SCITOS – Quick Start Guide

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Components for your robot

Component	Serial number
SCITOS G5 Base	10388-001
SCITOS G5 HMI	10388-002
Charging Station	10388-003
Laser range finder SICK S300 professional	1320 0191
FLIR Pan-Tilt-Unit PTU D46-17	#007881
Depth camera: Asus Xtion Pro Live	-

EBC Configuration

MainControlUnit EBC:

5V	SCITOS Head
12V	SCITOS Head
24V	SCITOS Head

EBC Card Slot 7:

Port 0	5V	not used
	12V	GigE camera power supply
	24V	not used
Port 1	5V	not used
	12V	FLIR PTU D46-17
	24V	not used

Embedded PC Configuration

CPU:	Intel Core i7-2640M, 2.8GHz
Memory:	4 GB RAM
Harddisc:	sda: 250 GB

```
/dev/sda1  /
/dev/sda2  SWAP
/dev/sda3  /localhome
```

Operating system:	Ubuntu 12.04LTS, 32bit, Updates until 2013-05-02
User account:	demo (Password: scitos)
Network configuration:	DHCP on eth0 and eth1
Keyboard settings:	English Keyboard Layout
VNC-Server:	Running at standard port 5900. Password: scitos
CAN adapter:	Integrated MetraLabs-CAN-Adapter (device `/dev/ttyUSB2`)

CAN bus driver:

If the robot is equipped with a PCAN adapter, the proprietary kernel module `pcan`. After each kernel update, the module `pcan` have to be re-compiled:

```
> sudo -s
> cd /usr/local/peak-linux-driver-7.8
> make NET=NO_NETDEV_SUPPORT clean
> make NET=NO_NETDEV_SUPPORT
> make NET=NO_NETDEV_SUPPORT install
```

To test the CAN bus interface:

```
> sudo -s
> rmmod pcan
> modprobe pcan
> cat /proc/pcan      → one CAN device (#32)
> cat /dev/pcan32     → lots of incoming messages
```

If your robot has an integrated MetraLabs-CAN-Adapter, you don't have to care about the `pcan` kernel module.

Touch calibration:

Please use xinput_calibrator to determine the calibration parameters:

```
> xinput_calibrator
```

Please copy the new calibration values to the following file:

```
/usr/share/X11/xorg.conf.d/99-touch
```

Software Configuration

Notes:
- The installation of MIRA and MIRA CogniDrive is described in separated document. Please refer to the file `SCITOS-MIRA-InstallGuide-2013-04-30.pdf.`
- At time of the delivery, all software is already installed and ready for use.

MIRA base installation: `/opt/MIRA`

MIRA CogniDrive: `/opt/MIRA-commerical`

MIRA installation repositories:
```
ftp://mira-project.org/repos/
    MIRA-main/ubuntu-1204lts-i686/MIRA-main.repo
ftp://metralabs-service.com/repos/
    MIRA-commercial/ubuntu-1204lts-i686/MIRA-commercial.repo
```

MIRA license file: `/opt/MIRA-license/*.lic`

Important environment variables in `~demo/.bashrc`:
```
MIRA_PATH=/opt/MIRA:/opt/MIRA-commerical
LD_LIBRARY_PATH=/opt/MIRA/lib:/opt/MIRA-commerical/lib
PATH=/opt/MIRA/bin
```

MIRA onlIne documentation:
```
http://www.mira-project.org/MIRA-doc/index.html
```

Install / update / remove packages using *mirapackage*:
```
> sudo -s
> source ~demo/.bashrc
> mirapackage
```

Online documentation of *mirapackage*:
```
http://www.mira-project.org/MIRA-doc/MIRAPackagePage.html
```

Online documentation of *miracenter*:
```
http://www.mira-project.org/MIRA-doc/MIRACenterPage.html
```

SCITOS configuration file:
SCITOS robots can be equipped with different kinds of sensors and optional components. For this reason, a global configuration file is used to specify the hardware configuration of the robot.

On your robot, the following configuration file is used:
```
/opt/SCITOS/SCITOSRobotAttributes.xml:
```

```xml
<root>
   <var robot="SCITOS-G5" />
   <var frontLaser="SickS300" />
   <var rearLaser="none" />
   <var sonar="false" />
   <var bodyType="normal" />
   <var coverType="2012" />
   <var color="0.10 0.15 0.32" />
   <var hmi="true" />
</root>
```

For more details, please look into the file and read the online documentation:
```
http://www.mira-project.org/MIRA-doc/domains/robot/SCITOS/index.html
```

Initial SCITOS mapping configuration (please run as user demo):
```
> miracenter -c \
    /opt/MIRA-commerical/domains/robot/SCITOSConfigs/etc/
    SCITOS-mapping.xml
```
– After some initializations, all authorities in the *AutorityView* should be OK (= green). Otherwise the "Status" should contain a human-readable error message.

Start using CogniDrive:

– Start the SCITOS mapping configuration (see above).

– Record a map of your environment using the *SimpleMapper*:
```
http://www.mira-project.org/MIRA-doc/toolboxes/\
        MapBuilder/index.html
```

– Save the new map as "map" in `~demo/mapping/`

– Close the *SimpleMapper* and then close *miracenter.*

– Start the SCITOS navigation configuration:
```
> cd ~demo/mapping
> miracenter -c \
      /opt/MIRA-commerical/domains/robot/SCITOSConfigs/etc/
      SCITOS-Pilot.xml \
      --variables staticMap=/localhome/demo/mapping/map-static.xml
```

   Please note, that the path to the map XML files must be an absolute path. Furthermore, this example must be started from the directory, where the maps are located.

– After some initializations, all authorities in the *AutorityView* should be OK (= green). Otherwise the "Status" should contain a human-readable error message.

– In the view *Channels* you should see a lot of channels, which are updating regularly.

– Open a 3D view: "*Window*" → "*Show view*" → "*Visualization – 3D*"

– Put the following channels into the 3D view (using drag & drop from the *Channels* view):
```
/maps/static/Map
/robot/Laser
/robot/navigation/Path
```

– Go to the "*Visualization Control*" window a using the "+" Button to add a "*Model – Rigid Model*" visualization.

– Now you should see the robot, the map and the laser range finder data in the 3D view. Use your mouse to move around in the 3D view ("*Orbit mode*"):
```
Left Button    → Rotation
Right Button   → Moving
Scroll Wheel   → Zooming
```

– The 3D view contains two buttons "*Localize*" and "*Goal*" to localize the robot and to set goal position. See the tool tips of this tools for some instructions. More details can be found in the online documentation of *miracenter*. Before using this tools, please record a map of your environment!

– Open the *DriveView*: "*Window*" → "*Show view*" → "*Robot – DriveView*". With this view, you should be able to move the robot round using the keyboard. The *DriveView* also contains button for reset the bumper ("*Reset Motorstop*") and to enable/disable the *FreeRunMode* of the robot.