BELL 429

ROTORCRAFT FLIGHT MANUAL

SUPPLEMENT

ASTRONAUTICS CORPORATON OF AMERICA DISPLAY UNIT/COURSE HEADING FLIGHT DIRECTOR PANEL

429-704-023
429-706-090
OR S/N 57402, 57403, 57404, 57425, 57430 AND SUBSEQUENT

CERTIFIED
12 APRIL 2019

This supplement shall be attached to the Bell Helicopter Model 429 Flight Manual when the Astronautics Corporation of America Display Unit/Course Heading Flight Director Panel is installed. Note that the Astronautics Corporation of America Display Unit/Course Heading Flight Director Panel is included in the basic aircraft configuration for serial numbers 57402, 57403, 57404, 57425, 57430 and subsequent.

Information contained herein supplements information in the basic Flight Manual. For Limitations, Procedures, and Performance Data not contained in this supplement, refer to the basic Flight Manual.

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Export Classification C, ECCN EAR99

12 APRIL 2019
REVISION 3 — 17 NOVEMBER 2021

NOTICE PAGE

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LOG OF REVISIONS

Original	0	12 APR 19	Revision	2	11 AUG 21
Revision	1	28 FEB 20	Revision	3	17 NOV 21

LOG OF PAGES

PAGE	REVISION NO.	PAGE	REVISION NO.
FLIGHT MANUAL		**MANUFACTURER'S DATA**	
Title	3	9	0
NP	2	10	3
A/B	3	11 — 15	0
C/D	3	16 — 28	3
i/ii	0		
1 — 5	0		
6 — 8	1		

NOTE

Revised text is indicated by a black vertical line. A revised page with only a vertical line next to the page number indicates that text has shifted or that non-technical correction(s) were made on that page. Insert latest revision pages; dispose of superseded pages.

LOG OF TC APPROVED REVISIONS

Original	0	12 APR 19	Revision	2	11 AUG 21
Revision	1	28 FEB 20	Revision	3	17 NOV 21

APPROVED **DATE**

DocuSigned by:
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11/17/2021

CHIEF, FLIGHT TEST
FOR
DIRECTOR — NATIONAL AIRCRAFT CERTIFICATION
TRANSPORT CANADA

GENERAL INFORMATION

The Astronautics Corporation of America (ACA) Display Unit (DU)/ Course Heading Flight Director (CHFD) panel kit (429-704-023) replaces existing Rogerson Kratos 2 DU and 3 DU installations as well as the CHFD. Optional kit (429-706-090), provides installation of a 3rd ACA DU if not previously installed.

Section 1

LIMITATIONS

1-1. INTRODUCTION

The 429-FMS-19 limitation regarding the use of MAP mode during a DME Arc approach and the limitation regarding the number of search pattern legs is not applicable with the ACA Display Unit installation.

1-3. TYPES OF OPERATION

Track (TRK) mode is approved for VFR operations only.

Coupling to HDG is prohibited when in TRK mode.

1-5. CONFIGURATION

Garmin GTN 750/650 main software shall be version 6.21 (or later) with GPS software 5.2 (or later).

Polar True Nav mode shall be DISABLED.

1-5-A-4. GPS APPROACHES

GPS advisory vertical guidance deviation information (LNAV+V, LP+V) is only an aid to comply with altitude restrictions. The pilot must use the primary barometric altimeter to ensure compliance with all altitude restrictions.

1-6. WEIGHT AND CENTER OF GRAVITY

Actual weight change will be determined after kit installation. Ballast will then be adjusted, as required, to return empty weight CG to within allowable limits.

Section 2

NORMAL PROCEDURES

2-4. INTERIOR AND PRESTART CHECK

NOTE

When electrical power is applied, force TRIM defaults to ON.

2-9-D. FLIGHT DIRECTOR OPERATIONS

NOTE

The pilot is responsible to monitor and adjust the helicopter attitude, if required, following engagement of the auto-couple feature.

Selection of CPL on the CHFD or selection of GA, with airspeeds at 65 KIAS and above, automatically activates the TRIM ON and ATT for auto-coupling of the FD. If CPL is selected, the default modes of HDG/VS (VS/HDG/ASPD, 4 axis only, if installed) will be automatically engaged. If GA is selected, GA/GA is initially presented and then automatically reverts to GA/VS (GA/GA/GA reverts to VS/GA/ASPD, 4 axis only, if installed).

2-9-E. FMS (GPS) OPERATIONS

During a missed approach sequence, the mode in the FMS status area (above the airspeed indicator) will remain green until the missed approach has been activated/ unsuspended. Once activated, the FMS navigation source flag may appear in white letters inside a gray box until the next sequence or leg has been intercepted. Then it will turn green to show the mode is active.

NOTE

When a missed approach requires that a heading leg be flown, a white "HDG" annunciation in the FMS status area and loss of the EHSI lateral deviation bar indicate that the heading leg is active.

NOTE

With bearing pointer number 1 selected to FMS 1 or FMS 2, the STA / APRT / WPT map symbol is overlayed by a VORTAC symbol (issue with S/W V017).

2-9-I. SEARCH AND RESCUE SEARCH PATTERNS

The use of the bearing pointer is prohibited during the orbit search pattern.

Section 3

EMERGENCY AND MALFUNCTION PROCEDURES

3-9-A. SINGLE MAGNETOMETER FAILURE

- **INDICATIONS:**

  L FD and AP 1 DEGRADED or R FD and AP 2 DEGRADED message illuminated.

  HSI displays (affected side) — Dashes.

  Automatic reversion to TRK mode on DU(s), if > 10 KTS GS airborne.

  FD flag — Red unfilled arrowhead pointing to affected side.

- **PROCEDURE:**

  1. **HDG softkey (affected DU) — Select valid heading source and then press TRK on bottom heading control tab to deselect TRACK mode.**
  2. **FD — As required.**

CAUTION

DO NOT UTILIZE FD CUES OR MODES THAT ARE SHOWN TO BE ACTIVE ON A FD FLAGGED AS FAILED.

3-9-B. DUAL MAGNETOMETER FAILURE

- **INDICATIONS:**

  L FD and R FD messages illuminated.

  AP 1 DEGRADED and AP 2 DEGRADED messages illuminated.

  HSI displays — Dashes.

  Automatic reversion to TRK mode on DU(s), if > 10 KTS GS airborne.

  FD flag — Red.

- **PROCEDURE:**

  1. **Utilize standby compass or GPS for heading reference.**
  2. **If TCAS Kit installed with Garmin GTN 750/650 Kit, cycle TCAS PBA to power system OFF/ON for correct GTN MAP orientation.**

Table 3-1. Electrical Distribution

EMERG BUS 1	ESS BUS 1	N ESS BUS	ESS BUS 2	EMERG BUS 2
ADAHRS (Left)	AFCS 1	Light, Cabin	ADF	ADAHRS (Right)
ADIU Channel A	Aux Power	OEI Training Switch	Auto RPM	ADIU Channel B
Bus Interconnect Relay	Avionics Fan	TCAS	ECS – Radio Heat	AFCS 2
	DU (Center)			
CVFDR	DU (Left)	Weather Radar	ELT	Cargo Hook Power
DU (Center) Emergency Power	ECS – Cabin Vent	Windshield Wiper (Left)	Hoist Controller	DU (Right)
ECS – Cabin Heat	Fuel Balance Pump		Instrument Panel Fan	ECS – Defog/ Blower
Engine 1 ECU	Fuel Transfer Pump		Lights, Instrument	Engine 2 ECU
Engine 1 FIRE Light & Discharge	LH CHFD		Lights, Position	Engine 2 Fire Light & Discharge
	Light, Search			
Engine 1 FMM	Lights, Anti-collision		Nav/Com 2	Engine 2 FMM
Engine 1 Ignitor			RAD ALT	
	Non-essential Controller			Engine 2 Intake Bypass
Engine 1 Intake Bypass			Transponder	
Engine 1 Starter	Pitot/Static Heater (Left)		Windshield Wiper (Right)	Engine 2 Starter
FDR				Fuel Interconnect Valve
Floats				Fuel Shut-off Valve, Engine 1
Force Trim Release				Generator 1 Control/Reset
Fuel Shut-off Valve, Engine 2				Hoist Power

Table 3-1. Electrical Distribution (Cont)

EMERG BUS 1	ESS BUS 1	N ESS BUS	ESS BUS 2	EMERG BUS 2
Fuel Transfer Valve				Hydraulic Shut-off Switch
Generator 2 Control/Reset				ICS
Hoist Cable Cut				Light, Landing
Lighting Annunciator				Pitot/Static Heater (Right)
Lighting, Emergency				RH CHFD
				Standby Attitude Indicator
Nav/Com 1				
Pedal Stop				
Standby Altimeter				
Standby Attitude Indicator				

Table 3-3. Caution (Amber) Lights/Messages

MESSAGE	FAULT CONDITION	CORRECTIVE ACTION
CHFD	Course heading flight director panel power failure. Course and heading functions inoperative.	Applicable maintenance required.
◀ FD ▶	Message will be displayed in the top right corner of the DU indicating a mismatched state between the flight directors.	CHFD — Select left or right FD.
HOT DU	Display Unit is overheating. DU HOT message will be displayed in the top left corner of the affected Display Unit.	Display unit – Reduce brightness to reduce temperature of DU. If INSTR FAN caution message is not illuminated, applicable maintenance is required.
STARTER (on PSI)	Respective engine starter fault. Starter not disengaging.	1) RUN OFF switch – OFF. 2) BATT – OFF. 3) Applicable maintenance required.

Table 3-4. Advisory (Green, White or Cyan) Lights/Messages

MESSAGE	SYSTEM CONDITION	CORRECTIVE ACTION
START (on PSI)	Respective engine starter engaged.	
ON GEAR (upper EICAS)	On ground with cyclic centered.	

Section 4

PERFORMANCE

No change from basic manual.

Section 5

WEIGHT AND BALANCE

No change from basic manual.

Section 1

SYSTEMS DESCRIPTION

1-11. INTEGRATED AVIONICS SYSTEM

The Astronautics Corporation of America (ACA) Display Unit (DU) and Course Heading Flight Director (CHFD) panel system interfaces with other helicopter systems to provide Primary Flight Display (PFD) and Multi-Function Display (MFD) functionality. The CHFD is a control panel to allow pilot to input course, heading and flight director selections.

The ACA display units and CHFD panel incorporate the following:

NOTE

Advisory vertical guidance information is only an aid to help pilots comply with altitude restrictions and cannot be coupled to the autopilot. When using advisory vertical guidance, the pilot must use the primary barometric altimeter to ensure compliance with all altitude restrictions.

1. **GPS advisory vertical guidance deviation (LNAV+V, LP+V) is presented with a cyan colored diamond marker versus a green diamond marker for LPV/ILS vertical guidance.**

NOTE

The pilot is responsible to monitor and adjust the helicopter attitude, if required, following engagement of the auto-couple feature. Once the flight director is coupled to the autopilot, the helicopter attitude can be adjusted by pressing and holding the TRIM REL button on the cyclic, as well as pressing and holding the FORCE REL button on the bottom of the collective (4-Axis only, if installed), and repositioning the controls as required. Once the desired attitude is achieved, releasing the button(s) will reset the flight director engaged modes to the conditions present at the time of release.

2. **Selection of CPL on the CHFD or selection of GA, with airspeeds at 65 KIAS and above, automatically activates the TRIM ON and ATT for auto-coupling of the FD. If CPL is selected, the default modes of HDG/VS (VS/HDG/ASPD, 4 axis only, if installed) will be automatically engaged. If GA is selected, GA/GA is initially presented and then automatically reverts to GA/VS (GA/GA/GA reverts to VS/GA/ASPD, 4 axis only, if installed).**

3. Uncoupled flight director (FD) modes are colored magenta. The FD source arrow symbol is cyan with an open circle when either TRIM ON and/or ATT have not been selected. The cyan arrow turns white and then to a green CPL arrow as the auto-couple feature transitions to the FD coupled state. The FD source arrow symbol is white when uncoupled with ATT selected.

4. If FD modes are active and either the TRIM ON and/or ATT are not selected, selection of CPL on the CHFD will automatically activate the TRIM ON and ATT for auto-coupling of the selected FD modes.

5. The FLT MISCOMP message is associated to a double headed yellow arrow IAS with the appropriate nomenclature (HDG, IAS, ALT, ATT, ILS) presented adjacent to the affected parameter.

6. ILS split mode is presented with a double headed green arrow located near the primary navigation source LOC 1.

7. During starter engagement, the START message is displayed under the appropriate engine digital parameters.

8. The CHFD panel (Figure 1-1) utilizes individual light annunciation for selected FD mode, in addition to the FD mode annunciation on the DU. A dashed heading reference line is temporarily drawn while adjusting the HDG bug.

NOTE

If the wind data is presented in light grey, the information should be considered unreliable.

9. If active wind data (arrow vector and digital readout in green) on the DU becomes unavailable, then the most recent wind data is retained and displayed in light grey for up to 10 minutes, then suppressed.

10. In addition to the existing SET HDG softkey and MAG softkey which are made available when the HDG softkey is selected, a TRK softkey and a DRIFT softkey have been incorporated (Figure 1-2).

NOTE

POLAR TRUE NAV Mode shall be selected to DISABLED in the MAINTENANCE MENU / PILOT SETUP.

NOTE

Track (TRK) Mode is approved for VFR operations only. Do not couple to HDG when in Track mode.

Track (TRK) Mode: This feature allows the FMS provided GPS calculated track to be displayed as the heading. The TRK softkey will be displayed in gray (suppressed) when Track Mode is not available and in white when Track Mode is available. For Track Mode to be available, all of the following conditions are required:

- the aircraft must be airborne
- the groundspeed from the selected FMS must be 10 knots or greater for more than 3 seconds
- and the FMS provided GPS track angle must be active

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Figure 1-1. CHFD Control Panel

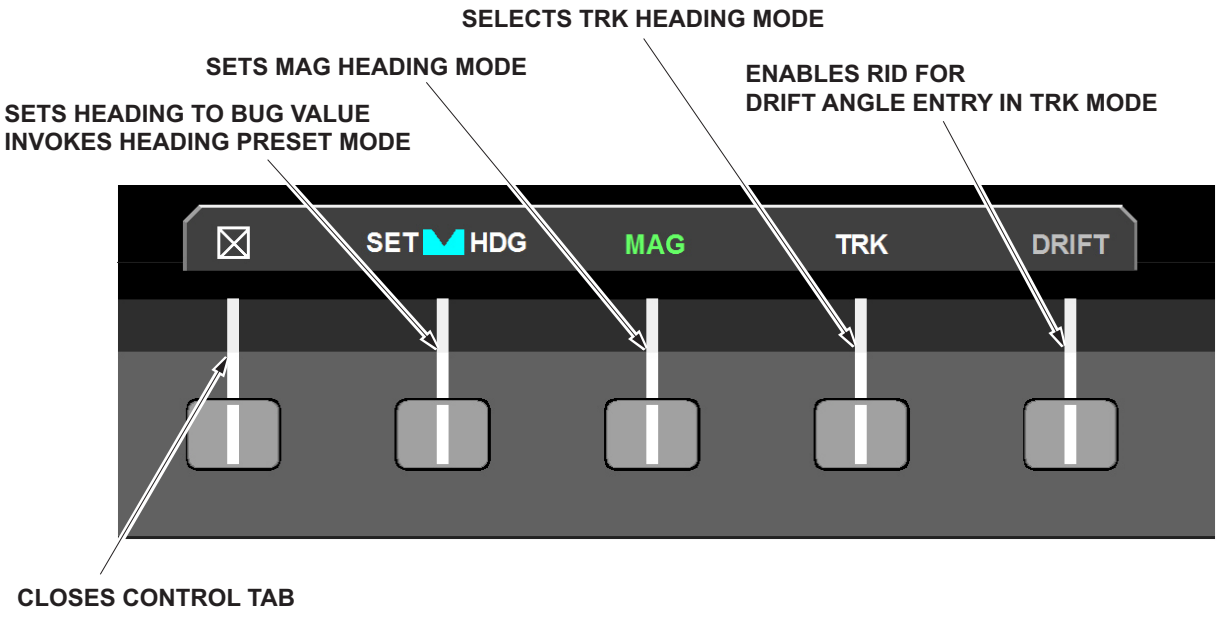

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Figure 1-2. Heading Control Tab TRK Mode and DRIFT Mode

When the above conditions are met, pressing the HDG softkey followed by the TRK softkey will cause the Track Mode to become active (Figure 1-3). When active the following will occur:

- the FMS provided GPS track angle will be displayed as the heading, TRK (magnetic) or TTK (true) will be displayed in yellow beside the track angle (i.e. depending on the Nav Angle selection)
- the TRK softkey will be displayed in green
- the AHRS aircraft heading (if available) continues to be shown as a white carrot on the outer compass rose for reference
- the Track Mode setting will be synchronized and displayed on the other DUs

In addition, Track Mode will be automatically set to active and displayed on the DUs if all of the following conditions are met for more than 3 seconds:

- the aircraft is airborne
- the groundspeed from the selected FMS is 10 knots or greater
- and the AHRS HDG data from both AHRS becomes invalid, or missing, or if the selected AHRS heading source indicates non-computed data.

Once set by these conditions, Track Mode can be deselected manually by pressing the TRK softkey. This will allow for the use of Mag Mode (if available), or the use of Heading Preset Mode (if available) via the SET HDG softkey if Track Mode information is not desired.

Track Mode will be automatically set to inactive if any of the following conditions are met:

- the aircraft is not airborne
- the groundspeed from the selected FMS is less than 10 knots and persists for more than 3 seconds
- the groundspeed or the FMS provided GPS track angle is missing or invalid
- if in normal heading mode (i.e. not true mode), the magnetic variation data is missing or invalid

Drift (DRIFT) Mode: This feature allows the compass to display a track-based heading display which will provide correct orientation based on the assumed drift. The DRIFT softkey will be displayed in gray (suppressed) when Track Mode is inactive and in white when Track Mode is active.

When Track Mode is active, pressing the HDG softkey followed by the white DRIFT softkey will turn the DRIFT softkey green and allow selection of a drift adjustment via the DU RID. Adjustments are limited to plus or minus 30 degrees in increments of 1 degree. When the RID is rotated to enter the assumed drift, a dashed yellow line will appear from the aircraft symbol to the edge of the compass card (Figure 1-4). In addition, the DU will rotate the compass presentation as the RID is turned to enter the drift. When the desired amount of drift has been entered and the RID is pressed, the DRIFT softkey will be displayed in white and the drift value will be stored and synchronized with the other operating DUs. Follow the same procedure to change or remove the assumed drift. If the drift is being removed, rotate the RID to select a drift of 0 degrees (i.e. rotate the RID until the dashed yellow line is removed).

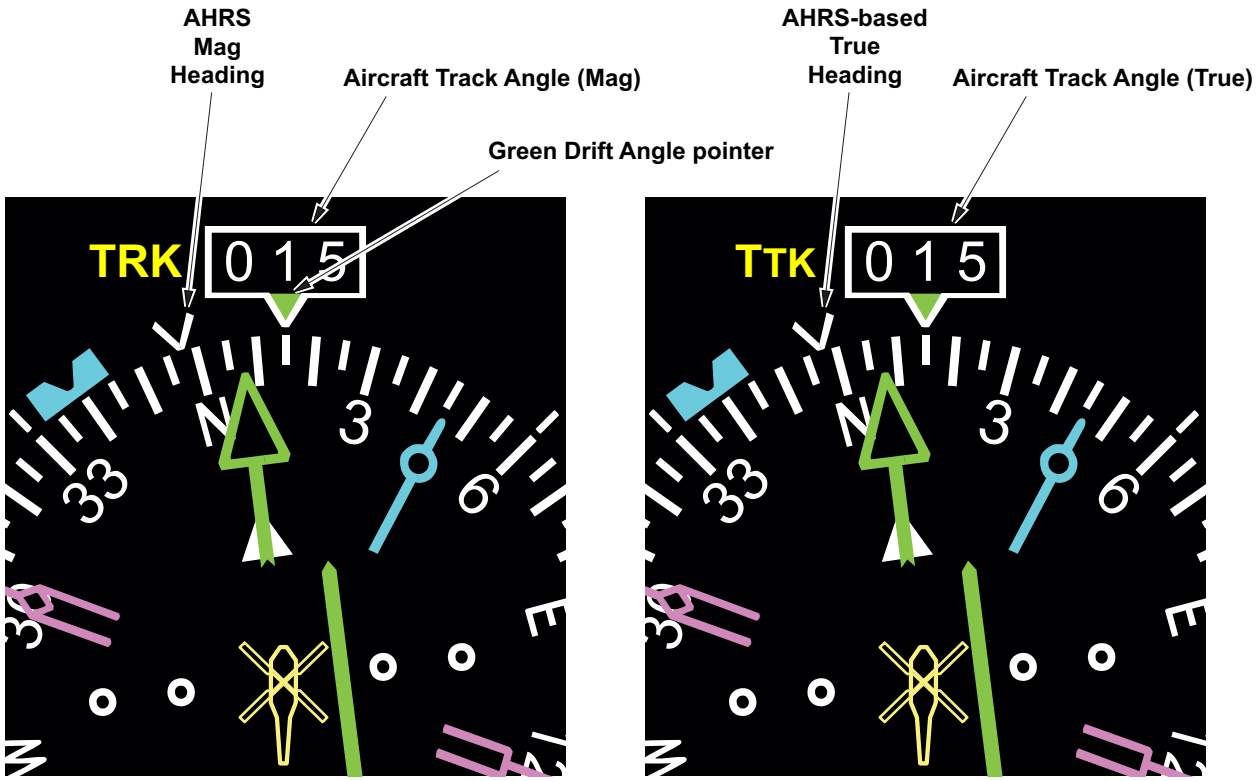

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Figure 1-3. Track and True Track Modes

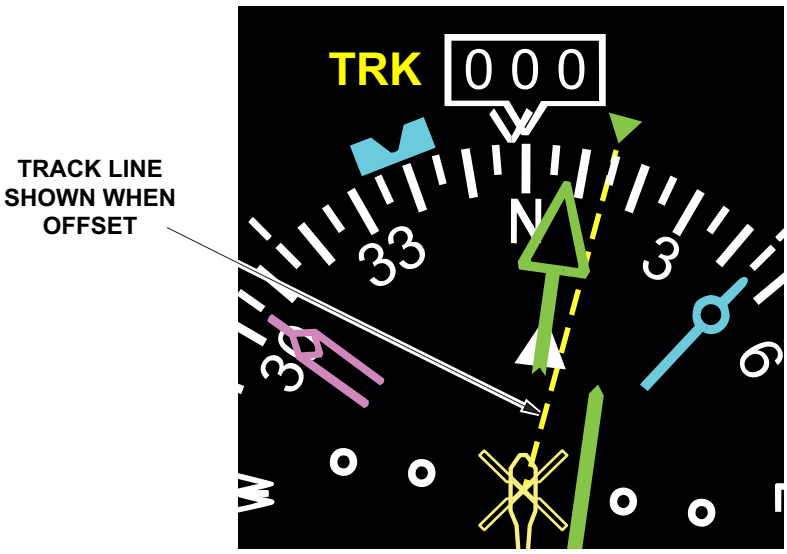

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Figure 1-4. DRIFT Mode

The drift will also return to zero whenever Track Mode is manually or automatically deselected.

NOTE

Garmin FMS display of calculated wind speed and direction will be erroneous if the manually entered DRIFT angle value is inaccurate.

In Track Mode, when a DRIFT angle is manually entered, the apparent heading passed to the FMS will be changed and the FMS will generate a wind calculation based on this data. Under these conditions, the wind data on the DU is displayed in cyan within a cyan outlined rectangle.

Section 2

ACA DISPLAY UNIT

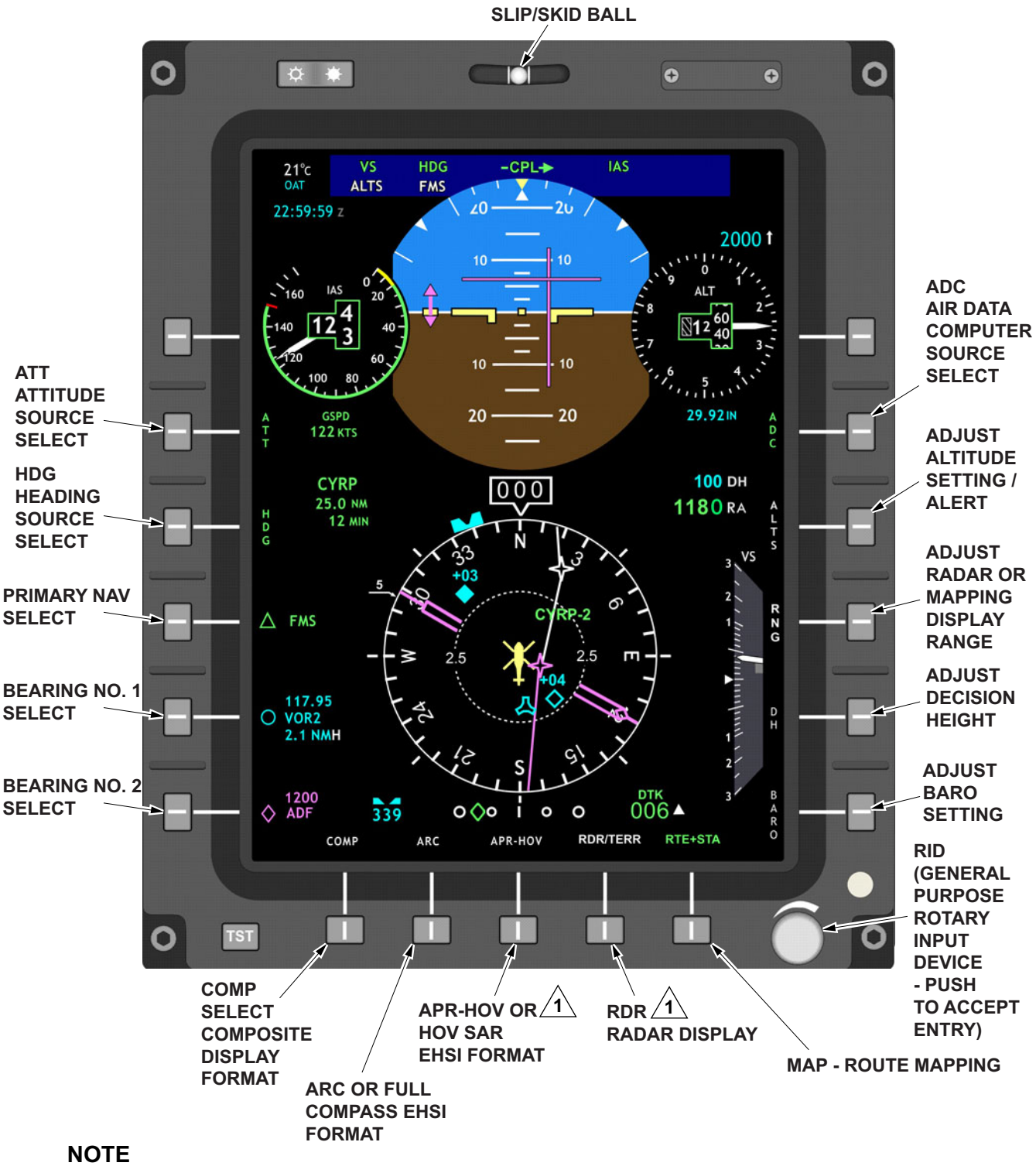
NOTE

The following information supplements BHT-429-IAM, addressing the differences from the Rogerson Kratos display unit presentation

2-1. PRIMARY FLIGHT DISPLAY

The primary flight display typically presents the flight (FLT) format (Figure 2-1). The FLT format presents the primary flight and navigation instruments. The upper portion of the display (Figure 2-2) provides an Electronic Attitude and Direction (EADI) presentation that includes the following:

- Attitude indicator
- Altimeter
- Airspeed indicator
- Ground speed indicator
- Outside air temperature indication
- Flight director status and command information
- Trim system status
- Marker beacon display
- Time display
- Lateral and vertical deviation
- FMS messages



NOTE

1 **Available with configured equipment.**

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Figure 2-1. FLT Flight Controls

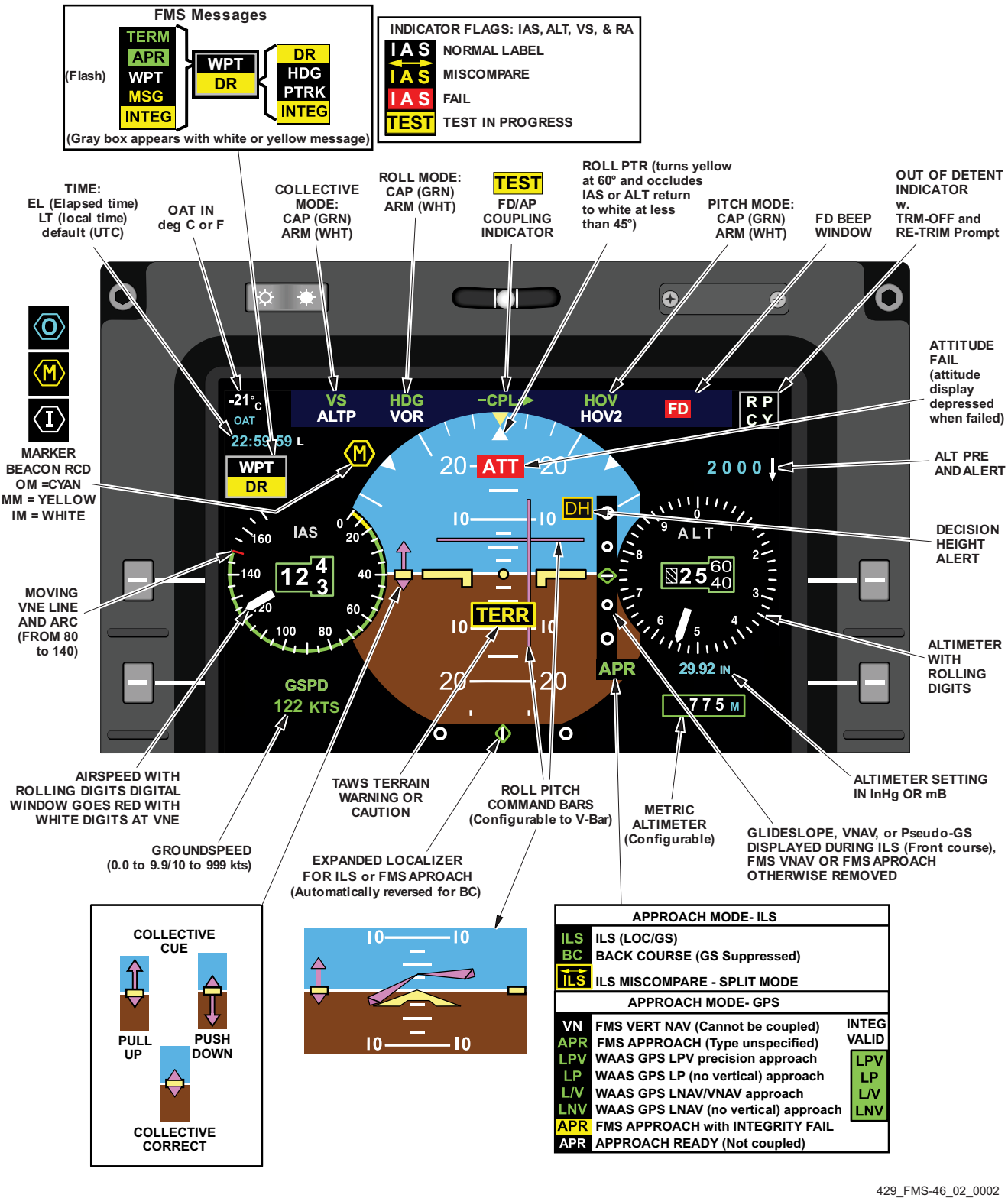


Figure 2-2. EADI Presentation

EADI FLAGS AND STATUS INDICATIONS

APR MODE IND.	PRIMARY NAVIGATION SOURCE AND CONDITIONS	LATERAL DEVIATION		VERTICAL DEVIATION	
		SOURCE	LOSS OF SIGNAL	SOURCE	LOSS OF SIGNAL
ILS	LOC and heading in the direction of the course needle	Localizer deviation x 2	LOC	Glideslope deviation	GS
BC	LOC and heading towards the tail of the course needle	Localizer receiver x 2	LOC	Not presented	
LPV L/V	FMS and WAAS LPV or LNAV/VNAV precision approach active	FMS/GPS generated pseudo localizer x 2	APR	FMS/GPS generated pseudo glideslope	APR
LP LNV	FMS and WAAS LP or LNAV approach active (without vertical)	FMS/GPS generated pseudo localizer x 2	APR	Not presented	
APR	FMS and non-WAAS precision approach being generated	FMS/GPS generated pseudo localizer x 2	APR	FMS/GPS generated pseudo glidescope	APR (also displayed if not available)
VN	FMS with enroute vertical navigation cue	Not presented		Deviation from GPS altitude profile	VN
	GPS advisory vertical guidance deviation (LNAV+V, LP+V) is presented with a cyan colored diamond marker versus a green diamond marker for LPV/ILS vertical guidance. Advisory vertical guidance deviation information is only an aid to help pilots comply with altitude restrictions. When using advisory vertical guidance, the pilot must use the primary barometric altimeter to ensure compliance with all altitude restrictions.				
APR	(Smaller font white text) Indicates approach mode is available – requires that FMS be disengaged and APPR selected be made on FDMS to activate. Will change to LPV, LP, L/V, LNV, or APR when approach mode is engaged.				
LPV	WAAS with final approach validity (indication becomes black on green).				
APR	Indicates approach mode with loss of approach integrity.				
ILS	For ILS split mode, indicates a miscompare between ILS receivers tuned to same frequency. △1				

NOTE:

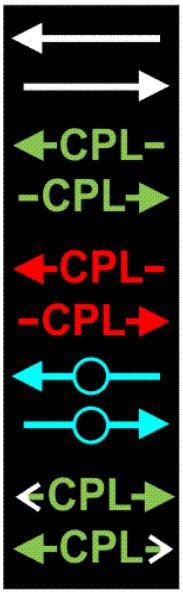
Display of APR deviation flags with no INTEG alert and green approach mode (LPV, L/V, etc) is an indication of a GPS/FMS that is either misconfigured for interface with this system, or is incompatible with the WAAS approach interface requirements of this system.

EADI FLAGS AND STATUS INDICATIONS

APR MODE IND.	PRIMARY NAVIGATION SOURCE AND CONDITIONS	LATERAL DEVIATION		VERTICAL DEVIATION	
		SOURCE	LOSS OF SIGNAL	SOURCE	LOSS OF SIGNAL

⚠1 The ILS comparison monitor is only enabled when both navigation receivers are on and tuned to the same localizer frequency. In addition to the ILS miscompare indication on the FLT format, a miscompare will also trigger the master caution and will cause the general FLT MISCOMP caution message to appear in the CAS window.

Flight Director indications:



Uncoupled, but ready to couple. Default side indicated (left or right)

Coupled to left or right flight direction as indicated. All active modes (in green) coupled.

Flashes for 5 seconds following decouple of one or more axis.

Uncoupled and unable to couple because either force trim OFF or not in ATT mode.

Dual Mode Active. Coupled flight director side indicated by green arrow, monitoring flight director indicated by unfilled white arrow.

Attitude Comparison Monitor — When both AHRS attitude sources are operational, the system will continuously monitor and compare pitch and roll from each source and will annunciate if these sources mismatch. Annunciations are double headed arrow and yellow text and are displayed over the upper left portion of the attitude presentation as follows:

- PIT if pitch data differs by more than 6° for more than 2 seconds
- ROL if roll data differs by more than 6° for more than 2 seconds
- ATT if both pitch and roll miscompare conditions are active

In addition, whenever a flight display miscompare condition occurs, the master caution will be triggered and the caution message FLT MISCOMP will appear in the CAS message area.

The lower portion (Figure 2-3) provides an Electronic Horizontal Situation Indicator (EHSI) presentation that includes the following:

- Compass card in either full rose or 120° arc format
- Heading bug
- Primary navigation course/track, deviation, and to/from indication

- Two navigation bearing needles
- Information related to the primary navaid station or waypoint (distance, time, frequency, and/or identification)
- Information related to the bearing navaid station or waypoint
- Wind speed and direction — Normally Green retained Wind data will display in gray, the last known information for up to 10 minutes if the data becomes invalid with airspeed below 30 knots. When in Track Mode, the wind arrow is oriented relative to track, and wind information is displayed in cyan and boxed.
- Mapping of the primary navigation route, related navaids, bearing No. 1 position, and TCAS intruders, depending on configuration, with decluttered and normal presentation
- Mapping Levels:
  - Level 0 — No map symbology
  - Level 1 — All map symbology (stations, airports, and waypoints)
  - Level 2 — Stations and route waypoints
  - Level 3 — Airports and route waypoints
  - Level 4 — Waypoints only (en-route and off-route)
  - Level 5 — Route waypoints only
- TCAS traffic advisory
- Radar or TAWS underlay and related status
- Radar altitude presentation
- Vertical speed presentation

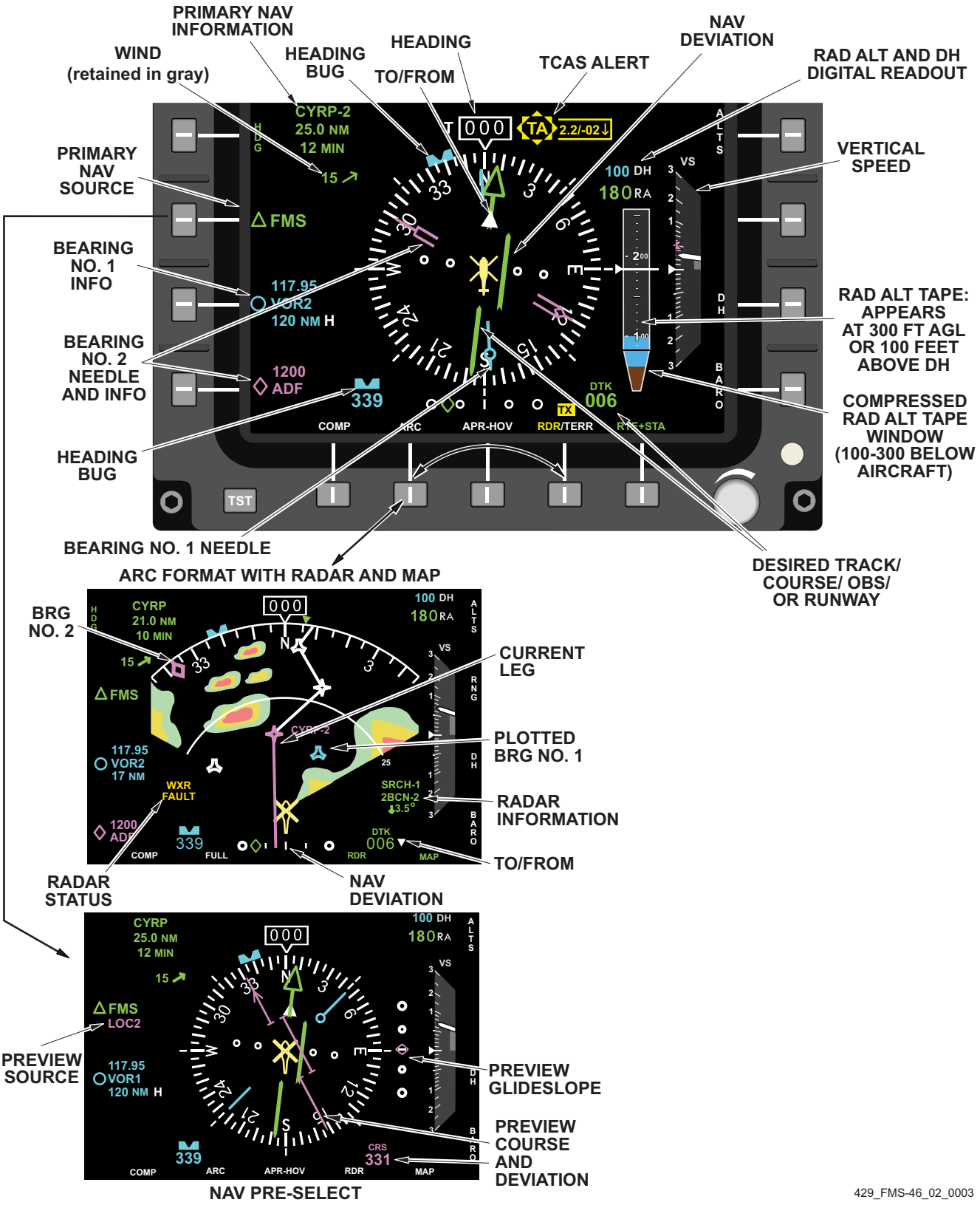


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Figure 2-3. EHSI Presentation

2-2. ELECTRONIC HORIZONTAL SITUATION INDICATION (EHSI) PORTION

The EHSI presents information in the following formats:

- **FULL compass, with conventional course and bearing pointers (Figure 2-4)**
- **ARC compass, conventional course and bearing pointers**
- **FULL compass with route mapping and optional TCAS intruder mapping**
- **ARC and FULL compass with route mapping, optional TCAS, and optional radar or TAWS presentation**
- **FULL compass, with navigation preview mode (2nd course pointer)**

These formats are selected using the lower softkeys on the display.

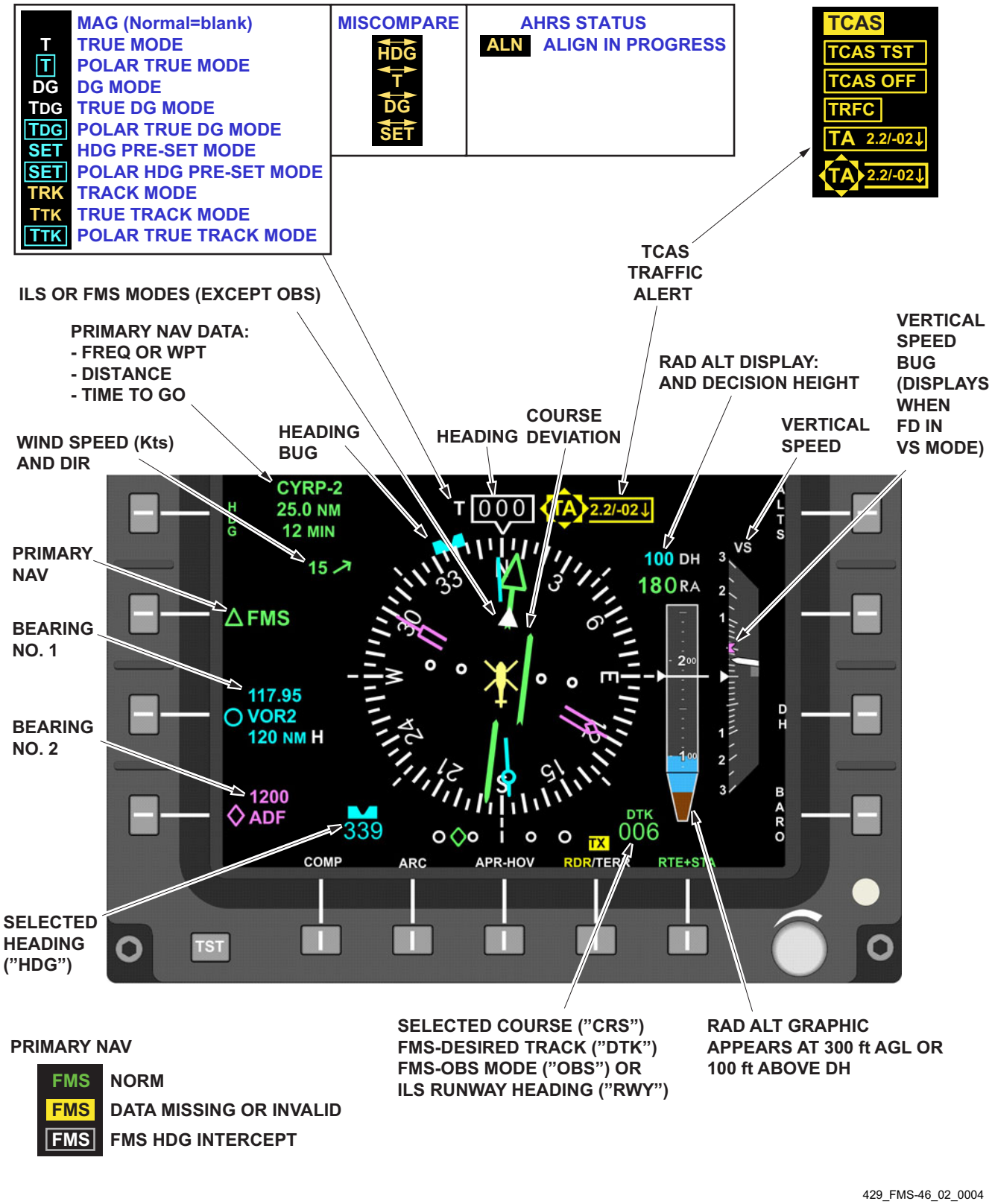

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Figure 2-4. EHSI Conventional Full Compass Format

Heading Modes — The heading mode is displayed adjacent to the heading digital readout. The mode reflects current pilot selections or maintenance modes as follows:

DISPLAY ANNUNCIATION	COMPASS MODE	REMARKS
Blank	Magnetic (slaved)	Normal mode
ALN	AHRS align mode	Heading is aligning and may not be fully accurate until alignment is complete. This may appear momentarily following startup, or while slewing the heading in DG mode.
TTK	Polar True Track mode	Track mode active and Polar True Heading mode active.
TTK	True Track mode	Track mode active and True Heading mode active.
TRK	Track mode	Track mode active.
SET	Heading Preset in Polar Nav mode	Heading Preset mode active and Polar True Heading mode.
SET	Heading Preset mode	Heading Preset mode active.
T	Polar True mode	Mag Slaving mode active and Polar True Heading mode active.
(blank)	Mag	Mag Slaving mode active.
TDG	Polar True DG mode	Polar True Heading mode active.
TDG	True DG mode	True Heading mode.
T	True heading mode	If the FMS selected as the primary navigation source is set to show in "true north" mode, then the EHSI presents all bearings and nav information relative to true north (typically used for search functions, available on optional alternate FMS units).
DG	Directional Gyro mode (unslaved)	Heading is functioning in DG mode (either selected through the AHRS control panel or due to loss of magnetic slaving).

Primary Navigation Source — The selected primary navigation source is associated with the course needle and deviation data presented on the EHSI compass. It is also the navigation source that the flight director will follow when a navigation (NAV) or approach (APPR) mode is selected on the flight director.

Primary navigation source data is presented in GREEN. The primary navigation source is selected through the L4 softkey marked by a green triangle △.

Pressing the softkey will sequence through primary nav sensor selections as follows:

- VOR1 or LOC1 depending on the tuning of the navigation receiver No. 1
- VOR2 or LOC2 depending on the tuning of the navigation receiver No. 2
- FMS
- △LOC 1 ILS Split Mode at primary NAV

FMS Heading Intercept Mode — For FMS that supports this mode (often used in missed approach procedures), HDG will be indicated in the FMS status area, and the FMS will cease to provide deviation data for the EHSI. This will cause the EHSI to flag the primary navigation source by FMS, FMS roll steering to the autopilot continues to be provided during this mode and the autopilot will remain coupled.

2-3. EHSI MAPPING PRESENTATIONS

The EHSI presentation includes the option of mapping routes, waypoints, off-route waypoints, and TCAS symbology. For FULL and ARC compass presentation, mapping is enabled by pressing the MAP softkey at the lower edge of the display (Figure 2-4). The MAP legend will display in GREEN when a mapping mode is active. Each press of the key cycles through the following available mapping options:

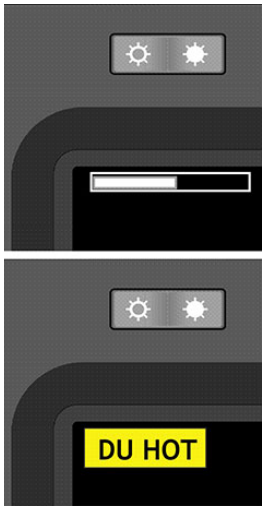
	SOFTKEY	MAPPING MODE
Level 0	MAP	No map data displayed (press to select map)
Level 1	RTE+ALL	Route and all other off-route items
Level 2	RTE+STA	Route and Navaid stations
Level 3	RTE+APRT	Route and airports
Level 4	RTE+WPT	Route and Waypoints other than APT and STA
Level 5	RTE	Route alone

Chronometer Display — A chronometer display is provided for easy reference presented in CYAN directly below the outside air temperature indication. The chronometer display will show either UTC time or local time depending on the selection made on the EICAS display. If the elapse timer has been activated on the EICAS display, then the elapse time will replace either the local or UTC time display. UTC is the default indication. L will be displayed if local time is presented, and is displayed when elapse time is being presented.

2-4. CREW ALERTING SYSTEM (CAS) MESSAGES

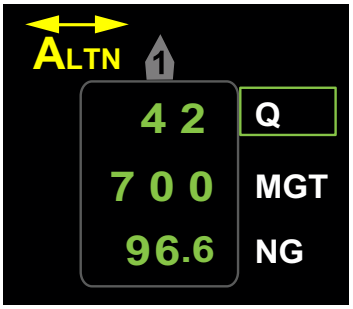
The Crew Alerting System (CAS) refers to the functions of the *BasiX-Pro*™ system devoted to alerting the flight crew to various conditions in the helicopter. The system includes the following:

- **The CAS window on the EICAS and compressed EICAS format**
- **The master caution and warning attention getters**
- **Various dedicated position annunciators on the displays**
- **Dedicated annunciators on the instrument panel**
- **Aural alerts and tones**



"DU HOT" is displayed in black characters on yellow background in the upper-left corner of the display when on of the DUs is in overtemp. The annunciation flashes when on-ground. The annunciation flashes for 5 seconds and then remains steady when airborne. The associated CAS message is "HOT DU". Recommended pilot action: take appropriate action to reduce ambient temperature at DU (e.g. check ventilation for blockage, seek cooler altitude, manually reduce display brightness, etc.).

The system continually monitors and compares data from the ECU and ADIU channels. If the data does not match within the allowed tolerances, the annunciation ALTN (yellow double headed arrow and text) will appear at the affected engine digital readout group, or below the triple tachometer. This indicates a miscompare and the message EICAS MISCOMP will appear in the CAS window.



If the ECU data is unavailable and ADIU data is in use, the annunciation ALTN (yellow text) will appear next to the affected engine data group or below the tachometer. This indicates that the alternate data source is in use. The CAS window would present a message indicating the reason for the loss of ECU data. For example: ECU FAIL, ECU DATA, or ECU DEGRADED for engine No. 1 or engine No. 2.

If the alternate data from either ADIU channel is unavailable for some reason, the annunciation ALTN (white text) will appear next to the affected data group. This indicates a loss of available backup should the primary data be lost. The CAS message ALTN DATA FAIL will accompany the indication.

The EICAS format will display START (green) (on PSI) message and it means the respective engine starter is engaged. The START is replaced with STARTER (yellow) if starter not disengaging.