ERL Consumer Service Robots Test Bed Certification

PAL Robotics Assisted House

Test bed name: PAL Robotics Assisted House

Test bed web page URL: https://sites.google.com/a/pal-robotics.com/erl-local-tournament-barcelona/

Name of Institution where test bed is hosted: PAL Robotics S.L., Barcelona

Designation of the lab/department/group where test bed is located: PAL Robotics office

Name of responsible person: Dr Jordi Pages

Contacts of responsible person:
- **E-mail**: erl@pal-robotics.com
- **Tel.**: +34 93 414 53 47

Pictures with overview of the test bed

Short description of the facility, including the type of furniture used, wall materials, available objects and robot platforms

The PAL Robotics Assisted House consists of the environment in which the competition will happen. The house has been developed as a typical apartment to provide realistic conditions to develop assistive robotics.

The facility has been constructed basing on the ERL-SR rulebook. The walls are made of expanded polystyrene (EPS – POREXPAN) and are fixed to the ground. The floor is well-levelled and uniform all over the testbed, without carpets. All the doors have a minimum width of 80 cm.

In the apartment five different rooms (accessible to the robot) have been configured:

- Bedroom: a double bed, two side tables, two table lamps and one large wardrobe with mirror.
- Living room: a couch with pillows, two armchairs, a coffee square table, a TV table, a floor lamp, a plant and a square puff.
- Dining room: a dining table seating four, four chairs and a library shelves.
- Kitchen: a kitchen table seating two, two chairs and a kitchen cabinet with multiple drawers and a wash sink.
- Hallway: a coat-rack.

Test bed layout, including dimensions, areas and room designations
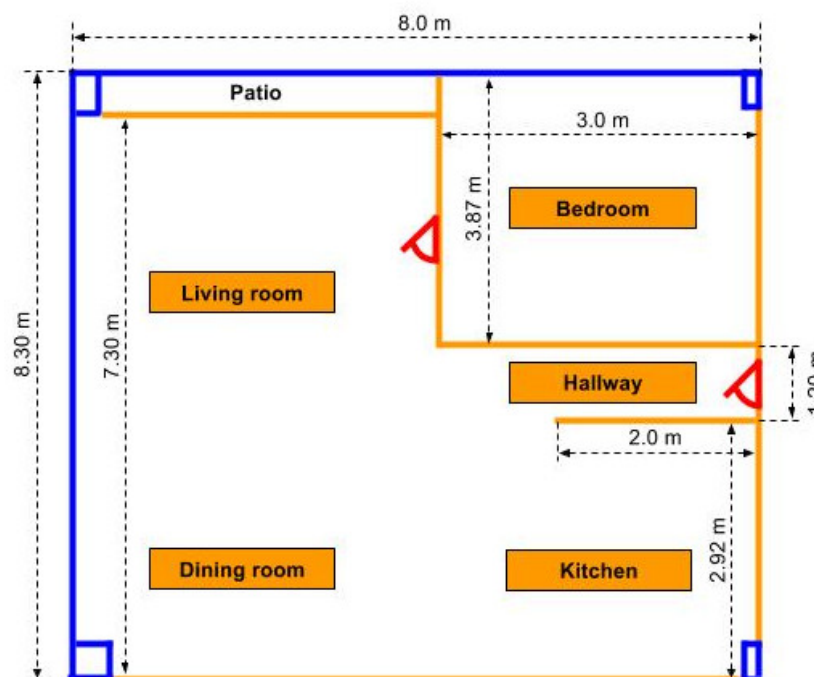
	Height	Thickness
Blue wall	2.78 m	\
Orange wall*	1.0 m	0.15 m

* the doors in red, should have a minimum width of 0.80 m

List of home automation devices available, including photo, make, model and main features:

● A computer server that run the RSBB software and the interface from the RSBB software and our home automation devices controller.

● An access point to create the dedicated network for the apartment and the RSBB server.

● Ethernet AXIS camera on the side of the front door.

● USB home automation devices controller: Aeotec Z-Stick Gen5. When connected to a host controller via USB, it enables the host controller to take part in the Z-Wave network.

● 1 motor to control window blinds: Fibaro Roller Shutter 2. Instead to control window blinds, in the PAL Robotics Assisted House the Roller Shutter 2 is used to control a motorized projector screen. The Roller Shutter 2 is powered by a single-phase AC and provides precise positioning of blinds, awnings or gates so they can be set to the position you choose.

● 2 controlled power plugs: Fibaro Wall Plug. Wall Plug is a smart switch with power metering for electrical devices.

● 1 door & window detector: Fibaro Door/Window Sensor. The Door/Window Sensor is a contact sensor fitted on front door with a temperature measurement feature.

Available Motion Capture system (make, model, and main features)

Not available.

Other relevant information

The test bed includes many Navigation-Relevant Objects (e.g., couch, tables, chairs), Manipulation-Relevant Objects (e.g., glasses, cups, cans, plates, forks, knifes, books) and Perception-Relevant Objects (e.g., cereal box, cans, cups, glasses).
The front door includes a doorbell button with a wireless speaker.

One block of expanded polystyrene (1m x 1m) of the wall will not be fixed to allow an easily moving for the TBM4, as described in the RoboCup@Home rulebook.

Current list of TBMs and FBMs for which the test bed is certified

Benchmark	Minimum required system / devices	Available in Test Bed
TBM1: Getting to know my home	RSBB	Yes
TBM2: Welcoming visitors	RSBB, IP camera at entrance	Yes
TBM3: Catering for granny Annie's comfort	RSBB, HAD	Yes
TBM4: Visit my home	None	Yes
TBM5: General purpose service robot	None	Yes
FBM1: Object perception functionality	RSBB, MoCap	No
FBM2: Navigation functionality	RSBB, MoCap	No
FBM3: Speech recognition functionality	None	Yes

Table 1: List of the ERL Consumer benchmarks with their corresponding required systems