THE CIUDAD 2020 R&D&i PROJECT DEVELOPS INNOVATIVE TECHNOLOGIES FOR MANAGING SMART CITIES AND PROMOTING CIVIC ENGAGEMENT

- **An innovative platform featuring new energy, environment and mobility management tools will deliver personalized services to citizens' mobile devices**

- **New intelligent networks comprising sensors, systems for predicting and controlling energy consumption and air pollution, and tools for recommending best practices or optimal routes in the city are just some of the new developments**

- **Led by Indra, the CIUDAD 2020 project will unveil its results at the Green Cities & Sustainability Fair and Tikal Forum in Málaga on October 2 and 3**

During the course of the last three years, the CIUDAD 2020 R&D&i project has developed new intelligent technologies to facilitate urban resource management and create new services to engage the public in these management efforts and allow them to enjoy the benefits of a smart city. The new smart sustainable city model has been developed in partnership with the cities of Málaga, Santander and Zaragoza, where the various tools and services offered to both managers and citizens have been tested.

The new tools developed, which form part of an innovative platform based on Future Internet paradigms, will not only facilitate energy management in buildings and public spaces but also the management of transport, mobility and environmental sustainability, the three aspects that have the greatest impact on citizens' quality of life.

Thanks to the new management solutions designed, city managers will be able to obtain real-time comprehensive information about the city and its various resources, all displayed in a highly graphic way on a map of the locality. This information will enable them to make decisions faster and more efficiently. For example, they will be able to detect abnormal situations or major sports, cultural and social events in order to alert citizens and recommend alternative routes to avoid congestion. They will also be able to manage public transportation and take measures to control local energy consumption or pollution.

Using predictive tools, managers will also be in a position to anticipate situations like traffic congestion and peak energy consumption and noise or air pollution, and adopt preventive measures to mitigate their effects.

The project team has also developed an application for mobile devices which will provide citizens with easy intuitive access to the tools offered by CIUDAD 2020 as well as external ones related to issues like leisure, tourism, education and healthcare in the city. Users will be able to access the wide range of applications offered by different organizations from the CIUDAD 2020 login page via a unique interface and credentials. The application will analyze the aggregate behavior of citizens in order to provide managers with information about how resources are used and will employ recommendation algorithms to offer citizens intelligent, personalized services.

New tools and applications

The team has developed and tested new management technologies and tools in the three main fields targeted by the project: mobility, energy and the environment.

In the case of the first field, a new tool will automatically detect abnormal mobility situations in the city and calculate the best routes accordingly, using a mixture of public (bus, subway, streetcar, public bicycle, etc.) and private transport modes. A solution based on artificial vision and another based on a network of wireless sensors have been designed and tested to detect parking lot occupancy.

In the energy field, one of the most pioneering achievements is a series of intelligent sensor networks to detect light intensity and presence in order to regulate public lighting by either dimming or increasing the intensity according to the presence of vehicles or people. An energy efficiency "recommender" has also been developed for the home, which thanks to a wireless network node installed in the apartment or house electrical panel measures consumption, analyzes it and offers tips on how to optimize it.

As regards improvements in how noise and environmental (CO_2 levels) pollution are measured, CIUDAD 2020 has led to the development of innovative low-cost sensors to complement the measurements taken by the high-performance equipment already used in cities. Suitable for installation at numerous points around the city, including bus stops, these devices not only enhance the reliability of pollution maps but can also generate alerts thanks to an air and noise pollution predictive model based on information obtained from sets of historical data.

These and other tools developed as part of CIUDAD 2020 exploit the information obtained from municipal infrastructures and citizens themselves, who are now viewed as veritable "sensors" that generate vast quantities of data through their use of different services or social media that share their location, messages and photos.

With a budget of €16.3 million, CIUDAD 2020 is one of the first research initiatives undertaken within the framework of the INNPRONTA Program promoted by the Center for Technological Industrial Development (CDTI). Indra is leading a consortium comprising FerrovialAgroman, Atos, FagorElectrónica and GFIInformática as well as the SMEsFractalia, Daedalus, Tekia and iSOCO. The consortium also includes research teams from the Polytechnic University of Madrid, University of Alcalá de Henares, Carlos III University, University of Zaragoza, University of Cantabria and University of La Coruña, as well as the foundations Barcelona Digital and CI3 (Center for the Innovation of Smart Infrastructures). Málaga, Zaragoza and

Santander are the partner cities involved in the project and have tested the new developments.

CIUDAD 2020 at the Green Cities & Sustainability Fair and the TIKAL Forum

The latest results of the CIUDAD 2020 project will be unveiled at the Green Cities & Sustainability Fair and Tikal Forum in Málaga on October 2 and 3.

The main lines of research will be presented on the opening day of the fair at the Smart Cities round table discussion in which Indra will be joined by project representatives FerrovialAgroman, GFIInformática, FagorElectrónica and Fractalia. The project will have its own stand in the central exhibition area of the conference center.

CIUDAD 2020 will also have a key presence at the TIKAL Forum, Latin America's leading technology, innovation and knowledge forum, which will be held at the same time as the Green Cities & Sustainability Fair and at which mayors and other municipal representatives and technicians from some of the main cities in Latin America will discuss smart city initiatives on both sides of the Atlantic.