

# Driving and Flight Simulator

## User Manual

### Simulator's Cabins Switch



## Signatures

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## Diffusion

OKTAL

University Federico II of Naples

## History

Version	Publication	Author(s)	Modifications
1.0		DG	Creation

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# 1 Important Information

## HOW TO INSTALL AND USE THE OKTAL'S MATERIAL

It is important to install and use the adaptor plates by respecting the necessary security measures. The person in charge of installation has to identify and respect all the necessary security measures; the non-respect of which is likely to cause material or physical damage. Please read this manual carefully before installing or using the material.

Only a person with the necessary training for installing or maintaining mechanical material is authorised to conduct the installation and verification procedures described in this manual. This person has to be aware of the likely dangers linked to the maintenance of the adaptor plates (please refer to the security warning mentioned below). The person or the group in charge of the material has to ensure that the operators are properly trained in this matter.

The material supplier does not assume any responsibility in case of any accessory, indirect or specific damage including among other things the loss of profits due to the or in any relation with the utilisation of the material or the manual.



### **SECURITY WARNING**

The installation of the adaptor plates requires trained personnel with a forklift truck operator driving licence.

Please respect the security norms applied for the installation and maintenance of the material.

## 2 Presentation of the simulator platform

The simulator consists of a 6-axis-motion platform system on which a cabin is installed. The system integrates two possible configurations for two different simulation cockpits:

- The first being a semi-vehicle (CITROËN C2)
- The second being a civil aircraft cockpit.

The two cockpits can be switched alternatively on the same motion platform system.

### 2.1 Document purpose

This document describes the installation procedure and the integration of the Flight/Driving cockpits into the 6-axis motion platform system of the simulator for the University of Naples.

### 2.2 Conditions for usage

The simulator is suitable for interior usage, under the following standard conditions:

- Temperature for storage: from  $-5^{\circ}$  to  $+40^{\circ}$ .
- Temperature for usage: from  $+15^{\circ}$  to  $+25^{\circ}$ .
- Relative rate of Humidity : from 10% to 60%
- No explosive atmosphere.
- Installation in a closed environment suitable for this usage.

### 2.3 Necessary tools

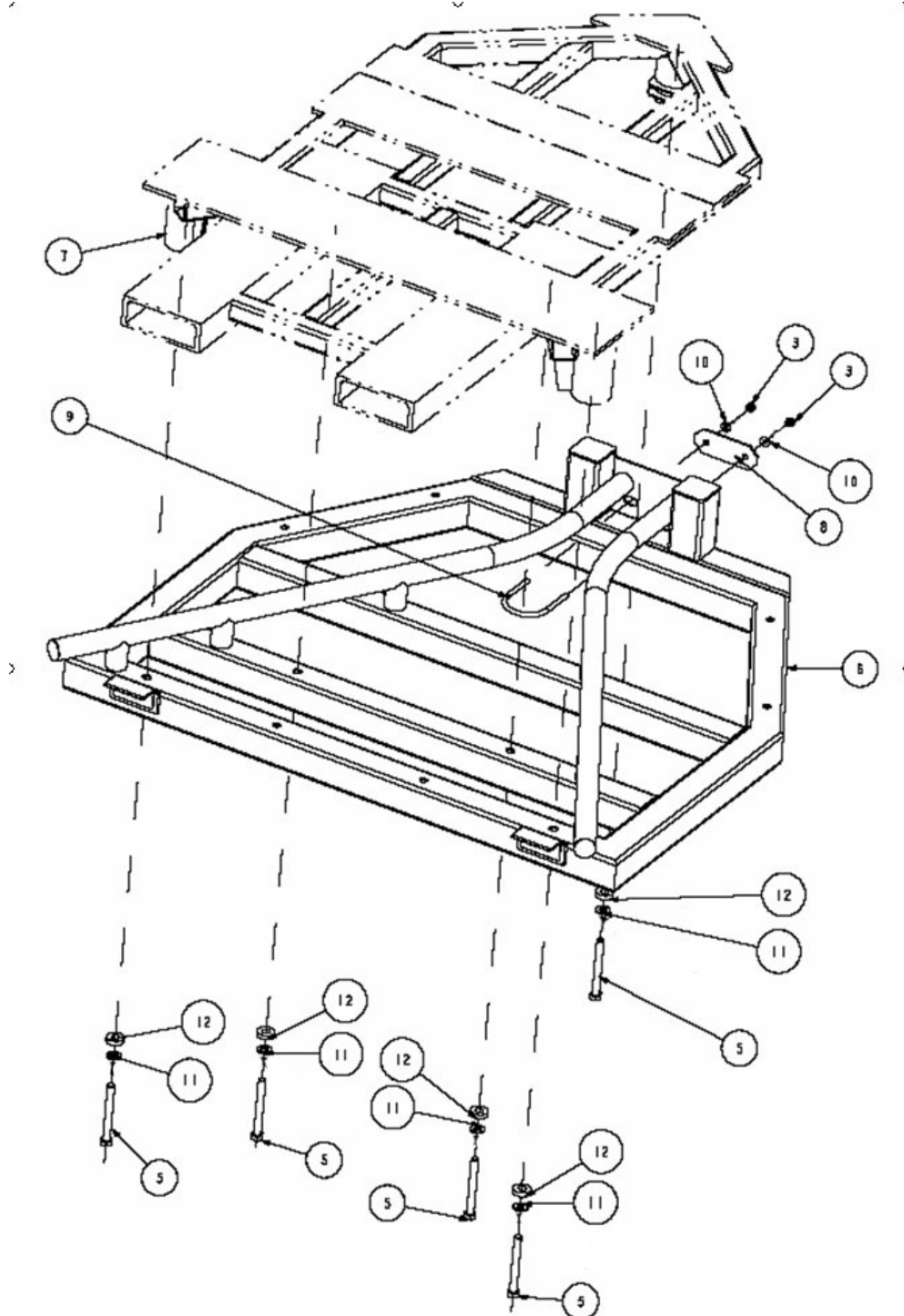
The following tools are necessary for switching the cabins:

- Fork lift (to be furnished by the user)
- Reversible ratchet socket wrench (furnished by OKTAL)
- A 16 mm socket (furnished by OKTAL)
- A 10 mm socket (furnished by OKTAL)

## 2.4 Architecture

### 2.4.1 General Architecture

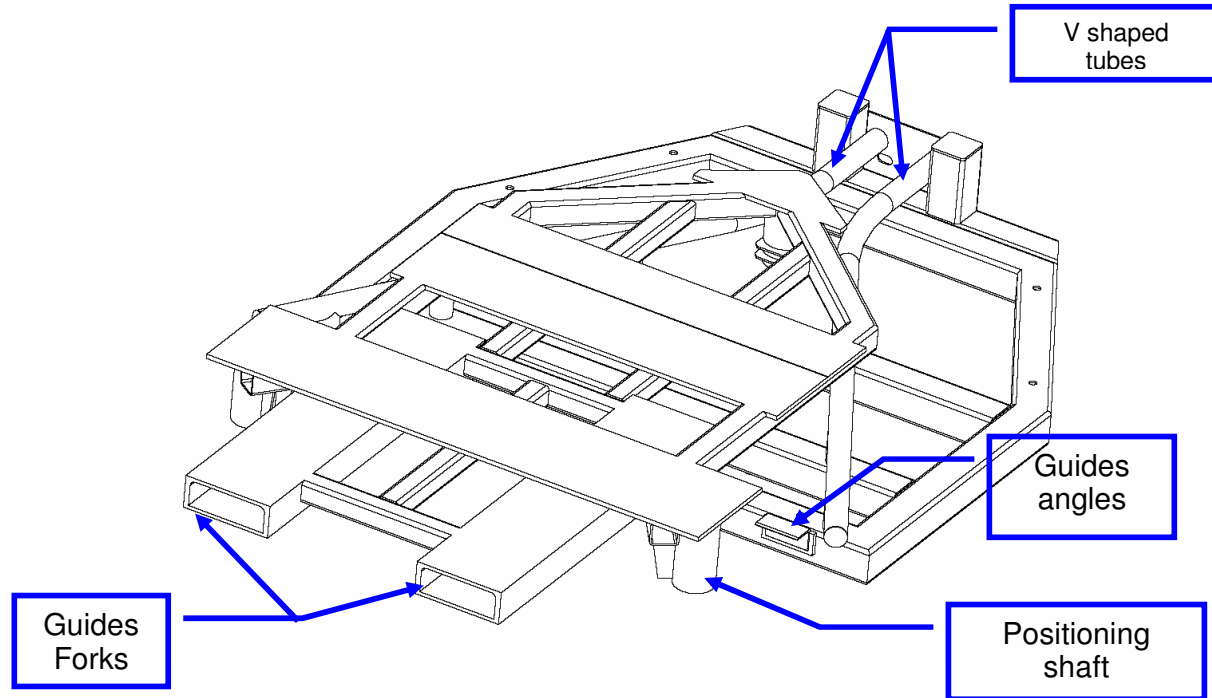
The system consists of a main plate (N° 6) attached to the platform and of a second plate (N° 7) fastened under each cockpit.



**2.4.1.1 Nomenclature**

Reference	Quantity	Description
3	2	Thin nut H, M10
5	5	Screw H, M16 x 140
6	1	Primary plate
7	1	Secondary plate
8	1	Front back plate
9	1	Front flange
10	2	Plain washer M10U
11	5	Plain washer M16U
12	5	levelling pad Ø16

### 3 Plate Installation



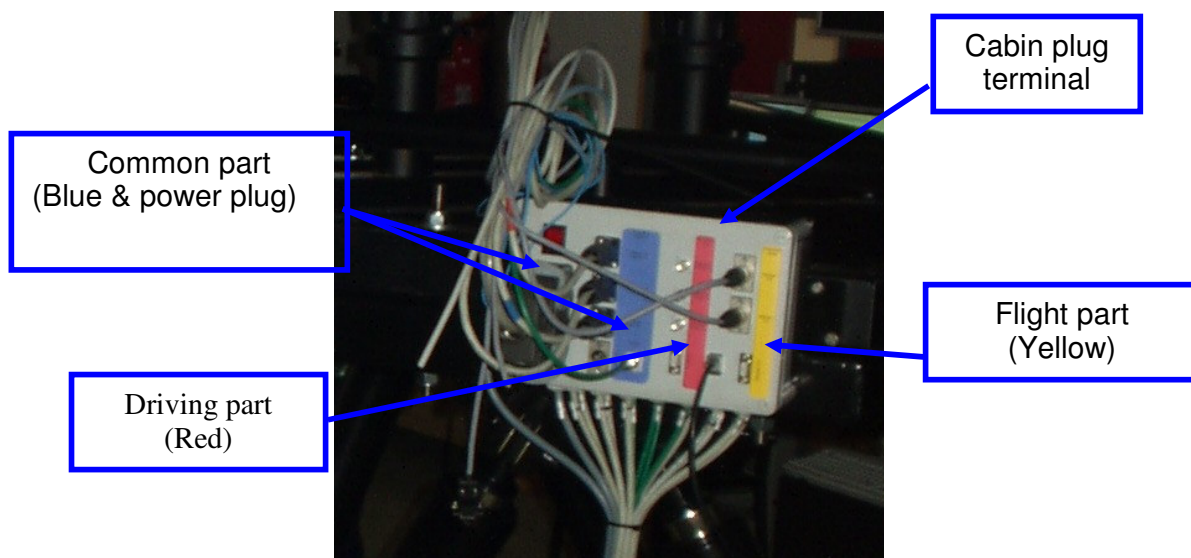
This installation is used for both cockpits (Flight/Driving).

#### 3.1 Cabin installation on the motion platform:

- Make sure that no obstacle can obstruct the manoeuvres (cables ...)
- Remove the stairs to enlarge the handling area.
- Check that the motion platform is not powered
- Check that the cabin main power is off
- Place the forks of the fork lift truck in the dedicated forks' guides (rep. 7) of the secondary plate (see figure above).
- Lift the cabin above the primary plate (rep. 6); the positioning shafts bottoms must not be above the V shaped tubes.
- Move forward the cabin in front of the V shaped tubes. The secondary plate's positioning shafts must be guided by the V shaped tubes.
- Move forward the cabin until the positioning shafts are all touching the primary plate's V shaped tubes. Check that the two rear shafts are after the guides angles.
- Put the secondary plate on the primary plate. The two rear shafts are after the guides angles and the front shaft touches the vertical plate on the primary plate.
- Try to place the 5 screws (rep. 5) and the M16 nuts (rep. 11) to link the primary and secondary plates. For the aircraft cabin, use the levelling pads (rep.12).
- If the screws cannot be screwed normally (screw holes not correctly aligned), make a fine positioning of the plate:
  - Place the flange (rep. 9) and the back plate (rep. 8).



- Fix the flange and the back plate with the washers (rep. 10) and the M10 nuts (rep.3) using the wrench to finely positioned the secondary plate on the primary one.
- Place the 5 screws (rep. 5) and the M16 nuts (rep. 11) to link the primary and secondary plates. For the aircraft cabin, use the levelling pads (rep.12).
- Get out the fork lift truck.
- Tighten the screws normally. Information: the screws clamping with a dynamometer wrench should be at the following values:
  - $40\text{N.m} \pm 5 \text{ N.m.}$  for the M10 screws
  - $190\text{N.m} \pm 5 \text{ N.m.}$  for the M16 screws
- Plug on the cables on the cabin plugs terminal respecting the codes (from C1 to C14):



- **Car cabin**
  - The speakers must be plugged on C3 (left), C5 (right) and the subwoofer on C4
  - The microphone must be plugged on C6
  - The camera must be plugged on C7
  - The mirrors screens must be plugged on C8, C9 and C10
  - The CAN acquisition board must be plugged on C11
  - Plug the electrical must be plugged on C1 and C2
- **Aircraft cabin**
  - The speakers must be plugged on C3 (left), C5 (right) and the subwoofer on C4
  - The microphone must be plugged on C6
  - The camera must be plugged on C7
  - The pilot intercom must be plugged on C12 and C13
  - The embedded PC Ethernet cable must be plugged on C14
  - the electrical must be plugged on C1 and C2

## 3.2 Cabin removal from the motion platform

- Make sure that no obstacle can obstruct the manoeuvres (stairs, cables ...)
- Check that the motion platform is not powered
- Check that the cabin main power is off
- Plug off the cables from the cabin plugs terminal. Place the cables that came from the cabin over the secondary plate to avoid having cables that hangs during the cabin moves.
- Unscrew the 5 M16 screws (rep.5)
- Place the forks of the fork lift truck in the dedicated forks' guides (rep. 7) of the secondary plate.
- If present, unscrew the flange (rep. 9)
- Lift the cabin over the positioning shaft.
- Move backward the cabin to have it outside the primary plate.
- Put the cabin on the floor.

## 3.3 Warehousing

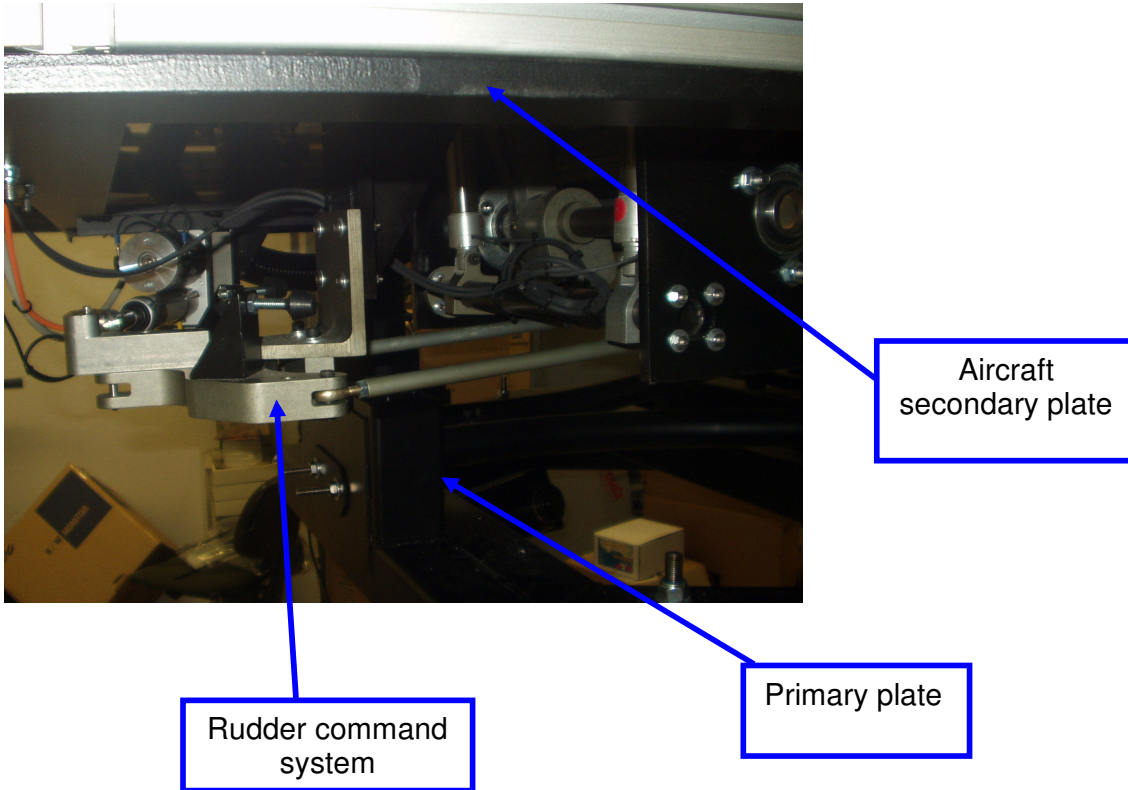
The cabin warehousing can be on ground. The secondary plate can lay on the 5 positioning shafts.

The cabin must store inside, in a **temperate, dry and clean** area.

### 3.4 Special Recommendations



During the manoeuvres with the aircraft cabin, be careful to have it height enough to keep it far from the primary plate. When putting down the cabin on or lifting it from the motion platform, you must avoid bumping the rudder command on the primary plate. Otherwise the rudder command can be destroyed.



## 4 Utilisation

### 4.1 Safe practice

A periodic check has to be done. The global check must be done at **each cabin interchange** and every days of use.

If you detect a defect, **DO NOT USE THE SYSTEM.**

Respect the condition of use.

Respect the handling operations security rules.

Periodic checklist:

- 1- Check the general aspect of the primary plate (no cracks on the welding, no deformations on the tubes or plates).
- 2- Check the general aspect of the secondary plate (no cracks on the welding, no deformations on the tubes or plates).
- 3- Check the general aspects of the screws and nuts (screw threads, nuts, washers).
- 4- Check the fixations and that the screws are normally tight