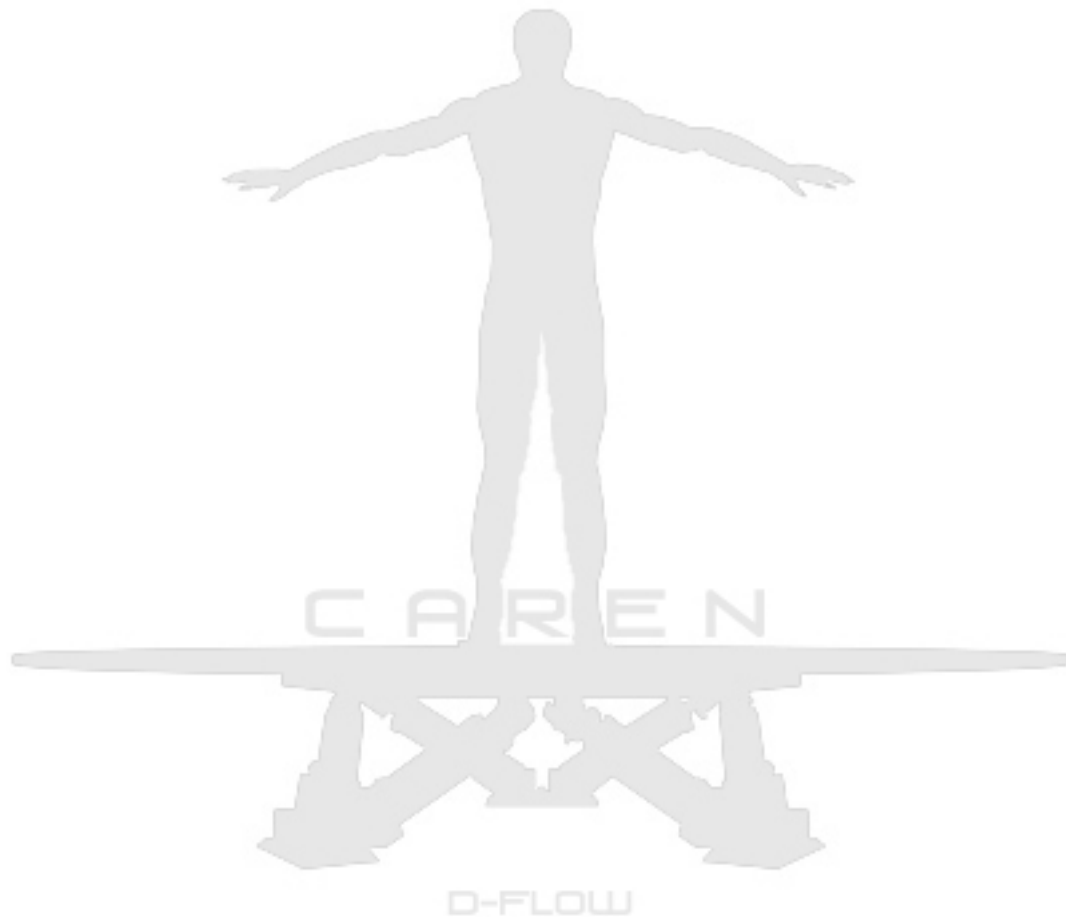


CAREN High-End

Architectural requirements



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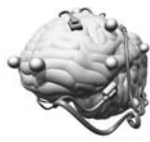
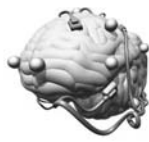


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1 Introduction

CAREN (Computer Assisted Rehabilitation Environment) is a turnkey, customizable visualization application designed for the medical industry. Based on MOTeK's patented D-Flow™ Technology, CAREN allows medical experts to view and analyze balance and coordination strategies in an interactive, controlled environment; enhancing diagnostic and therapeutic activities. Developed by MOTeK under a European Union (EU) funded program, CAREN "immerses" one or more patients in a fully reactive virtual and physical environment to determine, register, standardize, and evaluate human functional performance in a wide range of situations. The combination of the D-Flow feedback loop with a motion platform provides the ability to compensate or adjust the simulated experience by relocating the position of the platform in real-time. CAREN lets therapists introduce dynamic corrections to a patient's virtual and physical realities, creating an interactive relationship that can significantly reduce the rehabilitation and training times for adaptation to a prosthetic device.

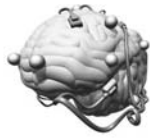
2 Architectural requirements

This section provides a description of the architectural requirements for housing the CAREN HighEnd system. The unique components of this system have specific requirements to the facility. Not only has the size of the room, but especially the fundament has strict requirements. To assist the client and possibly an construction company, additional assistance of Motek engineers during initial phase and (pre)installation is budgeted in.

2.1 CAREN HighEnd configuration

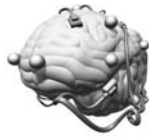
The Caren HighEnd set-up being described in this section is based on the next core configuration components:

- √ Moving platform with a payload of 1000 Kg payload and a platform top with a diameter of 4 meters containing an integrated self-paced instrumented treadmill
- √ 24 camera optical motion capture system
- √ 300° circular projection system



2.2 Spatial dimensions

The dome system dictates the position of the operator to the entrance of the dome. Next to the space of 10 x 10 x 10 meter for the system, additional space for storage of equipment of approximately 12 m² is required. An example of such a laboratory is provided in Figure 1.



2.3 Fundament

To prevent vibrations due to motions of the platform to be transferred to the dome, the fundament of the dome needs to be physical separate of the fundament of the platform. If this is not the case, the projection and motion capture system might pick up vibrations, resulting in moving projectors and cameras. Due to this, the projected image will move which can lead to motion sickness of the subject. Vibrations of the motion capture cameras adds noise to the recorded data, making it impossible for further usage.

Depending on the equipment mounted in the platform top, overall maximum weight of platform plus equipment can become 1800 kg. Reaction forces of 30 Kn and reaction moments of 60 Knm can be reached.

When using the regular platform, the resonant frequency of the floor shall be above the 10 Hz. and the mounting surface shall be able to withstand a preload on the 9 bolts of 260 Nm.

2.4 Electrical

Both standard single-phase 230V 50 Hz. and 400 V 50 Hz power are required. 3 Phase is necessary for both the control center power unit of the motion as well as for the instrumented treadmill in the platform top. Standard power is required for all other appliances like for instance the Caren host computer, the image generators and projectors.

3 Summary

Housing a CAREN HighEnd system requires close cooperation from the beginning between Motek, the client and, possibly, a construction company and architect. The fact that each CAREN HighEnd system contains latest available hardware, each system will be a 'one of a kind', making each installation unique.