Modelling an Aircraft Landing System

Especificação e Modelação

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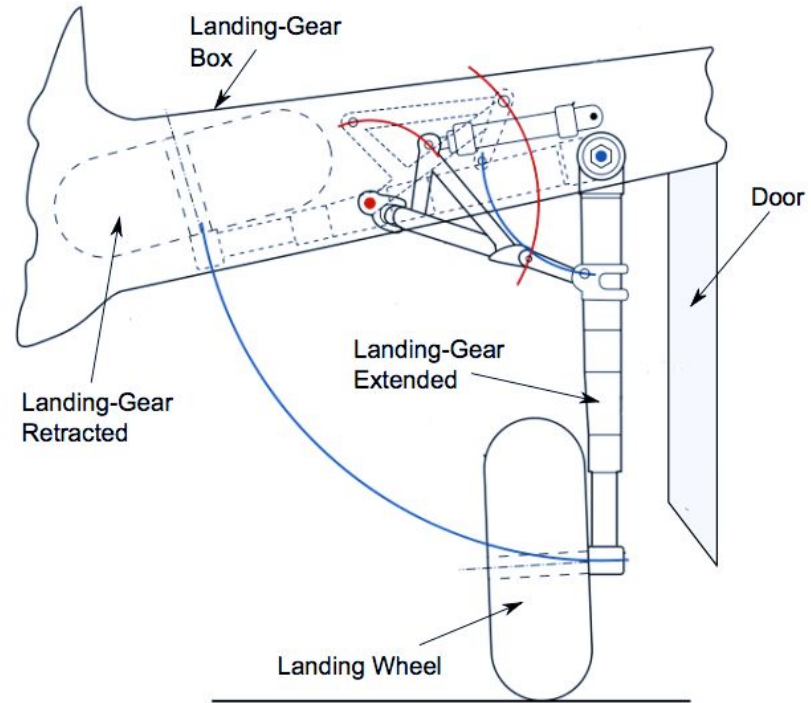*Fernanda Alves*

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Landing System

- Mechanic System
    - 3 Landing Sets
- Digital System
    - Control gears and doors
    - Anomalies detection
- Pilot Interface
    - System interaction
    - Set indicators

Landing Set

- Door
  - Open
  - Close
- Hydraulic cylinders
  - Extend
  - Retracted

Landing Set

sig LandingSet {

    landingset : Lstate -> State,

    valvesDoor : one Door,

    valvesHydraulic : one Hydraulic

  }

abstract sig Lstate {}

one sig Lock, Unlock extends Lstate {}

abstract sig Door {

    door : set Dstate -> State }

abstract sig Dstate {}

one sig Open, Close extends Dstate {}

abstract sig Hydraulic {

    hydraulic : set Hstate -> State }

abstract sig Hstate {}

one sig Extend, Retract extends Hstate {}

Digital System

- Handle Landing Sets
    - Active electro-valves
- Detect anomalies
    - Emergency mode

Digital System

sig DigitalSystem {

    anomaly : DSstate -> State,

    emergency : one AnalogicSystem,

    handle : one LandingSet

}

abstract sig DSstate {}

one sig Detect, Undetect extends DSstate {}

abstract sig AnalogicSystem {

    manual : ASstate -> State

}

abstract sig ASstate {}

one sig Active, Inactive extends ASstate {}

Pilot Interface

- Handle Button
    - Up or Down
- Control
    - Digital System
- Trigger Error
    - Analogic System
- Flight Sensor
    - On or Off

Pilot Interface

sig PilotInterface {

    button : Bstate -> State,

    control : one DigitalSystem,

    trigger : one AnalogicSystem,

    flightSensor : OFstate -> State

}

abstract sig Bstate {}

one sig Up, Down extends Bstate {}

abstract sig OFstate {}

one sig On, Off extends OFstate {}
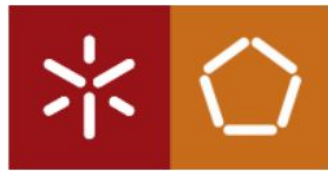
Constrains

Initiation

- Button: *Up*
- FlightSensor: *Off*
- Landingset: *Lock*
- Door: *Close*
- Hydraulic: *Extend*
- Anomaly: *Undetect*
- Manual: *Inactive*

Transation

- oneState *predicate*
- moving **or** halt **or** manualsystem **or** anomalyDetector *predicates*

Predicates

- oneState
- moving
- halt
- manualsystem
- anomalyDetector

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