

Title	PERSONNEL POSITIONING SYSTEM BASED IN INTERACTIVE TECHNOLOGIES FOR APPLICATION TO WORK ENVIRONMENTS
Acronym	LINEO
Call	MINECO
Duration	2011-2013
Partners and Collaborators	DRAGADOS, SICE, ETSI Telecomunicaciones (UPM), IRTIC
Specialty	Health and Safety
Application to work sites	Project development on-going

PROJECT OBJECTIVE

The R&D project LINEO aims to reduce the number of accidents due to collisions of workers with machinery on site by developing a tracking and positioning system that allows, in real time, to know at certain times and work areas both the exact position of the workers and of possible elements in the environment which are critical for their safety.

DESCRIPTION

In order to solve the problems described above, during the initial stage of the project an analysis of the different technological solutions was performed. After this analysis and taking into account the characteristics of the work environment, it was decided to develop a centralized tracking system in which the elements identified as critical, in this case the machinery, will be equipped with a number of detection devices that allow anything moving around it (operator, machine, etc.) to be detected and located without the need of carrying any specific device (passive subject model). To our knowledge, there are no technological solutions that can solve the requirements of this problem in a work site environment.



Figure 1 Implementation of the centralised LINEO system in the work site machinery.

Despite the difficulties of the application environment, very ambitious performance requirements have been set in order to ensure robustness (high percentage of correct measurements in any situation) and reliability (minimizing false positives and negatives) of the system. In this way, the objective also is that the system offers real-time measurements (update times lower than one second) and high precision (about 1 meter).

The project LINEO has been divided into three main work areas:

1. To build a series of autonomous modules that include different types of sensors and technologies capable of detecting and locating mobile elements and transmitting this information in real time. These

modules integrate ultrasonic sensors for short distances (up to 4m) and Doppler radars for medium and long distance (up to 10m).



Figure 2 Tests performed with the different sensing modules developed

2. Development of an response protocol based in processing and learning that allows for continual system improvement in the differentiation of sensitive information from what is not. Processing and filtering of information is based on the application of Kalman's filters.
3. Design and construction of a non-intrusive driver warning device according to the criteria of ergonomics, usability and self-installation that presents information clearly and efficiently and offers different possibilities of interaction with the driver.

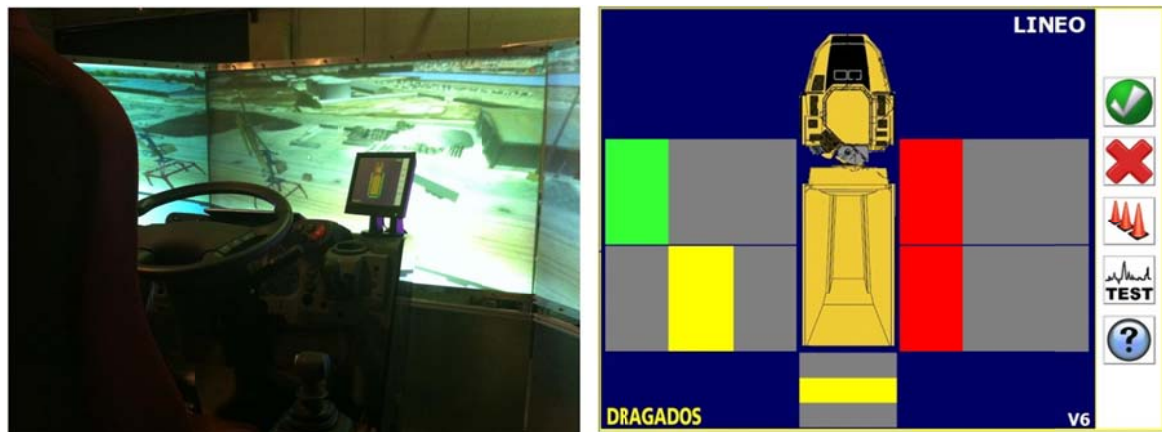


Figure 3 Evaluation of the driver warning device in a driving simulator

RESULTS ACHIEVED

The project is in the middle phase of development in which, having advanced and achieved satisfactory results in all three lines of work described above, the goal now is to integrate all developments bundled into a single system in order to validate at the work site their functionality and reliability under adverse operating conditions (temperature, humidity, dirt, movement of metal parts, etc.)