

|                                                                                   |                   |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|---------|-----|--------|
|  | NAVIGATION SYSTEM | 1.15.00 |     |        |
|                                                                                   |                   | P 1     | 090 |        |
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|                                                                                   |                        |  |         |     |        |
|-----------------------------------------------------------------------------------|------------------------|--|---------|-----|--------|
|  | NAVIGATION SYSTEM      |  | 1.15.10 |     |        |
|                                                                                   |                        |  | P 1     | 001 |        |
|                                                                                   | VOR/ILS/MKR/DME SYSTEM |  |         |     | DEC 96 |

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## 10.1 DESCRIPTION

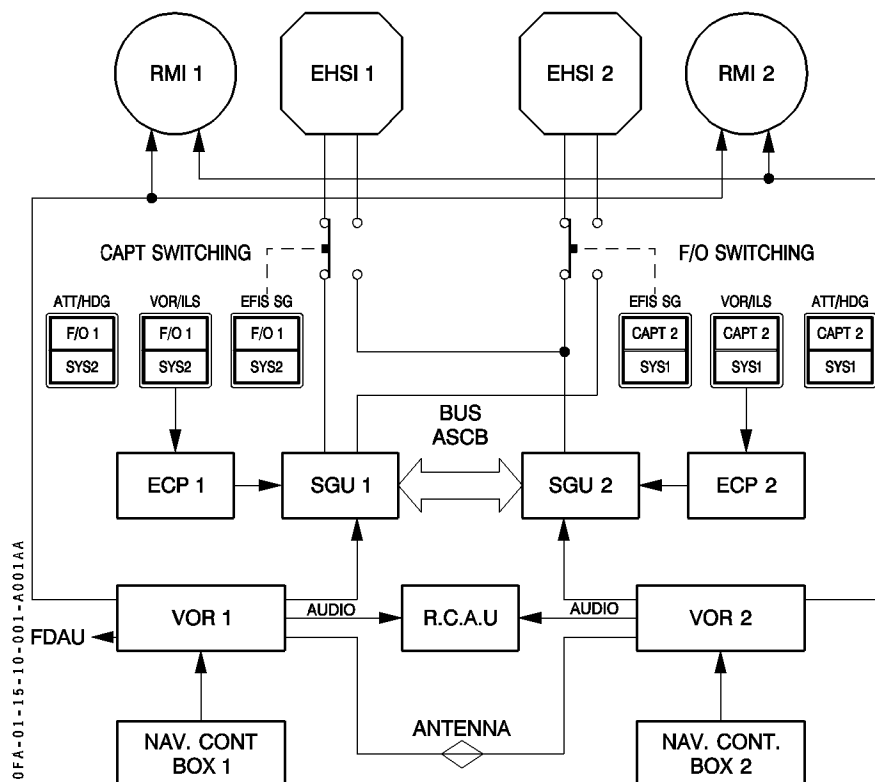
The aircraft is equipped with :

- two VOR receivers
- two ILS receivers
- one MKR receiver
- one DME interrogator/receiver
- one additional DME interrogator/receiver optional

Note : VOR 1, ILS 1 and MKR are integrated in a common box, as are VOR 2 and ILS 2.

## VOR

The two VOR receivers are independent, but use a common VOR antenna located on top of the vertical stabilizer. Each receiver is individually controlled by the associated NAV control box on the glareshield panel : VOR 1 on the LH side, VOR 2 on the RH side. The receivers are designed for reception of one of the 160 channels with 0,05 MHz spacing in the 108.00 to 117.95 MHz frequency range. The VOR audio signals are transmitted to the Remote Control Audio Unit.



ROFA-01-15-10-001-A001AA

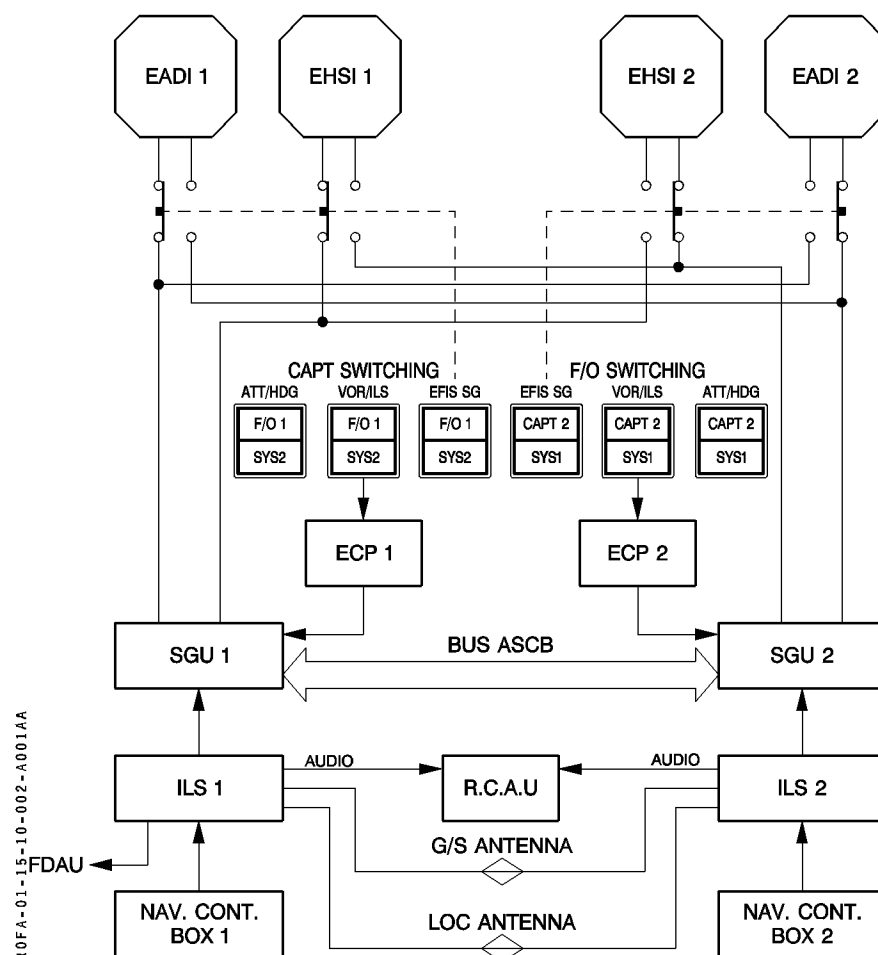
|                                                                                   |                        |  |         |     |        |
|-----------------------------------------------------------------------------------|------------------------|--|---------|-----|--------|
|  | NAVIGATION SYSTEM      |  | 1.15.10 |     |        |
|                                                                                   |                        |  | P 2     | 001 |        |
|                                                                                   | VOR/ILS/MKR/DME SYSTEM |  |         |     | DEC 96 |

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## ILS

The two ILS receivers are independent but use a common LOC antenna used for the VOR systems and a common G/S antenna. Each receiver is individually controlled by the associated NAV control box on the glareshield panel : ILS 1 on the LH side, ILS 2 on the RH side.

The receivers operate for localizer reception in the 108 MHZ to 112 MHZ VHF range and for glideslope reception in the 329 to 335 MHZ VHF range. Each of the 40 localizer channels is combined with a matched glideslope channel. The ILS audio signals are transmitted to the Remote Control Audio Unit.



|                                                                                   |                                                        |         |     |        |
|-----------------------------------------------------------------------------------|--------------------------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br>VOR/ILS/MKR/DME SYSTEM | 1.15.10 |     |        |
|                                                                                   |                                                        | P 3     | 010 |        |
|                                                                                   |                                                        |         |     | DEC 96 |

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## MARKER

The MARKER beacon receivers are connected to the marker antenna and are controlled by the NAV 1 and the NAV 2 control boxes. Outer, middle and inner or airways markers signals are received and processed for visual display and audio annunciation.

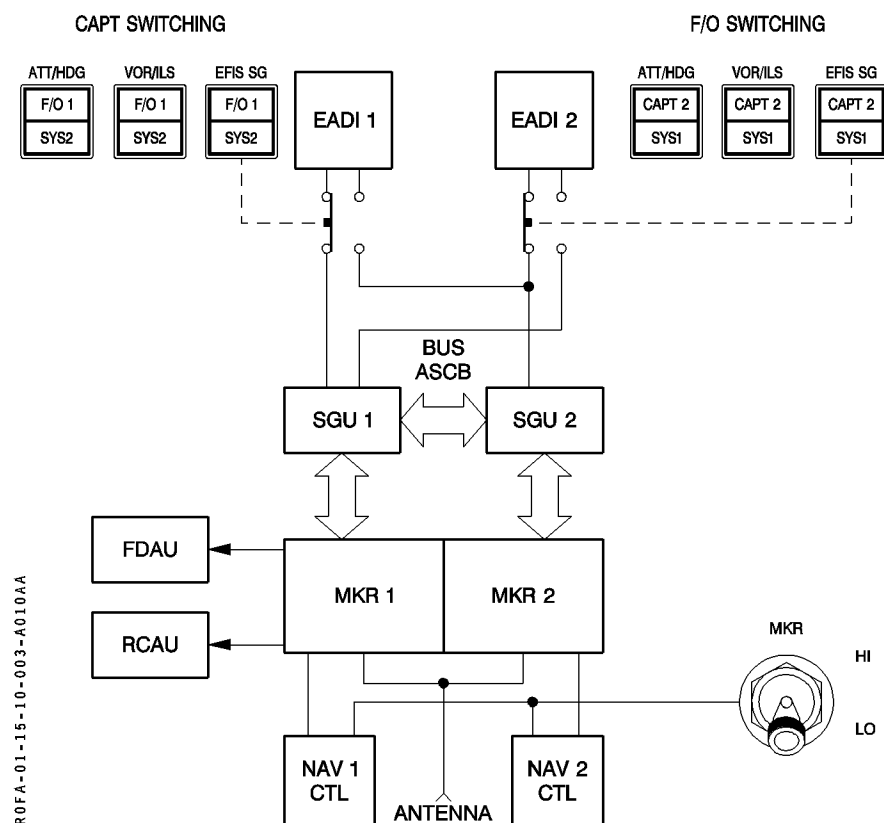
Information coming from VOR/ILS/MKR is digital.

The visual signal is displayed at the bottom right corner of the EADI.

Only MKR 1 audio signals are transmitted.

The marker audio signals are transmitted to the Remote Control Audio Unit.

On the captain's side panel, a switch allows selection of marker sensitivity (LO or HI).



|                                                                                   |                        |  |         |     |        |
|-----------------------------------------------------------------------------------|------------------------|--|---------|-----|--------|
|  | NAVIGATION SYSTEM      |  | 1.15.10 |     |        |
|                                                                                   |                        |  | P 4     | 010 |        |
|                                                                                   | VOR/ILS/MKR/DME SYSTEM |  |         |     | DEC 96 |

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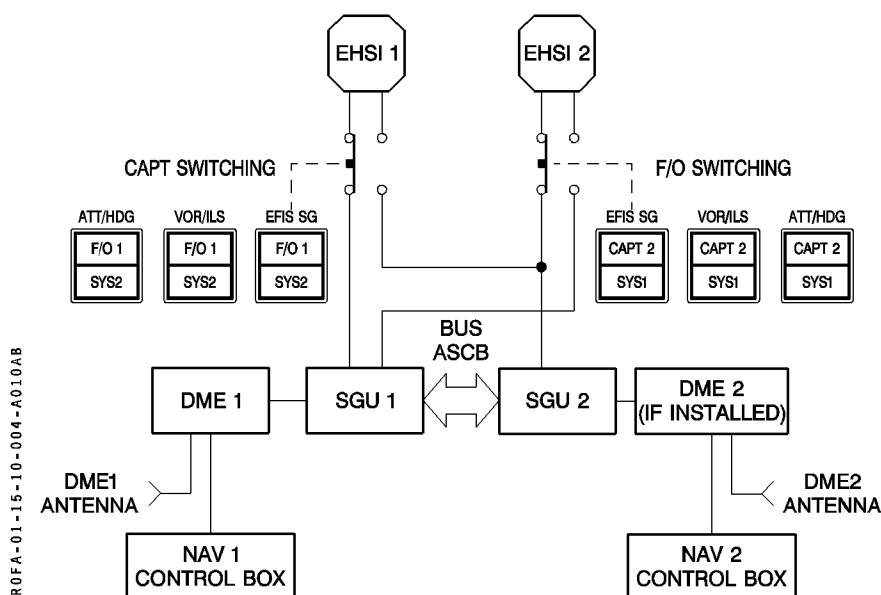
## DME

The DME system operates in the 1025 to 1150 MHZ frequency range with 1 MHZ spacing. DME channeling is accomplished through the NAV 1 control box and DME 2 channeling through the NAV 2 control box. The frequency selection is automatically associated with the relative NAV frequency, as selected on the glareshield panel. The DME measures the slant range to the station when the selected NAV station is equipped with a DME.

DME audio signals are transmitted to the Remote Control Audio Unit.

DME values are sent to the SGUs and displayed on the EHSIS.

When the DME is in "HOLD" mode, an amber "H" appears on top right corner of the affected EHSI. In this case, the affected DME will remain locked to the one previous frequency selected, allowing the NAV control box to be used for any other desired frequency.



R0FA-01-15-10-004-A010AB

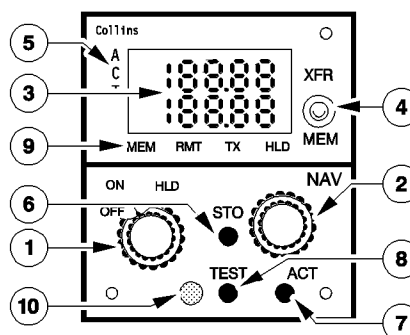
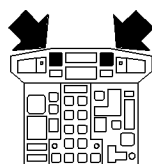
|                                                                                   |                        |  |         |     |        |
|-----------------------------------------------------------------------------------|------------------------|--|---------|-----|--------|
|  | NAVIGATION SYSTEM      |  | 1.15.10 |     |        |
|                                                                                   |                        |  | P 5     | 010 |        |
|                                                                                   | VOR/ILS/MKR/DME SYSTEM |  |         |     | DEC 96 |

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## 10.2 CONTROLS

### NAV CONTROL BOX

ROFA-01-15-10-005-A010AC



- ① Power, Mode and volume switches
  - Outer knob enables to switch the system ON. The HLD position allows the NAV frequency to be changed, while holding the DME on the current active frequency.
  - Inner knob enables to adjust the volume of reception.
- ② Frequency select knobs

Control the preset or active frequency display.

  - Outer knob changes the three digits to the left of the decimal point.
  - Inner knob changes the two digits to the right of the decimal point.
- ③ Frequencies display
  - The active frequency is displayed in the upper window.
  - The preset frequency is displayed in the lower window.
- ④ XFR/MEM switch

is spring loaded in neutral position.

XFR Exchanges active and preset frequency.

MEM One of the frequencies stored in the memory is loaded into the preset display. Successive actions cycle the four memory frequencies through the display.
- ⑤ Compare annunciator (ACT)

ACT flashes if the actual radio frequency is not identical to the frequency shown in the active frequency display.
- ⑥ STO button

Allows to enter the frequencies into the four memory positions.

  - Preset the frequency to be stored.
  - Push the STO button : upper window displays an available memory channel
  - For 5 seconds, the MEM switch may be used to change the channel number.
  - Push the STO button a second time : displayed frequency is stored in the displayed channel.
  - After 5 seconds, the control returns to normal operation.
- ⑦ ACT button

In normal operation, frequency select knobs (2) changes the preset frequency display. After a 2 second push on the ACT button, bottom window displays dashes, the knobs directly act on the active frequency. A second push on the ACT button enables a return to normal operation.

|                                                                                   |                                                        |         |     |        |
|-----------------------------------------------------------------------------------|--------------------------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br>VOR/ILS/MKR/DME SYSTEM | 1.15.10 |     |        |
|                                                                                   |                                                        | P 6     | 010 |        |
|                                                                                   |                                                        |         |     | DEC 96 |

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⑧ TEST button

Is used to initiate the radio self-test diagnostic routine.

⑨ Annunciators

MEM (Memory) illuminates when a preset frequency is being displayed in the lower window.

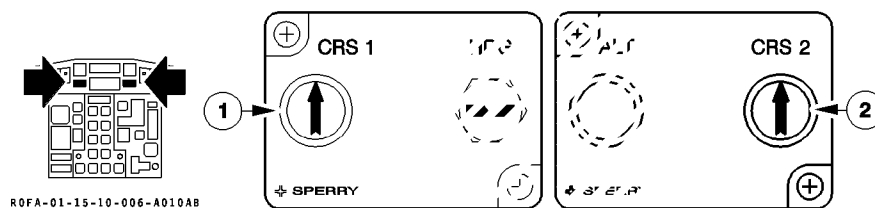
RMT (Remote) illuminates when the NAV control box is being remotely controlled by an other system (FMS, NCS, etc...).

HLD (Hold) illuminates when the DME is held to the active frequency at time of selection. The upper window displays the NAV frequency and the lower window displays the held DME frequency.

⑩ Light sensor

Automatically adjusts the display brightness.

**CRS 1/HDG AND ALT/CRS 2 PANELS**



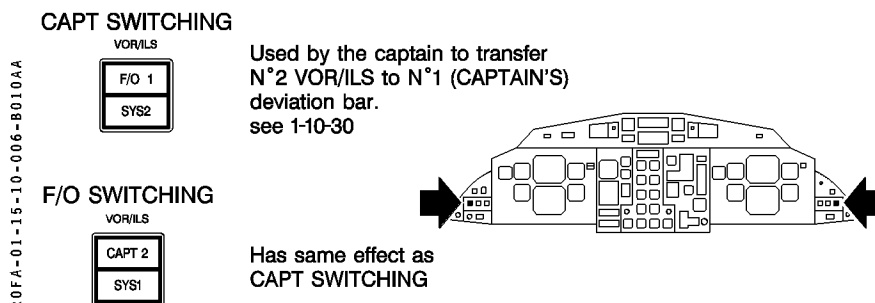
① CRS 1 knob

Selects course on CAPT EHSI.

② CRS 2 knob

Selects course on F/O EHSI.

**CAPT SOURCE AND F/O SWITCHING**

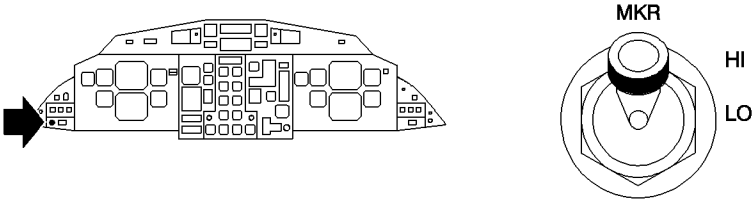


|                                                                                   |                                                        |         |     |        |
|-----------------------------------------------------------------------------------|--------------------------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br>VOR/ILS/MKR/DME SYSTEM | 1.15.10 |     |        |
|                                                                                   |                                                        | P 7     | 010 |        |
|                                                                                   |                                                        |         |     | DEC 96 |

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**MKR SW**

R0FA-01-15-10-007-A010AA



Is used to set marker sensitivity

**10.3 ELECTRICAL SUPPLY**

| EQUIPMENT               | DC BUS SUPPLY<br>(C/B)                   |
|-------------------------|------------------------------------------|
| NAV 1                   | DC STBY BUS<br>(on overhead panel VOR 1) |
| NAV 2                   | DC BUS 2<br>(on overhead panel VOR 2)    |
| DME 1                   | DC BUS 1<br>(on overhead panel DME 1)    |
| DME 2<br>(if installed) | DC BUS 2<br>(on overhead panel DME 2)    |



|                                                                                   |                                                        |         |     |        |
|-----------------------------------------------------------------------------------|--------------------------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br>VOR/ILS/MKR/DME SYSTEM | 1.15.10 |     |        |
|                                                                                   |                                                        | P 8     | 001 |        |
|                                                                                   |                                                        |         |     | DEC 96 |

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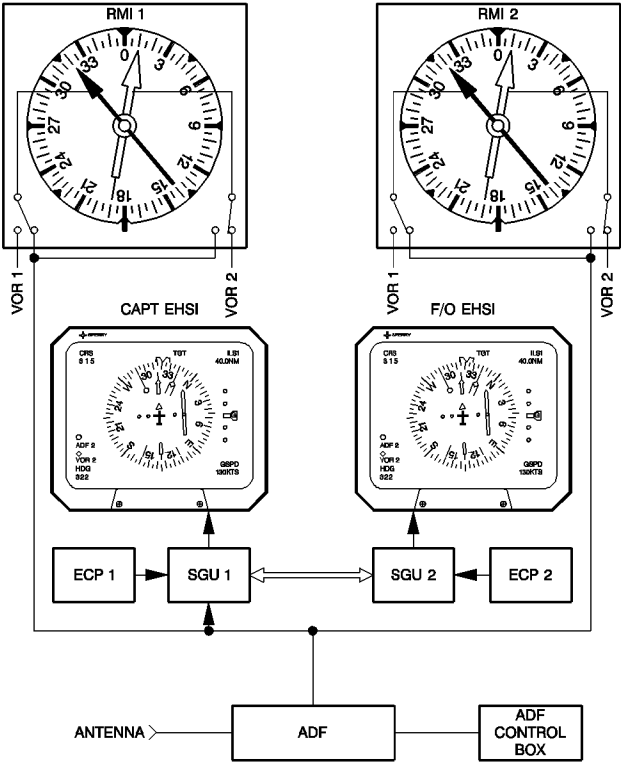
|                                                                                   |                   |  |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|--|---------|-----|--------|
|  | NAVIGATION SYSTEM |  | 1.15.20 |     |        |
|                                                                                   |                   |  | P 1     | 001 |        |
|                                                                                   | ADF SYSTEM        |  |         |     | DEC 96 |

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20.1 DESCRIPTION

The aircraft is equipped with an ADF system. It provides relative bearing indication to NDB'S or broadcast stations.  
Bearing can be displayed on EHSI and/or on RMI.  
The receiver frequency range is from 190 to 1799 KHz.  
The ADF antenna is located on top of the fuselage.  
The ADF audio signals are transmitted to the Remote Control Audio Unit.

ROFA-01-15-20-001-A001AA



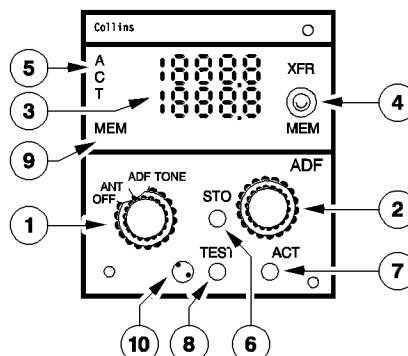
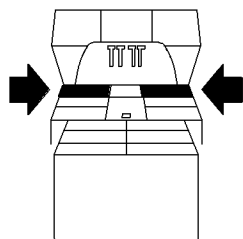
|                                                                                   |                   |  |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|--|---------|-----|--------|
|  | NAVIGATION SYSTEM |  | 1.15.20 |     |        |
|                                                                                   |                   |  | P 2     | 010 |        |
|                                                                                   | ADF SYSTEM        |  |         |     | DEC 96 |

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## 20.2 CONTROLS

### ADF CONTROL BOX

RUFA-01-15-20-002-A010AB



- ① Power, mode and volume controls
  - Outer knob enables to switch the system ON, and to choose ANT, ADF or TONE system mode of operation.
  - Inner knob enables to adjust the volume of reception.
- ② Frequency select knobs
  - The larger knob changes the 1000's and 100's KHz digits.
  - The smaller knob changes the 10's, units and tenth KHz digits. Normal rotation changes the display in 1 KHz steps, except for the two steps backward following a rotation, which will change the display in a 0.5 KHz step.
- ③ Frequencies display
  - Upper window displays the active frequency.
  - Lower window displays the standby frequency.
- ④ XFR/MEM switch

This switch is a 3 position, spring loaded toggle switch.

XFR : Active frequency and standby frequency are exchanged.

MEM : One of the four stored memory frequencies is loaded into the standby display. When the switch is pushed several times, the four memory frequencies are cycled.
- ⑤ Compare annunciator (ACT)

ACT flashes if the actual radio frequency is not identical to the frequency shown in the active frequency display.
- ⑥ STO button

Allows to enter frequencies into the four memory positions.

  - Preset the frequency to be stored.
  - Push the STO button : upper window displays an available memory channel.
  - For 5 seconds, the MEM switch may be used to change the channel number.
  - Push the STO button a second time : displayed frequency is stored in the displayed channel.
  - After 5 seconds, the control returns to normal operation.

|                                                                                   |                   |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|---------|-----|--------|
|  | NAVIGATION SYSTEM | 1.15.20 |     |        |
|                                                                                   |                   | P 3     | 010 |        |
|                                                                                   | ADF SYSTEM        |         |     | JUL 98 |

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⑦ ACT button

In normal operation, frequency select knobs(2) change the preset frequency display. After a 2 second push on the ACT button the bottom, window displays dashes, the knobs directly act on the active frequency. A second push on the button enables return to normal operation.

⑧ TEST button

Is used to initiate the radio self test diagnostic routine.

⑨ Annunciators

MEM (Memory) : illuminates when a preset frequency is being displayed in the lower window.

RMT (Remote) : illuminates when the ADF control box is being remotely controlled by an other system (FMS, NCS, etc...)

⑩ Light sensor

Automatically adjusts the display brightness.

### 20.3 ELECTRICAL SUPPLY

|   |                      |                                          |
|---|----------------------|------------------------------------------|
| R | EQUIPMENT            | DC BUS SUPPLY<br>(C/B)                   |
|   | ADF 1                | DC STBY BUS<br>(on overhead panel ADF 1) |
|   | ADF 2 (if installed) | DC BUS 2<br>(on overhead panel ADF 2)    |

|                                                                                   |                   |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|---------|-----|--------|
|  | NAVIGATION SYSTEM | 1.15.30 |     |        |
|                                                                                   |                   | P 1     | 001 |        |
|                                                                                   | RADIO ALTIMETER   |         |     | DEC 96 |

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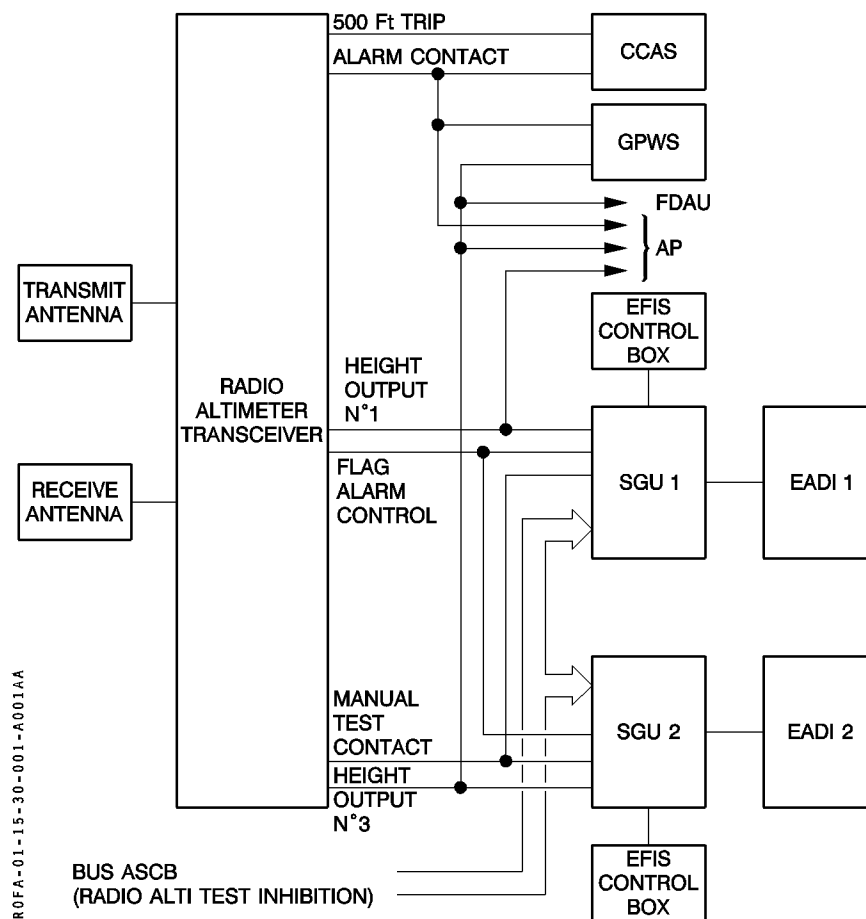
### 30.1 DESCRIPTION

The radio altimeter gives accurate height information when flying below 2500 ft and is particularly useful during the approach phase.

The radio altimeter system comprises one transceiver and two antennae.

The range of the display is from -20 to + 2500 ft. Radio altitude information is displayed on the bottom right of the EADI.

When radio altitude information is not valid, amber dashes are displayed and systems using this information may provide undue alarms.



|                                                                                   |                                                 |         |     |        |
|-----------------------------------------------------------------------------------|-------------------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br>RADIO ALTIMETER | 1.15.30 |     |        |
|                                                                                   |                                                 | P 2     | 001 |        |
|                                                                                   |                                                 |         |     | DEC 96 |

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**30.2 ELECTRICAL SUPPLY**

| EQUIPMENT       | DC BUS SUPPLY<br>(C/B)                  |
|-----------------|-----------------------------------------|
| Radio altimeter | DC BUS 1<br>(on overhead panel RAD ALT) |

---

|                                                                                   |                                      |         |     |        |
|-----------------------------------------------------------------------------------|--------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br>GPWS | 1.15.40 |     |        |
|                                                                                   |                                      | P 1     | 080 |        |
|                                                                                   |                                      |         |     | SEP 02 |

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#### 40.1 DESCRIPTION

(See schematic p 9/10)

The Enhanced Ground Proximity Warning System (EGPWS) provides visual and aural alerts in case of dangerous flight path conditions which would result in inadvertent ground contact if maintained.

The EGPWS performs the following alert modes :

- Basic GPWS modes
  - . Mode 1 :- excessive descent rate
  - . Mode 2 - excessive terrain closure rate
  - . Mode 3 - altitude loss after take-off
  - . Mode 4 - unsafe terrain clearance
  - . Mode 5 - below glideslope
  - . Mode 6 - altitude callouts
- Enhanced modes :
  - . Terrain Clearance Floor (TCF)
  - . Terrain Awareness & Display (TAD)

The system includes :

- one EGPWS computer
- two "GPWS/GS" lights illuminated when alert is activated
- one "FAULT/OFF" light and a selector dedicated to basic GPWS part
- one "TERR" pushbutton dedicated to enhanced mode
- two "DSP SEL" pushbuttons for display selection on EFIS

To operate, the system requires data supply from ADC1, ILS2, Radio Altimeter, AHRS1, GNSS, WX Radar, flaps position transmitter and gear lever position transmitter. The system provides SGU1 & 2 with terrain data to perform display on EFIS.

|                                                                                   |                                      |         |     |        |
|-----------------------------------------------------------------------------------|--------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br>GPWS | 1.15.40 |     |        |
|                                                                                   |                                      | P 2     | 080 |        |
|                                                                                   |                                      |         |     | SEP 05 |

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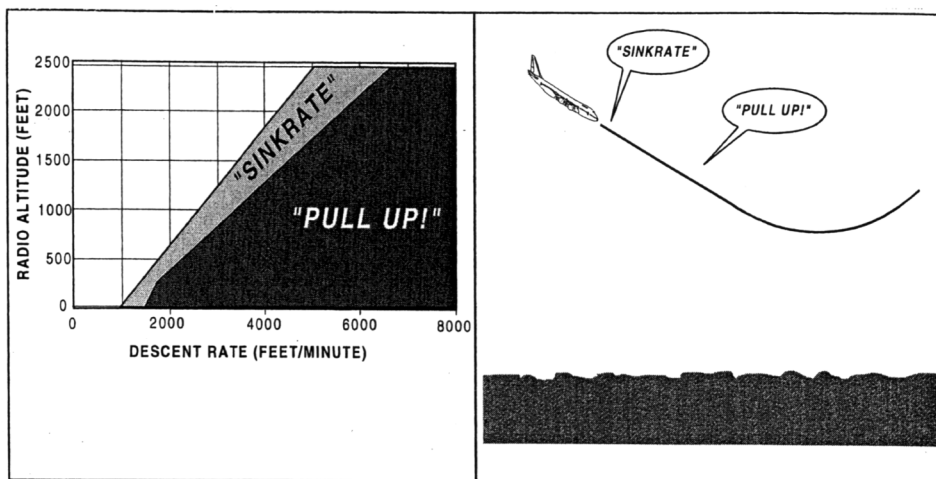
## **ALERT MODES**

### **MODE 1 - EXCESSIVE DESCENT RATE**

If the aircraft penetrates the outer envelope, the "SINK RATE" voice alert is generated and the red "GPWS" warning lights illuminate.

If the aircraft penetrates the inner envelope, the "PULL UP" voice alert is generated and the red "GPWS" warning lights illuminate.

This mode does not depend on the aircraft configuration.





|                                                                                   |                                      |         |     |        |
|-----------------------------------------------------------------------------------|--------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br>GPWS | 1.15.40 |     |        |
|                                                                                   |                                      | P 2 A   | 080 |        |
|                                                                                   |                                      |         |     | SEP 05 |

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## MODE 2 - EXCESSIVE TERRAIN CLOSURE RATE

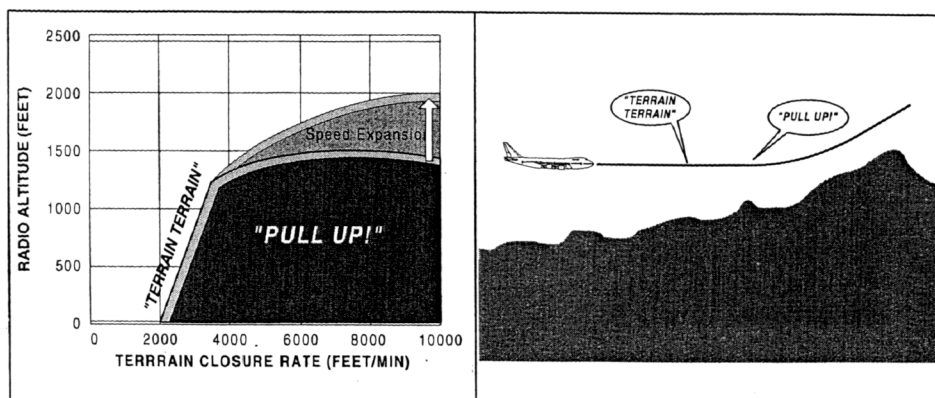
### • FLAPS NOT IN LANDING CONFIGURATION

When the aircraft penetrates the envelope, the "TERRAIN - TERRAIN" voice alert is generated and the red "GPWS" warning lights illuminate.

If the aircraft continues to penetrate the envelope, the "PULL UP" voice alert is now generated with the red "GPWS" lights always illuminated.

When the warning conditions no longer exist, the "TERRAIN - TERRAIN" aural message is heard until the aircraft pressure altitude has increased by 300 feet of altitude or 45 seconds has elapsed.

Note that the upper altitude limit is reduced to 1250 feet if Geometric Altitude is valid.

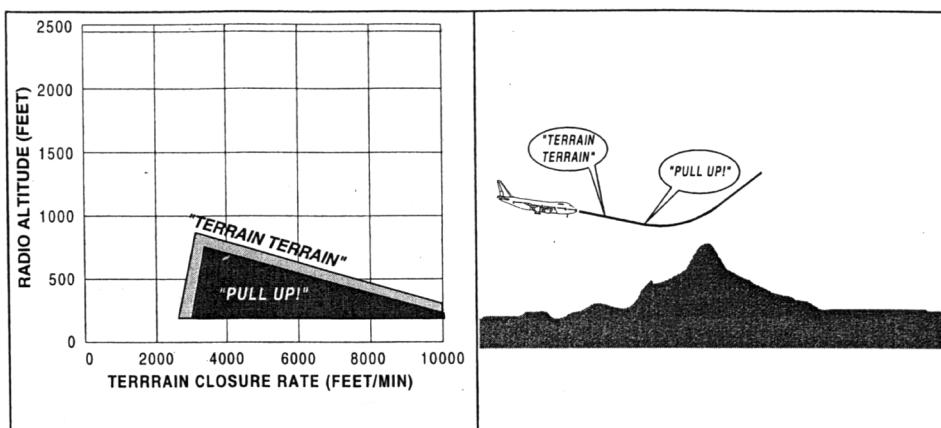


|                                                                                                                       |                          |  |         |     |        |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------|--|---------|-----|--------|
| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>NAVIGATION SYSTEM</b> |  | 1.15.40 |     |        |
|                                                                                                                       |                          |  | P 3     | 080 |        |
|                                                                                                                       | GPWS                     |  |         |     | SEP 05 |

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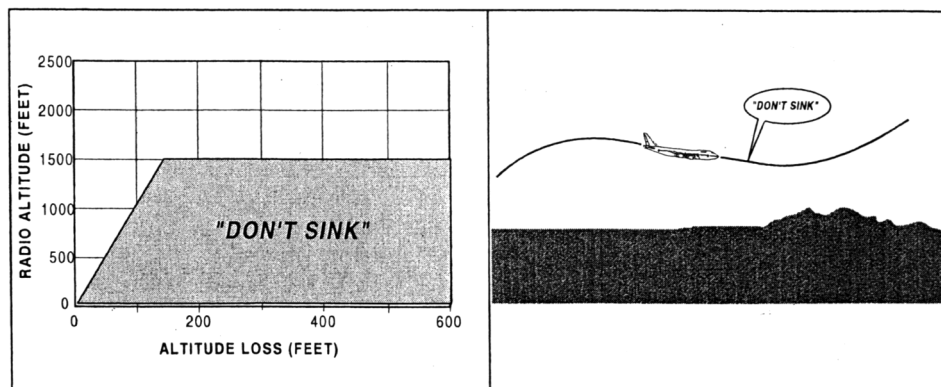
- FLAPS IN LANDING CONFIGURATION

When the aircraft penetrates the envelope, the "TERRAIN -TERRAIN" voice alert is generated and the red "GPWS" warning lights illuminate.



### MODE 3 - ALTITUDE LOSS AFTER TAKE-OFF

When the aircraft penetrates the envelope, the "DON'T SINK" voice alert is generated and the red "GPWS" warning lights illuminate.



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|                                                                                                                        |                          |  |         |        |
|------------------------------------------------------------------------------------------------------------------------|--------------------------|--|---------|--------|
| <br><b>A320neo</b><br><b>F.C.O.M.</b> | <b>NAVIGATION SYSTEM</b> |  | 1.15.40 |        |
|                                                                                                                        | GPWS                     |  | P 4 A   | 080    |
|                                                                                                                        |                          |  |         | SEP 05 |

AA

- FLAPS UP

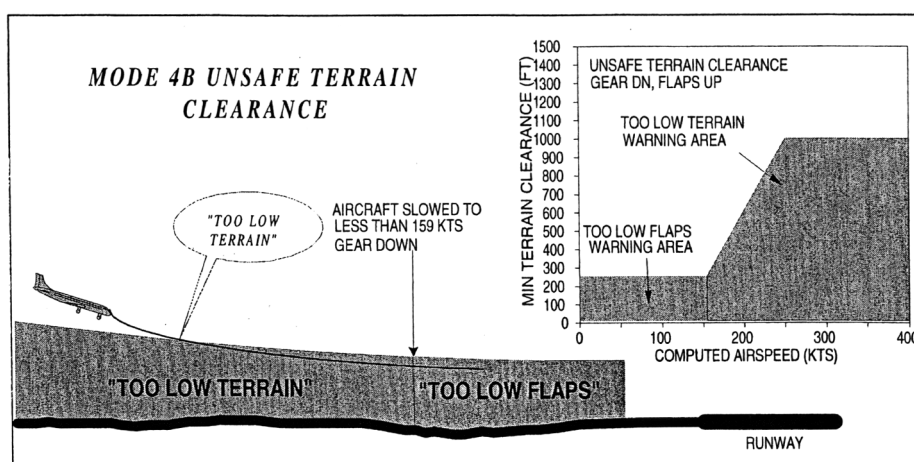
This mode is active during cruise and approach with gear down and flaps not in landing configuration.

When the aircraft penetrates the envelope at a speed higher than 159 kts, the "TOO LOW TERRAIN" voice alert is generated and the red "GPWS" warning lights illuminate.

Note that the "TOO LOW TERRAIN" warning area upper limit is reduced to 500 feet if Geometric Altitude is valid.

if penetration is performed at a speed lower than 159 kts, the "TOO LOW FLAPS" voice alert is generated and the red "GPWS" warning lights illuminate.

The GPWS selector enables a landing with flaps not in landing configuration without incurring a warning.



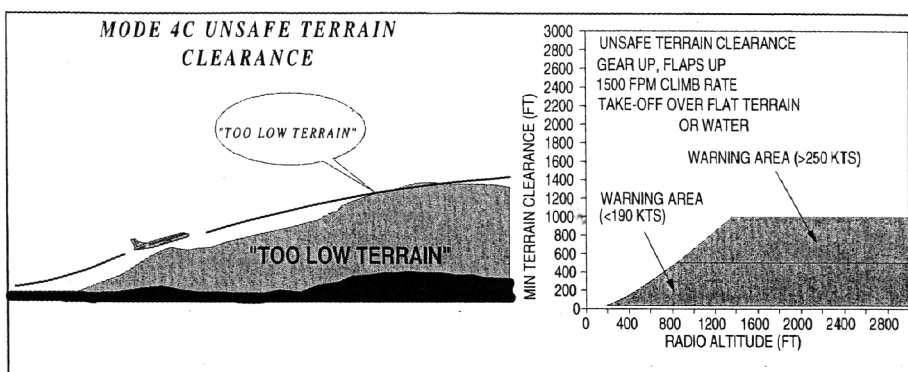
|                                                                                                                       |                          |  |         |     |        |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------|--|---------|-----|--------|
| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>NAVIGATION SYSTEM</b> |  | 1.15.40 |     |        |
|                                                                                                                       |                          |  | P 5     | 080 |        |
|                                                                                                                       | GPWS                     |  |         |     | SEP 05 |

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#### • TAKE OFF

This mode is active during take off with either gear and flaps not in landing configuration.

When the aircraft penetrates the envelope, the "TOO LOW TERRAIN" voice alert is generated and the red "GPWS" warning lights illuminate.



#### MODE 5 - BELOW GLIDESLOPE

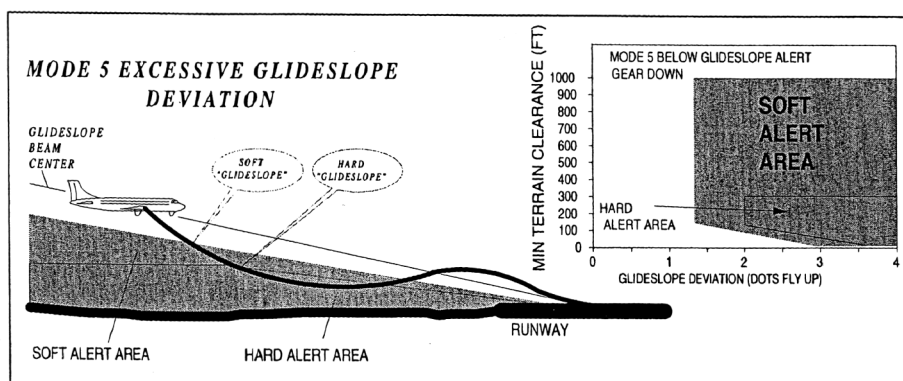
This mode is active during front course ILS approaches.

When the aircraft is more than 1.3 dots below the beam and penetrates the outer envelope, the "GLIDE SLOPE" voice alert is generated softly.

If the inner envelope is penetrated, the same voice alert repeats faster with an higher volume.

In both cases the amber "G/S" caution lights illuminate.

These alerts can be inhibited below 2000 feet AGL if ILS is tuned by depressing one of the "GPWS/GS" switches. The mode automatically rearms by ascent above 2000 feet AGL or landing or selection of a non-ILS frequency.



|                                                                                   |                   |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|---------|-----|--------|
|  | NAVIGATION SYSTEM | 1.15.40 |     |        |
|                                                                                   |                   | P 6     | 080 |        |
|                                                                                   | GPWS              |         |     | SEP 02 |

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#### MODE 6 - ALTITUDE CALLOUTS

- A "FIVE HUNDRED" foot callout is available during non-precision approach or if the aircraft is outside  $\pm 2$  dots glideslope deviation.
- A "MINIMUM - MINIMUM" audio callout is generated when the aircraft passes with gear down through the selected decision height.



|                                                                                   |                   |  |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|--|---------|-----|--------|
|  | NAVIGATION SYSTEM |  | 1.15.40 |     |        |
|                                                                                   |                   |  | P 6 A   | 080 |        |
|                                                                                   | GPWS              |  |         |     | SEP 05 |

AA

## TERRAIN CLEARANCE FLOOR

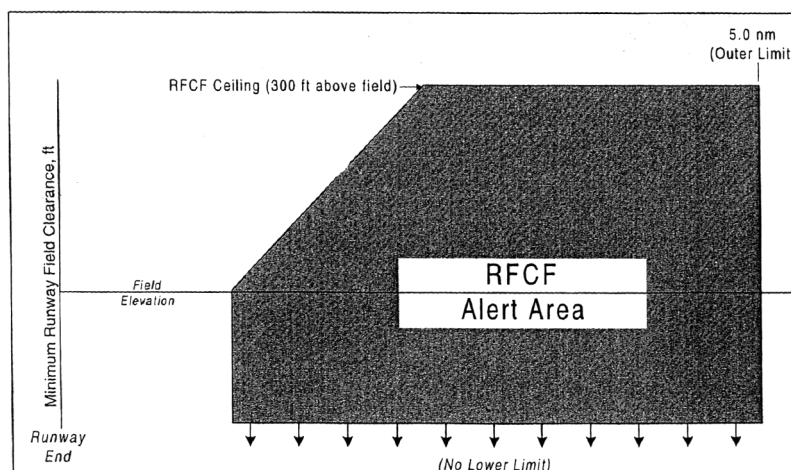
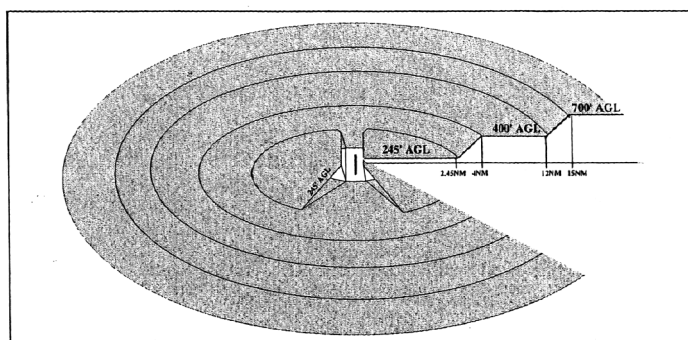
The Terrain Clearance Floor (TCF) mode creates an increasing terrain clearance envelope around the airport runway directly related to the distance from the runway. The alert is based on current aircraft location, nearest runway center point position and radio altitude.

TCF is activated during takeoff, cruise and final approach and complement existing Mode 4 by providing an alert based on insufficient terrain clearance even when in landing configuration.

A Runway Field Clearance Floor (RFCF) alert is also provided for runways that are located on top of a hill. This alert is similar to the TCF alert but is based on height above runway.

The aural message "Too Low Terrain" will occur once at the initial TCF envelope penetration and one time thereafter for each 20% degradation in radio altitude.

At the same time "GPWS" red alert lamp are illuminated and remain on until the alert envelope is exited.



|                                                                                   |                                      |         |     |        |
|-----------------------------------------------------------------------------------|--------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br>GPWS | 1.15.40 |     |        |
|                                                                                   |                                      | P 6 B   | 080 |        |
|                                                                                   |                                      |         |     | SEP 02 |

AA

## TERRAIN AWARENESS

This function uses aircraft geographic position provided by an aircraft GPS or an optional internal GPS card, aircraft altitude and a worldwide terrain database to predict potential conflicts between the aircraft flight path and the terrain, and to provide aural alert and graphic displays of the conflicting terrain.

### • **Terrain Alerting**

Caution and Warning envelopes below and ahead of the aircraft path are computed as a function of airspeed and flight path angle.

If the aircraft penetrates the Caution envelope boundary, an aural message "TERRAIN AHEAD. TERRAIN AHEAD" is generated with the red "GPWS" lights illuminated on each instrument panel. Simultaneously, terrain areas, which conflict with the Caution criteria, are shown in solid yellow on the Terrain Display.

If the aircraft penetrates the Warning envelope boundary, an aural message "TERRAIN AHEAD, PULL UP" is generated with the red "GPWS" lights illuminated on each instrument panel. Simultaneously, terrain areas, which conflict with the Caution criteria, are shown in solid red on the Terrain Display.

### • **Terrain Display**

The terrain data can be displayed on the Electronic Flight Instrument System (EFIS). When the Terrain Display is present, it replaces the Weather Radar display and can be available to the flight crew at any time.

A discrete pop-up signal provided by EGPWS is used to automatically display on EFIS the detected threatening terrain with an auto-range of 10Nm whatever is the previous information displayed.

The local terrain forward of the aircraft is depicted as variable density dot patterns in green, yellow or red. The density and color being a function of how close the terrain is relative to aircraft altitude. Terrain Alerts are depicted by painting the threatening terrain as solid yellow or red.



|                                                                                   |                   |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|---------|-----|--------|
|  | NAVIGATION SYSTEM | 1.15.40 |     |        |
|                                                                                   |                   | P 6 C   | 080 |        |
|                                                                                   |                   |         |     | SEP 05 |

AA

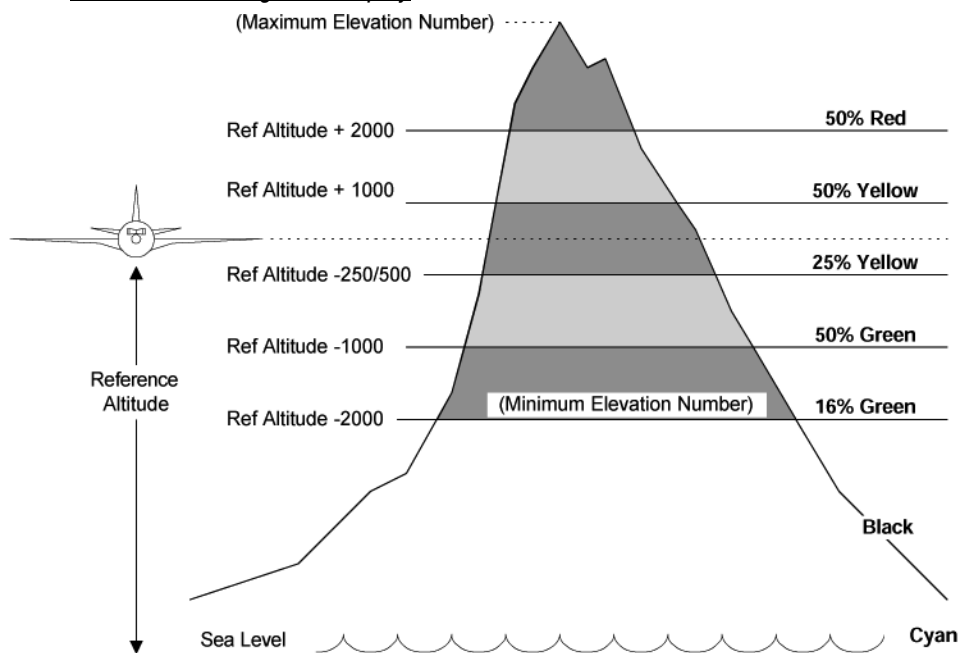
An optional Peaks display adds additional density patterns and level threshold to the standard mode display. At altitudes safely above all terrain for the display range chosen, the terrain is displayed independently of aircraft altitude.

The Peaks display includes a solid green level to indicate the highest non-threatening terrain. The red and yellow dot patterns, and solid red and yellow colors are unchanged with regard to the standard display.

The terrain identified as water (0 feet MSL) is displayed as cyan dots.

Two elevation numbers (in hundreds of feet above MSL) with the highest terrain on top and the lowest terrain under it are displayed with the corresponding colors to indicate the highest and lowest terrain currently being displayed. A single elevation number (high altitude) is displayed when the screen is all black or blue as a result of flying over water or relative flat terrain where there is no appreciable difference in terrain elevations.

#### Peaks terrain background display



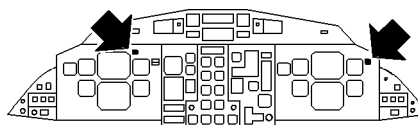
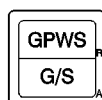
|                                                                                   |                                      |         |     |        |
|-----------------------------------------------------------------------------------|--------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br>GPWS | 1.15.40 |     |        |
|                                                                                   |                                      | P 7     | 080 |        |
|                                                                                   |                                      |         |     | SEP 05 |

AA

## 40.2 CONTROLS

### GPWS - G/S FB

ROFA-01-15-40-007-A001AA



The pbs on CAPT and F/O panels are identical and connected in parallel. GPWS and G/S indications are integrated into the pbs.

**GPWS** illuminates red as long as any mode 1 - 2 - 3 - 4 - TCF - TAD alert is activated. The illumination is accompanied by the voice alert for the particular mode.

**G/S** illuminates amber as long as a mode 5 alert is activated. The illumination is accompanied by the voice alert for this particular mode.

**Pressed**

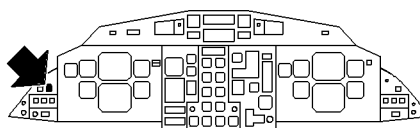
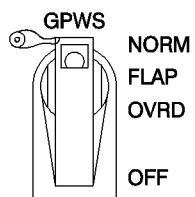
- . On ground will perform the system test
  - both GPWS and TERR FAULT lights illuminate on left panel
  - GPWS FAULT light on CAP turns on
  - G/S amber lights on both pilot panel turn on
  - GLIDESLOPE aural alert is broadcast
  - G/S amber lights turn off
  - GPWS red lights on both pilot panels turn on
  - PULL UP aural alert is broadcast
  - GPWS red lights turn off
  - GPWS red lights on both pilot panels turn on
  - TERR blue lights on DSP SEL pbs on both pilot panels turn on
  - Terrain Display test pattern is displayed on each EFIS
  - TERRAIN AHEAD PULL UP aural alert is broadcast
  - GPWS red lights turn off
  - After 12 sec, Terrain Display test pattern disappears on each EFIS
  - both GPWS and TERR FAULT lights on left panel turn off
  - GPWS FAULT light on CAP turns off
- . below 2000 feet, will inhibit the mode 5 alert (aural and visual)

|                                                                                                                       |                                      |         |     |        |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------|-----|--------|
| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>NAVIGATION SYSTEM</b><br><br>GPWS | 1.15.40 |     |        |
|                                                                                                                       |                                      | P 7 A   | 080 |        |
|                                                                                                                       |                                      |         |     | SEP 05 |

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### GPWS SELECTOR

ROFA-01-15-40-007-8001AA



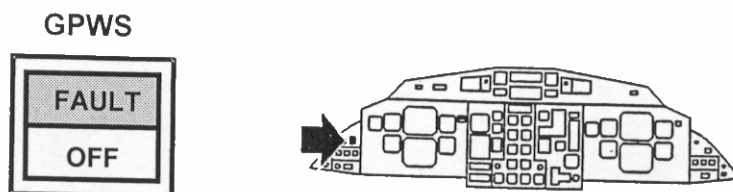
The selector is guarded and wirelocked on NORM position.

- NORM all basic GPWS modes alerts are operative.
- R FLAP Mode 4 alert caused by flap extension, at less than landing
- R OVRD configuration is inhibited to avoid nuisance warnings in case of landing
- R with reduced flap setting.
- OFF all basic GPWS modes inhibited.

|                                                                                                                       |                                      |         |     |        |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------|-----|--------|
| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>NAVIGATION SYSTEM</b><br><br>GPWS | 1.15.40 |     |        |
|                                                                                                                       |                                      | P 7 B   | 080 |        |
|                                                                                                                       |                                      |         |     | SEP 05 |

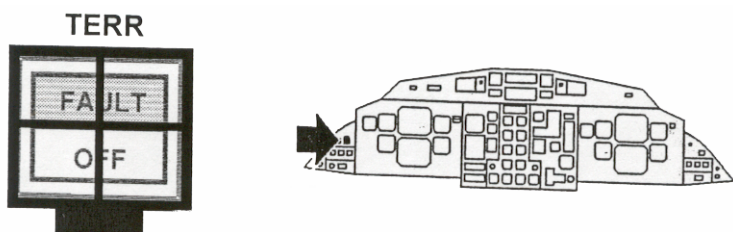
AA

### GPWS Light



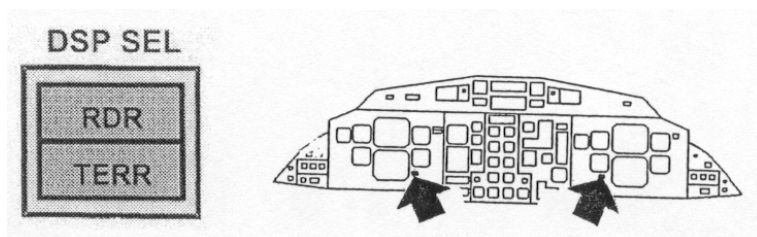
**FAULT**     illuminates amber when some or all GPWS basic modes are lost.  
**OFF**        illuminates white when GPWS selector on OFF position.

### TERR Guarded pb



**Pressed**     all Enhanced (TAD & TCF) modes are operative.  
**FAULT**        illuminates amber when some or all Enhanced modes are lost.  
**OFF**          illuminated white when TERR pb is released to inhibit Enhanced modes.

### DSP SEL pb



**RDR**         illuminates blue when Weather Radar display is selected on EFIS.  
**TERR**        illuminates blue when Terrain display is selected on EFIS.

|                                                                                   |                                      |         |     |        |
|-----------------------------------------------------------------------------------|--------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br>GPWS | 1.15.40 |     |        |
|                                                                                   |                                      | P 8     | 080 |        |
|                                                                                   |                                      |         |     | SEP 05 |

AA

### 40.3 ELECTRICAL SUPPLY/SYSTEM MONITORING

#### ELECTRICAL SUPPLY

| EQUIPMENT                                                               | DC BUS SUPPLY (C/B)                                 |
|-------------------------------------------------------------------------|-----------------------------------------------------|
| EGPWS computer<br>GPWS-G/S alert<br>GPWS light<br>TERR pb<br>DSP SEL pb | DC BUS 1<br>(on overhead panel EGPWS COMPTR & WARN) |
| GPWS FAULT indication on CAP                                            | DC BUS 2 (on overhead panel)                        |

R

#### SYSTEM MONITORING

The conditions are monitored by visual alerts :

- EGPWS computer internal failure or power supply loss.
  - .• GPWS FAULT amber light illuminates on CAP
  - .• both GPWS and TERR FAULT amber lights illuminate on left panel.
- ADC1 loss
  - .• GPWS FAULT amber light illuminates on CAP
  - .• both GPWS and TERR FAULT amber lights illuminate on left panel.
- Radio altimeter loss
  - .• GPWS FAULT amber light illuminates on CAP and on the 2VU left panel
- GNSS or AHRS1 loss
  - .• GPWS FAULT amber light illuminates on CAP
  - .• TERR FAULT amber light illuminates on the 2VU left panel



|                                                                                   |                   |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|---------|-----|--------|
|  | NAVIGATION SYSTEM | 1.15.50 |     |        |
|                                                                                   |                   | P 1     | 010 |        |
|                                                                                   | WEATHER RADAR     |         |     | JUL 00 |

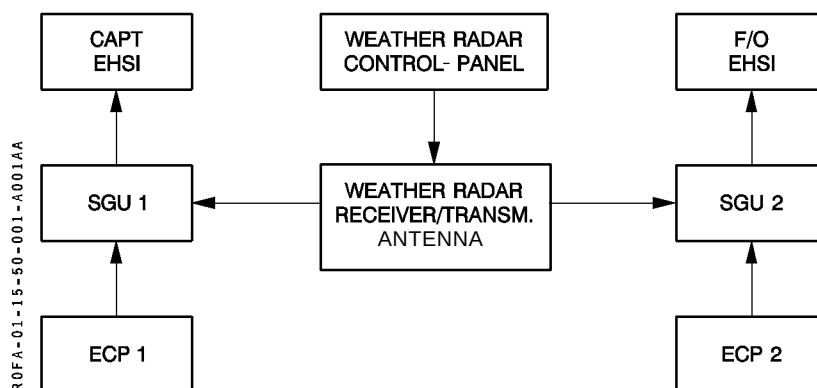
AA

## 50.1 DESCRIPTION

Weather radar system is designed for weather impediments detection, up to 300 NM in a 45 degree sector on each side of aircraft path.

Weather impediments are displayed on the EHSI(S) in ARC mode, in 4 colors according to the intensity of rain detected.

Weather radar can also be used in MAP mode to display ground obstacles.



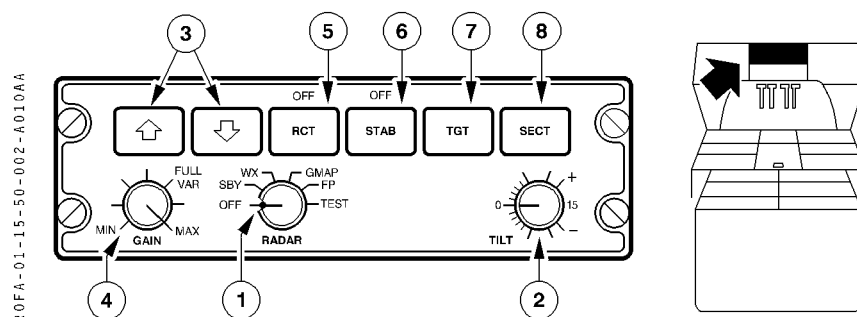
System is controlled with the weather radar control panel. Modes selected on this panel are displayed on the EHSI.

|                                                                                   |                   |  |         |        |
|-----------------------------------------------------------------------------------|-------------------|--|---------|--------|
|  | NAVIGATION SYSTEM |  | 1.15.50 |        |
|                                                                                   | WEATHER RADAR     |  | P 2     | 010    |
|                                                                                   |                   |  |         | JUL 00 |

AA

## 50.2 CONTROLS

### WEATHER RADAR CONTROL PANEL



#### ① Mode selector

Enables the selection of the operating mode.

OFF position : The radar system is turned off (WX displayed amber on the EFIS).

SBY position : (STBY displayed green on the EFIS) Places the radar in a ready state with the antenna scan stopped and the transmitter inhibited.

WX position : (WX displayed green on the EFIS) Selects the weather detection mode, displaying five different levels.

Level 0 : Black No detectable cloud

Level 1 : Green Moderate storm

Level 2 : Yellow Less severe storm

Level 3 : Red Strong storm

Level 4 : Magenta Intense storm

On the ground, the system is automatically forced in SBY position for safety. If needed, it is possible to restore the active WX mode by pushing the STAB button four times in three seconds.

GMAP position : (GMAP displayed green on the EFIS) Selects the ground mapping mode using four different levels.

Level 0 : Black No return

Level 1 : Cyan Least reflective return

Level 2 : Yellow Moderate return

Level 3 : Magenta Strong return

FP position : (FPLN displayed green on the EFIS). Clears the screen of radar data and put it in the flight plan mode. The target alert mode (TGT) can be used in FP mode.

TST position : (TEST displayed on the EFIS) displays a test pattern to verify the system.



|                                                                                   |                   |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|---------|-----|--------|
|  | NAVIGATION SYSTEM | 1.15.50 |     |        |
|                                                                                   |                   | P 3     | 010 |        |
|                                                                                   | WEATHER RADAR     |         |     | JUL 00 |

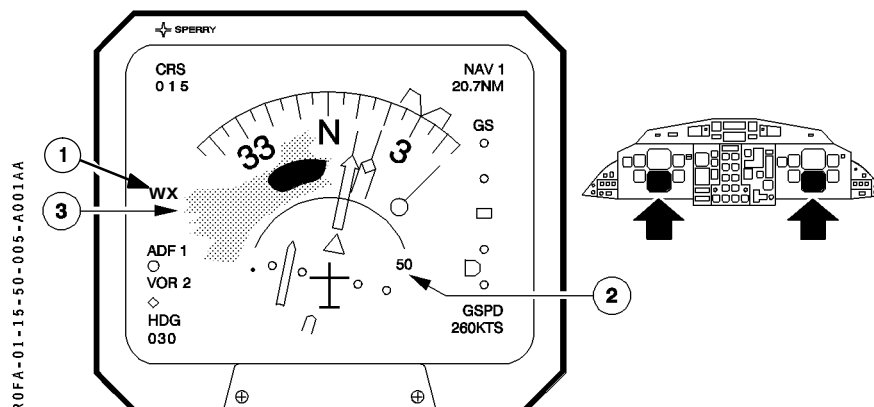
AA

- ② TILT control  
Is used to adjust the antenna pitch from 15° down to 15° up.
- ③ RANGE push buttons  
Select the different operating ranges from 5 to 300 NM. In the FP mode, additional ranges of 500 and 1000 miles are available.
- ④ GAIN rotary control and push/pull switch  
When the switch is pushed, the system enters the preset, calibrated gain mode, in this mode, the rotary control does nothing.  
When the switch is pulled, the system enters the variable gain mode, adjustable by the rotary control (VAR is displayed amber on the EFIS).
- ⑤ RCT push button  
Activates or deactivates the REACT mode which compensates for attenuation of the radar signal as it passes through rain fall.  
The cyan field indicates areas where further compensation is not possible. Any target detected in these areas will be displayed in magenta and should be considered dangerous.
- ⑥ STAB push button  
Turns the pitch and roll stability ON and OFF.
- ⑦ TGT push button  
Activates and deactivates the radar target alert mode. When activated, TGT is displayed green on the EFIS and the system monitors beyond the selected range and 7.5° on each side of the aircraft heading.  
If a characteristic return is detected in the monitored area, the TGT legend on the EFIS changes from green to amber. TGT alert can only be selected in the WX and FP modes.
- ⑧ SECT push button  
Is used to select either the normal 12 looks/mn 120° scan or the faster update 24 looks/mn 60° sector scan.

|                                                                                                                       |                          |  |         |        |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------|--|---------|--------|
| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>NAVIGATION SYSTEM</b> |  | 1.15.50 |        |
|                                                                                                                       | <b>WEATHER RADAR</b>     |  | P 4     | 010    |
|                                                                                                                       |                          |  |         | JUL 00 |

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### EHSI DISPLAY



#### ① Radar Mode Annunciator

Appears as soon as the weather radar is switched on.

- WAIT (green) : corresponds to the radar unit warning up time (is illuminated during 90 seconds)
- STBY (green) : radar is in STBY mode.
- TEST (green) : illuminates green when a test is initiated
- WX :
  - illuminates green when radar is operative
  - illuminates amber to indicate that radar is not working when it is either :
    - . selected ON on EFIS Control Panel (ECP) but OFF on Radar Control box.
    - . or selected ON on both ECP and Radar Control box but antenna is not scanning.
- G MAP (green) : enables to display the ground obstacles
- RCT (green) : Rain Echo Attenuation Compensation Technique mode is engaged.
- TX (magenta) : illuminates when radar operates with the screen dimmed.

#### ② Distance indication (white)

Appears as soon as ARC mode is selected on EHSI.

#### ③ Weather indication

Is displayed in four colors.

|                                                                                   |                   |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|---------|-----|--------|
|  | NAVIGATION SYSTEM | 1.15.50 |     |        |
|                                                                                   |                   | P 5     | 010 |        |
|                                                                                   | WEATHER RADAR     |         |     | JUL 00 |

AA

LEFT INTENTIONALLY BLANK

|                                                                                   |                   |         |     |        |
|-----------------------------------------------------------------------------------|-------------------|---------|-----|--------|
|  | NAVIGATION SYSTEM | 1.15.50 |     |        |
|                                                                                   |                   | P 6     | 010 |        |
|                                                                                   | WEATHER RADAR     |         |     | SEP 03 |

AA

### 50.3 ELECTRICAL SUPPLY

| EQUIPMENT     | DC BUS SUPPLY<br>(C/B)                 | AC BUS SUPPLY<br>(C/B)                        |
|---------------|----------------------------------------|-----------------------------------------------|
| Weather radar | DC BUS 1<br>(on overhead panel 28 VDC) | 26 VAC STBY BUS<br>(on overhead panel 26 VAC) |

|                                                                                   |                                           |  |         |     |        |
|-----------------------------------------------------------------------------------|-------------------------------------------|--|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b>                  |  | 1.15.60 |     |        |
|                                                                                   | <b>GLOBAL NAVIGATION SATELLITE SYSTEM</b> |  | P 1     | 130 |        |
|                                                                                   | GNSS                                      |  |         |     | JUL 01 |

AA

#### 60.1 DESCRIPTION

(See schematic P. 11/12)

Using information provided by a constellation of 24 satellites (the HT 1000 is able to track up to 12 satellites at a time), GNSS is an automatic tridimensional (latitude, longitude, altitude) location and navigation means. It also uses data recorded in a data base.

The data base is stored in the NPU and is updated every 28 days on the ground using a specific data loader. The effective date periods are displayed on the MCDU IDENT page.

The navigation is normally performed using the GPS sensor (GPS mode). In the case where the GPS position becomes unavailable, the dead reckoning mode (DR) is used like a back-up utilizing true airspeed, heading and the last computed wind data.

#### **FUNCTIONS**

HT 1000 is capable of performing all the functions associated with the great circle navigation.

It mainly allows to perform:

- "Direct To" navigation
- Flight plan navigation
- Navigation to nearest airport (or nearest VOR, NDB...)
- Vertical navigation (non-coupled to auto-pilot)
- Non precision approach

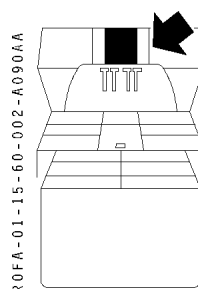
To know all the functions available, refer to the table of contents of the HT 1000 pilot's guide.

|                                                                                   |                                    |  |         |     |        |
|-----------------------------------------------------------------------------------|------------------------------------|--|---------|-----|--------|
|  | NAVIGATION SYSTEM                  |  | 1.15.60 |     |        |
|                                                                                   |                                    |  | P 2     | 090 |        |
|                                                                                   | GLOBAL NAVIGATION SATELLITE SYSTEM |  |         |     | JUL 00 |
|                                                                                   | GNSS                               |  |         |     |        |

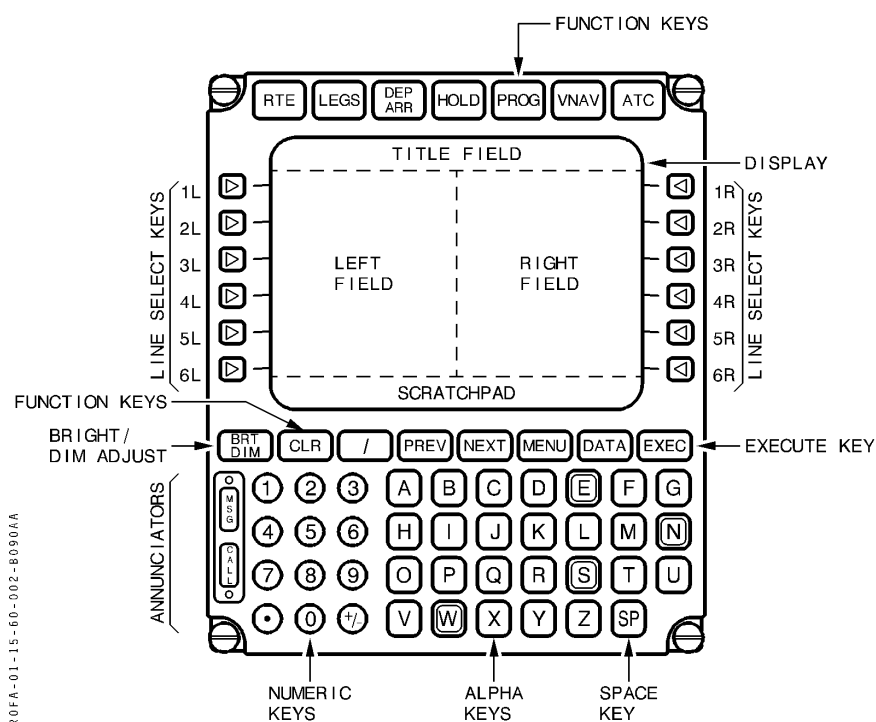
AA

## 60.2 CONTROLS

### HT 1000 CONTROLS



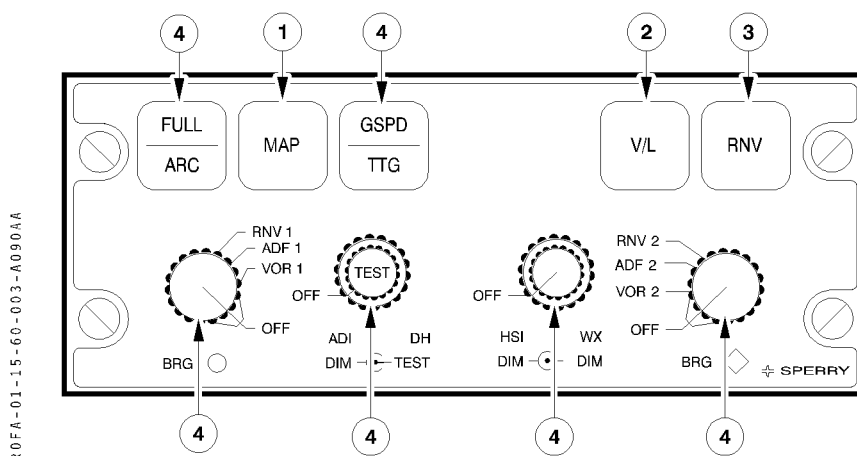
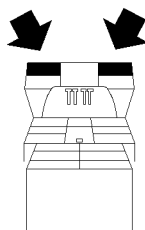
The MCDU is the pilot interface for operation and data entry of the HT 1000 and also displays routes and advisory data on a color 5.5" liquid crystal display. The display has 14 lines of data with 24 characters per line. The MCDU keyboards provides for data input and display selection and control.



|                                                                                                                       |                                    |  |         |     |        |
|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|--|---------|-----|--------|
| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>NAVIGATION SYSTEM</b>           |  | 1.15.60 |     |        |
|                                                                                                                       |                                    |  | P 3     | 090 |        |
|                                                                                                                       | GLOBAL NAVIGATION SATELLITE SYSTEM |  |         |     | JUL 00 |
|                                                                                                                       | GNSS                               |  |         |     |        |

AA

### EFIS CONTROL PANEL

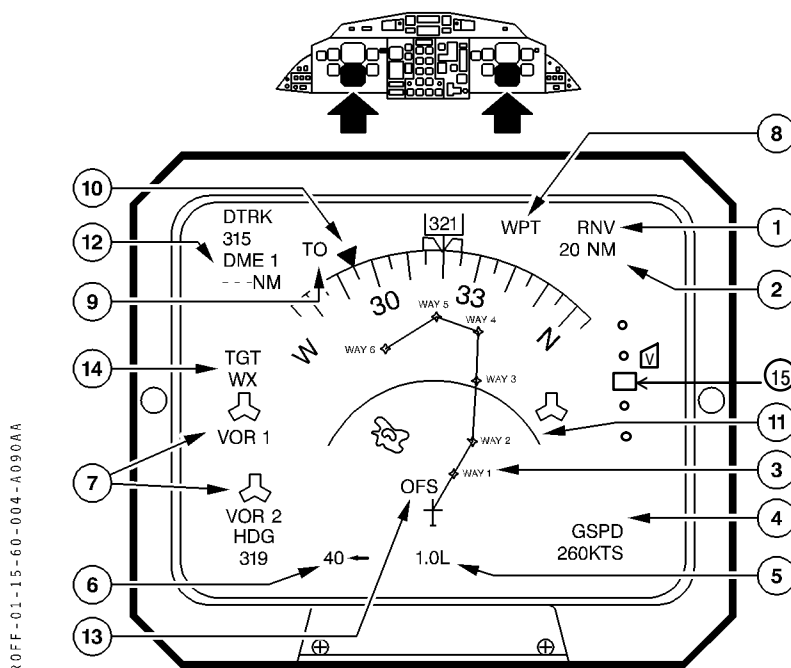


- ① **Map pb**  
Repetitive action on this pb selects alternately MAP display and ARC display on EHSI.  
In MAP selection, waypoints of the flight plan are displayed in white except the active waypoint which is magenta.
- ② **V/L pb**  
Action on this pushbutton causes selection of the VOR/LOC mode.
- ③ **RNV pb**  
Action on this pushbutton causes selection of the GNSS mode.
- ④ **Refer to 1.10.30.**

|                                                                                                                       |                                    |  |         |     |        |
|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|--|---------|-----|--------|
| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>NAVIGATION SYSTEM</b>           |  | 1.15.60 |     |        |
|                                                                                                                       |                                    |  | P 4     | 110 |        |
|                                                                                                                       | GLOBAL NAVIGATION SATELLITE SYSTEM |  |         |     | JUL 00 |
|                                                                                                                       | GNSS                               |  |         |     |        |

AA

### EHSI - MAP DISPLAY



ROFF-01-15-60-004-A090AA

#### NAV source annunciation

Identifies the source which supplies the EHSI.

- ① This information is blue when only one crew member uses GNSS. It becomes amber when both Pilot and F/O use GNSS as navigation source.

#### ② Distance counter

Indicates the distance computed by GNSS to the next waypoint.

#### ③ Waypoints

- ◇ next waypoint (magenta)
- ◇ other waypoint (white)
- indicates an airport
- ✈ indicates a VOR



|                                                                                   |                                                                                       |         |     |        |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><br><b>GLOBAL NAVIGATION SATELLITE SYSTEM</b><br><br>GNSS | 1.15.60 |     |        |
|                                                                                   |                                                                                       | P 5     | 110 |        |
|                                                                                   |                                                                                       |         |     | JUL 00 |

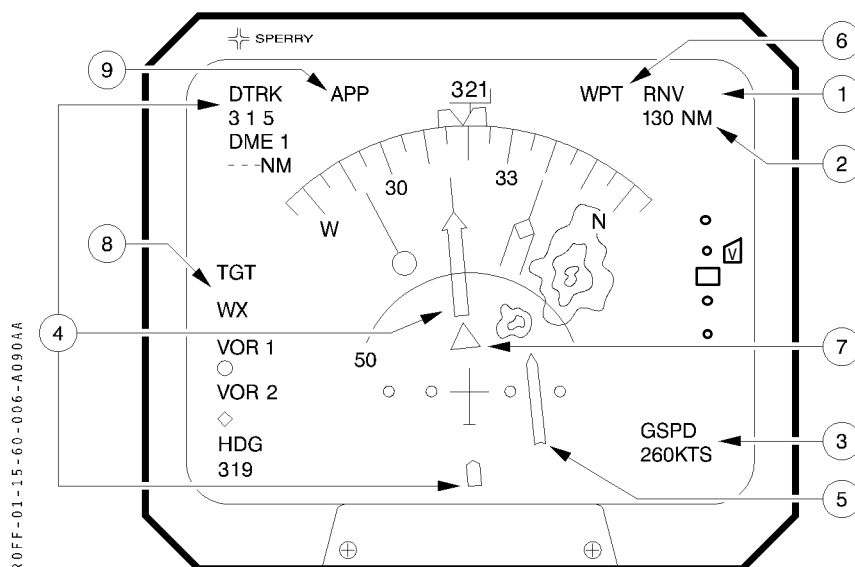
AA

- ④ Ground speed indicator  
Indicates the ground speed calculated by the GNSS.
- ⑤ Track deviation  
Indicates in NM and tenths of NM the track deviation to the left (L) or to the right (R) of the intended track.
- ⑥ Wind indicator  
An arrow and a figure indicates the direction and the velocity (in kt) of the wind.
- ⑦ VOR/RNV symbols  
 RNV  
 VOR  
Only VOR/DME or RNV waypoints will be presented on the MAP display.  
VOR/RNV 1 is displayed in blue.  
VOR/RNV 2 is displayed in green.
- ⑧ WPT/DGR alerting  
WPT illuminates amber when approaching a waypoint  
DGR illuminates amber when the "UNABLE RNP" message is displayed on the MCDU.
- ⑨ TO/FROM indicator (magenta)
- ⑩ Drift angle indicator (magenta)
- ⑪ Radar's range selector may be used to select the distance scale.
- ⑫ DME 1/2  
Indicates the distance given by DME 1/2.
- ⑬ OFS (cyan)  
Indicates that a parallel offset has been activated.
- ⑭ RADAR status
- ⑮ Vertical deviation  
Scale and Index

|                                                                                                                       |                                    |  |         |     |        |
|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|--|---------|-----|--------|
| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>NAVIGATION SYSTEM</b>           |  | 1.15.60 |     |        |
|                                                                                                                       |                                    |  | P 6     | 110 |        |
|                                                                                                                       | GLOBAL NAVIGATION SATELLITE SYSTEM |  |         |     | JUL 00 |
|                                                                                                                       | GNSS                               |  |         |     |        |

AA

### EHSI - ARC DISPLAY

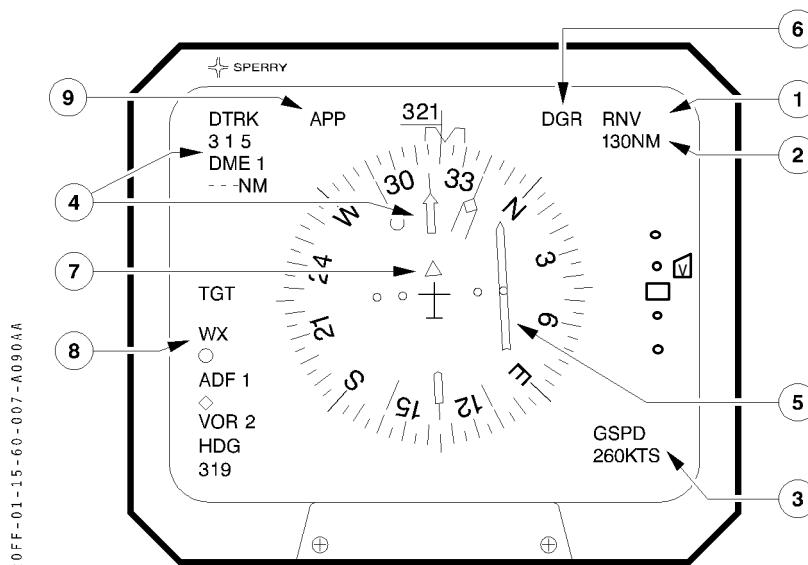


- ① NAV source annunciation  
Identifies the source which supplies the EHSI.  
This information is blue when only one crew member uses GPS. It becomes amber when both Capt and F/O use GPS as navigation source.
- ② Distance counter  
Indicates the distance computed by GPS to the next waypoint.
- ③ Ground speed indicator  
Indicates the ground speed calculated by the GPS.
- ④ Desired track indication
- ⑤ Lateral deviation to the track
- ⑥ WPT/DGR alerting  
WPT illuminates amber when approaching a waypoint  
DGR illuminates amber when the "UNABLE RNP" message is displayed on the MCDU.
- ⑦ TO/FROM annunciator
- ⑧ RADAR status
- ⑨ APP/OFS  
APP illuminates cyan when in approach phase.  
OFS illuminates cyan when an offset has been activated.

|                                                                                                                       |                                    |  |         |     |        |
|-----------------------------------------------------------------------------------------------------------------------|------------------------------------|--|---------|-----|--------|
| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>NAVIGATION SYSTEM</b>           |  | 1.15.60 |     |        |
|                                                                                                                       |                                    |  | P 7     | 110 |        |
|                                                                                                                       | GLOBAL NAVIGATION SATELLITE SYSTEM |  |         |     | JUL 00 |
|                                                                                                                       | GNSS                               |  |         |     |        |

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### EHSI - FULL MODE



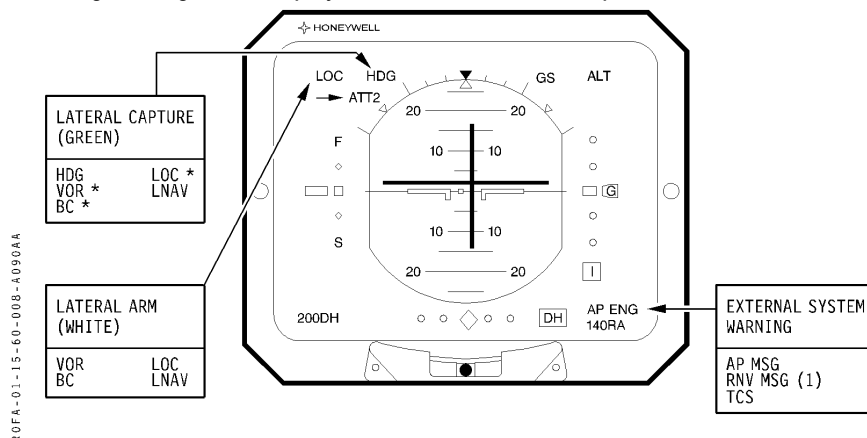
- ① NAV source annunciation  
Identifies the source which supplies the EHSI.  
This information is blue when only one crew member uses GPS. It becomes amber when both Capt and F/O use GPS as navigation source.
- ② Distance counter  
Indicates the distance computed by GPS to the next waypoint.
- ③ Ground speed indicator  
Indicates the ground speed calculated by the GPS.
- ④ Desired track indication
- ⑤ Lateral deviation to the track
- ⑥ WPT/DGR alerting  
WPT illuminates amber when approaching a waypoint  
DGR illuminates amber when the "UNABLE RNP" message is displayed on the MCDU.
- ⑦ TO/FROM annunciator
- ⑧ RADAR status
- ⑨ APP/OFS  
APP illuminates cyan when in approach phase.  
OFS illuminates cyan when an offset has been activated.

|                                                                                   |                                    |  |         |     |        |
|-----------------------------------------------------------------------------------|------------------------------------|--|---------|-----|--------|
|  | NAVIGATION SYSTEM                  |  | 1.15.60 |     |        |
|                                                                                   |                                    |  | P 8     | 110 |        |
|                                                                                   | GLOBAL NAVIGATION SATELLITE SYSTEM |  |         |     | JUL 00 |
|                                                                                   | GNSS                               |  |         |     |        |

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## EADI

Alerting messages and displays related to the HT 1000 operation.



- (1) RNV MSG is triggered by one of the following messages displayed on the MCDU:
- UNABLE RNP: message annunciated when ANP exceeds RNP or integrity is greater than twice the selected RNP (Once the value for approach). The conditions for displaying this message are flight phase dependent as follows:

| PHASE OF FLIGHT | DEFAULT RNP (NM) | Unable RNP Time to Alarm (s) |
|-----------------|------------------|------------------------------|
| OCEANIC         | 12               | 80                           |
| EN ROUTE        | 2                | 80                           |
| TERMINAL        | 1                | 60                           |
| APPROACH *      | 0.3              | 10                           |

\* Not applicable

- DEAD RECKONING: message annunciated when NAV source becomes dead reckoning (GPS and DME modes are lost).
- VERIFY RNP ENTRY: message annunciated when the pilot entered RNP is greater than default current RNP.
- VERIFY RNP-POS REF: message annunciated when flight phase changes and current pilot entered RNP is greater than the default RNP for new flight mode.
- UNABLE APPROACH: message annunciated when within 2 NM from the FAF, and RAIM prediction at FAF/MAP fails, or navigation source is not GPS.

## VERTICAL TRACK CHANGE ALERT

This message and annunciator is displayed prior to reaching a vertical track change.

## END OF DESCENT

This message appears whenever the aircraft reaches the last altitude constraint on the descent path.

|                                                                                   |                                                                                   |         |     |        |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------|-----|--------|
|  | <b>NAVIGATION SYSTEM</b><br><b>GLOBAL NAVIGATION SATELLITE SYSTEM</b><br><br>GNSS | 1.15.60 |     |        |
|                                                                                   |                                                                                   | P 9     | 270 |        |
|                                                                                   |                                                                                   |         |     | JUL 00 |

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In addition there are some advisory messages such as:

- RAIM LIMIT EXCEEDS XX NM: message annunciated when the GPS RAIM protection Limit exceeds TSO-C129 requirement for current flight phase.
- CHECK DEST RAIM-POS REF: message annunciated within 30 NM of destination airport if active route contains approach and approach RAIM predicted to be non available for some period of time within 15 minutes of destination ETA.

RNV MSG will extinguish when the associated MCDU message is cancelled.

### 60.3 ELECTRICAL SUPPLY

| EQUIPMENT | DC BUS SUPPLY                          |
|-----------|----------------------------------------|
| GNSS      | DC STBY BUS<br>(on overhead panel GPS) |

|                                                                                   |                                                                 |         |     |        |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------|---------|-----|--------|
|  | NAVIGATION SYSTEM<br>GLOBAL NAVIGATION SATELLITE SYSTEM<br>GNSS | 1.15.60 |     |        |
|                                                                                   |                                                                 | P 10    | 090 |        |
|                                                                                   |                                                                 |         |     | JUL 00 |

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|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------|-----|--------|
| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>NAVIGATION SYSTEM</b>                  | 1.15.60 |     |        |
|                                                                                                                       | <b>GLOBAL NAVIGATION SATELLITE SYSTEM</b> | P 11/12 | 110 |        |
|                                                                                                                       | <b>GNSS</b>                               |         |     | JUL 01 |

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60.4 SCHEMATIC

