

# 07 FLIGHT INSTRUMENTS, DISPLAYS



BOEING 737 NEXT GENERATION **737**

### Course overview

- Airplane General
- Air Systems
- Warning Systems, Communications, Ice & Rain Protection
- Electrical
- Engines, APU, Fuel System
- Hydraulics, Flight Controls, Landing Gear, Brakes
- Flight Instruments, Displays
- Automatic Flight
- Flight Management, Navigation
- Normal Operations

BOEING 737 NEXT GENERATION **737**  
FLIGHT INSTRUMENTS, DISPLAYS

### Topics

**Common Display System**

- Overview
- Controls & indicators
- Information sources, ADIRU

**EFIS**

- Primary flight displays
  - Overview, controls, indicators
  - Airspeed
  - Attitude
  - Steering indications
  - ILS system indications
  - Approach minimums
  - Heading
  - Radio altitude
  - Altitude
  - Vertical speed
  - Alerts & warnings
    - Radio altitude
    - TCAS
    - GPWS

- Navigation displays

- Overview, controls, indicators
- Horizontal situation indicator
- Radio distance magnetic indicator
- Display modes
  - MAP
  - VOR
  - APP
  - PLN
- Display symbols

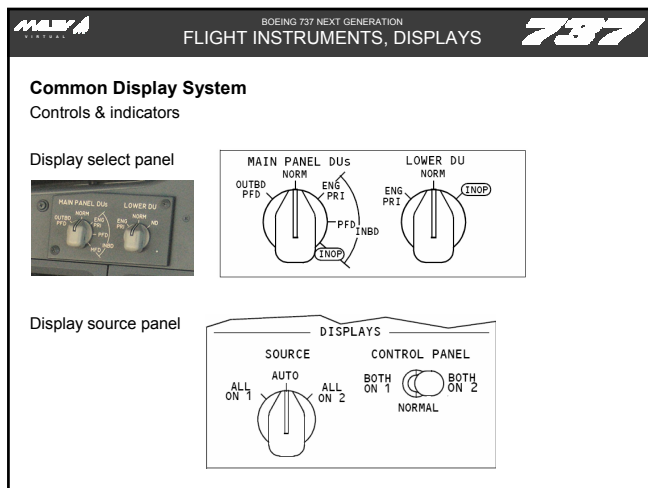
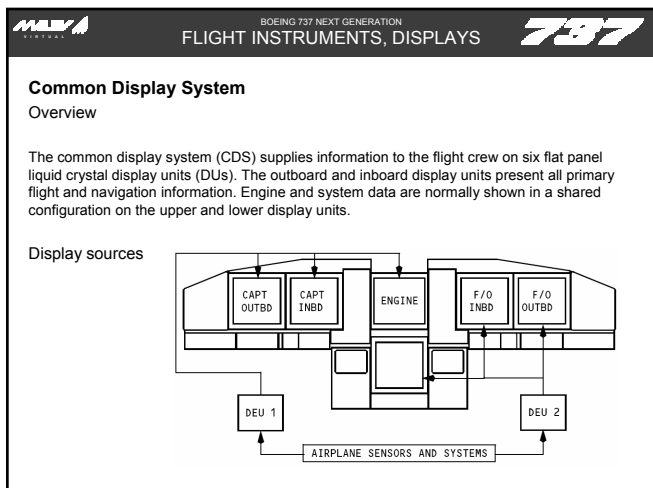
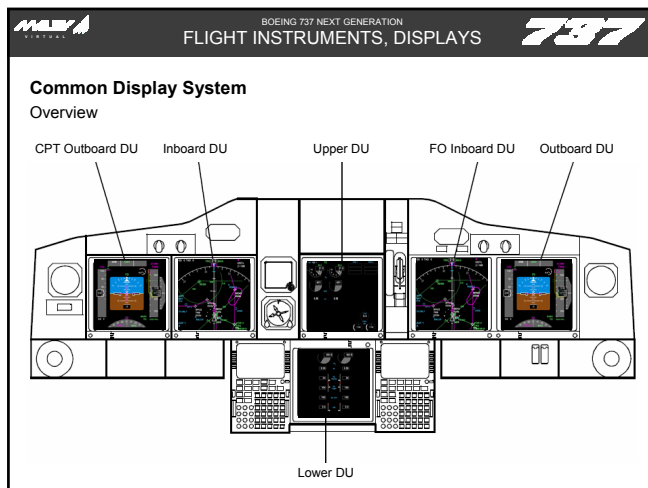
**Standby flight instruments**

- Standby magnetic compass
- Standby RMI
- ISFD, Standby ADI

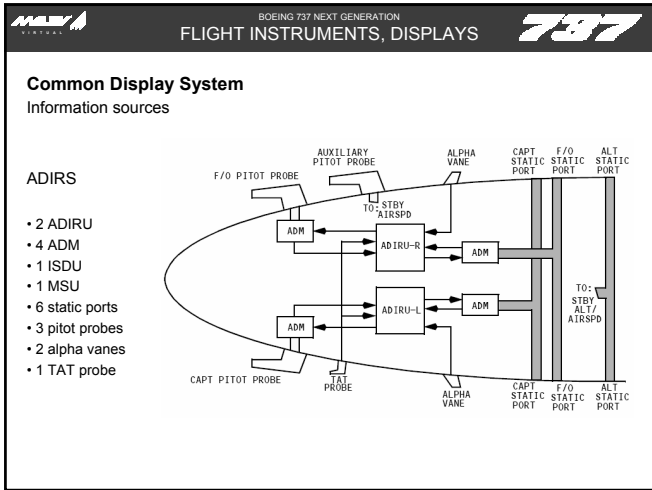
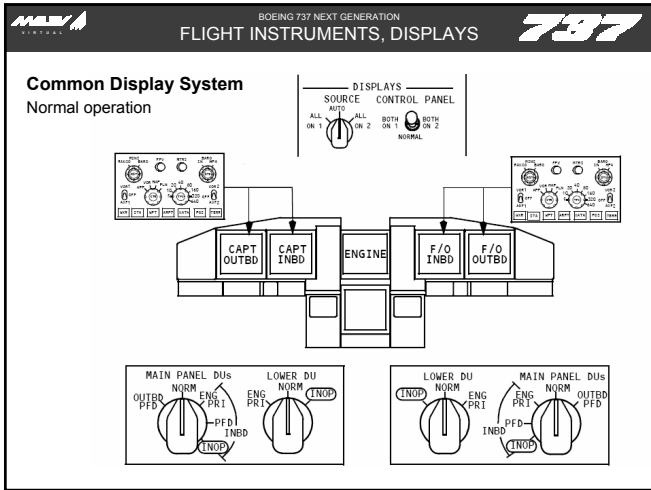
**Clocks**

**Flight recorder**

**ACMS**



# 07 FLIGHT INSTRUMENTS, DISPLAYS



BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

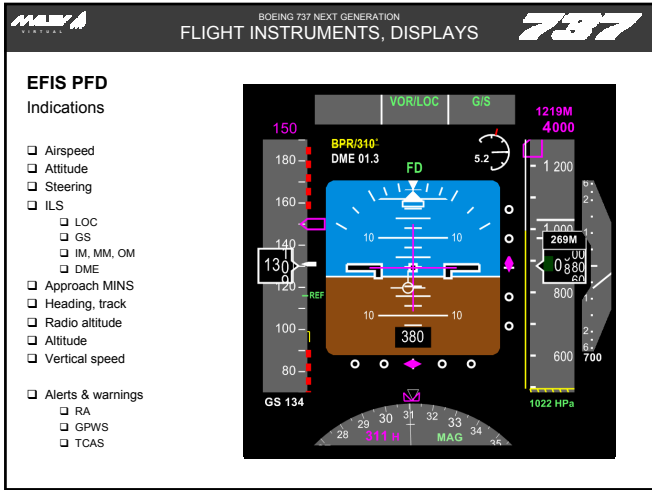
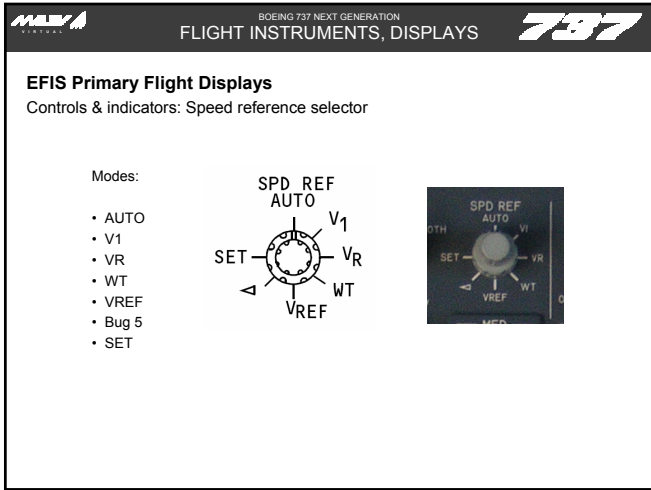
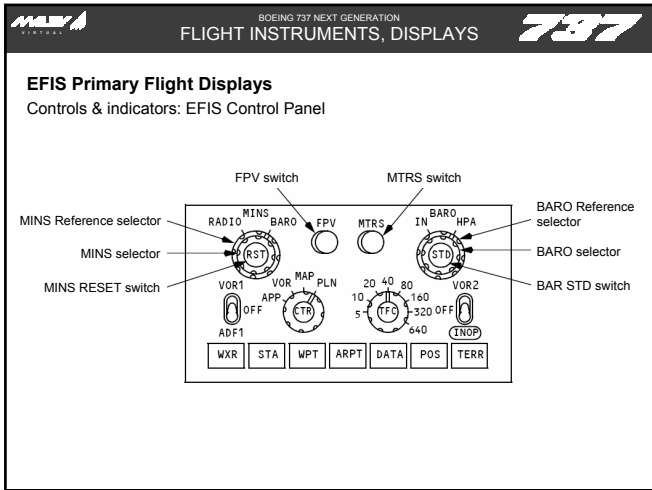
### EFIS

Overview

The electronic flight instrument system (EFIS) presents a dynamic color display of the parameters necessary for flight path control.

The displays provide:

- flight mode annunciation
- airspeed
- attitude
- steering information
- instrument landing system display
- approach minimums
- radio altitude
- altitude
- vertical speed
- GPWS annunciations
- TCAS indications.



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BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

### EFIS Navigation Displays

Controls & indicators: EFIS Control Panel

Labels for the EFIS Control Panel:

- VOR/ADF switch
- Mode selector
- Center (CTR) switch
- MAP switches: WXR, STA, WPT, ARPT, DATA, POS, TERR
- Traffic (TFC) switch
- Range selector

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

### EFIS ND

Indications

- HSI
- RDMI
- Nav display with map
  - Current track
  - Selected heading
  - Current heading
  - Position trend vector
  - Range to selected altitude
  - Map range scale
  - GS
  - TAS
  - Wind direction and speed
  - Next WP distance
  - WP ETA
  - Selected NAV DATA points
- Traffic information
- Weather information
- Terrain information

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

### EFIS ND

MAP Expanded

Center

VOR APP Expanded

Center

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

### EFIS ND

PLN

TCAS Indications

MAP, MAP CTR  
VOR EXP, APP EXP

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

### EFIS ND

Display Symbols

Heading, Track, Speed

	<b>Track orientation, Current track, Track reference</b> MAP, MAP CTR
	<b>Heading orientation, Current heading, Heading reference</b> <b>Heading pointer</b> APP, APP CTR, VOR, VOR CTR
	<b>Selected heading bug</b> MAP, MAP CTR, APP, APP CTR, VOR, VOR CTR
	<b>Track line and range</b> MAP, MAP CTR, APP, VOR

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

### EFIS ND

Display Symbols

Heading, Track, Speed

	<b>Expanded compass (60°)</b> MAP, APP, VOR
	<b>Current heading pointer</b> MAP, MAP CTR, APP, APP CTR, VOR, VOR CTR
	<b>Ground speed</b> All
	<b>True airspeed (above 100 Kts)</b> MAP, MAP CTR, APP, APP CTR, VOR, VOR CTR
	<b>Wind direction and speed, wind arrow</b> MAP, MAP CTR, APP, APP CTR, VOR, VOR CTR

# 07 FLIGHT INSTRUMENTS, DISPLAYS

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS ND**  
Display Symbols  
Radio navigation

	<b>System source annunciation</b> APP, APP CTR, VOR, VOR CTR
	<b>ILS/VOR frequency</b> APP, APP CTR, VOR, VOR CTR
	<b>DME distance</b> APP, APP CTR, VOR, VOR CTR
	<b>VOR1/ADF1 pointer</b> MAP, MAP CTR, APP, APP CTR, VOR, VOR CTR
	<b>VOR2/ADF2 pointer</b> MAP, MAP CTR, APP, APP CTR, VOR, VOR CTR

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS ND**  
Display Symbols  
Radio navigation

	<b>ILS LOC/VOR CRS deviation indication and scale</b> APP, APP CTR, VOR, VOR CTR
	<b>Selected course pointer and line</b> APP, VOR
	<b>Selected course pointer, TO/FROM pointer</b> APP CTR, VOR CTR
	<b>To/from indication</b> VOR, VOR CTR

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS ND**  
Display Symbols  
Radio navigation

	<b>VOR</b> MAP, MAP CTR, PLN <b>DME/TACAN</b>
	<b>VORTAC</b>
	<b>Manually tuned VOR radial</b> MAP, MAP CTR, PLN
	<b>VOR radials, ADF bearings</b> MAP, MAP CTR

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS ND**  
Display Symbols  
MAP

	<b>Airplane symbol</b> MAP, MAP CTR, APP, VOR
	<b>Airplane symbol</b> APP CTR, VOR CTR
	<b>Position trend vector (30s, 60s, 90s)</b> MAP, MAP CTR
	<b>Airplane symbol</b> PLN
	<b>Active WP identifier</b> MAP, MAP CTR, PLN

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS ND**  
Display Symbols  
MAP

	<b>Active WP distance</b> MAP, MAP CTR, PLN
	<b>Active WP ETA</b> MAP, MAP CTR, PLN
	<b>WP: active, inactive</b> MAP, MAP CTR, PLN
	<b>Off route WP</b> MAP, MAP CTR, PLN
	<b>Flight plan route</b> MAP, MAP CTR, PLN

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS ND**  
Display Symbols  
MAP

	<b>Route data</b> Active WP Inactive WP MAP, MAP CTR, PLN
	<b>Holding pattern</b> Active / Inactive / Modified MAP, MAP CTR, PLN
	<b>Altitude range arc</b> MAP, MAP CTR, PLN
	<b>VOR radials</b> MAP, MAP CTR

# 07 FLIGHT INSTRUMENTS, DISPLAYS

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS ND**  
Display Symbols  
MAP

	<b>Altitude profile points and identifiers</b> MAP, MAP CTR, PLN T/C T/D S/C E/D DECEL AD SPD RESTRICTION
	<b>VNAV Path pointer and deviation scale</b> MAP, MAP CTR

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS ND**  
Display Symbols  
MAP

	<b>Airport and runway</b> MAP, MAP CTR, PLN
	<b>Airport</b> MAP, MAP CTR, PLN
	<b>Airport and runway</b> MAP, MAP CTR, PLN
	<b>Selected ref fix and bearing/distance display</b> MAP, MAP CTR

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS ND**  
Display Symbols  
MAP

	<b>Selected map options</b> MAP, MAP CTR, PLN
	<b>MAP source annunciation</b> MAP, MAP CTR, PLN
	<b>Drift angle pointer</b> APP CTR, VOR CTR
	<b>North up arrow</b> PLN

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS ND**  
Display Symbols  
TCAS (MAP, MAP CTR, APP, VOR)

	<b>TCAS RA, relative altitude</b>
	<b>TCAS TA, relative altitude</b>
	<b>TCAS Proximate traffic, relative altitude</b>
	<b>TCAS Other traffic, relative altitude</b>
	<b>TCAS no bearing message</b> TA RA

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS ND**  
Display Symbols  
TCAS

	<b>Range ring</b> MAP, MAP CTR, PLN
	<b>TCAS traffic alert</b>
	<b>TCAS off scale message</b>
	<b>TCAS modes</b>

BOEING 737 NEXT GENERATION  
FLIGHT INSTRUMENTS, DISPLAYS **737**

**EFIS**  
TCAS system indications

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