New FlightZoomer Autoflight Features

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	
	Hea		
	Turn		
VERTICAL	**Altitu**		
	Vertica		
	Fligth P		
	FLCH (F		
SPEED	**Speed** *sele*		**Flight Plan Speed** *hold*

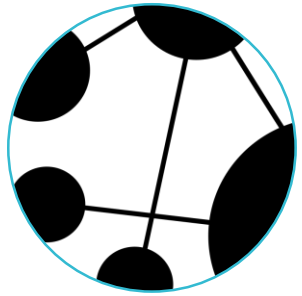
System architecture

FlightZoomer

Pilot

FlightZoomer Groundstation

User Layer

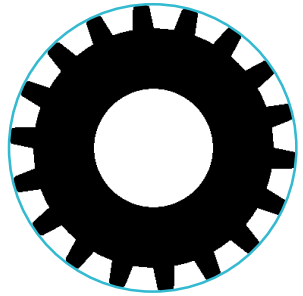


Cellular Network

Communication Layer

FlightZoomer Sensorics App

Processing Layer



Flight Controller

Copter

Flightzoomer autoflight modes

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	ILS Glideslope *arm+capture+hold*	VNAV *follow flight plan vertically*
	Vertical Speed *select+hold*		
	Fligth Path Angle *select+hold*		
	FLCH (Flight Level Change) *activate*		
SPEED	Speed *select+hold*		Flight Plan Speed *hold*

1. Speed

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	ILS Glideslope *arm+capture+hold*	VNAV *follow flight plan vertically*
	Vertical Speed *select+hold*		
	Fligth Path Angle *select+hold*		
	FLCH (Flight Level Change) *activate*		
SPEED	Speed *select+hold*		

- The *Speed*-mode controls the forward speed.
- The *Speed*-mode is activated by turning the speed selector to select a target speed.
- Any other mode depends that the aircraft is moving forward, so activating the *Speed*-mode is the first step when flying with the basic and the radio navigation modes.

2. Track Over Ground

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	ILS G	
	Vertical Speed *select+hold*		
	Fligth Path Angle *select+hold*		
	FLCH (Flight Level Change) *activate*		
SPEED	Speed *select+hold*		

- Default lateral mode.
- Target direction is the track over ground irrespective of crosswind.
- Can be activated coming from any other mode.
- Pressing the HOLD button activates the current direction.
- Turning the direction selector directly activates the new target direction.
- A new target direction can be set even before the previous turn has finished.

3. Heading

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	ILS Glideslope *arm+capture+hold*	VNAV *follow flight plan vertically*
	Vertical Speed *select+hold*		
	Fligth Path Angle *select+hold*		
	FLCH (Flight Level Change) *activate*		
SPEED	Speed *select+hold*		Flight Plan Speed *hold*

- The *Heading*-mode is a variation of the *Track Over Ground*-mode which is activated using the HDG (o) TRK switch above the direction display.
- Nose is pointing into the target direction
- Crosswind results in a crab angle
- Otherwise the same applies as for the *Track Over Ground*-mode

4. Turn Rate

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	IL…eslope *arm+capture+hold*	**VNAV** *follow flight plan vertically*
	Vertical Speed *select+hold*		
	Fligth Path Angle *select+hold*		
	FLCH (Flight Level Change) *activate*		
SPEED	Speed *select+hold*		

- Tapping on the left or right of the direction selector allows setting the turn rate in degrees per second.
- Values are AUTO, 5, 10, 20, 30 or 60 deg/s.
- AUTO means using the Standard Turn Rate as configured for the aircraft.
- The turn rate can be changed at any time, also during turns.

5. Altitude

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	ILS Glideslope	
	Vertical Speed *select+hold*		
	Fligth Path Angle *select+hold*		
	FLCH (Flight Level Change) *activate*		
SPEED	Speed *select+hold*		

- The *Altitude*-mode has three phases: armed, capturing and hold.
- The *Altitude*-mode can be armed using the altitude selector directly to set a new target value or using the HOLD-button beneath the altitude selector.
- After setting a target altitude capturing is initiated by using one of the next three basic vertical modes.
- Smooth transition from any climb/descend gradient to level flight with 0.5 $\frac{m}{s^2}$.
- Target altitude in AMSL.
- Configurable altitude unit can be feet or Meter.

6. Vertical Speed

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	ILS Glideslope	
	Vertical Speed *select+hold*		
	Fligth Path Angle *select+hold*		
	FLCH (Flight Level Change) *activate*		
SPEED	Speed *select+hold*		

- Default vertical mode.
- The *Vertical Speed*-mode can be activated using the up/down-thumbwheel directly setting a new target value or using the VS/FPA-button to pick the current vertical speed as target.
- Smooth transition from any previous climb/descend gradient to a new vertical speed by 0.5 $\frac{m}{s^2}$.
- Configurable units can be feet/minute or Meter/minute.

7. Flight Path Angle

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	ILS Glideslope	
	Vertical Speed *select+hold*		
	Fligth Path Angle *select+hold*		
	FLCH (Flight Level Change) *activate*		
SPEED	Speed *select+hold*		Flight Plan Speed *hold*

- The *Flight Path Angle*-mode is a variation of the *Vertical Speed*-mode which is activated using the V/S (o) FPA reference switch above the altitude display.
- So everything mentioned on the previous slide applies here as well.
- *Flight Path Angle*-mode keeps the climb/descend gradient irrespective of forward speed or crosswind.

8. FLCH

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	ILS Glideslope *arm+capture+hold*	
	Vertical Speed *select+hold*		VNAV *follow flight plan vertically*
	Fligth Path Angle *select+hold*		
	FLCH (Flight Level Change) *activate*		
SPEED	Speed *select+hold*		Flight Plan Speed *hold*

- The *FLCH*-mode is activated using the FLCH-button.
- The *FLCH*-mode is a convenient option to just reach the armed altitude by pressing a single button.
- The standard vertical speed, as configured for the aircraft, is used.

9. VOR Localizer

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	ILS Glideslope	VNAV
	Vertical Speed *select+hold*		
	Fligth Path Angle *select+hold*		
	FLCH (Flight Level Change) *activ*		
SPEED	Speed *select+hold*		

- The *VOR Localizer*-mode has three phases: armed, capturing and hold.
- It is activated using the LOC-button.
- This mode is armed while the aircraft is approaching the radial of the VOR L using one of the basic lateral modes.
- It then captures and holds the radial.
- The VOR L is tuned and the radial is selected on the Flight Management System NAV RAD page.
- The radial is captured smoothly using the standard turn rate.

10. ILS Localizer

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	ILS Glideslope *arm+capture+hold*	VNAV *follow flight plan vertically*
SPEED	Speed *select+hold*		Flight Plan Speed *hold*

- The *ILS Localizer*-mode has also three phases: armed, capturing and hold.
- It is activated using the APP-button.
- Also here the aircraft is approaching the extended runway center line using one of the basic lateral modes.
- It then captures and holds the localizer of the ILS until the runway is reached.
- The ILS is tuned on the Flight Management System NAV RAD page.

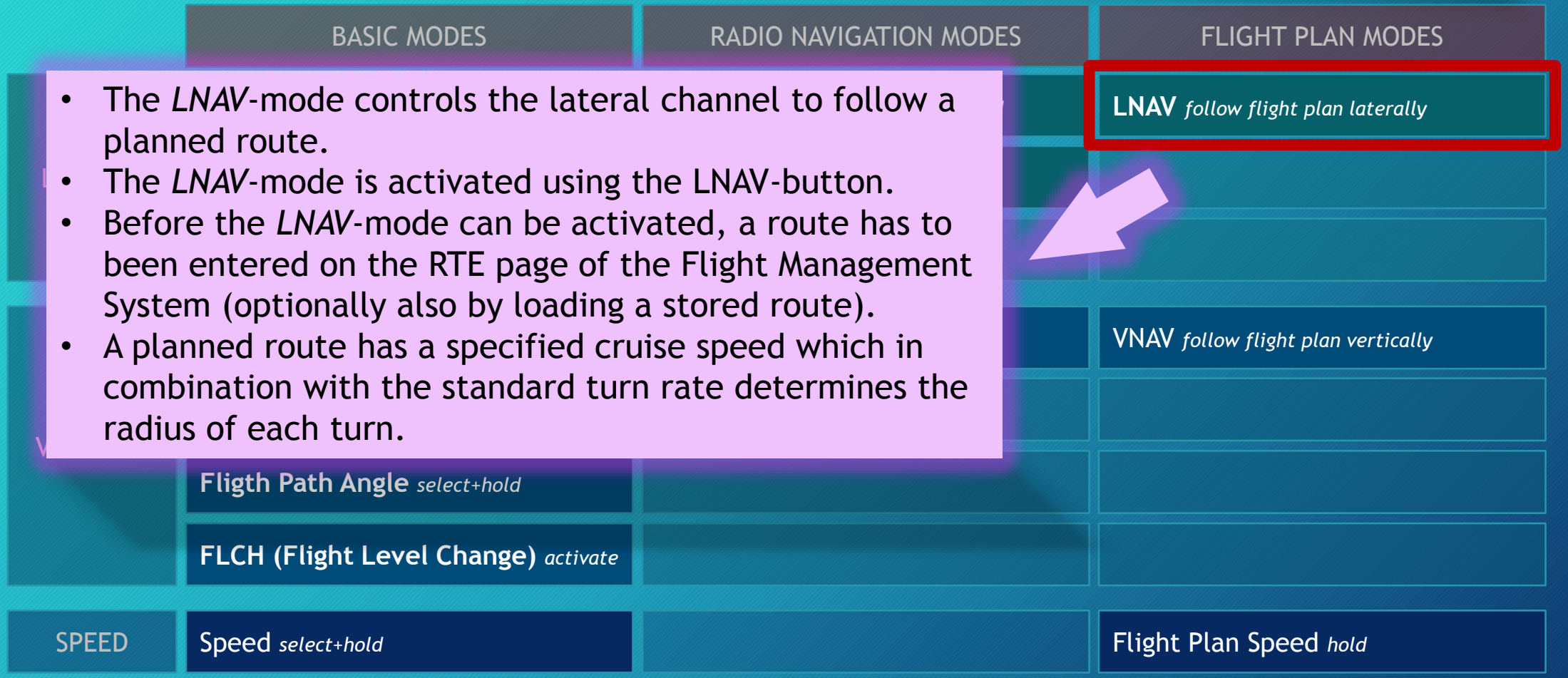
11. ILS Glideslope

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
VERTICAL	**Altitude** *arm+capture+hold*	**ILS Glideslope** *arm+capture+hold*	**VNAV** *follow flight plan vertically*
	Vertical Speed *select+h*		
	Fligth Path Angle *select+hold*		
SPE			

- The *ILS Glideslope*-mode has also three phases: armed, capturing and hold.
- It is activated together with the *ILS Localizer*-mode using the APP button.
- The glideslope should be captured in horizontal flight from below (while in *Altitude*-mode).
- For copters there is an option in the aircraft settings to let the aircraft stop at the touchdown point.

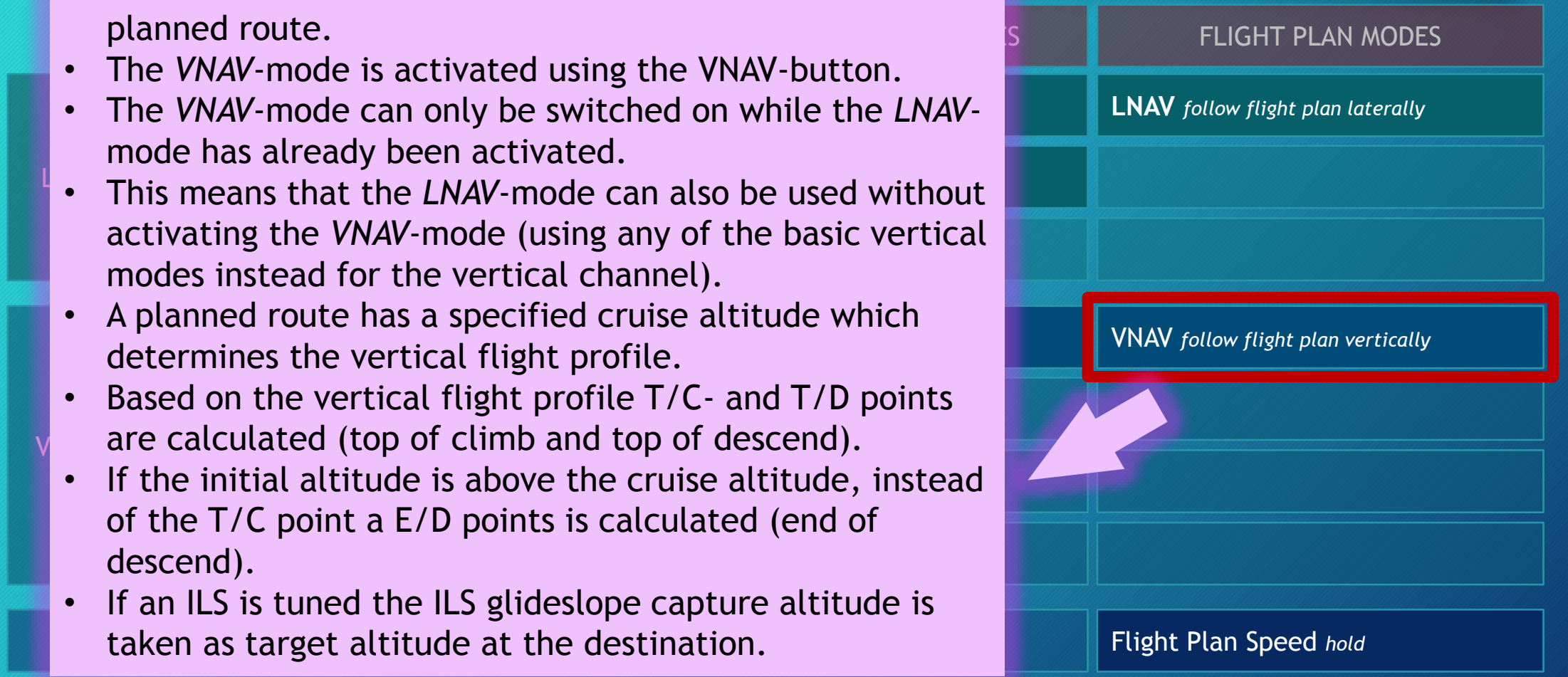
12. LNAV

- The *LNAV*-mode controls the lateral channel to follow a planned route.
- The *LNAV*-mode is activated using the LNAV-button.
- Before the *LNAV*-mode can be activated, a route has to been entered on the RTE page of the Flight Management System (optionally also by loading a stored route).
- A planned route has a specified cruise speed which in combination with the standard turn rate determines the radius of each turn.



13. VNAV

- The *VNAV*-mode controls the vertical channel to follow a planned route.
- The *VNAV*-mode is activated using the VNAV-button.
- The *VNAV*-mode can only be switched on while the *LNAV*-mode has already been activated.
- This means that the *LNAV*-mode can also be used without activating the *VNAV*-mode (using any of the basic vertical modes instead for the vertical channel).
- A planned route has a specified cruise altitude which determines the vertical flight profile.
- Based on the vertical flight profile T/C- and T/D points are calculated (top of climb and top of descend).
- If the initial altitude is above the cruise altitude, instead of the T/C point a E/D points is calculated (end of descend).
- If an ILS is tuned the ILS glideslope capture altitude is taken as target altitude at the destination.



14. Flight Plan Speed

	BASIC MODES	RADIO NAVIGATION MODES	FLIGHT PLAN MODES
LATERAL	**Track Over Ground** *select+hold*	**VOR Localizer** *arm+capture+hold*	**LNAV** *follow flight plan laterally*
	Heading *select+hold*	**ILS Localizer** *arm+capture+hold*	
	Turn rate *select+hold*		
	Altitude *arm+capture+hold*	ILS Glideslope *arm+capture+hold*	VNAV *follow flight plan vertically*
			Flight Plan Speed *hold*

- The *Flight Plan Speed*-mode controls the speed channel to follow a planned route.
- Holding the speed of a planned route is activated automatically by switching on the *LNAV*-mode using the LNAV-button.
- The target speed is taken from the specified cruise speed.