A previous flight plan may be deleted by either entering '99' in any flight plan location field and pressing **ENTER** or by selecting FPL, MENU, DELETE FPL.

2.23.19   VNAV Procedures

The VNAV function should be used when possible in order to achieve optimal descent.

VNAV provides a desired vertical profile along the flight plan route and computes the aircraft deviation from that profile for display. The Flight Director and Autopilot are coupled with VNAV and controlled by pilot inputs selecting that rate of descent for the initial TOD point, then the FMS provides a calculated rate for subsequent waypoints. A climbing profile will provide vertical speed information only.

If a VNAV profile is programmed in the FMS, but not slaved, the magenta 'glideslope' can be used for guidance. However, it will not be accurate if there is a deviation from the flight plan routes, as the algorithm will allow track miles to regain the flight plan route.

2.23.20   Selecting a VNAV Waypoint

Press **VNAV** function key on the FMS. The VNAV path page will be displayed. The reference number waypoints are shown, enter the waypoint required, use **NEXT** or **PREV** to extend the list. Note all waypoints are shown ahead of the FMS present position. Once selected press **ENTER**. The cursor then covers the off-set entry field. Use ± to select prior (-) or distance beyond (+) the waypoint; press **ENTER**.

Note: LNAV must be active and coupled before vertical guidance can be coupled.

CAUTION
VNAV can work when either LNAV or LNAV HDGSEL is active, but should only be used with LNAV. If LNAV HDGSEL is active, the algorithm will allow track miles to regain the flight plan route. If the clearance is 'be level abeam', this will cause the aircraft to remain high and may also cause marked changes in rate of descent.

2.23.21   Selecting a Flight Level or Altitude

The cursor will now cover the target altitude entry field. Enter either the flight level or altitude required (e.g. 100 or 10,000). Press **ENTER**. If flashes appear then the flight path angle (FPA) is too great and is not accepted, a FPA TOO STEEP is displayed.

2.23.22   Continuous VNAV Descents

Further waypoints and descents may be added to the profile by using the **NX** key and repeating the previous steps. Press **NEXT** to view VNAV waypoints on VNAV PATH 2/2.

2.23.23   Selecting a Rate of Descent

Press **TGT V/S** and enter the required rate of descent (e.g. 2000 for 2000 fpm), press **ENTER**. This value will be 'locked-in', a Flight Path Angle (FPA) is then calculated along with a TOD point, this may vary the TGT V/S slightly due to changing factors, groundspeed, etc. If in NAV mode, a white TOD circle will appear on the MFD along with the waypoint and selected altitudes shown in magenta. The TGT V/S must allow the TOD point to be beyond the present position of the FMS, if not, the message TGT V/S LOW will display along with flashes not accepting the value. A message of V/S HIGH will show if 6000 or above is entered or if the FPA limit is exceeded. Shown on the VNAV PATH 1/2 page is distance and time to TOD point along with the FPA.

2.23.24   Approaching TOD Point

In the normal manner, when cleared by ATC, select the cleared flight level or altitude with ALTSEL, note this must be at least 200 ft below the current altitude and takes preference over VNAV. Two minutes before the TOD point, a message TOP OF DESCENT ALERT appears. Remove this by pressing **MSG**. Press **VNAV** on the FGCP, this will activate VNAV.

Fifteen seconds before the TOD point, the waypoint annunciator flashes and VNAV WAYPOINT ALERT displays; press **MSG** to clear.

2.23.25   Capture and Monitoring of VNAV

As long as the VNAV on the FGCP has been selected between the TOP OF DESCENT and the VNAV WAYPOINT ALERT message, VNAV will capture and follow the profile. After this time, arming of the VNAV is prohibited to prevent abrupt pitch-over manoeuvres. In this event, the pilot may manually fly the profile and within limits, reselect VNAV on the FGCP. Vertical deviation is shown on VNAV PATH 1/2 and is dependent on speed and FPA.

It is important to monitor IAS during VNAV descents.

2.23.26   Approaching VNAV Waypoint

Fifteen seconds before the waypoint and level-off, the annunciator VERT ALERT will activate. The WPT alert annunciator will remain illuminated until vertical leg sequencing occurs. If lateral and vertical waypoints are co-located the WPT annunciator will flash since vertical waypoints take precedence over lateral waypoints. If the altitude selector is adjusted so as to remain below the current VNAV constraint altitude/level, then the aircraft will continue to descend on the calculated VNAV path between consecutive vertical waypoints.

2.23.27   Vertical Direct-to Procedure

This is similar to the DTO procedure for lateral flight paths but is used in vertical flight paths and redefines an existing VNAV leg. Press **FMS VNAV** to access the VNAV PATH 1/2, press **VTO** to display the VERTICAL TO page: the vertical waypoints are listed with the offset distance, altitude and vertical speeds required in relation to each waypoint. Invalid waypoints are displayed in small font. Select the required reference number of the desired VNAV DTO waypoint and press **ENTER**. If the cursor flashes the selection is outside the altitude constraints or would result in a climb indicating an illegal entry. The FMS does not allow climbs during VNAV and a message NO CLIMB VTO will be displayed.

Care should be exercised if a large change in rate of descent is expected, as the autopilot may make a very sharp change in attitude to acquire the required rate of descent. A smoother transition can be made if VS is used initially until the rate of descent coincides with the predicted VTO rate of descent, then engage VNAV.

2.23.28   Temperature Compensation

Under cold temperatures, barometric altimetry may be inaccurate, causing the actual aircraft altitude to be lower than that indicated by the altimeter.

To activate VNAV Temperature Compensation:

➤ Press FPL to access Flight Plan Pages.

➤ Press MENU and NEXT to access Flight Plan Menu Page 2.

➤ Press TEMP COMP to access Temperature Compensation pages.

➤ Enter Temperature and Airfield Elevation.

➤ Press ACTIVATE key.

When activated TCMP will be displayed in cyan. An inverse "T" appears next to all altitudes on the FPL pages to indicate Temperature Compensation is active and that these altitudes have had an altitude correction applied.

Manually entered altitudes will not have an altitude correction applied when the temperature compensation function is activated. All manually entered altitudes must consider the temperature correction before they are entered into the FMS, even if the temperature compensation function is not active.

2.23.29   Transition from En-route Descent to Approach Mode

For the FMS to provide VPATH approaches there must be altitude constraints from the FAF and RWY or Map waypoints.

CAUTION
If VNAV is engaged and the altimeter is set to a Flight Level with a significant change between QNH and 1013, when QNH is set the autopilot will make a sharp change in vertical speed, in order to regain the flight path angle profile. A temporary selection of VS to adjust rate will achieve a smoother transition.

2.23.30   Approach Mode

The pilot must rely on the altimeter as the primary vertical reference during the final approach segment, including step down fixes. VNAV path guidance is supplementary guidance information.

2.23.31   Cancellation of VNAV

VNAV will cancel under any of the following conditions:

➢ ADC altitude becomes invalid or is deselected.

➢ The altitude preselector is above the aircraft altitude.

➢ A manual altitude is entered.

➢ POSITION UNCERTAIN message appears.

➢ Selected Cross-track Mode is activated.

➢ CNX VNAV line select key is activated (VNAV PATH Page 2).

➢ Cross-track deviation becomes greater than 12.5 Nm.

➢ En-route/Approach VNAV waypoint gap is encountered.

➢ A valid vertical leg does not exist after sequencing a hold fix.

If any of the following happen before entering into a VNAV leg the vertical profile will be invalid and the TOD point will be removed.

➢ Landing the aircraft (WoW).

➢ Entering '99' as a vertical waypoint will cancel VNAV mode and delete the VNAV flight plan.

➢ On reaching target VNAV altitude and no further altitude has been entered then VNAV is cancelled.

2.23.32   Message

FMS MCDU and PFD/MFD annunciators flash MSG (not on PFD if Nav source is VOR/ILS – cyan needle). Press **MSG** to display message page. Action message as required, if no action required press MSG again to return to previous page. If message indicates system failure, invalid sensor or invalid navigation, deselect FMS guidance and use conventional navigation equipment. (Advise ATC if required).