Display System Requirements

# Component Modes

## Landing Gear

The aircraft contains 2 landing gear units, one on the right and another on the left. The landing gear units can be locked when they are fully retracted (up) or fully extended (down). Both the landing gear units should work in tandem. In other words, they should both be locked at the end positions and unlocked for extending/retracting together. Different outputs are generated when both the units are locked, when both are unlocked and when only one is locked. The output controls which warning message should be displayed to the user.

## Inputs

* The state of the landing gear will be contained in a bus object: MiscData. This bus object is defined as follows:

|  |  |  |
| --- | --- | --- |
| **Name** | **Data Type** | **Dimension** |
| FlapPosition | double | 1 |
| CabinPressure | double | 1 |
| HydraulicPressure | double | 1 |
| APUData | double | 1 |
| LGleftLock | boolean | 1 |
| LGRightLock | boolean | 1 |

* The LGLeftLock and LGRightLock elements of the bus will be used to determine the output of the system: LandingGearMode.

## Output

* The output of the system shall be an integer of type double, LandingGearMode.

## Logic

* LGLeftLock == true shall indicate a locked state for left landing gear unit. [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step1_BuildLogic_Link\\DisplayModel_Step1_done.slx%22,%22:6:128%22,%22:6:120%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_start.slx%22,%22:6:120%22,%22:6:128%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_done.slx%22,%22:6:120%22,%22:6:128%22%5d)
* LGLeftLock == false shall indicate an unlocked state for left landing gear unit. [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step1_BuildLogic_Link\\DisplayModel_Step1_done.slx%22,%22:6:117%22,%22:6:118%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_start.slx%22,%22:6:118%22,%22:6:117%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_done.slx%22,%22:6:117%22,%22:6:118%22%5d)
* LGRightLock == true shall indicate a locked state for right landing gear unit. [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step1_BuildLogic_Link\\DisplayModel_Step1_done.slx%22,%22:6:131%22,%22:6:137%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_start.slx%22,%22:6:131%22,%22:6:137%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_done.slx%22,%22:6:138%22,%22:6:131%22,%22:6:137%22%5d)
* LGRightLock == false shall indicate an unlocked state for right landing gear unit. [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step1_BuildLogic_Link\\DisplayModel_Step1_done.slx%22,%22:6:134%22,%22:6:132%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_start.slx%22,%22:6:132%22,%22:6:134%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_done.slx%22,%22:6:132%22,%22:6:134%22%5d)
* If LGLeftLock and LGRightLock are both locked, the value of LandingGearMode will be 1. [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step1_BuildLogic_Link\\DisplayModel_Step1_done.slx%22,%22:6:97%22,%22:6:91%22,%22:6:94%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step1_BuildLogic_Link\\DisplayModel_Step1_done.slx%22,%22:16%22,1%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_start.slx%22,%22:6:94%22,%22:6:97%22,%22:6:91%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_done.slx%22,%22:6:90%22,%22:6:94%22,%22:6:97%22,%22:6:91%22%5d)
* If LGLeftLock or LGRightLock, but not both, are unlocked, the value of LandingGearMode will 2. [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step1_BuildLogic_Link\\DisplayModel_Step1_done.slx%22,%22:6:103%22,%22:6:105%22,%22:6:106%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step1_BuildLogic_Link\\DisplayModel_Step1_done.slx%22,%22:16%22,3%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step1_BuildLogic_Link\\DisplayModel_Step1_done.slx%22,%22:16%22,4%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_start.slx%22,%22:6:105%22,%22:6:103%22,%22:6:106%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_done.slx%22,%22:6:103%22,%22:6:105%22,%22:6:106%22%5d)
* If neither LGLeftLock nor LGRightLock are locked, the value of LandingGearMode will be 3. [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step1_BuildLogic_Link\\DisplayModel_Step1_done.slx%22,%22:6:100%22,%22:6:101%22,%22:6:93%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step1_BuildLogic_Link\\DisplayModel_Step1_done.slx%22,%22:16%22,2%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_start.slx%22,%22:6:100%22,%22:6:101%22,%22:6:93%22%5d) [](http://localhost:31415/matlab/feval/rmiobjnavigate?arguments=%5b%22C:\\work\\collateral\\Models\\Displays\\CockpitDisplays_forC\\Models\\Step2_ReqBasedTesting_ModelCoverage\\DisplayModel_Step2_done.slx%22,%22:6:101%22,%22:6:100%22,%22:6:93%22%5d)

## Fuel System

* 1. Fuel Pressure
     1. In the second phase of flight, the fuel pressure should be above 0.2.
     2. In the third and fourth phase of flight, the fuel pressure should be above 0.5.
  2. Fuel Quantity
     1. In the second phase of flight, the quantity of fuel should be above 20000 lbs.
     2. In the third phase of flight, the quantity of fuel should be above 10000 lbs.

# Flight Phases

The complete flight has been broken into 4 phases. The phase of flight affects warning generation and page control. Different sets of signals/components are monitored in every phase of flight. Warnings and status messages are generated for the monitored components and presented on the display unit. There are separate pages on the System Display Unit for each phase of flight. The System Display Unit switches pages based on the current phase of flight.

## Inputs

* The input to the system shall be 2 signals, LGLeftLock and LGRightLock.

## Output

* The output of the system shall be an integer of type uint8, LandingGearMode.

## Logic

1. Phase 1: The system enters this phase when the engines are turned off.
2. Phase 2: The system enters this phase of flight from XXX when the engines have turned on.
3. Phase 3: The system enters this phase of flight from XXXX when the airspeed is over 100 knots.
4. Phase 4: The system enters this phase of flight from XXX when the airspeed becomes less than 100 knots.

# Electronic Flight Information System (EFIS)

1. Cabin Pressure Digital Readout: The cabin pressure is available as a digital readout in the EFIS panel. The user can use a toggle button to select from 2 units of pressure: mm of Hg and inches of Hg.
2. Navigation Display Mode: There are 3 modes of navigation available to the user. The modes are as follows:
   1. ROSE: This mode has 3 sub-modes:
      1. ILS: When the user selects this mode, the Navigation Display screen should show the ROSE ILS mode.
      2. VOR: When the user selects this mode, the Navigation Display screen should show the ROSE VOR mode.
      3. NAV: When the user selects this mode, the Navigation Display screen should show the ROSE NAV mode.
   2. ARC: When the user selects this mode, the Navigation Display screen should show the ROSE ARC mode.
   3. PLAN: When the user selects this mode, the Navigation Display screen should show the ROSE PLAN mode.
3. Additional Navigation Data Display: There are 5 toggle buttons in the EFIS panel to show additional information on the Navigational Display Screen:
   1. CSTR: Selecting this button overlays constraint points on the current Navigational Display screen.
   2. WPT: Selecting this button overlays waypoints on the current Navigational Display screen.
   3. VORD: Selecting this button overlays VORD points on the current Navigational Display screen.
   4. NDB: Selecting this button overlays nod directional beacons on the current Navigational Display screen.
   5. ARPT: Selecting this button overlays airports on the current Navigational Display screen.

# Electronic Centralized Aircraft Monitoring (ECAM) Panel

This panel contains 6 buttons to allow the user to select which page to display on the System Display screen:

1. ENG: Selecting this button will populate the System Display screen with the Engine page.
2. BLEED: Selecting this button will populate the System Display screen with the Air bleed page.
3. PRESS: Selecting this button will populate the System Display screen with the Cabin pressurization page.
4. HYD: Selecting this button will populate the System Display screen with the Hydraulic page.
5. FUEL: Selecting this button will populate the System Display screen with the Fuel page.
6. APU: Selecting this button will populate the System Display screen with the APU page.