

# MOBILIDADE SUSTENTÁVEL

Voo Perpétuo



Capgemini  engineering



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**Pedro Braga** · 1st

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500+ connections



243 mutual connections: Tiago Valentim, Helder Pinheiro, and 241 others

Message

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Capgemini Engineering



Universidade do Porto

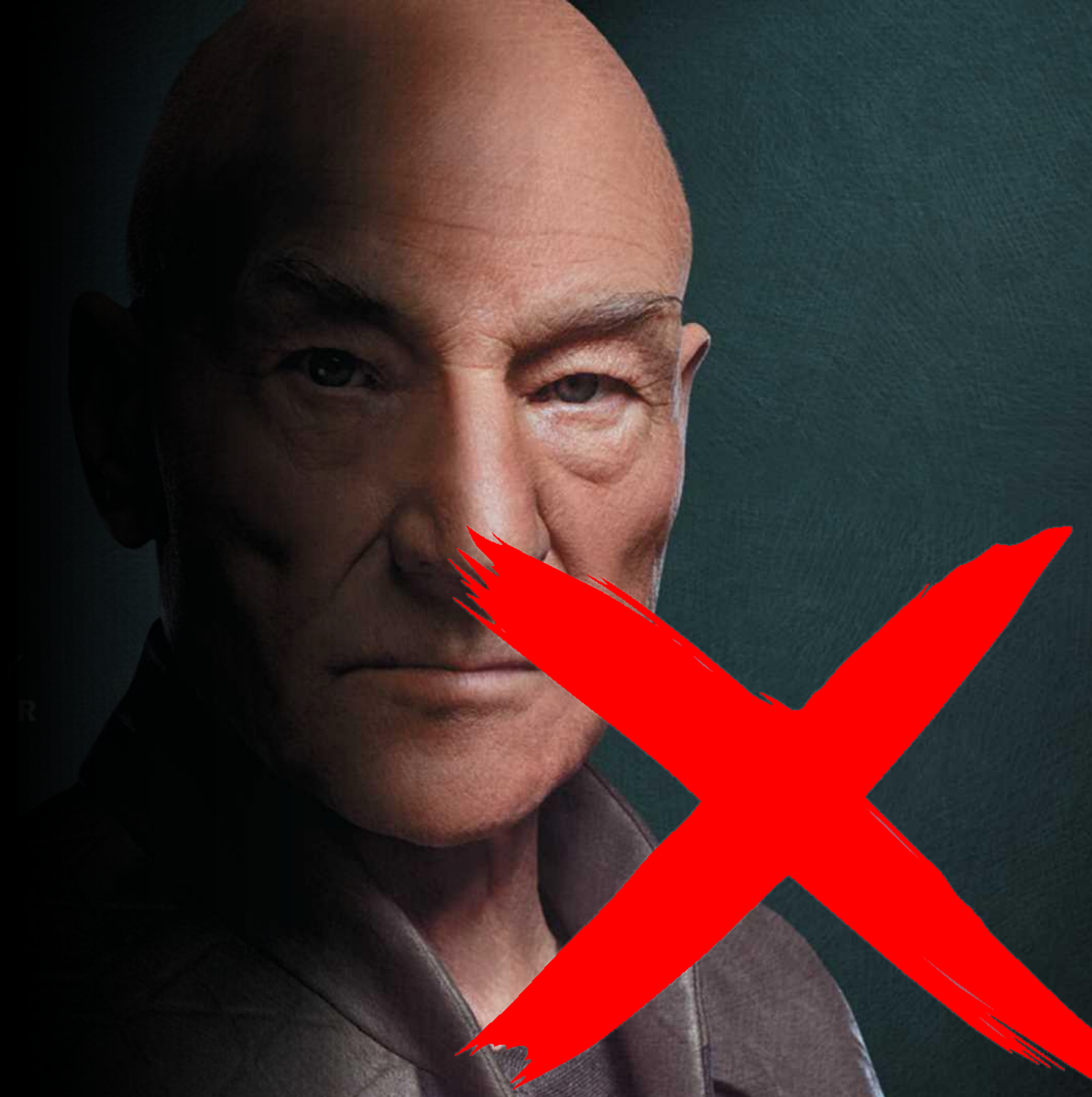


**AUTONOMOUS &  
FREE**



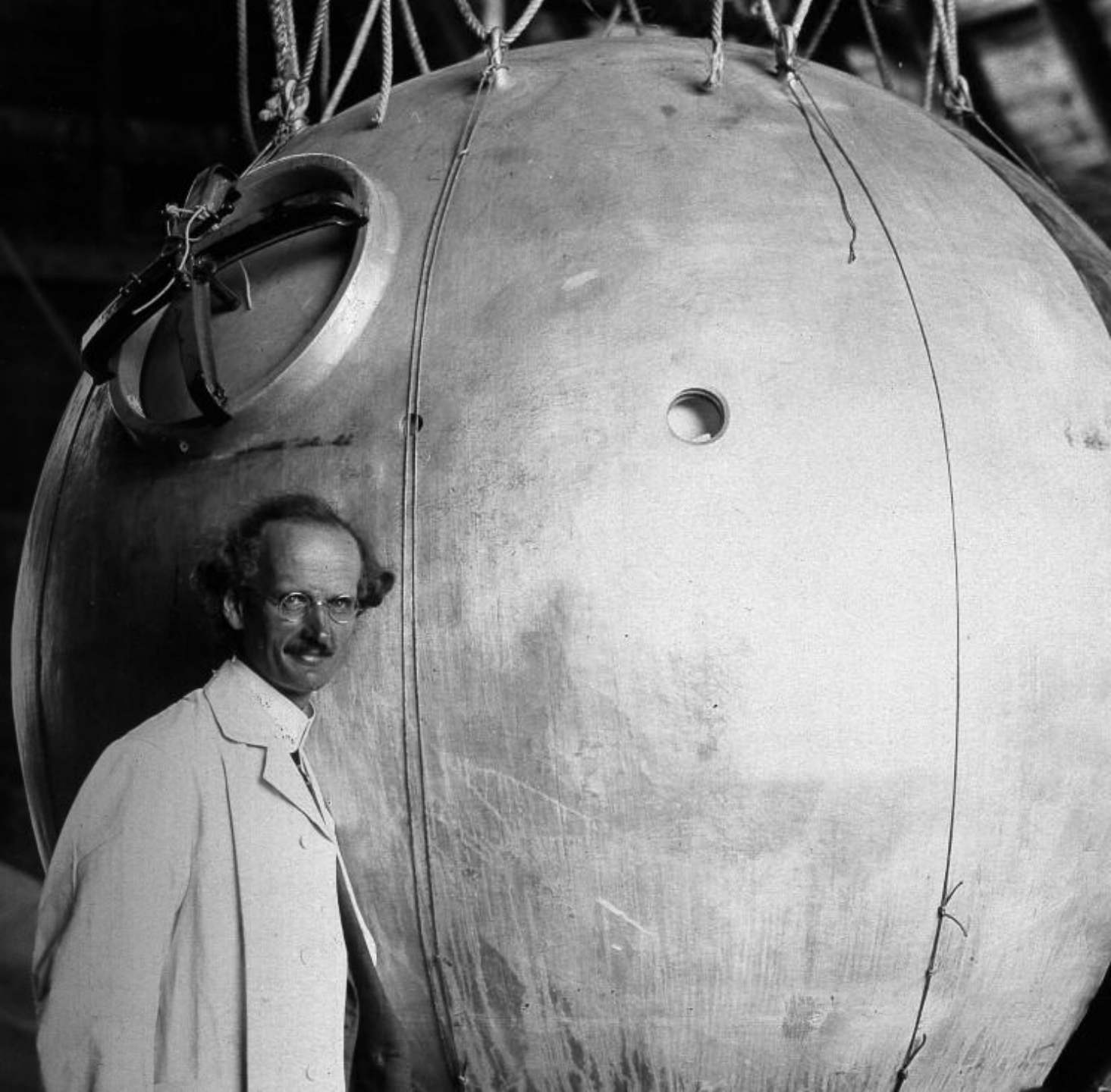
**THE LAST  
FRONTIER**

**PICCARD**



# AUGUSTE PICCARD

1931  
THE FIRST MAN TO SEE  
THE EARTH CURVATURE



# JACQUES PICCARD

1960  
REACHED THE DEEPEST POINT  
OF THE OCEAN



# BERTRAND PICCARD



2016  
TRAVEL AROUND THE WORLD  
IN A SOLAR PLANE

# SOLARIMPULSE







LifeXpress

ALTRAN  
Swiss Re  
Corporate Solutions



# SOLARIMPULSE

AROUND THE WORLD IN A SOLAR AIRPLANE

Solar Impulse 2

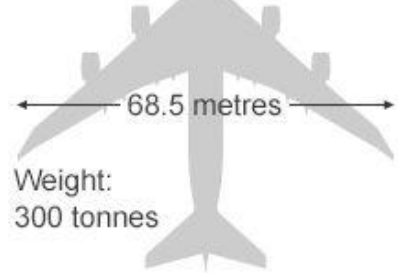


72 metres

Weight: 2.3 tonnes

Average speed 70km/h

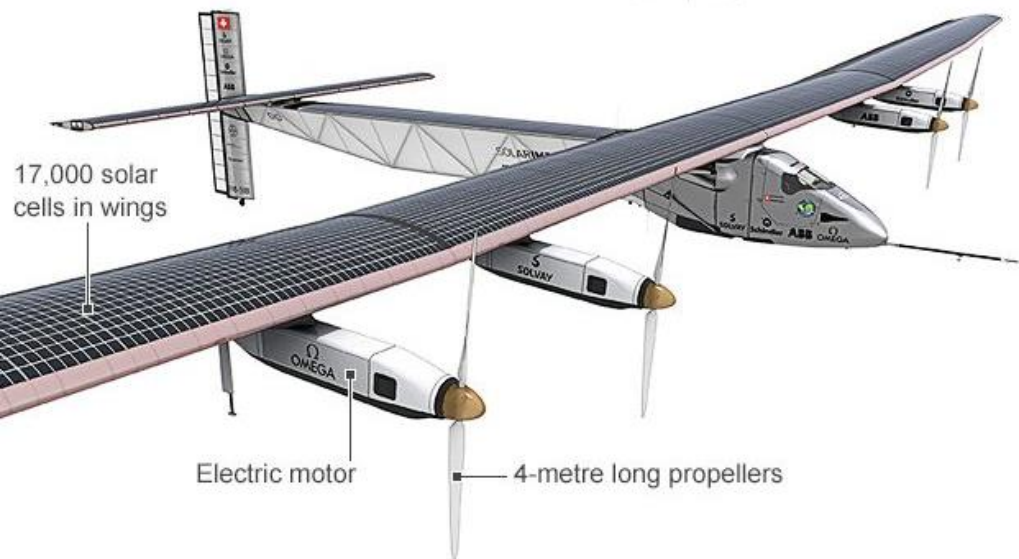
Boeing 747-81



68.5 metres

Weight:

300 tonnes





<https://www.youtube.com/watch?v=55Mu0JljMRg>

*Solar Impulse 2: An Exclusive Insight into Life Onboard*

(Video feito pelo próprio Bertrand Piccard a bordo do Solar Impulse enquanto fazia a travessia do Oceano Atlantico)

# PERPETUAL FLIGHT

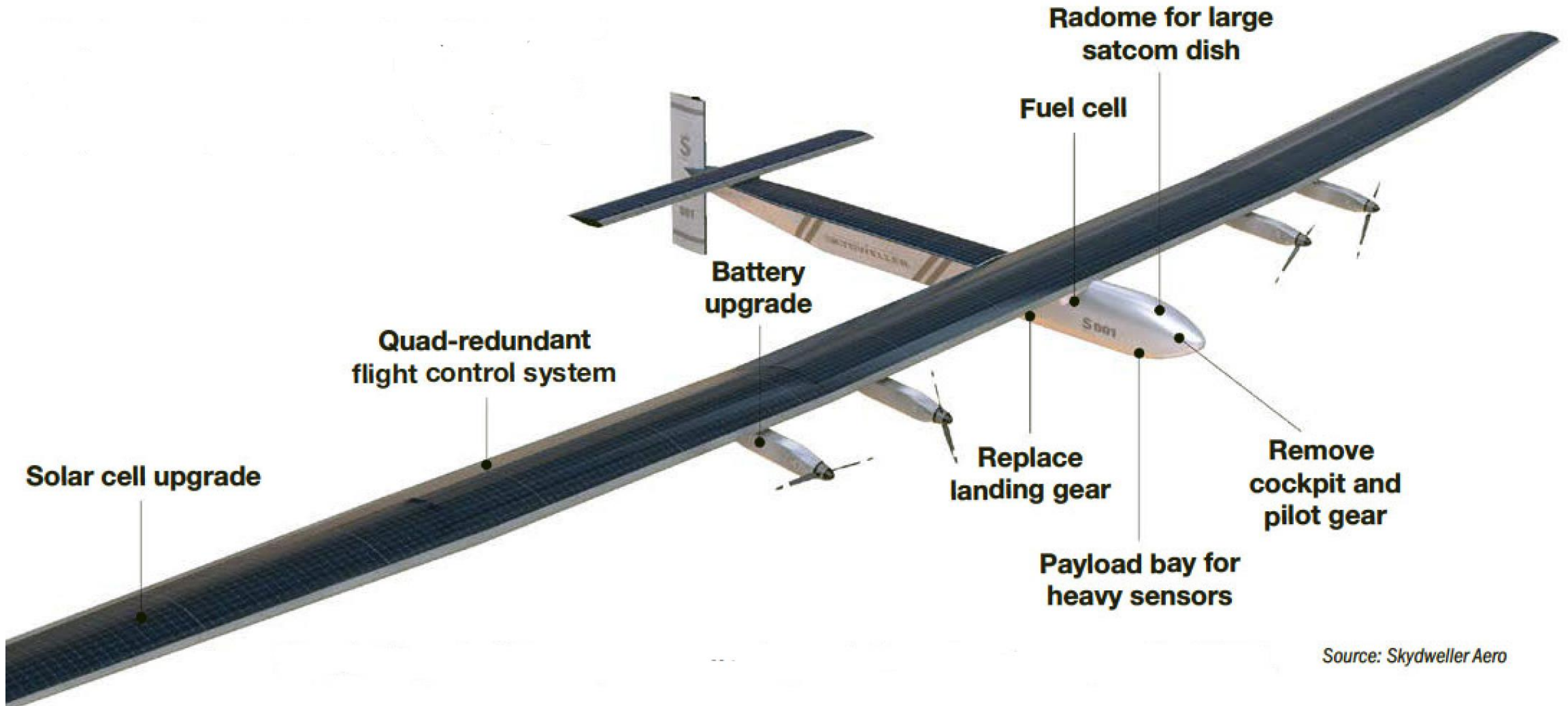




# SOLAR DRONIFICATION

# SKYDWELLER

Perpetual Flight™



Solar cell upgrade

Quad-redundant flight control system

Battery upgrade

Replace landing gear

Payload bay for heavy sensors

Fuel cell

Radome for large satcom dish

Remove cockpit and pilot gear

# OUR PARTICIPATION

GLOBALLY AT CAPGEMNI ENGINEERING:

SYSTEM

SAFETY

SOFTWARE

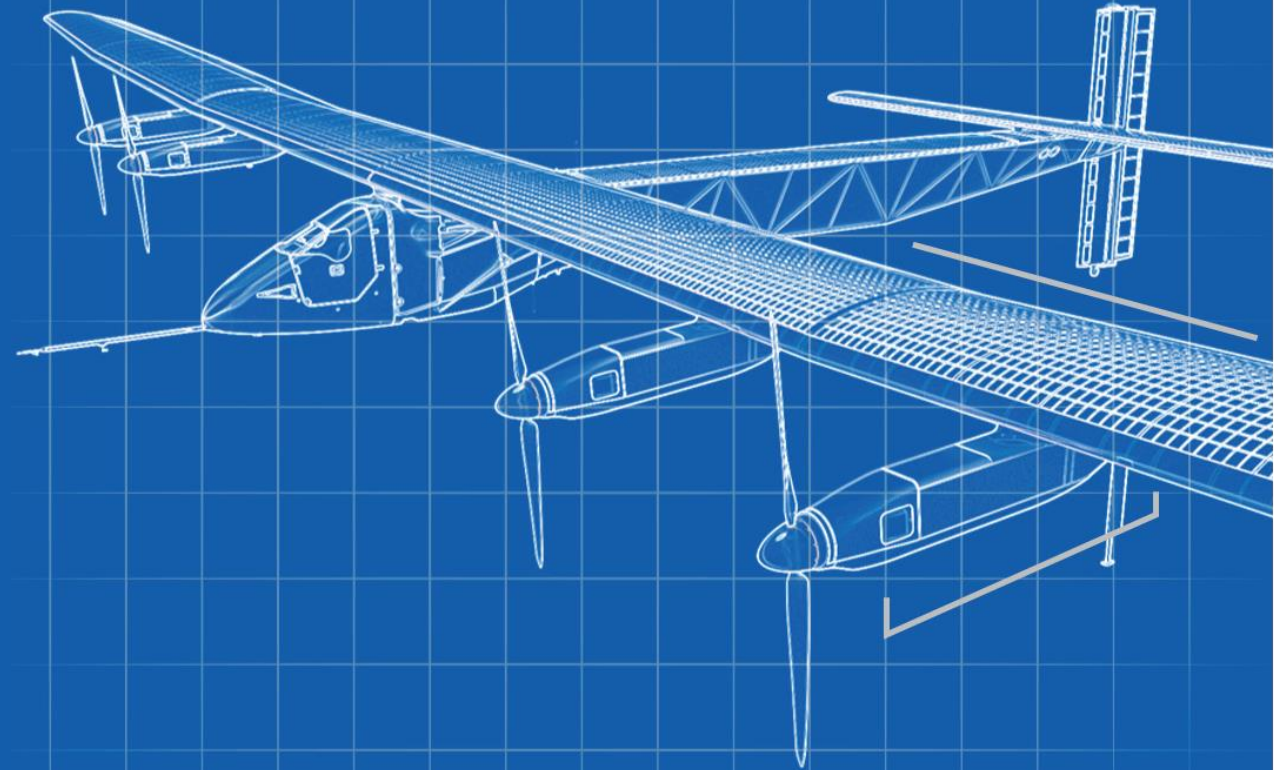
FROM PORTUGAL:

SW ARCHITECTURE

SW MODELING

MBSD

Model-Based Software Development  
Low-Code / No-Code Solution



DEVELOPPING SAFETY  
RELATED SYSTEM...

REMOVE BEFORE FLIGHT

PUSH





# EXAMPLE OF ACTIVE SAFETY STRATEGIES

REDUNDANT DISSIMILAR SUBSYSTEMS

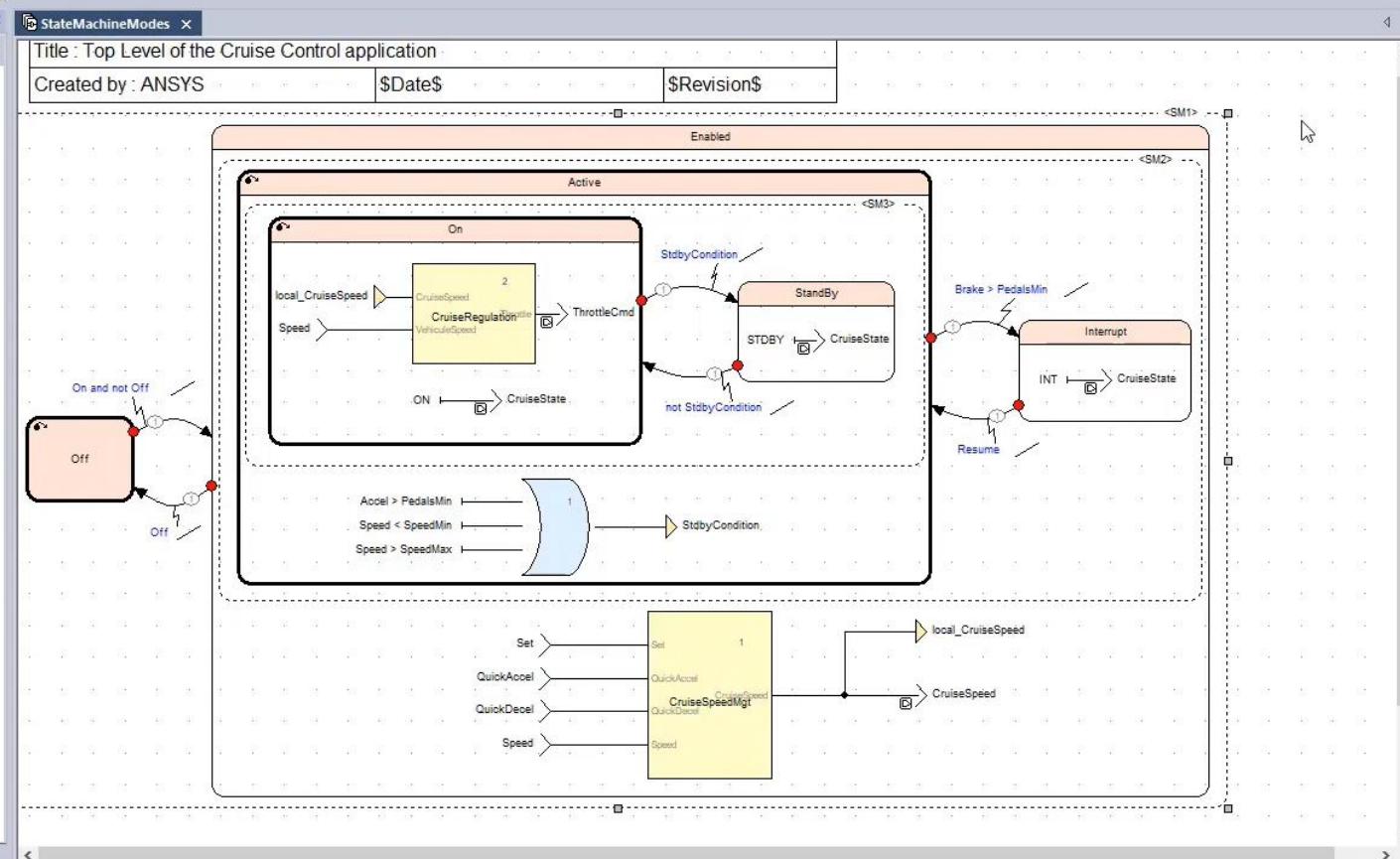
FDIR

MBSD



Scade

- CruiseControl.etp
  - CruiseControl
    - Operators
      - CruiseControl
      - CruiseRegulation
      - CruiseSpeedMgt
      - SaturateThrottle
    - Defs
    - Proof
      - Operators
        - Proof
        - Prop1
        - Prop2
        - Prop3
        - Prop4
        - Prop5
      - System
        - Operators
          - SystemSimul
    - Car
      - CarType
      - libdigital
      - liblinear
      - libmath
      - libmathext
      - libpwnlinear
      - libverif
    - CruiseControl\_Test.etp
    - cc\_architecture.etp



Requirements

Shortcuts

High Level Requirements

- 2. Cruise Control Requirements
  - Interface
    - CC\_HLR\_IN\_01
    - CC\_HLR\_IN\_02
    - CC\_HLR\_IN\_03
    - CC\_HLR\_IN\_04
    - CC\_HLR\_IN\_05
    - CC\_HLR\_IN\_06
    - CC\_HLR\_IN\_07
    - CC\_HLR\_IN\_08
    - CC\_HLR\_IN\_09
    - CC\_HLR\_OUT\_01
    - CC\_HLR\_OUT\_02
    - CC\_HLR\_OUT\_03
  - Cruise Control behavior
    - CC\_HLR\_CCB\_01
    - CC\_HLR\_CCB\_02
    - CC\_HLR\_CCB\_03

Mathematical

- Plus
- Minus
- Multiplication
- Polymorphic Division
- Modulo
- Unary Minus
- Numeric Cast

Comparison

- Logical
- Structure/Array
- Time
- Choice
- Bitwise
- Higher Order

Output

Loading project CruiseControl.etp...  
 Successfully loaded project CruiseControl.etp  
 Loading project 'cc\_architecture.etp'...  
 Project 'cc\_architecture.etp' successfully loaded.

Properties of SM1

General

Name: SM1

Path: CruiseControl:CruiseControl/SM1:

Filename: CruiseControl1.xscade

Separate File Name

Visibility

Public  Private



**WHAT ROLE WILL  
YOU PLAY IN  
BUILDING THE FUTURE?**

Capgemini  engineering

# JOIN OUR ENGINEERING TEAM

Opportunities

**+150**

**+130**

**+80**

PORTO

FUNDÃO

LISBOA





**GET THE  
FUTURE  
YOU WANT**