

GoalRef: FIFA approves intelligent goal from Fraunhofer

July 9 2012



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FIFA, football's world governing body, and a member of the IFAB has decided to use both goal-line technology systems from GoalRef and Hawk-Eye at the FIFA Club World Cup in [Japan](#) in December this year. The GoalRef system was developed by researchers from the Fraunhofer Institute for Integrated Circuits IIS. "The technology works in a similar way to that of the theft protection of a [department store](#)," explained René Dünkler, spokesman of the GoalRef project. Ten antennae behind the goalpost and crossbar create and monitor a weak magnetic field. As soon as the ball nears the goal-line the field is influenced by thin spools in the football. A processor is then able to determine, by means of the antenna signal, whether the ball fully crossed the goal-line or not.

"GoalRef is a bit like an invisible curtain which hangs behind the crossbar and the goal-line. As soon as the ball fully passes through this "curtain", it is recognised as a goal," says Ingmar Bretz, project head of GoalRef. The system then automatically sends this information in real time via encoded radio signals to the referees whose special wrist watches display the result visually and by means of vibration.

The IFAB investigated the possible use of technical aids after several incorrect rulings including the disallowed goal for England in the game against Germany in the 2010 World Cup. Eight goal-line technology systems were initially tested for the International Football Association Board last November and December. The evaluation criteria were compiled by the Swiss Federal Laboratories for Materials Science and Technology (EMPA). Only two systems managed to qualify for the next

test phase with this set of criteria – including GoalRef from the Fraunhofer Institute for [Integrated Circuits](#) IIS in Erlangen.

In the second test phase the independent testers of the EMPA put both systems through rigorous tests in the laboratory as well as in field tests, training and live professional matches. Several thousand goals were evaluated for each system to test the reliability and also whether the referees receive prompt notification. These extensive tests were successfully passed by the GoalRef system.

"In the test and test matches we used the ball of our development partner of many years, the Danish manufacturer Select," explained René Dünkler. Peter Knap, CEO of Select and Derbystar: "The challenge was to develop a ball which could withstand even a shot from Ronaldo and, at the same time, communicate with the intelligent goal." The iball is also available under the name Derbystar. In the future balls from other manufacturers will also be able to use the GoalRef technology.

Provided by Fraunhofer-Gesellschaft

Citation: GoalRef: FIFA approves intelligent goal from Fraunhofer (2012, July 9) retrieved 16 April 2024 from <https://phys.org/news/2012-07-goalref-fifa-intelligent-goal-fraunhofer.html>

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