

AUTOMATIC EMERGENCY CALLS IN FRANCE

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ABSTRACT

In Europe, during 2004, 1,7 million people were injured in road accidents and 43,500 were killed. Fast and effective care of polytraumatized people by the emergency services can reduce the number of those seriously injured and killed.

An automatic emergency call system has been installed on PSA passenger cars in France and in seven other European countries. It is an integrated car radio/GSM/GPS system that can be used with a SIM card. When an accident occurs, a call is sent automatically to a telephone call centre. Knowing the geographic location, the vehicle and owner identity and the possibility of communicating directly with the persons involved enables the nearest emergency services to be called out.

In this context, the LAB has set up a study aimed at evaluating the effectiveness of these systems. It consists of:

- an accident analysis study
- a questionnaire, sent to persons involved, aimed at estimating the time saved to get to the scene
- a judgement of the emotional reassurance brought to the vehicle occupants

During the system's first years of operation, about forty cases have been studied in detail, using accident analysis investigation procedures.

The initial findings show that pinpointing the exact accident location enables the emergency services to reach the scene very quickly. In addition, some important vehicles characteristics are transmitted to them. A future system improvement could be the calculation of the accident's severity, the impact type and the number of people involved.

The development of this automatic call equipment should continue in France and in Europe. It will be an additional tool in the fight against road injury and death, particularly for accidents at night, involving single vehicles and in isolated areas. The purpose of

this article is to explain the method of investigation used and present the first experimental feedback.

INTRODUCTION

For many years now, car manufacturers have devoted enormous efforts to improving the level of safety of their vehicles. These efforts have mainly concentrated along two complementary lines. The first line of action is that of primary safety, whose purpose is to prevent the accident from happening: here, visibility, braking, suspension, lights, etc. have been the main technical areas improved. The second line of action, secondary safety, is concerned with the protection of the vehicle's occupants during a traffic accident. For a few hundred milliseconds, according to an expertly programmed scenario, the structure of the vehicle, the seats, restraint equipment, airbags, etc. work together to reduce the consequences of the impact itself as far as possible. These two lines of action are still the ones receiving the most attention for safety reasons, but recently, solutions for responding to concerns about the post-accident period are emerging: the emergency call is at the forefront of tertiary safety.

GENERAL DESCRIPTION OF AN EMERGENCY CALL

The emergency call service is now available in nine western European countries on both Peugeot and Citroën ranges of passenger cars (except Peugeot 107 and Citroën C1) fitted with a telematic unit as standard or as an option. The procedure can be triggered manually or automatically.

Manual emergency call

In an emergency situation, the occupant of the vehicle presses the SOS button on the telematic terminal for at least two seconds. As soon as the button is pressed, the telematic terminal sends an SMS message to the IMA (*Inter Mutuelles Assistance*) centre assigned to cover the area in which the vehicle is located (Niort for France, Munich for Germany and Austria, etc.). This

SMS message contains vital information for dealing with the emergency:

- type and vehicle identification number of the vehicle, from which the vehicle type and specification, as well as the name of the owner, can be obtained;
- GSM telephone number;
- GPS coordinates of the vehicle;
- triggering mode: manual or automatic (airbag, seat belt pretensioners, etc.)

As soon as the call is intercepted, these details appear immediately on the IMA operator's control screen, in the form of a customer sheet, location on a digital map, etc. In this way, the IMA operator has useful data available even before establishing direct telephone voice contact with the occupant of the vehicle.

Once voice communication has been established with the driver, the IMA operator analyses the situation more closely. First of all, he ascertains whether the situation really is urgent. Then he analyses the situation (risk of death, number of persons involved, witnesses to the accident, etc.), he checks the location on various types of map, and if necessary informs the emergency services responsible for the area in which the vehicle is currently located (fire brigade, ambulance service, police, etc.), giving them all the information about the situation.

Depending on the situation, but only in France, the IMA operator can also call on one of the emergency doctors permanently stationed at the IMA centre, using a three-way conferencing system with a view to assessing the situation more accurately or to give advice while waiting for help to arrive. The three-way conferencing system can also be used to take care of people travelling outside their own country. Communication can be in their own language from the call centre in the relevant country, while the local public services will if necessary be informed in their own language by the national centre which covers the place of the accident.

At that stage the procedure continues "in the field" with the intervention of the emergency services at the scene of the accident until the people involved are taken care of definitively.

Automatic emergency call

After a violent impact, if the vehicle's pyrotechnic equipment has been triggered (airbag or seat belt pretensioner), the vehicle itself sends out the SMS message containing the basic information mentioned previously and the request for voice contact.

In all cases, if there is no response from the accident victim, the established protocol requires the IMA operator to try to make contact with the vehicle within a limited time: when the set time has elapsed, the operator must transmit the alert to the emergency services on the basis of the information contained in the SMS message: type of vehicle, owner's name, GSM telephone number, GPS coordinates of the vehicle.

Telematic platform development

The "Telematic Project" began at the end of the 1990s in the Group's own *Direction Recherche et Innovation Automobile* (motor vehicle research and innovation department) and finally in 2002 a working motor vehicle telematic platform was launched. Developed in partnership with Magneti Marelli, this equipment is in 1 DIN format, which corresponds to the standard size of a car radio. The care and attention given to the integration of various types of technology simplifies the work of designing the vehicle, enabling the equipment to occupy very little space on board (this technology usually requires 2 units). What is more, the deployment of the equipment across the range is facilitated because there is no variation: the equipment can be offered on all models, thus providing a means of access to the services connected to it.

Peugeot sells the product under the name of RT3 and Citroën calls it Navidrive. It provides a navigation system with on-board mapping, GPS satellite location module, GSM telephone module (900/1800Mhz), integrated voice recognition and synthesizer system (hands-free telephone kit, announcement of navigation instructions, voice command for main functions, etc.), and radio-CD.

Although it integrates all these technologies, in particular those relating to GPS and GSM, the terminal's telematic functions appear simply as two special very clearly marked buttons of different shapes on the front panel,;

- a red button, marked SOS, contacts the emergency call service, exclusively for emergency assistance to people;
- a button marked with the logo of the make of the vehicle contacts the commercial telephone call centre of Peugeot or Citroën, immediately able to provide the motorist with technical assistance services or help to continue their journey.

Setting up an efficient back office

In parallel with the engineering work to develop the in-car telematic platform, PSA Peugeot Citroën has set up a complete and efficient data processing system capable of providing the required emergency call service. This crucial task also required much work with several partners.

As soon as the emergency call is triggered, an SMS message is created and sent over the networks of existing mobile telephone companies by a first partner, an SMS aggregator. These SMS messages are sent via a unique subscriber number that all the companies have reserved, by means of an SMS gateway set up by the partner. The partner has a dedicated PSA Peugeot Citroën server used exclusively for handling the SMS messages concerning PSA Peugeot Citroën's localized emergency and assistance services.

These SMS messages are then decoded by means of an application specially developed for this function and hosted by a second partner, an *SSI Informatique*. Once decoded, the second partner immediately retransmits the data to the IMA via its own network.

The secure transmission and decoding tasks only take a fraction of a second.

At this point, the third and final partner comes into play in order to finalize the emergency call. Then the process of handling the emergency by the IMA operator mentioned earlier begins. Of course, the IMA operator makes use of modern telecommunications technology but also more importantly uses extremely valuable databases in order to ensure that appropriate action is taken (collection and updating of emergency numbers for areas where the service is offered). The expertise and experience of the IMA operator are very important here to ensure high-quality service.

LIVES AT STAKE

In 2005, road accidents killed nearly 1.2 million people around the World, of whom 45% were in Asian and Pacific countries (e.g. 100,000 in China and 90,000 in India) and 13% were in countries with high motor traffic density (43,000 in Europe, 42,000 in the United States, 8 500 in Japan). According to estimates, this represents 25 to 50 million injured persons.

According to a report published in 2005 by the World Health Organization, by 2020, the number of road accidents will have increased by 60%, especially in developing countries. Road accidents will then be the

3rd cause of death worldwide. In 1990, they were in 9th position.

However, the latest statistics on traffic accidents in the 25 countries of Europe show a marked improvement with time between 1990 and 2004, in almost all countries except the Czech Republic, Cyprus, and Slovakia. The number of those killed annually in the European Union is now estimated at around 43,500 (cf. table 1). The most spectacular improvement was observed in France between 2001 and 2004, with a 32% drop in fatalities. The authorities attribute 75% of this decrease to the installation of automatic speed-control radar systems. The stakes are very high. Road accidents are the chief cause of death for 15-24-year-olds [ref. *La sécurité routière en France*¹]. In Europe during 2002, 1.7 million people were involved in accidents, of whom 220,000 were seriously injured and 39,000 were killed.

For France, that represents 116,000 persons involved in accidents, of whom 19,000 were seriously injured and 5,731 were dead within six days during 2003. In 2004, that figure was reduced to 5,217 persons who died within six days. France currently has nearly 30 million vehicles, which is one third more than ten years ago. But, during the same period the number of accidents has decreased by more than a third. At the same time, the number of deaths has fallen by 36.7%, the number of people seriously injured by 55.9% and the number slightly injured by 33.5%. There was a significant drop in the number of people killed in France in those two years: between 2002 and 2003, the decrease was 20% and between 2003 and 2004, 9%. Figures for the years 2003 and 2004 show a decrease never previously recorded.

Analysis of types of accident in France

France is one of the countries in Europe where the population density is relatively moderate compared with surrounding countries. It has approximately 110 inhabitants per km². More than 30 million vehicles travel on French roads, which make up a total of nearly one million kilometres. The road network consists of 1% motorways, 2.6% main roads, 36.1% secondary roads and 60.2% other roads and urban streets.

Table 1 below shows the distribution of traffic, the distribution of accidents and the distribution of people killed in France according to the type of road used. Note that the proportion of persons killed is greatest on secondary roads and smallest on motorways. The proportion of accidents on main and secondary roads

is 45% with a proportion of persons killed of more than 75%.

Table 1.
Distribution on French roads

	Mileage	Traffic	Accidents	Number killed
Motorways	1%	21.3%	6.3%	6.8%
Main Roads	2.6%	17.2%	14.2%	24.7%
Secondary Roads	36.1%	36.1%	30.7%	51.6%
Other	60.3%	25.4%	48.7%	16.9%

In 2005, police forces recorded 35,327 car accidents resulting in physical injury where no pedestrian or 2-wheeled vehicle was involved, including 5,847 on main roads and 12,392 on secondary roads. In addition, night accidents accounted for 37% of accidents resulting in physical injury involving at least one passenger car and 51% of accidents resulting in physical injury where a single passenger car was involved (figures 1 and 2).

Figure 1.
Day/night distribution of accidents resulting in physical injury involving at least one passenger car but no pedestrian or 2-wheeled vehicle (%)

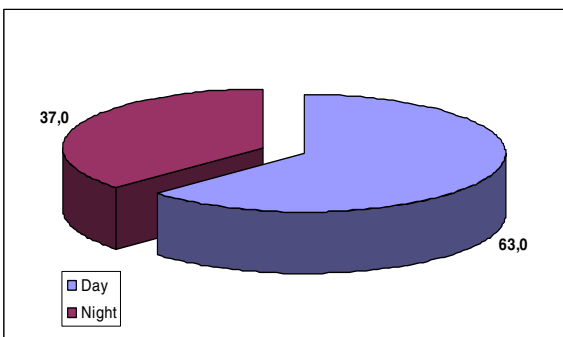
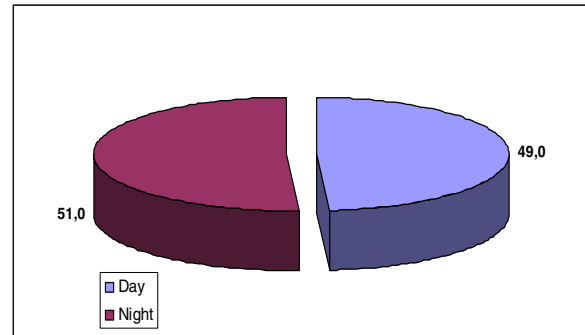


Figure 2.
Day/night distribution of accidents resulting in physical injury involving a single passenger car but no pedestrian or 2-wheeled vehicle (%)



With the same type of analysis, it appears that accidents involving passenger cars in rural areas account for 37% of accidents resulting in physical injury (figures 3 and 4) involving at least one vehicle and 50% of accidents resulting in physical injury involving a single vehicle. This means that 72% of deaths and 56% of serious injuries where a single vehicle is responsible occur out in the countryside. Also, 21% of deaths and 13% of serious injuries involve night accidents in rural areas with a single vehicle.

Figure 3.
Distribution according to road type for accidents resulting in physical injury involving at least one passenger car but no pedestrian or 2-wheeled vehicle (%)

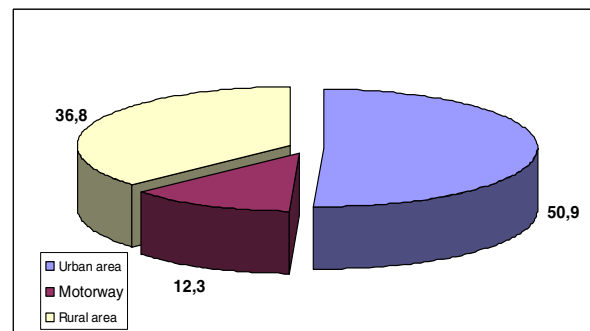
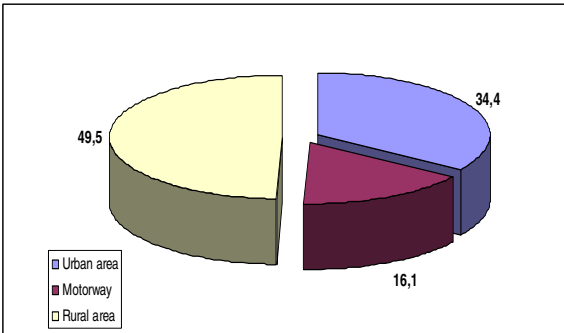


Figure 4.
Distribution according to road type for accidents
resulting in physical injury involving a single
passenger car but no pedestrian or 2-wheeled
vehicle (%)



The "rural area/night time/single vehicle" situation is the most difficult one for the emergency services to handle and the one where they are most likely to be delayed: problems of receiving the alert and locating the accident, difficulty of reaching the scene, etc... And it is often in these circumstances that the people involved must be cared for most quickly [ref. Chen⁶].

ACCIDENT ANALYSIS STUDIES

At the LAB, road accident analysis studies cover three areas: primary accident analysis, secondary accident analysis and tertiary accident analysis.

Primary accident analysis (pre-accident) studies active safety devices such as ABS (longitudinal control of the vehicle), emergency braking assistance, and ESP (lateral control of the vehicle). The aim is to provide and assess innovative car safety measures to prevent accidents.

Secondary accident analysis studies the consequences of road accidents. The aim is to provide systems for protecting the occupants in an impact. In this area, detailed investigations of crashed cars are carried out with the help of police forces, vehicle recovery specialists and emergency services. These investigations reveal the circumstances of the accident, allow measurements to be made on crashed vehicles and make it possible to obtain accurate assessments of occupants' injuries.

Lastly, tertiary accident analysis (post-accident) consists of optimizing the intervention of the emergency services after an accident - locating, taking care of the victims, information about the vehicle involved – to prevent the injuries of the victims becoming worse.

Secondary and tertiary accident analysis is based on studies carried out on selected accidents resulting in physical injury, following the general methodology used by the LAB for many years. The studies are carried out across the country on accidents selected for their value in terms of the development of safety systems. The following characteristics are selected:

- vehicles fitted with the latest passive and active safety equipment.
- cars carrying children.

These studies are carried out after accidents and selected from monthly files of traffic accidents supplied by the national police force: Traffic Accident Analysis Report or BAAC.

Initially, accidents are followed up by telephone, enabling researchers to identify accurately the vehicles involved and locate them at vehicle recovery and garage premises.

For each case the researchers must:

- obtain from the police all the information required to understand the accident: identity of the victims, diagram of the accident, location, weather conditions, environment, witness statements, photos taken at the time of the accident, etc.
- inspect the vehicles involved: take measurements of the deformation of impact zones and the passenger compartment; photograph the interior and exterior of the vehicle and details of zones struck by the occupants. Lastly, examine carefully restraint equipment such as seat belts, airbags and pretensioners.
- obtain medical reports on victims from hospitals: identification of each injury and its exact location, duration of hospitalization and time off work, etc.

These accident studies are then used to compile full accident files containing:

- summary of the information from the BAAC with the circumstances of the accident.
- vehicle data sheet and personal information sheet for each occupant.
- medical records with AIS levels.
- vehicle damage files with tables of measurements (EES, VR, DV, vehicle weight, extent of damage, intrusion, etc.).
- diagrams of the scene.

- comments on the accident and the structural behaviour of the vehicles.
- relevant photos with comments.

Three studies of accidents that occurred in rural areas at night, involving lone vehicles, illustrate the points noted above:

Example 1: at approximately 2 o'clock in the morning, the 47-year-old driver of the vehicle concerned loses control of his car on a left-hand bend on a narrow country road. The car leaves the road at low speed and slides down the bank (photos 1 and 2). It rolls over and ends up on its roof. The driver, shaken but not injured, very drunk, unfastens his safety belt with difficulty, falls onto the roof of his vehicle and goes to sleep waiting for the new day to dawn. It is the middle of winter and the temperature is -2°C . The driver of the vehicle spends the whole night in this position and is only discovered the next day around 11:30 a.m. in a state of hypothermia (body temperature 27°).

Photo 1.



Photo 2.



The driver died due to being exposed to a temperature lower than -2 degrees for more than 10 hours.

Example 2: During the night, for some unknown reason, a young man aged 22 goes off the road on a motorway. The weather is very cold (-9°C). The vehicle goes out of control, leaves the road on the right-hand side, jumps the embankment and goes down nearly 2.5 metres. It rolls over once or twice in the ditch, breaks the wire fence and comes to rest on top of it, on its wheels. The point where the vehicle fell is not visible from the roadway (photos 3 and 4).

The car is found by the emergency services in the morning around 8:15. The young man is curled up on his right side, on the driver's seat placed in the fully reclined position. In addition, he seems to have suffered from the night frost. His clothes bag, found the other side of the fence, suggests that the driver got out of his vehicle, then returned to it to take shelter and lie down.

According to the emergency services, the driver died a few hours after the accident. According to the autopsy, death appears to have been due to a haemorrhage in the pubic region and a fractured pelvis. Other injuries were observed such as a gash on the left temple, suggesting a head injury and a wound at the base of the neck on the left side.

Let us add finally that his mobile phone was found at the first point of impact, still in working order.

Photo 3.



Photo 4.



SETTING UP A SPECIAL STUDY

In this new context of the deployment of an automatic emergency call system, the LAB has set up a study to obtain experimental results about the system's operation and effectiveness and the feelings of people cared for by this means. This makes it possible to calculate the time saved in getting the emergency services to the scene and check the operation of the telecommunications systems and systems for locating the accident. It also provides realistic information about the perceptions of those involved. A special questionnaire [Appendix (1)] has been created for this study. It contains a score of very specific questions. The questions are in 3 sections:

- an accident analysis section to give details of the circumstances of the accident, place, time, number of occupants, injuries, how long the emergency services took to arrive, etc.
- a technical section to give information about how the system operated at the time of the accident, the communication between the people involved and the emergency centre, the telephone company used, etc.
- a section for the user/person involved to provide feedback.

First experimental results

In France between January 2004 and the middle of 2006, 270 automatic emergency calls were recorded. In the first few years of the system's operation, 41 calls from vehicles fitted with it have been studied in depth. As explained above, this study includes not only detailed information about the circumstances of the accident, but also accurate assessments of occupants' injuries and expert reports on the vehicles involved.

The first results, presented here, show that, by accurately locating the site of the accident, the system enables the emergency services to reach the scene very rapidly. The combination of GPS and the quality of current road maps is an essential tool. Another important point is that the emergency services can obtain the details of the vehicles on which they will have to work (type of vehicle and colour, type of fuel, vehicle configuration, etc.). Lastly, future development of the system should make it possible to assess the violence of the accident, the type of impact and the medical attention required. In addition this system reassures the victims and spares them additional stress, which is already very severe after the shock of the accident. Within a few seconds of the collision they know they are being taken care of and that the emergency services will be able to reach them very soon.

Examples of accidents

Several very different cases of cars fitted with an emergency call system are here presented:

The first sample accident, summarized in table 2, happened in Austria, on a minor mountain road covered with snow (photos 5 and 6). It well illustrates the value of the automatic emergency call system and how useful it is for the emergency services.

Table 2.

Place	In Austria, on a minor mountain road covered with snow.
Time	Daytime.
Circumstances	The vehicle concerned skids at low speed on a sloping bend, then leaves the road and falls down the bank. It ends up on its roof, jammed against a rock.
Driver	Man aged 50, wearing seat belt.
Front Passenger	Girl aged 13, wearing seat belt.
Rear Passenger	Woman aged 51, not wearing seat belt.
Help Given	Emergency call activated automatically. Emergency services arrived within ½ hour. Took care of both accidents.
Injuries	Rear passenger injured with fractured collarbone.

This case is all the more interesting because a second accident happened a few minutes later. Another driver arrives at the same bend and also loses control of his vehicle, which leaves the road and after flying through the air more than 15 m lands on its 4 wheels at the bottom of the bank a few metres from the first car. Injuries are slight and only the front passenger suffers compression of the lumbar vertebrae.

Photo 5.



Photo 6.



The accident was accurately located, in spite of the mountainous area. The emergency services were able to reach the scene quickly with suitable equipment for the weather conditions and the terrain. In addition, the reaction of the driver was excellent. He felt well cared for after this automatic call.

The second example, described in table 3, is an accident that occurred early in the morning on a motorway approximately 300 kilometres [180 miles] south of Paris.

The impact was violent (photos 7 and 8). There were no witnesses to the accident. Only a farmer, wondering what the noise was, came to help the driver. Although the driver had difficulty unfastening his seat belt (since he was upside down), the emergency call was immediately activated automatically.

After a brief conversation with the assistance centre and confirmation of the location of the accident, the emergency services were alerted. They arrived at the scene 10 minutes later.

Table 3.

Place	On a motorway about 300 kilometres south of Paris.
Time	Very early morning.
Circumstances	The vehicle arrives at the Chalon Sud exit slip road too fast and the driver is unable to negotiate the rather tight bend. The car crosses the central reservation, then the other carriageway, somersaults and ends up on its roof in the ditch.
Driver	Man aged 50, wearing seat belt.
Help Given	The emergency call was immediately activated automatically and the emergency services arrived at the scene within 10 minutes after the accident.
Injuries	Minor injuries: grazes to the right hand and neck injury.

Photo 7.**Photo 8.**

The third example, described in table 4, was an accident in an urban area. To be specific, it was a front/side collision between a motorcycle and a car. The impact was very violent.

Table 4.

Place	Porte d'Orleans, Paris, along the ring road near the town of Montrouge.
Time	Daytime.
Circumstances	A motorcycle with an engine capacity of more than 600 cc coming from the Porte d'Orleans passes a first set of traffic lights at green and then the next set of traffic lights at red. Seeing that he is going to hit the car coming from his right, the motorcyclist drops to the ground and slides. He cannot avoid a collision. The motorcycle then strikes the car on the lower part of the front door and the rider strikes the lower part of the rear door and the wing. The impact is violent enough to trigger the left-hand side airbag and both the left-hand side windows explode in fragments.
Driver	Man, wearing seat belt.
Help Given	Emergency call activated immediately.
Injuries	Car driver received small cuts to hands and thumb.

The intrusion of the motorcycle into the left-hand front door of the vehicle is approximately 10 cm and the impact is strong enough to trigger the left-hand side and curtain airbags. The emergency call is activated immediately. The driver tries to open his door but it is jammed due to the collision and he receives the call from the assistance call centre. He describes the situation and confirms to the assistance call centre that the emergency services are needed. Several witnesses are present when the accident happens.

The driver was very pleased to have this device in his vehicle and being taken care of by the emergency services made him feel "safer".

The fourth example is described in table 5. This accident happened in a rural area, involving a car (photos 9 and 10) and a heavy construction vehicle.

Once again, the driver of the people carrier was not seriously injured.

Table 5.

Place	On a straight stretch of minor road.
Time	Daytime.
Circumstances	Catches up with a civil engineering tractor and overtakes it. As the MPV driver comes alongside, the tractor driver suddenly turns left, blocking his path. The vehicle is struck on its right-hand front and then thrown to the left, ending up in the ditch.
Driver	Man aged 63, wearing seat belt.
Help Given	Emergency call activated automatically. Emergency services arrived within a quarter of an hour. Fire brigade took charge immediately. The driver left hospital 6 hours after the accident.
Injuries	Minor injuries.

Photo 9.



Photo 10.



The 5th example is a classic case, because the accident occurred on a country road in the middle of the night with a single car involved. In this case, while the 2 passengers in the vehicle are unconscious due to the impact, the voice of the emergency call centre operator wakes the driver from his blackout. The driver answers and confirms to the emergency call centre the need of assistance (table 6).

Table 6.

Place	On a minor road, at the exit from a roundabout.
Time	At night.
Circumstances	Accident in a rural area, 90 km/h (55 mph). Road with 2 single lanes. The 407 goes out of control at a roundabout, crosses the opposite lane, hits the kerb, then the bank, and rolls for a distance of about twenty metres.
Driver	Man aged 21, wearing seat belt.
Front Passenger	Man aged 21, wearing seat belt.
Help Given	Emergency call activated automatically.
Injuries	Driver: minor head injuries. Front passenger: seriously injured. Total injuries still unknown: fractured skull or neck?

Photo (11)



The impact was extremely violent (photos 11, 12 and 13) resulted in the partial ejection of the passenger's head through the right-hand side window, causing serious injuries to his skull.

It is absolutely certain that the rapid arrival of the emergency services saved the passenger's head injuries from getting worse.

Photo 12.



Photo (13)



In the 6th example, the circumstances are very interesting because they demonstrate that the communication with the emergency call centre operator can come from a third party (for example a witness to the accident) and can be established from outside the vehicle (table 7). In this case, driving along a straight forest road, the left-hand front of the vehicle strikes a wild boar crossing the road. The impact is very slight because the dent in the car is only 12 cm with 10% of the front panel making contact (photos 14 and 15). No airbag is triggered. Only the seat belt pretensioners are activated, pressing the driver back in his seat to prepare him for a potentially more violent impact. However, the driver is in shock due to the minor impact and cannot answer the call of the emergency centre operator. Therefore, the lady driver

of the car behind, who also witnessed the accident, answers the operator and takes over the conversation.

Table 7.

Place	On a straight stretch of minor road.
Time	Daytime.
Circumstances	The left-hand front of the 407 strikes a wild boar weighing about 45 kg. The driver says he was travelling at approximately 85 km/h (50 mph). Only the 2 front seat pyrotechnic pretensioners are triggered.
Driver	Man aged 43, 1.82 m, 90 kg, wearing seat belt.
Help Given	Emergency call activated automatically. Emergency services arrived within a quarter of an hour. Fire brigade took charge immediately. The driver left hospital 6 hours after the accident.
Injuries	Neck injuries (pain, stiff back) and thoracic contusions near the sternum.

Photo 14.



Photo 15.



Initial Technical Accident Analysis Conclusions

The following section gives a statistical overview of all the cases handled with Emergency Call. Note that in addition to the 41 cases of accidents dealt with in depth, 4 accident cases were handled without an Emergency Call. These accidents involved vehicles fitted with the system but where no call was made because there was no SIM card inserted in the terminal and therefore no communication established automatically with the emergency call centre.

Overall, for the cases studied, the degree of seriousness of the accidents was low. Only 1 fatal accident was recorded (killed in the vehicle that was struck) and 1 serious accident with only one person involved, at night in a rural area (see case described earlier).

The studies of these accidents already highlight some major statistical trends. First of all, table 8 shows the distribution between urban and rural areas for the accidents studied.

Table 8.

	urban area	rural area
Accident zone	51%	49%

Note that the distribution is almost the same as the distribution obtained from the national file.

If we identify more precisely the type of road on which the accidents occurred, we obtain the distribution in table 9.

Table 9.

	Road system on which the accident occurred
Motorway	10%
Main Road	5%
Minor Road	36%
Urban Area	49%

Note that 34% of people involved were alone at the time, but in 81% of cases, there were witnesses in the accident zone.

As far as the technical aspect of the emergency call system is concerned, in 100% of cases where those involved heard the call, the sound level of the system was loud enough and the people were able to answer, they were heard and there was no break in the telephone link. The telephone messages have always passed correctly whether French companies are used or foreign ones as in the case of the accident in Austria, which shows the strength of the SMS + voice solution. It appears that the area coverage is correct for the geographic locations of the accidents. In addition, although in some accidents the vehicle turned over and the roof aerial was torn off, no interruption in telephone communication was observed when establishing communication between the person involved and the assistance call centre.

Table 10 lists the services involved after an accident. Note that in the majority of cases, the fire brigade and the police (very often both) went to the scene of the accident. Note also that nearly 11.5% of people concerned either did not call for any outside help or at most asked for their vehicle to be towed to a garage.

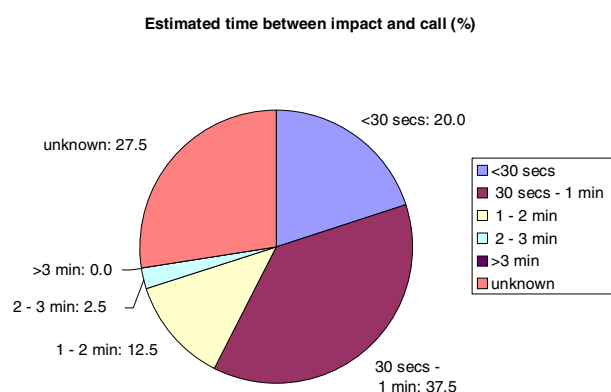
Table 10.

	Involved after an accident
Fire Brigade	29%
Ambulance	2%
Police	40.5%
Towing	5.5%

None	6%
Unknown	17%

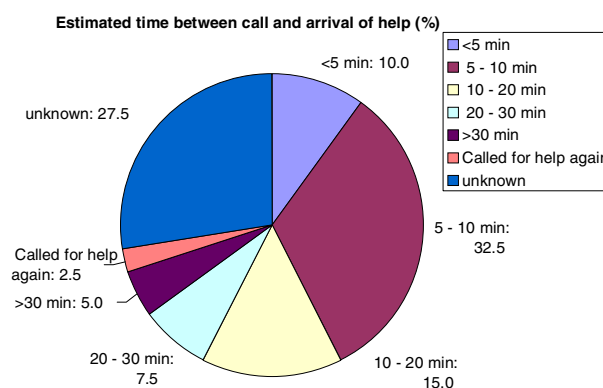
For 21% of people involved, they estimated the average time between the impact and the call was less than 30 seconds and 34% estimated it was between 30 seconds and 1 minute. Figure 5 shows the total distribution.

Figure 5.



If we move on to the average time for the emergency services to arrive as estimated by those involved, in 31% of cases it was between 5 and 10 minutes, and in 16% of cases between 10 and 20 minutes (figure 6).

Figure 6.



Lastly, it is important to mention that the feedback from those involved about the way the IMA took care

of them was extremely positive in more than 85% of cases: listening, availability, presence, efficiency. Only 5 accident victims felt that the system did not help them at all in their case, either because the accident was too minor or because there were enough witnesses around to reassure them and alert the emergency services.

OUTLOOK AND CONCLUSIONS

The LAB estimates that it can complete a detailed study of about twenty emergency call cases per year on average. All these cases improve this new tertiary accident analysis database and thus it is hoped to have a statistically representative database available soon. This will then enable us to calculate more accurately how many lives such a system could save [ref. Clark¹²] [ref. Pieske¹¹].

By the end of October 2006, the service was operational in 9 European countries and more than 300,000 vehicles fitted with it have been sold in these countries. It now represents an additional weapon in the fight against road deaths and injuries, in particular for accidents at night in rural areas involving a single vehicle. As we have seen in a case described above, it is in these circumstances that the implementation of this system is expected to have the greatest benefits.

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APPENDIX 1: EMERGENCY CALL QUESTIONNAIRE

Did you know that your vehicle was fitted with an emergency call system? Yes ☐ No ☐

Did you insert a SIM card into the telematic terminal yourself? Yes ☐ No ☐

Which company do you use? Orange ☐ Bouygues ☐ SFR ☐ Other _____

Which type of SIM card do you use? Subscription ☐
Pre-paid ☐
Dual ☐ Mother ☐ Daughter ☐

Did you try to use the emergency call during your accident (pressing the SOS button manually)? Yes ☐ No ☐

Did someone call you in your vehicle shortly after the accident? Yes ☐ No ☐

Do you know which TELECOM company took care of you? Yes ☐ No ☐

If so, company name _____

Did you hear the words, "Hello, this is Peugeot/Citroën Emergency"? Yes ☐ No ☐

Could you hear the message clearly? Yes ☐ No ☐

Were you able to answer? Yes ☐ No ☐

Were you heard? Yes ☐ No ☐

Was there any breakdown in the telephone connection? Yes ☐ No ☐

If so, did someone make contact with you again a few seconds after contact was lost? Yes ☐ No ☐

Did you feel you were being taken care of during the telephone contact? Yes ☐ No ☐

Did the time elapsed, between the initial accident impact and the telephone contact, seem long or short? Short ☐ Long ☐

Can you estimate the length of time? Yes ☐ No ☐

Time _____

Did you leave the vehicle immediately after the accident? Yes ☐ No ☐

If so, can you estimate how much time later? _____

Did you remember to remove the SIM card inserted in your telematic terminal after the accident? Yes ☐ No ☐

If so, when? _____

Were there any witnesses to the accident nearby (homes, open countryside, etc.)? Yes ☐ No ☐

Other details / 2nd call: _____

Estimated time taken for emergency services to arrive: _____