



Press Release

INDRA EXTENDS ITS REMOTE REHABILITATION SYSTEM IN THE CLOUD TO THE TREATMENT OF LOWER LIMBS

- **The consulting and technology multinational has just concluded pilot tests of the TRAM project (Remote Audiovisual Motor Rehabilitation) at four benchmark centers in Valladolid, León, Madrid and Toledo**
- **The project builds on Toyra (Objective Therapy and Audiovisual Rehabilitation) by extending its scope to include the treatment of lesions and integrating it with the dedicated social media site and psychological aspects in determining therapies**
- **The initiative marks a new breakthrough in the decentralization of treatments and remote rehabilitation in the home post discharge**

Indra, the consulting and technology multinational, has extended the capabilities of Toyra, a system developed in partnership with the National Paraplegics Hospital in Toledo and with the support of the Rafael del Pino Foundation which combines virtual reality and real-time motion capture for the motor rehabilitation of the upper limbs (shoulder, arm, forearm and hand).

The TRAM project (Remote Audiovisual Motor Rehabilitation) has increased the scope of the former to include the treatment of the lower limbs and improve the in-cloud service, following pilot tests carried out over the course of nearly one year with real cases at four new centers: Benchmark Center, IMSERSO, Ministry of Health, Social Services and Equality in San Andrés del Rabanedo (León); ASPAYM (Association of Paraplegics and People with Major Physical Disabilities) Residence (Valladolid); Brain Damage Unit at the Beata María y Hermanas Hospitalarias Hospital (Madrid); and the Virgen de la Salud Hospital (Toledo Hospital Complex).

The initiative involved more than 60 patients, around 18 healthcare professionals and 30 technology experts. To allow the centers to operate as pilots, the scope of the audiovisual model was expanded to include mobility of the legs and associated exercises, based on the preliminary knowledge obtained by the healthcare professionals.

Led by Indra, the project was partly financed by the Ministry of Industry, Energy and Tourism and carried out within the framework of European funding programs, in line with the "Digital Agenda for Europe" approved by the European Commission on May 19, 2010. The initiative falls within the remit of the "Health and Social Welfare" area and specifically addresses the



issue of "Healthcare and emergency solutions related to remote care, remote control and remote monitoring as services for the Smart City".

More motivation and customization

One of the most important improvements from the technological point of view contemplates the integration of the system with a dedicated social media site in order to reinforce collaboration and provide a channel of communication for the different actors involved in the rehabilitation process (patients, families, doctors, therapists and technicians) through various communities that they can join according to their particular interest. The ultimate aim is to increase patient motivation and integration through effective feedback, and the model includes tools to manage groups, users and content, a messaging service, event and forum management, and comments.

There are also data presentation and information mining tools to allow doctors and physiotherapists to customize treatments based on evaluations of the patient's performance. This includes both the psychological and physical aspect. In other words, the system combines the results obtained from the suggestibility tests, which provide the therapist with guidelines on how to treat the patient, with reports and surveys that allow the healthcare professional to easily identify whether the patient is making progress or not, and depending on that whether the treatment needs to be changed.

All the information gathered is fed into the system database and processed using statistical tools to obtain a format more in line with what the healthcare professional wants to see. For example, it is possible to create progress reports that analyze the results obtained from a series of therapy sessions conducted over a given period of time and identify the progress made by the patient during that time.

Indra developed TRAM in partnership with the Valladolid firm Divisa IT, which created the social media site and adapted it to the platform. The project also had input from Technaid, a spin-off of the Bio-Engineering Group of the Spanish National Research Council (CSIC) which designed and integrated the inertial motion and biosignal capture system, and from VipScan Predicting Behaviour, a company specializing in services related to behavioral sciences.

TRAM captures motion either through the use of the Tech-MCS system designed by Technaid or through Microsoft's Kinect device. The capture system is connected to the interactive therapy station, which sends the location and position of the exercises being performed by the patient to the system for recreation on the screen using an avatar. With the information received and stored in a central server, TRAM evaluates, records and analyzes the results obtained by the patient during the therapy session. The system also increases motivation through the use of mirror images, the recreation of movements in the virtual world and by making the exercises fun.

In addition, TRAM provides an electronic platform for managing therapy and rehabilitation records, therefore permitting the customized analysis of the results obtained from the therapy undertaken. This information is useful for creating medical surveys and protocols, and can even be included in the patient's electronic medical record.



A constantly evolving solution

In 2013 Indra announced the development of an "in-cloud" version of Toyra as part of its evolution with TRAM, focused in particular on the needs and characteristics of rehabilitation clinics and centers which, because of the volume of patients and the cost of the technological infrastructure, are unable to access a version installed ad hoc for them in their own servers. The service provision model is completely flexible and can be accessed from any location, making it possible to establish the business relationship that best suits the needs of clients and their patients.

The improvements included in the in-cloud version also signal a breakthrough in achieving one of the principal goals of Toyra: supporting the future decentralization of treatments that will pave the way to remote rehabilitation post discharge. In other words, to continue the treatment in the home with remote monitoring by the healthcare professional.

The Objective Therapy and Audiovisual Rehabilitation (TOYRA) system was developed as part of an R&D project launched in 2008 by Indra and the Biomechanical and Technical Aids Unit of the National Paraplegics Hospital, with the support of the Rafael del Pino Foundation. Initially, the tool was created specifically for people with spinal cord injury affecting the mobility of their upper limbs. However, as a constantly evolving project, it was seen to have useful applications for other sectors of the population and specific exercises were created for people who have had a stroke or have mobility problems due to traumatic lesions to their upper limbs. Thanks to the work undertaken, the scope of the TRAM project has now been extended to include patients with problems in their lower limbs, and it will soon also include lesions to the neck and torso.

Indra, chaired by Javier Monzón, is one of the world's largest consultancy and technology multinationals, a leader in Europe and Latin America and is expanding in other emerging economies. Innovation is the cornerstone of its business, which is highly focussed on the customer and on sustainability. The multinational is one of the leaders in its sector in Europe in terms of investment in R&D and innovation, having invested more than €570M in the last three years. With sales approaching €3,000 million, it employs 43,000 professional and has customers in 138 countries