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DLR traffic monitoring images help avoid match-day congestion

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Zeppelin cockpit

Germany’s recent successes on the football pitch were matched by a success for high technology from DLR. The traffic research project ‘Soccer’, operated by the German Aerospace Center (DLR), was used to assist in traffic management during the FIFA World Cup, using up-to-the-minute traffic data gathered from the air.

Camera images sent over the Internet and simultaneously generated aerial maps provided objective visual information about the traffic situation and the predicted build-up of traffic over the next five to 15 minutes. The project ensured that teams, referees and fans all made it to the match and back home again afterwards - without traffic congestion. In Cologne, normal travel times to and from the stadium were even substantially reduced.

A scientist monitors the ANTAR system

"The fact that we had an up-to-date overview of free sections of road was amazingly effective," says Chief Police Commissioner Peter Brunke, head of the Cologne police's traffic management group. The

average flow of traffic to and from the Cologne stadium lasts two to three hours, but for the World Cup matches it was less than one hour."

Frank Hellberg, Managing Director of Air Service Berlin CFH GmbH, who utilised DLR technology in Berlin, believes that this air-supported system for recording traffic data has opened the door to even further-reaching applications, for example in the management of disasters.

The Soccer research project was awarded €1.25 million in funding by the Federal Ministry for Economics and Technology (BMWi). An equal sum was contributed by DLR, which collaborated in the complex project alongside Air Service Berlin CFH GmbH, the Ministry of the Interior of Baden-Württemberg, the Cologne Police and Deutsche Zeppelin-Reederei.

ANTAR and Traffic Finder

The module used to record traffic data consists of the ANTAR camera system and analytical software called Traffic Finder. Together, these provide automatic, close to real-time extraction of traffic data on the ground. ANTAR includes both a conventional camera and a thermal imaging camera, as well as an inertial system for identifying positions and a computer unit. The Traffic Finder software analyses incoming images online and defines road-based traffic parameters.

Camera team in the Zeppelin

The georeferenced aerial images (adapted to the geographical conditions on the ground) are then produced. Project Soccer involves the detailed and differentiated large-scale gathering of traffic data from the air, to keep traffic control centres, law enforcement agencies and motorists themselves up to date with the situation on the roads, predict developments and make appropriate recommendations..

Three-pronged approach

Data is collected, analysed and prepared as a basis for traffic predictions using modern optical and infrared cameras mounted on three different airborne platforms. In Berlin a Cessna 172 aircraft was used, in Stuttgart an MD 900 police helicopter and in Cologne a Zeppelin NT. We can now study how the different characteristics of the three aircraft (range, manoeuvrability, noise, load and operating costs) influence the application of air-supported traffic data gathering.

Evening view of Cologne's football stadium

Different ways of representing and predicting the traffic situation were also trialled, depending on the size of the region being covered and its ground layout. For example, a different kind of simulation was

produced for the relatively homogeneous urban area of Berlin than in the Greater Stuttgart area, which has many outlying communities and therefore a much more heterogeneous structure. While the simulation in Berlin incorporated the results of a survey conducted before the event, for example on the locations where matches were going to be watched, the simulation in Stuttgart was more heavily based on actual empirical data measured on the ground and information from taxis, using what is known as Floating Car Data.

"Over the coming weeks we'll be working together with DLR researchers to find out how these different data sources can best be interlinked," says Jürgen Rieger from the Ministry of the Interior in Stuttgart. - The World Cup may be over, but traffic research continues on board the state of Baden-Württemberg's police helicopter with its DLR technology.

Soccer = Systematic analysis and evalution of individual traffic situations with consideration for the special conditions at particular World Cup venues.

Related Contacts

Cordula Tegen
Deutsches Zentrum für Luft- und Raumfahrt (DLR) - German Aerospace Center
Corporate Communications
Tel: +49 2203 601-3876
Fax: +49 2203 601-3249
E-Mail: Cordula.Tegen@dlr.de

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