

GoalREF™

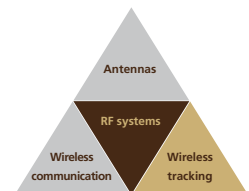
GOAL-LINE TECHNOLOGY





FRAUNHOFER IIS – YOUR PARTNER FOR WIRELESS TRACKING

RF engineering has been a core competency of the Fraunhofer Institute for Integrated Circuits IIS for more than 20 years, with a current staff of 50 working with clients in this field from concept to pre-production. Many small, medium and large companies use our ability to innovate in the areas of wireless communications and tracking as well as antenna technology. The institute's 30-strong Department of Wireless Locating and Communication Systems is currently working on technologies for event detection and for measuring angles and signal travel times as well as on related applications.



Fraunhofer IIS has many years of experience in wireless communications and tracking and offers a comprehensive portfolio of related services

GOALREF™ AT A GLANCE

The GoalRef goal-line technology meets all accuracy and reliability requirements.

Compactness

One advantage of GoalRef is that it is compact and easy to install. It comprises only three key types of components: goal frames, balls and referee watches.

Accuracy

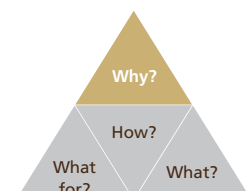
GoalRef provides accurate information regardless of what is happening on the pitch. It detects whether a goal has been scored even if the ball is obscured by one or more players.

Reliability

GoalRef works reliably in any situation on the pitch and in any weather.

Goal detection in real time

GoalRef tells the referee immediately whether or not a goal has been scored.



Why Fraunhofer IIS's GoalRef goal-line technology is the right choice



GOAL OR NO GOAL?

FIFA's Laws of the Game state that "a goal is scored when the whole of the ball passes over the goal line, between the goalposts and under the crossbar, provided that no infringement of the Laws of the Game has been committed previously by the team scoring the goal."

Goal or no goal? In future, FIFA will look to Fraunhofer IIS's GoalRef technology to provide the answer. Out of eight interested suppliers that submitted their goal-line technologies for approval, only Fraunhofer IIS and one competitor have won through to gain the opportunity to become a FIFA licensee for goal-line technology.

OUR VISION

GoalRef combines the emotions of football with exciting, cutting-edge technology.

Making goal-line technology available worldwide

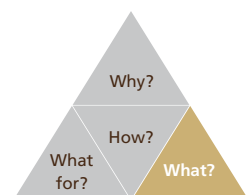
Our aim is to achieve a consistent basis for goal decisions at both national and international levels. Easy to install, GoalRef can be implemented on any football pitch anywhere in the world. All that is needed is a playing field and a power supply.

Advancing technology

Our developers' ingenuity knows no bounds and is what drives us to develop and refine pioneering technologies.

Capturing goals – delivering excitement

At a later stage, ultra-high-resolution miniature cameras and/or data visualisation could be used to bring audiences even closer to the goal scoring action and so enhance their football viewing experience.



*Our vision:
advancing technology,
delivering excitement*



GOALREF™ SYSTEM COMPONENTS

Ball

- Wire coils are embedded in a football (any make)
- The physical and aerodynamic properties of the ball are unaffected



Goal

- Ten receiving antennas attached to each goal frame
- Underground wiring between the goalposts



Watch

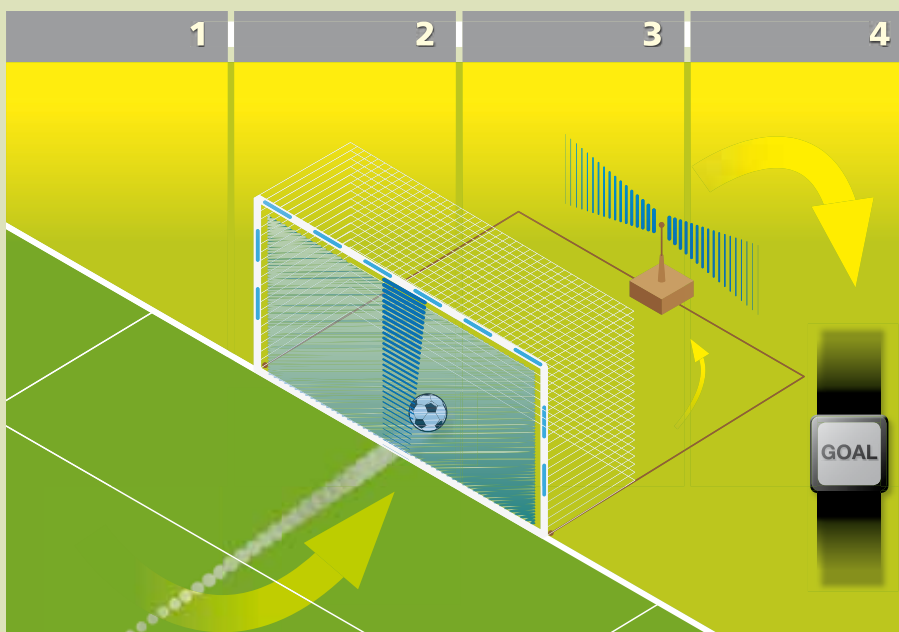
- A text message stating whether a goal has been scored is displayed on the match officials' wristwatches, coupled with a vibrating alert
- Match officials are each issued with a special wristwatch





HOW GOALREF™ WORKS

- 1 The GoalRef system uses antennas to create low-frequency magnetic fields in and around the goal. Embedded in the ball are three flexible copper coils.
- 2 Every time the ball approaches the goal line, it causes slight changes in the magnetic field around the goal. These are detected in real time and the data processed by a computer.
- 3 By analysing the changes in the magnetic field, the ball can be located precisely. If it has wholly crossed the goal line, a goal is judged to have been scored.
- 4 A goal alert is then instantaneously transmitted to the match officials using an encrypted radio signal, with a message displayed on their wristwatches.



Goal detection in real time: It takes less than half a second for a "goal" or "no goal" signal to be sent to the match officials' watches.

FIFA allows up to one second for this to happen!



BENEFITS OF GOALREF™

Benefits for referees

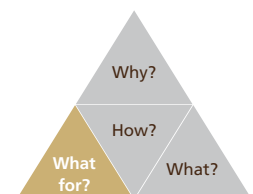
When it comes to deciding whether the whole of the ball has crossed the line, the human eye is all too often inadequate. The GoalRef goal-line technology supports referees by immediately informing them whether or not a goal has been scored.

Benefits for leagues and clubs

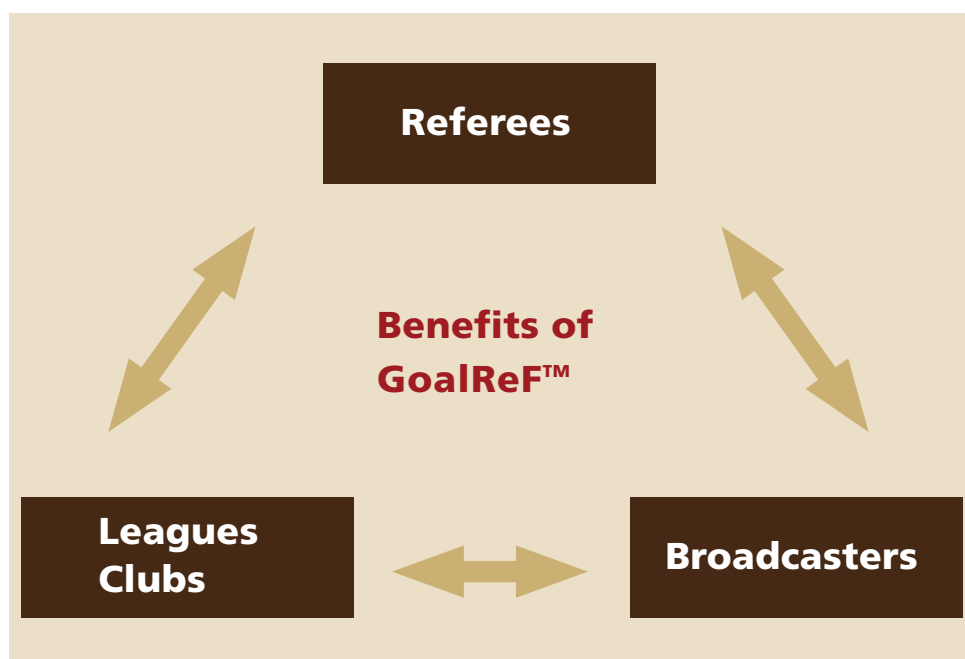
GoalRef ensures accurate goal-line decisions and fair competition the world over, making wrongly awarded or disallowed goals a thing of the past. The system is quick and easy to install and dismantle, which avoids problems when a club is promoted or relegated.

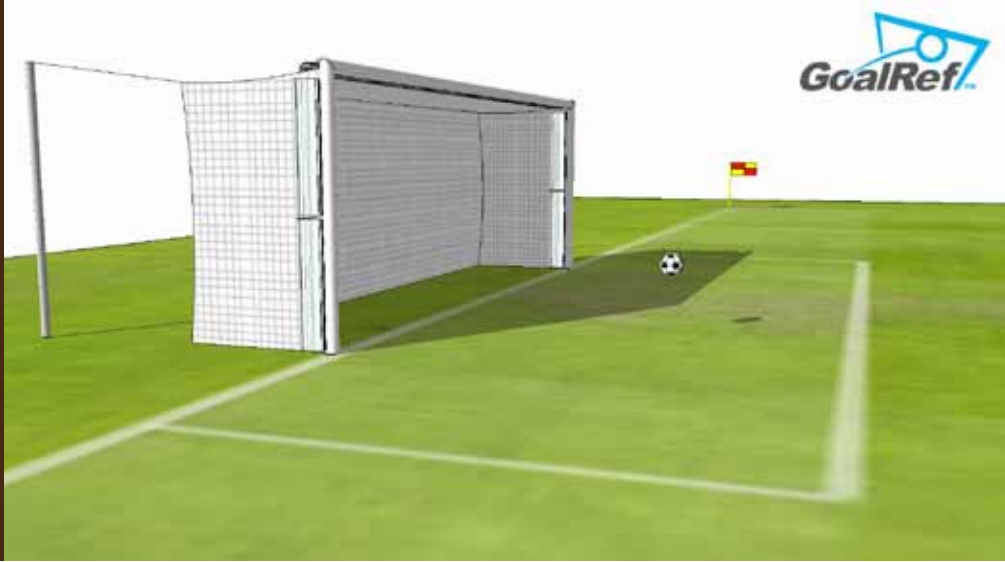
Benefits for broadcasters

In the future, GoalRef could be coupled with ultra-high-resolution miniature cameras to provide viewers with a whole new football experience.



Benefits for referees, leagues, clubs and broadcasters





INSTALLATION OF GOALREF™

The complexity of the GoalRef technology is concealed by its compactness and usability:

- Very few components are required: goal frames, balls and referee watches
- The system can be installed at any stadium or sports ground, irrespective of its size and location
- As a result, GoalRef could be phased in even at amateur level
- Efficient, low-cost installation
- Goal frames can be adapted to existing infrastructures such as goal anchoring or under-soil heating

OPERATION AND MAINTENANCE OF GOALREF™

- Following installation, the GoalRef system will be maintained by one of our local service partners so as to ensure the integrity of the system, guarantee flawless operation and satisfy warranty requirements.

Please do not hesitate to call or write to us. We will be happy to hear from you.

For more information visit:

WWW.GOALREF.COM

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