Connectivity and Safety

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Despite the significant mileage increase in Germany by a factor of 13 during the past 50 years, the number of accidents has only grown by a factor of 5 and the number of fatalities was reduced in the same time period by more than 50% (Fig. 1). Purely statistically speaking this entails that nowadays the risk of a fatality when driving along a defined distance is approximately 30 times less than in the year 1953.

If focus is placed on the analysis of severe accidents, it can be seen that more than 50% of these accidents are affected by a lack of driver information (Fig. 2). As for example, if the driver had known that the road ahead is icy, he would have reduced the driving speed and would probably have avoided the skidding of his vehicle. Or if the driver had been informed that there is an optically hidden crash situation on the lane he is following, he would have had the chance to break in time, thus avoiding to hit the vehicle preceding him.

This suggests that a thoroughly-defined driver information concept might be of a primary importance to further reduce the accident numbers. Fig. 3 gives an overview on how the information flow from one set of vehicles, e.g. involved in a crash situation, is passed to another set of vehicles to which this probably dangerous situation might be of importance. In the scope of today's usual information scenario, the information has to pass through a so-called Traffic Control Centre where all decisions of how to spread the warning to the drivers concerned are taken. There is no need to say that this information scenario, with the involvement of many parties, is characterized by a rather long time delay which entails that the information is normally provided too late.

The speed of the information transmission can be significantly increased if Ad-Hoc communication technologies form the basis of the information process. As can be taken from Fig. 4, the Ad-Hoc

connectivity allows to directly pass information from vehicles to vehicles or from vehicles to the traffic infrastructure and vice-versa. Due to the fact that relevant messages are transmitted within seconds, the information is provided to the drivers concerned in time to avoid a critical situation.

In Fig. 5 it is indicated how the transmission of a message is realized in the scope of a Vehicle-to-Vehicle Ad-Hoc information scenario related to a crash warning application.

Fig. 6 addresses the situation of a slippery road condition warning by making use of an Ad-Hoc Vehicle-to-Infrastructure communication process.

The examples addressed above clearly indicate that a most promising information scenario is realized if both information processes, the Ad-Hoc Vehicle-to-Vehicle and Vehicle-to-Infrastructure communication are realized. As is shown in Fig. 7, a high penetration rate of the Ad-Hoc technology is needed to allow to handle more complex safety applications.

Having in mind the tremendous traffic safety potential of future Ad-Hoc connectivity technologies it is of no surprise that a full variety of thus related research projects have been set up. Fig. 8 indicates that the highly promising and challenging Ad-Hoc technology is actively pursued on 3 major continents.

In order to challenge our competitors in Asia and North America it is of a primary importance to politically support the allocation of a frequency band (Fig. 9) to Direct Short Range Communication (DSRC) applications in Europe in the scope of an intelligent transport systems safety approach.

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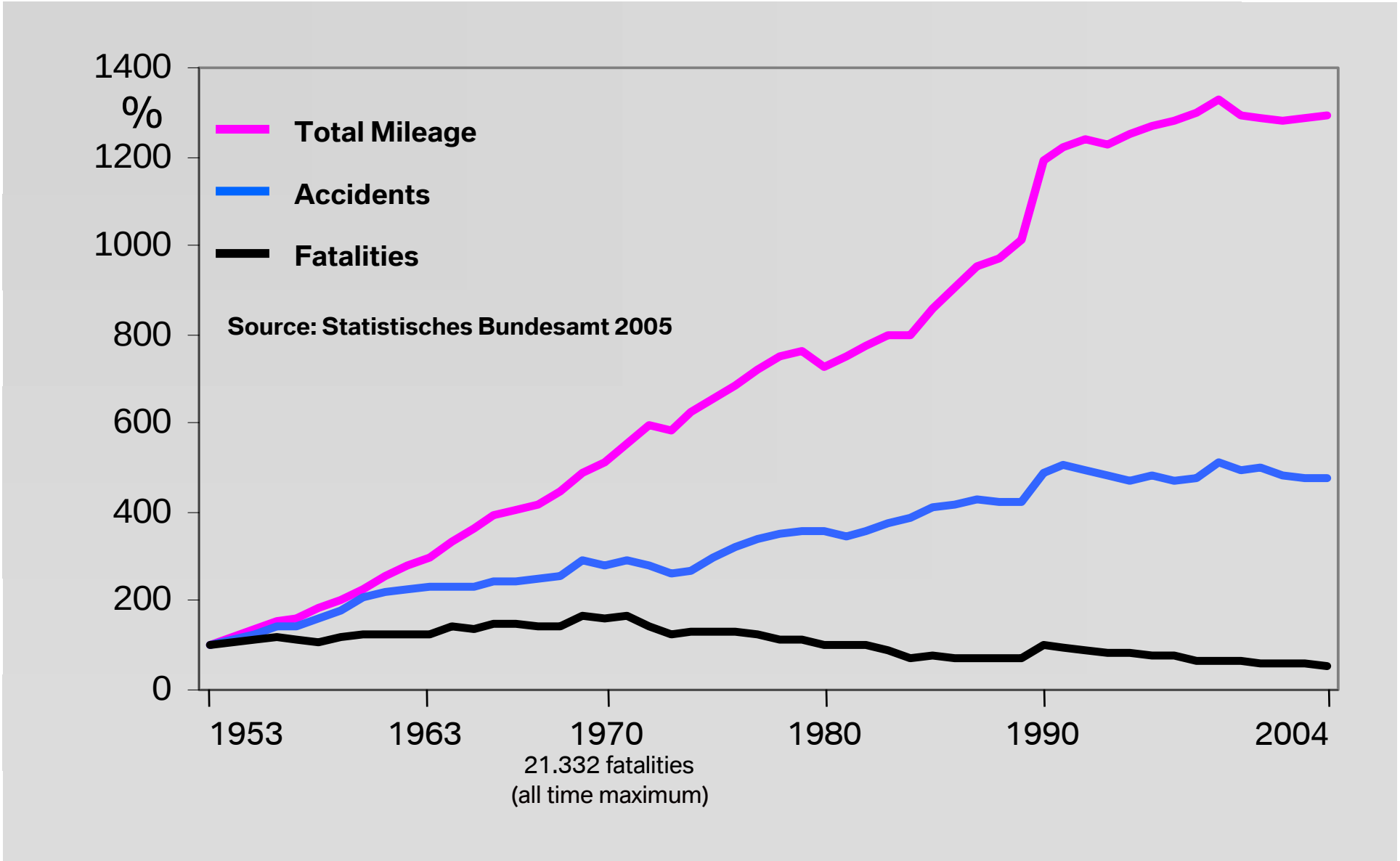
Traffic and Accident Numbers.

Safety has increased during the past 50 Years.



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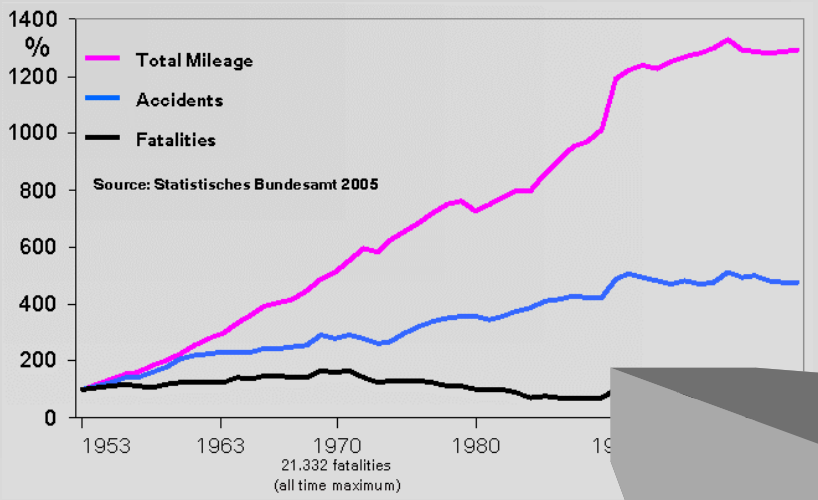
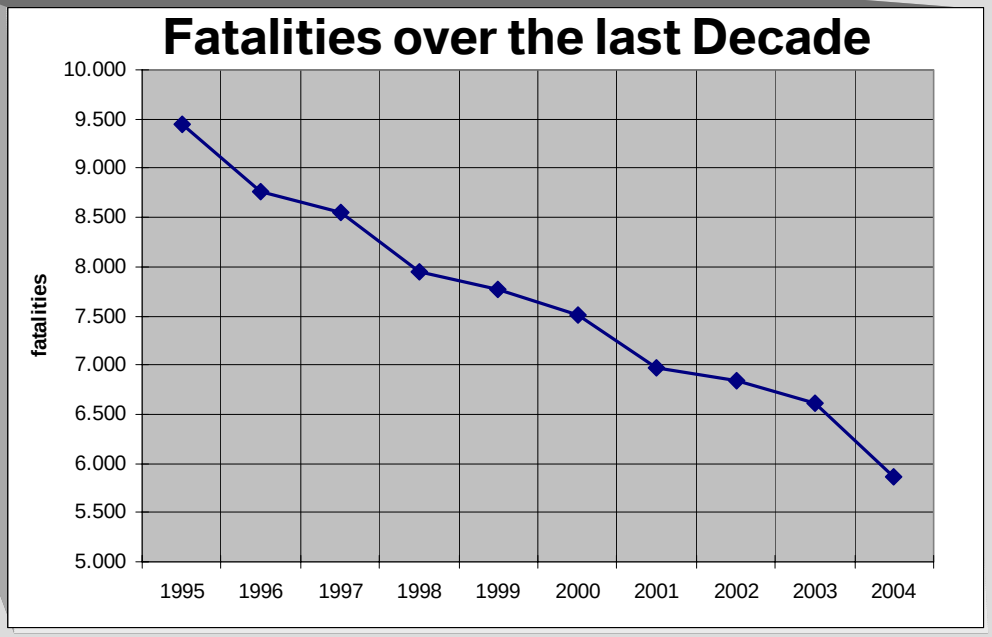
Traffic and Accident Numbers.

Fatalities reduced by 38 % in past Decade.





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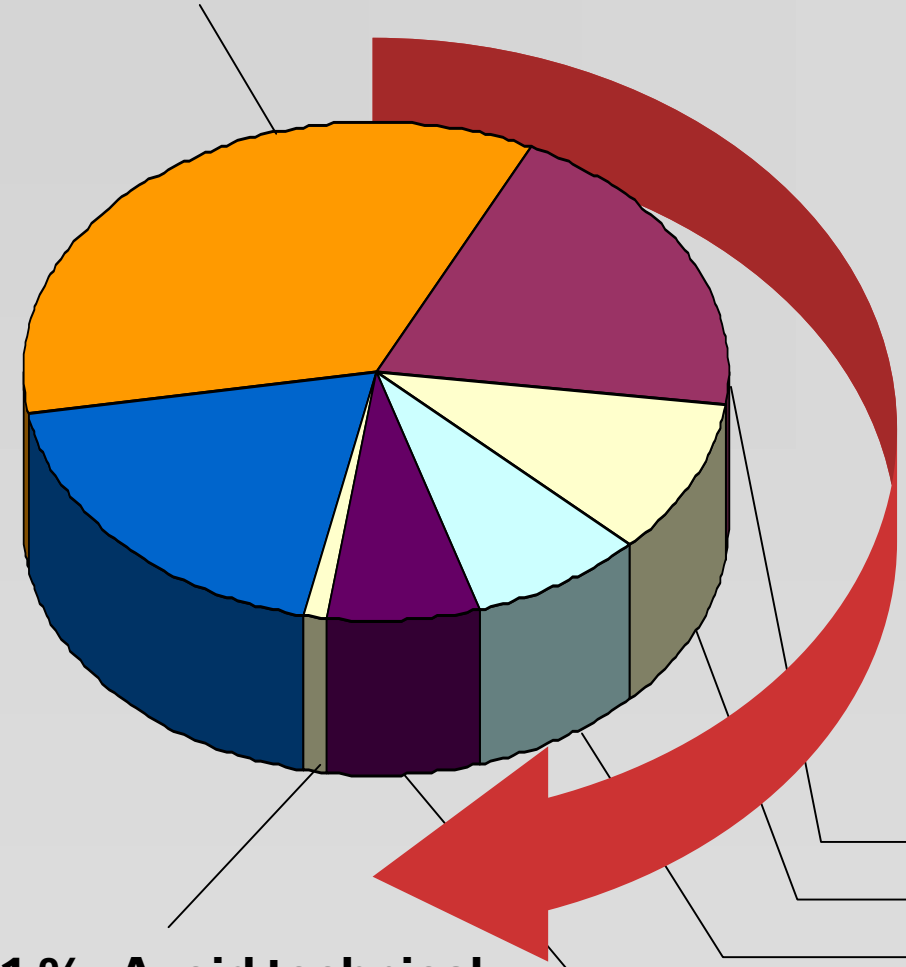
What do we need to further reduce the Total Number of Severe Accidents?



More than 50% of all severe accidents are affected by a lack of information!

45 % Develop systems to enhance perception and viewing:

- 20 % intersections/crossings
- 10 % pedestrians
- 8 % preceding vehicle
- 7 % ...

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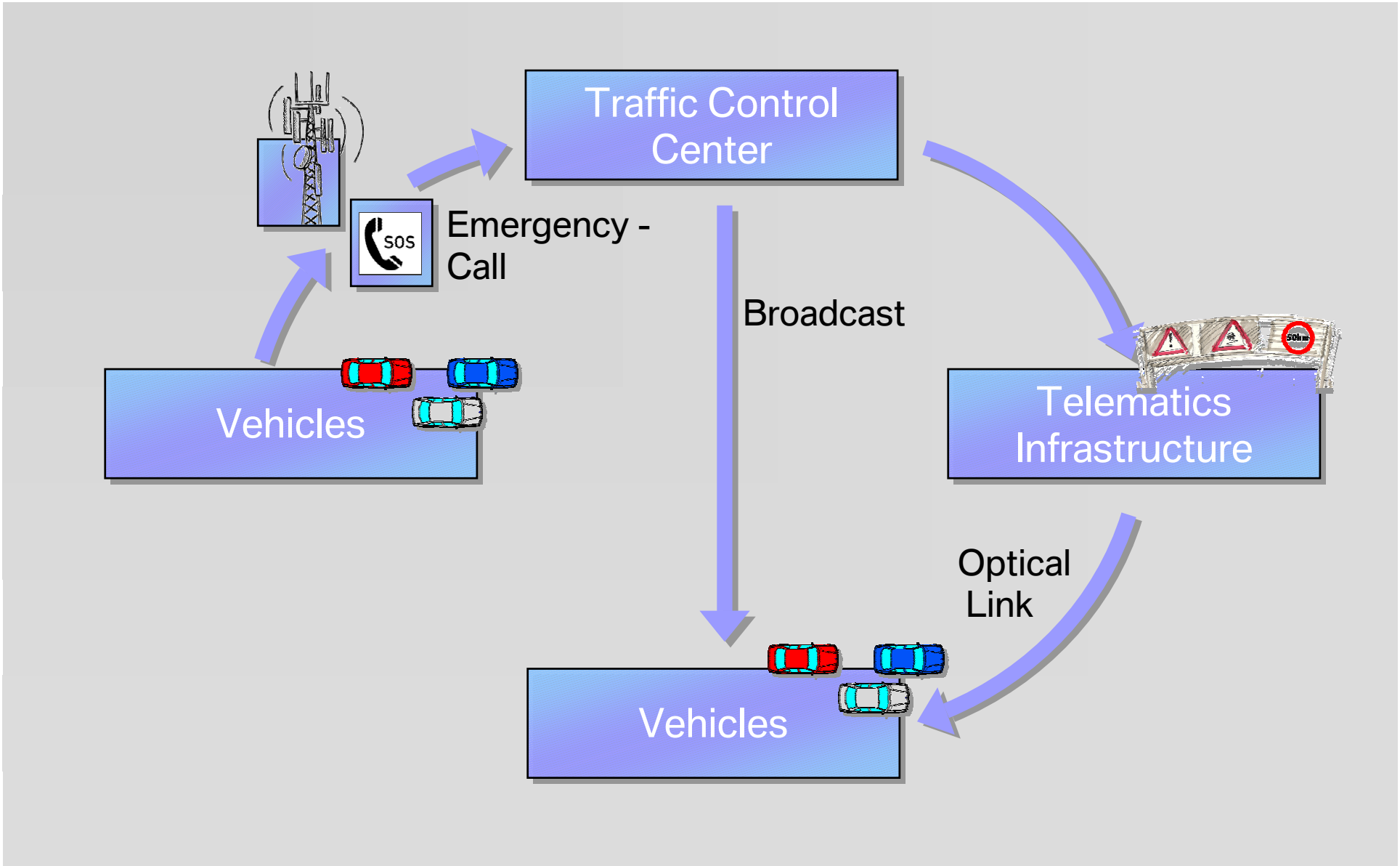
Vehicle-to-Vehicle Connectivity.
The Information Flow.



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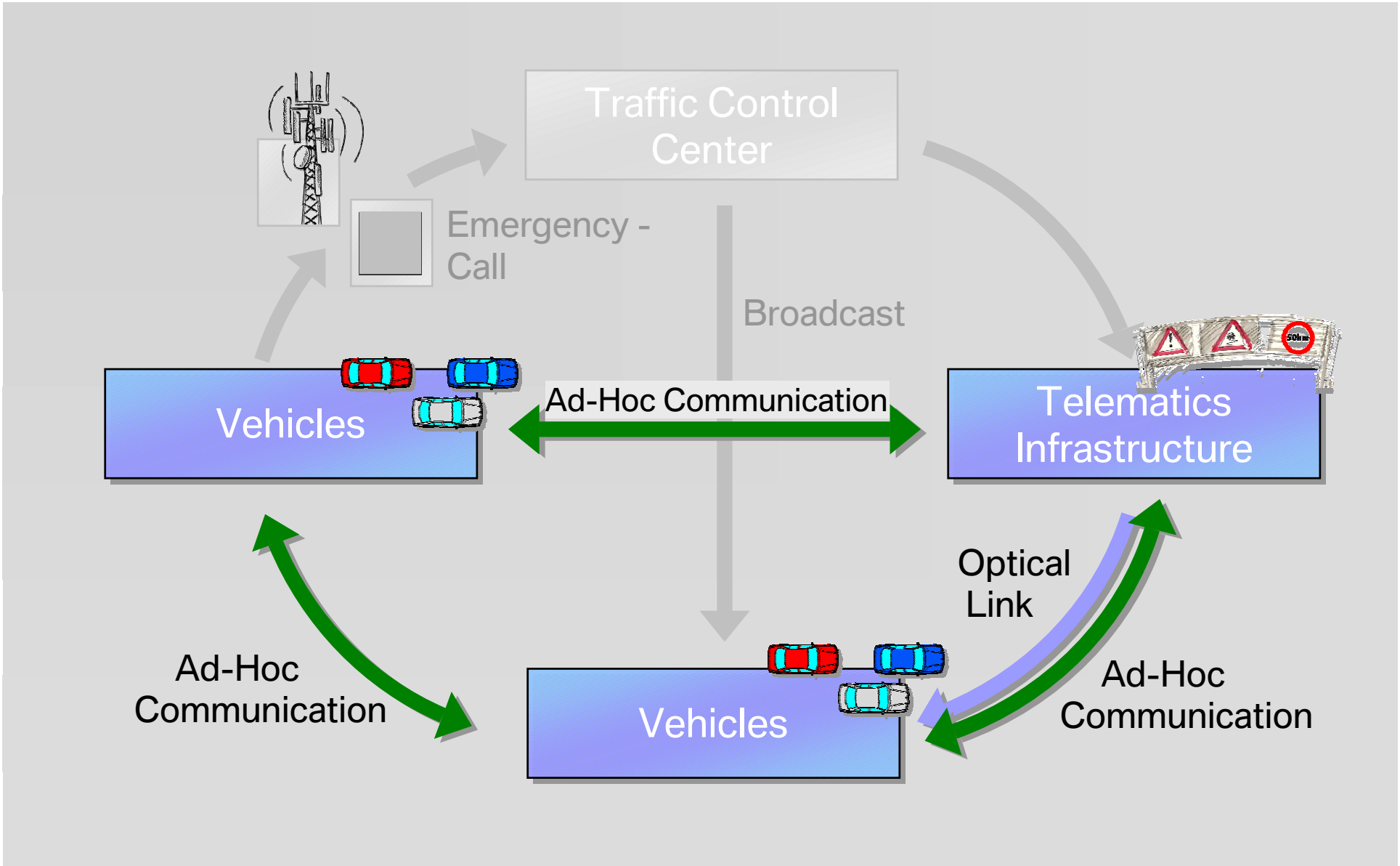
Vehicle-to-Vehicle Connectivity.
The Information Flow.



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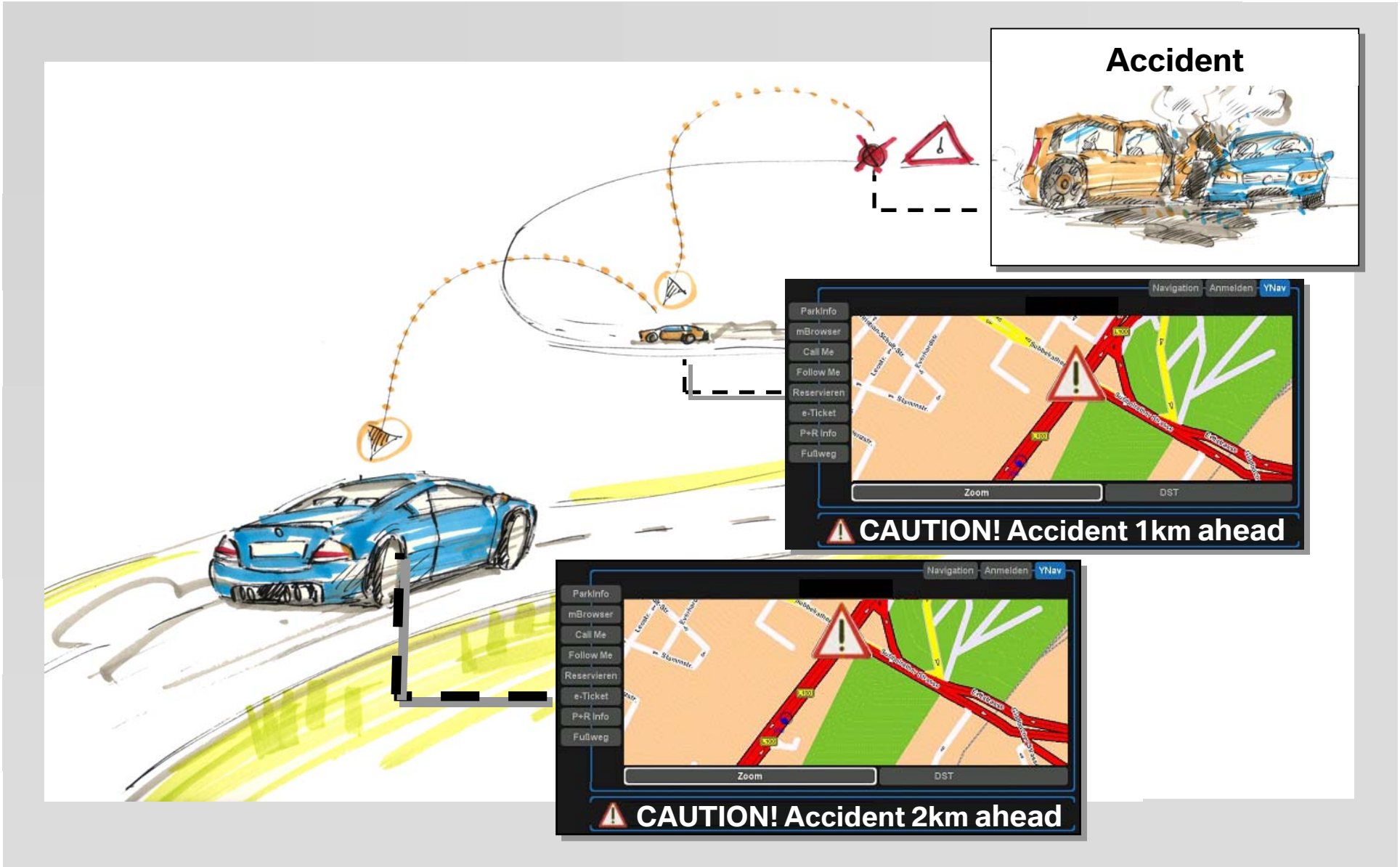
Ad-Hoc Connectivity.
Vehicle-to-Vehicle-Scenario.



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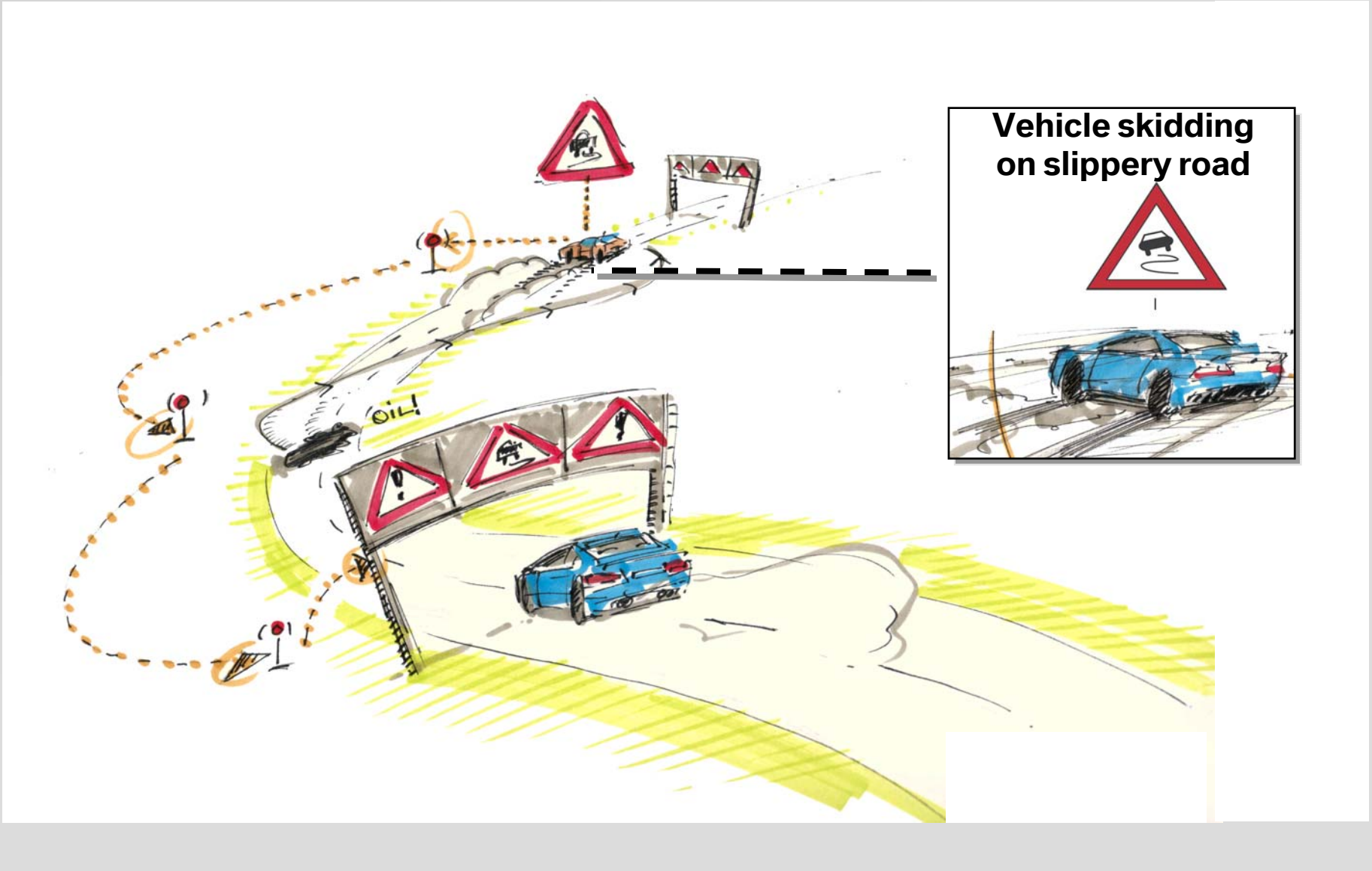
Ad-Hoc Connectivity.
Vehicle-to-Infrastructure Scenario.



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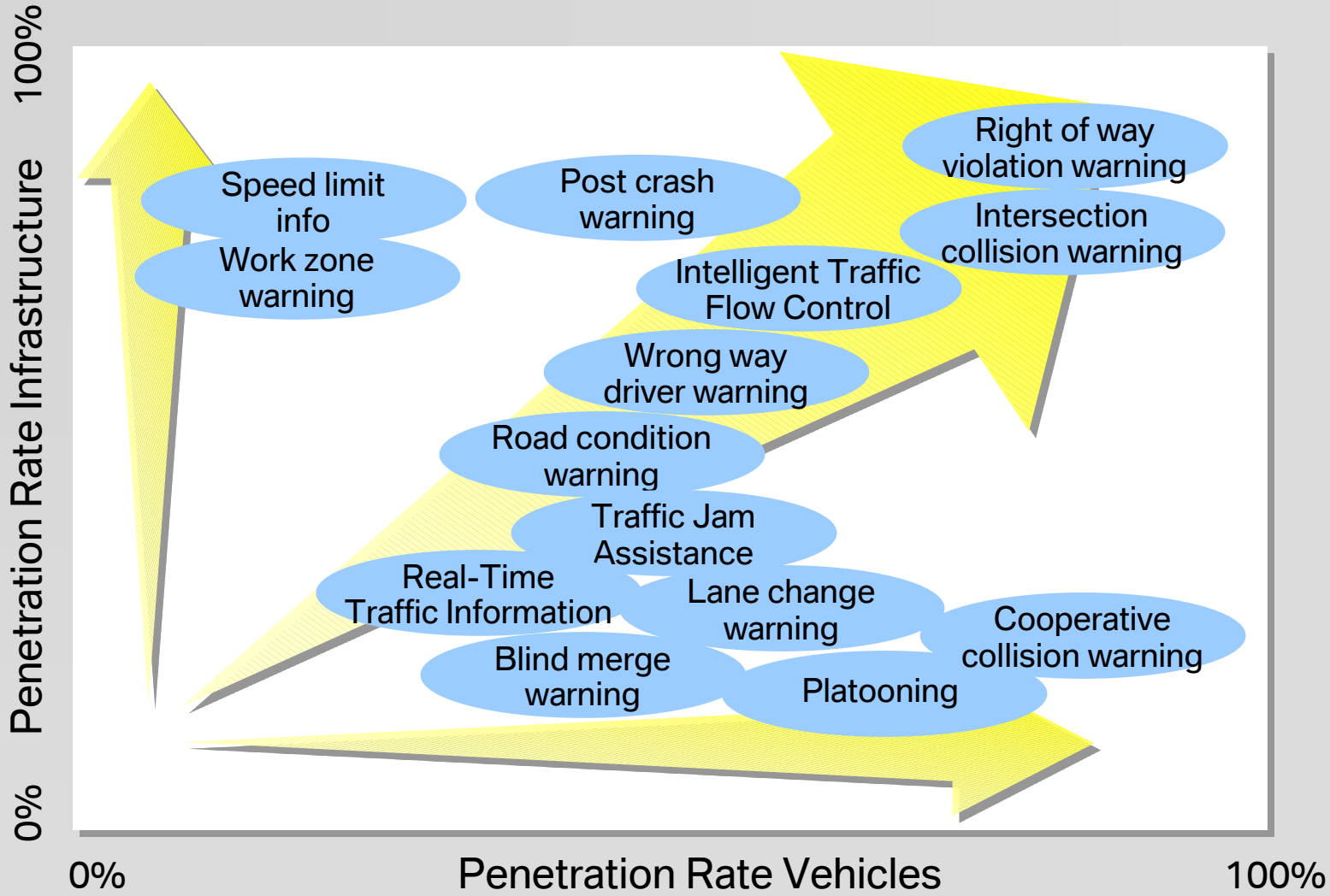
Ad-Hoc Connectivity.

Key Point is a High Systems Penetration Rate.



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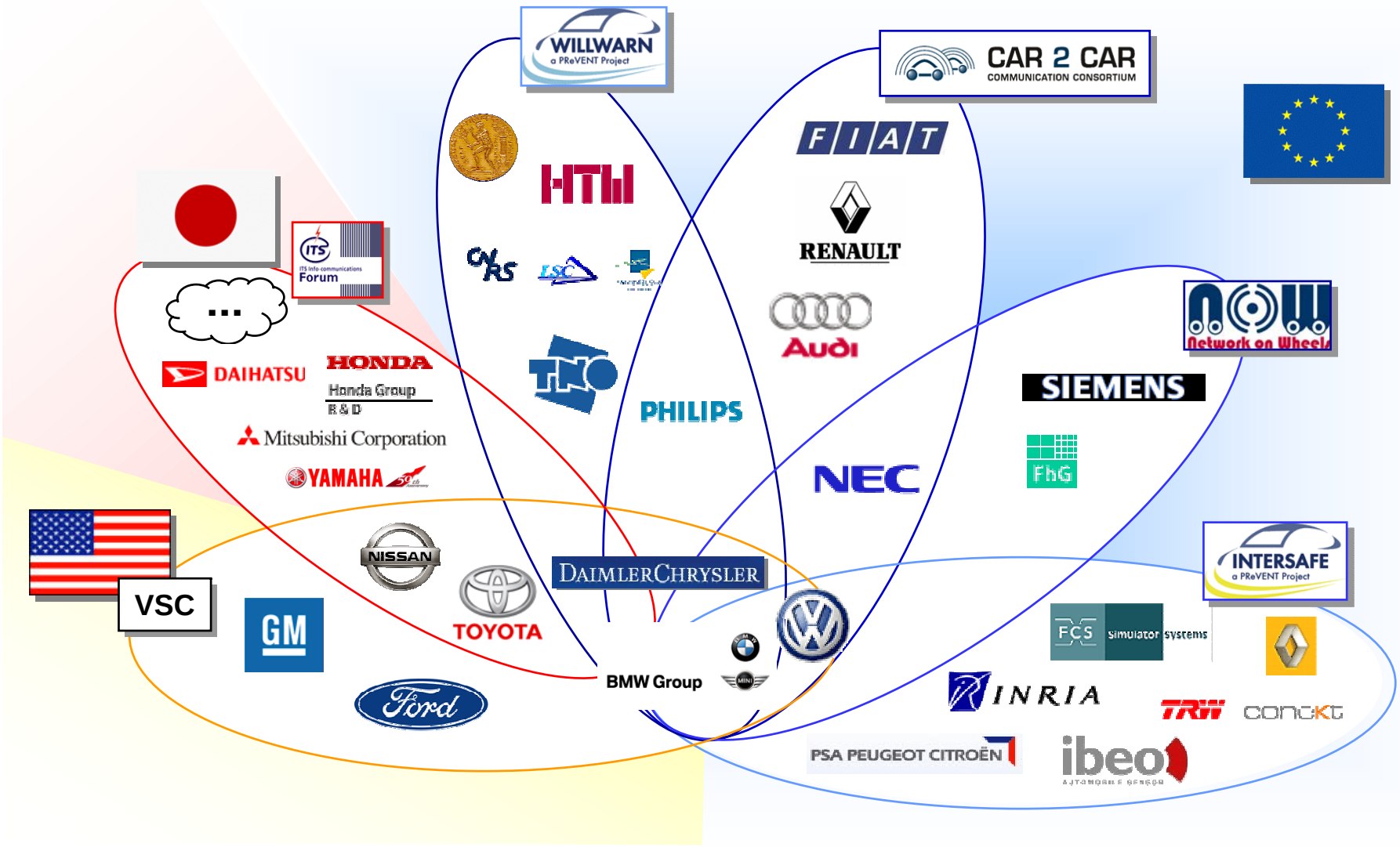
Ad-Hoc Connectivity.
Research Projects on 3 Continents.



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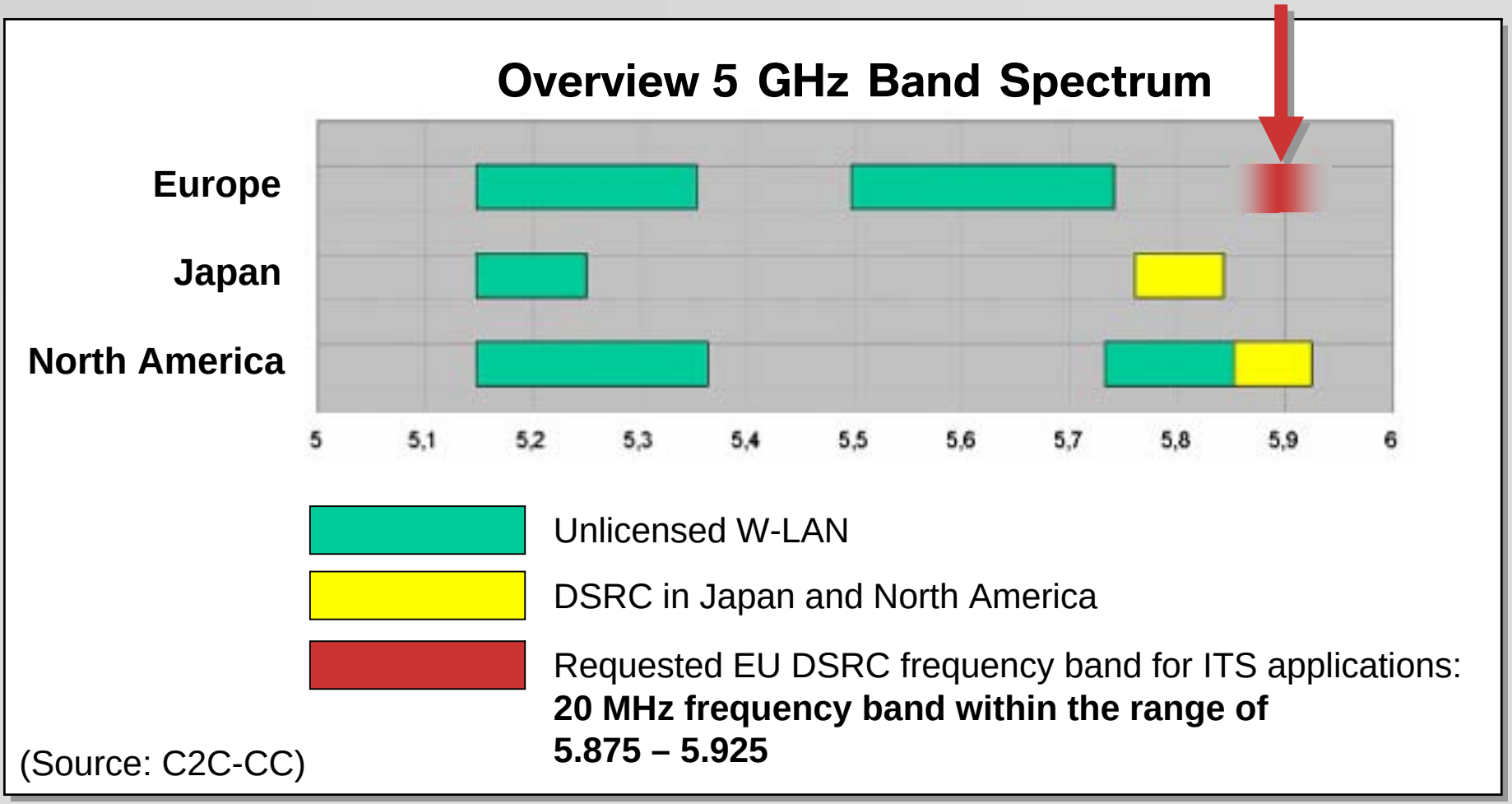
Ad-Hoc Connectivity.
Frequency Allocation.

Our Request: A Short Range ITS Communication Frequency Band in the EU.



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