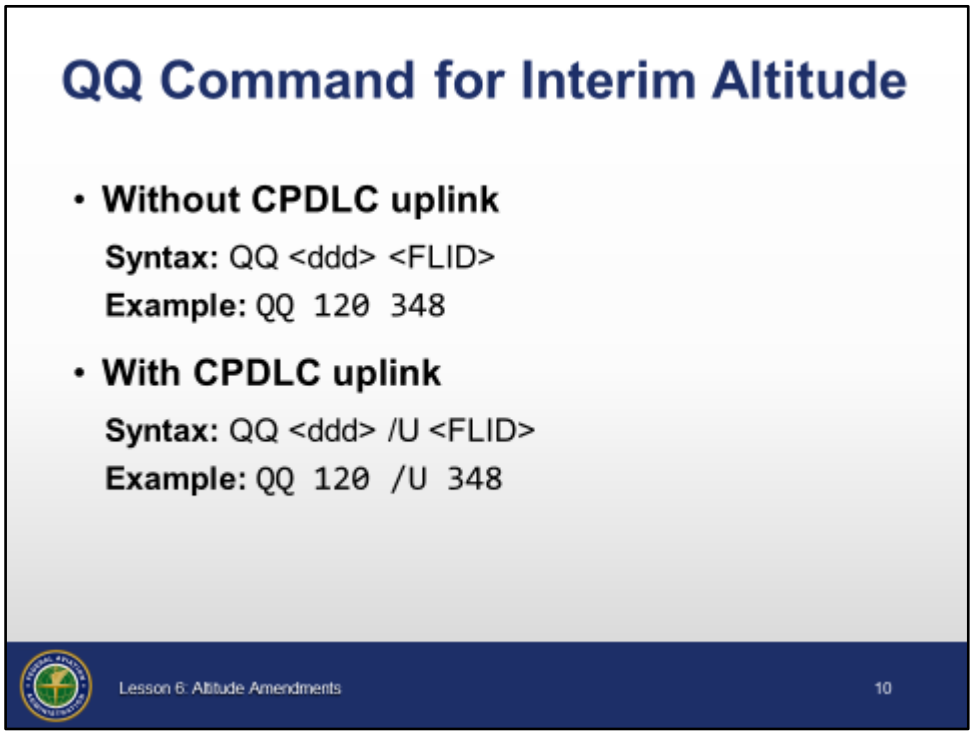
- Interim altitude:
  - Temporary altitudes issued by controllers for:
    - Separation
    - Meeting flight restrictions
  - Displayed to the right of the FP assigned altitude in the ACL

  NOTE: ACL entries do not display Mode C altitude.
  - Displayed instead of the FP assigned altitude in the FDB
    - Does not remove or replace FP assigned altitude
  - Coordinated with a neighboring ARTCC

ALTITUDE AMENDMENTS *(CONT'D)*

QQ Command for Interim Altitude

TI 6110.100, sec. 8.2



- QQ command for interim altitude
  - Without CPDLC uplink

    Syntax: QQ <ddd> <FLID>

    Example: `QQ 120 348`
  - With CPDLC uplink
    - The CPDLC uplink indicator (/U) may be entered anywhere between the QQ command and the FLID

      Syntax: QQ <ddd> /U <FLID>

      Example: `QQ 120 /U 348`
- Eligibility override for interim altitude
  - May be performed using /TT

    Syntax: QQ /TT <ddd> <FLID>

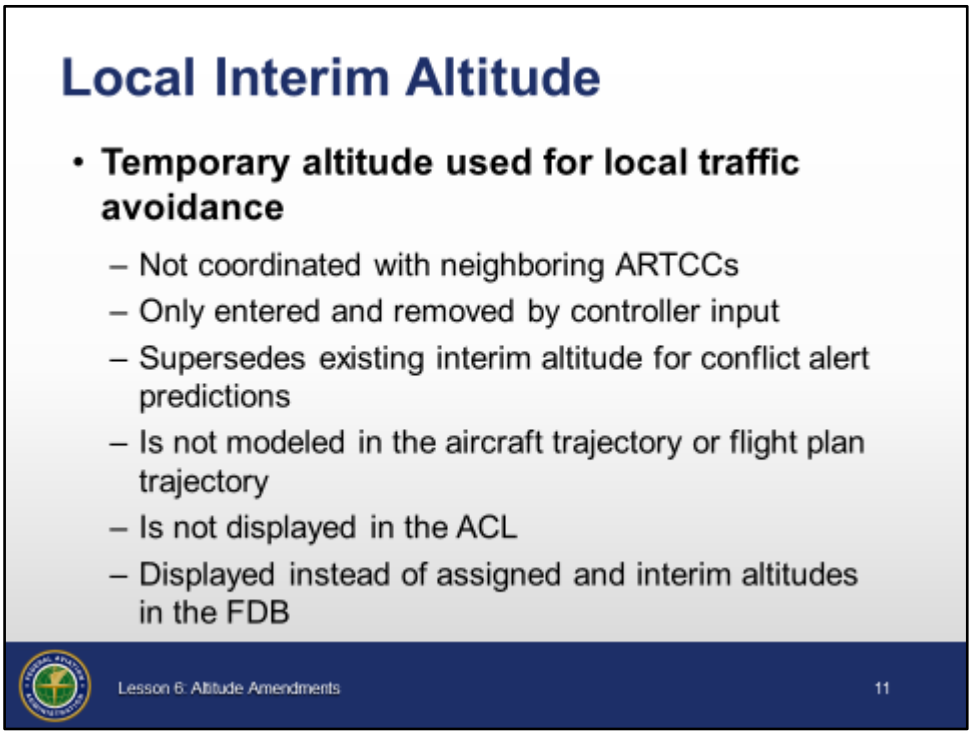
    QQ <ddd> /TT <FLID>

    Example: `QQ /TT 120 348`
- To remove the interim altitude
  - QQ <FLID>

ALTITUDE AMENDMENTS *(CONT'D)*

Local Interim Altitude

TI 6110.101, sec. 8.3

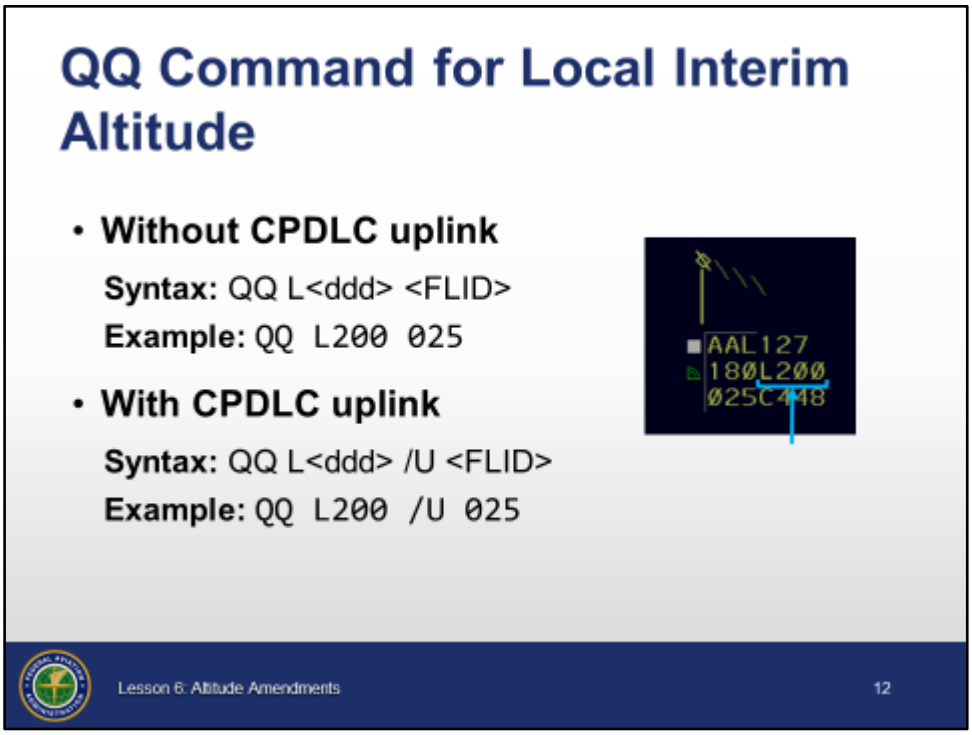


- Local interim altitude is a temporary altitude used for local traffic avoidance
  - Not coordinated with neighboring ARTCCs
  - Only entered and removed by controller input
  - Supersedes an existing interim altitude for conflict alert predictions
  - Not modeled in the aircraft trajectory or flight plan trajectory, possibly resulting in inaccurate conflict probing
  - Is not displayed in the ACL
  - Displayed instead of assigned and interim altitude in the FDB
    - Does not remove or replace assigned or interim altitudes in the flight plan

ALTITUDE AMENDMENTS *(CONT'D)*

QQ Command for Local Interim Altitude

TI 6110.100, sec. 8.3.1



- QQ command for local interim altitude
  - Without CPDLC uplink

    Syntax: QQ L<ddd> <FLID>

    Example: `QQ L200 025`
  - With CPDLC uplink

    Syntax: QQ L<ddd> /U <FLID>

    Example: `QQ L200 /U AAL127`
- Sector eligibility override for local interim altitude
  - May be performed using /TT

    Syntax: QQ /TT L<ddd> <FLID>

    QQ L<ddd> /TT <FLID>

    Example: `QQ /TT L200 025`
- To remove a local interim altitude that has not been uplinked

  Syntax: QQ L <FLID>

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ALTITUDE AMENDMENTS *(CONT'D)*

QQ Command for Local Interim Altitude (Cont'd)

TI 6110.100, sec. 8.3.1

⊙ Uplinked local interim altitude

- Can be replaced by another uplinked altitude

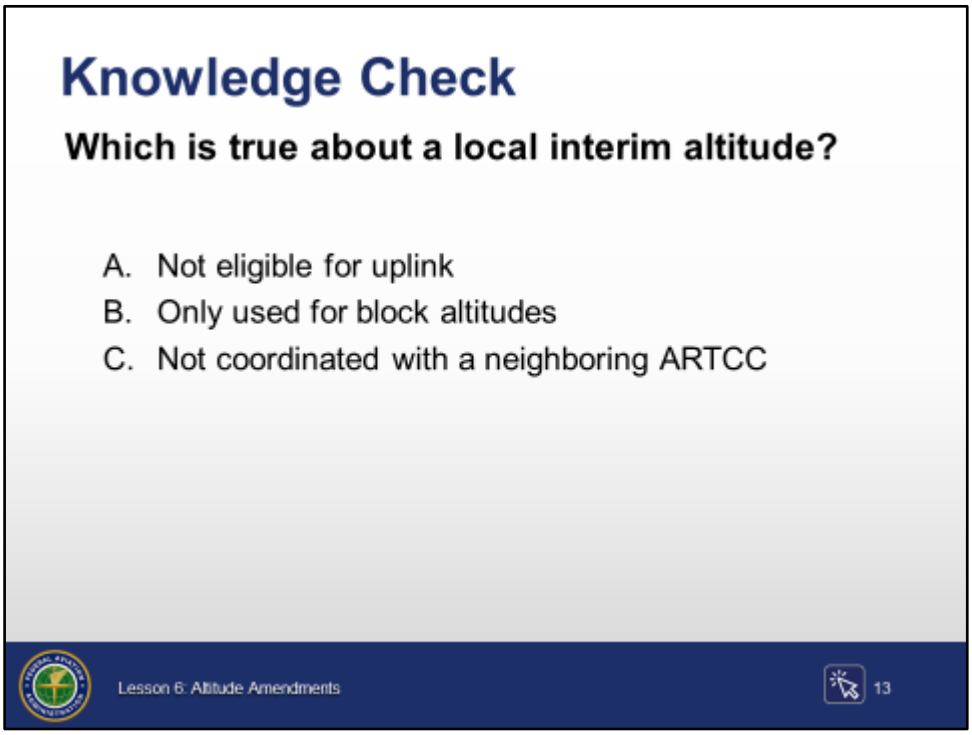
Examples: `QZ 350 /U AAL190`

`QQ L350 /U AAL190`

`QQ T350 /U AAL190`

ALTITUDE AMENDMENTS *(CONT'D)*

Knowledge Check



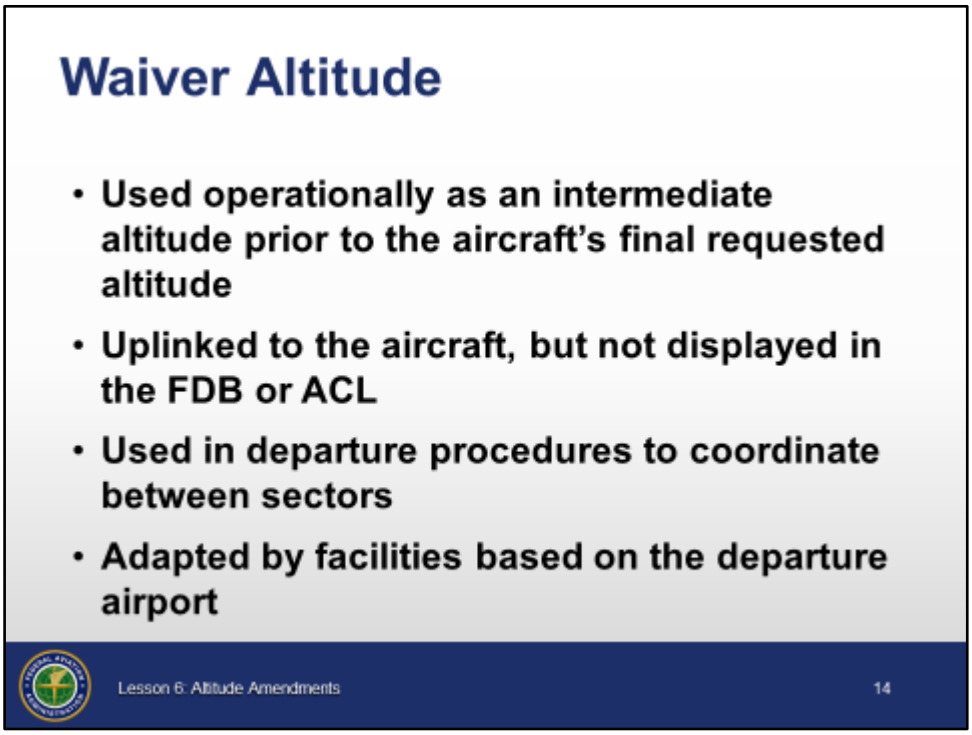
Question: Which is true about a local interim altitude?

Answer: *C. Not coordinated with a neighboring ARTCC*

ALTITUDE AMENDMENTS *(CONT'D)*

Waiver Altitude

TI 6110.100, sec. 8.5



⊙ Waiver Altitude:

- Used operationally as an intermediate altitude prior to the aircraft's final requested altitude
- Uplinked to the aircraft, but not displayed in the FDB or ACL
- Used in departure procedures to coordinate between sectors where the aircraft is issued an intermediate altitude without it being entered into the system as an interim altitude
- Adapted by facilities based on the departure airport
  - Each sector can only adapt a single waiver altitude per airport

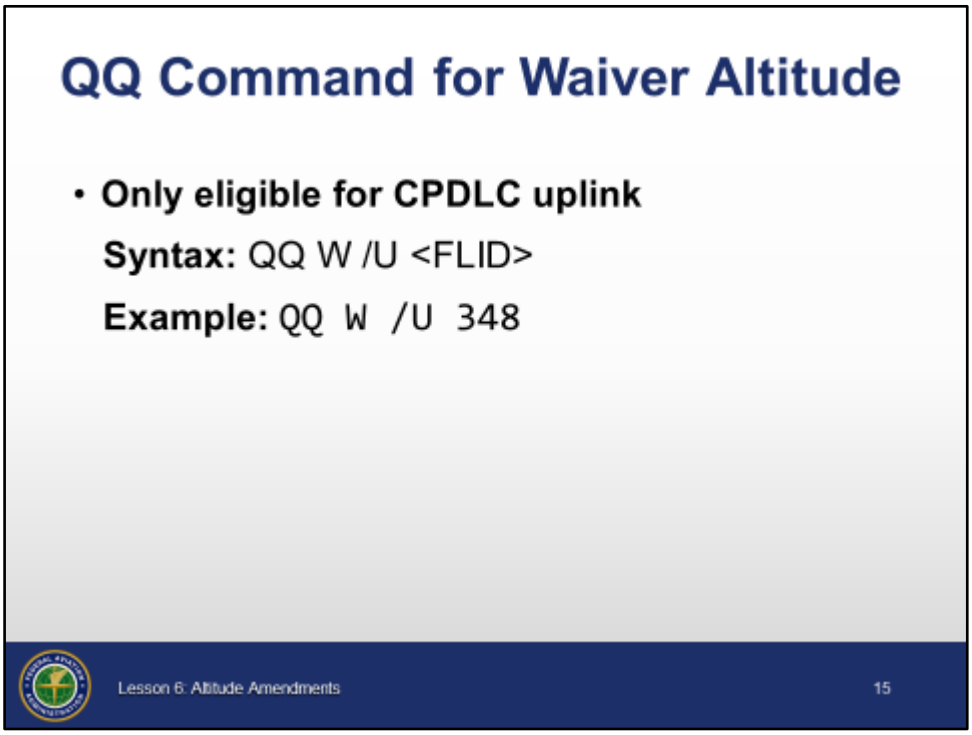
Discuss the difference between local facility waiver to interim altitude requirements and CPDLC adapted waiver altitude.

ALTITUDE AMENDMENTS *(CONT'D)*

QQ Comand for Waiver Altitude

TI 6110.100, sec. 8.5.1

JO 7210.3, par. 8.2.7



- QQ command for waiver altitude:
  - Only eligible for CPDLC uplink

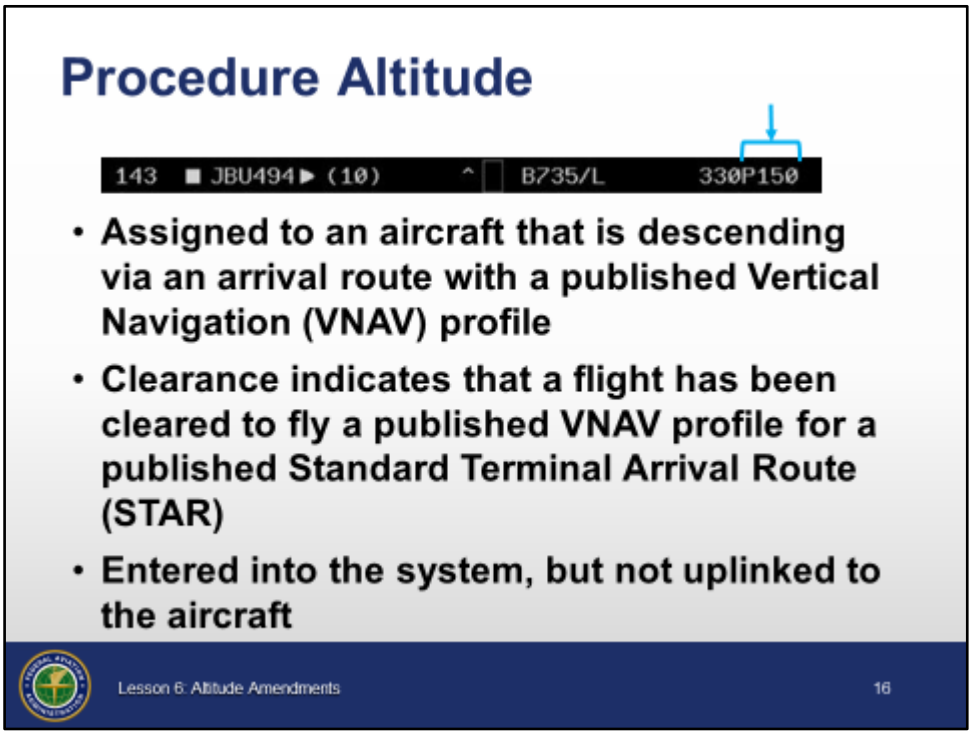
    Syntax: QQ W /U <FLID>

    Example: `QQ W /U 348`

ALTITUDE AMENDMENTS *(CONT'D)*

Procedure Altitude

TI 6110.101, sec. 8.4

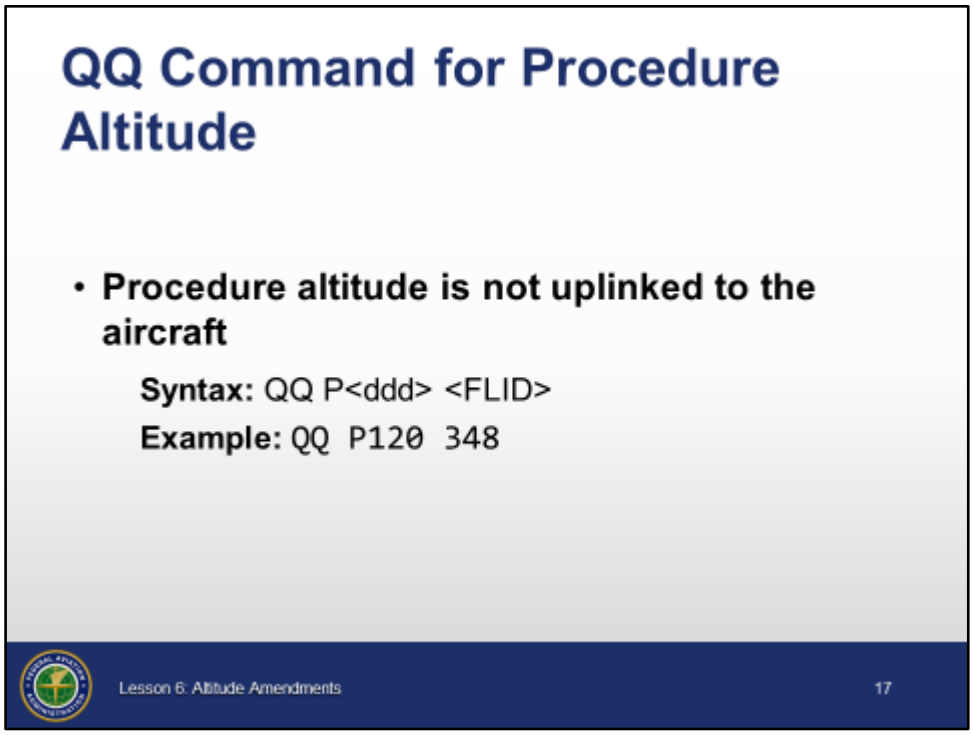


- Procedure Altitude:
  - Assigned to an aircraft that is descending via an arrival route with a published Vertical Navigation (VNAV) profile
  - Clearance indicates that a flight has been cleared to fly a published VNAV profile for a published Standard Terminal Arrival Route (STAR)
  - Entered by the controller, but not uplinked to aircraft
  - When a procedure altitude is entered:
    - It replaces an existing interim altitude
    - A local interim altitude will continue to be displayed in the FDB
  - If an interim altitude is entered while a procedure altitude is in place, it replaces the procedure altitude and removes the procedure altitude designator in the FDB, ACL, and GPD
  - If a local interim altitude is entered while a procedure altitude is in place, the local interim altitude is displayed in the FDB
    - When the local interim altitude is removed, the procedure altitude is once again displayed

ALTITUDE AMENDMENTS *(CONT'D)*

QQ Command for Procedure Altitude

TI 6110.100, sec. 8.4.1



- QQ command for procedure altitude
  - Procedure altitudes cannot be uplinked

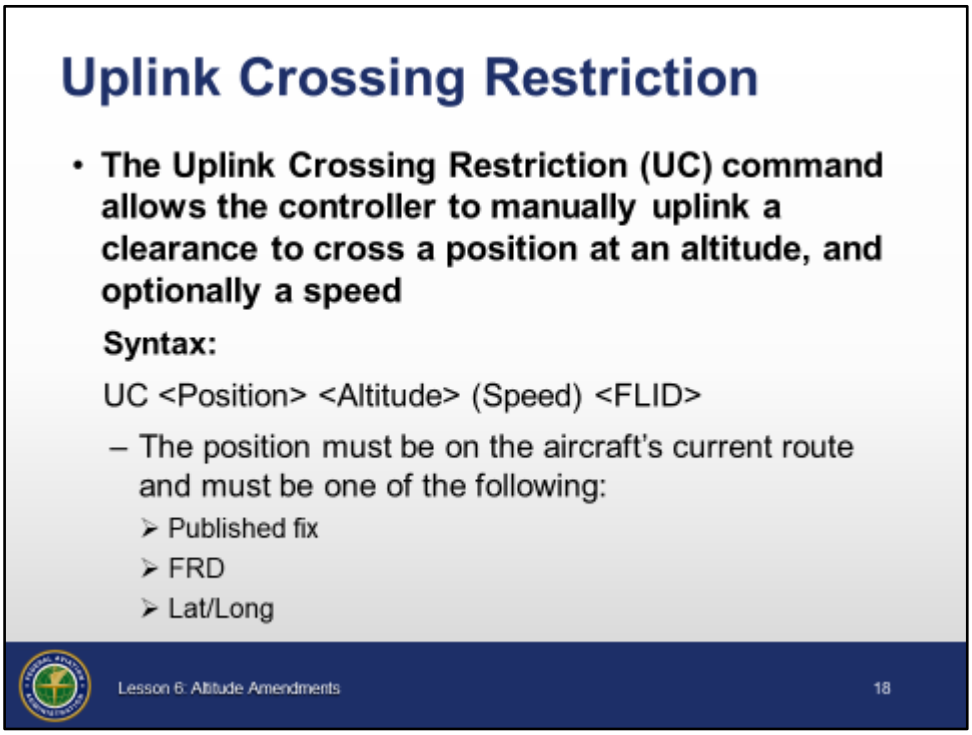
    Syntax: QQ P<ddd> <FLID>

    Example: `QQ P120 348`

ALTITUDE AMENDMENTS *(CONT'D)*

Uplink Crossing Restriction

TI 6110.101, sec. 6.2.3.11



⊙ The Uplink Crossing Restriction (UC) command allows the controller to manually uplink a clearance to cross a position at an altitude, and optionally, a speed

Syntax: UC <Position> <Altitude> (Speed) <FLID>

- The position must be on the aircraft's current route and must be one of the following:
  - Published fix
  - Fix Radial Distance (FRD)
  - Lat/Long
- Airports cannot be used as a crossing restriction fix
- Altitude must be preceded by:
  - "A" (FP assigned altitude), or
  - "T" (interim altitude)

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ALTITUDE AMENDMENTS *(CONT'D)*

Uplink Crossing Restriction (Cont'd)

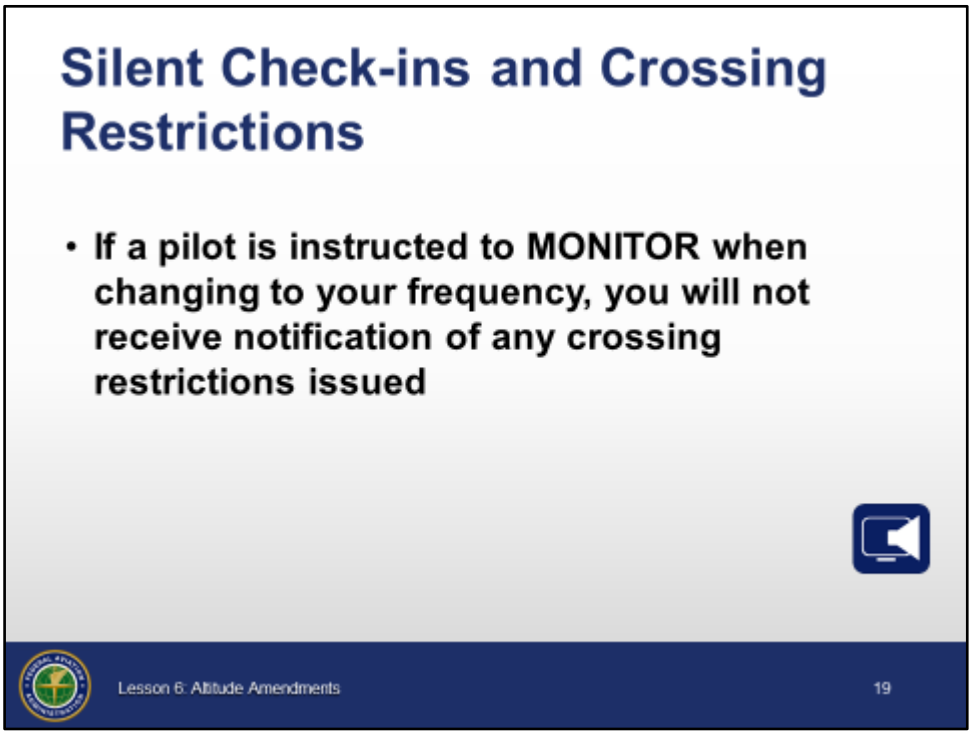
- Speed (optional), can either be:
  - Mach (.61 - .99 in .01 increments), *or*
  - Indicated airspeed (70 - 380 knots in 10 knot increments)
- FLID - Up to 15 Flight IDs can be entered in a single command, each separated by a slant "/"
  - A separate command and uplink is created for each FLID. If one fails, the subsequent commands are not processed and an error message is displayed.

Examples:

```
UC LOZIT A120 AAL250

UC LOZIT A120 249

UC LOZIT A120 S250 249

UC PIRAT T110 DAL234

UC PIRAT T110 DAL234/AAL101/UAL1223
```

ALTITUDE AMENDMENTS *(CONT'D)*

Silent Check-in

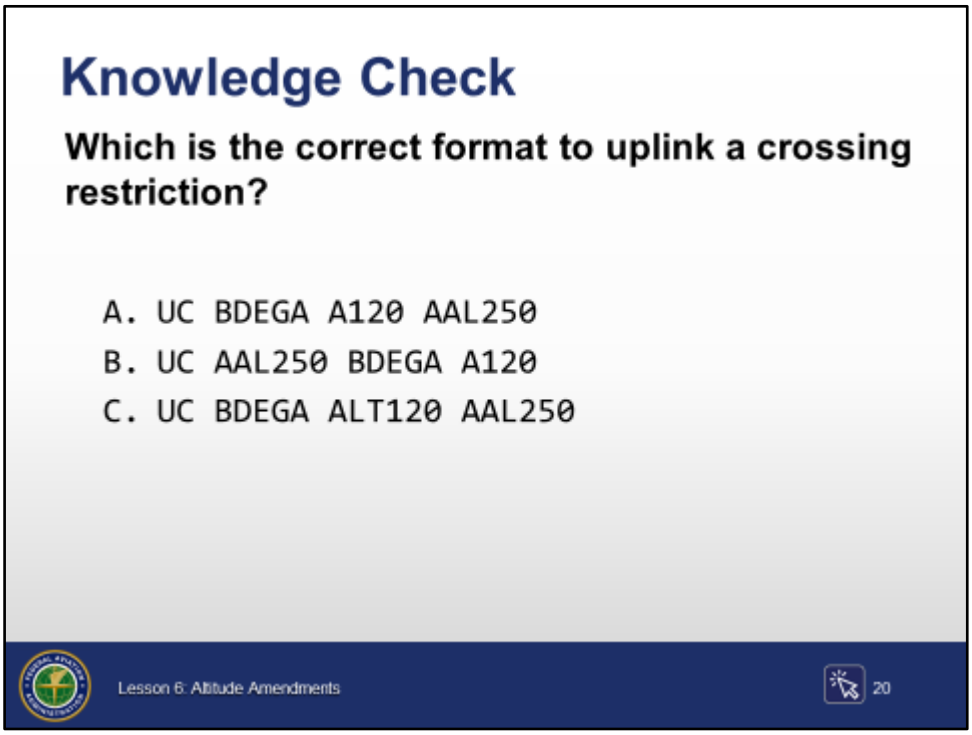


Click on the media icon to play the video for crossing restrictions, 2 minutes in length. Tell the students that this video is using the term Data Comm and not CPDLC.

- A pilot that has been issued a crossing restriction provides the crossing restriction information when checking in via voice. When using CPDLC, if the pilot has been instructed to MONITOR the next sector's frequency, the pilot will not check in via voice and has no mechanism to provide the crossing restriction information on silent check-in.
- If you are using CPDLC and your sector is set up for silent check-ins, the expectation is that the aircraft will meet any LOA or facility directives requiring crossing restrictions unless otherwise coordinated

ALTITUDE AMENDMENTS *(CONT'D)*

Knowledge Check

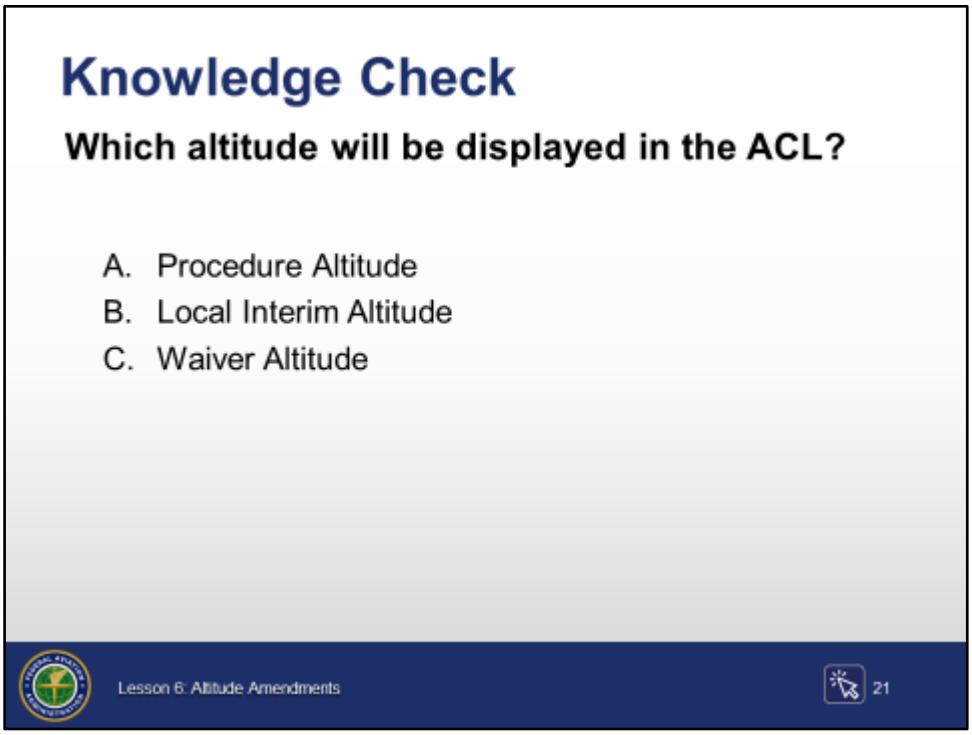


Question: Which is the correct format to uplink a crossing restriction?

Answer: *A. UC BDEGA A120 AAL250*

ALTITUDE AMENDMENTS *(CONT'D)*

Knowledge Check



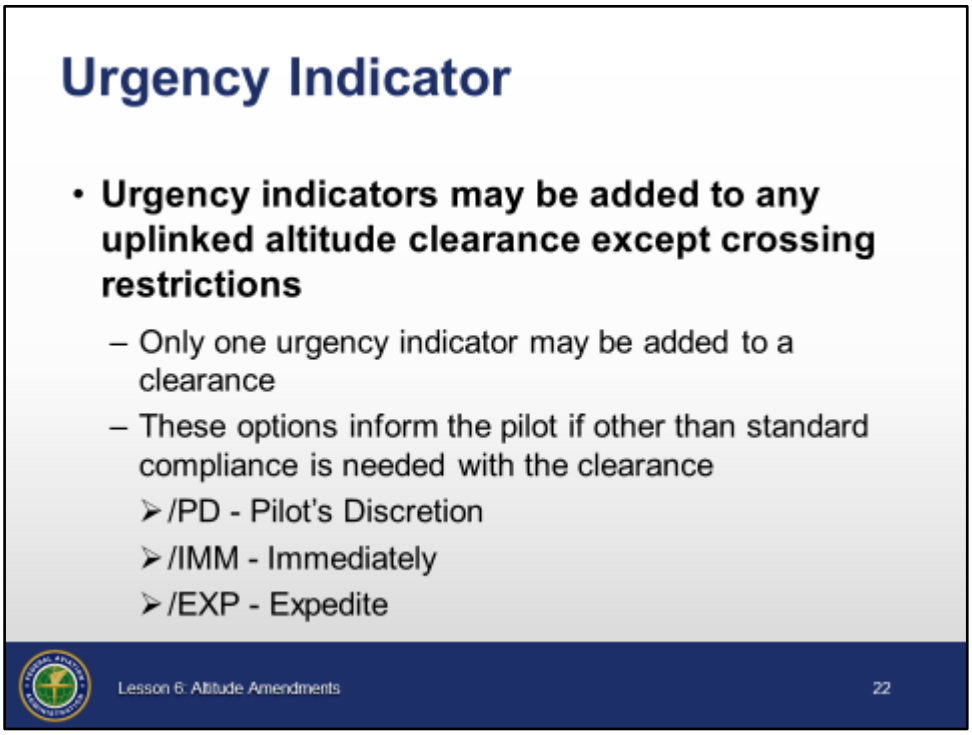
Question: Which altitude will be displayed in the ACL?

Answer: *A. Procedure Altitude*

ALTITUDE AMENDMENTS *(CONT'D)*

Urgency Indicator

TI 6110.100, sec. 6.2.3.1



⊙ Urgency indicators may be added to any uplinked altitude clearance except crossing restrictions

- Only one urgency indicator may be added to a clearance
- These indicators inform the pilot if other than standard compliance is needed with the clearance
  - /PD - Pilot's Discretion
    - Pilot has the option of starting climb or descent when they wish
  - /IMM - Immediately
    - Used when compliance is required to avoid an imminent situation
  - /EXP - Expedite
    - Prompt compliance is required to avoid the development of an imminent situation
    - Best rate of climb or descent should be used without requiring an exceptional change in aircraft handling characteristics

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ALTITUDE AMENDMENTS *(CONT'D)*

Urgency Indicator (Cont'd)

- Urgency indicators may be entered anywhere between the message type and the FLID
  - Spaces between CPDLC elements are optional

  Syntax: QZ <ddd> (/PD; /IMM; /EXP) /U <FLID>

  Syntax: QZ /U (/PD; /IMM; /EXP) <ddd> <FLID>

  Syntax: QZ (/PD; /IMM; /EXP) /U <ddd> <FLID>

  Examples: `QZ 120 /PD /U 348`

  `QZ /U /PD 120 348`

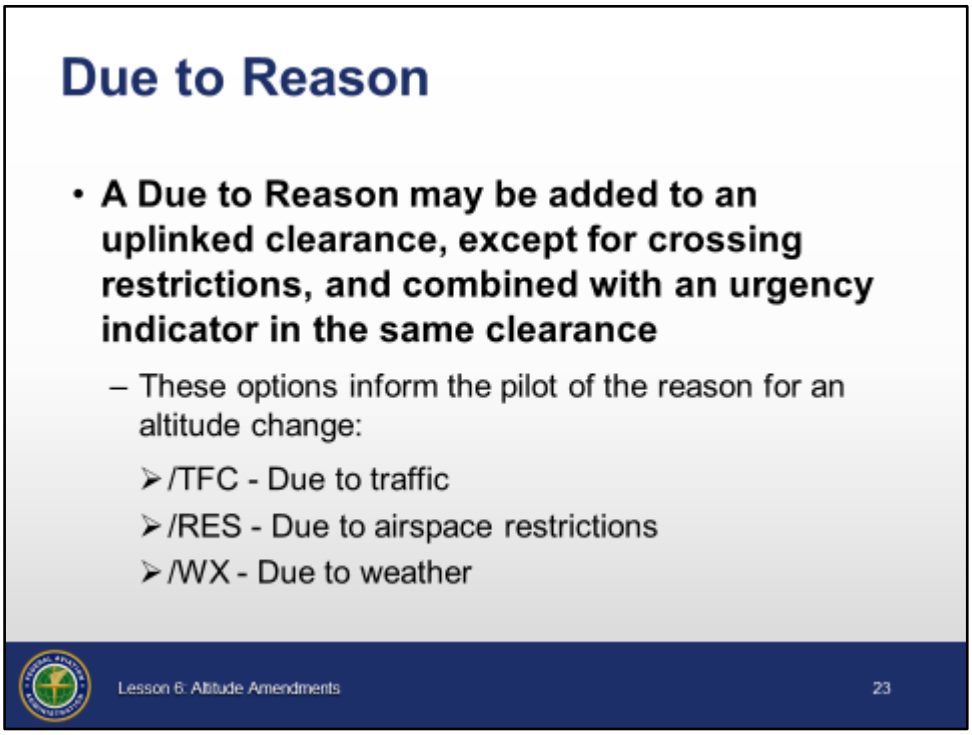
  `QZ /IMM /U 120 348`

NOTE: CPDLC should not be used to issue immediate or expedite clearances unless voice communication is not operationally feasible.

ALTITUDE AMENDMENTS *(CONT'D)*

Due to Reason

TI 6110.100, sec. 6.2.3.1



- A Due to Reason may be added to an uplinked clearance, except for crossing restrictions, and combined with an urgency indicator in the same clearance
  - These options inform the pilot of the reason for an altitude change:
    - /TFC - Due to traffic
    - /RES - Due to airspace restrictions
    - /WX - Due to weather
  - Only one Due to Reason may be added to a clearance
- A Due to Reason may be entered anywhere between the message type and the FLID

  Syntax: QZ <ddd> (/TFC; /RES; /WX) /U <FLID>

  Syntax: QQ /U (/TFC; /RES; /WX) <ddd> <FLID>

  Syntax: QZ (/PD; /IMM; /EXP) /U <ddd> <FLID>

  Examples: `QZ 120 /EXP /TFC /U 348`
  `QQ /PD /U /WX L120 348`
  `QQ /U /EXP /TFC 120 348`

NOTE: Spaces between CPDLC elements are optional.

ALTITUDE AMENDMENTS *(CONT'D)*

CPDLC Keyboard Keys

TI 6110.100, sec. 6.2.3.1

TI 6110.146, tables 3-308, 3-309

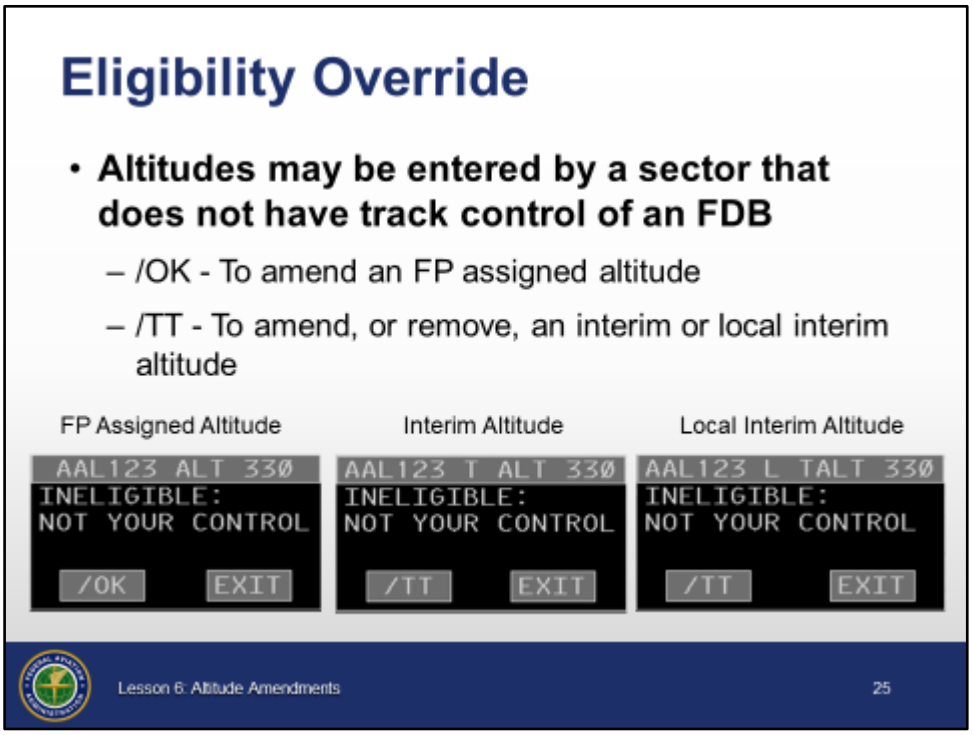
- CPDLC Keys
  - CPDLC Enter key
    - Inserts a /U
    - Immediately executes the command
    - Facility adapted to any of the Function Keys (F1 through F12)

    NOTE: If using any CPDLC elements, they must be entered immediately after the message type.
  - CPDLC key
    - QQ or QZ command
      - Will insert /U wherever the cursor is located and will not execute the command
    - AM command
      - Insert /U after the last character and will not execute the command
    - Facility adapted to either of the two space keys above the numeric keypad

ALTITUDE AMENDMENTS *(CONT'D)*

Eligibility Override

TI 6110.101, sec. 8.6.1.4



⊙ Altitudes may be entered by a sector that does not have track control of an FDB

- When a controller attempts to amend the altitude of an aircraft that is not their track control using the Altitude menu or Altitude Text Box menu, the system will display:
  - /OK
    - Used to amend FP assigned altitude
  - /TT (Or other locally adapted two characters)
    - Used to amend or remove an interim or local interim altitude

Discuss what your facility uses for eligibility override if other than TT has been adapted.

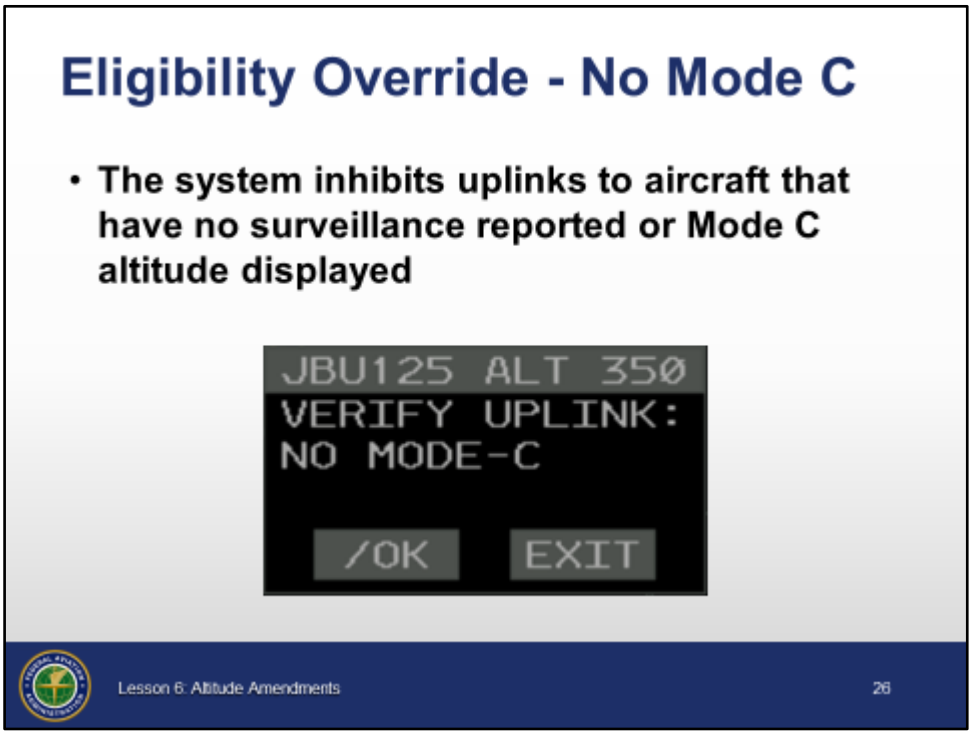
- TBP or TBE the /OK pick area, or the /TT pick area. The system executes the command with the eligibility override and the pop up is removed from the display.

NOTE: Use caution when using an eligibility override. Check that the entry is being made for the correct aircraft.

ALTITUDE AMENDMENTS *(CONT'D)*

Eligibility Override - No Mode C

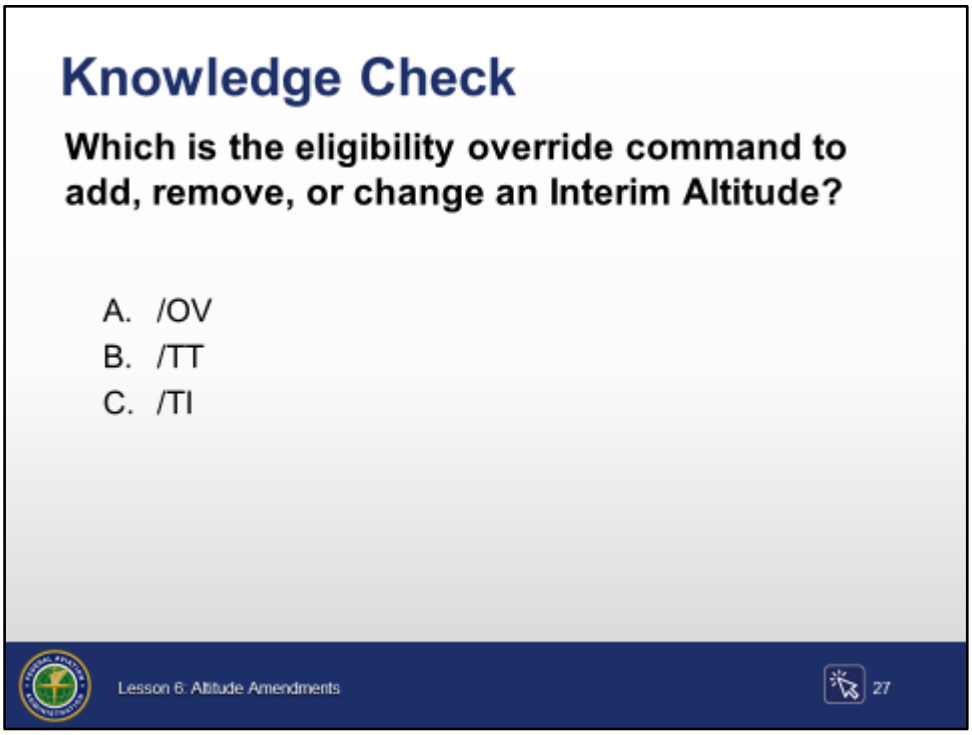
TI 6110.100, sec. 8.6.1.4



- The computer inhibits uplinks to aircraft that have no surveillance reported or Mode C altitude displayed
  - TBP or TBE the /OK button
    - The system performs the command with the eligibility override and the menu is removed from the display
    - /OK functionality updates the altitude but does not uplink it to the aircraft
- If an error in the entry was made and you do not want to override eligibility, TBP or TBE on EXIT
  - The pop up will close with no amendment made

ALTITUDE AMENDMENTS *(CONT'D)*

Knowledge Check



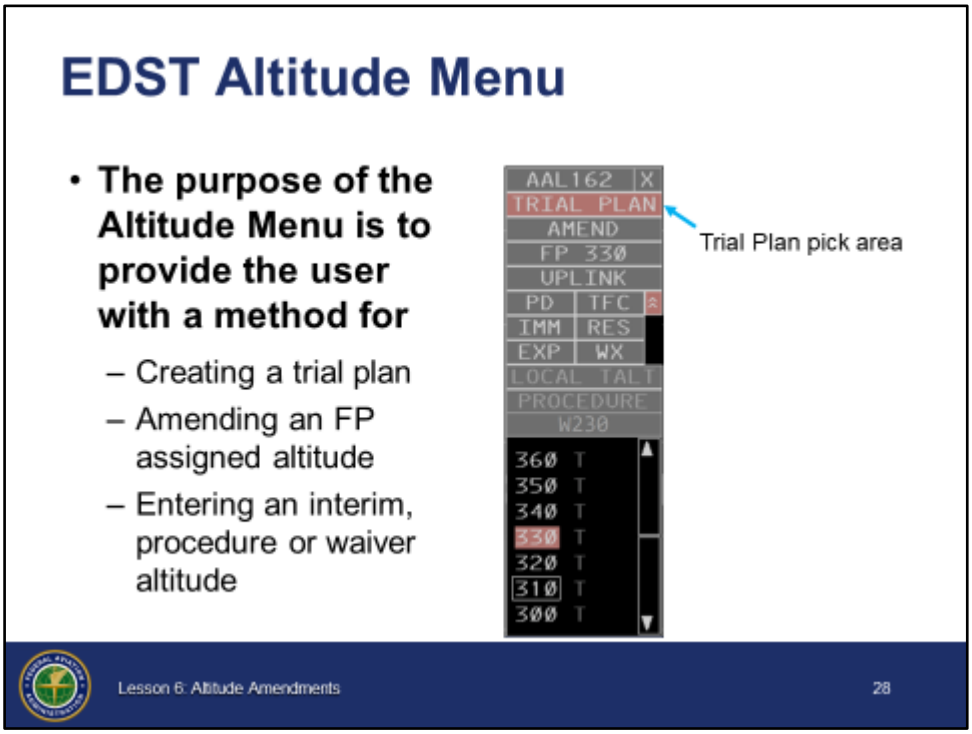
Question: Which is eligibility override command to add, remove, or change an Interim Altitude?

Answer: *B. /TT*

EDST ALTITUDE AMENDMENTS

EDST Altitude Menu

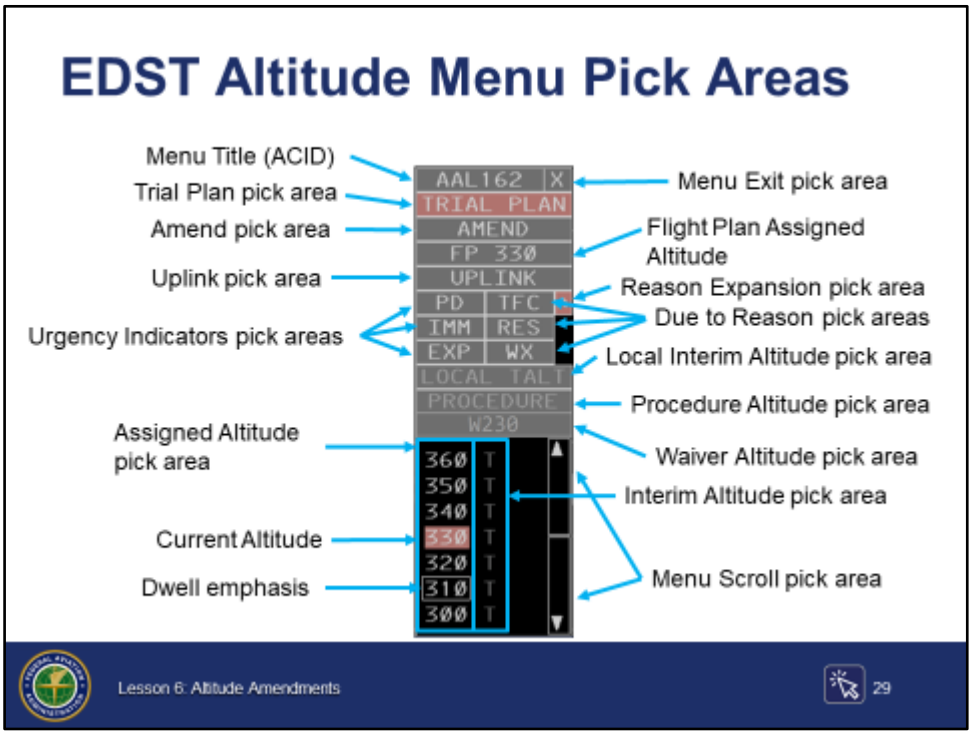
TI 6110.101, sec. 8.6



- The purpose of the Altitude Menu is to provide the user with a method for:
  - Creating a trial plan
  - Amending an FP assigned altitude
  - Entering an interim altitude message by selecting an altitude value from the menu options
  - Entering an interim altitude or FP assigned altitude message by typing an altitude in the typing box
  - Entering a procedure altitude by selecting the procedure altitude button when a procedure altitude button is available
  - Entering a waiver altitude by selecting the waiver altitude button (e.g., W230) when a waiver altitude button is available

EDST Altitude Menu Pick Areas

TI 6110.100, sec. 8.6



Slide is animated, 17 clicks. Click where indicated by click icon.

- EDST Altitude menu
  - Altitude menu accessed through:
    - Altitude field of an entry in the ACL
    - Plan Options Menu
    - Altitude field of a GPD data block
  - Menu Title (ACID)
  - Menu Exit pick area
  - Trial Plan pick area
    - Used to create a Trial Plan
    - Only displayed for active flights
    - Designates that a trial plan is to be created based on the designated altitude
    - The uplink area is not active when the Trial Plan pick area is active
    - The Urgency indicators and Due to Reasons are not available when the Trial Plan pick area is active

Continued on next page

EDST ALTITUDE AMENDMENTS *(CONT'D)*

EDST Altitude Menu Pick Areas (Cont'd)

TI 6110.100, sec. 8.6

- Amend pick area
  - Creates an amendment to the designated altitude
  - All eligible pick areas are active when amend is selected
  - Executes the command immediately upon completion of the amendment
- Flight Plan Assigned Altitude
  - Displays the Flight Plan Assigned Altitude, regardless of what is displayed in the FDB
- Uplink pick area
  - Displayed when a flight has a CPDLC session established
  - Only selectable at the sector with CPDLC eligibility
  - When active, the pick area will have burnt coral shading
- Urgency indicators pick areas
  - Appends Urgency indicator to uplink message
  - Only displayed and selectable when the uplink area is displayed and selectable
  - TBP or TBE the chevrons to display all selectable items
- Reason Expansion pick area
  - Used to display additional pick areas for Due to Reasons and Urgency indicators
  - Only displayed when the Uplink pick area is displayed
- Due to Reason pick areas
  - Appends the selected Due to Reason to uplink message
  - Only displayed and selectable when the uplink area is displayed and selectable
  - TBP or TBE the chevrons to display all selectable items

Continued on next page

EDST ALTITUDE AMENDMENTS *(CONT'D)*

EDST Altitude Menu Pick Areas (Cont'd)

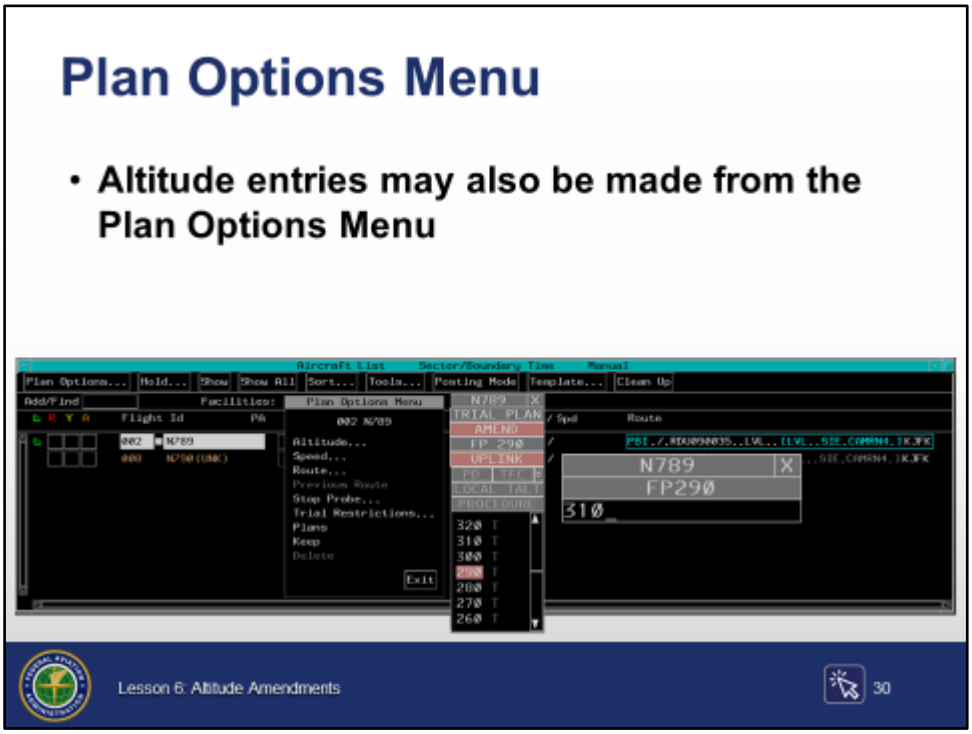
TI 6110.101, sec. 8.6

- Local Interim Altitude pick area
  - TBP or TBE LOCAL TALT
  - The "T"s in the menu will be removed
    - Select the altitude to assign
- Procedure Altitude pick area
- TBP or TBE PROCEDURE pick area
  - The "T"s in the menu will be removed
    - Select the altitude to assign
- Waiver Altitude pick area
  - If a waiver altitude is adapted for the sector, it will be displayed in the Waiver Altitude pick area (e.g., W260) of the altitude menu
  - TBP/TBE on the UPLINK button
    - TBP/TBE on the Waiver Altitude pick area to assign
- Current Altitude Value
  - Currently assigned altitude is highlighted in burnt coral
- Dwell emphasis on altitude
  - White box around an altitude will display when the cursor is over it
- Assigned Altitude pick area
  - TBP or TBE the altitude to assign the new altitude
  - When a new altitude is assigned, an interim, local interim, or procedure altitude will be removed
  - RVSM capable aircraft
    - Altitudes will be displayed in white in 1000' increments
  - Non RVSM capable aircraft
    - Altitudes above FL290 are grayed out
- Interim Altitude pick area
  - Indicated by a "T" next the assigned altitude pick area
  - TBP or TBE the "T" to assign an interim altitude
- Menu Scroll pick area

EDST ALTITUDE AMENDMENTS *(CONT'D)*

Plan Options Menu - Altitude Amendment

TI 6110.100, sec. 8.6.2



Slide is animated, 6 clicks. Click where indicated by click icons.

⊙ Altitude entries may also be made from the Plan Options Menu

- The Plan Options Menu is opened from the ACL by:
  - TBP on the Flight Id, then
  - TBP on Plan Options… button in the toolbar
- On the Plan Options Menu, position the trackball cursor and TBP on Altitude…
  - The Altitude menu appears
- TBP or TBE on the AMEND button or UPLINK button
  - The TRIAL PLAN button is always active when the Altitude menu is initially opened
- Optionally add a Due to Reason or Urgency indicator

Continued on next page

EDST ALTITUDE AMENDMENTS *(CONT'D)*

Plan Options Menu - Altitude Amendment (Cont'd)

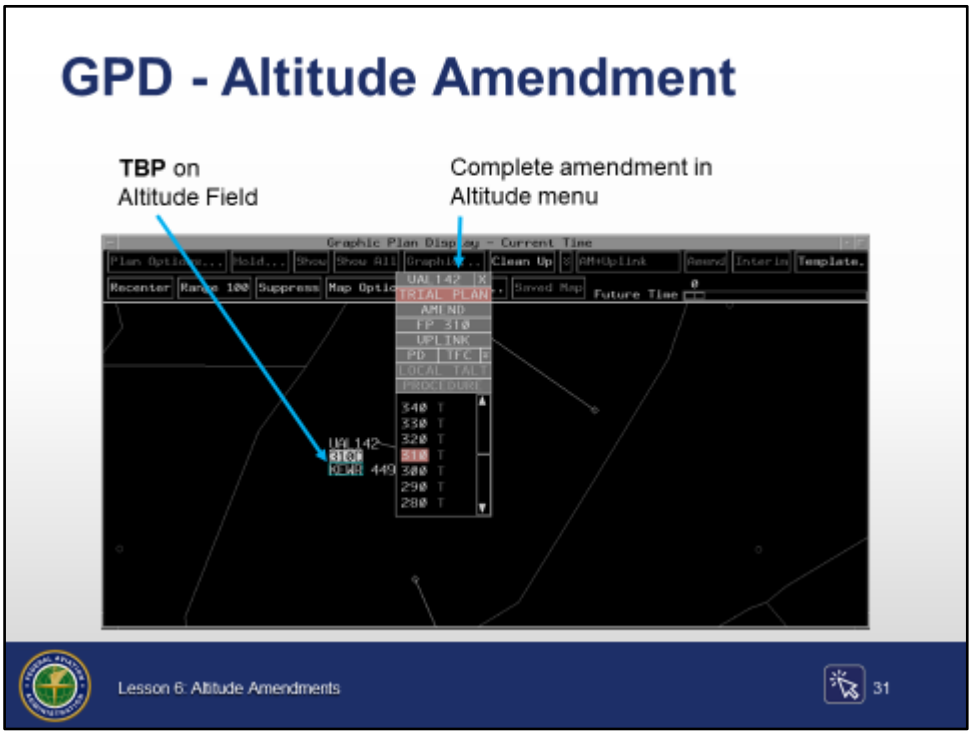
TI 6110.100, sec. 8.6.2

- Complete the amendment by doing one of the following:
  - For an FP assigned altitude, TBP or TBE an altitude in the menu
  - For an interim altitude, TBP or TBE a "T" adjacent to an altitude in the menu
  - Alternatively, for an FP assigned altitude, type the digits of the desired altitude and press the Enter key when done
    - Upon typing the first number a menu opens up to accept the FP assigned altitude

EDST ALTITUDE AMENDMENTS *(CONT'D)*

GPD - Altitude Amendment

TI 6110.101,
sec. 3.1.1.4



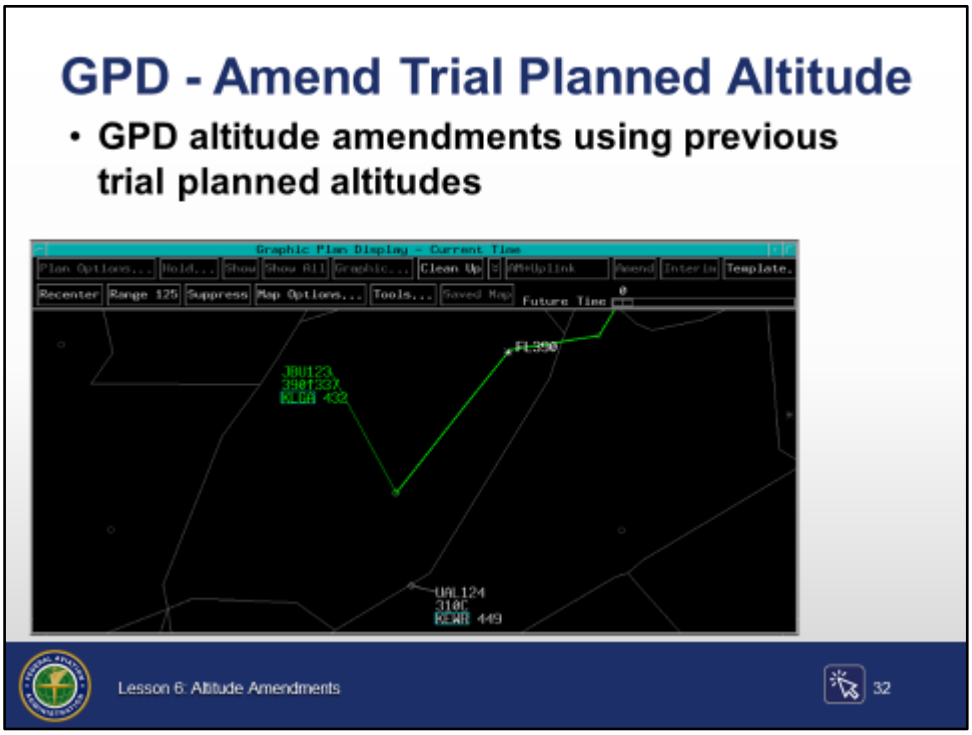
Slide is animated, 1 click. Click where indicated by click icon.

- Altitude entries may also be made in the Graphic Plans Display (GPD)
  - TBP on the Altitude field of the GPD data block, then
  - Complete the amendment in the Altitude menu

EDST ALTITUDE AMENDMENTS *(CONT'D)*

GPD - Amend Trial Planned Altitude

TI 6110.100, sec. 3.1.1.4



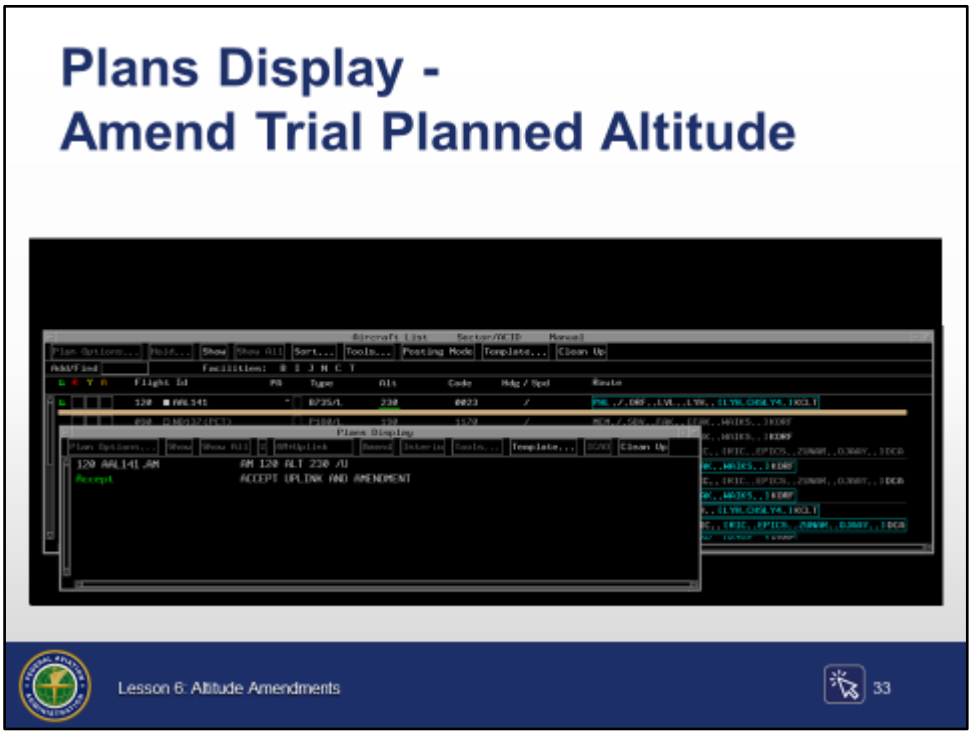
Slide is animated, 4 clicks. Click where indicated by click icons.

- Within the GPD, altitude amendments may be made using previous trial planned altitudes
  - TBP on a Trial Plan Data Block ID for which an altitude has been trial planned, then:
    - TBP the Interim button to make the interim altitude amendment in the computer
    - TBP the Amend button to make the FP assigned altitude amendment in the computer
    - TBP the AM + Uplink button to make the FP assigned altitude amendment in the computer and uplink the clearance
  - The AM + Uplink button will be grayed out for non-CPDLC aircraft
  - The AM + Uplink button will be grayed out for CPDLC aircraft and not selectable when either:
    - The flight is not controlled by the local facility, or
    - The flight is not marked on frequency for the sector

EDST ALTITUDE AMENDMENTS *(CONT'D)*

Plans Display - Amend Trial Planned Altitude

TI 6110.100, sec. 3.1.1.4



Slide is animated, 2 clicks. Click where indicated by click icons.

- Within the Plans Display, altitude amendments may be made using previous trial planned altitudes
- To make an altitude amendment using the Plans Display:
  - Trial plan an altitude in the ACL or GPD using the Altitude Menu
    - An entry is created in the Plans Display
    - The Plans Display is brought to the foreground of the position display
  - TBP the Interim button to make the interim altitude amendment in the system
  - TBP the Amend button to make the Altitude amendment in the system or,
  - TBP the AM + Uplink button to make the Altitude amendment in the system and uplink the clearance

Continued on next page

EDST ALTITUDE AMENDMENTS *(CONT'D)*

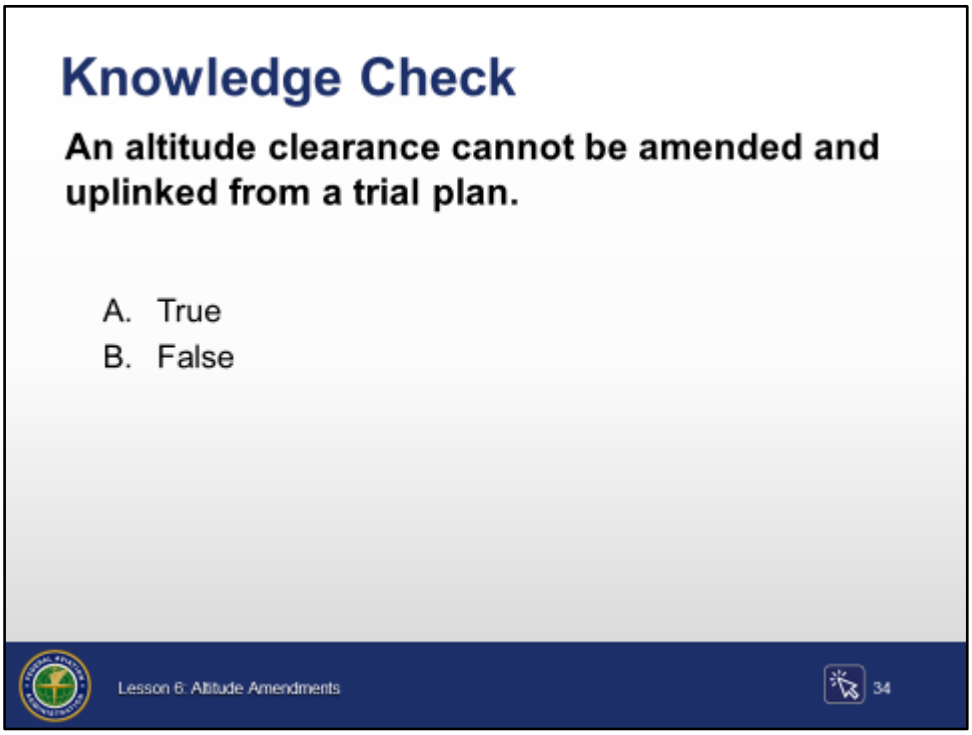
Plans Display - Amend Trial Planned Altitude (Cont'd)

TI 6110.100, sec. 3.1.1.4

- The AM + Uplink button will be grayed out for non-CPDLC aircraft
- The AM + Uplink button will be grayed out for CPDLC aircraft and not selectable when either:
  - The flight is not controlled by the local facility, or
  - The flight is not marked on frequency for the sector
- Another Plans Display entry, besides the most current entry, may be amended by:
  - TBP on the Plan ID for the desired entry and proceed with the amendment

EDST ALTITUDE AMENDMENTS *(CONT'D)*

Knowledge Check



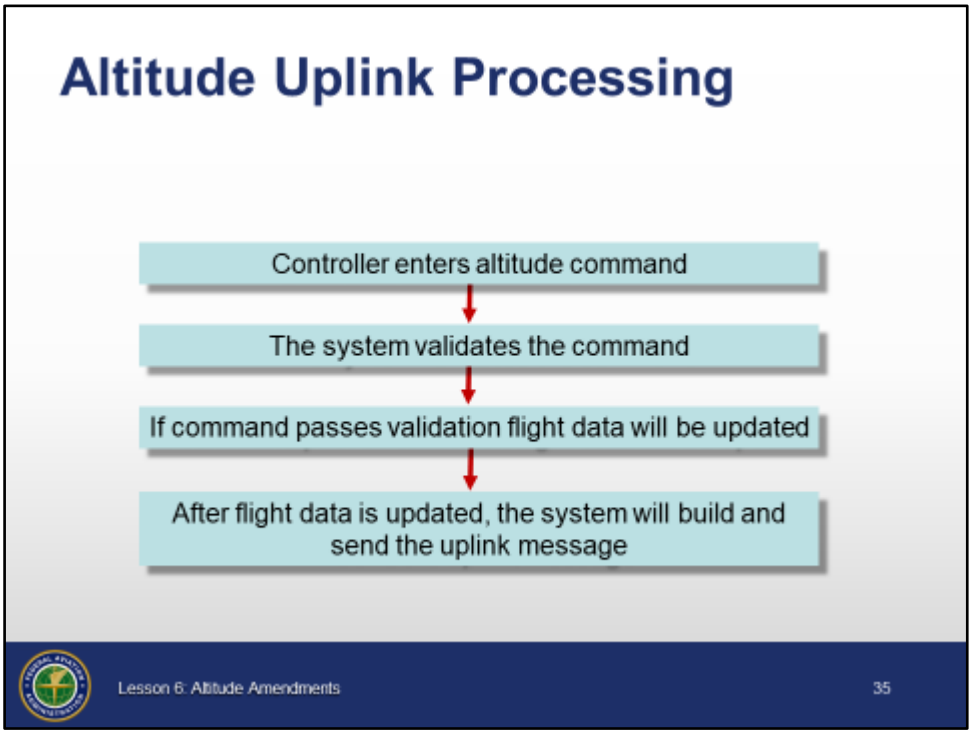
Question: An altitude clearance cannot be amended and uplinked from a trial plan.

Answer: *B. False*

CPDLC ALTITUDE PROCESSING

Altitude Uplink Processing

TI 6110.100, sec. 6.1



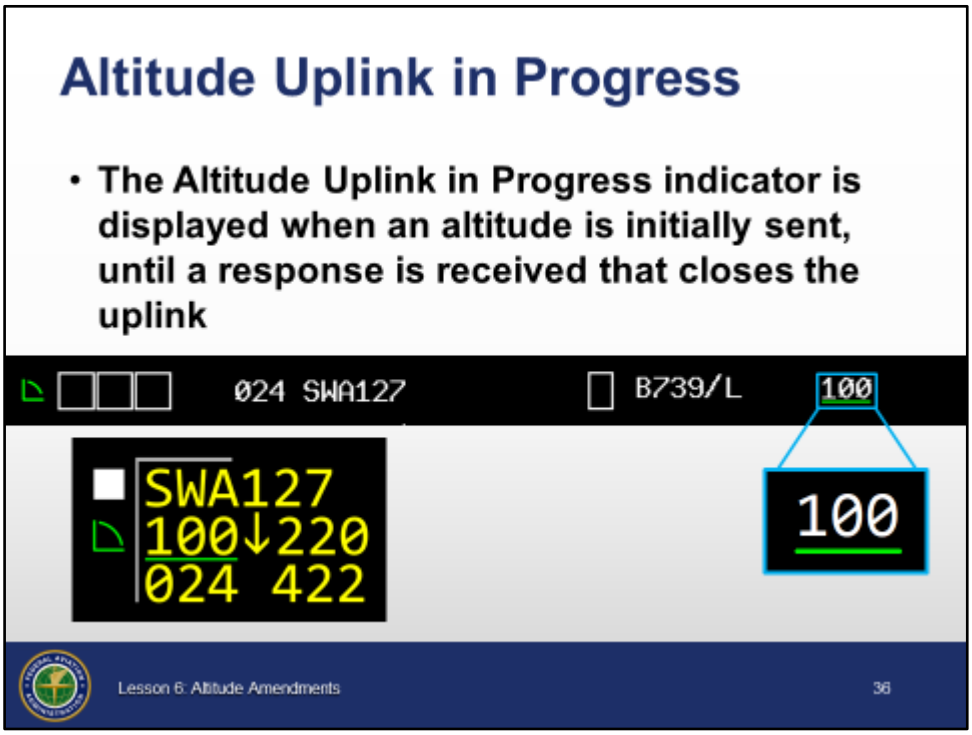
- Controller enters altitude command
- The system validates the command
- If command passes validation, flight data will be updated
- After flight data is updated, the system will build and send the uplink message

CPDLC ALTITUDE PROCESSING *(CONT'D)*

Altitude Uplink in Progress

TI 6110.100, sec. 8.7.1.1

TI 6110.100, sec. 8.7.1.1



⊙ The Altitude Uplink in Progress indicator is displayed when an altitude is initially sent, until a response is received that closes the uplink

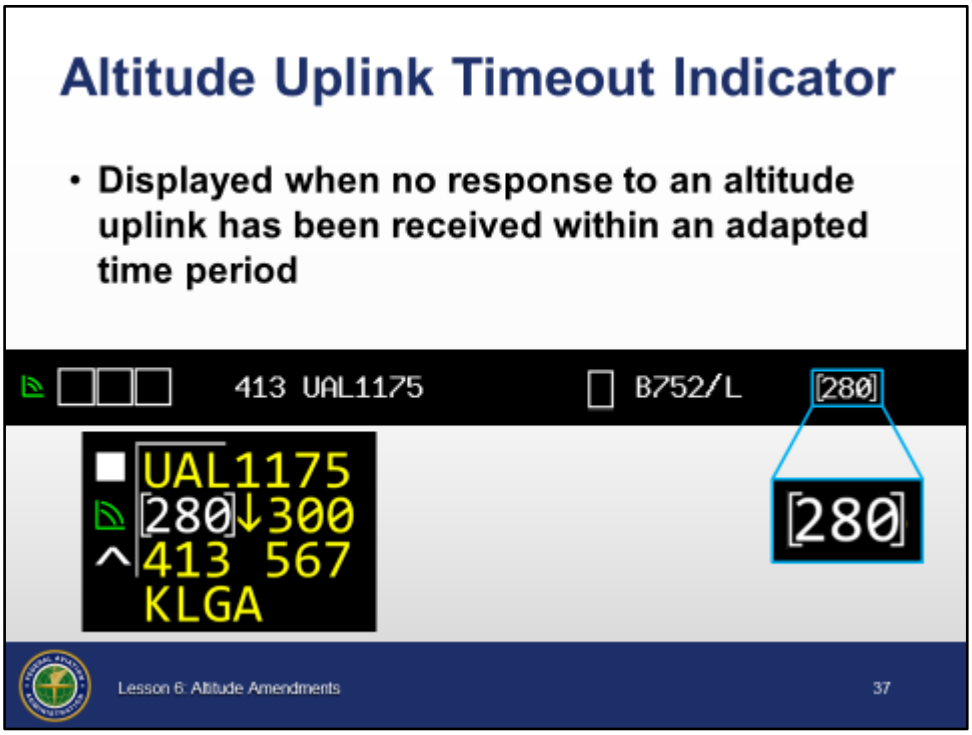
- The altitude will be underlined in green on the ACL and FDB
- Displayed until the pilot acknowledges the clearance with:
  - Wilco - green line is removed, *or*
  - Unable - abnormal indicator, *or*
  - No response - timeout indicator

CPDLC ALTITUDE PROCESSING *(CONT'D)*

Altitude Uplink Timeout Indicator

TI 6110.101, sec. 8.7.1.2

JO 7110.125, par. 8.h



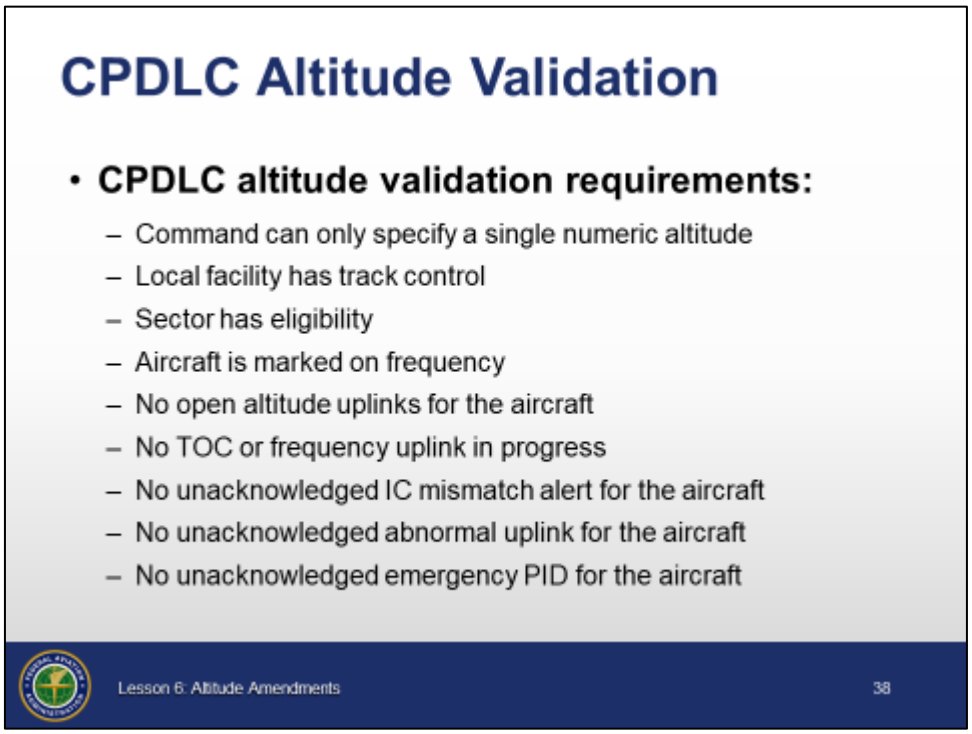
- The Altitude Uplink Timeout indicator is displayed when no response to an altitude uplink has been received from the aircraft within a facility adapted time period
- The altitude is shown in white surrounded by white brackets
- If an altitude uplink times out:
  - You cannot uplink a new altitude clearance when there is a timeout indicator
  - You cannot release a held TOC when there is a timeout indicator
  - Only the sector with eligibility will see the timeout indicator
- Timeout indicator is removed when:
  - Pilot acknowledges the clearance with a response of Wilco, which closes the uplink
  - Controller cancels uplink
    - Controllers may cancel an open uplink only after ensuring the pilot has been issued, via voice communication, the correct ATC clearance

CPDLC ALTITUDE PROCESSING *(CONT'D)*

CPDLC Altitude Validation

TI 6110.100, sec. 8.7

TI 6110.101, sec. 8

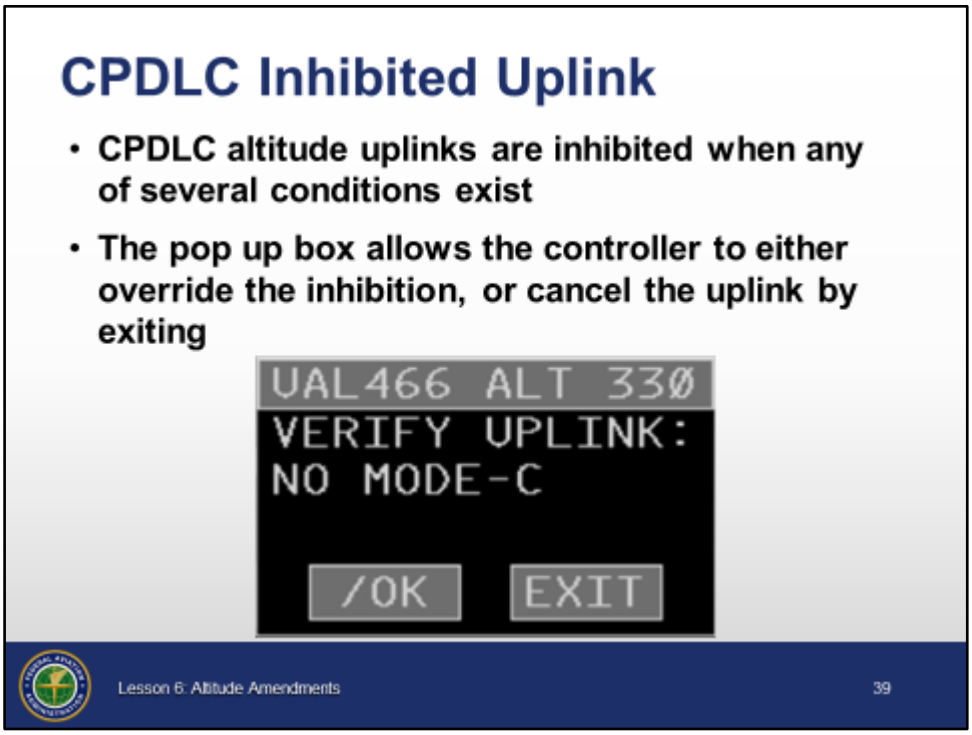


- CPDLC altitude validation requirements:
  - Command can only specify a single numeric altitude
  - Local facility has track control
  - Sector has eligibility
  - Aircraft is marked on frequency
  - No open altitude uplinks for the aircraft
  - No TOC or frequency uplink in progress
  - No unacknowledged IC mismatch alert for the aircraft
  - No unacknowledged abnormal uplink for the aircraft
  - No unacknowledged emergency PID for the aircraft
- If any CPDLC altitude validation requirement is not met, the result will be a message entry rejection and an error response

CPDLC ALTITUDE PROCESSING *(CONT'D)*

CPDLC Inhibited Uplink

TI 6110.100, sec. 8.6.1.2

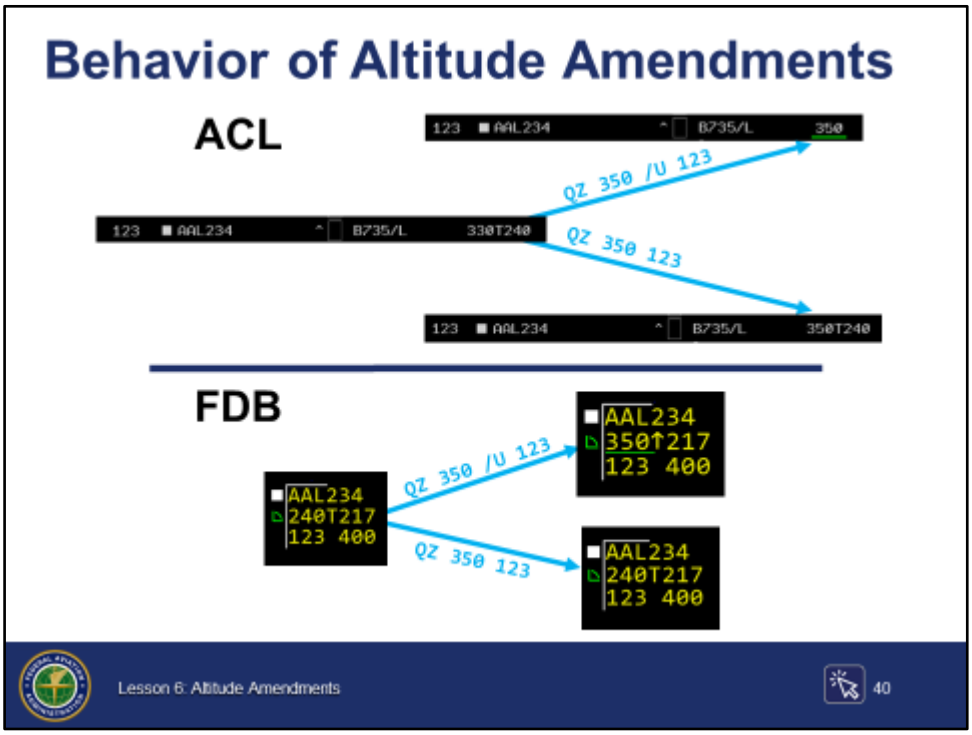


- CPDLC altitude uplinks are inhibited and will result in the display of an eligibility override prompt when any of several conditions exist:
  - A flight is unpaired
  - Aircraft has a controller entered Reported Altitude
  - No surveillance reported altitude (e.g., Mode C or ADS-B)
- The pop up box allows the controller to either override the inhibition, or cancel the uplink by exiting

CPDLC ALTITUDE PROCESSING *(CONT'D)*

Behavior of Altitude Amendments

TI 6110.100, sec. 8.1



Slide is animated, 2 clicks. Click where indicated by click icons.

NOTE: The ACL and FDB on the slide depict AAL234 with requested altitude FL330; interim altitude FL240; Mode C readout FL217. AAL234 is about to be assigned FL350.

- When an altitude amendment is uplinked:
  - FP assigned altitude removes any existing interim, local interim, or procedure altitude
  - Interim altitude removes any existing local interim or procedure altitude
  - Local interim altitude:
    - Displayed in lieu of any FP assigned, interim altitude, or procedure altitude in the FDB
    - Not displayed in the ACL
  - Since waiver altitudes are not displayed, they have no effect on flight data available at control positions

Continued on next page

CPDLC ALTITUDE PROCESSING *(CONT'D)*

Behavior of Altitude Amendments (Cont'd)

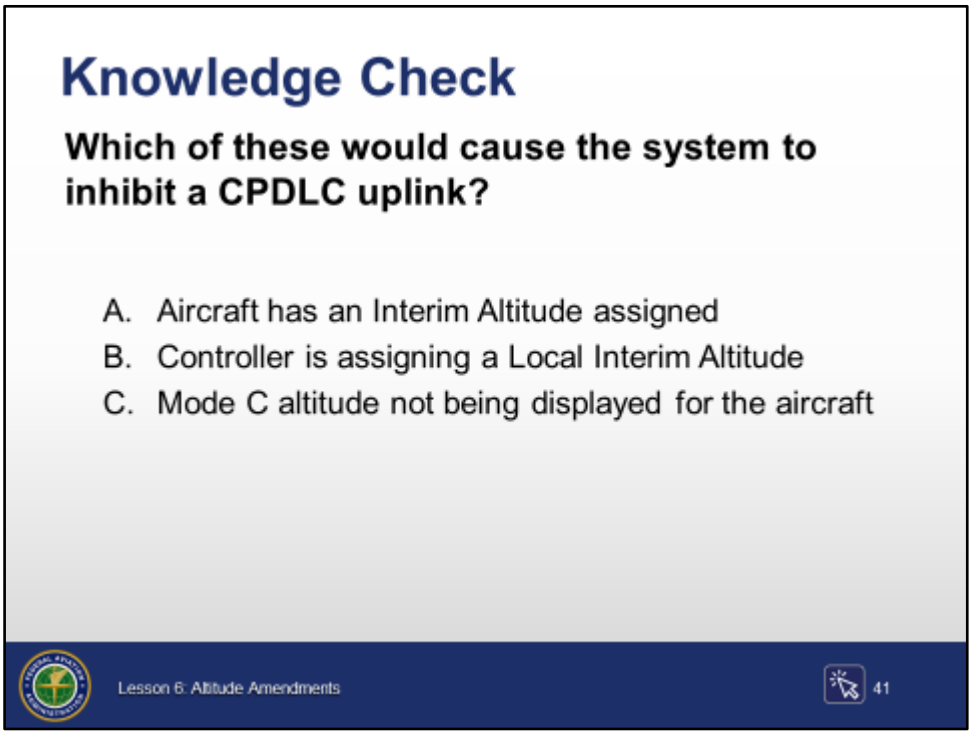
TI 6110.100, sec. 8.1

⊙ When the altitude amendment is not uplinked:

- An FP assigned altitude replaces the previous FP assigned altitude in the ACL, and:
  - Interim and procedure altitudes are unaffected in the ACL and are displayed to the right of the FP assigned altitude
- An FP assigned altitude does not remove any existing interim, local interim, or procedure altitude from the FDB

CPDLC ALTITUDE PROCESSING *(CONT'D)*

Knowledge Check



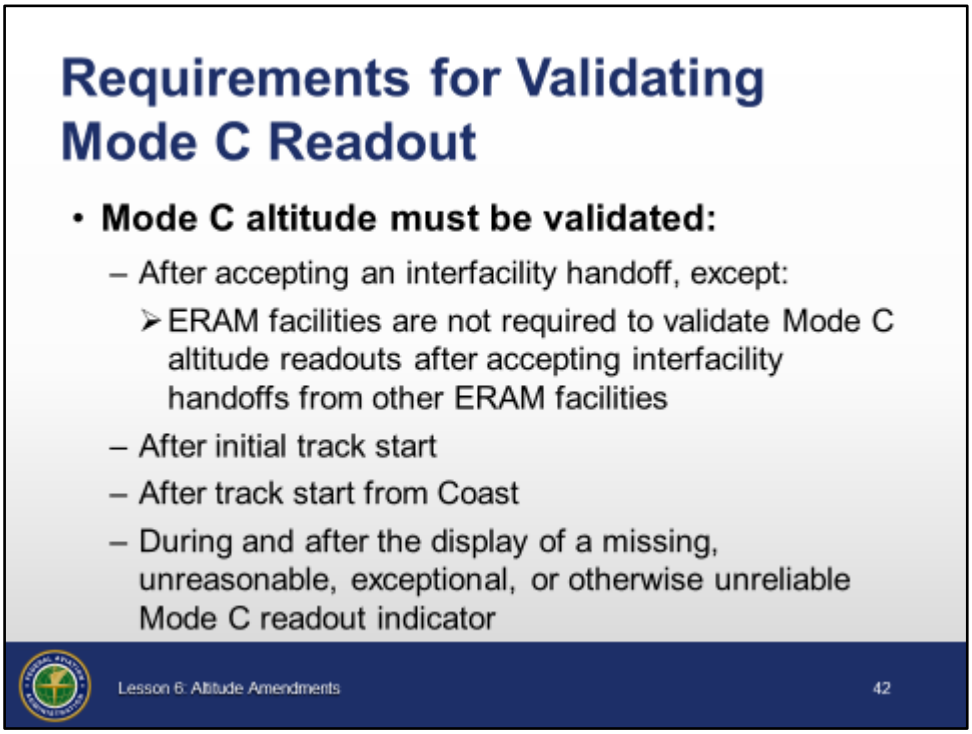
Question: Which of these would cause the system to inhibit a CPDLC uplink?

Answer: *C. Mode C altitude not being displayed for the aircraft*

VALIDATION OF MODE C

Requirements for Validating Mode C Readout

JO 7110.65, par. 5-2-15



⊙ Mode C altitude must be validated:

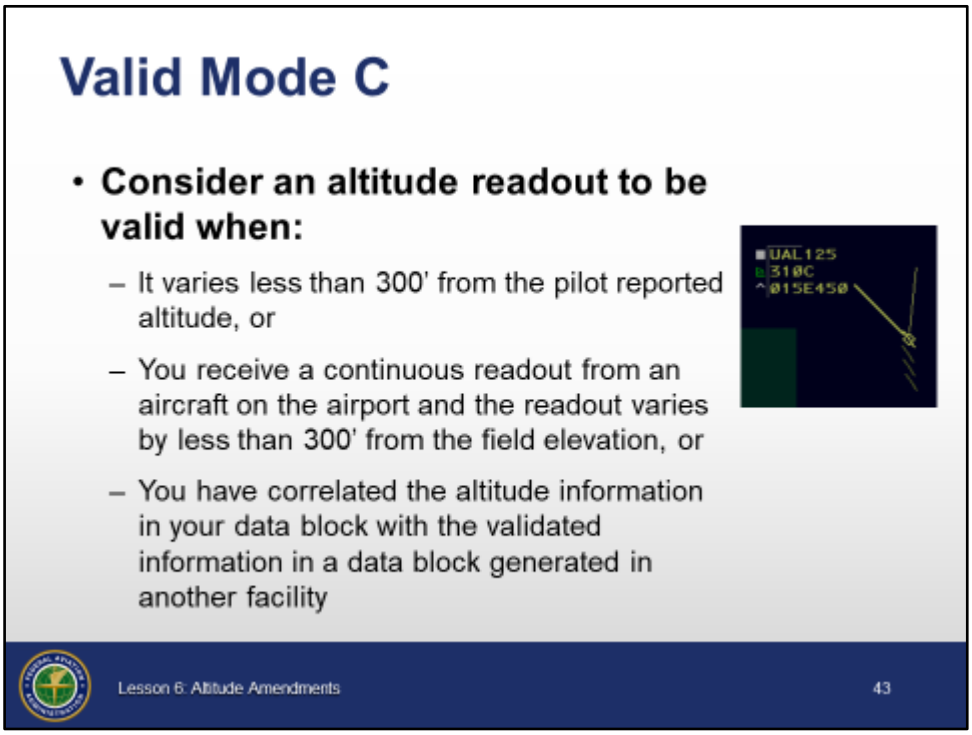
- After accepting an interfacility handoff, except:
  - ERAM facilities are not required to validate Mode C altitude readouts after accepting interfacility handoffs from other ERAM facilities
- After initial track start
- After track start from coast
- During and after the display of a missing, unreasonable, exceptional, or otherwise unreliable Mode C readout indicator

NOTE: Mode C altitude readouts displayed on the Situation Display include altitudes derived from other surveillance systems, e.g., ADS-B.

VALIDATION OF MODE C (CONT'D)

Valid Mode C

JO 7110.65, par. 5-2-15

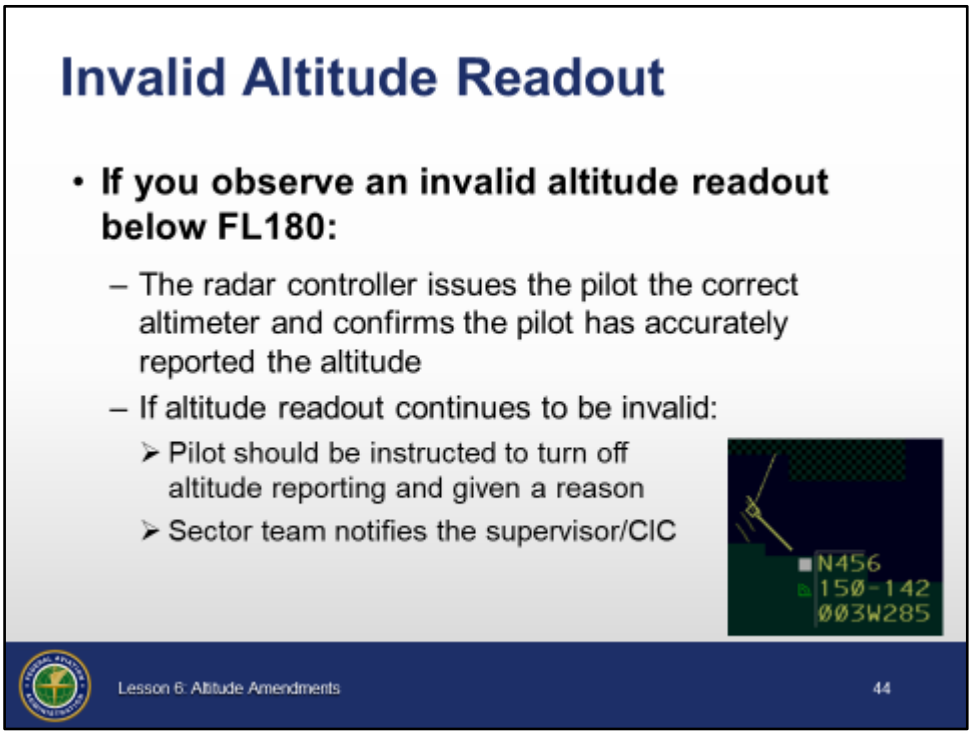


- Consider an altitude readout to be valid when:
  - It varies less than 300' from the pilot reported altitude, or
  - You receive a continuous readout from an aircraft on the airport and the readout varies by less than 300' from the field elevation, or
  - You have correlated the altitude information in your data block with the validated information in a data block generated in another facility (by verbally coordinating with the other controller) and your readout is exactly the same as the readout in the other data block
- When unable to validate the readout, do not use the Mode C altitude information for separation

VALIDATION OF MODE C (CONT'D)

Invalid Altitude Readout

JO 7110.65, par. 5-2-15



⊙ If you observe an invalid altitude readout below FL180:

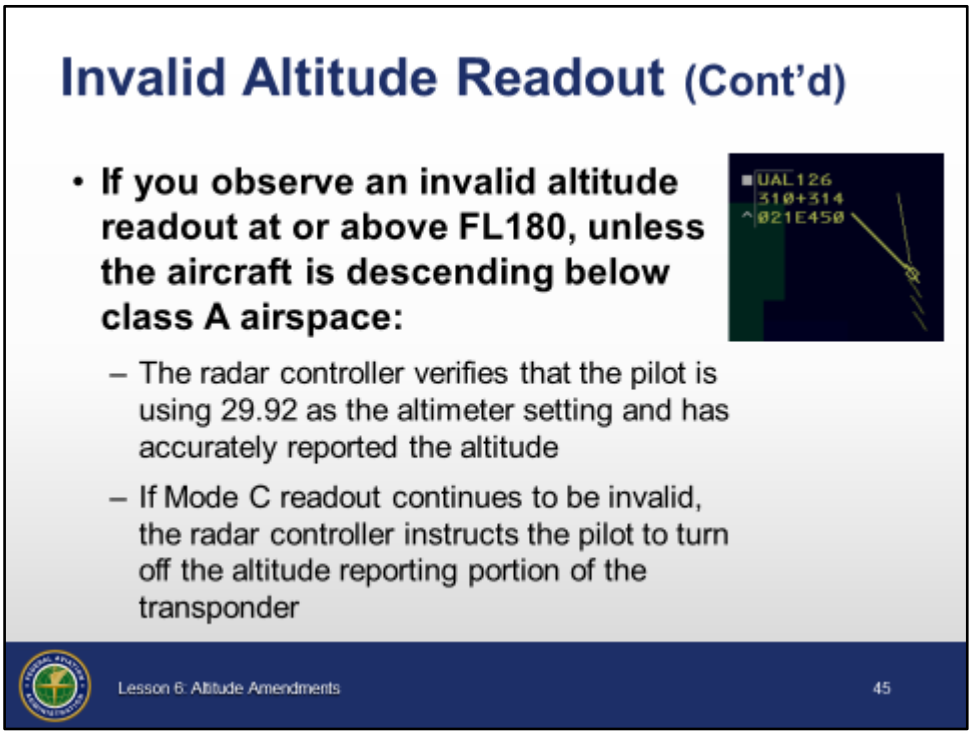
- The radar controller issues the pilot the correct altimeter and confirms the pilot has accurately reported the altitude
- If altitude readout continues to be invalid:
  - The pilot should be instructed to turn off altitude reporting and given a reason
  - The sector team notifies the supervisor/CIC

VALIDATION OF MODE C (CONT'D)

Invalid Altitude Readout (Cont'd)

JO 7110.65, par. 5-2-18

CFR Part 91.215

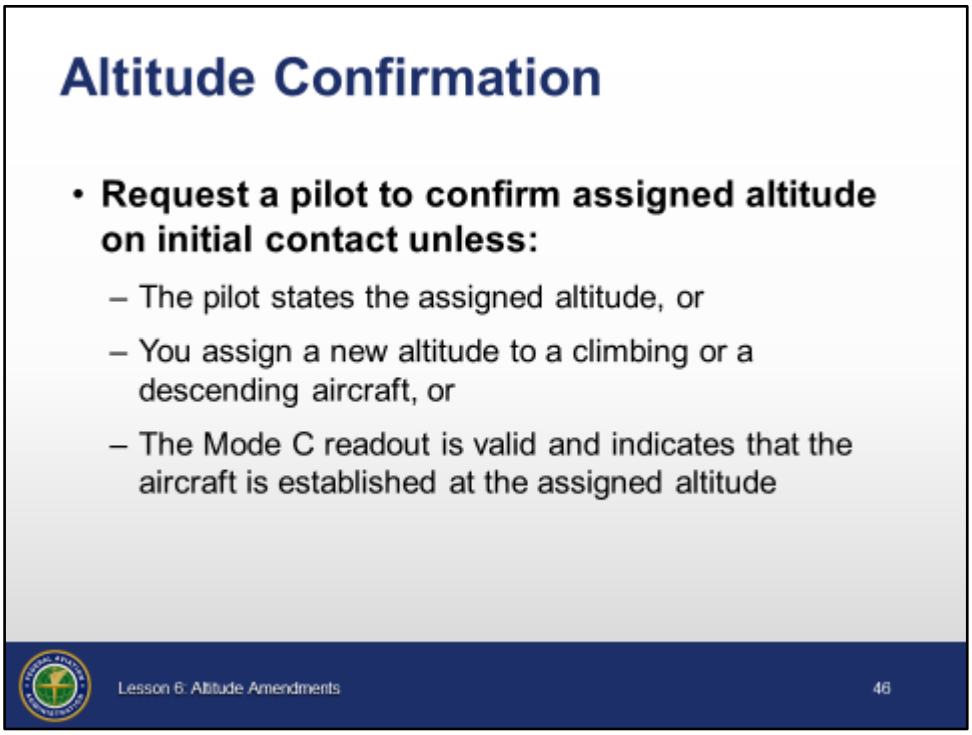


- If you observe an invalid altitude readout at or above FL180, unless the aircraft is descending below class A airspace:
  - The radar controller verifies that the pilot is using 29.92 as the altimeter setting and has accurately reported the altitude
  - If Mode C altitude readout remains invalid:
    - The radar controller instructs the pilot to turn off the altitude reporting part of his/her transponder and includes the reason; and
    - The sector team notifies the supervisor/CIC
- Aircraft are required to have an operating transponder with Mode C and ADS-B out equipment when operating in Class A airspace. Should the pilot lose altitude reporting capability, verbally obtain approval before allowing the aircraft to enter the receiving controller's airspace.

VALIDATION OF MODE C (CONT'D)

Altitude Confirmation

JO 7110.65, pars. 5-2-19, 5-2-20

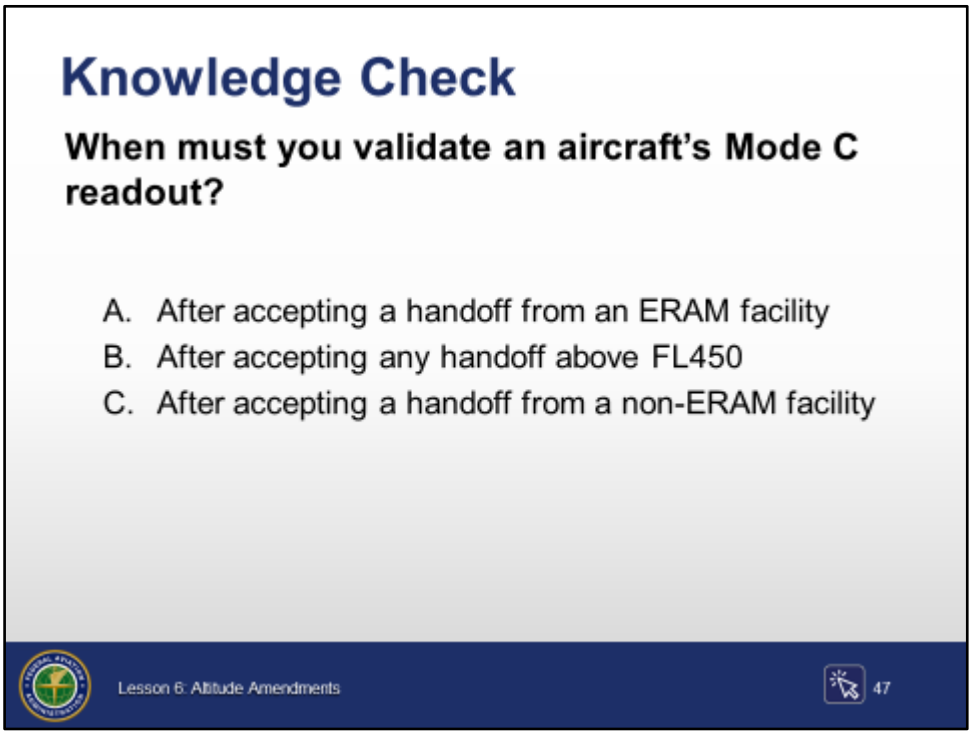


⊙ Request a pilot to confirm assigned altitude on initial contact unless:

- The pilot states the assigned altitude, *or*
- You assign a new altitude to a climbing or a descending aircraft, *or*
- The Mode C readout is valid and indicates that the aircraft is established at the assigned altitude

VALIDATION OF MODE C (CONT'D)

Knowledge Check

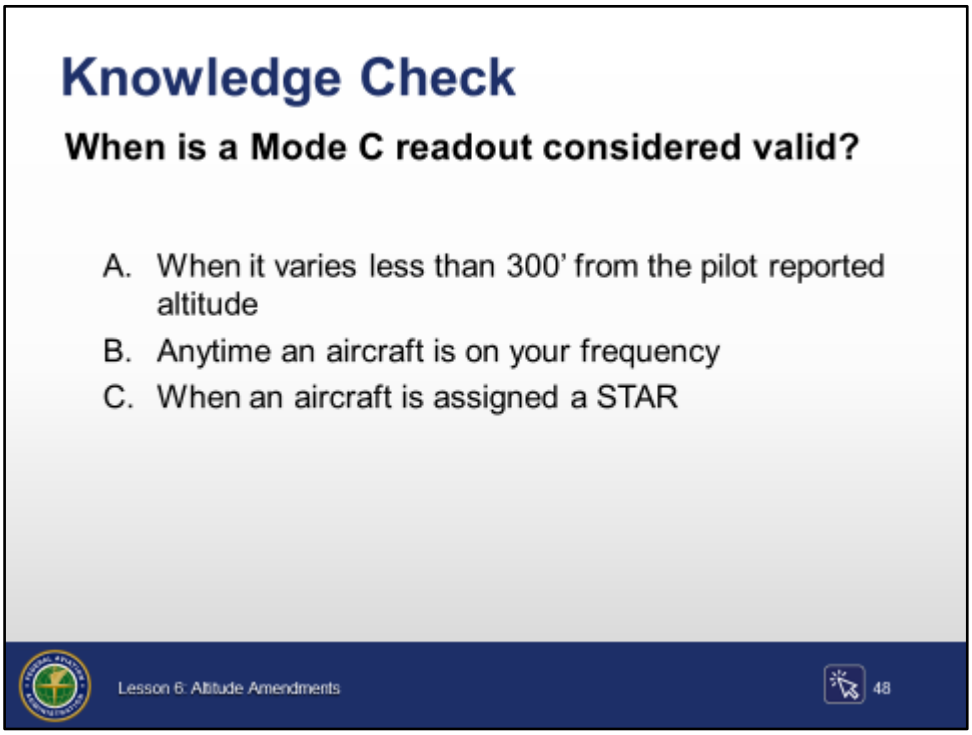


Question: When must you validate an aircraft's Mode C readout?

Answer: *C. After accepting a handoff from a non-ERAM facility*

VALIDATION OF MODE C (CONT'D)

Knowledge Check

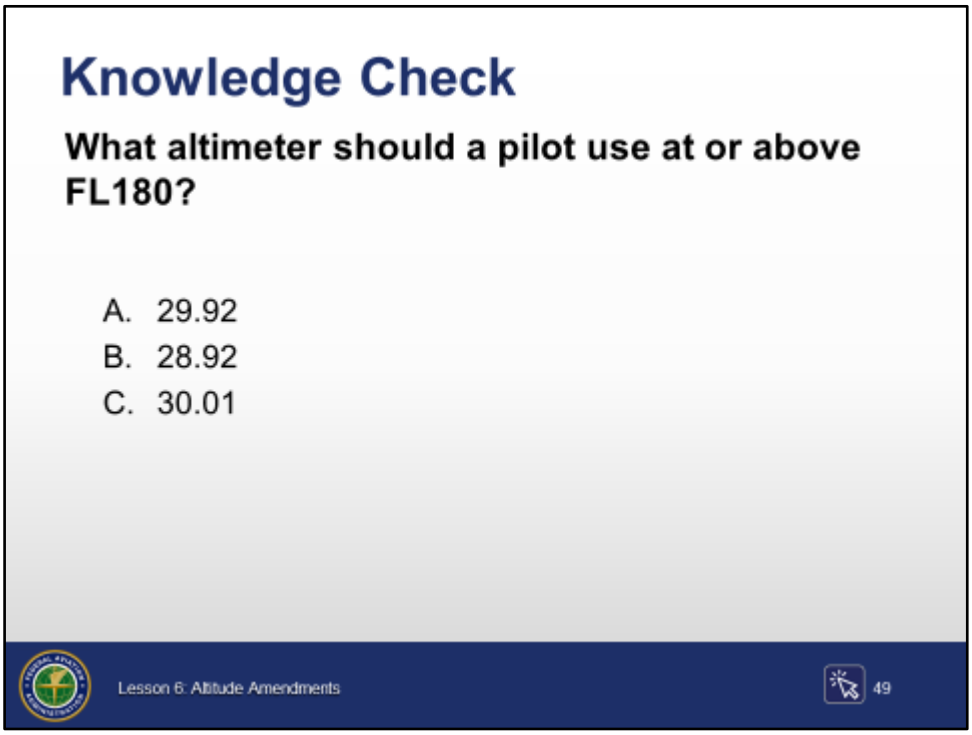


Question: When is a Mode C readout considered valid?

Answer: *A. When it varies less than 300' from the pilot reported altitude*

VALIDATION OF MODE C (CONT'D)

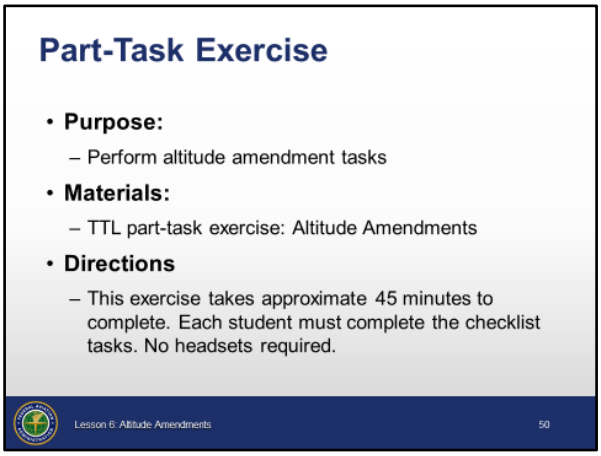
Knowledge Check



Question: What altimeter should a pilot use at or above FL180?

Answer: *A. 29.92*

PART-TASK EXERCISE: ALTITUDE AMENDMENTS



Purpose

Perform altitude amendment tasks.

Materials

Handout: H001_L06

⊙ TTL part-task exercise: Altitude Amendments

TTL Scenario: *55054003_L06_S###*

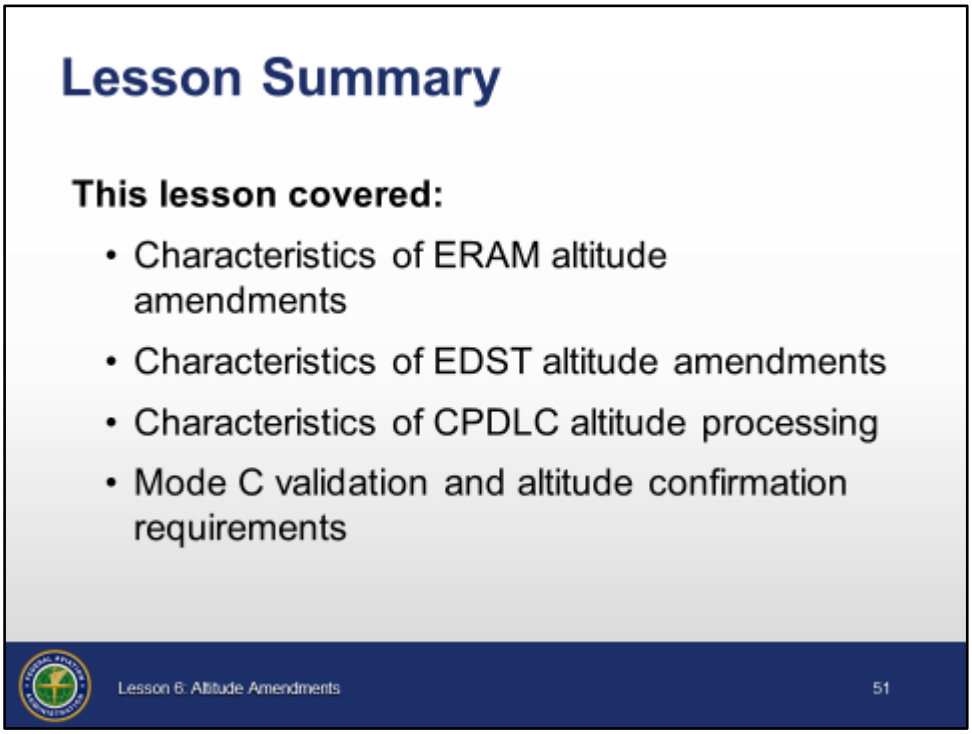
Directions

This exercise takes approximately 45 minutes to complete. Each student must complete the checklist tasks. No headsets are required.

Provide instruction as required. Check off each task after completion. No ghost pilots are required.

CONCLUSION

Lesson Summary



Review and elaborate briefly on the following topics. Ask students if they have questions about any of the concepts covered in the lesson.

This lesson covered:

- Characteristics ERAM altitude amendments
  - Types of ERAM altitude amendments
  - Supported altitude uplinks
  - Altitude data processing
  - FP Assigned Altitude
    - AM
    - QZ
  - Interim Altitude
    - QQ
  - Local Interim Altitude
    - QQ L

Continue on next page

Lesson Summary (Cont'd)

- Waiver Altitude
  - QQ W
- Procedure Altitude
  - QQ P
- Crossing restriction
  - UC
- Silent Check-in
- Urgency indicator
  - IMM
  - EXP
  - PD
- Due to Reason
  - TFC
  - RES
  - WX
- CPDLC keyboard keys
- Eligibility override
  - /OK
  - /TT
  - With no Mode C

⊙ Characteristics of EDST altitude amendments

- Altitude Menu
  - Pick areas
- Plan Options Menu
- GPD - Altitude amendment
- GPD - Amend trial planned altitude
- Plans Display - Amend trial planned altitude
- Layout and Characteristics
- Amend and Uplink in Plans Display

Continued on next page

CONCLUSION *(CONT'D)*

Lesson Summary (Cont'd)

- Characteristics of CPDLC altitude processing
  - Altitude uplink processing
  - Altitude uplink in progress
  - Altitude uplink timeout indicator
  - CPDLC altitude validation
  - CPDLC inhibited uplink
  - Behavior of CPDLC altitude amendment
- Validation of Mode C and altitude confirmation requirements
  - Requirements for validating Mode C readout
  - Valid Mode C
  - Invalid altitude readout
  - Requirements for altitude confirmation

Hand out and administer the end of lesson test. Provide feedback on missed items, including why particular answers are correct, as well as why some responses are incorrect.