

Figures and tables

Table 1. PUMA System main components.

Wheelchair		Wheelchair with tilting system, which allows the positioning of the user.
Smart pant and control system		The Smart pant allows the measurement of blood flow. Also includes the sensors for the functional electrical stimulation (FES)
Dynamic Cushion		Dynamic cushion with pressure matrix sensor and independent control of the movement of each zone

Table 2. Stakeholder involvement along PUMA project.

Phase	Profile	Objective	Methodology
Gather user needs (WP1)	20 healthy users	characterize healthy user behaviour, tissue status and autonomic system response	Pressure, tissue status and movement recording
	20 SCI users	characterize baseline tissue status of buttocks, and response to pressure	
	20 SCI users, 7 caregivers and 20 professionals	Gather user expectative, daily living problems, limitations of current solutions. Propose the first solution concepts	Diary study, focus group, brain-drawing, online survey
Conceptual Design Assessment (WP2)	11 SCI user and 10 professionals	Validate fitting of conceptual design and functionalities s to user needs	Observation, think aloud, check list, interviews, performance tests with mock-ups
Components Validation and Usability Test (WP6)	20 SCI users	Validate the performance of each PUMA component (risk system detection and strategies) and the usability	Pressure and tissue status recording. Usability tests during task performance. Observation, questionnaires, free use, etc.
Clinical Validation (WP7)	20 SCI users	Validate in real environment the PUMA solution	Free use, observation, checklist, questionnaires, interviews
Acceptance validation (WP7)	10 SCI users 10 Stakeholders	Validate the acceptance of the solution and detect the key indicators for PUMA production and marketing	Interviews, innovation workshop, MOSCOW

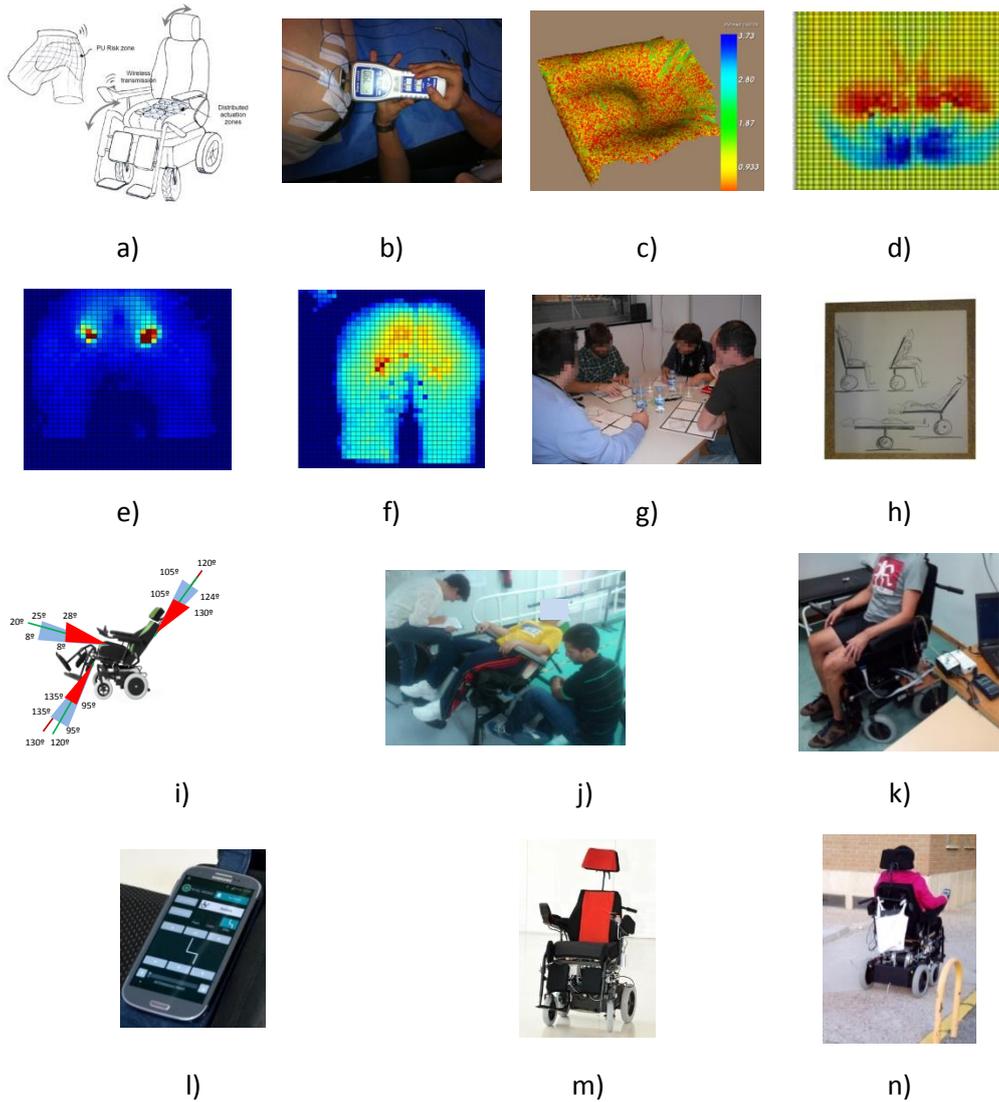


Figure 1. Examples of user involvement and results: First concept (a); Test to check effect of pressure (b); extract shape of buttocks (c); pressure maps for user movements (d) of healthy (f) and SCI users (e); braindrawing session and results (g, h); tests to define wheelchair positions and suggested changes by users (i,j); user tests to assess effectiveness of solutions (k); Final prototype of mobile solution (l) and wheelchair and cushion (m); and Tests in real condition (n).

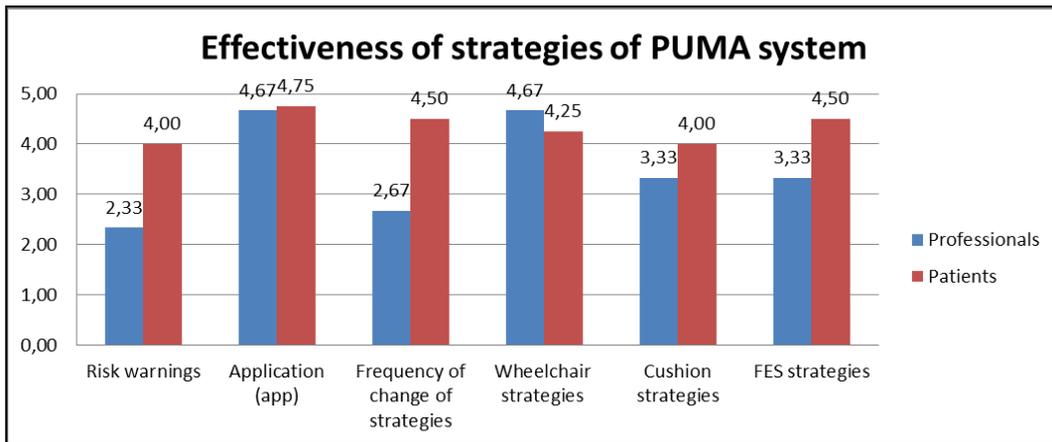


Figure 2. Effectiveness of PUMA strategies during validation in real conditions.

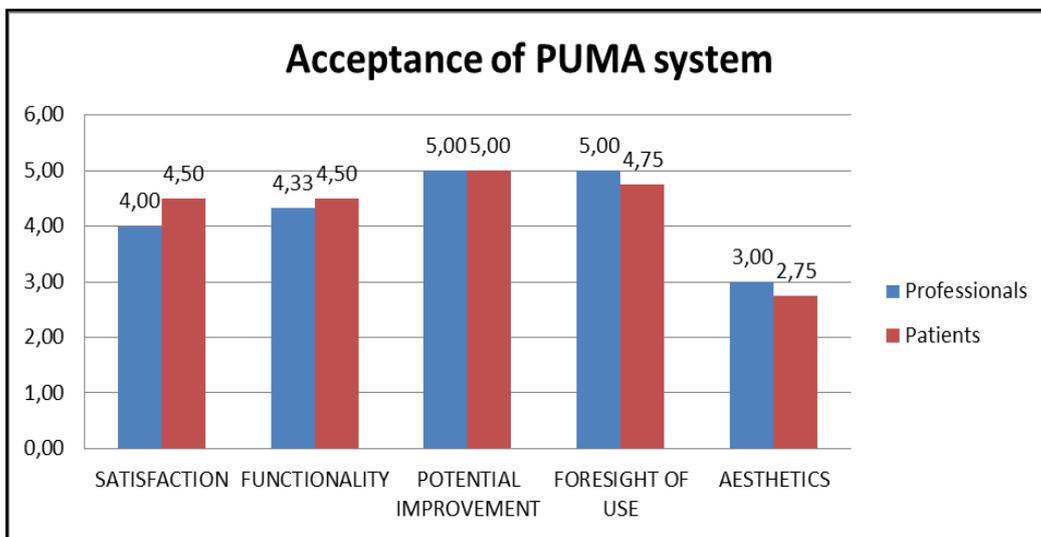


Figure 3. Acceptance of final version of PUMA solution.



Figure 4. Photos of the trade/fair.