

	INDICATING/RECORDING SYSTEMS INDICATIONS ON ND		1.31.45	P 1
			SEQ 001	REV 08

GENERAL

Six different displays are available (five modes in which to display navigation information and one to display engine primary parameters) :

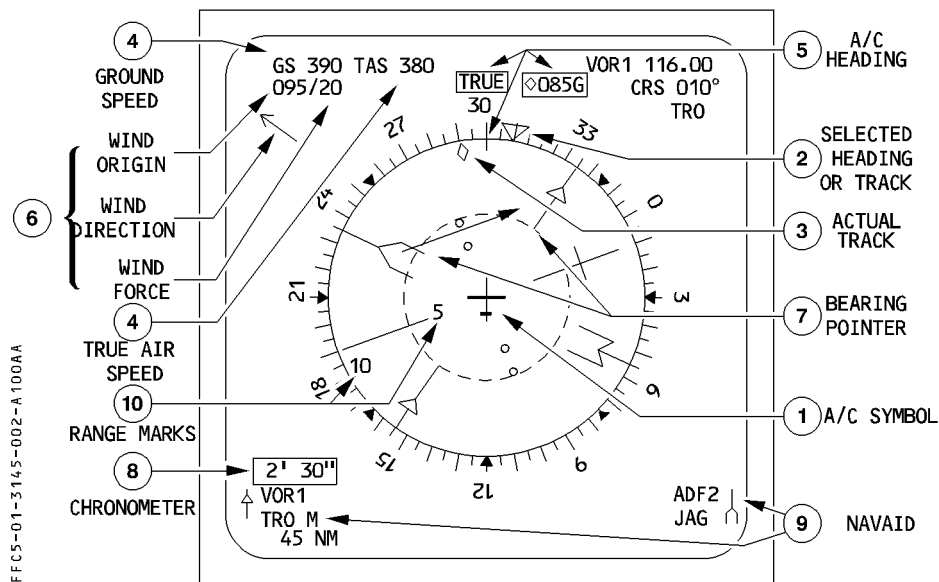
- ROSE ILS
- ROSE VOR
- ROSE NAV
- ARC
- PLAN
- ENG (standby page)

The navigation display (ND) can show a weather radar image in all modes except PLAN.

Note : *In case the temperature in the NDU exceeds a certain threshold the weather radar image is suppressed in order to avoid a DU overheat.*

If the temperature increases further the complete image is replaced by a green diagonal line to avoid DU hardware failure. The image is recovered after cool down of the DU.

ROSE MODES



①Aircraft symbol (yellow)

Fixed and centered on the display. This symbol points to the yellow lubber line.

②Selected heading or track (blue)

This pointer shows the heading or track, indicated on the HDG TRK counter of the FCU.

③Actual aircraft track (green)

This symbol is a small green diamond.

④ Ground speed and true air speed (green)

ADIRS furnishes these speeds.

	INDICATING/RECORDING SYSTEMS INDICATIONS ON ND	1.31.45 P 3	
		SEQ 100	REV 15

⑤ Aircraft heading

The fixed yellow lubber line points to the aircraft's magnetic heading on the moving white compass rose. Small white triangles are fixed, at 45° intervals, on the circumference of the compass rose.

At latitudes above 82° North or 60° South (or when entering the north magnetic polar region, latitude 73° N and longitude between 120° W and 90° W), the ADIRUs replace the magnetic heading with true heading on the EFIS and DDRMI.

When the aircraft is close to these regions (-0.5° away), the ADIRU causes the "SELECT TRUE REF" to appear on the ND. When the crew selects TRUE, "TRUE" appears in blue above the heading scale.

TRUE (blue) :

This appears on the ND when the compass is in the true heading configuration. The message flashes for 9 seconds, or until the slats are extended, then it remains steady.

Grid track (green) :

The ND displays the grid track in numerical form, when the switch is in true reference and the latitude is above 65° N or S.

⑥ Wind direction and speed

ADIRS furnishes the wind direction and speed. The digital direction is with respect to true north, and the analog direction (green arrow) is with respect to magnetic north. The arrow appears only if the wind speed is greater than two knots and the true airspeed is greater than 100 knots.

If the display does not receive either wind speed or direction, dashes replace the numbers on the display.

⑦ Bearing pointer

The ND displays the bearing pointer when bearing data is available. The pointer is :

- Green for ADF
- White for VOR.

If ROSE NAV or ARC mode is selected, and the computer detects a mismatch between the aircraft and the VOR reference, the bearing pointer appears in magenta. The VOR bearings are true bearings, having been corrected with the magnetic variation of the actual aircraft position (See also the FMGS PILOT'S GUIDE – POLAR NAVIGATION, 4.04.40).

If reception of a beacon ceases, or if the receiver fails, the associated bearing pointer disappears.

	INDICATING/RECORDING SYSTEMS INDICATIONS ON ND	1.31.45 P 4	
		SEQ 100	REV 15

⑧ Chronometer indication (white)

These numbers appear when the onside chronometer is started.

They display the elapsed time.

The indication is in minutes and seconds from 0 to 59' 59", and in hours and minutes from 1 H to 99 H 59'. (Seconds are not displayed beyond 59' 59").

⑨ Nav aids

When the ADF-OFF-VOR selector switch, on either the pilot's or co-pilot's EFIS control panel, is set to ADF or VOR, the onside ND displays the following characteristics of the corresponding navaid in white, for VOR, or in green, for ADF (left side for receiver 1 and right side for receiver 2) :

- Type of navaid (ADF or VOR) ;
- Shape and color of the associated bearing pointer (if the bearing pointer is in view);
- Navaid identification (or frequency by default) ;
- DME distance, if a DME is collocated with the selected VOR ADF, and the DME distance is never displayed at the same time.
- Tuning modes :
 - M for a navaid manually tuned by the pilot via the MCDU (underlined and dimmed);
 - R for a navaid tuned from an RMP (Radio Management Panel) (underlined and dimmed);
 - Nothing for a navaid automatically tuned by the FMGC.

If reception fails, the ND stops displaying the associated data (except for the identification or frequency).

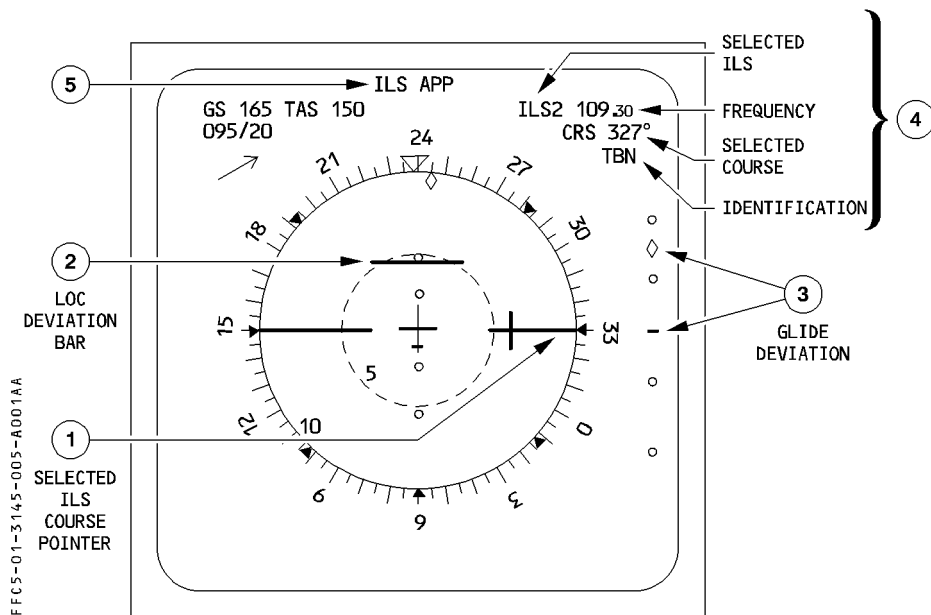
- If there is a mismatch between the aircraft and the VOR reference, the following messages are displayed next to the navaid parameters :
 - In case ROSE NAV or ARC mode is selected : CORR (magenta).
 - In case ROSE VOR or ROSE LS mode is selected : MAG or TRUE (amber) according to the VOR reference.

Also, see the FMGS PILOT'S GUIDE – POLAR NAVIGATION (Refer to 4.04.40).

⑩ Range marks

The range scale value, selected on the EFIS control panel (10 to 320 NM), governs the scale of the ND.

ROSE ILS MODE



① ILS Course Pointer (magenta)

This dagger-shaped symbol points to the selected ILS course.

The ILS is selected either by the FMGC (autotuned or manually) or through the RMP in backup mode.

② Localizer Deviation Bar (magenta)

This bar moves laterally with respect to the course pointer. Its scale consists of two dots on each side of zero deviation. Each dot represents a deviation of about $\pm 0.8^\circ$.

If the deviation becomes excessive (1/4 dot, 0.2°) above 15 feet RA, the bar and the scale pulse.

	INDICATING/RECORDING SYSTEMS INDICATIONS ON ND	1.31.45 P 6	
		SEQ 001	REV 08

③ Glide Deviation (magenta)

This diamond moves on a vertical scale consisting of two white dots on each side of the yellow reference line. Each dot represents a deviation of about $\pm 0.4^\circ$.

If the deviation becomes greater than one dot above 100 feet RA, the scale and the diamond flash.

④ Selected ILS Information

This display shows the ILS frequency (magenta), selected course (blue), and identification (magenta).

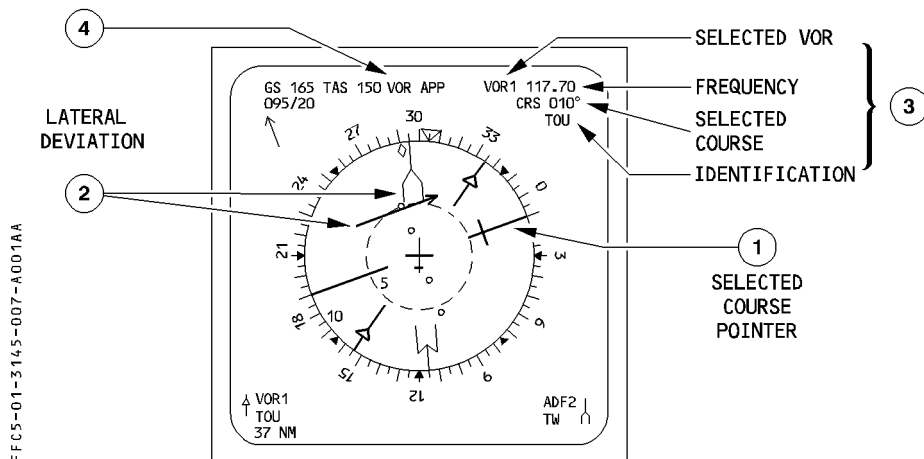
⑤ ILS APP Message (green)

These letters appear when an ILS approach has been selected on the MCDU.

Note : ILS1 information appears on PFD1 and ND2.

ILS2 information appears on PFD2 and ND1.

ROSE VOR MODE



① VOR Course Pointer (blue)

This dagger-shaped symbol points to the selected VOR course.

The VOR course is automatically selected by the FMGC or manually by the crew using the MCDU pages or the RMP backup mode.

② Lateral Deviation Bar (Blue)

This bar shows the VOR deviation on a lateral scale.

Each dot represents 5°. When the lateral deviation exceeds 10°, the bar remains displayed on the outer dot.

The arrow on the bar gives the TO/FROM indication.

③ VOR Information (White)

This area displays the frequency of the selected VOR and its identification (decoded by the receiver), the selected course, and the tuning mode.

④ VOR APP Message (green)

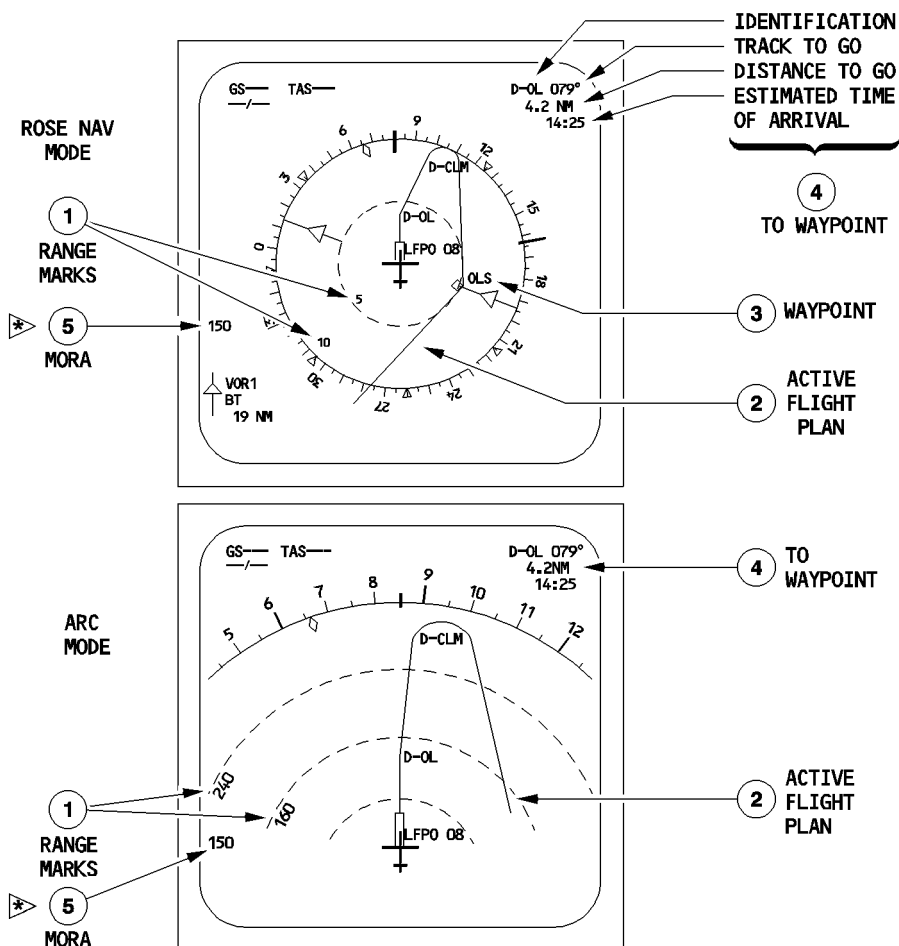
These letters appear when a VOR approach has been selected on the MCDU.

ROSE NAV MODE/ARC MODE

ROSE NAV and ARC modes give the pilot the same information, but ARC mode limits it to the forward 90° sector.

The ROSE NAV and ARC mode displays are oriented with respect to aircraft heading.

Note : The compass rose is oriented to magnetic or true north depending on NORTH REF pushbutton selection.



	INDICATING/RECORDING SYSTEMS INDICATIONS ON ND	1.31.45	P 9
		SEQ 001	REV 12

① Range Marks and Values

The values displayed on the ND are :

In ROSE NAV mode

1/4 of the selected range for the inner circle.

1/2 of the selected range for the heading scale circle.

In ARC mode

1/4 of the selected range for the first inner arc.

1/2 of the selected range for the second inner arc.

3/4 of the selected range for the third inner arc.

	INDICATING/RECORDING SYSTEMS		1.31.45	P 10
	INDICATIONS ON ND		SEQ 002	REV 08

② Flight Plan

The crew can use the MCDU to select various types of flight plan :

- The active flight plan (the flight plan the aircraft is actually following when the AFS NAV mode is engaged) is represented by a continuous green line. The ND shows only the part of the flight plan that is ahead of the aircraft, as well as the waypoints that are still to be overflown and the waypoint from which the aircraft is coming.

The ND does not show a SID or a STAR, except for the last waypoint of the SID and the first waypoint of the STAR, when the selected range is 160 or 320 NM.

If the primary flight plan is not active, it is represented by a dotted green line.

- A continuous blue line portrays the missed approach procedure, and a dashed blue line portrays the flight plan to the alternate.

The missed approach and the alternate flight plan are displayed when :

- In ARC or ROSE NAV mode, a missed approach waypoint or an alternate flight plan waypoint is displayed on the onside MCDU.
- In PLAN mode a missed approach or alternate waypoint is displayed in the 2L field of the onside MCDU.

- The secondary flight plan is represented by a continuous white line. The ND continues to display the active flight plan.

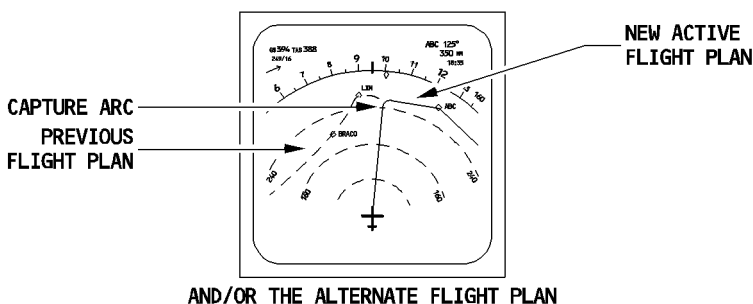
- Temporary flight plan

The revised portion of the flight plan is represented by a dotted yellow line.

- Flight plan capture

When the aircraft is off the primary flight plan and is flying toward it in HDG mode with the NAV mode armed, the ND shows the new active flight plan as a continuous green line if the FMGC has computed the intercept path.

The part of the flight plan before the interception point shows as a dotted green line.



- Abeam/Radial vectors

The pilot can select on the MCDU to have the display of :

- either the radial of a selected waypoint perpendicularly to the aircraft present track (abeam)
- or the selected radial of a waypoint (Radial)

These vectors are displayed using a dashed blue line.

 A340-600 <i>Flight crew operating manual</i>	INDICATING/RECORDING SYSTEMS INDICATIONS ON ND	1.31.45 SEQ 100	P 11 REV 08
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③ Waypoint

The ND can show various kinds of waypoints :

Flight plan waypoints

The ND shows these as green diamonds (white for the TO waypoint). When the pilot selects the WPT option on his EFIS control panel, the screen shows all waypoints other than flight plan waypoints in magenta.

– Pseudo waypoint

It is a predicted point of the flight path where the aircraft will reach a selected or a constraint altitude or speed.

• Level point (blue)

The symbol ( or ) gives the point on the flight plan where the aircraft will reach the FCU selected altitude when CLB or DES mode is armed or engaged. It is only displayed when aircraft is within 100 feet above or below the altitude selected.

It is displayed in magenta if it corresponds to a constraint.

• Start of climb or Top of Descent

The symbol ( or ) shows the point on the flight plan where the aircraft is predicted to leave the current flight level. It is displayed in white or in the blue when the corresponding mode (CLB or DES) is armed.

• Continue descent

This symbol () is displayed in white or in blue when DES mode is armed.

• Intercept Point :

The symbol () shows the point of the flight plan where the aircraft will intercept the FMGC computed descent profile. It is displayed in white before DES mode is armed and in blue when DES mode is armed.

• Speed change waypoint

It is indicated by a magenta point (•). It represents the point(s) of the flight plan where the speed has to change.

• Decelerate waypoint

It is indicated by a D inside a circle () and represents the point of the flight plan where the aircraft is predicted to decelerate for approach.

It is displayed in magenta when in managed speed mode or HDG/TRK mode.

Automatic decelerations occur only when displayed in magenta.

• Energy circle

It is indicated by an arc drawn 20° (). The radius corresponds to the required distance to land from present position.

The energy circle computed by the FMGC is available in ROSE NAV and ARC modes only.

• Constraint waypoint ()

This is displayed at flight plan waypoints where an altitude constraint is defined.

– magenta when the ALT CSTR is predicted to be satisfied

– amber when the ALT CSTR is predicted to be missed

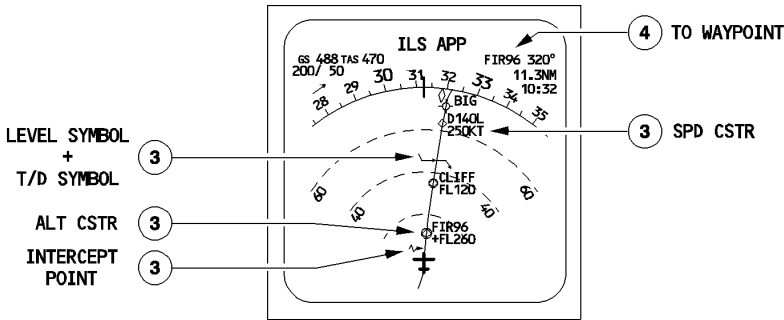
– white when the ALT CSTR is not taken into account by the guidance and the NAV mode is engaged.

• Time marker or equitime point

A green circle is displayed for a time marker or equitime point.

③ Waypoint (cont'd)

FFCS-01-3145-012-A100AA



④ TO waypoint

This is the next waypoint to be overflown.

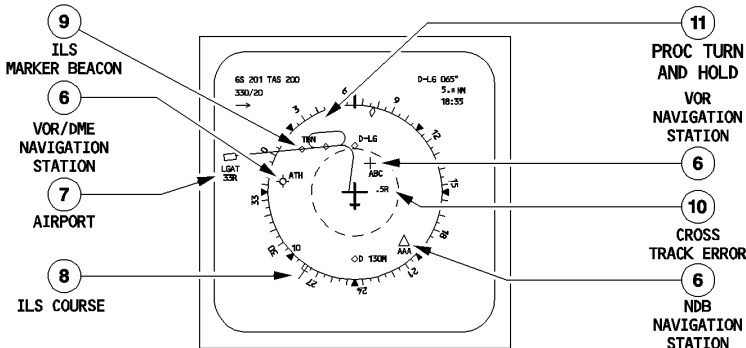
This area of the screen also shows :

- Waypoint identification (white).
- Track to go (green).
- Distance to go (green).
- Estimated time of arrival (green), assuming the aircraft will fly directly from its present position to the TO waypoint at the current ground speed.

⑤ Minimum Off Route Altitude (MORA) <4>

Provided CSTR is selected and range is selected equal to or above 40 NM a digital readout (Flight Level) is displayed which represents the Minimum Off Route Altitude allowed in a circle of 40 NM around the aircraft. Nothing is displayed, if MORA for the chosen flight route is not available in the FMGS database.

FFCS-01-3145-012-B100AA



	INDICATING/RECORDING SYSTEMS INDICATIONS ON ND	1.31.45	P 13
		SEQ 002	REV 08

⑥ Nav aids

The display uses specific symbols for nav aids :

○ DME or TACAN

+ VOR

✧ VOR/DME

△ NDB

The symbol appears :

- In green if the nav aid is a current waypoint of the flight plan.
- In white if it is the TO waypoint.
- In blue when the nav aid is tuned for display either automatically by the FMGC or manually through the MCDU.
- In magenta when the nav aid is not part of the flight plan and is called for display as an option (corresponding option pushbutton pressed on the FCU EFIS control panel).

⑦ Airport

Airport included in the flight plan :

- If the runway is not specified, the airport is represented by a star and the identification is displayed in white.

Example : * LSGG

- If the runway is specified, it is represented by an oriented runway symbol in white.



LSGG
33R

The runway is drawn to scale (paved length) if the selected range is 10, 20 or 40 NM.

Optional airport information

The airports that are not displayed as part of the flight plan may be called for display (ARPT pushbutton on the EFIS control panel).

They are represented by a star and the identification in magenta.

⑧ ILS Course (Magenta)

When the pilot pushes the ILS pushbutton switch on the EFIS control panel, and if an ILS station has been selected, the display shows an ILS course symbol.

⑨ ILS Marker Beacons

The screen shows these as waypoints (diamonds).

When the aircraft overflies a marker beacon, the corresponding symbol flashes :

Blue for the outer marker.

Amber for the middle marker.

White for the inner marker.

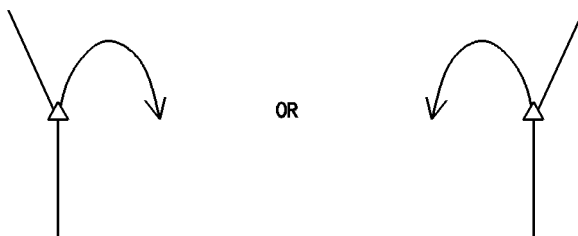
⑩ Cross Track Error

This is the aircraft's lateral deviation from the active leg of the flight plan (related to the great circle route). It is indicated in nautical miles (NM), with the letter R (right) or L (left), according to the position of the aircraft with respect to the flight plan.

⑪ Procedure turns and holding patterns

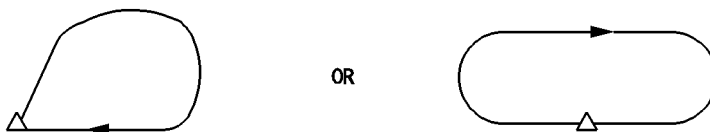
These appear only when they are part of the flight plan. For the 160 and 320 NM range scales, each one is represented by a white arrow that originates at the associated fix and indicates the direction of the turn.

FFC5-01-3145-014-A002AA



For shorter range scales and if the procedure turn or the holding pattern is in the next or the active leg, the display shows the full circuit or pattern.

FFC5-01-3145-014-B002AA



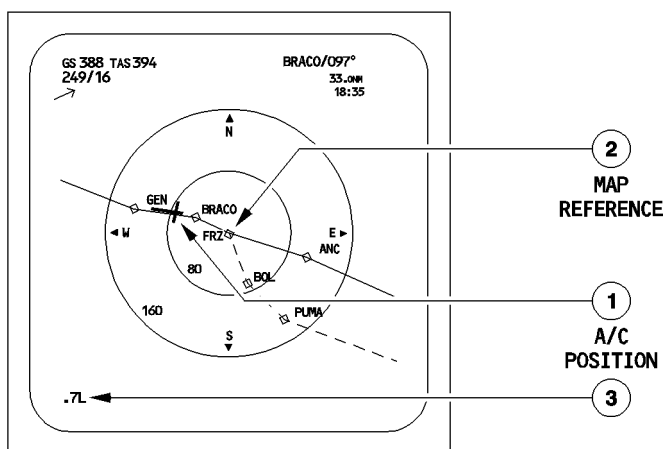
PLAN MODE

This mode statically displays the flight plan legs on a map oriented to true north. The map is centered on a map reference point that the pilot selects by slewing to it on his MCDU. The map reference point is the waypoint displayed on the second line of the MCDU F-PLN page. It can either be the active waypoint (next waypoint to be overflown), or any other waypoint of the flight plan.

The pilot can slew the overall flight plan and display it in PLAN mode.

The pilot chooses the scale of the map with the range selector. (The diameter of the outer circle corresponds to the selected range).

Data on nav aids, and their characteristics and associated bearing pointers, are not available in this mode.



① Aircraft Position and True Track

The orientation of the yellow aircraft symbol always indicates the aircraft's true track. Its position represents the aircraft position given by the FMGS.

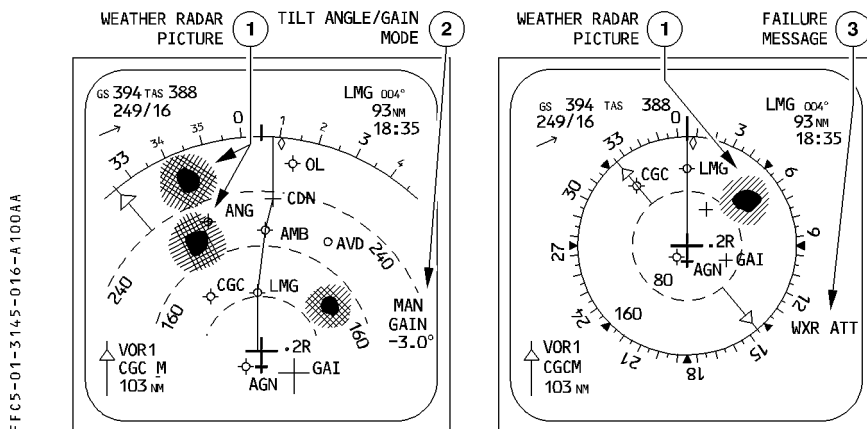
② Map Reference Point

③ Crosstrack Error

See ROSE NAV MODE/ARC MODE.

FFCS-01-3145-015-A002AA

WEATHER RADAR



① Weather Radar Picture

The ND presents the weather radar image when the radar is operating and the ND is not in PLAN mode.

The echoes appear in different colors : black, green, yellow, red, or magenta, according to the precipitation rates.

The refresh rate for the presentation depends on the range selected for the ND.

② Tilt Angle and Gain Mode

The antenna tilt angle appears in degrees and quarters of a degree in the lower right corner of the screen (blue). It is the angle between the horizon and the radar beam axis.

When selected, the MAN GAIN calibration mode appears in white.

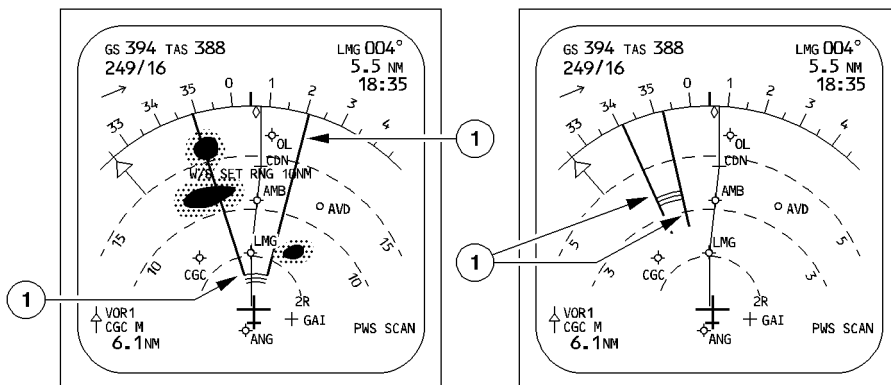
③ Failure Messages

The ND lists failures detected in the system. If there is a "red" failure, the screen does not display a radar image. If the message is in "amber", the image is not affected.

WXR RT (red)	for a radar transceiver failure.
WXR ANT (red)	for a radar antenna failure.
WXR DU (red)	for an overheating of the display unit
WXR CTL (red)	for a radar control unit failure.
WXR RNG (red)	for a range error.
WXR WEAK (amber)	for a calibration failure.
WXR ATT (amber)	for an attitude control failure.
WXR STAB (amber)	for an antenna stabilization failure.

PREDICTIVE WINDSHEAR SYSTEM

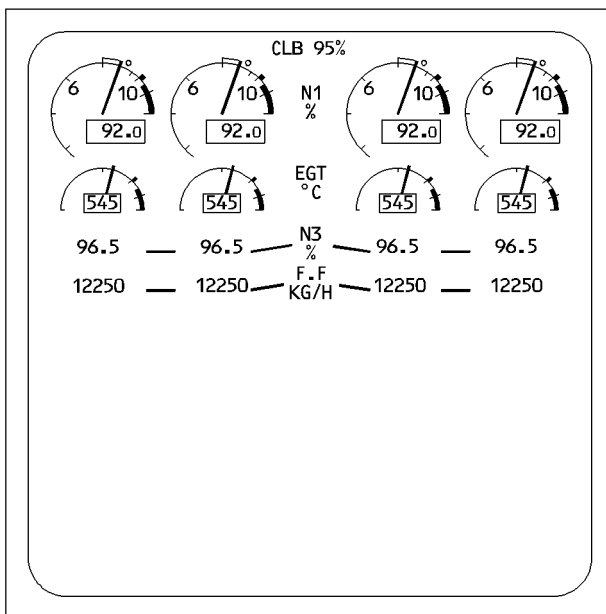
FFCS-01-3145-017-A200AA



① Predictive windshear area indication

A PWS SCAN message is displayed when the Predictive Windshear system is active on the ND. The area of predicted windshears is indicated by a red and black icon and two yellow radial lines. Windshear information is available in ARC and ROSE ND modes. When the ND range is set above 10 NM then a message W/S SET RNG 10 NM (Windshear, set range 10 NM) appears requesting the crew to adjust the ND range. It is displayed even if the weather radar is switched off, provided WINDSHEAR switch on weather radar panel is set to AUTO. Depending on the windshear alert level, ND indication may be completed with a PFD message (Refer to 1.31.40).

ENGINE STANDBY PAGE



FFCS-01-3145-018-A100AA

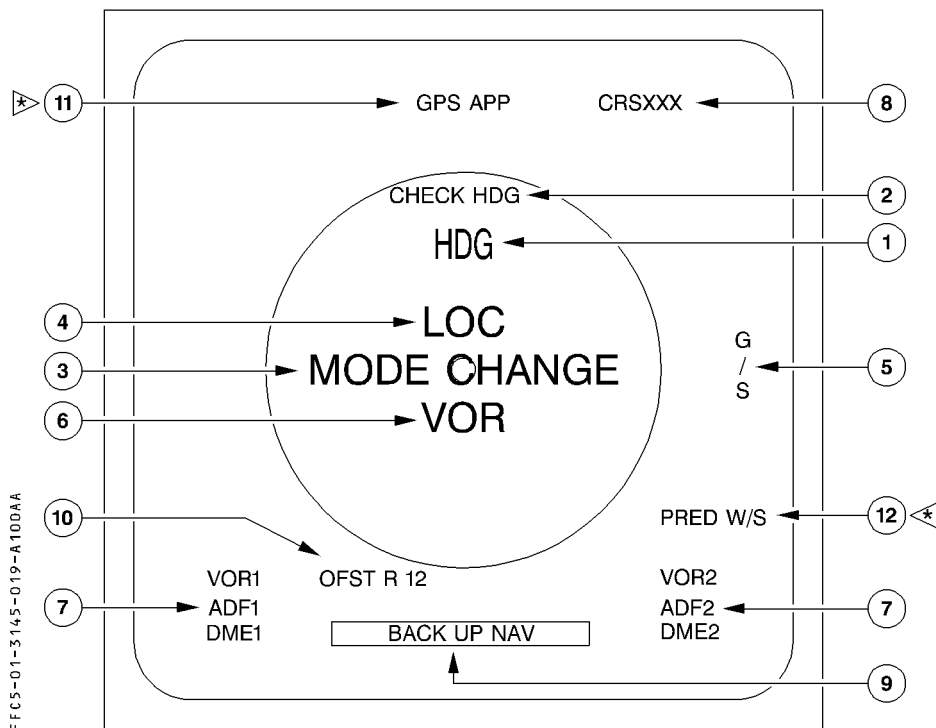
In case all ECAM DMC channels fail, each pilot may display the engine standby page on their respective ND.

The displayed information is N1, N3, EGT, FF and limit modes (same presentation as upper part of primary engine page).

This information is generated by the EFIS channel of the DMCs.

For more information on this page, see the POWERPLANT Chapter (Refer to 1.70.95).

FLAGS AND MESSAGES DISPLAYED ON ND



① HDG flag (red)

In case of a heading data failure, the rose/arc and associated symbols are cleared.

A HDG flag first flashes for 9 seconds, and is displayed on the upper part of the ND.

② CHECK HDG flag (amber)

When a discrepancy (5°) is detected by FWC between sides 1 and 2, a CHECK HDG flag flashes for nine seconds, then remains steady on both NDs associated with an ECAM caution. This message is not available when plan mode is selected.

	INDICATING/RECORDING SYSTEMS INDICATIONS ON ND	1.31.45	P 20
		SEQ 100	REV 09

③Center Part Messages

- The screen displays a MODE CHANGE message in green if there is a discrepancy between the selected mode on the EFIS control panel and the mode sent from the onside FMGC, or while the DMC is preparing a new page for display.
- The screen displays a RANGE CHANGE message in green if there is a discrepancy between the range selected on the EFIS control panel and the range sent from the onside FMGC. A MODE CHANGE message has priority over a RANGE CHANGE message.
- The screen displays a MAP NOT AVAIL message in red for several reasons :
 - The MODE CHANGE or RANGE CHANGE message has been displayed more than six seconds.
 - A disagreement between DMC and FMGC has been detected while EFIS control panel is failed (default mode ROSE NAV 80 NM).
 - The FMGC is not able to indicate the flight plan reference point (back up mode) while PLAN mode is selected.
 - The FMGC has failed.
 - The FMGC has delivered an invalid aircraft position.
- The screen displays CHECK ND (1,2) message (amber) when the DMC detects a discrepancy between acquisition and display of parameters.
- The screen displays CHECK EWD message (amber) when the DMC detects a discrepancy between acquisition and display of E/WD parameters.
- The screen displays a W/S SET RNG 10 NM message if a predictive windshear alert is triggered and the range is above 10 NM.
- The screen displays a W/S CHANGE MODE message if a predictive windshear alert is triggered and the ND is not in ARC or ROSE mode. The message appears in red or amber corresponding to the windshear alert.

④LOC Flag (red)

If LOC data fails, this flag flashes for nine seconds, then remains steady.

⑤G/S Flag (red)

If G/S data fails, this flag flashes for nine seconds, then remains steady.

⑥VOR Flag (red)

In ROSE VOR mode, when the VOR bearing is not valid, this flag flashes for nine seconds, then remains steady.

⑦VOR1(2) or ADF1(2) or DME1 Flag (red)

If a navigation receiver fails, the appropriate one of these flags flashes for nine seconds, then remains steady.

	INDICATING/RECORDING SYSTEMS INDICATIONS ON ND	1.31.45	P 21
		SEQ 001	REV 08

⑧ VOR Course flag

In case of failure, a red CRSXXX flag is displayed.

In case of Non Computed Data (NCD), a blue CRS — — — flag is displayed.

⑨ Other messages

MAP PARTLY DISPLAYED(amber) : in case of uncomplete data transmission between FMGC (priority criteria) and DMC or if DMC cannot draw the complete MAP.

NAV ACCUR UPGRAD or(white)

NAV ACCUR DOWNGRAD(amber) : signals a change in navigation accuracy.

SPECIF VOR/D UNAVAIL(amber) : if the navaid which is tuned for the selected approach or departure is not available.

BACK UP NAV(amber) : if the MCDU back up navigation mode is activated (refer to 1.22).

OFF SIDE FM CONTROL(amber) : if the offside FM supplies the ND

CHK FLT PLN POSITION(amber) : On ARC or ROSE NAV mode if the DMC detects a discrepancy between the acquisition and the display of the flight plan.

SELECT TRUE REF(amber) : when entering the polar area if the TRUE North reference not selected by the crew (MAG/TRUE pushbutton).

↓ (amber) : overflow arrow displayed when more than one of the following messages are present at the same time :

- NAV ACCUR DOWNGRAD
- NAV ACCUR UPGRAD
- SPECIF VOR/D UNAVAIL
- SELECT TRUE REF

GPS PRIMARY  (white, boxed white) : This message appears when GPS PRIMARY mode is available or has been recovered. The pilot can clear this message by pressing the CLR key on the MCDU.

GPS PRIMARY LOST 

(amber, boxed white) : This message appears when GPS PRIMARY is not available and is not clearable by pilot action.

⑩ OFST R(L) XX message (yellow)

Message displayed when a temporary or an offset flight plan is entered. The offset value is given in NM.

Note : For TCAS messages (Refer to 1.34.80).

	INDICATING/RECORDING SYSTEMS INDICATIONS ON ND	1.31.45 P 22	
		SEQ 001	REV 08

⑪ GPS APP (green)

This message is displayed when a GPS approach has been selected.

⑫ PRED W/S flag (amber)

The WINDSHEAR switch on the weather radar panel is set to AUTO, and a Predictive Windshear System fault is detected. This message appears on 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.

	INDICATING/RECORDING SYSTEMS INDICATIONS ON ND		1.31.45	P 24
			SEQ 100	REV 10

② TERR : CHANGE MODE indication

Displayed in red (or amber) in case of Terrain Awareness Display (TAD) warning (or caution) alert, if the current selected display mode is PLAN.

③ TERR indication

To differentiate the terrain from the weather display, the weather radar TILT is replaced by a blue TERR, and the terrain display sweeps from the center outward to both sides of the ND.

④ Warning and caution messages

TERR AHEAD (amber)	for a caution
TERR AHEAD (red)	for a warning

When triggered, these messages are flashing 9 seconds, then remain steady until the caution or warning alert condition disappears.

TERR RNG (red)	for a RANGE error warning
TERR TST (amber)	appears during the EGPWS test when the terrain pattern, is displayed and there is no failure.

⑤ Terrain caution alert

This alert is generated when a conflict exists between the terrain caution envelope ahead the aircraft and obstacles stored in the database. The area of conflict is displayed in solid yellow.

⑥ Terrain warning alert

This alert is generated when a conflict exists between the terrain warning envelope ahead the aircraft and obstacles stored in the database. The area of conflict is displayed in solid red.

Note : *When an alert is generated (either caution or warning) and the TERR ON ND is not selected, the terrain is automatically displayed and the ON light of the TERR ON ND pushbutton switch comes on.*

CAUTION

1. The relative height of the aircraft is computed using the captain baro setting. Thus the Terrain Awareness Display (TAD) does not protect against baro setting errors.
2. The TAD and Terrain Clearance Floor (TCF) functions operate using the FMS 1 position. Thus, the system does not protect against FMS 1 position error.