

## The Ford heart rate monitoring seat

Developed by Ford in co-operation with Rheinisch-Westfälische Technische Hochschule, Aachen University, the Ford heart monitoring seat can detect and monitor a driver's heart activity using contactless built-in sensors. Ford believes that this advanced technology may one day provide a range of convenience and safety benefits to Ford drivers and other road users.

#### What is an ECG?

Used in medicine for more than a century, the Electrocardiograph is a method for monitoring the activity of the heart through sensors that detect its electrical impulses. These impulses are then displayed in the form of a graph, originally on paper but more recently on monitors and computer screens.

#### How does an ECG work?

Traditionally, ECGs have required metal sensors to be attached directly to the subject's skin at various locations on the body. The system measures voltage from the heart's "depolarisation" action at these different locations. The difference between the readings provides the information experts require to monitor heart activity.

### What can doctors tell from ECG readings?

Using ECG readings, medical experts can determine much about the current condition of a heart. This can tell them about the owner's current health status, and give them clues to future health problems.

The Ford heart rate monitoring seat could potentially play an important role in notifying Ford owners about their heart health – making it a valuable tool in the fight against heart disease.

An ECG reading will inform a doctor of:

- An unusually fast or slow heart rate
- Heart impulses that indicate a heart condition or impending attack
- Heart impulses that indicate a previous, undetected heart attack
- Evidence of high pressure
- Evidence of conditions in other body systems, including the lungs
- Blood electrolyte level imbalances

# How is the Ford heart rate monitoring seat different?

The Ford heart rate monitoring seat performs much like a traditional ECG, except the sensors are placed on the surface of the car seat instead of being directly attached to the driver. These special sensors are capable of reading the heart's electrical impulses through clothing and are able to use the driver's natural contact with the seat to maintain a reading in most cases.

Ford's engineers are researching methods to perfect the Ford heart rate monitoring seat's ability to take readings through different materials and from the many body shapes and sizes of potential users.



Using six carefully positioned sensors, the system is able to accurately monitor the electrical impulses from a range of body types by taking readings from those electrodes with the strongest signals. In testing, 95 per cent of subjects proved compatible with the Ford heart monitoring seat.





# Potential roles of the Ford heart rate monitoring seat

#### Telemetry to monitoring station

Perhaps using a driver's integrated mobile phone, the Ford heart rate monitoring seat could stream heart telemetry to remote medical facilities, allowing experts to be notified if the driver experiences a change in heart condition and the driver to be contacted if required.

#### Driver warning via on-screen display

In some cases it may be the best course of action to inform a driver directly of the need to leave the road. Of course, the message would need to be carefully delivered, to avoid worsening matters!

#### **Emergency Assistance**

Users of Ford's Emergency Assistance feature could potentially benefit from the additional information the Ford heart rate monitoring seat could supply to emergency response services. Response teams could be informed of the heart condition of the driver before and possibly even during and after an accident.

#### Driver assist systems

Existing Ford systems such as Lane Departure Warning, Lane Keeping Aid, Active City Stop, Driver Alert and Speed Limiter could potentially be activated when the Ford heart rate monitoring seat senses an attack is imminent, mitigating the consequences of a driver losing control because of a heart-related episode.

#### Routine check up

Time spent behind the wheel could possibly save drivers a visit to the doctor for a routine heart check-up. The Ford heart rate monitoring seat has the potential to supply medical experts with in-depth heart telemetry, increasing comfort and convenience for users.

#### Why is this important?

Heart disease is one of the biggest health threats in Europe. It becomes more prevalent with age so, as Europe's population continues to grow older, the number of drivers on the roads at risk of heart problems increases, too.

- The percentage of Europe's population aged 65 or older grew from 9.1 per cent to 20.6 per cent between 1950 and 2000
- Europe's over-65 population is predicted to reach 22.7 per cent by 2025 and 30.3 per cent by 2050
- Heart disease killed 135,413 people in Germany in 2009 - 7.9 per cent of victims were aged between 50 and 64 while 31.3 per cent were between 65 and 80, compared to just 1.7 per cent aged 35 to 49
- Heart disease accounted for 40 per cent of all deaths inside the EU in 2008
- 40 per cent of the world's population is predicted to suffer from high blood pressure by 2025
- Research has shown drivers suffering from cardiovascular disease are 23 per cent more likely to be involved in a road accident, rising to 52 per cent for drivers suffering from angina





