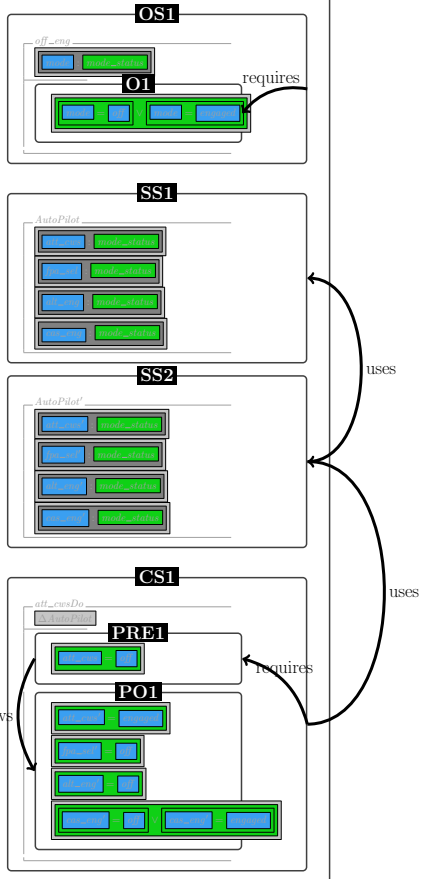
T1

1. The mode-control panel contains four buttons for selecting modes and three displays for dialling in or displaying values. The system supports the following four modes:

   - attitude control wheel steering (att_cws)
   - flight path angle selected (fpa_sel)
   - altitude engage (alt_eng)
   - calibrated air speed (cas_eng)

Only one of the first three modes can be engaged at any time. However, the cas_eng mode can be engaged at the same time as any of the other modes. The pilot engages a mode by pressing the corresponding button on the panel. One of the three modes, att_cws, fpa_sel, or alz_eng, should be engaged at all times. Engaging any of the first three modes will automatically cause the other two to be disengaged since only one of these three modes can be engaged at a time.



2. There are three displays on the panel: and altitude [ALT], flight path angle [FPA], and calibrated air speed [CAS]. The displays usually show the current values for the altitude, flight path angle, and air speed of the aircraft. However, the pilot can enter a new value into a display by dialling in the value using the knob next to the display. This is the target or "pre-selected" value that the pilot wishes the aircraft to attain. For example, if the pilot wishes to climb to 25,000 feet, he will dial 25,000 into the altitude display window and then press the alz_eng button to engage the altitude mode. Once the target value is achieved or the mode is disengaged, the display reverts to showing the "current" value.

3. If the pilot dials in an altitude that is more than 1,200 feet above the current altitude and then presses the alz_eng button, the altitude mode will not directly engage. Instead, the altitude engage mode will change to "armed" and the flight-path angle select mode is engaged. The pilot must then dial in a flight-path angle for the flight-control system to follow until the aircraft attains the desired altitude. The flight-path angle select mode will remain engaged until the aircraft is within 1,200 feet of the desired altitude, then the altitude engage mode is automatically engaged.

4. The calibrated air speed and the flight-path angle values need not be pre-selected before the corresponding modes are engaged– the current values displayed will be used. The pilot can dial-in a different target value after the mode is engaged. However, the altitude must be pre-selected before the altitude engage button is pressed. Otherwise, the command is ignored.

5. The calibrated air speed and flight-path angle buttons toggle on and off every time they are pressed. For example, if the calibrated air speed button is pressed while the system is already in calibrated air speed mode that mode will be disengaged. However, if the attitude control wheel steering button is pressed while the attitude control wheel steering mode is already engaged, the button is ignored. Likewise, pressing the altitude engage button while the system is already in altitude engage mode has no effect.

   Because of space limitations, only the mode-control panel interface itself will be modelled in this example. The specification will only include a simple set of commands the pilot can enter plus the functionality needed to support modes switching and displays.The actual commands that would be transmitted to the flight-control computer to maintain modes,etc., are not modelled.