# A smartphone as copilot - FAQ



(*) from the editorial acquired

### A nice theory, but it does work?

Yes If there is a "safety culture", you can reduce the number of accidents quickly and strongly. Electronics can play a key role here. Some arguments:

- Case study presented at the Road Safety conference 2015 (December 15). Transport company Essers has succeeded by electronic monitoring of driving behavior (positive) feedback, mutual 'safety competition', good follow-up make the number of accidents *halve* (cfr. Figure 1). Based on of consumption and acceleration data, the company could single out dangerous drivers,and proceed to focused intervention or further training usually occurred BEFORE it crashes.
- in the United States offer many insurance companies offer two policies  Cheap, with tracker, and a more expensive, without tracker ... In Belgium Baloise and Corona Direct  recently took the first steps, and Axa (up to 50% off!). In the Netherlands you have players like Fairzekering, Voorop, Kroodle
- The founder of Rookie Dongle confirmed me (figures in hand) that such a tracker is developing a completely different Driving experience. Just the fact that people are aware of the device provides an entirely different way of driving. There is a competition to get the best safety ratings to their clients, no one would drink before he gets behind the wheel. This is of course a specific group..
- More and more companies install this type of trackers on their vehicles or trucks, just to lower costs (accidents, fuel). Providers eg. Suivo,ProDongle, DriveOlution.... The only user that I know already calls for the introduction of the entire fleet.
- Academic research and numerous pilot projects (eg. SpeedMonitor).The main problem appears to be that other users do not have such a system.
- George Hotz made  in late 2015 with cheap hardware an existing car (almost) self-driving!
- See further references at the back

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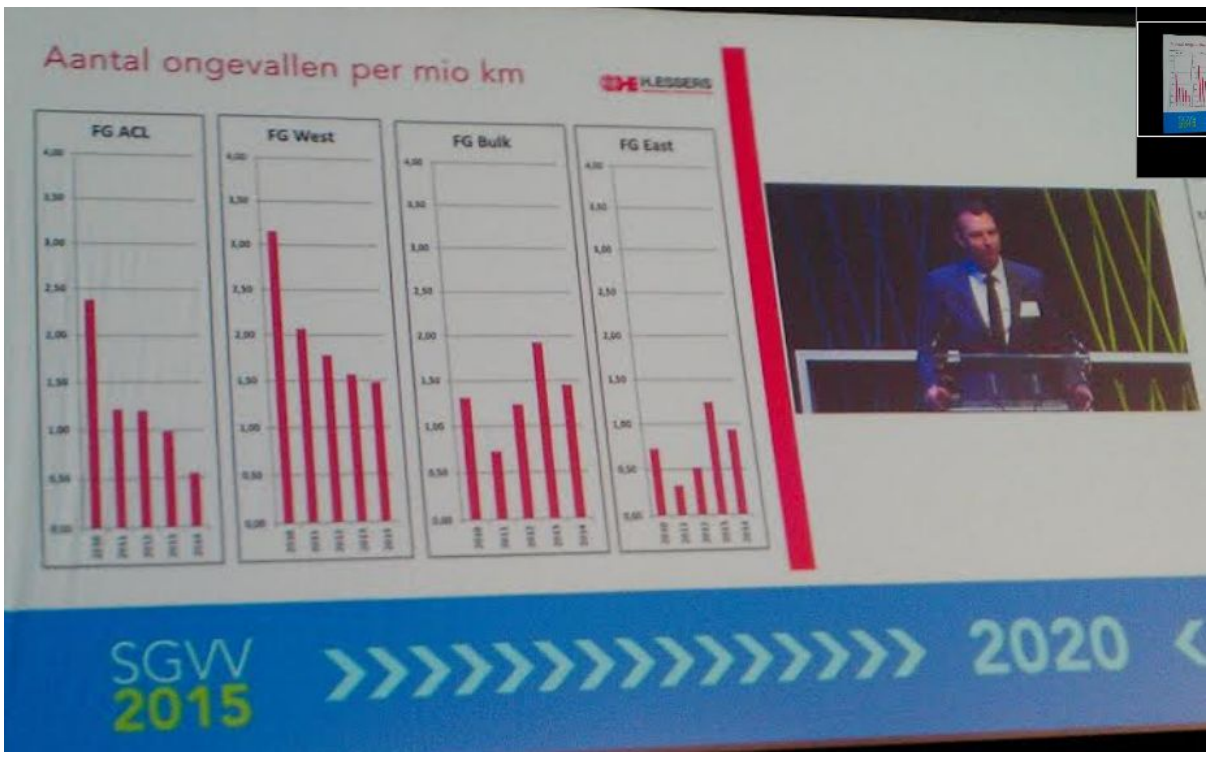


Figure 1 In the two leftmost divisions Essers worked actively with an on-board unit and they followed the drivers. The result is spectacular, in divisions where this system was not yet active, the number of accidents rose even (smartphone use?).

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**Does this system doesn't generate lot of stress? (*)**
Nobody is perfect. It's not that "points are subtrachted from your driving license" for each infraction detected by the system. Warnings will be given, a tolerance threshold on a human scale will be determined. In a pilot project with sufficient drivers this can all be tested thoroughly in advance, and even fine tuned when in operation (remotely updatable). I think on the contrary that driving in a safety culture will be much more enjoyable than it is today. Driving in Norway surely is more relaxing then in Greece.
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**Are there any privacy *issues?***
The system really comes down to dramatically increase the probability of detection, something that just about everyone advocates. The bulk of the data will be handled fully secured by computers. In itself this hardly differs with the daily operation of your (traced) mobile or handling electronic payments. Fines or penalties for the license itself will be assigned automatically to a large extent. The only individuals who will have access to the violation, now have even access to the database behind the hundreds of speed cameras in the country. You could also 99% of never able to send data, even then you still have an increased risk of being caught by a factor of 1000. You can also finetune the enforcing policy like never before, starting relatively slow, or targeting specific drivers.
Because it is hardware specific design, one can protect against intruders increase to a very high level, similar to the safest online banking.
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**Is this not a form of deprivation of liberty?**
This is a story of freedom promotion instead of deprivation of liberty. The father of liberalism, John Stuart Mill, already indicated that there are limits to freedom. Self-protection gives people individually or collectively, the right to intervene in the freedom of action of one of their own.
Rules in the case of traffic even are a prerequisite for freedom. If we do'nt set clear rules, we will end in chaos. Violating widely these rules, has already deprived a large group of road users of their freedom. Many children, elderly people and adults avoid traveling using active means in fear of their lives, they depend on the goodwill of others to give them a lift. Some streets have become effectively 'no-go zones for all active road users because of traffic delinquency. A neutral, laissez-faire government chooses for the strongest road users.
And what about the victims of road accidents who will have to pass the rest of their lives with severe physical or mental disabilities? Or all the human talent that never reached maturity, because they encountered a speed offender on their way?
Actually there is not much change for the vehicle drivers. The traffic remains the same, anyone can come and go as they please. They are followed strictly alone. However, the recovered freedom in so many other road users is vast.
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**What about calibration and certification of the speed detection?**
A speed determination of a vehicle by GPS, whether or not in combination with the in-vehicle data, is much less prone to error than the way in which fixed cameras or speed checks for work. Accuracy is a pure mathematical-statistical story. It may be that there is a certain distance is a poor satellite reception (by the use of three satellite systems this will be minimal). However, the system knows this and can continuously perform a probability calculation of the probability of the estimated speed. Of course, the driver does not need to know this.

It is sufficient to draw a line of probability in which a violation can be established, for example. 99% confidence interval of the measurement in combination with a margin of tolerance of 3%. Our entire society is heavily dependent on these kinds of assumptions. Even if we eg. fully realize global climate intentions made, we still have an uncomfortably high probability of 5 to 10% that the global warming yet completely off the rails and threatens to implode human civilization. Another reason for a proper climate policy with effective, ethical and sustainable mobility policies.
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**What about foreign drivers?**
Suppose that Belgium is the only country making its fleet accelerated intelligent and connected.
Because more than 95% of the vehicles are Belgian, safe traffic behavior will dominate, generating social pressure and making any abnormal behavior attract attention.
We must distinguish between the occasional passers-by, and people who stay here a long time.
The first group can be monitored by the part of the Belgian vehicle fleet equipped with cameras. We can here play the power of numbers out. Speeding can thus be permanently monitored as soon as there are some of these cars in the neighborhood.
Foreign cars here are more than about a week (can also be detected automatically), should also be equipped with a digital identification and license plate. This may then temporary identification cards are issued.
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**What about fraud? I just drive without virtual license or hack it**
The main tool against fraud is that 99% of vehicles indeed are in order and that you drive yourself immediately in the spotlight while you're driving reckless. In other words, you will be on camera quickly or get the police behind you.
We can also make quite a fraud-proof system.
Since the introduction of modern cryptographic anti-start systems, the number of car thef has plummeted.Without the key with authentication chip, you just can't get a car as average criminal not started. The strong encryption behind online banking or electronic identity is the basis of their huge success.
If someone your ID & PIN would steal, then you have it but to show and the card is not used as identification. You will find it very quickly. Additionally, there is the face of new forms of identification via smartphone (also via fingerprint).
What about vehicles that no virtual license (tracker) wear or where it is turned off? Each vehicle has a license plate and can thus be detected by an ANPR camera, which can then check in the database if the tracker of the passing car is working.
If vehicles are checking each other through the assistance camera, you have a form of social control that is almost foolproof. A nice alternative is to equip the trucks with the assistance cameras. This may be cheap hardware, you may sometimes have a miss by the power of numbers.
Anyway, there is already a massive deployed of a network of fixed and mobile cameras going on, now also as a weapon against the threat of terrorism. This has for example. been rolled out for the smart road charging for trucks, and the ANPR network of police and customs grows every year very strong. Importantly, this network of cameras needs to be much smaller than a comprehensive network of safety cameras. Checking the presence of a tracker needs to be done from time to time, but speed checking actually everywhere where you have active road users. Turning the unit off for some time does not bring you further

because then abnormalities appear in the distance traveled history (+ control mileage).
As an alternative to plate recognition to cars emit a WiFi beacon through the device, so that even in poor visibility (fog, rain) cars are identifiable. In any case, the threshold to cheat will be hundreds of times greater than now. Very high penalties can deter any fraud of whiz kids
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**Is this affordable?**

It is likely the biggest bargain that the Belgian government can do. The benefits of such a system are so diverse that they are incalculable.
Less accidents, less congestion, less stress, more cyclists (huge social benefits) and pedestrians, less justice spending, fewer police spending, less spending on infrastructure ....
The cost is only to determine once it is clear which components are retained. The cost-benefit analyzes that are attached to ISA,indicate that we have to do from a cost / benefit perspective with a 'no-brainer'.
Let's do a simple exercise for the base system, the virtual license (tracker) in combination with smartphone identification. By Rookie Dongle / Prodongle which costs about € 150, but that includes VAT. Installation can be done by the user, so we sit at a net cost of roughly € 125 million vehicles * 6 = € 700 million. It is likely that the device will outlast 5 years.
There are investment in the traffic cloud, the software and the cost of operational maintenance, but because there are 6 million users, are come at a very low cost per user.
Even with a very simplified solution, wherein you eg. only transfer 1% of the positional data (random or selected), you increase the probability of detection by a factor of 1000 or something. This seems more than adequate for a total reversal in behavior.
SWOV estimated the cost of traffic accidents in the Netherlands at about € 12.5 mijlard in 2009.There were 720 fatalities, which is as much as Belgium in 2014. We there will not be far off when we say that the cost of traffic accidents is also about € 12 billion. Even a 10% reduction in the number of road accidents consequence, presents huge societal benefits.
The smart kilometer levy allows additional to save billions because there is less need for large infrastructure projects. She also makes the necessary ambitious climate targets 2020 feasible.
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**Can we as a society impose that everyone should have such a system in the car?**
The European Parliament already approved in July 2013 a resolution which calls on the committee this kind of technology in conduct
"*8. Calls on the Commission to review its legislation on passive and active vehicle safety so as to adapt it to the most recent technical progress, and to support the implementation of in-car enforcement technologies*"
In addition, doesn't Belgium requires the electronic identity card? And tracking device for smart kilometer levy on trucks?
Any vehicle with internal combustion engine is a very dangerous and polluting mobile unit. It is therefore a huge favor that the car is exempt from environmental or other authorization. The only conditions for the use of this device are the property of driving license, a valid registration (with corresponding number plate) and accident insurance. It is, therefore, the logic itself, that, now the technology now makes it possible, to use effective instruments in order to minimize its harmful effects. President Obama calls for tighter arms law, because the open sale of weapons leads to the violation of ""our unalienable right to life, and liberty, and the pursuit of happiness." His opponents can still suggest that citizens also the "right to protect themselves," but even this argument does not apply in the case of the traffic tragedy.

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**Is there public support for it?**

There's a big difference between support in advance and support thereafter. There is, to my knowledge, not been any fundamental improvement of road safety with support in advance:

- Obligation of the seat belt
- Obligation of the driver's license
- Introducing speed limits outside urban areas

Who would want to reverse this? Also, in Stockholm there was a majority against the toll system, after picking the fruits, a majority was in favour.
The main advantage of upgradable hardware is also that you can adjust finely the effects on a very short term.

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**Background and additional links**

- Article in the Volkskrant on the rise in the insurance industry of tracking devices(PDF)
- The Dutch research institute TNO in on the research domain secure mobility 2.0
- A survey of academic publications around Imobility: http://www.imobility-effects-database.org/applications.html
- Resolution (2013/2670 (RSP)) Parliament to introduce such a system advocated
- all manufacturers equip their vehicles in 2016 en masse with cameras and alarm systems.(Overviewpage , Concrete egvisualizations:. Toyota Safety Sense)
- New Opportunities and threats
- IEEE Intelligent Vehicles Symposium
- GM Connected Car presentation

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