

INDRA'S TECHNOLOGY ALREADY MANAGES LONDON'S 12 STREET TUNNELS

- **The company's Horus platform enables for centralizing the management of tunnels and over 90 km of metropolitan streets connected with these, improving operations and guaranteeing greater security of drivers**
- **The transition from the old systems to the Indra solution has been a success and has demanded a tunnel-by-tunnel migration, an exhaustive programming of the required closures for tests, and traffic deviations to reduce the impact on London's mobility**
- **This highly complex project has been an example of a collaborative effort with Transport for London (TfL) and of Indra's rigorous project methodology, based on its proprietary management and organization tools**

Madrid, January 17, 2016.- Indra technology already controls and permits centralized operation of 12 street tunnels in London, critical for mobility and security in the city, and over 90 km of metropolitan streets connected with these. The company has designed, installed and started up the new London Streets Tunnels Operation Centre (LSTOC), integrated within the advanced center at the Palestra building. From here, Transport for London (TfL) manages London's entire transport system, including the capital's buses, subways, and streetcars, as well as a network of 580 km of roads and the city's 6,000 traffic lights.

The transition from the old systems unrelated with the Indra solution has been a success and has demanded a tunnel-by-tunnel migration, an exhaustive compliance with the required closures and traffic deviation for tests, in addition to the analysis of works for special situations. This migration and start-up plan led by Indra has guaranteed TfL service continuity of the tunnels over the duration of the installation in suitable security conditions and has reduced the impact that any incident in the tunnels would generate in the transportation network of a city like London to a minimum.

This transition phase was preceded by a rigorous certification plan for validating the solution, the acceptance of which has granted the project solidity while assuring the platform's present and future validity. Furthermore, this was also possible thanks to a simulation and training tool implemented by Indra that allows for simulating different situations and circumstances. For example, a traffic jam, fire or accident in the tunnel so as to verify that the solution, the established procedures and the systems installed in the tunnel respond in the most adequate manner. By simulating emergency response in the environment without real risk, this tool facilitates, in addition, training of its operators so that they may identify the most suitable action to implement.

Integrated management for greater security

Indra's Horus intelligent management solution has integrated into a single system the monitoring and control of all the tunnels and different subsystems currently in place, such as video surveillance, automated incident detection, sensors, traffic systems, variable signaling, lighting, ventilation, and communication, among others.

Its graphic interface complies with the leading international standards as to the solution's user friendliness and usability. Thus, it facilitates for TfL the operation and control over infrastructures and traffic, ensures full operability in both daily management and emergency situations, and improves the drivers' security.

Horus offers operators information in real time and indicates the preferred actions for each situation, thereby contributing to decision-making. Its high level of automation improves emergency detection and response to shorten response times, a critical aspect in the case of tunnels, in which the first seconds are crucial, for example, in the event of a fire.

By collecting data related with emergency resolution, the platform also supports the analysis and consolidation of information and report generation to help shape the best mobility policies and actions in the event of another emergency. Likewise, the Indra solution favors a collaborative ecosystem across different bodies in charge of traffic and mobility in the city, like maintenance teams, emergency and police services, etc.

To increase the system's reliability, security and flexibility, Indra has also equipped a secondary control center and two redundant data centers.

Collaboration model with the client

Despite its magnitude and complexity, the project for modernizing the control technology of London's tunnels has been executed in under two years. An exemplary collaborative effort, a committee of experts comprised of professionals from both Indra and TfL have tackled and monitored its various aspects. The trust of TfL in the experience and knowledge of the Indra team, and the company's rapid response unto its requirements, has enabled agreeing to and implementing improvements in parallel to the execution of the project itself. Among these are worth highlighting the review of the tunnel operation manual and the design of a tool for mobile devices that grants access to system-related data from any point along the infrastructure, simplifying maintenance tasks and response to possible incidents. These types of improvements are possible thanks to the open, highly flexible and configurable nature of the Horus solution, prepared to incorporate any new system required by the client in the future.

Indra's project management methodology has resulted in compliance with the rigor demanded by the project, as well as the use of all of the capacities of MIND, a proprietary suite of management and organization tools for managing and sharing information online, a critical aspect in any project where part of the team is distributed across different geographies.

Recently, Indra has been acknowledged in the United Kingdom for its relationship model with customers, partners and suppliers, as the first Spanish company to obtain the BS11000 certification. This British standard promotes the establishment and improvement of relationships in corporate collaborations to ensure their effectiveness, that they are taken full advantage of, and that they offer greater, sustainable benefits to the supply chain in its totality.

On its behalf, Transport For London has been awarded the ITS España 2016 Award for the implementation of the urban tunnel integrated management system in London, based on the Indra Horus platform. In addition, TfL has been selected as a finalist for the "Best Information Technology Project of the Year" award by the APM (Association For Project Management).

Cutting-edge technology for traffic and tunnel management

This project in one of the major world capitals reinforces Indra's position as an international leader in smart technology for traffic and tunnel management, with projects in this area in more than 50 countries and internationally-renowned cities.

The tunnels equipped with Indra's control systems have received the best ratings in all the EuroTAP studies carried out since the publication of the European Directive 2004/54/EC on minimum safety requirements for tunnels. In 2016, the company has equipped with its Horus solution the tunnel of Marao, in Portugal, the longest of the Iberian peninsula; the Renacer tunnel along the Bogota-Villavicencio highway, in Colombia; and is currently designing projects for the tunnel in Bouira, located on the most important highway in Algeria; the Chenani tunnel in India, the largest of southeast Asia; or the tunnel for Line 2 of the metro in Mashad, in Iran, among others.

Indra is also one of the world's leading companies in smart technology applied to mobility and urban transport, with its systems implemented in over 100 cities worldwide, including Madrid, London, Dublin, Medellin, Kuwait, Curitiba, St. Louis, Sydney, and Manila, among others.

About Indra

Indra is one of the main global consulting and technology companies and the technology partner for core business operations of its clients businesses throughout the world. It offers a comprehensive range of proprietary solutions and cutting edge services with a high added value in technology, which adds to a unique culture that is reliable, flexible and adaptable to its client's needs. Indra is a world leader in the development of comprehensive technological solutions in fields such as Defense & Security, Transport & Traffic, Energy & Industry, Telecommunications & Media, Financial Services and Public Administrations & Healthcare. Through its Minsait unit, it provides a response to the challenges of digital transformation. In 2015 it reported revenues of €2,850m, had a workforce of 37,000 professionals, a local presence in 46 countries, and delivered projects in more than 140 countries.