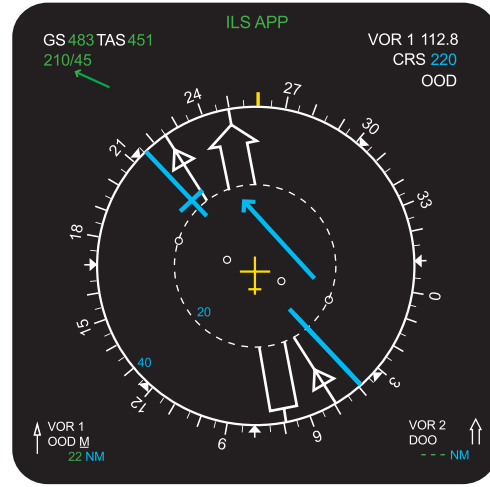


The ND, positioned inboard of the PFD, is independently controlled by the captain and first officer. There are five modes available for display: ROSE NAV, ROSE ILS, ROSE VOR, ARC and Plan.

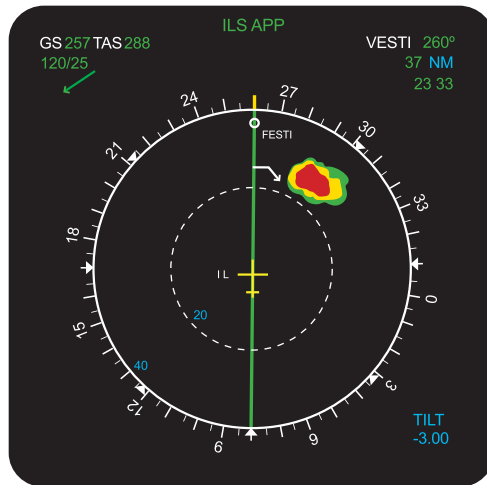
### ROSE ILS



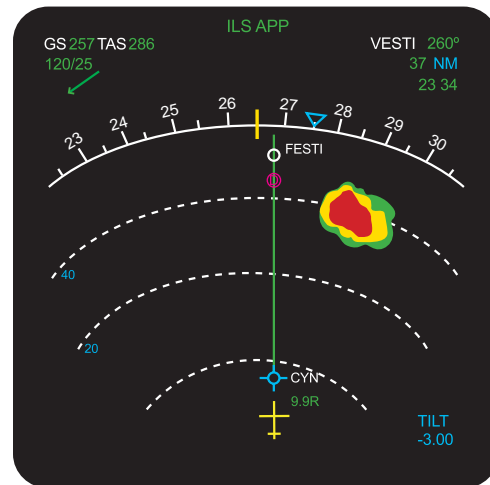
### ROSE VOR



### ROSE NAV



### ARC NAV-Wx Radar




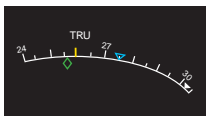
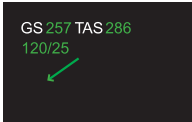
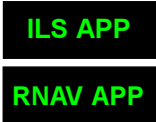
### PLAN






## Navigation Display (ND) INFORMATION COMMON TO ALL MODES

### Range Scale

- Each mode is capable of displaying a range scale from 10 to 320 NM, selected on the respective Captain's or First Officer's EFIS control panel.
- The maximum range from the aircraft position in the rose mode is half the selected range.
- In the ARC mode, the range from the aircraft position to the outer edge of the scale is equal to the selected range.
- The range scale will be indicated on the ND display by white dashed circular lines with blue distance markers.
















INDICATION	DESCRIPTION
	<p><b>Aircraft Symbol/Cross Track Error</b></p> <ul style="list-style-type: none"> <li>• This <b>Aircraft Symbol</b> indicates the current position and appears in the center of the ND in the ROSE mode, at the bottom of the display in the ARC mode, and along the route at the appropriate location in the PLAN mode.</li> <li>• The <b>Cross Track Error</b>, the lateral deviation left or right of the active flight plan course, will be displayed next to the aircraft symbol in nautical miles.</li> </ul>
	<p><b>Aircraft Heading</b></p> <ul style="list-style-type: none"> <li>• The yellow line displays the aircraft's magnetic heading on the moving white compass rose.</li> <li>• Small white triangles are fixed at 45° intervals on the compass rose.</li> <li>• 'TRU' appears at the top of the compass rose if the display has changed from magnetic heading to true heading.</li> <li>• The FCU selected heading appears as a blue triangle on the heading scale.</li> <li>• A green diamond below the appropriate track identifies the actual aircraft track.</li> </ul>
	<p>The ground speed and true airspeed are displayed in the upper left-hand corner on the ND. This information is furnished by the ADIRS.</p> <ul style="list-style-type: none"> <li>• The ground speed is operative on the ground and can assist in monitoring taxi speed.</li> </ul> <p>The wind direction and speed are displayed below the GS and TAS.</p> <ul style="list-style-type: none"> <li>• The digital indication is based on true north.</li> <li>• The wind arrow indicates the wind direction based on magnetic north. The wind arrow will appear when the velocity is greater than 2 knots.</li> </ul>
	<p><b>Approach message</b></p> <p>The type of approach selected from the MCDU database, if any, is indicated in the top center of the ND.</p>


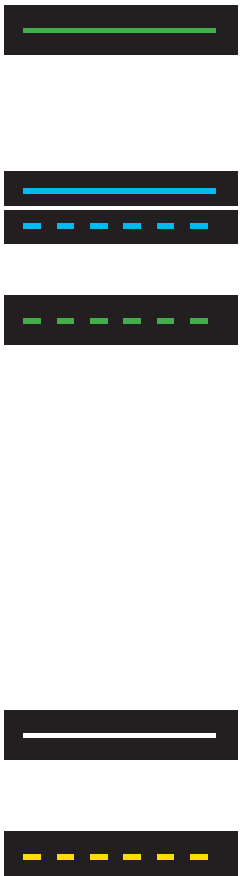
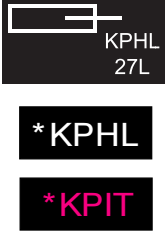

INDICATION	DESCRIPTION
	<p><b>Waypoint/Navaid Information</b></p> <p>The upper right-hand corner of the ND will display navaid or waypoint information depending on the ND mode selection.</p> <ul style="list-style-type: none"> <li>• When ROSE NAV ILS mode is selected, the ILS frequency course and identifiers are displayed.</li> <li>• When ROSE NAV VOR is selected, the VOR frequency, selected course, and identifier are displayed.</li> <li>• In ROSE NAV, ARC or PLAN modes, the TO waypoint is displayed in the upper right-hand corner along with the track, distance, and ETA.</li> </ul>
	<p><b>Chronometer Information</b></p> <ul style="list-style-type: none"> <li>• Each ND has an independent chronometer controlled by a CHRONO pb. The display will appear and begin timing when the pb is pressed once. The indication is in minutes and seconds from 0 to 59' 59" in hours and minutes from 1 H to 99 H 59'.</li> <li>• The elapsed time will stop when the CHRONO pb is pressed a second time and the display will be removed when CHRONO is pressed a third time.</li> </ul>
	<p><b>Navaid Information</b></p> <p>When the VOR selector switch on the Captain's or First Officer's EFIS control panel is set to VOR, the respective ND displays the bearing pointer and the following navaid information:</p> <ul style="list-style-type: none"> <li>• Type of navaid (VOR).</li> <li>• A single line bearing pointer for VOR 1 and a double line bearing pointer for VOR 2.</li> <li>• Navaid identification if the navaid is tuned. If the navaid is not tuned, the navaid frequency is displayed.</li> <li>• DME.</li> <li>• Mode of tuning: <ul style="list-style-type: none"> <li>• Nothing for a station tuned automatically by the FMGC.</li> <li>• <b>M</b> for a manually tuned navaid on the MCDU RAD NAV page.</li> <li>• <b>R</b> for a remotely tuned navaid through the RMP. This procedure is used in the event of a failure of both FMGCs or MCDUs.</li> </ul> </li> <li>• If the navaid signal is lost, the ND stops displaying the associated data except for the identification or frequency.</li> </ul>

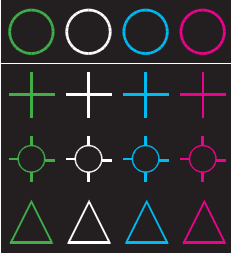
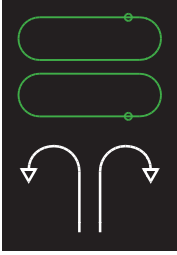

## ROSE and ARC NAV MODES

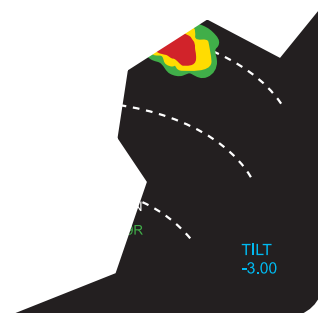
- ROSE and ARC modes provide the same information except the ARC mode provides only a 90° compass rose view.

### NAV Mode Symbols

INDICATION	DESCRIPTION
	Position where the aircraft will level-off at the FCU selected altitude. The same symbol will indicate a level-off from a managed climb (CLB) or selected climb (OP CLB).
	Position where the aircraft will level-off at the constrained altitude entered in the MCDU. The managed CLB mode must be engaged for the altitude constraint symbol to appear and be honored.
	Position where the aircraft will level-off at the FCU selected altitude. The same symbol will indicate a level-off from a managed descent (DES) or selected descent (OP DES).
	Position where the aircraft will level-off at the constrained altitude entered in the MCDU. The managed DES mode must be engaged for the altitude constraint symbol to appear and be honored.
	Start of climb with the CLB mode armed.
	Start of climb with the CLB mode <u>not</u> armed.
	Top of Descent or continue descent with DES armed.
	Top of Descent or continue descent with DES <u>not</u> armed.
	Intercept point where the aircraft is predicted to intercept the FMGS computed vertical descent profile. The indicator is blue indicating the DES mode is engaged.
	Intercept point where the aircraft will meet the FMGS computed vertical profile. The indicator is white indicating the DES mode is not engaged.
  	<ul style="list-style-type: none"> <li>Flight Plan Waypoint</li> <li>FMGC Database Waypoint: Displayed when the waypoint pb is pressed on the EFIS control panel.</li> <li>“TO” Waypoint.</li> </ul>
	<b>Speed Change</b> <ul style="list-style-type: none"> <li>Indicates the point where the aircraft will initiate an automatic acceleration or deceleration from current speed to new computed speed in case of SPD LIM, SPD CSTR, or HOLDING SPD (including 250 knots below 10,000).</li> </ul>
	<b>Deceleration Point</b> <ul style="list-style-type: none"> <li>Indicates where the aircraft will initiate an automatic deceleration toward <math>V_{APP}</math>.</li> <li>Managed NAV mode and managed speed must be engaged.</li> </ul>

INDICATION	DESCRIPTION
	<p><b>Altitude Constraints</b></p> <ul style="list-style-type: none"> <li>• Constraint is predicted to be met when the aircraft is in managed lateral and vertical modes.</li> <li>• Constraint is predicted to be missed. In this situation the aircraft is in the managed lateral and vertical modes; however, the FMGC will not be able to meet the altitude constraint.</li> <li>• Constraint is not being considered by the FMGC.</li> </ul>
	<p><b>Flight Plan Routes</b></p> <ul style="list-style-type: none"> <li>• The NAV modes can display the following flight plans. <ul style="list-style-type: none"> <li>• A green line represents the <b>Active Flight Plan</b>. <ul style="list-style-type: none"> <li>• Managed Mode: The course line will be continuous and depict the waypoints in range that are yet to be overflown. <ul style="list-style-type: none"> <li>• When the range selector is set to 160 or 320 NM, only the first waypoint of a SID or the last waypoint of a STAR will be depicted.</li> </ul> </li> <li>• A continuous blue line depicts the <b>Missed Approach Procedure</b>.</li> <li>• A dashed blue line depicts the <b>Alternate Flight Plan</b> until activated. Once activated, the alternate flight plan is displayed in green.</li> <li>• If a flight plan offset is entered, the original flight plan course will be a dashed green line and the offset course will be depicted as a continuous green line.</li> <li>• Note: When flying an ILS approach the ND course will be depicted as a continuous green line; however, course guidance is being provided by the localizer signal. The FMA must be referenced to determine the active navigation mode.</li> </ul> </li> <li>• Selected Mode: If HDG is selected (FCU HDG knob pulled) the active flight plan line will be dashed. <ul style="list-style-type: none"> <li>• When the HDG mode active with NAV armed to intercept the FMGC course, the ND will display the new active flight plan as a continuous green line once the FMGC has computed the intercept. The portion of the flight plan before the intercept, that will not be flown will be shown as a dashed line.</li> </ul> </li> </ul> </li> <li>• A continuous white line depicts the <b>Secondary Flight Plan</b>. The ND will continue to display the active flight plan and where common legs occur, the course line will be a continuous green line.</li> <li>• A dashed yellow line represents the <b>Temporary Flight Plan</b>.</li> </ul>
	<p><b>Airports</b></p> <ul style="list-style-type: none"> <li>• Airports included in flight plan: <ul style="list-style-type: none"> <li>• If the runway is specified in the flight plan (departure or destination) it is represented by the oriented runway symbol in white.</li> <li>• If the runway is not specified in the flight plan it is represented by a star and the identification is displayed in white.</li> </ul> </li> <li>• The magenta star represents the airports that are displayed by pressing the APRTS pb on the EFIS control panel.</li> </ul>
	<p><b>ILS Marker Beacon (Diamond Shape)</b></p> <ul style="list-style-type: none"> <li>• Outer marker</li> <li>• Middle marker</li> <li>• Inner marker</li> </ul>

INDICATION	DESCRIPTION
	<p><b>Nav aids</b> The ND can display:</p> <ul style="list-style-type: none"> <li>• TACAN/DME</li> <li>• VOR</li> <li>• VOR/DME</li> <li>• NBD nav aids from the database. <ul style="list-style-type: none"> <li>• The color of the symbols will vary depending on its current status: <ul style="list-style-type: none"> <li>• Green if the nav aid is a current waypoint on the flight plan.</li> <li>• White if it is the TO waypoint.</li> <li>• Blue when the nav aid is tuned for display either automatically by the FMGC or manually through the MCDU.</li> <li>• Magenta when the nav aid is not part of the flight plan and is displayed by selecting the appropriate pb on the EFIS control panel.</li> </ul> </li> </ul> </li> </ul>
	<p><b>Holding Pattern</b></p> <ul style="list-style-type: none"> <li>• The ND will display the holding pattern circuit when the hold is part of the active or next leg. The holding pattern will be displayed with right or left turns as appropriate.</li> <li>• The ND will display an arc representing the holding pattern and the direction of the hold when the hold is <u>not</u> part of the active or next leg.</li> </ul>
	<p><b>Energy Circle</b> This symbol indicates the radius corresponding to the required distance to land from present position. This symbol will be centered on the aircraft position and oriented to the current track line and is only displayed in DES and APPR phase when a selected lateral mode is engaged (i.e. heading).</p>

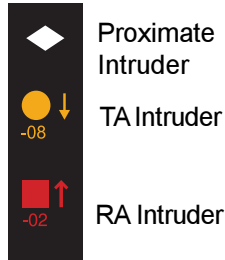
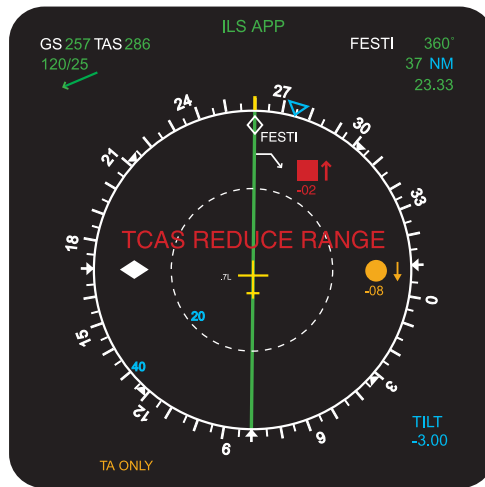


### Weather Radar Display

- The weather radar display is depicted on the ND in any mode except PLAN. The selected ND range scale will control the weather radar range.
- The radar returns will appear in black, green, yellow, red or magenta depending on the precipitation intensity. The antenna tilt angle will be displayed in the lower right-hand corner of the ND and is the angle between the horizon and the radar beam axis. When manual calibration mode is selected, MAN appears in green.
- If the TERR ON ND is selected on, the ND displays the surrounding terrain from the stored database, and the weather radar display will be suppressed.
- Failure messages displayed on the ND for weather radar:

<b>WXR RT</b>	Radar transceiver failure
<b>WXR ANT</b>	Radar antenna failure
<b>WXR CTL</b>	Radar control unit failure
<b>WXR RNG</b>	Range error
<b>WXR WEAK</b>	Calibration failure
<b>WXR ATT</b>	Attitude control failure
<b>WXR STAB</b>	Antenna stabilization failure

} The screen will not display a radar image for these failures.



### TCAS Display

The TCAS detection capability is limited to intruders flying within 30 NM horizontally and 9,900' vertically. The ND will display the TCAS intruder information provided the TA/RA mode is selected on the transponder and the ND range is 10, 20 or 40 NM. Only the 8 most threatening intruders are displayed.

- A TA intruder will be associated with a "TRAFFIC-TRAFFIC" aural message.
- A RA intruder will be associated with vertical commands displayed on the PFD and aural messages.
- The relative altitude of an intruder will be displayed in hundred of feet above or below the respective symbol depending on its position.
- A vertical speed arrow will appear next to an intruder if its climb or descent exceeds 500 feet/Min.

TCAS : REDUCE RANGE

TCAS : REDUCE RANGE

TCAS : CHANGE MODE

TCAS : CHANGE MODE

### TCAS Mode and range Messages

- These messages will be displayed in the center of the ND.
- REDUCE RANGE is displayed when a TA or RA is detected and ND range is above 40 NM.
- CHANGE MODE is displayed when a TA or RA is detected and ND mode is in PLAN.

TCAS

TA ONLY

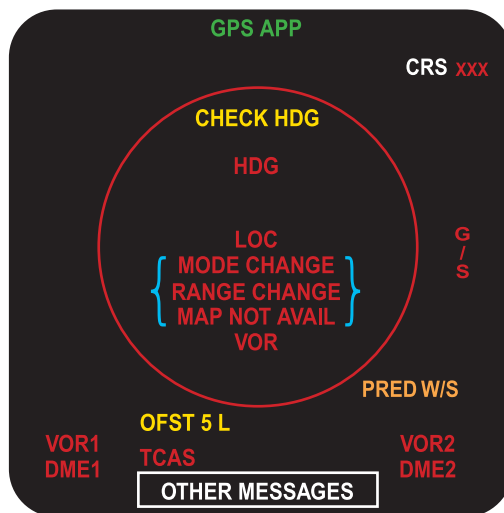
TA ONLY

### TCAS Operational Messages

- The message appears in red in case of an internal TCAS failure.
- Displayed in amber when controlled by specially equipped ground control stations through transponders link.
- White when TA is selected by the crew.



## ND Warnings and Messages

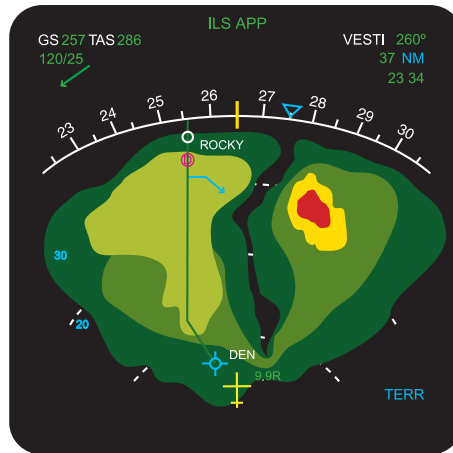


<b>HDG</b>	HDG will flash for 9 seconds, then remain steady if heading data fails. The compass rose or arc and associated symbols disappear.
<b>CHECK HDG</b>	Indicates the FWC detects a 5° discrepancy between the Captain's and First Officer's heading indications. This flag will appear on both NDs with an ECAM caution.
<b>MODE CHANGE</b>	This message appears when there is a discrepancy between the selected mode on the EFIS control panel and the mode sent to the onside FMGC, or while the DMC is preparing a new page for display. This message has priority over a Range Change message.
<b>RANGE CHANGE</b>	Indicates a discrepancy between the range selected on the EFIS control panel and the range sent from the onside FMGC.
<b>MAP NOT AVAIL</b>	Displayed if: <ul style="list-style-type: none"> <li>• A mode change or range change message has been displayed for more than 6 seconds.</li> <li>• The FMGC has failed.</li> <li>• The FMGC has delivered an invalid aircraft position.</li> </ul>
<b>LOC</b>	This message will flash for 9 seconds then remain steady if the localizer data fails.
<b>G / S</b>	This message will flash for 9 seconds then remain steady if the glide slope data fails.
<b>VOR</b>	This flag flashes for 9 seconds, then remains steady when the VOR bearing is not valid and in ROSE VOR mode.
<b>VOR1</b> <b>VOR2</b> <b>DME1</b> <b>DME2</b>	If a navigation receiver fails, the appropriate flag flashes for 9 seconds, then remains steady.
<b>CRS XXX</b>	VOR course has failed.
<b>OFST R 12</b>	A temporary or offset flight plan has been entered. The offset value is given in NM.

<b>PRED W/S</b>	The WINDSHEAR switch on the weather radar panel is set to AUTO, and a Predictive Windshear System fault is detected. This message appears on the ground or when flaps and slats are extended. It is associated with a single chime. The radar image remains available provided the fault does not affect the radar mode.
<b>XXX APP</b>	This message is displayed when an ILS or RNAV approach has been selected.

<b>MAP PARTLY DISPLAYED</b>	<b>Other Messages</b>
<b>NAV ACCUR UPGRAD</b> <b>NAV ACCUR DOWNGRAD</b>	Indicates incomplete data transmission between FMGC (priority criteria) and DMC or
<b>SPECIFIC VOR/D UNAVAIL</b>	if DMC cannot draw the complete MAP.
<b>CHECK VOR 1(2)</b> <b>CHECK ILS 1(2)</b>	Indicates a change in navigation accuracy.
<b>SET OFFSIDE RNG/MODE</b>	Indicates the tuned navaid is not available. Discrepancy between the tuned FMGC ident and the ident received.
<b>GPS PRIMARY</b>	If an FMGC fails, this message will be displayed on the affected ND if the EFIS range selected differs from the active ND/FMGC range.
<b>GPS PRIMARY LOST</b>	This message appears when GPS primary mode is available or has been recovered. The MCDU CLR key can clear this message.

## ND EGPWS Display



This message appears when GPS PRIMARY mode is not available. It cannot be cleared by pilot action. The ND will display the EGPWS terrain picture provided the ND is not in the PLAN mode:

- When either TERR ON ND switch is selected on.
- When an alert is generated and the TERR ON ND pb is not selected, the terrain is automatically displayed and ON illuminates in the TERR ON ND pb.
- The aircraft height above the terrain is computed using the Captain's altimeter setting. The Terrain Awareness Display DOES NOT protect against altimeter setting errors. Likewise, the EGPWS terrain feature uses FMS 1 for position information and will not protect against position errors.

**TERR: CHANGE MODE**

**TERR: CHANGE MODE**

- If the ND is in the PLAN mode, this message is displayed in case of a Terrain Awareness Display (TAD) warning alert.
- If the ND is in the PLAN mode, this message is displayed in case of a Terrain Awareness Display (TAD) caution alert.

**TERR**

To differentiate the terrain from the weather display this will replace the weather radar tilt indication and the display sweeps from the center outward to both sides of the ND.

**TERR AHEAD**

**TERR AHEAD**

**TERR RNG**

**TERR TST**

### WARNING AND CAUTION MESSAGES

- This message will flash for 9 seconds, then remain steady until the terrain caution condition no longer exists.
- This message will flash for 9 seconds, then remain steady until the terrain warning condition no longer exists.
- Indicates a RANGE error warning.
- Appears during EGPWS test when the terrain pattern is displayed and there is no failure.

### TERRAIN DISPLAY

The terrain appears in different colors and densities according to its relative height. The reference altitude is projected downward from the actual aircraft altitude to provide a 30 second advanced display of terrain when descending at more than 1000 FPM.

- High density red: Terrain is at least 2000 ft. above aircraft altitude.
- High density yellow: Terrain is between 1000 ft. and 2000 ft. above aircraft altitude.
- Medium density yellow: Terrain is between -250 ft (gear down) or -500 ft (gear up) to 1000 ft above aircraft altitude.
- Medium density green: Terrain is between 250 ft. (gear down) or 500 ft. (gear up) to 1000 ft. below aircraft altitude.
- Light density green: Terrain is between 1000 ft. to 2000 ft. below aircraft altitude.