Federal Aviation Administration

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

Lesson 18: CPDLC Abnormal Conditions

Version: 1.0 2022.08

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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	CPDLC Abnormal Conditions
Duration	2 hours, 45 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 6110.107, ERAM Outage Job Aid; TI 6110.108, En Route Automation Modernization Quick Reference Card; JO 7110.125, Controller Pilot Data Link Communications (CDPLC) in the ERAM Environment; FAA Course 55155003, Data Communications Initial Services En Route Air Traffic Control Specialist (ATCS), Lesson 12: Abnormal Conditions; SIG ERAM 1564, sec. 3.2.2.5.3.3
Prerequisites	NONE
Handout(s)	⊙ Part-Task Exercise HO01_L18 ⊙ TI 6110.108 ERAM Quick Reference Controller Card
Exercise / Activity	Refer to handout for: ⊙ Part-Task Exercise: CPDLC Abnormal Conditions
Scenario	⊙ Run scenario 55054003_L18_S## in TTL
Assessments	⊙ YES - Written
Materials and Equipment	⊙ Pencil and/or pen
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

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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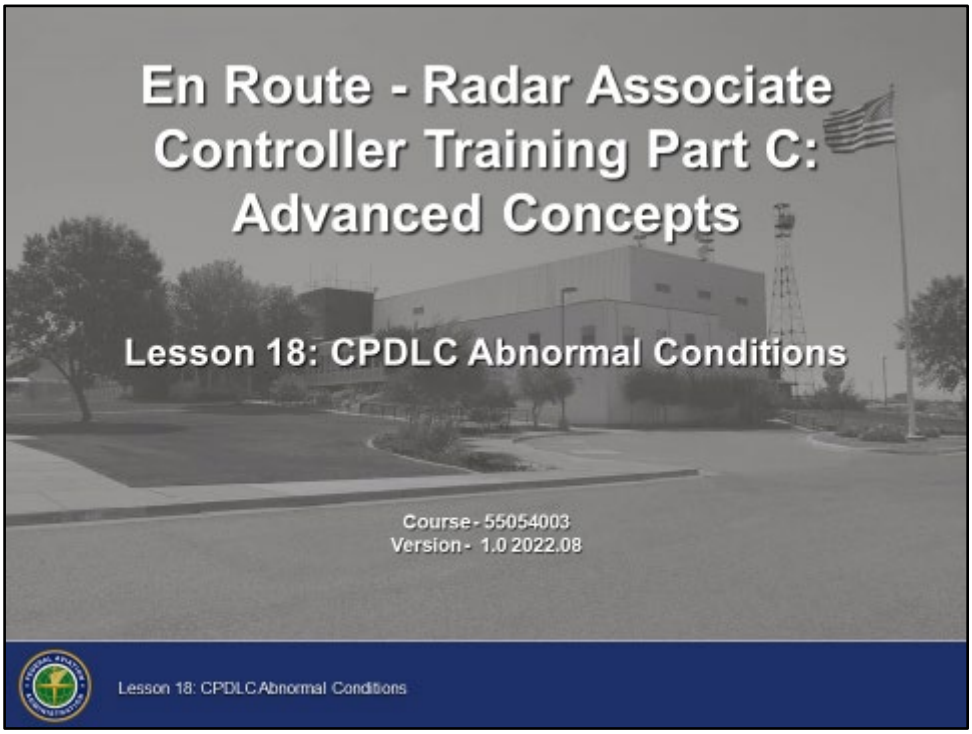
LESSON INTRODUCTION

Overview

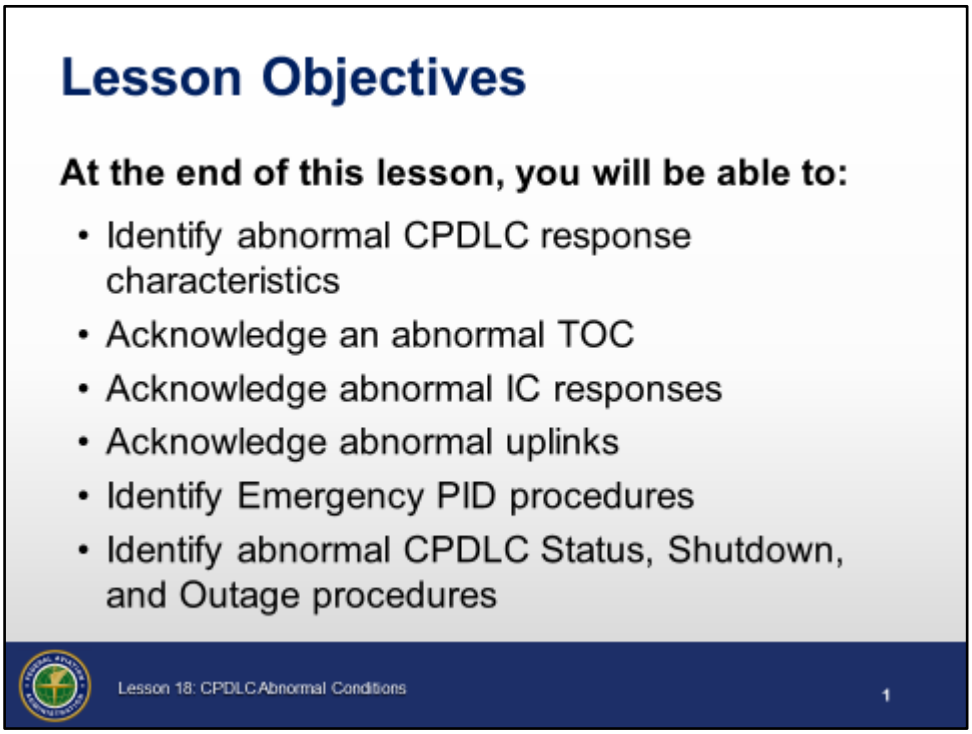


There are conditions that result in the display of abnormal CPDLC indicators in the Full Data Block (FDB) and the Aircraft List (ACL).

The various abnormal uplink indications and the steps for acknowledging them are covered in this lesson.

LESSON INTRODUCTION *(CONT'D)*

Lesson Objectives



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

- Identify abnormal CPDLC response characteristics
- Acknowledge an abnormal TOC
- Acknowledge abnormal IC responses
- Acknowledge abnormal uplinks
- Identify Emergency PID procedures
- Identify abnormal CPDLC Status, Shutdown, and Outage procedures

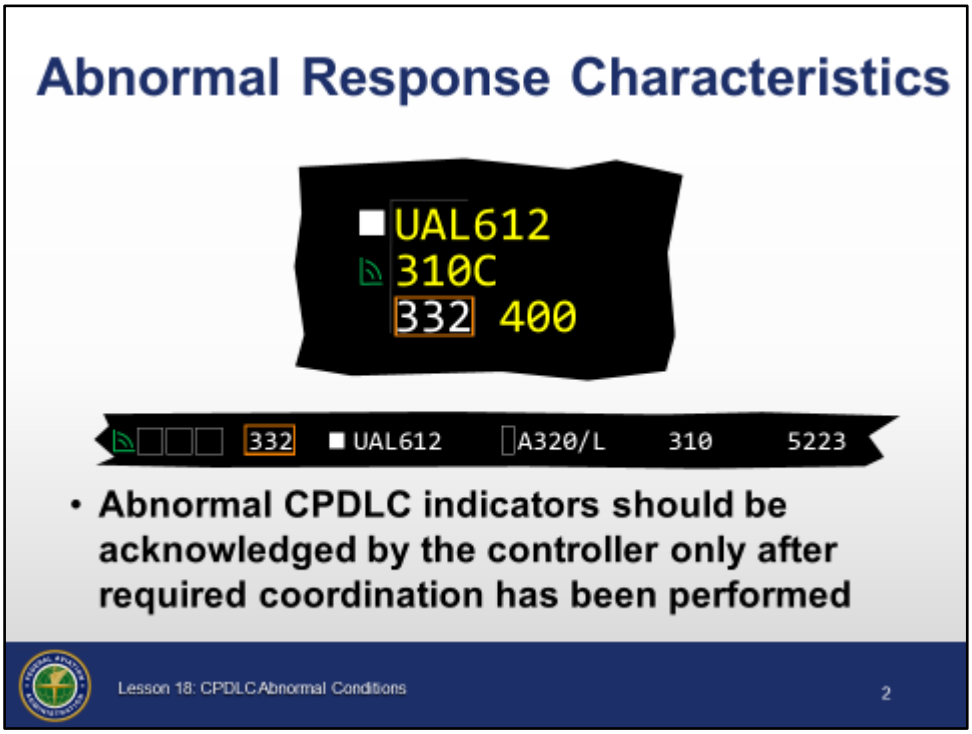
NOTE: There will be a graded end-of-lesson test upon completion of the lesson. The passing score is 70%. If you do not achieve a score of 70%, you will be provided study time and one retake of an alternate end-of-lesson test.

ABNORMAL RESPONSE CHARACTERISTICS

Abnormal Coding

TI 6110.101, sec. 4.13.2.5.2

JO 7110.125, par. 8



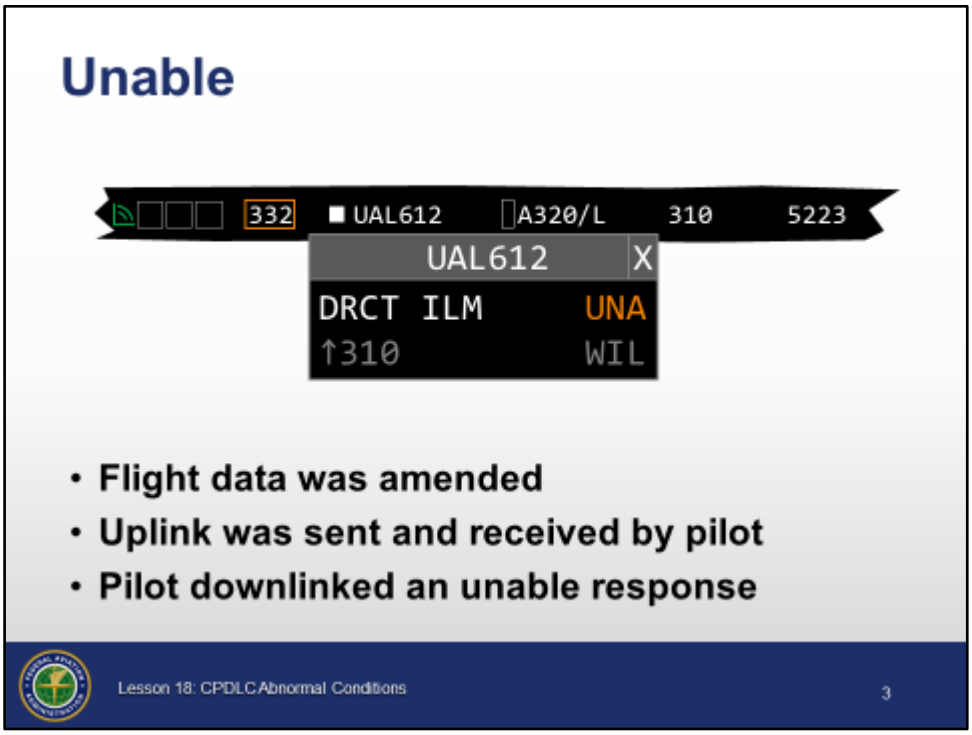
- Four conditions result in an abnormal CPDLC indicator being displayed in the Full Data Block (FDB) and the Aircraft List (ACL) entry of the affected flight:
  - Unable
  - Error
  - Fail
  - Not Sent
- FAA procedures require that when an abnormal CPDLC indicator is displayed, controllers should acknowledge it only after required coordination has been performed

ABNORMAL RESPONSES CHARACTERISTICS *(CONT'D)*

Unable

TI 6110.101, sec. 4.13.2.5.2

JO 7110.125, par. 8

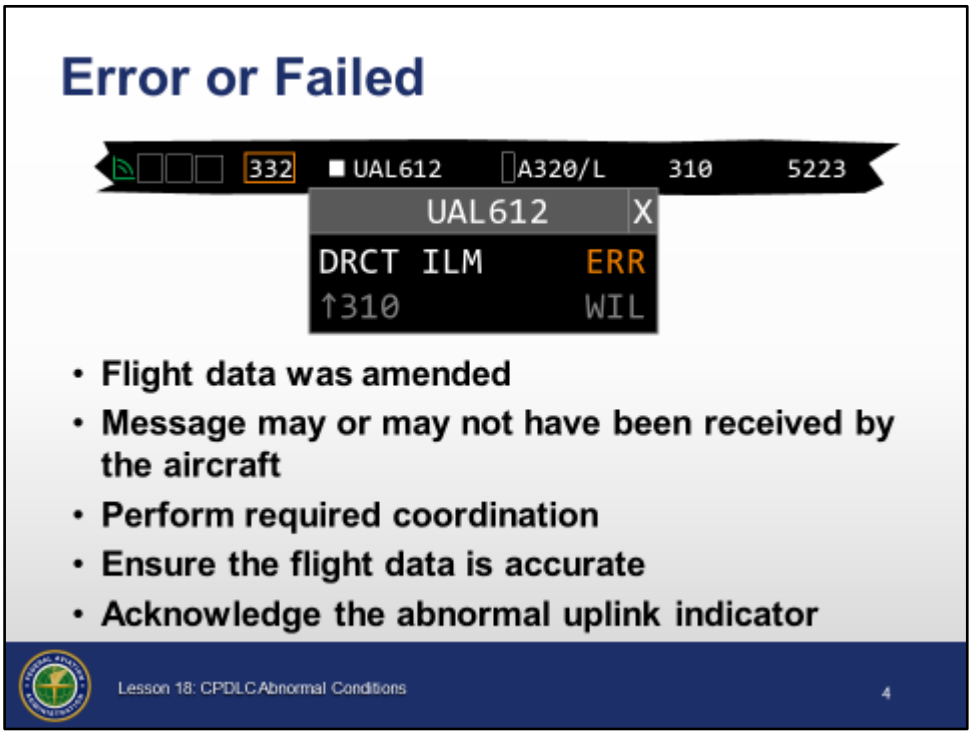


- When the abnormal indicator is a result of an unable response, indicated by UNA:
  - Flight data was amended
  - Uplink was sent and received by pilot
  - Pilot downlinked an unable response
- Use voice to coordinate with the aircraft and ensure the flight data is accurate
- Acknowledge the abnormal uplink indicator

ABNORMAL RESPONSE CHARACTERISTICS *(CONT'D)*

Error or Failed

TI 6110.101, sec. 6.2.2.2

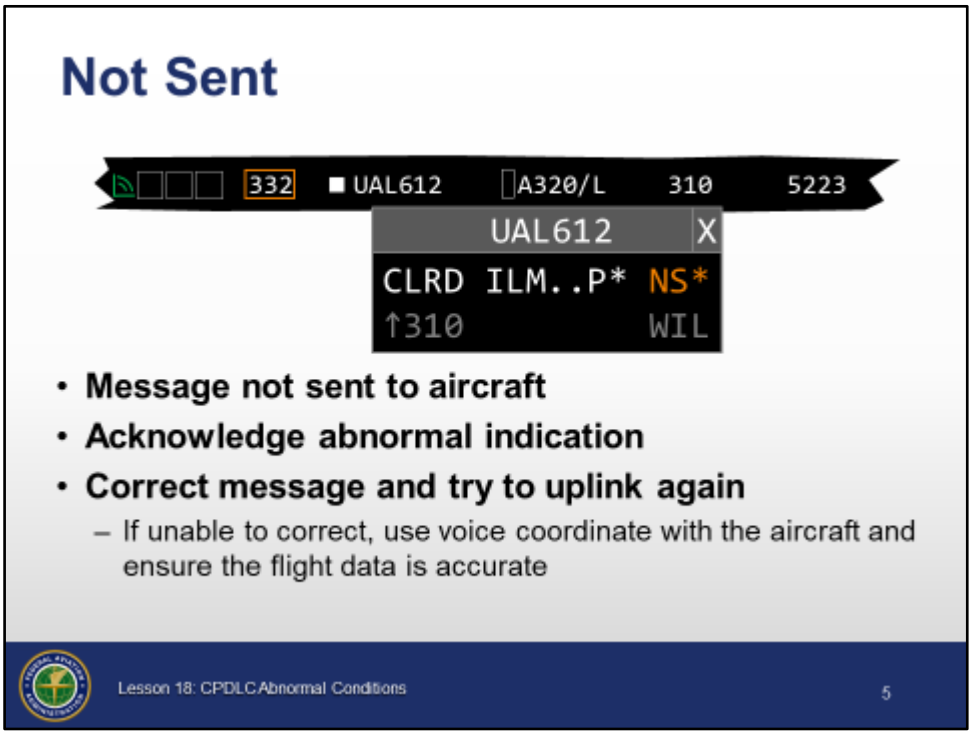


- When the abnormal indication is a result of either an error or a fail condition:
  - Flight data was amended
  - Message may or may not have been received by the aircraft, and the aircraft may comply (or already be complying) with the uplink instructions
- Use voice to coordinate with the aircraft and ensure the flight data is accurate
- Acknowledge the abnormal uplink indicator
- Error condition, indicated by ERR
  - Occurs when there is a transmission error, and
  - System cannot ensure the message was uplinked successfully
- Fail condition, indicated by FAIL
  - Occurs when the CDA session with the aircraft terminates abnormally
  - System automatically closes all open uplinks and sets their status to FAIL

ABNORMAL RESPONSE CHARACTERISTICS *(CONT'D)*

Not Sent

TI 6110.101,
sec. 10.3.4



- When the system is not able to build the uplink message, the system will automatically close the uplink and set the status to not sent, indicated by NS

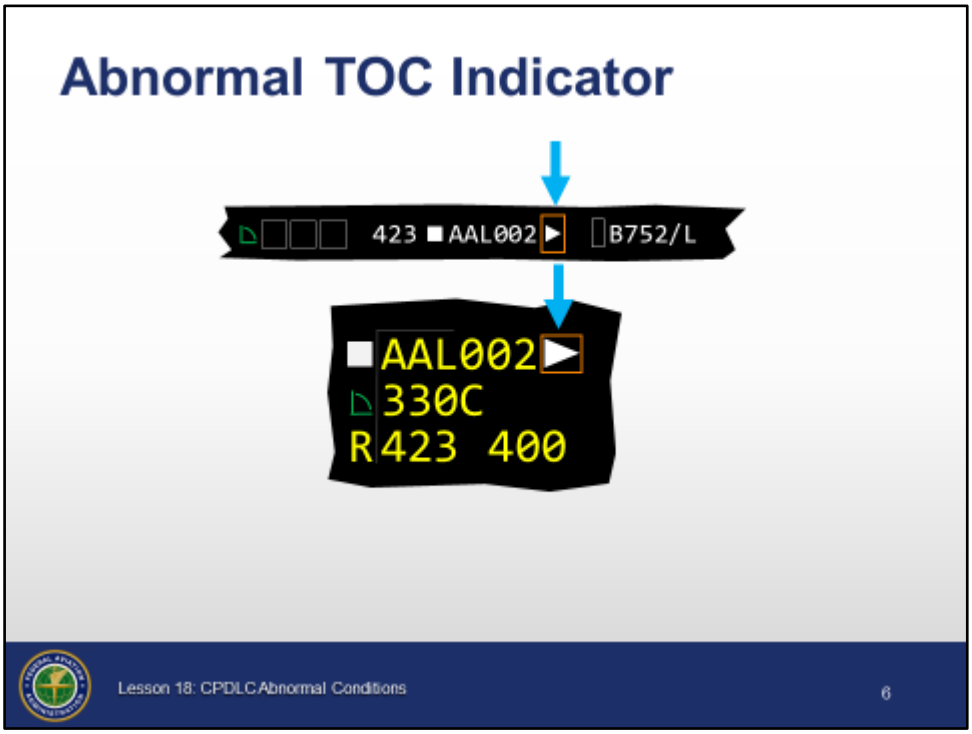
  Example: A route amendment was made and accepted by ERAM, but contains an incomplete route indicator (XXX or ???). Since the incomplete route indicator prevents the route from being loaded into the aircraft's Flight Management System (FMS), the software will not uplink the route clearance.

- When the abnormal indication is a result of an NS condition:
  - Flight data was amended
  - Aircraft never received amendment
- Acknowledge the abnormal uplink indicator
- Correct the message and try to uplink again
  - If unable to correct, use voice to coordinate with the aircraft and ensure the flight data is accurate

ABNORMAL TOC

Abnormal Transfer of Commun-ication (TOC) Indicator

TI 6110.101, sec. 7.2.2, Table 7-1

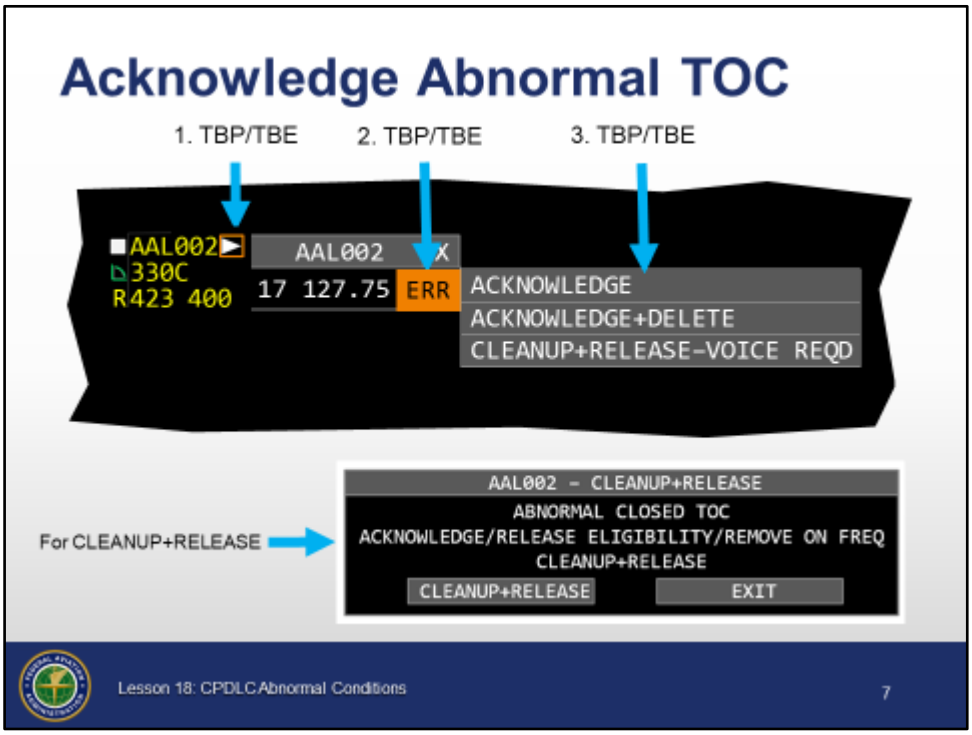


- An Abnormal TOC indicator is displayed at the transferring sector anytime the TOC uplink is closed as a result of a pilot response of UNA, or a system response of ERR or FAIL
  - Orange box is added to TOC In Progress indicator on both FDB and ACL

ABNORMAL TOC *(CONT'D)*

Acknowledge Abnormal TOC

TI 6110.101, secs. 4.13.2.6.2, 7.2.2



- To acknowledge the Abnormal TOC indicator from the Message Out menu (Mini Mo):
  - Trackball Pick (TBP) or Trackball Enter (TBE) the Abnormal TOC indicator
    - Opens the Message Out menu

    NOTE: Another option is to TBP or TBE on the CDA Session With Eligibility indicator.
  - TBP or TBE on the desired status to display the Acknowledge pop up menu

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ABNORMAL TOC *(CONT'D)*

Acknowledge Abnormal TOC (Cont'd)

6110.101, secs. 4.13.2.6.2, 7.2.2

- TBP or TBE on:
  - ACKNOWLEDGE pick area to acknowledge but keep the entry in the view
  - ACKNOWLEDGE+DELETE pick area to acknowledge the entry and remove it from the view
  - CLEANUP+RELEASE-VOICE REQD pick area to acknowledge the entry, release eligibility for the aircraft, and mark the aircraft off frequency, all in one action

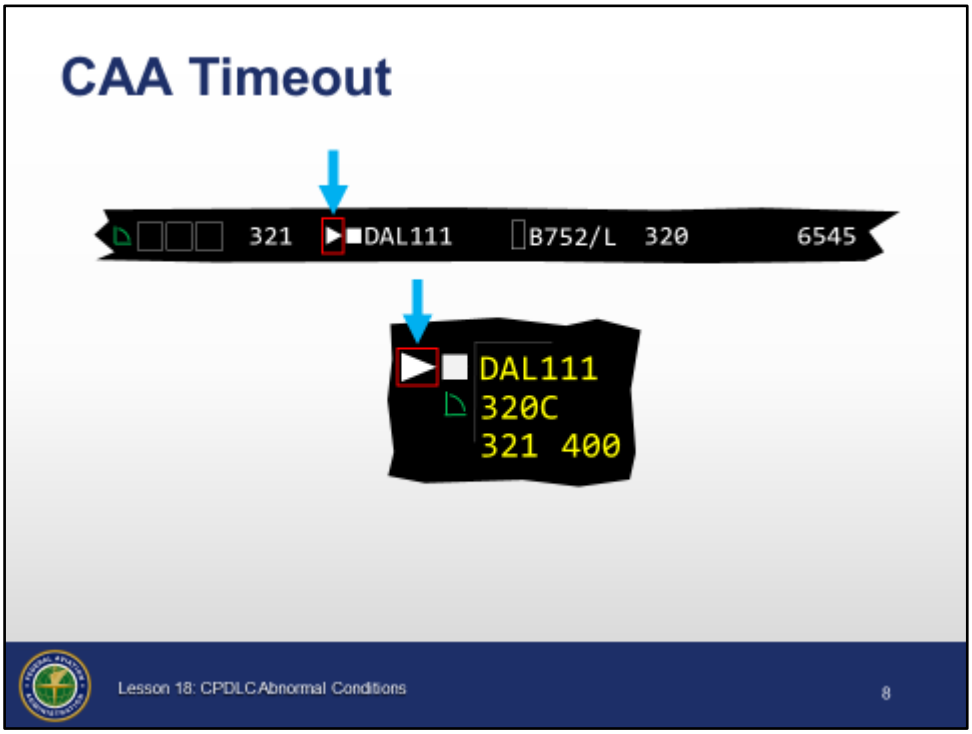
    NOTE: Voice coordination with the aircraft is indicated for this option.
- If CLEANUP+RELEASE-VOICE REQD option is selected, a confirmation window will be displayed with the following pick areas:
  - CLEANUP+RELEASE to complete the action
  - EXIT to cancel the action

⊙ The Abnormal TOC indicator can also be acknowledged from the Message Out view by opening the view and performing the first and second steps

CONFIRM ASSIGNED ALTITUDE (CAA) TIMEOUT

CAA Timeout

TI 6110.101, par 12.1



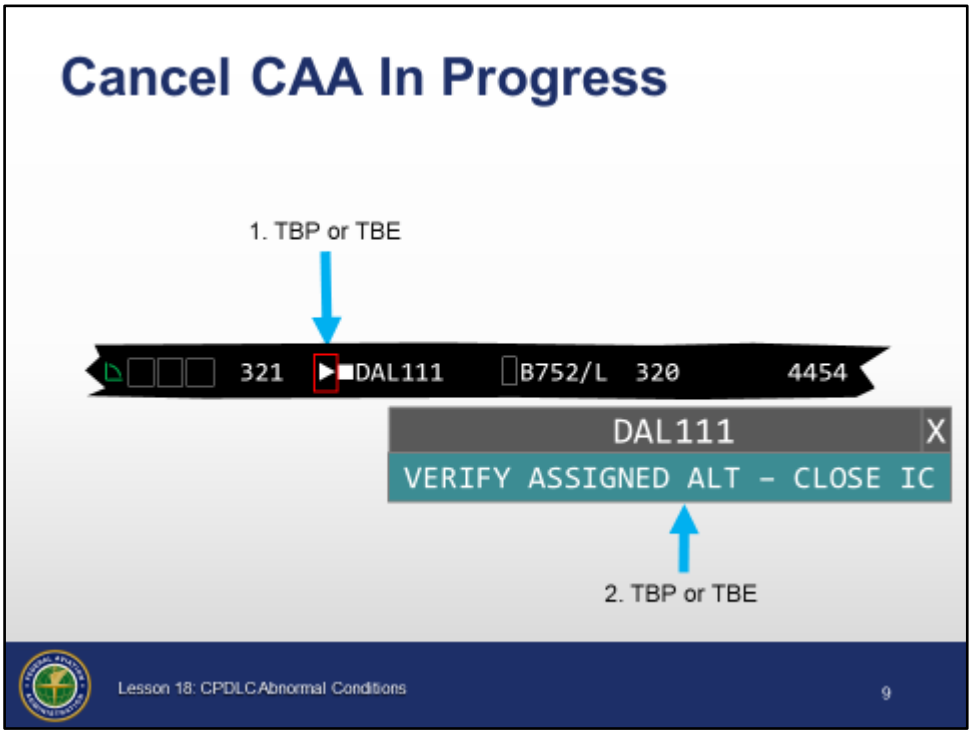
- Confirm Assigned Altitude (CAA) Timeout indicator will be displayed if a pilot does not downlink the cleared altitude within an adapted period of time
  - Red box is added to the CAA In Progress indicator on both FDB and ACL
- Use voice to coordinate with the aircraft to verify altitude

CAA UPLINKS

Cancel CAA In Progress

TI 6110.101, secs. 12.4, 12.4.1

JO 7110.125, par. 8

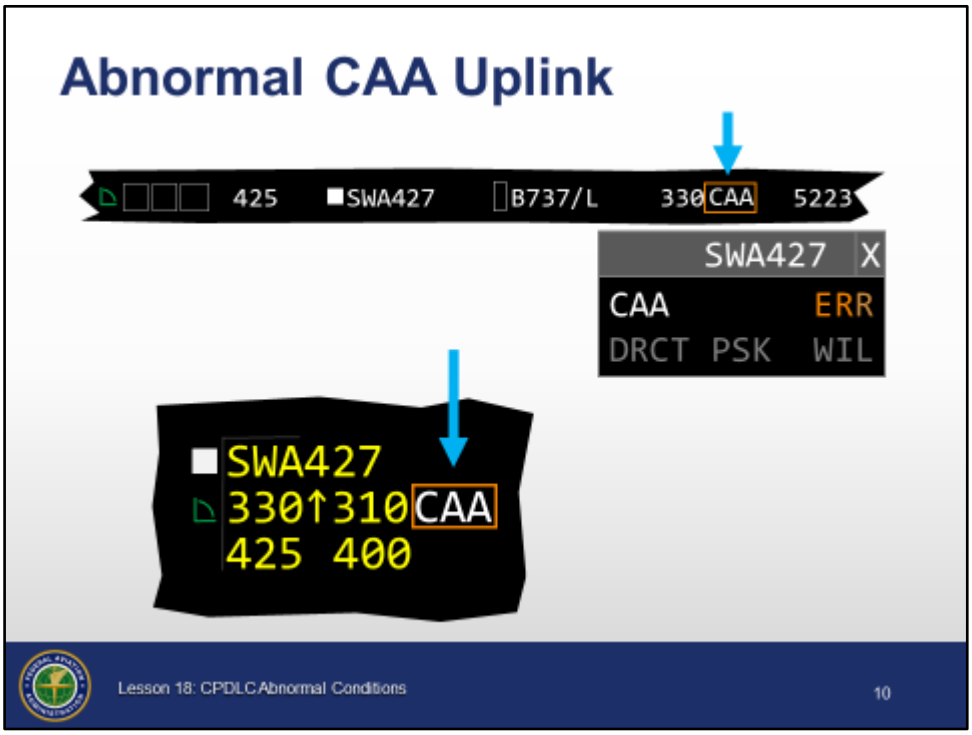


- Cancelling an open CAA uplink should only be done after voice coordination with the aircraft
- To cancel the open CAA uplink:
  - TBP or TBE on the CAA In Progress Indicator to open the CAA cancellation pick area
  - TBP or TBE the VERIFY ASSIGNED ALT - CLOSE IC pick area
- May also use the Message Out view or the Message Out menu (Mini Mo) to cancel the entry

CAA UPLINKS *(CONT'D)*

Abnormal CAA Uplink

TI 6110.101, sec. 12.4

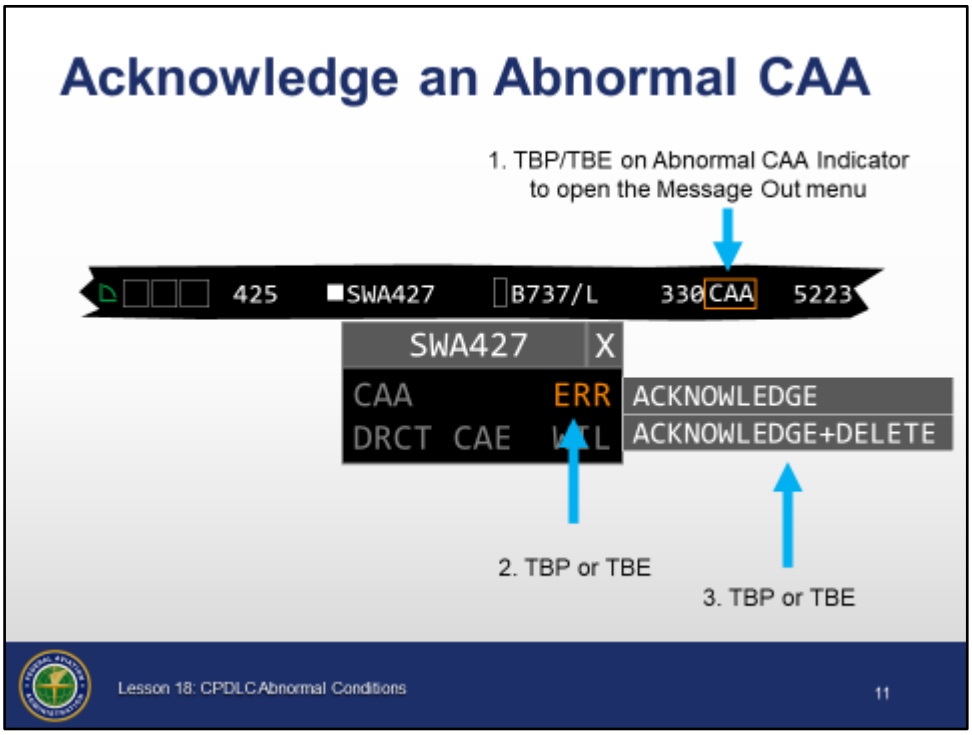


- An Abnormal CAA indicator is displayed anytime the CAA uplink is closed as a result of a system response of ERR or FAIL
  - Orange box with the white letters CAA inside added to the right of the last character in the altitude field on both the FDB and ACL
- An unacknowledged Abnormal CAA indicator prevents any other uplinks to the aircraft

CAA UPLINKS *(CONT'D)*

Acknowledge an Abnormal CAA

TI 6110.101, sec. 12.4.1



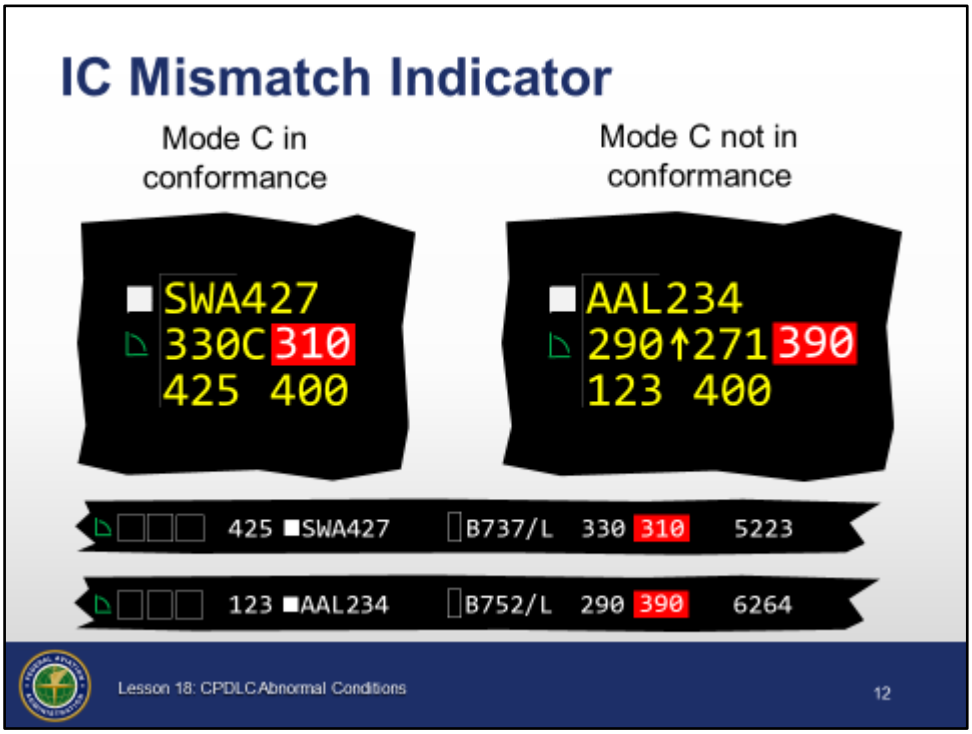
- To acknowledge the Abnormal CAA indicator from the Message Out menu (Mini Mo):
  - TBP or TBE on the Abnormal CAA indicator
    - Opens the Message Out menu
    - Another option is to TBP or TBE on the CDA Session With Eligibility indicator
  - TBP or TBE on the desired Status field to display the Acknowledge pick areas
  - TBP or TBE on:
    - ACKNOWLEDGE pick area to acknowledge but keep the entry in the view
    - ACKNOWLEDGE+DELETE pick area to acknowledge the entry and remove it from the view
- The Abnormal CAA indicator can also be acknowledged from the Message Out view

IC MISMATCH

IC Mismatch

TI 6110.101, secs. 5.2.9, 12.2

JO 7110.125, par. 8



- If the assigned altitude downlinked by the aircraft does not match the altitude displayed in the data block or, if applicable, the locally adapted waiver altitude, an IC Mismatch indicator will be displayed
  - Red block containing the downlinked cleared altitude in white letters to the right of the Mode C altitude
  - At all sectors with the FDB
    - Ensures that both the transferring and receiving sectors are aware of the mismatch
- An unacknowledged IC Mismatch indicator prevents all other uplinks to the aircraft
- When an IC Mismatch CAA downlink timeout indicator is displayed in the FDB and ACL, the controller who has the aircraft on their frequency must use voice communication to verify the assigned altitude of the aircraft and acknowledge the indicator

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IC MISMATCH *(CONT'D)*

IC Mismatch (Cont'd)

TI 6110.101, sec. 12.2

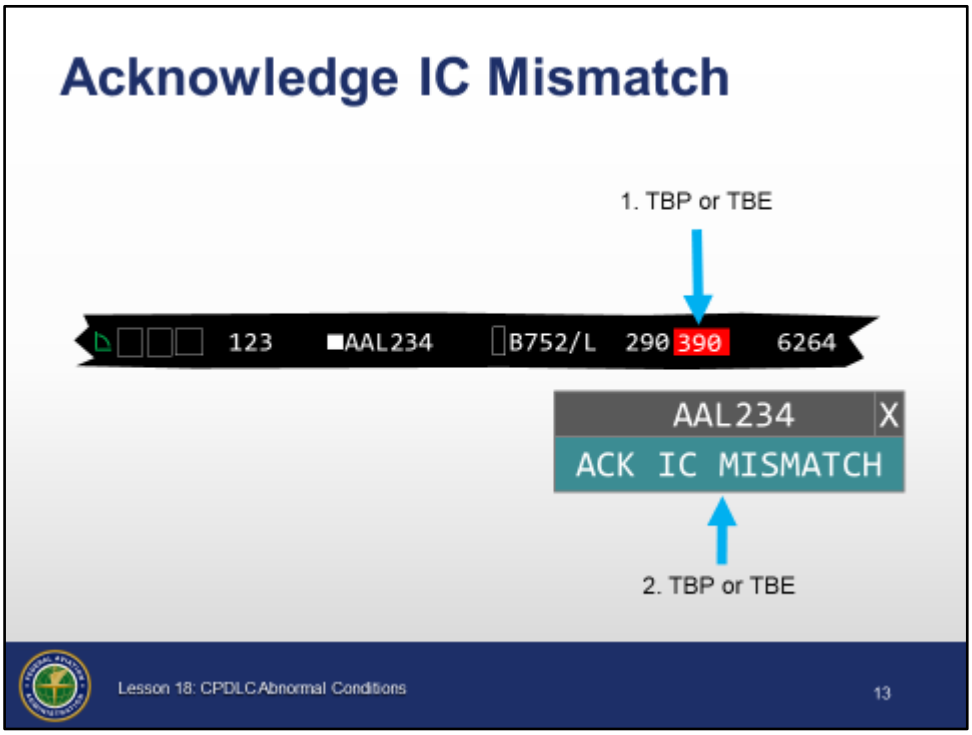
⊙ The avionics on some international flights may be set to downlink an altitude in metric units

- If metric units, or any other unsupported altitude formats, are downlinked in response to a CAA:
  - IC Mismatch indication displayed
  - XXX shown as the downlinked altitude
  - The system automatically sends an uplink notifying the pilot that the downlinked altitude contained an unsupported altitude format and that they should contact the controller

IC MISMATCH *(CONT'D)*

Acknowledge IC Mismatch

TI 6110.101, sec. 12.2.1

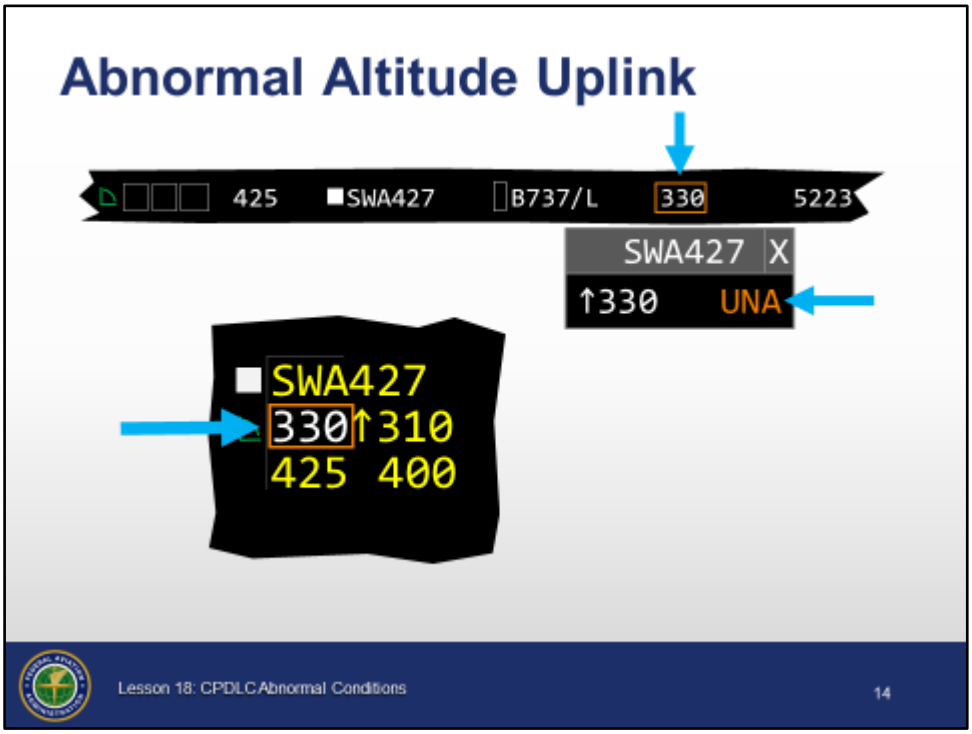


- Once coordination via voice has been accomplished with the aircraft, the IC Mismatch coding should be acknowledged
- To acknowledge an IC mismatch:
  - TBP or TBE on the IC Mismatch indicator to open the Acknowledge pick area
  - TBP or TBE on the ACK IC MISMATCH pick area
- Once acknowledged, the IC Mismatch indicator will be removed wherever it is being displayed

ALTITUDE UPLINKS

Abnormal Altitude Uplink

TI 6110.101, sec. 8.7.1.3



- If an altitude uplink results in an UNA, ERR, or FAIL, the Abnormal Altitude Uplink indicator is displayed
  - Orange box around altitude on both the FDB and ACL
    - Altitude is shown in white in the FDB
  - Status of the uplink on Message Out menu (Mini Mo) and Message Out view updated and color coded orange
- Since flight data processing was completed prior to the system attempting to uplink the clearance, there will be a discrepancy between the ERAM altitude and the cleared altitude in the aircraft's Flight Management System (FMS)
  - Discrepancy needs to be resolved via voice
  - You are responsible for re-entering the correct altitude in the data block, if needed
- An unacknowledged Abnormal Altitude indicator prevents any other uplinks to the aircraft

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ALTITUDE UPLINKS *(CONT'D)*

Abnormal Altitude Uplink (Cont'd)

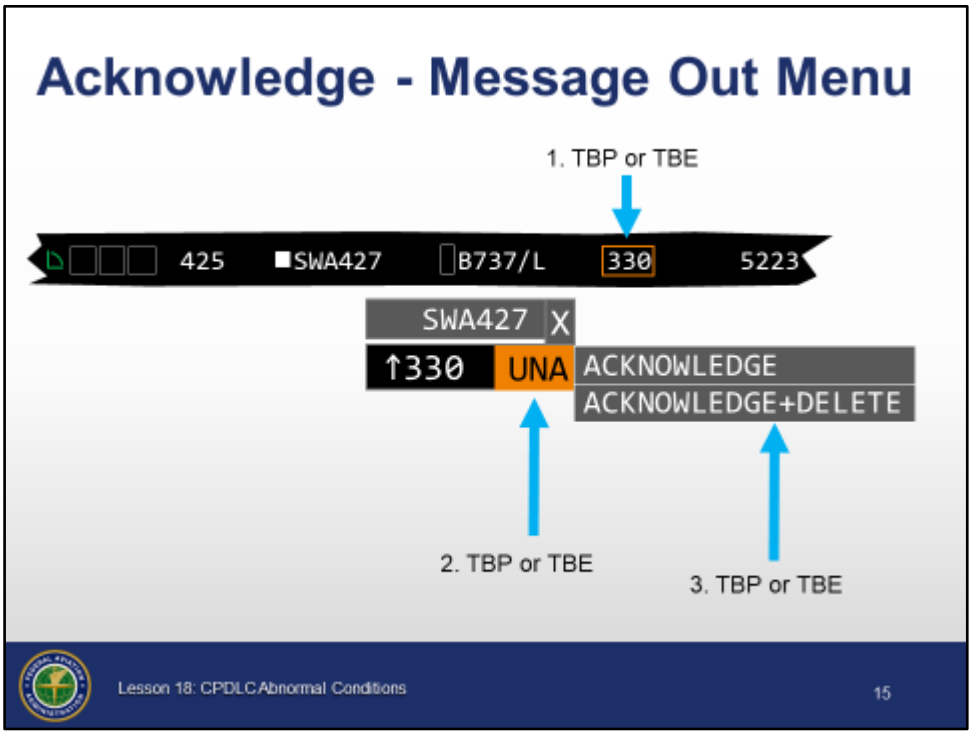
TI 6110.101, sec. 11.2.1.4

NOTE: Some avionics allow a pilot to add free text to an UNA response. CPDLC does not support such free text messages and will alert the pilot that the UNABLE response was accepted but the free text was not displayed to the controller. In such cases, the alert message uplinked to the aircraft (e.g., UNABLE RECEIVED. FREE TEXT/DUE TO REASON NOT SHOWN TO ATC) would appear in the Message History view when viewing messages to or from that aircraft. The same behavior applies to any such UNA response, regardless of uplink type.

ALTITUDE UPLINKS *(CONT'D)*

Acknowledge - Message Out Menu

TI 6110.101, sec. 4.13.2.6.2

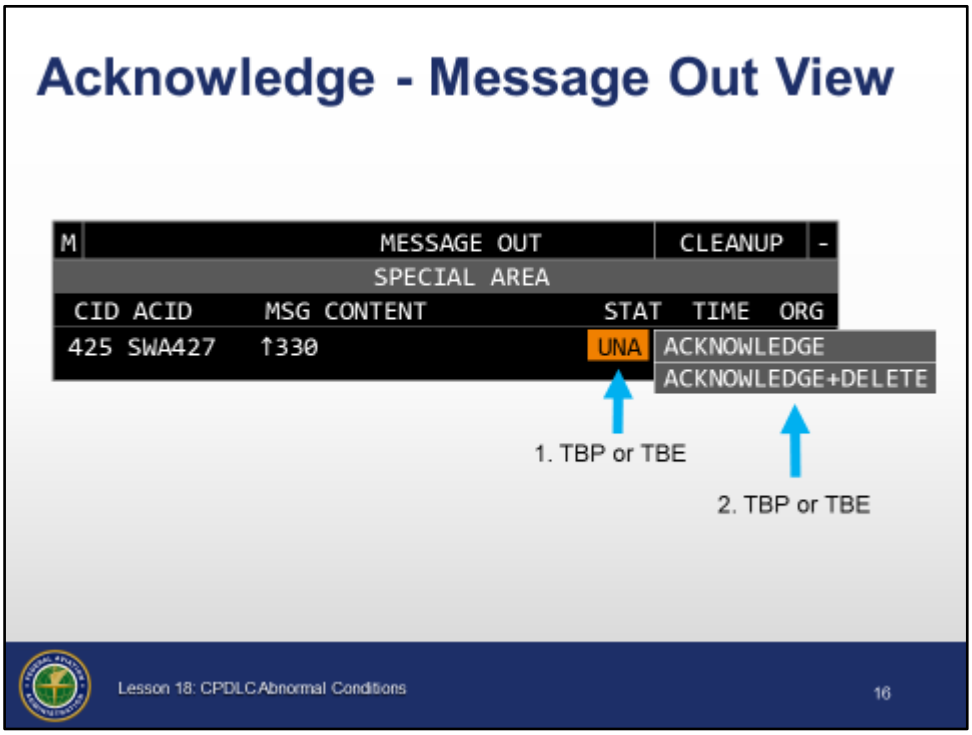


- To acknowledge the Abnormal Altitude Uplink indicator from the Message Out menu (Mini Mo):
  - TBP or TBE on the Abnormal Altitude indicator
    - Opens Message Out menu, or
    - TBP or TBE on the CDA Session With Eligibility indicator
  - TBP or TBE on the desired status to display the Acknowledge pick areas
  - TBP or TBE on:
    - ACKNOWLEDGE pick area to acknowledge but keep the entry in the view
    - ACKNOWLEDGE+DELETE pick area to acknowledge the entry and remove it from the view

ALTITUDE UPLINKS *(CONT'D)*

Acknowledge - Message Out View

TI 6110.101, sec. 4.13.2.6.2



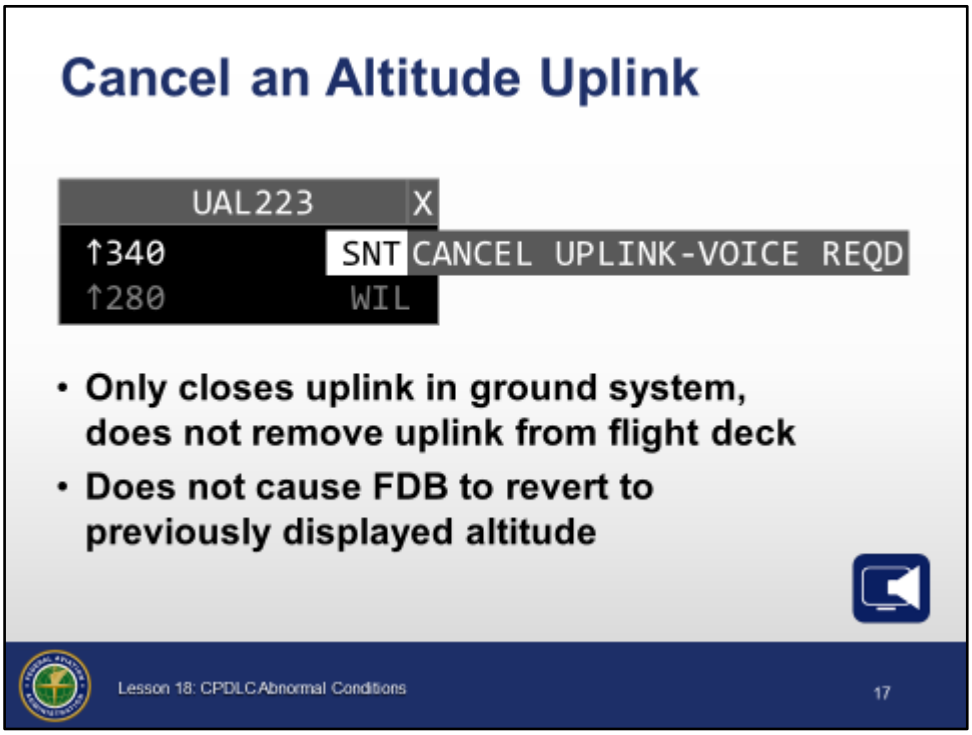
- To acknowledge the Abnormal Altitude Uplink from the Message Out view:
  - TBP or TBE on the desired status, CID, or ACID
    - Displays the Acknowledge pick areas
  - TBP or TBE on:
    - ACKNOWLEDGE pick area to acknowledge, but keep the entry in the view
    - ACKNOWLEDGE+DELETE pick area to acknowledge the entry and remove it from the view

ALTITUDE UPLINKS *(CONT'D)*

Cancel an Altitude Uplink

JO 7110.125, par. 8

TI 6110.101, sec. 4.13.2.6.5

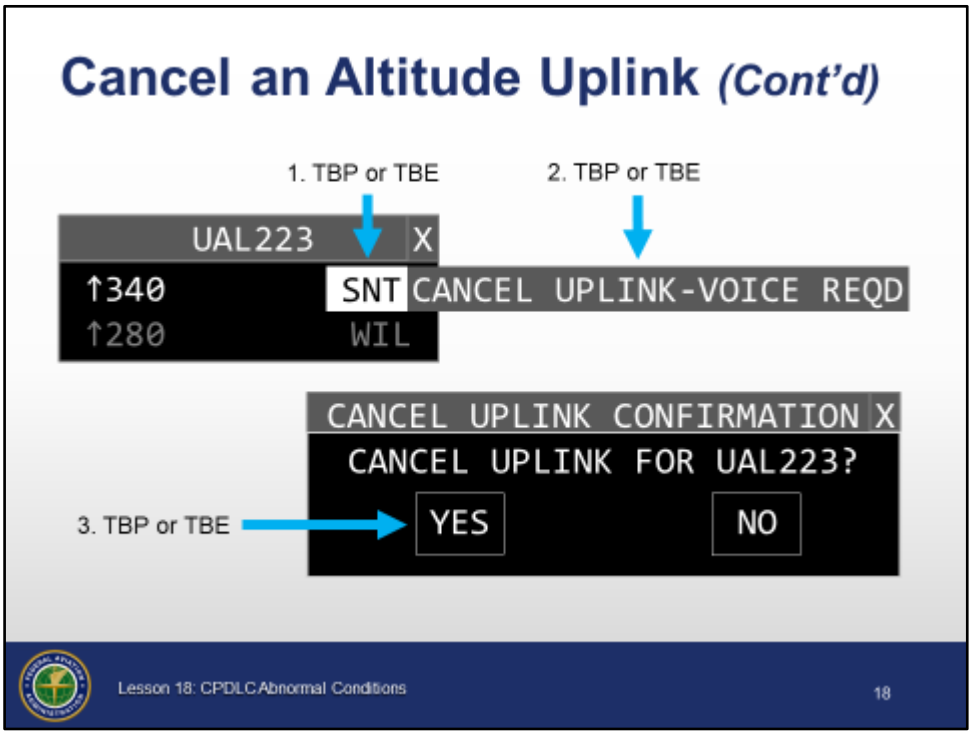


- Cancelling an open altitude uplink:
  - Only closes the uplink in the ground system and does not remove the uplink from the flight deck
    - It is possible the pilot may still act on it
  - Does not cause the FDB to revert to the previously displayed altitude
- Controllers may only cancel an open uplink after ensuring the pilot has been issued, via voice communication, the correct clearance

ALTITUDE UPLINKS *(CONT'D)*

Cancel an Altitude Uplink (Cont'd)

TI 6110.101, sec. 4.13.2.6.5

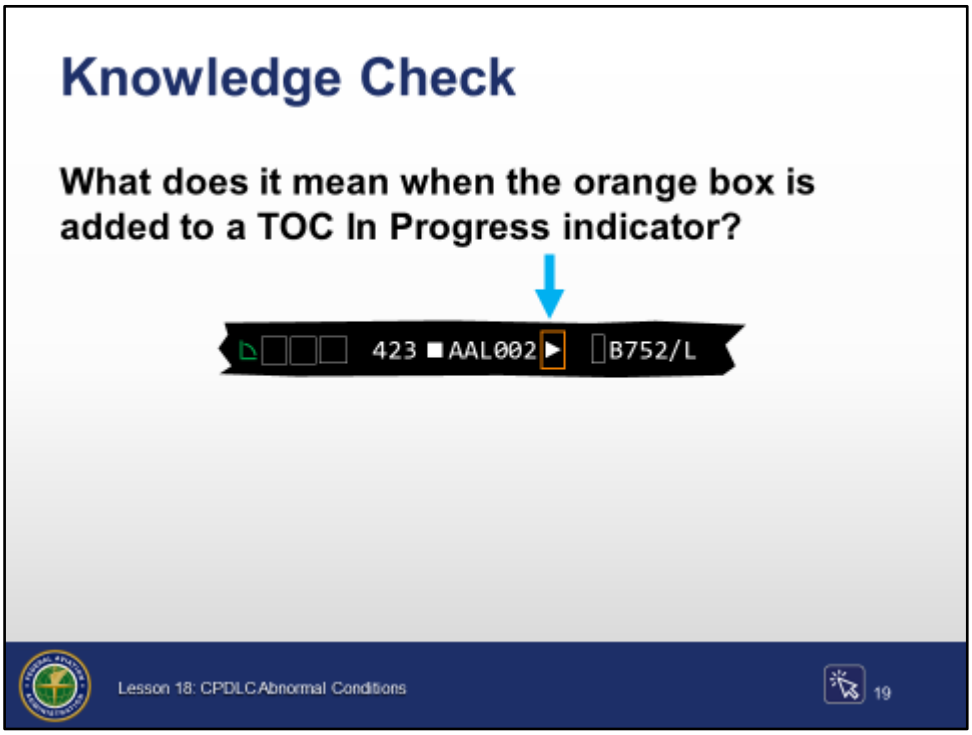


- To cancel the open uplink from either the Message Out menu (Mini Mo) or the Message Out view:
  - TBP or TBE on the Status field of the desired entry
    - Opens the cancellation pick area
  - TBP or TBE on the CANCEL UPLINK - VOICE REQD pick area
    - CANCEL UPLINK CONFIRMATION pop up will appear
  - TBP or TBE on YES
- Once the open uplink is cancelled, the status of the entry will change to CNCL and the entry will be displayed in gray and can then be deleted

NOTE: Remember that cancelling an uplink only closes it in the ground system. The uplink may still be available in the FMS.

ALTITUDE UPLINKS *(CONT'D)*

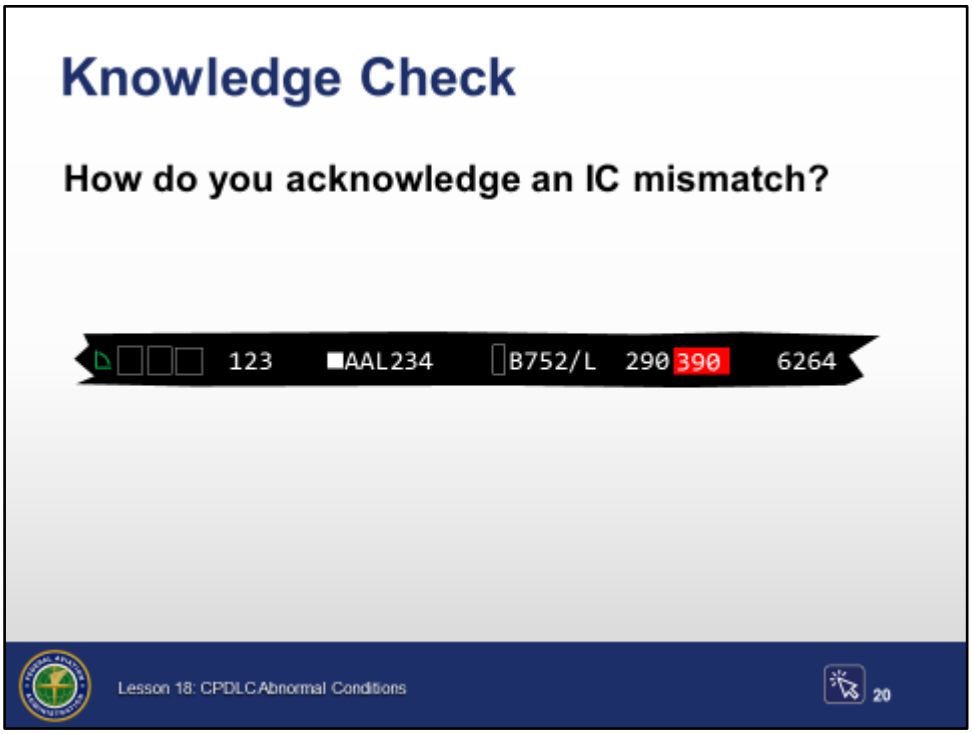
Knowledge Check



Question: What does it mean when the orange box is added to a TOC In Progress indicator?

ALTITUDE UPLINKS *(CONT'D)*

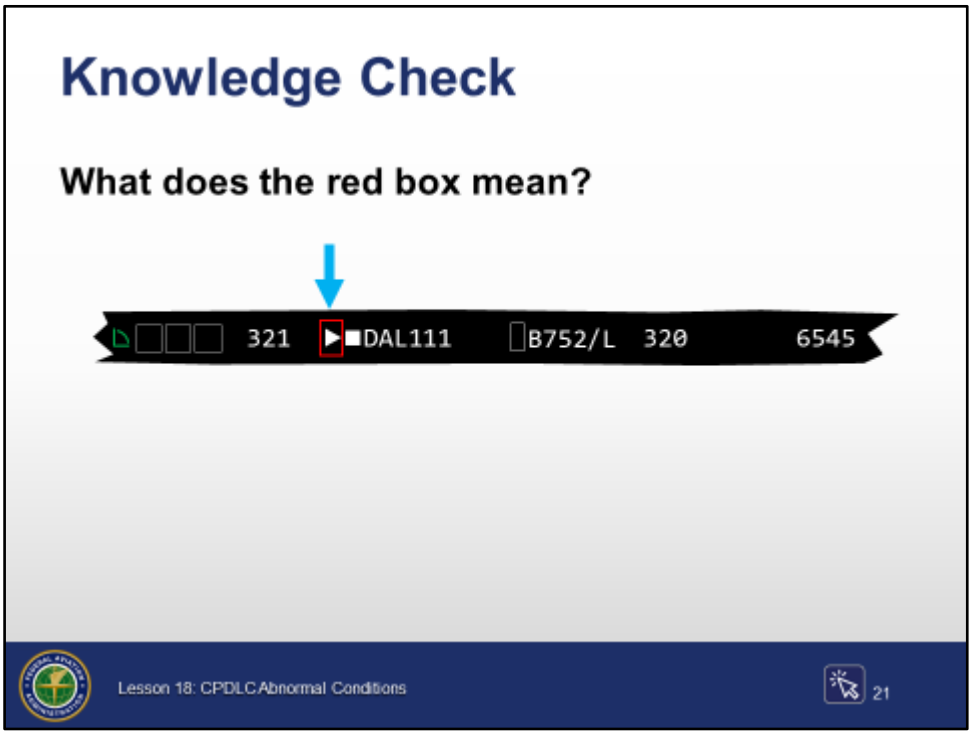
Knowledge Check



Question: How do you acknowledge an IC mismatch?

ALTITUDE UPLINKS *(CONT'D)*

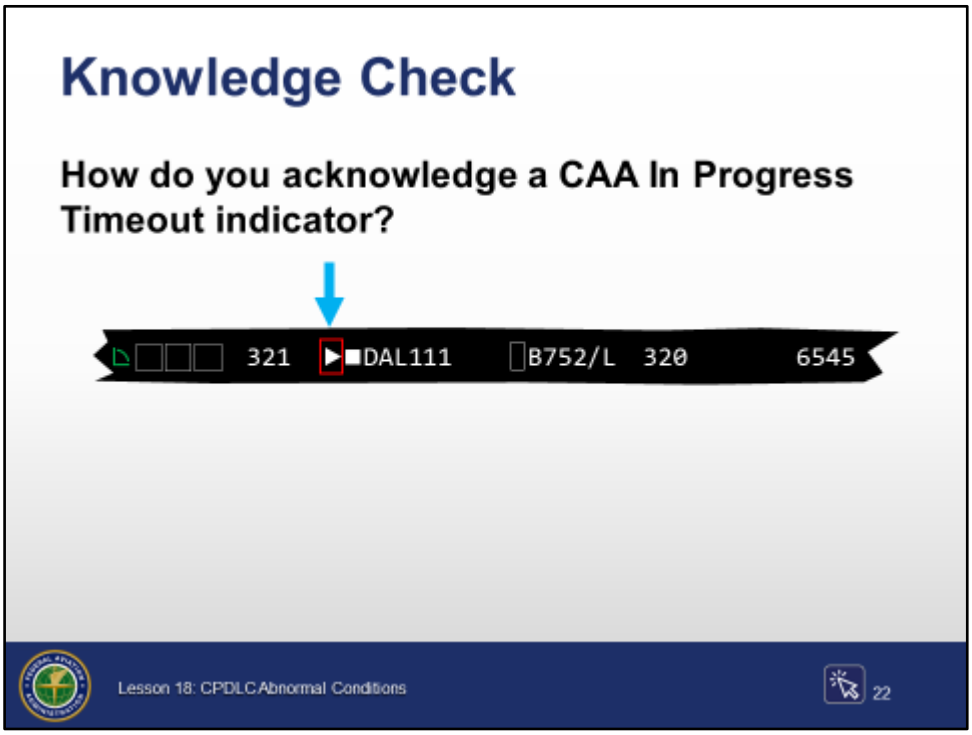
Knowledge Check



Question: What does the red box mean?

ALTITUDE UPLINKS *(CONT'D)*

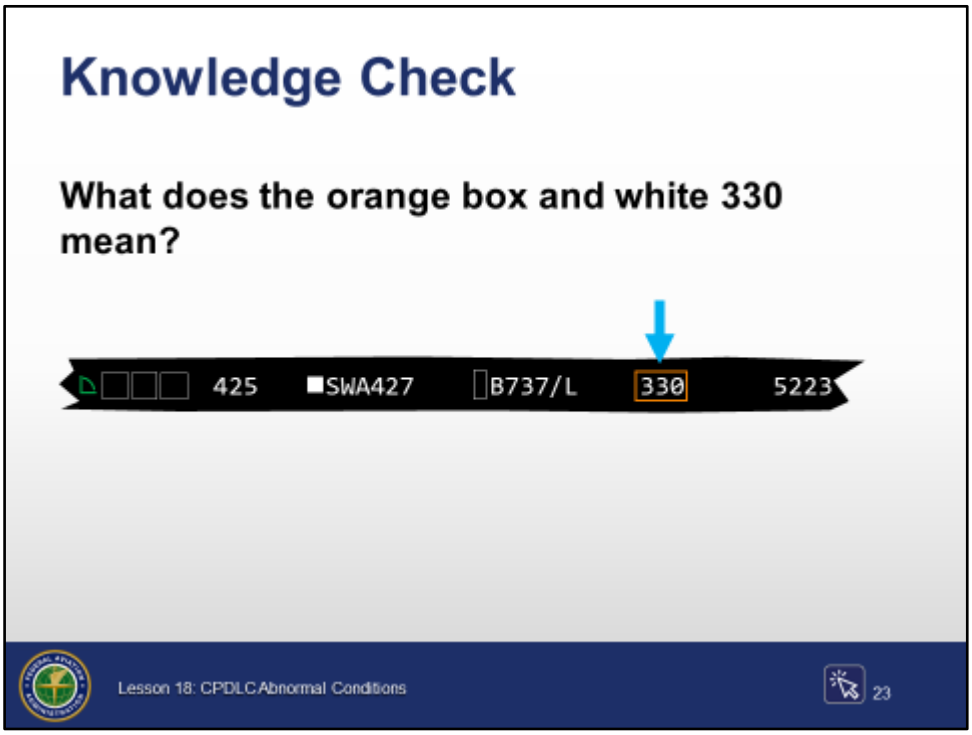
Knowledge Check



Question: How do you acknowledge a CAA In Progress Timeout indicator?

ALTITUDE UPLINKS *(CONT'D)*

Knowledge Check



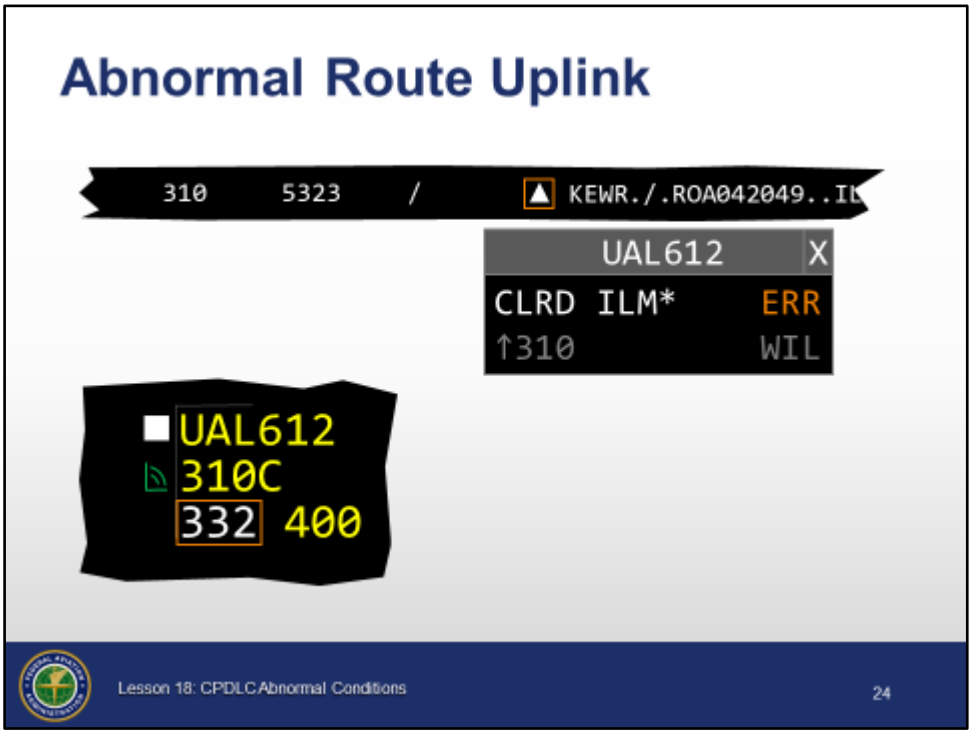
Question: What does the orange box and white 330 mean?

ROUTE UPLINKS

Abnormal Route Uplink

TI 6110.101, sec. 10.3.2.3

SIG ERAM 1564, sec. 3.2.2.5.3.3



- If a route uplink results in an UNA, ERR, or FAIL condition, the Abnormal Route Uplink indicator is displayed
  - Orange box around a white triangle on the ACL
  - Orange box with white CID characters in the FDB
- The status of the uplink on the Message Out menu (Mini Mo) and Message Out view will be updated to UNA, ERR, or FAIL and color coded orange
- Since flight data processing was completed prior to the system attempting to uplink the clearance, there will be a discrepancy between the ERAM route and the cleared route in the aircraft's FMS
  - Discrepancy must be resolved
  - Controller is responsible for re-entering the correct route, if needed

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ROUTE UPLINKS *(CONT'D)*

Abnormal Route Uplink (Cont'd)

TI 6110.101, sec. 10.3.2.3

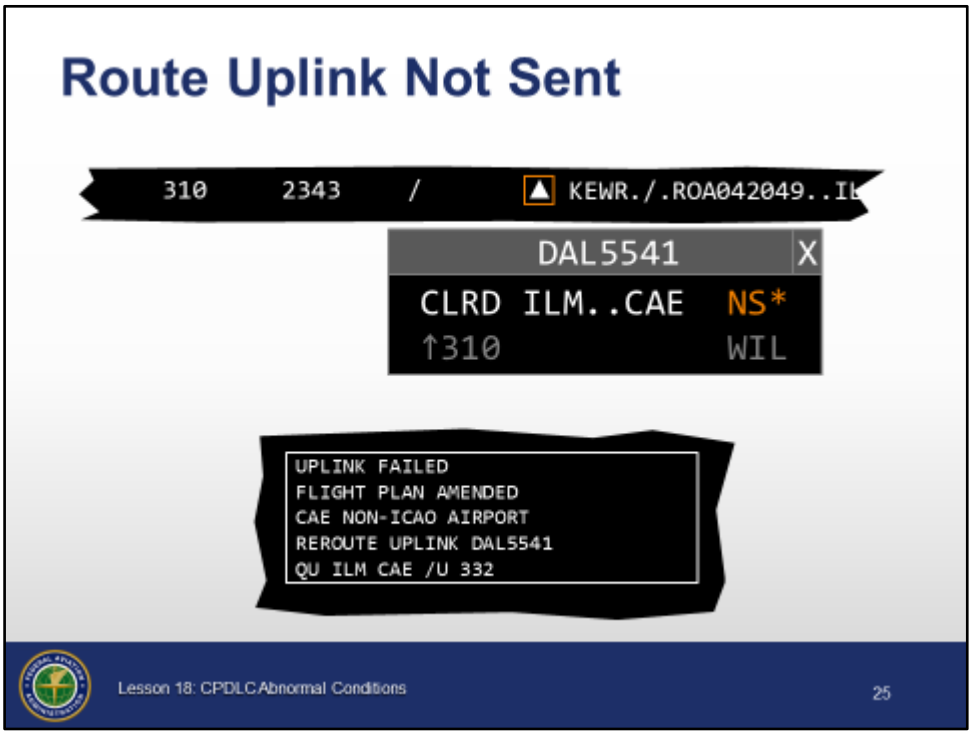
SIG ERAM 1564, sec. 3.2.2.5.3.3

- ⊙ Uplinking a route clearance with the FRC option will ensure the ERAM route and FMS route are in sync
  - FRC option replaces the entire current route from the flight plan current position to the destination
  - If accepted by pilot, the new route will entirely replace the current route in the FMS
    - Erases any wind and arrival data manually entered by the pilot
- ⊙ An unacknowledged Abnormal Route Uplink indicator prevents any other uplinks to the aircraft

ROUTE UPLINKS *(CONT'D)*

Route Uplink Not Sent

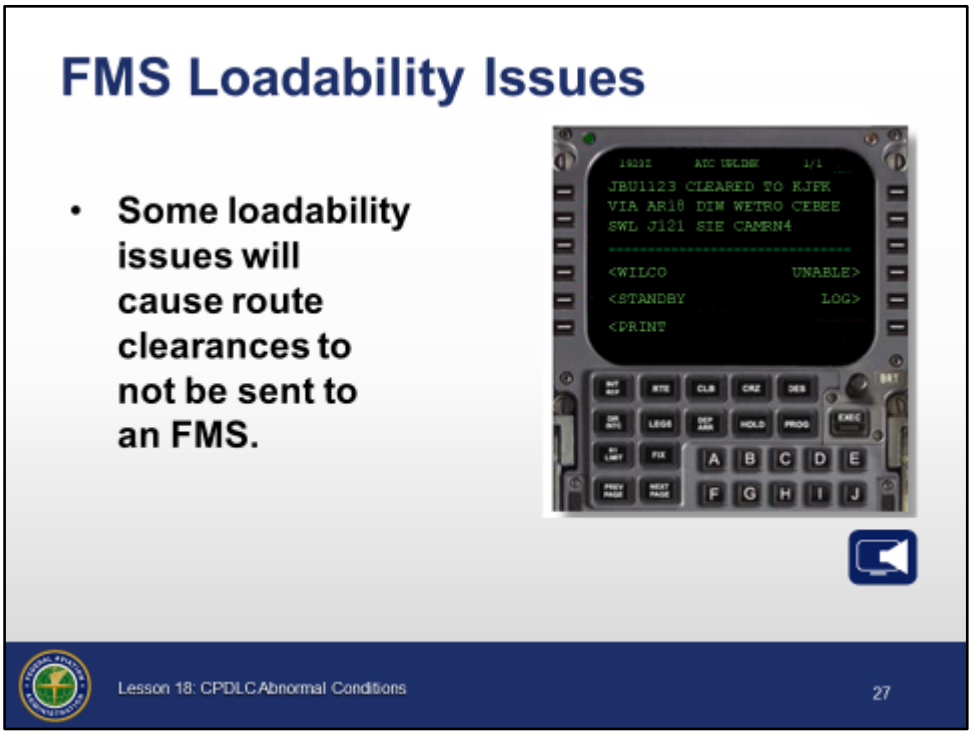
TI 6110.101, sec. 10.3.4



- Following a successful route amendment in ERAM, CPDLC will process the new route
- If any known issues that result in FMS load errors or discontinuities are present in the route string:
  - An Abnormal Route Uplink indicator is displayed
  - On the Message Out menu (Mini Mo) and Message Out view, the status of the uplink will change to NS and be color coded orange
  - Feedback is displayed in response area
    - The response area feedback reports that the uplink was not sent and that the flight plan was amended
    - Includes the issue that was encountered
- If the system encounters unexpected data while trying to construct the uplink, the reason provided in the response area will be: SYSTEM ERROR
- Since no uplink was sent, you may use voice or try to resend the uplink
- An unacknowledged Abnormal Route Uplink indicator will prevent any other uplinks to the aircraft

FMS Loadability Issues

TI 6110.101, sec. 10.3.4



- There are several items, called loadability issues, that will cause route clearances to not be sent to an FMS:
  - Incomplete Route indicator (i.e., XXX or ???)
  - Route conversion fails beyond US airspace
  - Route is direct to a new destination (with or without the FRC option)
    - Direct to current destination is allowed as long as the FRC option is not used
  - Airport identifier other than departure/destination (e.g., KIAD./.FAK..KROA..RDU..KATL)
  - Non-ICAO airport as departure or destination airport
  - Non-ICAO format

Continued on next page

ROUTE UPLINKS *(CONT'D)*

FMS Loadability Issues (Cont'd)

TI 6110.101, sec. 10.3.4

- Flight rules in the route string (e.g., IFR, VFR, DVFR)
- Locally adapted route element in route string
- Airway to airway
- Delay in route (e.g., ORF/D0+30)
- Re-entry operator in route
- Lat/Longs without direction character
- Route element with more than six characters (excluding FRDs and Lat/Longs)
- FRD with distance longer than 700 miles
- More than 128 route elements in the route string
- More than 1245 characters in the route string

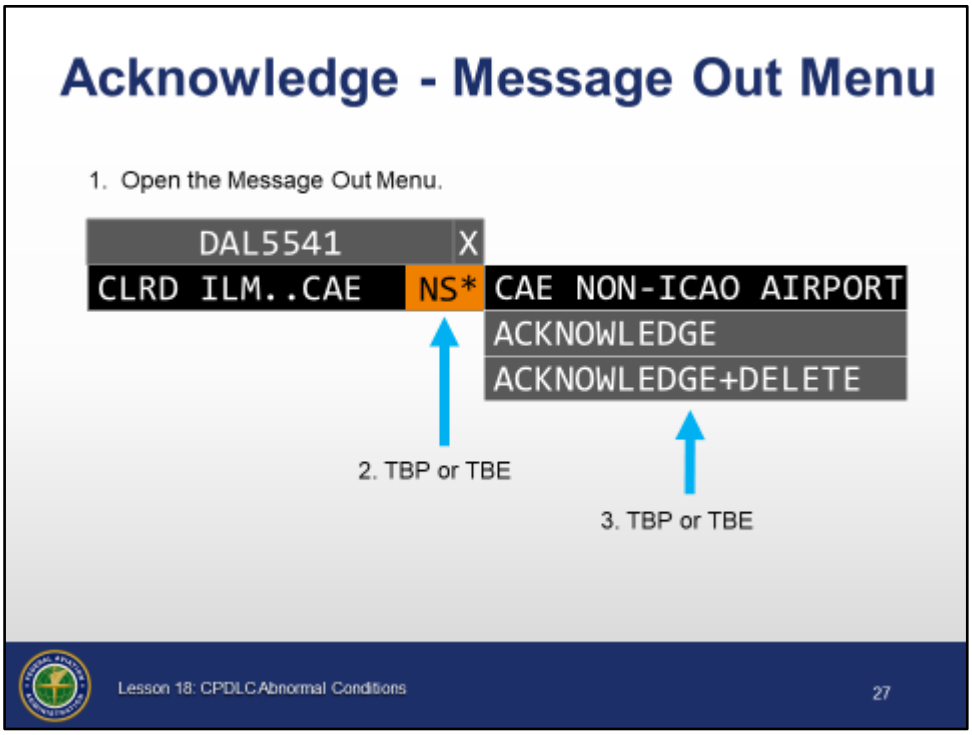
⊙ Some avionic systems are unable to load route clearances that contain a STAR with a transition or a runway dependent STAR

- These aircraft will be identified using a special character in ICAO field 18 (the letter R included in the /DAT element)
- For these aircraft, CPDLC will uplink a route clearance up to the STAR and add free text that contains the cleared STAR, including transition or runway instructions, and an instruction to the pilot to MANUALLY LOAD ARRIVAL

ROUTE UPLINKS *(CONT'D)*

Acknowledge - Message Out Menu

TI 6110.101, secs. 4.13.4.3.1, 4.13.4.3.2

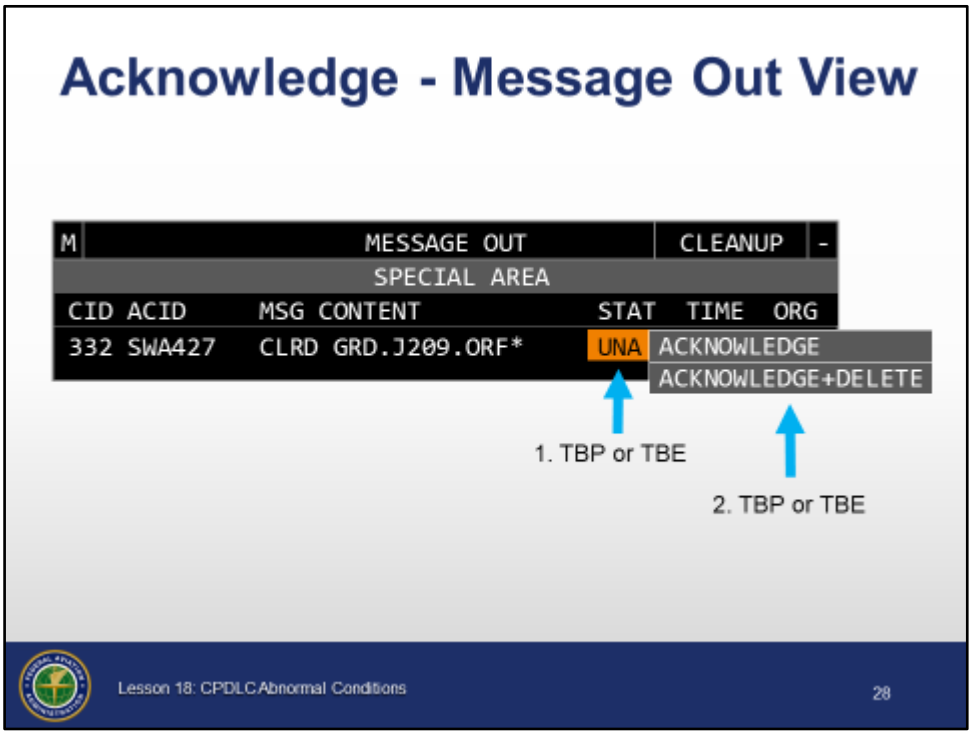


- To acknowledge the Abnormal Route Uplink indicator from the Message Out menu (Mini Mo):
  - TBP or TBE on the abnormal indicator. This will open the Message Out menu.
    - Another option is to TBP or TBE on the CDA Session With Eligibility indicator
  - TBP or TBE on the desired status to display the Acknowledge pick areas
    - When the abnormal status is NS due to an FMS Loadability issue, an asterisk will be displayed next to the NS to indicate that the pick area contains a description of the issue
  - TBP or TBE on:
    - ACKNOWLEDGE pick area to acknowledge, but keep the entry in the view
    - ACKNOWLEDGE+DELETE pick area to acknowledge the entry and remove it from the view

ROUTE UPLINKS *(CONT'D)*

Acknowledge - Message Out View

TI 6110.101, sec. 4.13.4.3.1

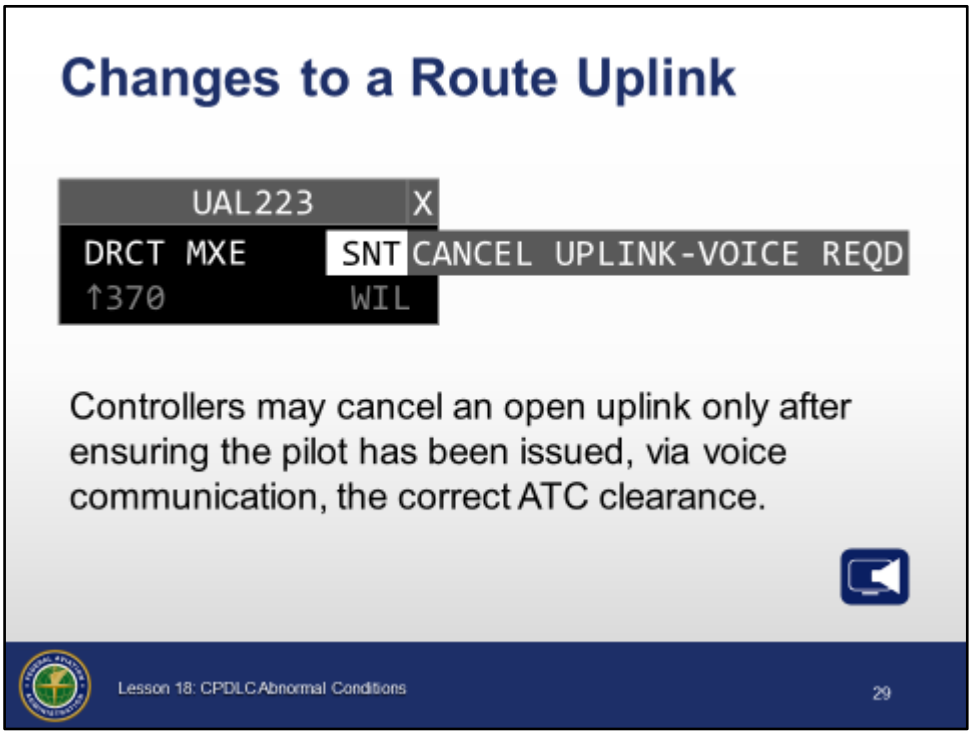


- To acknowledge the Abnormal Route Uplink indicator from the Message Out view:
  - TBP or TBE on the desired status to display the Acknowledge pick areas
  - TBP or TBE on:
    - ACKNOWLEDGE pick area to acknowledge, but keep the entry in the view
    - ACKNOWLEDGE+DELETE pick area to acknowledge the entry and remove it from the view

ROUTE UPLINKS *(CONT'D)*

Changes to a Route Uplink

JO 7110.125, par. 8

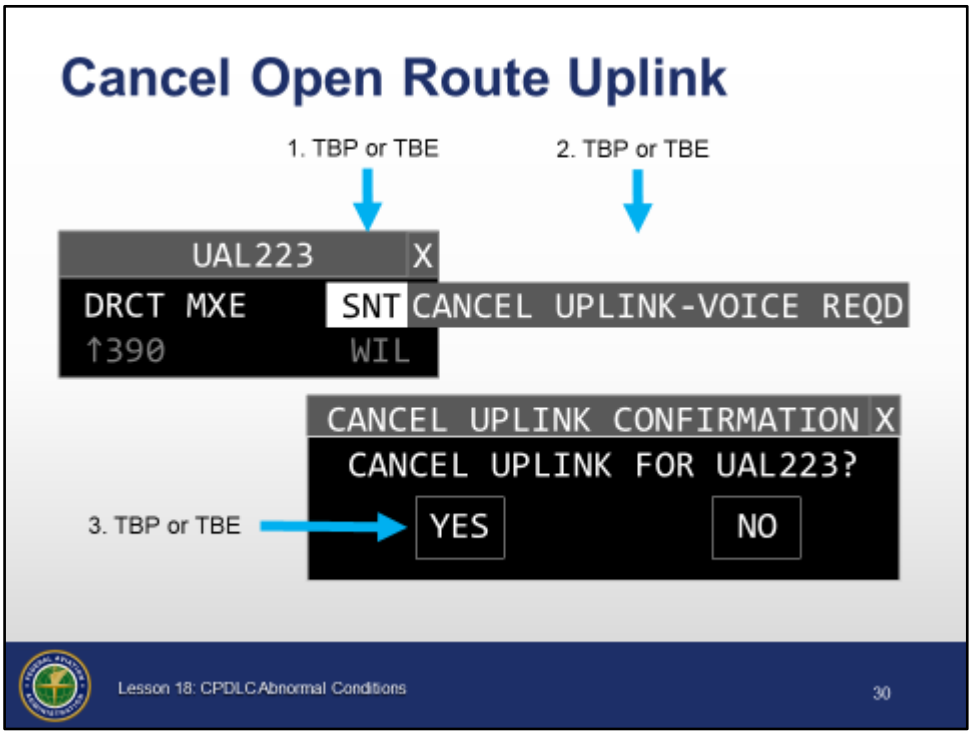


- Cancelling an open route uplink:
  - Only closes the uplink in the ground system and does not remove the uplink from the flight deck
  - Does not cause the route to revert to the previously displayed route
- Controllers may cancel an open uplink only after ensuring the pilot has been issued, via voice communication, the correct ATC clearance

ROUTE UPLINKS *(CONT'D)*

Cancel Open Route Uplink

TI 6110.101, sec. 4.13.2.6.5

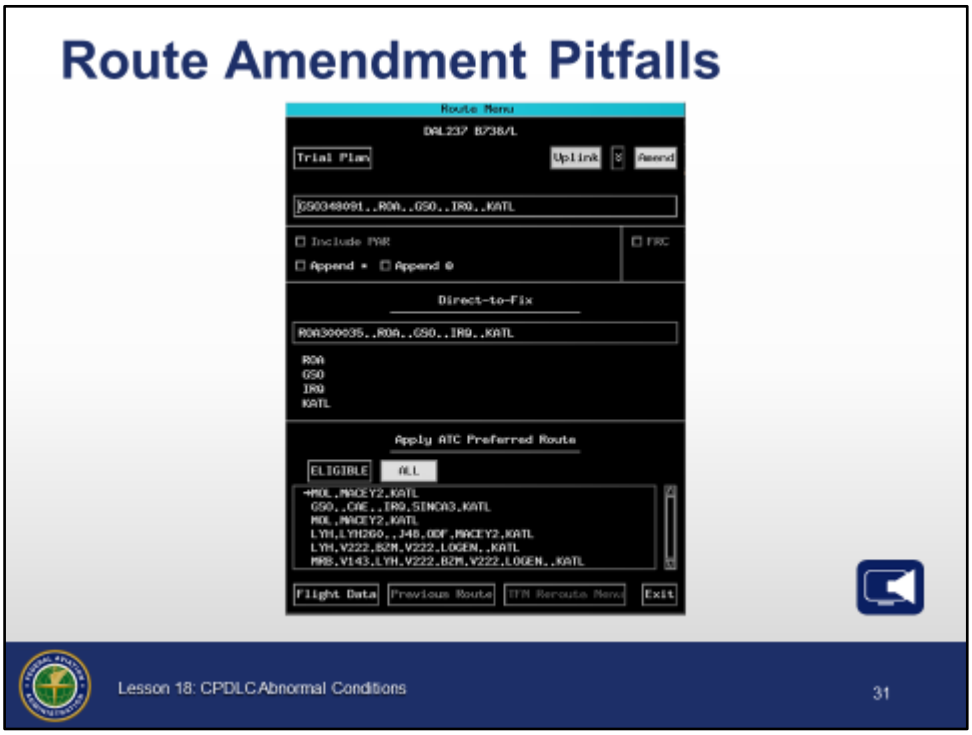


- To cancel an open uplink from either the Message Out menu (Mini Mo) or the Message Out view:
  - TBP or TBE on the Status field of the desired entry to open the cancellation pick area
  - TBP or TBE on the CANCEL UPLINK - VOICE REQD pick area
    - CANCEL UPLINK CONFIRMATION pop up appears
  - TBP or TBE on YES
- Once the open uplink is cancelled, the status of the entry will change to CNCL and the entry will be displayed in gray and can then be deleted

ROUTE UPLINKS *(CONT'D)*

Route Amendment Pitfalls

TI 6110.101, sec. 10.2.2.4



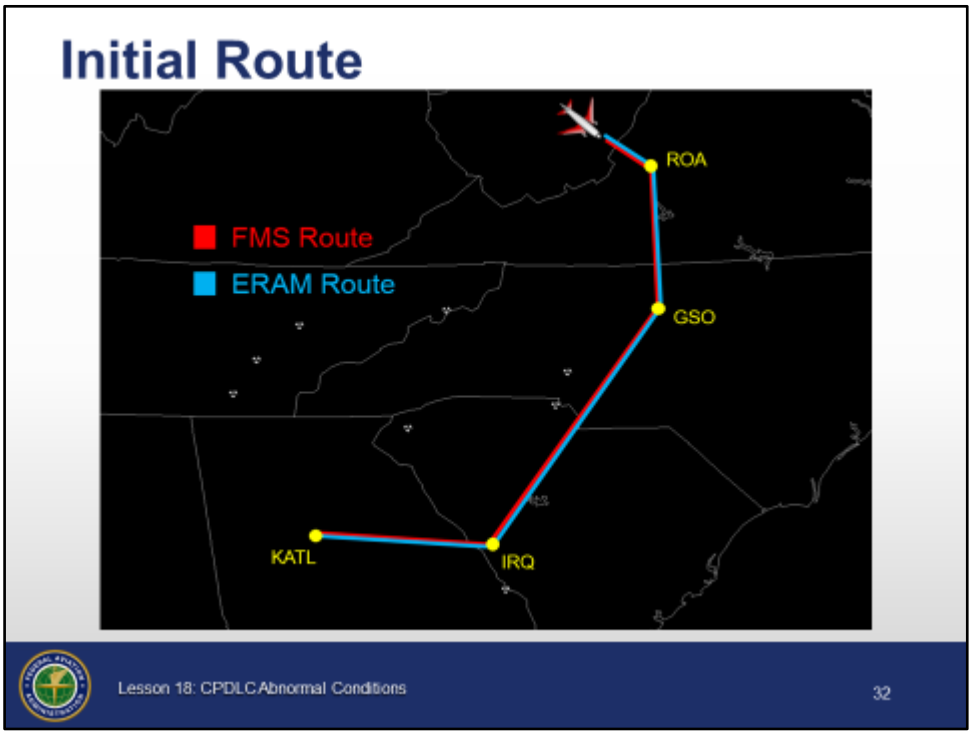
Changing route elements via voice and CPDLC consecutively may cause a discrepancy between the ERAM route and the FMS route

Example: Making two consecutive entries on the Route Menu with the expectation of issuing a clearance of the resulting route via CPDLC.

ROUTE UPLINKS *(CONT'D)*

Route Amendment Pitfalls - Initial Route

TI 6110.101, sec. 10.2.2.4

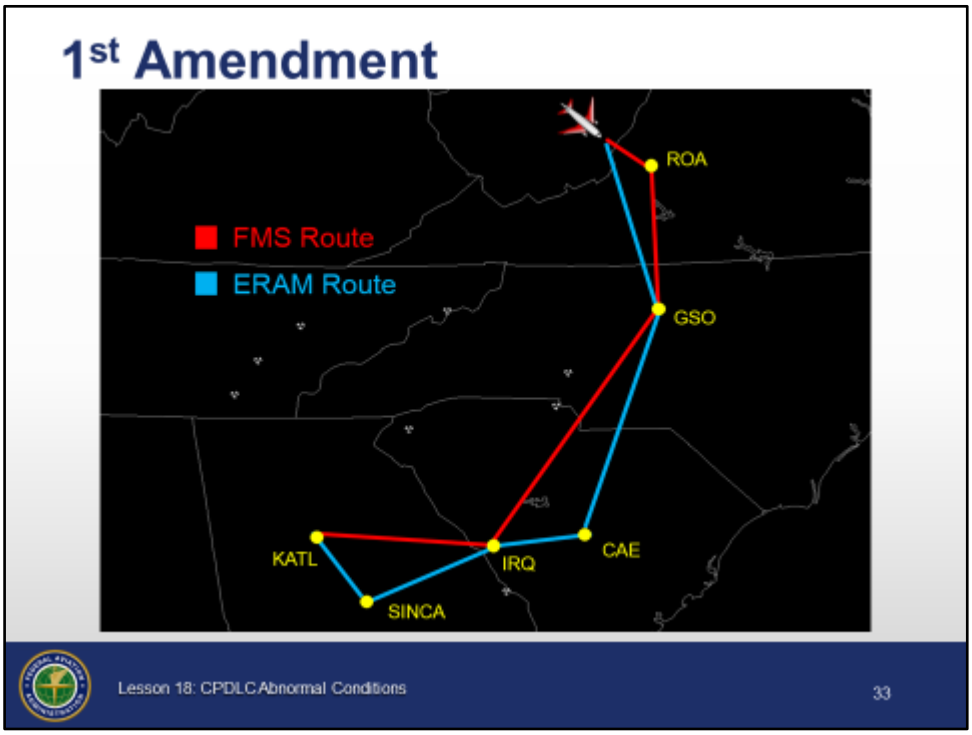


- Initially, the FMS and ERAM routes are in sync
  - FMS: Present Position..ROA..GSO..IRQ..KATL
  - ERAM: Present Position..ROA..GSO..IRQ..KATL

ROUTE UPLINKS *(CONT'D)*

Route Amendment Pitfalls - 1st Amendment

TI 6110.101, sec. 10.2.2.4



- After the first amendment (i.e., selection of the APR from the route menu), if the controller does not uplink or verbally issue the route, ERAM will have a route with the APR applied but the FMS will still have the original route

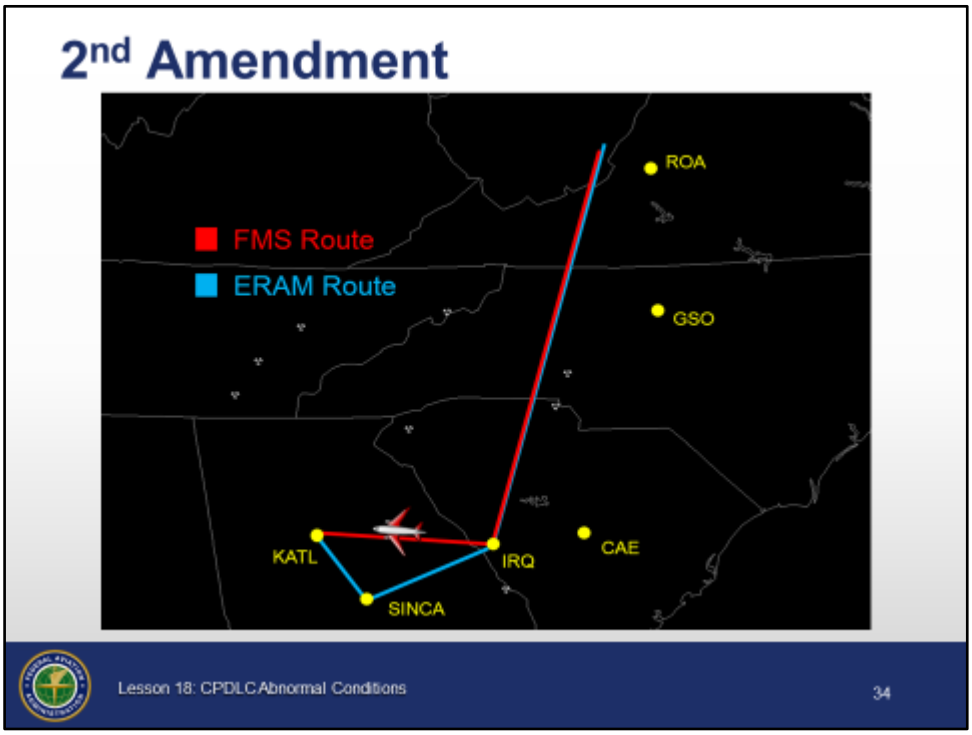
  NOTE: The routes are no longer in sync.

  - FMS: Present Position..ROA..GSO..IRQ..KATL
  - ERAM: Present Position..GSO..CAE..IRQ.SINCA3.KATL

ROUTE UPLINKS *(CONT'D)*

Route Amendment Pitfalls - 2nd Amendment

TI 6110.101, sec. 10.2.2.4



- After the second amendment (i.e., Direct to IRQ) is uplinked, both routes merge at IRQ but the rest of the route will differ

  NOTE: The controller working the IRQ sector will be expecting the aircraft to proceed to SINCA, but the aircraft is going to turn towards KATL.

  - FMS: Present Position..IRQ..KATL
  - ERAM: Present Position..IRQ.SINCA3.KATL

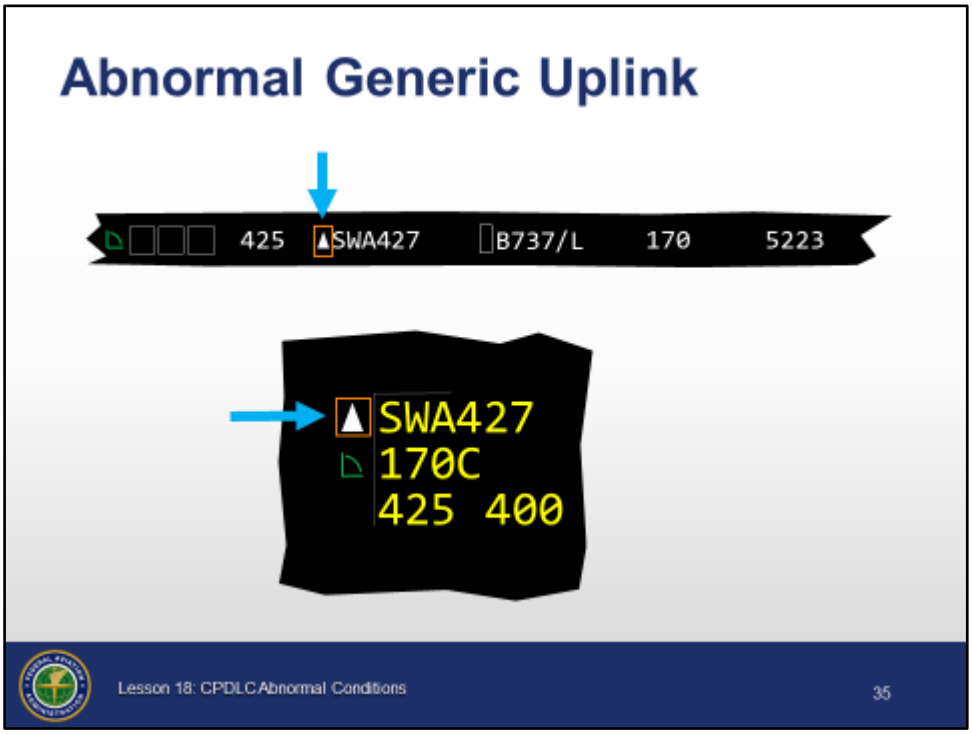
- Techniques for keeping the FMS and ERAM routes synchronized are to:
  - Uplink both amendments
  - Use voice
  - Use the FRC option when uplinking the second clearance
  - Use the typing buffer to create and uplink the desired route

GENERIC UPLINKS

Abnormal Generic Uplink

TI 6110.101, sec. 6.2.2.1.3

JO 7110.125, par. 8

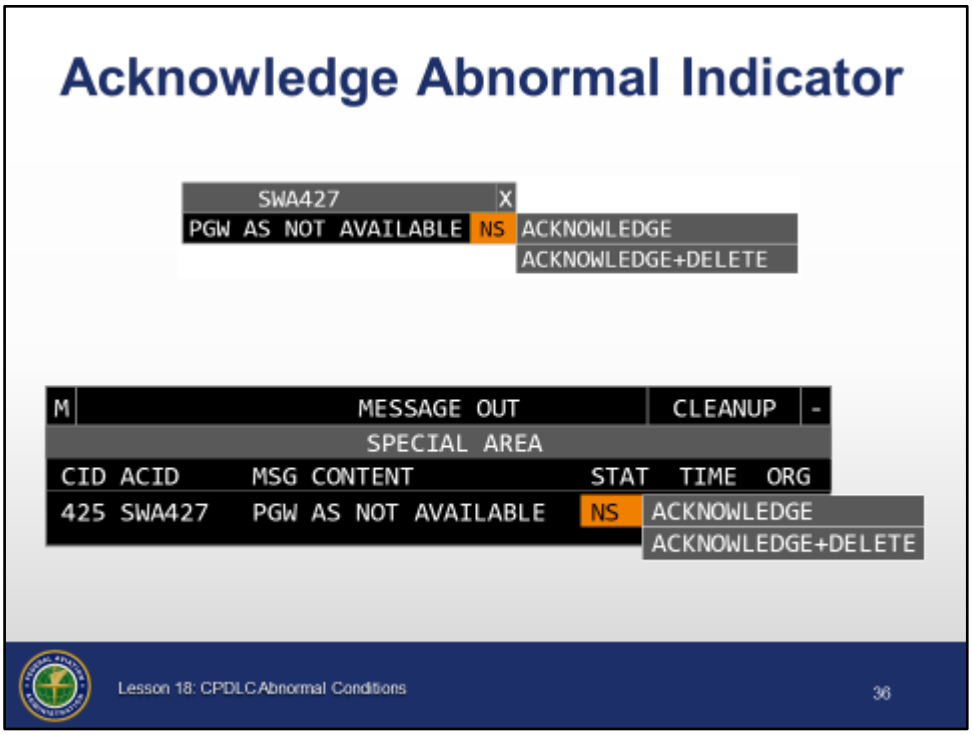


- An Abnormal Generic Uplink is indicated by an orange box around the generic uplink and is caused by:
  - An automatic altimeter uplink that could not be sent
  - An automatic or manual altimeter uplink that was sent and received an abnormal response (UNA, ERR, FAIL)
  - A frequency that is uplinked independent of track control (using the UF command without the end session parameter) and receives an abnormal response (UNA, ERR, FAIL)
- If the CPDLC system fails to provide a necessary automated altimeter setting to an aircraft, the controller must issue an altimeter

GENERIC UPLINKS *(CONT'D)*

Acknowledge Abnormal Indicator

TI 6110.101, sec. 4.13.4.3.1

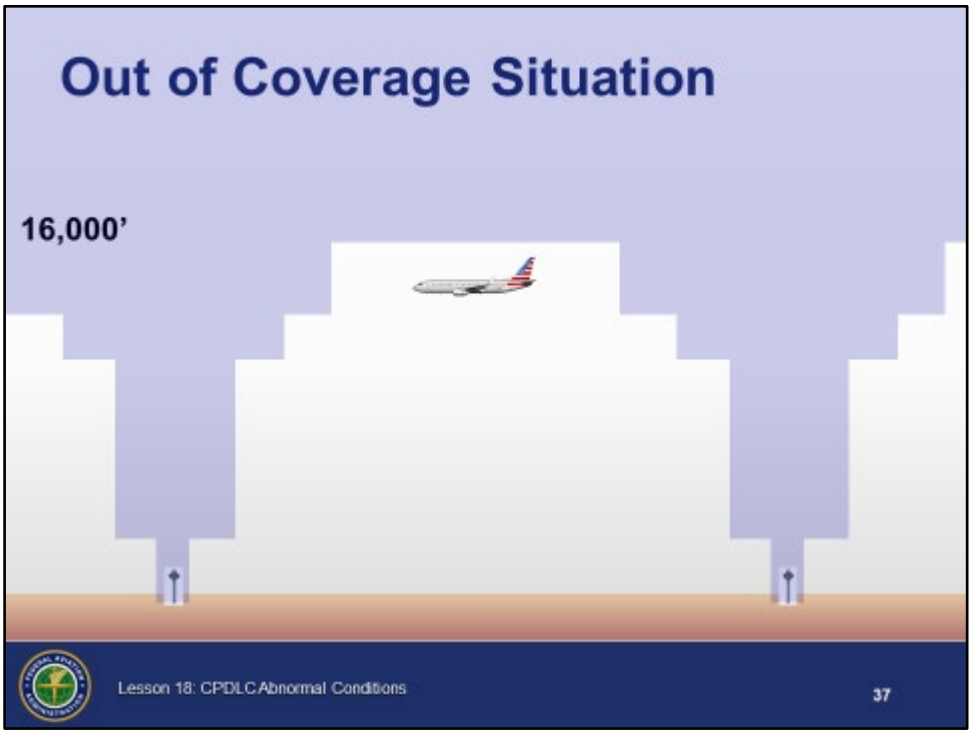


- The Abnormal Generic Uplink indicator can be acknowledged from the Message Out menu (Mini Mo) or the Message Out view
  - TBP or TBE on the desired status, CID, or ACID to display the Acknowledge pick areas
  - TBP or TBE on:
    - ACKNOWLEDGE pick area to acknowledge, but keep the entry in the view
    - ACKNOWLEDGE+DELETE pick area to acknowledge the entry and remove it from the view

GENERIC UPLINKS *(CONT'D)*

Out of Coverage Situation

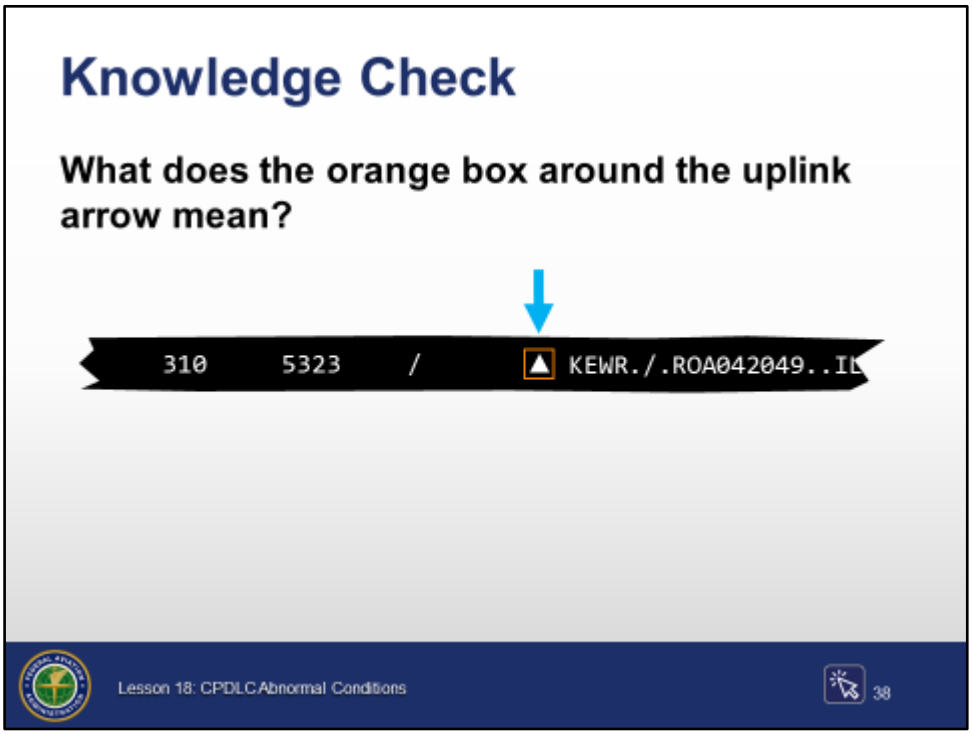
Course 55155003, LP 12, p. 52



- If a CPDLC equipped aircraft with a CDA session flies into a CPDLC non-coverage area (typically below 16,000'):
  - If no uplink is sent, there is no indication that the aircraft is out of coverage
  - If an uplink is attempted while the aircraft is out of coverage:
    - The message may time out, and timeout coding will be displayed, or
    - If the aircraft remains out of coverage, the network provider will send back a message that the aircraft is not reachable resulting in abnormal coding with a status of ERR, or
    - If the aircraft re-enters the coverage area before the error message is received the uplink will make it to the aircraft

GENERIC UPLINKS *(CONT'D)*

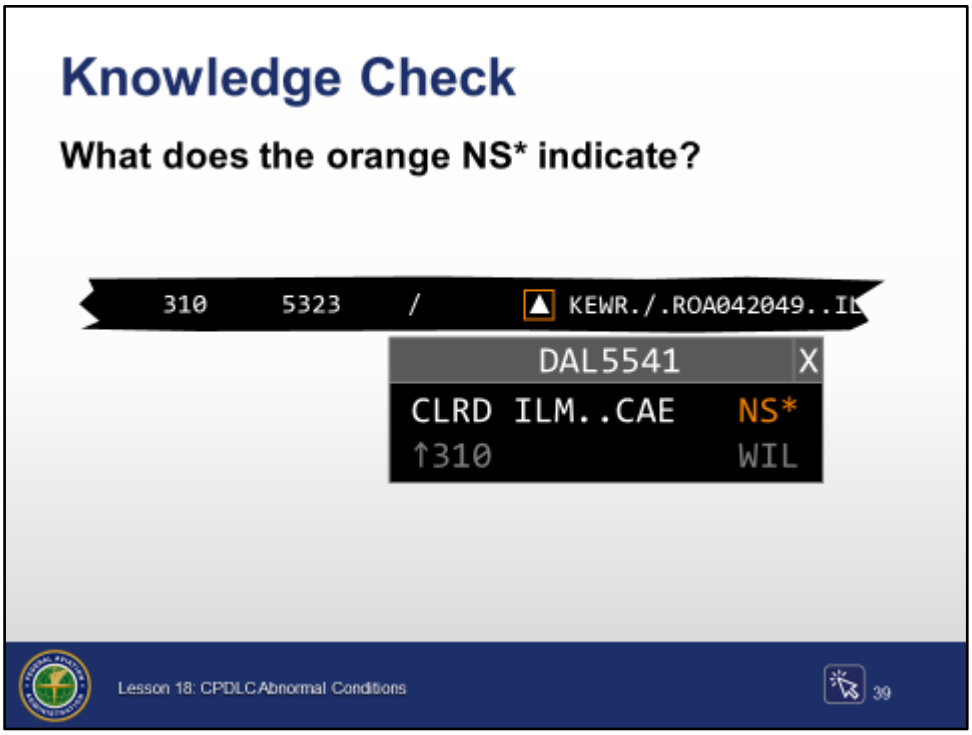
Knowledge Check



Question: What does the orange box around the uplink arrow mean?

GENERIC UPLINKS *(CONT'D)*

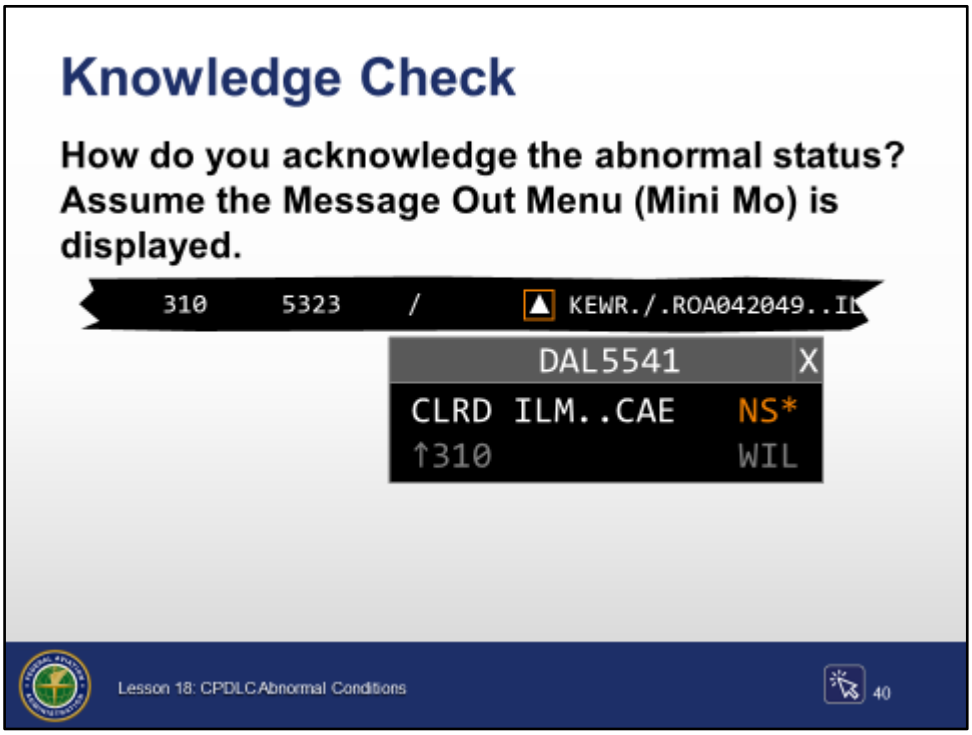
Knowledge Check



Question: What does the orange NS* indicate?

GENERIC UPLINKS *(CONT'D)*

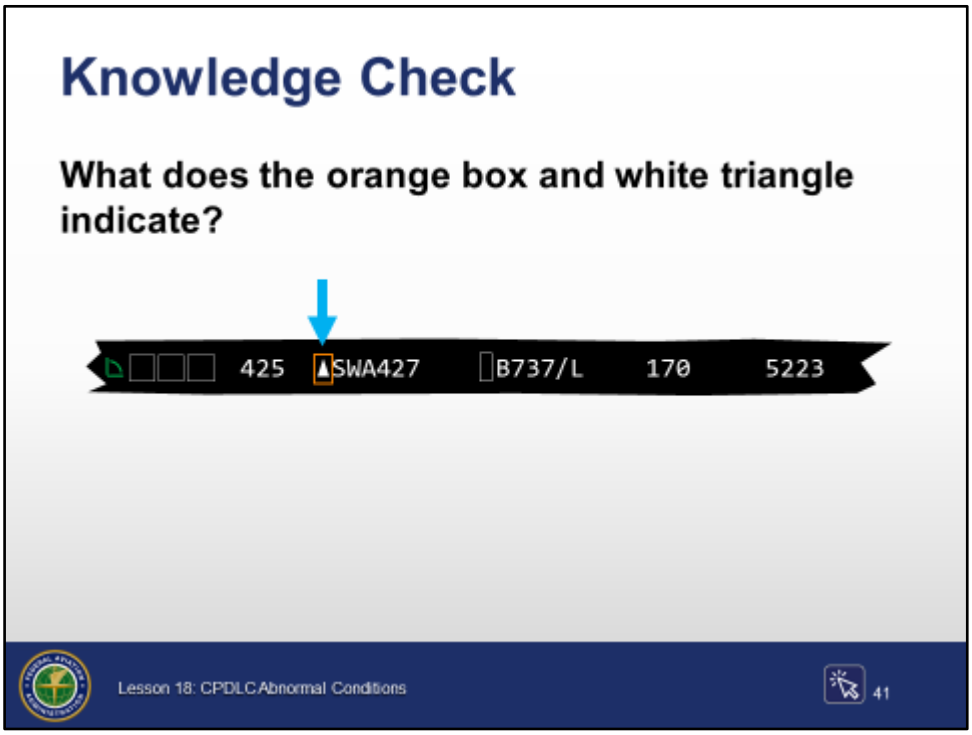
Knowledge Check



Question: How do you acknowledge the abnormal status? Assume the Message Out menu (Mini Mo) is displayed.

GENERIC UPLINKS *(CONT'D)*

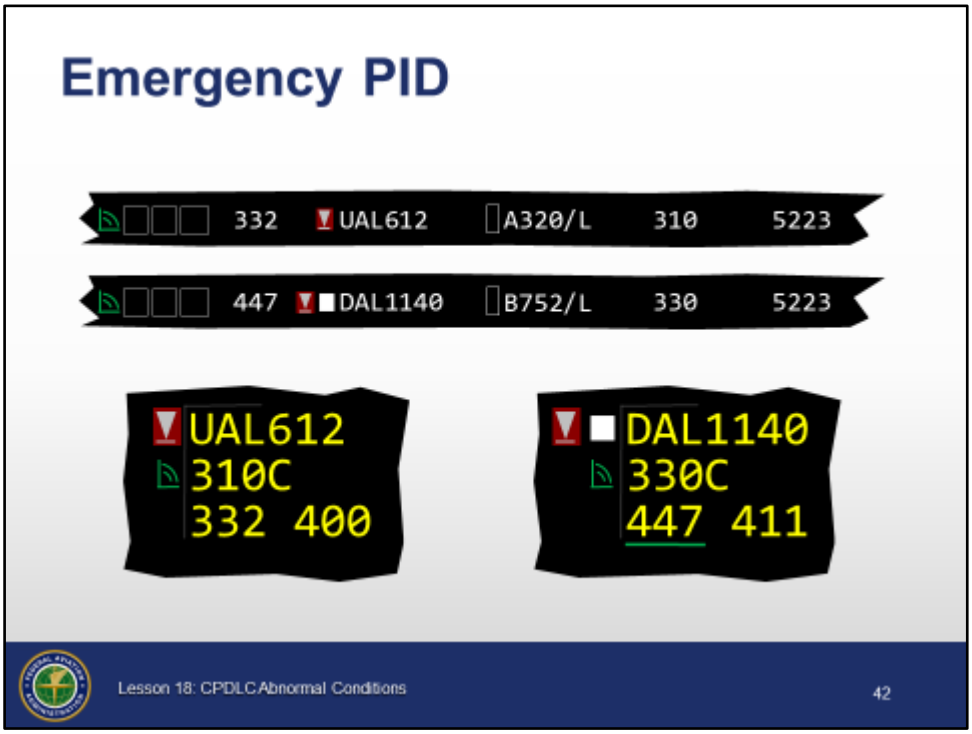
Knowledge Check



Question: What does the orange box and white triangle indicate?

Emergency PID

TI 6110.101, sec. 11.3.1



- An Emergency PID indicator is displayed whenever an Emergency Pilot Initiated Downlink (PID) is received from an aircraft
  - On FDB and ACL
  - Solid red block containing a white PID indicator
  - Blinks under certain circumstances:
    - An emergency PID has been received and the PID menu has not been opened by the controller
      - Opening the PID menu by TBP or TBE on the indicator acknowledges receipt of the emergency PID and stops the blinking
      - If the PID menu is open when the PID is received, close the menu and reopen to stop the blinking
    - An emergency PID still exists in the PID menu, but the PID menu is closed and a new PID is received
      - New PID can be either a normal or emergency PID

Continued on next page

EMERGENCIES *(CONT'D)*

Emergency PID (Cont'd)

TI 6110.101, sec. 11.3.1,

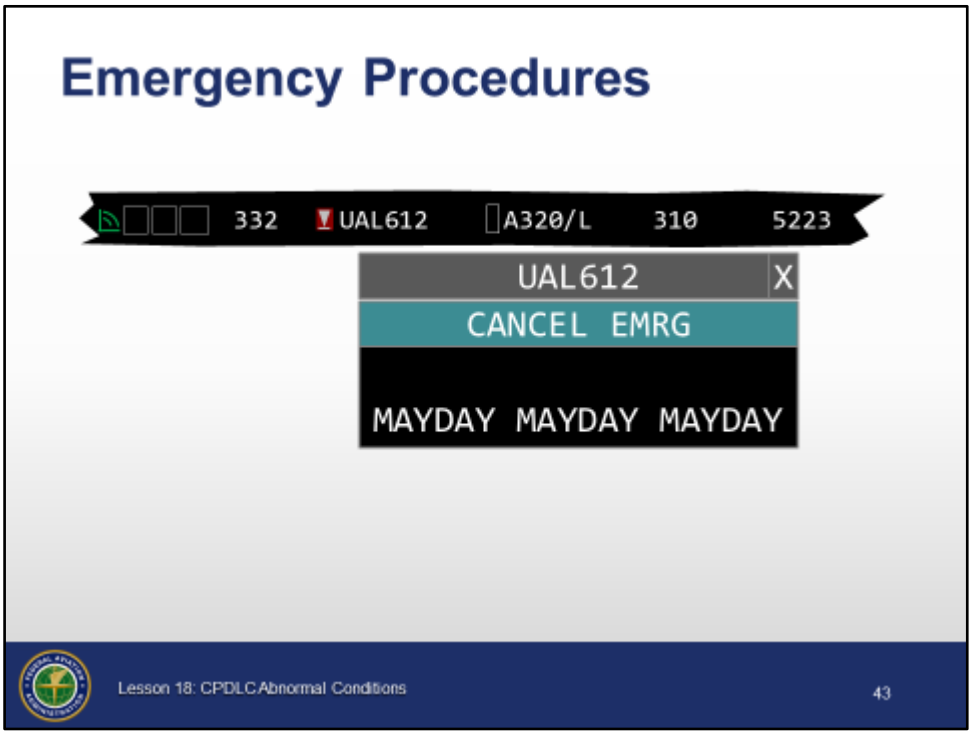
JO 7110.125, par. 8

- Emergency PID indicator
  - Replaces the CDA Session With Eligibility indicator when there are no entries in the Message Out menu (Mini Mo) (shown on slide)
  - Will shift left if other indicators must be displayed (i.e., CDA Session With Eligibility indicator with at least one entry in the Message Out menu or a Generic Uplink indicator)
- Respond to emergency messages by immediately attempting to contact the pilot via voice
  - If pilot does not respond to ATC's voice call, use the Uplink Frequency (UF) command to instruct the pilot to contact ATC on a specified frequency
  - If no voice contact is established, controller should follow emergency procedures (i.e., based on anticipated pilot actions)
- If a diverting or descending Emergency PID is received, and no voice communication is established, the controller may elect to uplink CPDLC messages, clearing the aircraft to perform the maneuver requested in the emergency downlink
- An FDB cannot be forced off or suppressed if an unacknowledged Emergency PID is eligible for display at the sector
- An FDB will be forced on if an unacknowledged Emergency PID is eligible for display in the PID menu at the sector

Emergency Procedures

JO 7110.125, par. 8

TI 6110.101, sec. 11.3.1, 11.3.2



- When an Emergency PID is received, the PID menu contains:
  - The emergency message, or messages
    - May contain free text (i.e., ENGINE OUT, PASSENGER HEART ATTACK)
  - A CANCEL EMRG pick area
  - Any normal PIDs that still require a response
- In the event of receipt of an Emergency Pilot Initiated Downlink, the provisions of JO 7110.65, Chapter 10, Emergencies, must be followed
- TBP or TBE on the CANCEL EMRG pick area
  - Removes all Emergency PID messages from the PID menu
  - Removes the Emergency PID indicator from the FDB and ACL
- Emergency PID indicators do not pass between ARTCCs
  - Coordination must still be accomplished via voice

Continued on next page

EMERGENCIES *(CONT'D)*

Emergency Procedures (Cont'd)

TI 6110.101, table 11 - 3

⊙ Emergency messages available for downlink by the flight crew:

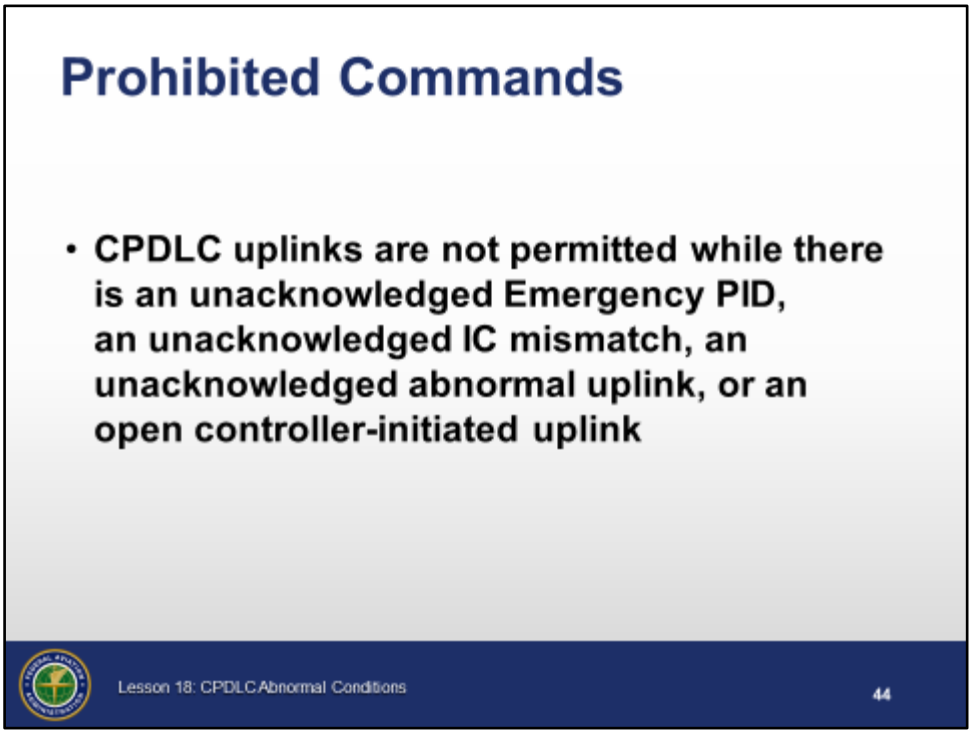
- PAN PAN PAN
- MAYDAY MAYDAY MAYDAY
- (Amount) OF FUEL REMAINING AND (Number of people) SOULS ON BOARD

  Example: 1+30 OF FUEL REMAINING…
- CANCEL EMERGENCY
- DIVERTING TO (Position) VIA (Route)
- OFFSETTING (Distance) (Direction) OF ROUTE
- DESCENDING TO (Altitude)
- DEVIATING (Distance) (Direction) OF ROUTE
- FREE TEXT
  - May be appended to any emergency message

PROHIBITED COMMANDS

Prohibited Commands

TI 6110.101, secs. 11.3.2 and 6.1.6



- In general, CPDLC uplinks are not permitted while there is an unacknowledged Emergency PID, an unacknowledged IC mismatch, an unacknowledged abnormal uplink, or an open controller-initiated uplink
- Prohibited commands:
  - Release eligibility
  - Steal eligibility
  - Commands that terminate the session
    - ED FLID
    - An amendment to the ACID
    - An altitude amendment to VFR
  - Release a Held TOC
  - Uplink a frequency independent of track control change

Continued on next page

PROHIBITED COMMANDS *(CONT'D)*

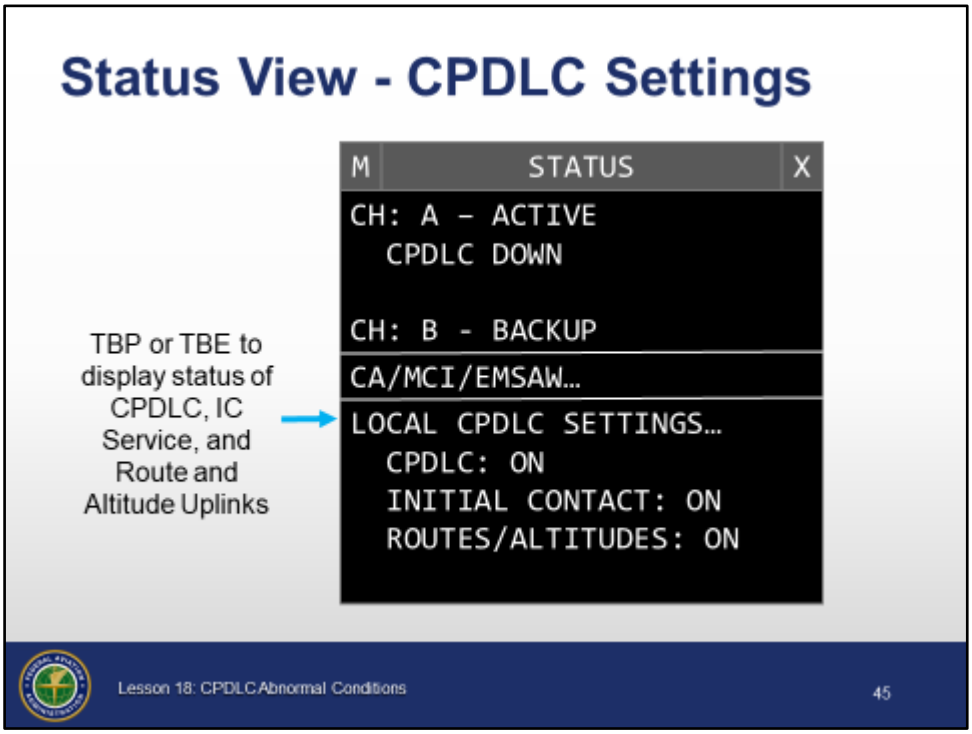
Prohibited Commands (Cont'd)

TI 6110.101, sec. 11.3.2 and 6.1.6

- Altitude clearance uplink
- Crossing restriction uplink
- Route clearance uplink
- RS, QX, or RX command
- Flight plan amendment to aircraft CPDLC equipment designator(s)
- Manually adding a flight to the blocked list

Status View - CPDLC Settings

TI 6110.101, sec. 4.14.1.2



- On the Situation Display, the Status view displays the current state of CPDLC, Initial Contact services, and Route and Altitude Uplinks in the Local CPDLC Settings sub list
- TBP or TBE on LOCAL CPDLC SETTINGS… pick area to display or hide the sub list
- The sub list contains entries that can be on or off:
  - CPDLC
  - INITIAL CONTACT
  - ROUTES/ALTITUDES
- Changes to the Status view are underlined until they are user acknowledged
  - If unacknowledged, underline removed automatically after 15 seconds
- CPDLC, Initial Contact, and Route and Altitude Uplinks can be turned on or off by authorized personnel at adapted Air Traffic Specialist Workstations
  - Only occurs after coordination with all areas

Continued on next page

STATUS, SHUTDOWN, AND OUTAGES *(CONT'D)*

Status View - CPDLC Settings (Cont'd)

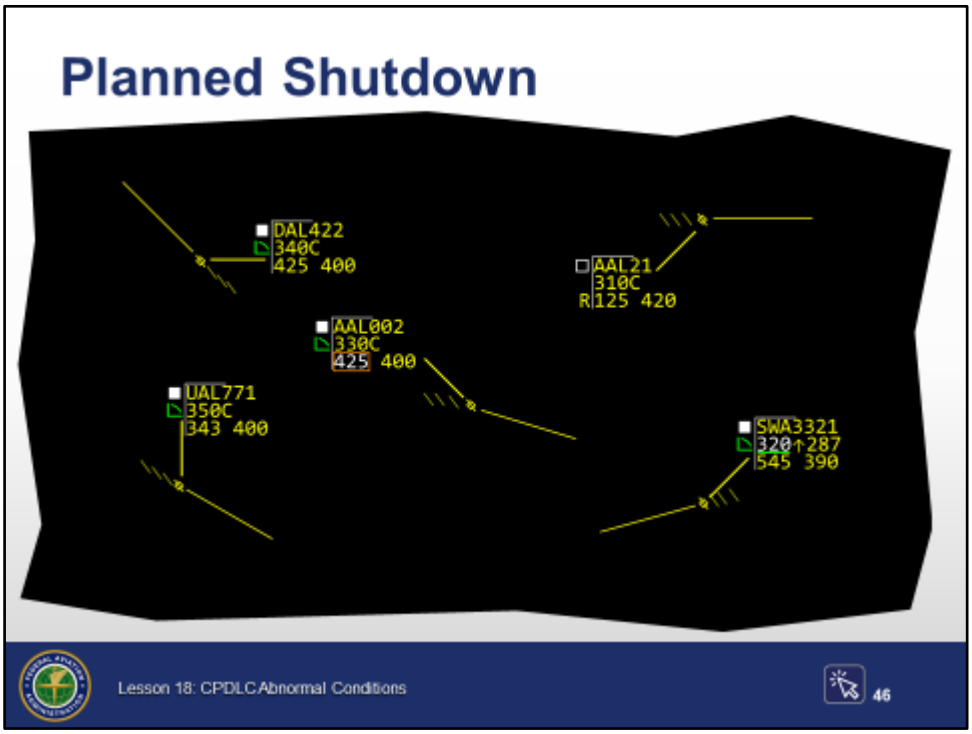
TI 6110.101, sec. 4.14.1.2

- If CPDLC is On and the Initial Contact service is Off, all TOCs will use the CONTACT instruction
- If CPDLC is On and Routes/Altitudes Uplinks are Off, no route clearances can be uplinked
- If CPDLC is Off, IC and Routes/Altitudes Uplinks will be Off by default

Planned Shutdown

TI 6110.101, secs. 6.1.6.2, 11.3.2.2

TI 6110.107, p. 17;



- When a planned shutdown occurs, all core CPDLC functionality will be off and CPDLC messages cannot be exchanged with any aircraft
- The system does initially retain sufficient functionality to ensure open controller uplinks can be closed and unacknowledged abnormal uplinks can be acknowledged
- Changes during a planned shutdown:
  - CDA and/or NDA session indicators will disappear for all adjacent center flights
  - Eligibility for all local center flights will be automatically released to the National Application Processor (NAP), as long as they do not have any open controller initiated uplinks or unacknowledged abnormal uplink indicators
    - Session indicators will disappear after eligibility is released to the NAP

Continued on next page

STATUS, SHUTDOWN, AND OUTAGES *(CONT'D)*

Planned Shutdown (Cont'd)

TI 6110.101, secs. 6.1.6.2, 11.3.2.2

TI 6110.107, p.17

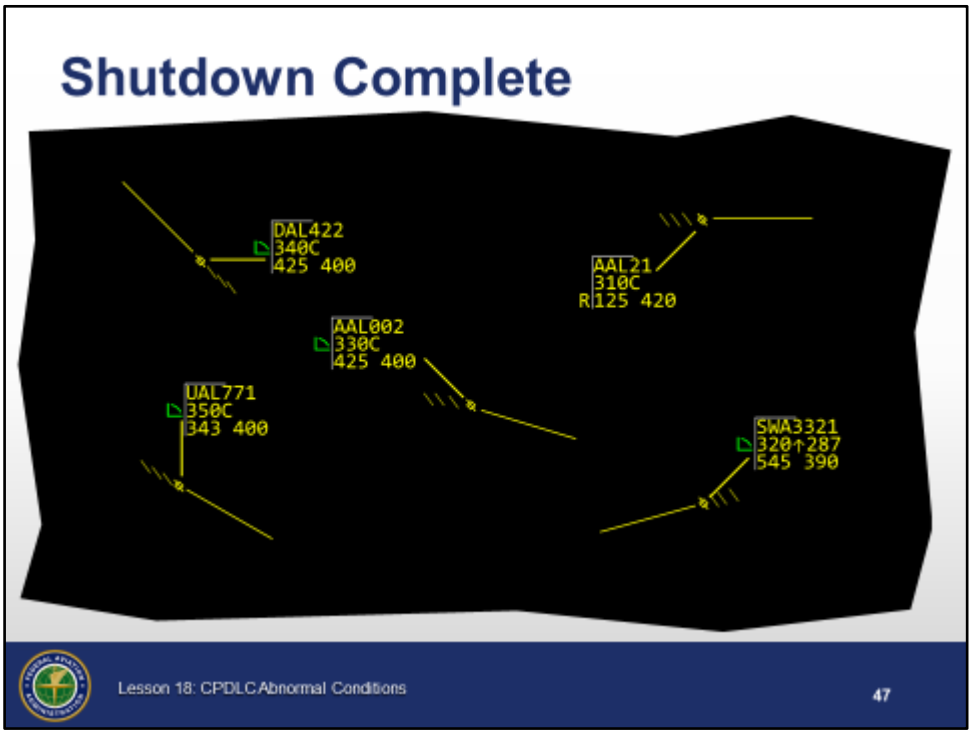
JO 7110.125, par. 8

- For open controller initiated uplinks, controllers can:
  - Wait for a pilot response, or
  - Cancel the open entry on the Message Out view or menu
- For abnormal uplinks that have not been acknowledged, the controller must acknowledge the entry in accordance with procedures
- As open controller initiated uplinks are closed or abnormal uplinks are acknowledged, eligibility will be released to the NAP and session indicators will be removed

STATUS, SHUTDOWN, AND OUTAGES *(CONT'D)*

Shutdown Complete

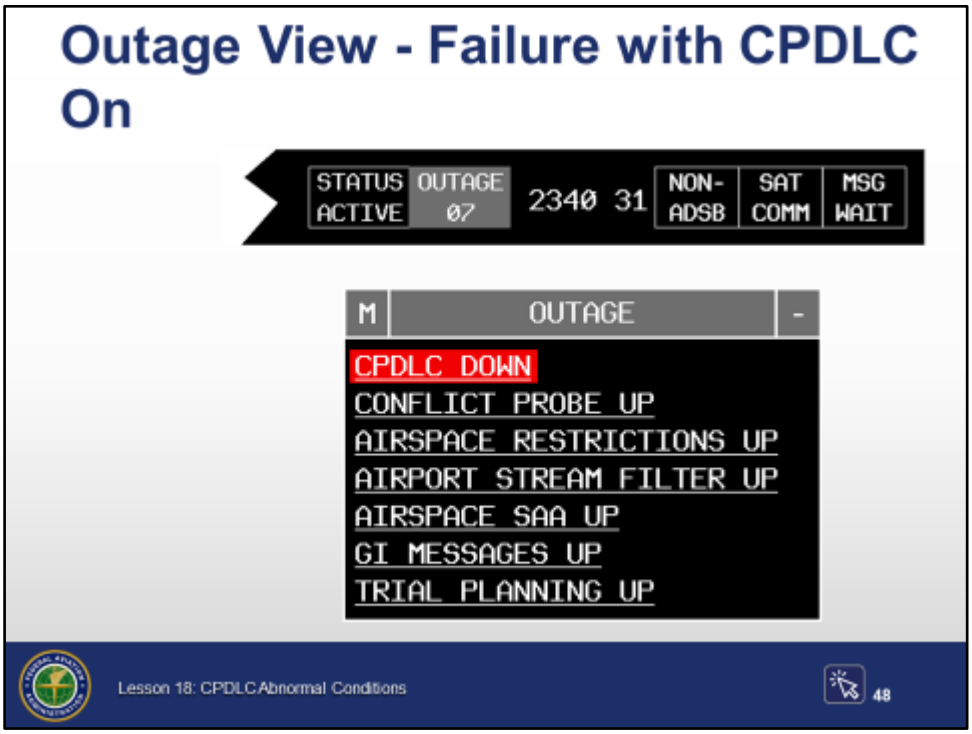
TI 6110.107



- The following functionality will remain available after the CPDLC service is turned off and all sessions are terminated at the facility:
  - CPDLC Flight Plan Readout (FR D / QF D)
    - There will be no eligibility information since CPDLC is OFF and therefore no eligibility is being assigned
  - CPDLC status information displayed in the Status view
  - Message History view can be displayed, but will be empty
  - Message Out view can be displayed, but will be empty
  - CPDLC keyboard commands can be entered, but will be rejected
  - Emergency PID alerts will be displayed in the Alerts view of the adapted AT Specialist Workstation at the NAP

Outage View - Failure with CPDLC On

TI 6110.101, sec. 4.15.2.2



- A CPDLC outage occurs when there is a software or hardware failure that prevents use of CPDLC
  - CPDLC outage information is provided in the Outage view at the R, RA, and ATSW
- If a CPDLC outage occurs while CPDLC is ON, the Outage button will turn red
- When the Outage view is opened:
  - CPDLC DOWN displayed in the Outage List
    - White letters and a red background

Continued on next page

STATUS, SHUTDOWN, AND OUTAGES *(CONT'D)*

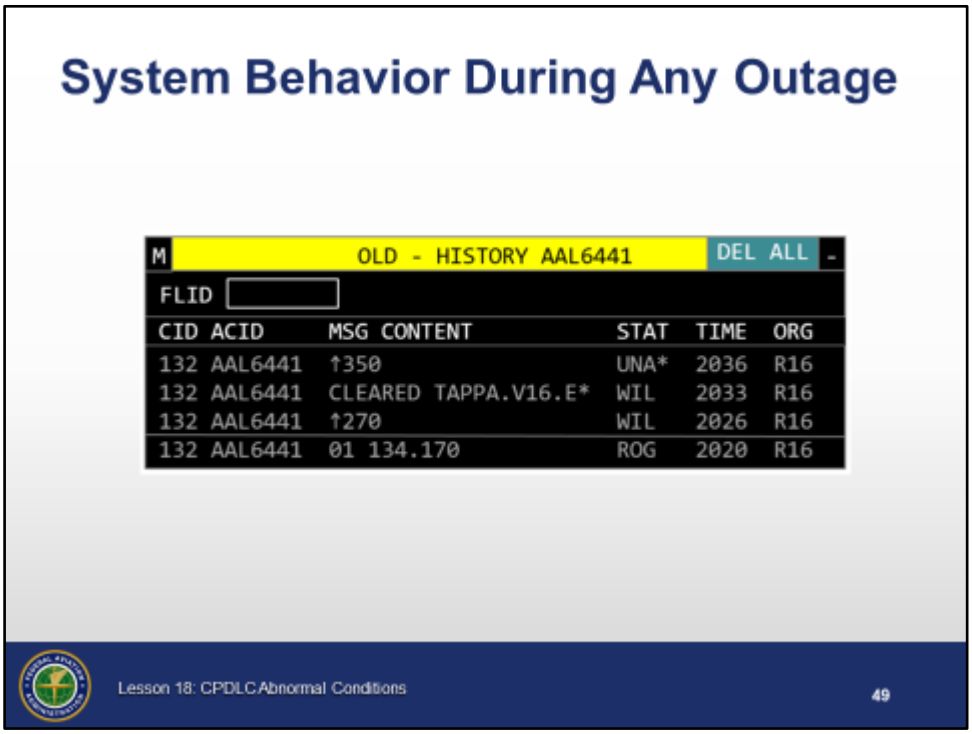
Outage View - Failure with CPDLC On (Cont'd)

TI 6110.101, sec. 4.15.2.2

- If a CPDLC outage occurs while CPDLC service is OFF:
  - Outage button is yellow
  - CPDLC DOWN added to Outage List
    - Yellow letters
- A CPDLC outage should be reported in the same manner as any other outage
- Specific capabilities available during an outage depend on whether CPDLC outage is internal or external
  - If outage is the result of a CPDLC software or hardware failure in your facility, it is considered an internal failure
  - If all software and hardware in your facility is operational, but unable to communicate with the Data Comm Network (DCNS) it is considered an external failure
- There is no indication whether the outage is internal or external
- When CPDLC returns to service:
  - CPDLC UP is added to the Outage List
    - Green letters

System Behavior During Any Outage

TI 6110.101, sec. 6.2.4.1.3



⊙ When an outage occurs:

- System rejects any controller initiated CPDLC uplink commands, as well as the Steal Eligibility command
  - Message REJECT - UPLINK NOT ALLOWED CPDLC UNAVAILABLE displayed
- The following coding is intended to ensure controllers are aware that CPDLC uplinks and steal eligibility commands are unavailable:
  - Steal Eligibility pop up only shows the header
  - Held TOC menu cannot be displayed, and will go away if displayed at the time of the outage
  - PID menu displays CPDLC Down error
    - Any attempt to interact with the menu will result in an invalid selection error
  - Any button used to initiate uplinks is grayed out

Continued on next page

System Behavior During Any Outage (Cont'd)

TI 6110.101, sec. 6.2.4.1.3

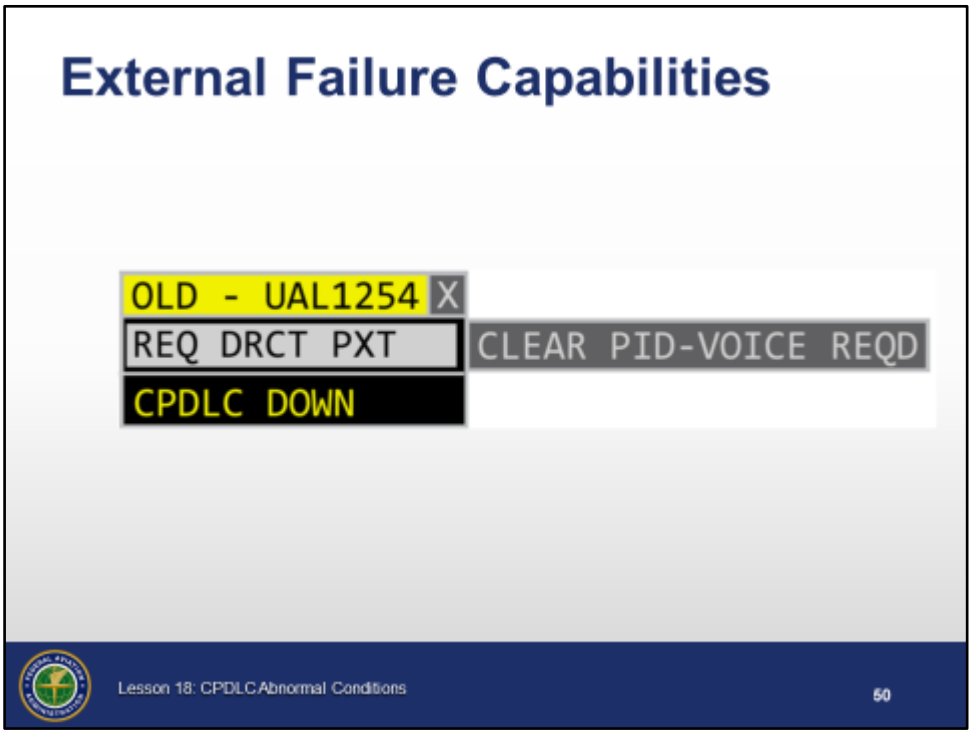
- CPDLC views will be accessible and contain the data present at the time of the outage
  - Coded as OLD and the data presented in gray to indicate they are not being updated
  - No actions can be performed if the failure is internal

⊙ It is possible that the CPDLC failure occurs after the controller initiated uplink has been entered and accepted, therefore amending the flight plan, but before the uplink is sent

- CPDLC will alert the controller that the flight plan was amended but the uplink was not sent
  - Response message will state UPLINK NOT ALLOWED CPDLC UNAVAILABLE

External Failure Capabilities

TI 6110.101, sec. 6.2.4



- When an outage is a result of an external failure, the system does allow the controller to clean up FDB and ACL indicators that prevent the FDB from being dropped or an ACL entry from being removed
- Clean up capabilities:
  - Acknowledge an Emergency PID
  - Cancel an Emergency PID
  - Clear a Normal PID
  - Cancel an open CAA uplink
  - Acknowledge an IC mismatch
  - Acknowledge a Failed Session indicator
  - Manage TOC settings in the TOC Settings view

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STATUS, SHUTDOWN, AND OUTAGES *(CONT'D)*

External Failure Capabilities (Cont'd)

TI 6110.101, sec. 6.2.4

⊙ Use the Message Out view to:

- Acknowledge an abnormal uplink indicator
- Delete an open uplink
- Clean up entries
- Cancel an open uplink
- Cancel an open CAA uplink
- Acknowledge a Failed Session indicator

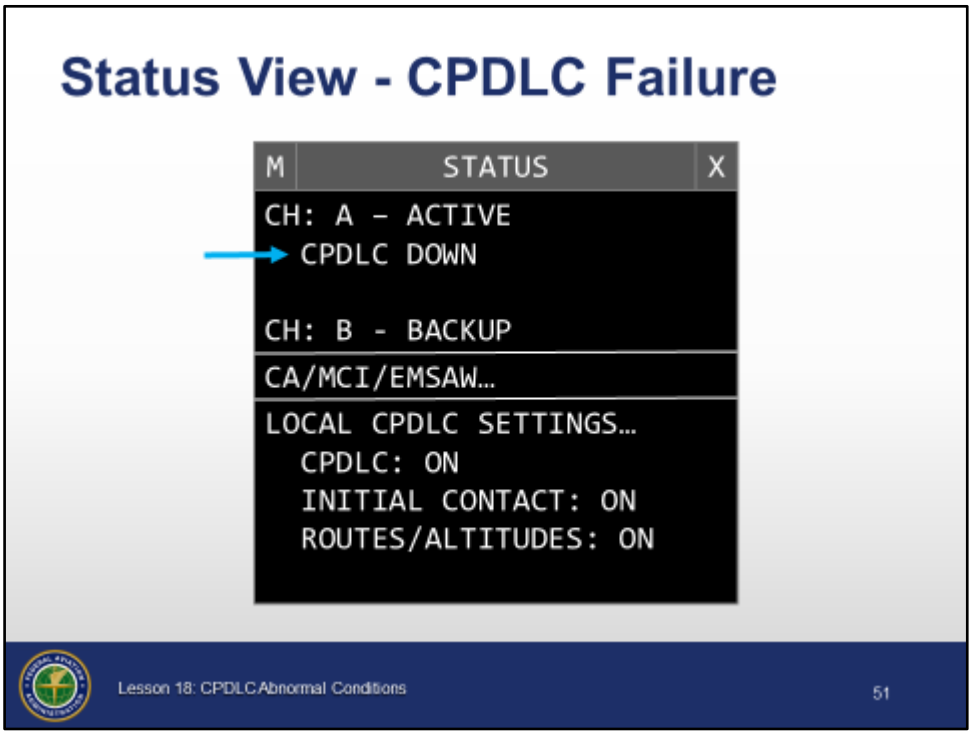
NOTE: The various pop up menus used to accomplish these tasks will have old coding.

⊙ These functions are not available if the outage is due to an internal failure

STATUS, SHUTDOWN, AND OUTAGES *(CONT'D)*

Status View - CPDLC Failure

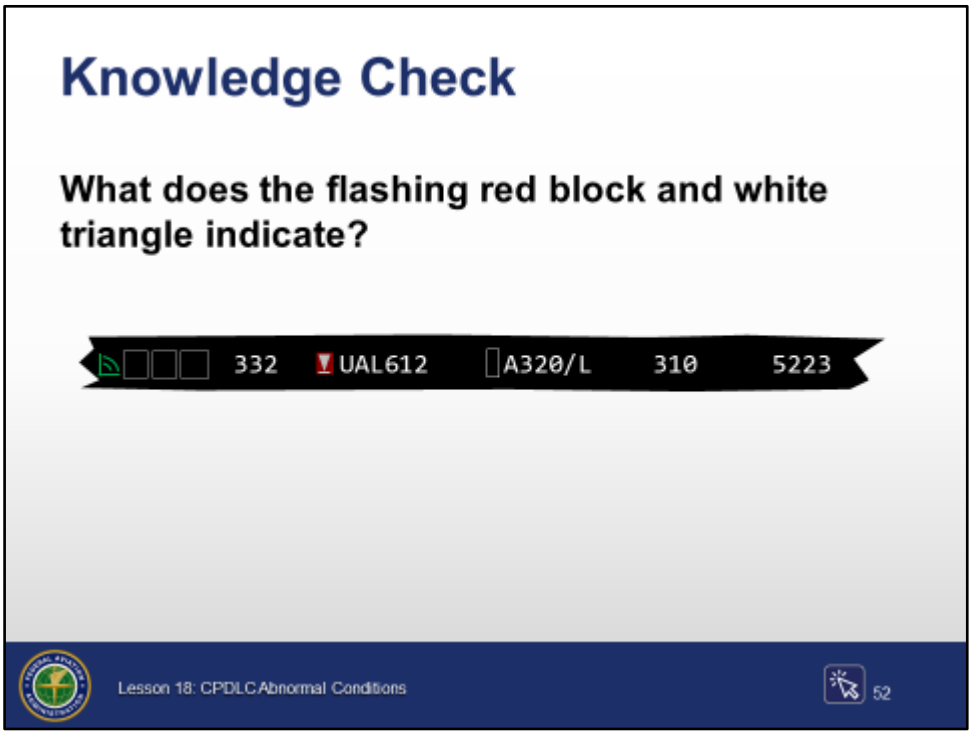
TI 6110.101, sec. 4.14.1.2



- If a CPDLC outage occurs:
  - Entry stating CPDLC DOWN added to top portion of Status view
- When CPDLC returns to service:
  - Status view indicates CPDLC is back in service

STATUS, SHUTDOWN, AND OUTAGES *(CONT'D)*

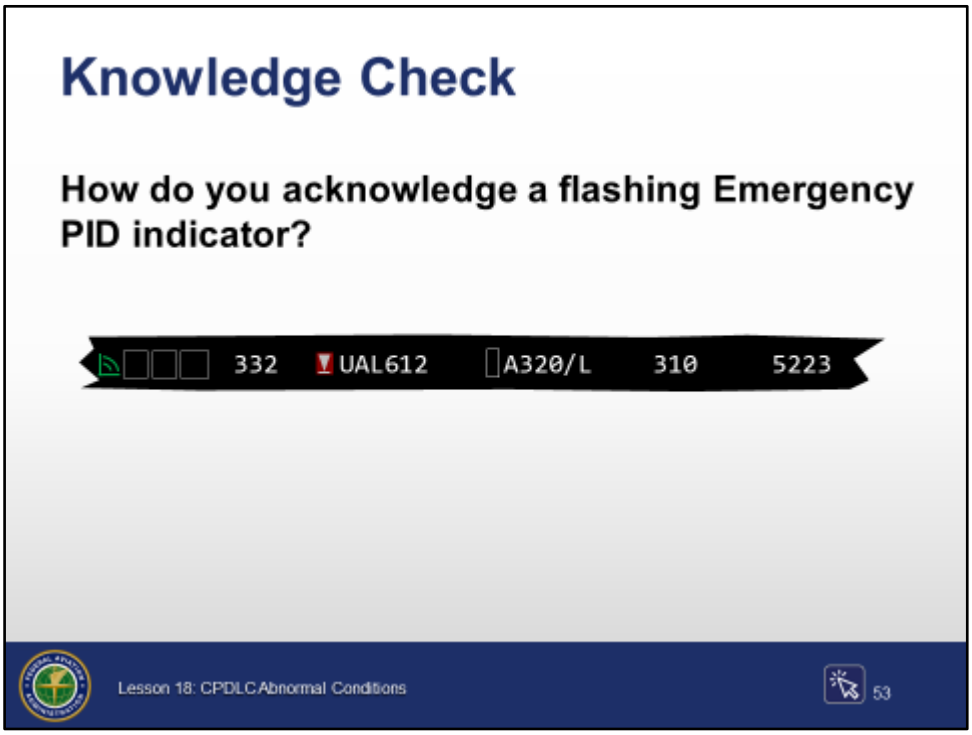
Knowledge Check



Question: What does the flashing red block and white triangle indicate?

STATUS, SHUTDOWN, AND OUTAGES *(CONT'D)*

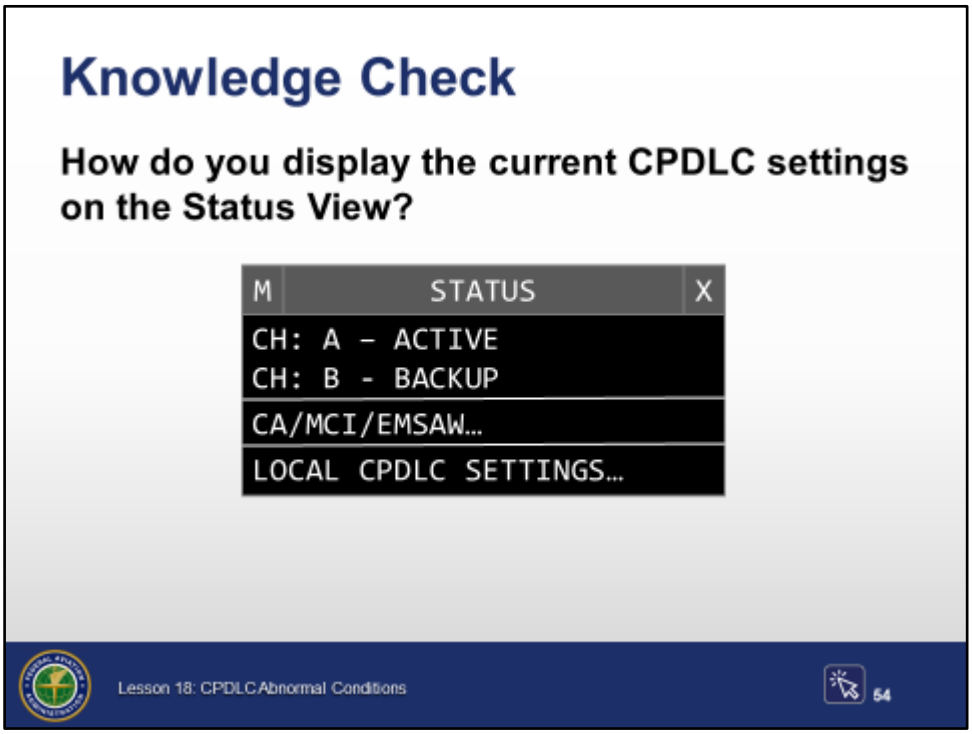
Knowledge Check



Question: How do you acknowledge a flashing Emergency PID indicator?

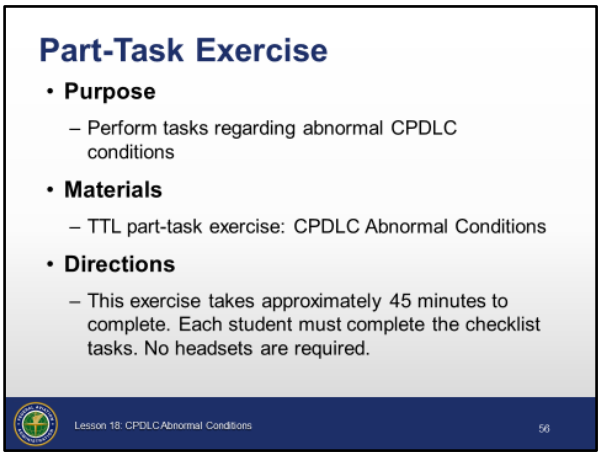
STATUS, SHUTDOWN, AND OUTAGES *(CONT'D)*

Knowledge Check



Question: How do you display the current CPDLC settings on the Status view?

PART-TASK EXERCISE: CPDLC ABNORMAL CONDITIONS



Purpose

Perform tasks regarding abnormal CPDLC conditions.

Materials

Handout:

- TTL part-task exercise: CPDLC Abnormal Conditions

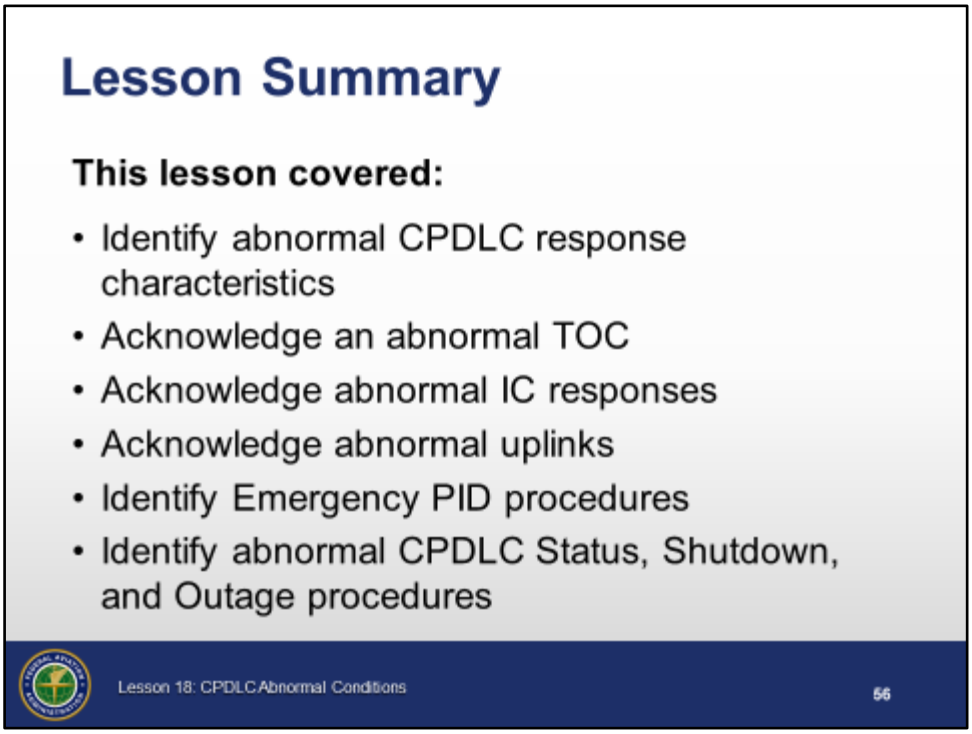
TTL scenario

Directions

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

CONCLUSION

Lesson Summary



This lesson covered:

- Abnormal response characteristics
  - Coding
  - Unable
  - Error or failed
  - Not sent
- Abnormal TOC
  - Indicator
  - Acknowledging
- Confirmed assigned altitude timeout

Continued on next page

CONCLUSION *(CONT'D)*

Lesson Summary (Cont'd)

- CAA uplinks
  - Cancel CAA in progress
  - Acknowledging abnormal CAA uplinks
- IC Mismatch
  - Acknowledging
- Altitude uplinks
  - Abnormal altitude uplink
  - Acknowledging
  - Canceling
- Route uplinks
  - Abnormal route uplinks
  - Not Sent (NS) indicator
  - FMS loadability issues
  - Acknowledging
  - Changes to a route uplink
  - Canceling an open route uplink
  - Route amendment pitfalls
- Generic uplinks
  - Abnormal generic uplinks
  - Out of coverage situation
- Emergencies
  - Emergency PIDs
  - Emergency procedures
- Prohibited commands

Continued on next page

Lesson Summary (Cont'd)

- Status, shutdowns, and outages
  - Status view CPDLC settings
  - Planned shutdown
  - Outage view - failure with CPDLC ON
  - System behavior during any outage
  - External failure capabilities
  - Status view - CPDLC failure