

# Annual Report to Shareholders

Operative Year # 6

April 1<sup>st</sup>, 2011 – March 31<sup>st</sup>, 2012

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Enclosure 1: Project overview

## HIGHLIGHTS FROM YEAR 6

- An exhibition outside SAFER, in the open arena space, welcomes “key people” and visitors to the SAFER facilities at Lindholmen Science Park. People active at SAFER – “key people” – have increased from 164 year 2009 to 242 2012-04-01.
- Two new partner organizations, Swerea IVF and City of Gothenburg joined at Shareholders meeting 2011.
- 11 Competence Areas are up and running. One example is the competence area Behaviour in Accident Causation which took the initiative to gather experts from Swedish stakeholders with an interest in driver distraction due to technical devices, in particular mobile phoning and texting, with the aim to summarize the latest research and conclusions and open issues. This result has been presented to the Traffic Committee of the Swedish Parliament.
- The international evaluation (requested by VINNOVA) of SAFER Stage 2 took place in October 2011.
- At Chalmers 58 senior researchers are engaged and receive strategic funding (within Chalmers Transport Area of Advance) for safety research. In total some 140 employees at Chalmers are involved in traffic safety research.
- The researchers at SAFER and its partners have established collaborations and exchanges with a number of national and international partners, both academic and non-academic.
- A new global link project has been launched to prepare for Stage 3. The MoU with MOVEO in France has resulted in a joint project on needs for elderly people in traffic which started January 2012. A group of MOVEO partners visited in March 2012.
- The MoU with HTAS in Holland has led to group visits from their partner companies.
- Collaborations with Japan were followed up by a visit to TUAT, Tokyo University and Nagoya University in March 2012.
- In the US, SAFER has enhanced collaboration with UMTRI and University of Michigan in the areas of vehicle dynamics and driving studies. In the area of child safety, an interesting collaboration has been signed with Childrens Hospital of Philadelphia (CHOP) and its centre CChIPS.
- Several new projects have been started in all four reference groups and the project portfolio is growing. In total 68 projects are on-going (both own and associated), of which 13 are funded by EU 7th FP. SAFER is participating as JRU SAFER in six EU projects.
- VR (Vetenskapsrådet) granted funding for project on field data collection INTACT 2.
- SAFER was in 2011 awarded a prestigious analysis project of NDS data from the Strategic Highway Research Program 2 (SHRP2) in the US.
- In the up-coming 7FP project UDrive, SAFER will handle the central database where similar data collected in seven European countries will be gathered for analysis. The responsibilities of the SAFER partners also include the project

leadership of all analysis and of Distraction and Inattention, which is the largest analysis task.

- Support has been given to the development of AstaZero by engaging in discussions, inviting AstaZero to use the SAFER facilities and by addressing needs for new physical test methods for evaluation of various types of active safety systems.
- Three SAFER student teams had high rankings (2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> positions) in an international competition on cooperative driving in Holland in May 2011. The industrial partners together with researchers and teachers are engaged in a follow-up project during 2012 and SAFER applies in collaboration with TNO and IDIADA for funding to arrange a new GCDC competition 2013.
- The multi-stakeholder SEVS 2, is a new project following on SEVS 1, taking a deeper and more integrated societal/technical approach on the question of driving forces and possible transport scenarios 2030+.
- Within the area of human modelling SAFER now provides a competence platform and a natural contact point for external cooperation for the SAFER partners. Significant research steps have been taken.
- The growth of the annual project portfolio turnover is on target with the goal to reach 200 MSEK by 2016. For year 2011 the project turnover was some 140 MSEK.
- SAFER has participated at several national and international conferences and meetings, i.e. ESV 2011 in Washington DC, Tylösandseminariet 2011, and Transportforum in Linköping 2012.
- SAFER has arranged 23 internal seminars and 17 external seminars and workshops.
- SAFER, together with IFSTTAR (former INRETS), have initiated and organised the International Conference on Driver Distraction and Inattention (DDI) in Gothenburg twice. 150 people attended the highly appreciated conference in both 2009 and 2011.
- 4 dissertations and 2 licentiate thesis have been completed during year 6.
- More than 120 publications from SAFER own and associated projects have been produced during Stage 2.

# 1. LONG-TERM VISION, MISSION AND STRATEGY

## Vision

SAFER provides **excellent multi-disciplinary** research and **collaboration** to eliminate fatalities and serious injuries, making Swedish **society, academy and industry** a **world leader** in vehicle and traffic safety.

## Mission

- Run collaborative research projects with excellent academic publications and high relevance to society and industry. Explore new research areas through pre-studies and participation in international networks.
- Combine the multi-disciplinary scientific competence available within SAFER to enhance scientific excellence as well as innovation capability.
- Serve as an open innovation centre for partners and international researchers and provide the prerequisites for creative and productive research collaboration.
- Develop world-class competence, including research tools and methods, in SAFER focus topics.
- Inspire students, researchers and product developers to be devoted to the area of traffic safety.
- Disseminate results and knowledge to society.

## Strategy

To significantly contribute to the vision and become a well renowned international centre of excellence SAFER has to deliver results, build competence and create strong networks in selected areas.

The strategy is built on the pillars **Excellent competence, Multi-disciplinary research and Collaboration**. The strategic plan is to build long-term competence in defined Competence Areas necessary to achieve outstanding research and innovation in chosen Focus Topics. The Focus Topics together form a framework for project content and for development of competences and collaborations.

Presently the six Focus Topics are:

- **Incidents and accidents – priorities and effect analysis**
- **Driver state/action/reaction**
- **Prediction for accident prevention**
- **Methods for evaluation of vehicle and traffic safety**
- **Safety for Novel Electric Vehicles and Vehicle Combinations**
- **Human Models and Biomechanics**

The strategy also includes a common **work environment, seminars and work methods**, and a **uniting name** – SAFER. Multi-disciplinary research and collaboration is supported by the SAFER environment where researchers and project members can meet and work side by side. This is to create an atmosphere of true collaborative research and an ongoing dialogue involving many different actors within the safety area.

## **Values**

SAFER is guided by its vision, strategy and values. The essence and ultimate purpose of SAFER is to create a setting where “World class expertise in traffic safety collaborates to save lives”. The hallmark for SAFER should be values to support that. The atmosphere should express: Open minds, respect for each other, cooperative spirit, high aspirations, curiosity and joy.

## **Financing**

According to the partner agreement for Stage 2, running from April 1<sup>st</sup> 2009 to March 31<sup>st</sup> 2012, SAFER has a funding of a total of 92 MSEK. VINNOVA is providing cash 30 MSEK, Chalmers provides 3 MSEK in cash and the remaining 59 MSEK is in-kind except for 700 kSEK in annual cash contribution that was implemented for year 6.

It is important to follow the economy from the start of SAFER as projects run over several years and the resources are booked as soon as a decision is taken. With year 6 completed SAFER has finished Stage 2. The partners have together delivered above the commitment. Exact numbers will be submitted in the final report to VINNOVA, after all partners have “signed-off” their contributions.

Chalmers Transport Area of Advance is granted Swedish national strategic research funding for Traffic Safety. The amount of this grant is well in the order of Chalmers in-kind commitment in SAFER and the research grants play an important role for the development towards a world class research centre.

As SAFER grows the common costs are also growing and are now close to 50% of the cash contribution. The ability to attract external funding for projects is increasingly important. The contribution of cash must increase.

## **Project economy**

Projects in the SAFER environment are split in two categories, “own projects” governed according to SAFER financial rules and project procedures and “associated projects” with external grants and governance but part of the total project portfolio and follow-up. The total project turnover, including all projects, own and associated, in the SAFER environment is monitored regularly. The goal for SAFER is to reach an annual project portfolio turnover of 200 MSEK by year 2016. When SAFER started in

2006 the existing annual project portfolio was estimated to 60 MSEK. Result for year 6 is approx. 140 MSEK.

The growth of the project portfolio and its changes year by year reflects the outcome of SAFER efforts, but also the effect of changes in national and international research programmes for automotive research.

## **2. ORGANISATION AND MANAGEMENT OF THE CENTRE**

### **Partners and Shareholders meeting**

The partners in SAFER are:

AB Volvo, Autoliv, Chalmers University of Technology, Epsilon, Folksam, Imego, Lindholmen Science Park, Region Västra Götaland, Saab Automobile (filed bankruptcy in Dec 2011), Saab Electronic Defence System, Scandinavian Automotive Suppliers, Scania, Swerea SICOMP, SP Technical Research Institute of Sweden, Swedish Transport Administration, Telia Sonera, University of Gothenburg, Viktoria Institute, VINNOVA, Volvo Car Corporation, VTI Swedish National Road and Transport Research Institute, and TÖI – the Norwegian Institute of Transport Economics.

During the last year of Stage 2, two new partners have joined: Swerea IVF and City of Gothenburg (Traffic and Public Transport Authority). All partners hold a place in the Shareholders meeting.

### **Board**

The executive board of SAFER consists of nine members: Jan Olsson, Autoliv (Chairman); Hans Nyth, Volvo Cars; Per Lenhoff, Saab Automobile; Karin Svensson, AB Volvo; Jan Andersson, VTI Swedish National Road and Transport Research Institute; Claes Tingvall, Swedish Transport Administration; and Anna Dubois, Per Lövsund and Jan Smith, Chalmers. Due to Saab Automobile's bankruptcy, Per Lenhoff stepped down by the end of 2011.

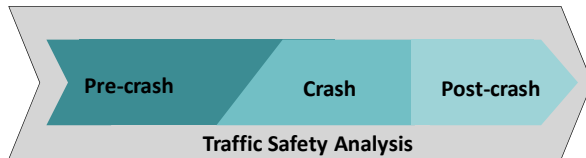
There have been eight board meetings during year 6, including longer strategy meetings in August and January.

### **Reference groups**

The research at SAFER is conducted in four research programmes, each led by a reference group leader. Projects are initiated, discussed and recommended to the board by reference groups for each programme. These groups include representatives from all SAFER partners (that want to participate) and are the base for establishing world class competitive project portfolios. Each programme is host for a mix of

projects: previously established by other parties, newly established and pre-studies for future projects.

The four research programmes are: *Pre-Crash* which handles projects on accident prevention (accident avoidance and crash mitigation), *Crash* handles projects concerning injury prevention, *Post-Crash* handles projects on mitigating consequences and *Traffic Safety Analysis* concerns projects aiming at understanding traffic and the causation and dynamics of accidents and injury occurrence.

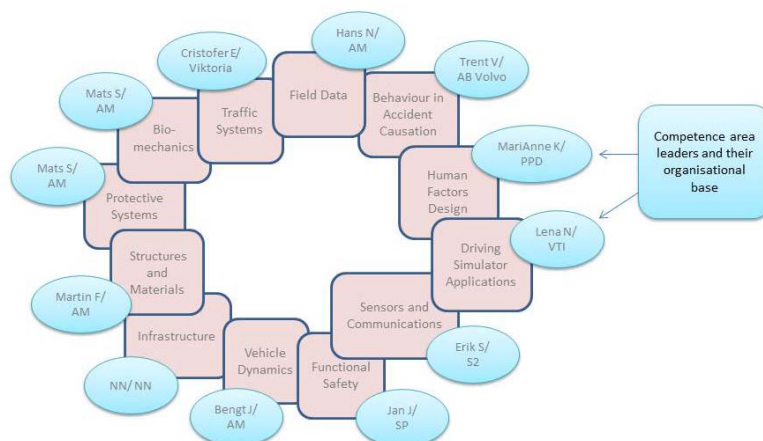


Pic 1. The four research programmes

During year 6, two new reference group leaders have been appointed. Robert Thomson, VTI, has been recruited as reference group leader for Traffic Safety Analysis as Hans Norin has retired. Bengt Arne Sjöqvist, Chalmers department Signals and Systems, is now leading the Post-Crash reference group.

## Competence areas

The competence areas at SAFER are: Field Data, Behaviour in Accident Causation, Human Factors Design, Driving Simulator Applications, Sensors and Communication, Functional Safety, Vehicle Dynamics, Infrastructure, Structures and Materials, Protective Systems, Biomechanics, and Traffic Systems.



Pic 2. The twelve competence areas and their leaders

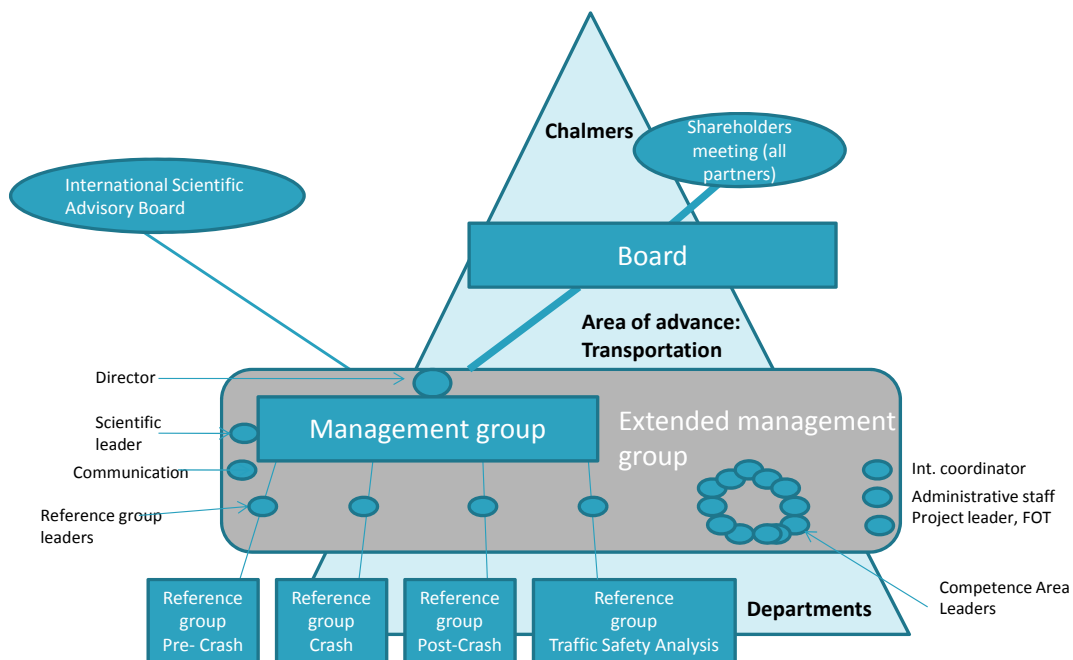


Each area is led by a competence area leader (CAL) who gathers key persons from SAFER partners with their main research interest in the competence area. It is the responsibility of each competence area to know state-of-the art of global research and what's perceived as world-class research. Each should have a short and a long-term plan for competence development.

During year 6 Cristofer Englund, Viktoria Institute, has been appointed as CAL for Traffic Systems. Infrastructure is still vacant.

### Centre Director and Management group

SAFER has two management groups. The Operative Management Group which consists of the Director and the Research Coordinators and the Extended Management Group, which besides the Operative Management Group also includes the Competence Area Leaders, the International coordinator, the Communication officer and the financial officer. "Large project" leaders are also invited. The position Scientific Leader has been vacant during the year 6.



Pic 3. The organisation of SAFER and relation to Chalmers

Chalmers is the host for SAFER and SAFER is the core of the research profile Traffic Safety within the Transport Area of Advance at Chalmers (Styrkeområde Transport).

### International Scientific Advisory Board (ISAB)

The SAFER ISAB consists of 3 members. Present members are Dr Joseph Kaniyanthra from USA, Dr Kazuya Takeda from Japan and Dr Anne Guillaume from France. A first meeting was held in February 2011. Based on written material, presentations and

interviews the ISAB presented a report with findings and recommendations. Actions based on this report were discussed in the board meeting in August. The general impression was that SAFER is on the right track, with the different partners well engaged, research programs with relevant topics, strong pre-competitive collaboration and stimulating work environment. However, there is room for improvement regarding internationalization, volume of scientific output, organisational clarity and efficiency, structure and availability of material and presentations and proactivity. Furthermore SAFER was encouraged to continue with the in-depth investigations and enhance field data analysis work.

## **VINNOVS's evaluation of SAFER Stage 2**

In October 8-10 2011, an international evaluation took place. The purpose was to evaluate the centre progress in Stage 2 and give recommendations for Stage 3.

An eleven-page report has been submitted to VINNOVA including 19 different recommendations to SAFER and two to VINNOVA. The evaluators find the vision and mission good and that SAFER has done an outstanding job in developing technical programs aligned with this. The internationalization is supported and found well on its way. The evaluators are impressed by our multi-disciplinary teams and our achieved breath of research. They also state that the quality of the scientific program is high but we don't fully capitalize on research outputs to gain respect and improve reputation. The Board is given credit for its hard work to steer the evolution of SAFER and to engage in annual strategic planning as well as active decisions on projects to include in the SAFER orbit. The strong relationship with industry partners is seen as strength and further actions should be taken to ensure a level of high activity from all. The evaluators see a clear potential for significant impact from SAFER research. The 19 recommendations cover six issues:

- 1) Partner strategy. Includes understanding which companies, organisations etc are important to SAFERs further development.
- 2) Project initiation, planning, reviewing, follow-up. A lot has been done during Stage 2 and it is an important discussion how this can further be improved and to which level it is desired to do so.
- 3) Goals and strategies. Financial goals, Focus Topic goals, size of project portfolio, infrastructures, the office. Choice of indicators, metrics and success factors to monitor.
- 4) Wanted position regarding visibility and identity, role in the Swedish safety research landscape, international activities & collaborations, publications and Impact on real traffic safety improvement, innovation, decision making, public understanding.
- 5) Organisation, management and staffing need to be seen in the light of the results from bullets above.
- 6) Competence and education planning strategy.

In the operational plan for Stage 3 the evaluation and the recommendations have been addressed.

### 3. RESEARCH PROGRAMME

The research projects are addressed to one of four project portfolios who together make up the research programme. The projects build the road maps for the six Focus Topics. Some projects fit into several Focus Topics.

Projects present at SAFER can be initiated at SAFER **or** be started by SAFER partners in another context and wish to be associated to the SAFER environment. SAFER initiated projects can be financed in several ways, by national/international funders or by SAFER and SAFER partners. Often there is a mixed financing, where SAFER finances a pre-study which evolves to a pre-project, partly SAFER financed, and eventually a full project with external financing.

SAFER keeps track of all projects and their progress and turn-over but takes the full project responsibility for projects with SAFER financing and for projects where SAFER is project manager towards an external funder. This is the case for instance when SAFER acts as Joint Research Unit (JRU) in EU programmes but also in several national projects. Projects, for which SAFER takes full responsibility, are named "own" while all other projects are named "associated". A list of all projects, own and associated, are continuously up-dated and presented to the SAFER board at each meeting. A total of 68 projects and pre-studies are ongoing.

#### 3.1. Reference group status report

As mentioned above, the Focus Topics are a guide for the research programmes to focus on the right projects. Below, each reference group describes its ongoing projects and their contribution to relevant Focus Topics.

#### 3.2 Pre-Crash Safety

Leader of the Pre-Crash reference group is Dr. Yngve Håland, adjunct professor in Vehicle Safety at Chalmers, formerly Vice President Research at Autoliv Inc. and now Senior Advisor at the same company. Secretary is Ms Daniela Michael. The Pre-Crash reference group meets 6 times per year with about 12 participants each time.

The main aim for pre-crash safety is to prevent accidents from happening. However, if an accident cannot be avoided, another aim for pre-crash safety is to mitigate the severity of the accident. Pre-crash safety covers traffic from normal driving, as well as driving with various risk situations, up to the point when an accident may happen. Three of the Focus Topics are especially relevant for the Pre-Crash group. These Focus Topics are:

##### ***Driver State/Action/Reaction***

"Driver state/action/reaction" covers how we actually behave in traffic, not just how we are supposed to behave. It covers, for instance, permanent and temporary states

of the driver, such as fitness for driving (impaired drivers), why and how we take risks and what we do to compensate for risks. It also covers the driver's interaction with in-vehicle information systems (including nomadic devices) and interaction with advanced driver assistance systems, and how the driver reacts to and accepts warnings as well as automatic interventions of active safety systems such as emergency braking.

The project "Safety Assessment QUADRA – Quantitative Driver Behaviour Modelling for Active Safety Assessment (A15)" is the first project ever that aims at developing driver behaviour models to be used in computer simulations to evaluate active safety systems. This new type of evaluation tool for active safety systems can be compared with crash test dummies that have been used for a long time to evaluate passive safety systems. Within QUADRA, one industrial and one academic PhD student are working together to develop and verify quantitative models of driver behaviour, which can be applied in computer simulations with the purpose of evaluating, verifying and/or fine-tuning active safety systems.

The population of elderly people in many countries is increasing. To maintain their transport mobility by using their cars as long as possible, it is important to understand the needs of elderly drivers and their changing driving behaviour. A pre-study (A4) was performed in 2007 to investigate the safety needs within the growing field of senior drivers. A project, "Safety for an Ageing Population 2 (A14)", is ongoing with the purpose of expanding research and establishing a well-reputed knowledge base within SAFER whilst further capitalizing and expanding on the resources already allocated within the partners and forming a SAFER platform using data retrieved from FICA, EuroFOT and more. This national project is complemented by a joint research project with France "SAFE MOVE (A27)", that is derived from discussions with MOVEO and French researchers. "SAFE MOVE" has three complementing approaches. Factors leading to under- and overestimation of cognitive performances and driving ability will be studied. Possibilities for using a driving simulator for training and learning will be investigated. Developing assistance systems in the car itself will help keep older people driving longer.

When designing car HMIs, one of the challenges is how to inform the driver about the traffic situation and a potential danger, to help the driver to drive in an environmental friendly way and to avoid accidents. Research investigating 'optimal' car HMIs is being done in a large project including four PhD students and different research domains at Volvo Cars, universities and institutes. The project is called "EFESOS - Environmental Friendly Efficient Enjoyable and Safety Optimized Systems" and focuses on visual and auditory displays with the aim of presenting information in a natural and intuitive way to avoid extra workload and causing distraction. The project is halfway through and expands competence and promotes effective knowledge transfer between partners as the main result. It has a strong presence in the SAFER environment, with a majority of industrial researchers present, highlighting the innovations in this research field.

In Vehicle Information Systems (IVIS) and Advanced Driver Assistance Systems (ADAS) are designed for the primary function without faults being present. However, errors

do occur, and it will be very important to handle these errors, which can be driver errors or technical errors. The projects "SHADES I and II - System Safety through combination of HMI and DEpendable Systems" (A10, A28) take a holistic view, where the effects on road safety are studied regardless of whether the errors arise from poor HMI or technical malfunctions. PhD students employed at VTI and SP, respectively, work together in an interdisciplinary approach to handle errors in driver-safety systems. Also, similar research questions are studied by an Industrial PhD student at Volvo Cars within the project "Verification of Active Safety Functions". This project has been ongoing since 2007 and implementation of the knowledge gained is transferred into the product development of new safety systems. A third project within the area is an EU project "ADAPTATION – Driver's Adaptation Processes in Response to ADAS use", where Volvo Technology is an active part. This project comprises nine other European academic and industrial partners and aims at studying the whole range of adaptation processes.

### ***Prediction for Accident Prevention***

The Focus Topic "Prediction for Accident Prevention" covers how different systems can predict a potential crash, and gives input to the control of the vehicle to avoid it. Technologies concerned are, for instance, real-time wireless communication (V2V and V2I), sensing of own vehicle's motion and behaviour and sensing of the surrounding traffic, signal/image processing and algorithms, functional safety, vehicle dynamics control systems, and the vehicle dynamics during automatic intervention of a crash avoidance system.

The project "Physical Layer Techniques for Vehicle-to-Vehicle Communications (A19)" is of basic research character in the area of vehicle-to-vehicle communication. It leverages results from two earlier pre-study projects, "Real-time wireless communications vehicle-vehicle and vehicle-infrastructure (AD2)" and "Wireless communication V2V and V2I (AD4)", in which the important research problems were identified. The pre-studies have resulted in multiple scientific publications and paved the way for Prof. Erik Ström (Competence Area Leader and member of the SAFER Extended Management Group) to become the lead editor for the Proceedings of IEEE special issue on Vehicular Communications, which was published in July 2011. The Proceedings of the IEEE is a very high-impact journal and the special issue has given SAFER valuable international visibility.

Another project within the area of V2V communication is the project "Principle Other Vehicle Warning (A23)". This is a joint project between SAFER and VIP (a "sister" centre on simulator methodology) aiming at evaluating the effectiveness of a warning given by one actor in a pending collision to the other actor for he/she to take an evasive action. Within the area of V2I, a pre-study was run 2010 to investigate which traffic applications are suitable to develop for intelligent road marks.

The Project "VISAS – Volvo Infotainment Support for Automotive Safety" studies and develops infotainment and safety functions based on communication between car and infrastructure. One work package of the project deals with the active safety of pedestrians and bicyclists in urban intersections. Also, a pre-study "MASCOT –

Personal Monitoring and Assisting System for Cooperative Applications Outdoors and in Traffic" has been performed to evaluate the possible potential of a wearable system for detecting vulnerable road users.

Several studies have shown the high effectiveness of ESC (Electronic Stability Control) systems. These systems are standard equipment in new cars sold in many countries today. However, current ESC systems are not designed for sudden disturbances that can arise from curb contact, impacts with guard rails, lane edge drop offs, or minor vehicle impacts. The project "Enhanced/Robust Stability Control (AD3)" studied how these disturbances can be detected, analyzed and handled, for example by other vehicle control inputs such as steering, to work in conjunction with brake-based ESC systems. This work can form the basis for the next generation of ESC systems.

Two projects have been run within the area of functional safety; "Functional Safety for Systems of Road Vehicles (A18)" and "BeSafe-Benchmarking of Functional Safety". The SAFER researchers are among the leading Swedish researchers in the area.

Three Swedish teams from Chalmers University of Technology, the Royal Institute of Technology and Halmstad University participated with two cars (Volvo) and one heavy truck (Scania) very successfully in an international competition, the Grand Cooperative Driving Challenge, in Holland in May 2011. The vehicles were equipped with cooperative systems facilitating platooning of vehicles in car/vehicle trains in both city and highway driving. The work was performed within the project "CoACT Cooperative Autonomous Car Train (A25)" at SAFER. The CoACT project was preceded by two pre-studies "Grand Cooperation Driving Challenge pre-study (A16)" and "PreACT (A24)" in order to prepare for the competition. The projects has led to new educational activities, two films showing the project process and competition, media coverage, and an interview in MIT Technical Review. The eight core partners from industry, institutes and academia have decided to develop the achieved national competence platform and to start a new project "CoAct 2".

Several other projects within SAFER deal with accident avoidance and future possibilities of autonomous driving. "ASIS – Algorithms and Software for Improved Safety" combines research by four PhD students (both industrial and academic) in several departments at Chalmers. Based on the vehicle and its environment, crash avoidance scenarios are studied while focusing on crash avoidance, but also including how to utilize passive safety systems more efficiently. The results from the project feed into vehicle system development as well as increase knowledge in the academic world about vehicle electronics and safety.

The project "Systems for Roadway Departure Avoidance" focuses on lane and roadway departure warning and control systems for developing new active safety functions based on real world needs. The European research project "InteractiVe" takes a step towards the goal of crash-free traffic, by developing advanced driver assistance systems for safer and more efficient driving, such as autonomous braking and steering systems based on a sensor platform that recognizes the driving situation.

A national project named "Non-Hit Car and Truck", was started during 2011 which joins both truck and car industrial partners as well as academics with the focus on developing technologies to reduce crashes and particularly address the situations for which today's active safety systems are not yet sufficient. Results will be reached in sensor capability and sensor fusion techniques.

### **3.3 Crash Safety**

Leader of the Crash Reference Group is Dr. Lotta Jakobsson, adjunct professor in Vehicle Safety at Chalmers and senior technical leader at Volvo Car Corporation. Secretary is Dr. Stefan Thorn, AB Volvo. Thirteen partners (fourteen including Saab Automobile during 2011) are members of the reference group and six meetings were held during the year.

The crash reference group coordinates the crash project portfolio and drives the research within the crash area. Crash safety aims at protection of people in traffic by minimizing injury risks when a crash occurs. Situations include drivers and passengers of all sizes and ages in passenger cars and heavy vehicles (trucks and busses) as well as vulnerable road users such as pedestrian and occupants on two-wheelers.

Competence areas regularly reporting to the crash reference group are "Biomechanics", "Protection system" and "Structures and Materials". The Focus Topics mostly related to the crash reference group are "Human Models and Biomechanics" and "Novel Electric Vehicles and Vehicle Combinations", which will be described further down. All projects in the Crash portfolio, except one, are related to these two focus areas. The exception is the EU project FimCar aiming at developing a frontal impact test method, thus related to the focus area "Methods for evaluation of vehicle and traffic safety" where one of the objectives are to contribute to the development of strategic crash test methods.

#### ***Human Models and Biomechanics***

The focus Topic "Human Models and Biomechanics" covers biomechanical injury mechanisms, responses and consequences, the principles for protection including safety system usage as well as mechanical and mathematical occupant and vulnerable road user models.

Within the area of human modelling the main objective is to build cutting-edge competence valuable to SAFER's partners by creating a strong network and a critical mass of researchers and PhD students. Thanks to strategic investments with SAFER resources, SAFER now has a strong core group of activities in the area of human modelling involving researchers in different types of projects (EU, national and SAFER funded) involving both academic and industrial PhD students. Totally seven PhD students have been active during the year together with more than ten senior researchers from Chalmers, Saab, Autoliv, Volvo Technology and Volvo Cars. Also, master thesis projects have been performed within the area as well as a three months project on transforming medical images to FE models. This project was successful and

an important part of the human models development strategy enabling a feasible method for creating human body parts.

In spring 2011, a continuation project on "Active human body models" was granted support from FFI and an additional PhD student could be hired, further strengthen SAFER's position in modelling of low-g occupant response. The on-going activities will be complemented by a 2 year Post Doc position within child HBM with active muscles, starting March 2012. Early 2011 the project "Human Body Model with Active Muscles and Detailed Head for Pedestrian Protection" was started, where one PhD student at Chalmers and one PhD student position at KTH work in the project together with the two (former three) industrial partners. Lately, Saab is replaced by Umeå University in the project. The project has further strengthened SAFER's research within pedestrian safety and also tightened the collaboration with the researchers at KTH as well as Umeå University.

For the industrial partners, the SAFER competence platform of human model development and the pre-competitive research is especially valuable for providing close access to people with core competence in the area. The refined human models, including the knowledge obtained in the joint projects, are regularly used by the industry in safety development, such as autonomous braking systems and occupant restraint systems. The SAFER strategic work has helped to significantly speed up this process of industrial implementation. Also the growing activity in human body modelling has already placed SAFER among the more well-known organisation within Europe, and the interest shown by other universities proves its high academic relevance.

Within the area of Biomechanics, the overall aim is to guard and develop the world class reputation of SAFER researchers in the area of applied biomechanics and injury prevention. Extra high ambitions are stated within the area of whiplash research and child safety. Also, within thorax, shoulder and brain biomechanics the objective is to be an active part within a wider research community, developing a niche of fundamental research. The involvement in the EU projects THORAX and ADSEAT, the Human body modelling projects and the national brain project are examples of this, with the ambition to further strengthen these areas. Within the area of whiplash one PhD student and several SAFER senior researchers are active in the EU project ADSEAT (Adaptive Seat to Reduce Neck Injuries for Female and Male Occupants). One of the main results of the project is a FE model of a scaled down BioRID model. With SAFER partners being the creator of the BioRID dummy during the 1990's, this project is a clear example of the continued leadership in the area.

Within the project of "Rear Seat Safety for Small Occupants", three PhD students and several senior researchers have been very active during this year, resulting in approximately ten conference or journal papers as well as a Dissertation (and a PhD) at the end of year 6. The project also includes a visiting professor, Kristy Arbogast from Children's Hospital of Philadelphia (CHOP) and direct connections to ISO activities as well as the ECE R44 update. This project is a good example of how joined efforts by four partners will help maintain Sweden and SAFER to be a main centre of



excellence, contributing to external activities and setting the agenda in child safety and rear seat safety research. In September, SAFER hosted a workshop in Prato, Italy, September 2011 with researchers from USA, Australia and Europe, summarized in a conference presentation at the International Conference on Protection of Children in Cars in December 2011, entitled "Setting the Future Agenda for Child Passenger Protection". The joint international activities have also resulted in SAFER becoming an affiliated organisation to Center for Child Injury Prevention Science (C-ChIPS) in USA, a joint research project in collaboration with CHOP and NHTSA in USA as well as joint research project with Monash University, Australia.

### ***Safety for Novel Electric Vehicles and Vehicle Combinations***

The crash area focus of Novel Electric Vehicles and Vehicle Combination covers structural requirements (design guidelines) regarding crashworthiness (self and opponent protection) for new safety driven, lightweight designs, including protection of batteries / capacitors, development of design and assessment tools (mathematical models and virtual testing) and system design optimization for novel vehicles.

A first step towards the overall objective of creating strategies and develop edge competence for increased crashworthiness and safe vehicle dynamics by advance structures and novel propulsion and drivelines beyond 2030 was taken within the work of SEVS in 2010. Applications for further project within the area are being prepared aiming at the overall goal of creating a critical mass of researchers and PhD students in the area of safe novel electric vehicles. Late 2011 a continuation project, SEVS2, was accepted. This 18 months project continues to focus on societal questions on a global level and on scenarios for electro mobility. The outcome will be a set of guidelines for further transition of challenges directed to different actors/ stakeholders.

The project application on "Modeling of Crash Behavior for Composites" was unfortunately rejected by FFI, while another associated PhD project on "Methods for Characterization of Material Properties for Crash Modeling" was started with its basis at Swerea and Chalmers. Involving most relevant SAFER partners, a pre-study "Computational Methods for Assessment of Laminated Safety Glass" started early 2012, with the ambition to apply for a larger continuation project. SAFER is a part of the EU project "ELVA" where six international partners combine their efforts within the area of advanced electric vehicle architecture and adds to the area of safety for future light-weight vehicles. The ELVA project will generate, investigate and analyze innovative design concepts and is an important part of the growth of competence within this area at SAFER. These research areas are of high importance for effective development in future vehicle design and also exemplifies the strength within SAFER to combine large and small projects addressing the different needs of the partners.

### 3.4 Post-Crash Safety

The Director of SAFER, Anna Nilsson-Ehle acted as Leader of the Reference Group Post-Crash up until the end of 2011. Starting from the last meeting of 2011 the new Reference Group Leader, Dr. Bengt Arne Sjöqvist, adjunct professor in Healthcare Informatics at Chalmers, has fulfilled the role although he will not fully take the responsibility until April 2012. Eight partners are active within the Post-Crash Reference Group. During the year three meetings were held.

Post-crash aims at reducing the consequences of accidents and the main effort in the reference group has been towards issues concerning information from the accident scene and how this can adequately support the rescue management and operations on-scene. A common opinion in post-crash research is that the response and rescue time is of great importance and the Post-Crash reference group has so far decided to limit the scope to the immediate actions of treatment/rescue and taking involved persons to the hospital and clearing the accident site. This encompasses research on alarming (i.e. e-call), organization of response, rescue and extrication methods, improve medical handling of victims and the availability of vehicle and occupant information.

In 2008 SAFER, Security Arena and Viktoria Institute started a pre-study on sensor-assisted situational awareness (E1). This was successful and has led to two consecutive projects, LiveResponse 2 and LiveResponse 3 (E3 and E4, totaling kSEK 697), led by project leader Jonas Landgren. Both projects are now finished. In short LiveResponse was about live video capabilities for emergency response work. The different response actors, like ambulance and rescue staff, share the same information that is broad-casted via mobile phone by the team "first-on-scene". Thus the understanding of the actual situation is improved and actions can be discussed and prepared in interaction with someone present at the accident. These projects have been highly appreciated and the solution is being implemented. It has created international interest. A company was started in 2010 in connection to this technology.

On November 2-5, 2009, SAFER was visited by Dr M. Varghese, traumatologist from TRIPP (The Transportation Research and Injury Prevention Program at the Indian Institute of Technology in New Delhi. A project idea was outlined and in 2010 a MoU between SAFER and TRIPP was signed. The project aim was to compare long-term outcome for people injured by accidents in two different cases: "high-tech ambulance service" and "brought to hospital by any transport". The project name is "SAFER - TRIPP study on emergency care of trauma patients". Responsible at SAFER is Dr Per Örténwall, University of Gothenburg/Region Västra Götaland. Each party bears its own cost. SAFER part will be financed by in-kind from GU/VGR. The first results from TRIPP were shown in December 2010. Final data are now being analyzed and the results will be presented during 2012.

During 2011 a new project was initiated within SAFER, IPCaR (Improving the Pre-hospital Care process for victims in Road traffic accidents). The principle investigator

is Stefan Candefjord, Chalmers, who started a post-doc assignment within this field during 2011. Reference Group Leader Bengt Arne Sjöqvist is also part of the research team. The overall purpose of the project is to improve the on-site treatment and care processes involved when taking care of trauma patients in traffic accidents. This shall be achieved by using ICT, computerized clinical decision support system (CCDSS) and ultimately new monitoring means for detection of intra-cranial and thoracic bleedings. Apart from just using traditional input data from the victim in the triaging/prioritization process, also crash data from the vehicle, e-call information etc. will be used as part of the CCDSS.

Effective emergency response requires a well-functioning prehospital workflow and information exchange, so that the patient is transported to the correct hospital without unnecessary delay. The receiving trauma team shall have as good understanding of the accident, the vital status of the patient, and what possible occult injuries that can be expected as possible. To make an early decision on what treatment is needed it is advantageous to collect as much relevant information about the status of the patient as possible already before ambulance arrival as well as on-site. The accurate identification and prioritization of patients relies on the triage protocol, which is a standardized procedure to assess the clinical priority level of patients. Improved decision support algorithms have potential to reduce over- and under triage. Patients with occult injuries are at higher risk of being under triaged, and patients that look and feel fine but still have life-threatening occult injuries have become more common due to the use of effective restraint systems with airbags in modern vehicle fleets. Furthermore, there is a high rate of over triage of trauma patients today, which wastes hospital resources, e.g. trauma teams are “activated” un-necessarily causing unnecessary costs “down-stream”. The CCDSS algorithms could use predictions of accident severity obtained from the vehicle itself in combination with current triage criteria related to the injured itself to improve the process. New diagnostic tools for early detection of occult injuries like internal bleedings could also be integrated into an improved triage protocol.

The upcoming public service eCall in the European Union has also the potential to improve the care of the victims. Vehicles involved in an accident will automatically transmit location coordinates and establish a voice connection to the emergency call center. Although eCall holds much promise, no indication of the severity of the accident is included in the transmitted set of minimum data currently recommended. Having this information available would help to plan the emergency service operations significantly.

A long-planned SAFER workshop will be held in April 2012. It is now planned by Bengt Arne Sjöqvist, Chalmers together with Ants Silberberg, Chalmers, Jonas Landgren, Chalmers, and Christer Karlsson, SP. The intention is to use this workshop as a kick-off of a revitalization process of the post-crash area. The results of the first workshop will be agreement on post-crash research focus areas and directions, including identification of all relevant stakeholders; SAFER partners as well as external. This workshop will be followed by others focusing on selected research focus areas and identified user groups. The goal is to expand the post-crash area research portfolio

significantly during the upcoming Operative year (2012-2013) by for instance engage and recruit new relevant stakeholders and research groups.

Two Focus Topics are relevant to Post-crash: Incidents and Accidents, and Novel Electric Vehicles and Vehicle Combinations.

### ***Incidents and Accidents***

The focus topic is described in more detail below in the section on Traffic Safety Analysis. It is relevant to Post-Crash as it deals with the understanding of real traffic situations and how to get correct information and communication real-time across to the relevant response (rescue) actors.

### ***Safety for Novel Electric Vehicles and Vehicle Combinations***

The Focus Topic Novel Electric Vehicles and Vehicle Combination covers structural requirements (design guidelines) regarding crashworthiness (self and opponent protection) for new safety driven, lightweight designs, including protection of batteries / capacitors, development of design and assessment tools (mathematical models and virtual testing) and system design optimization for novel vehicles.

Post-crash aspects on these designs are important. New challenges to the rescue situation are introduced due to, for instance, high-strength materials and to high-voltage electricity on-board. In spring 2010 it was decided that the Crash reference group will cover also these aspects as the solving of the problem is integrated in the crash protection design process.

SAFER collaborates in this research area with Security Arena at Lindholmen Science Park. This creates important synergies as Security Arena and TUCAP (SOS Alarm development department established at Lindholmen) gather the different response actors and service providers for “home-land security and emergency”. A good and unique network is formed and SAFER can serve as a research collaborator to more implementation and development-oriented projects.

## **3.5 Traffic Safety Analysis**

The Traffic Safety Analysis Reference Group has changed leadership due to the retirement of Dr. Hans Norin, associate professor in vehicle safety at Chalmers. Dr. Robert Thomson, associate professor in vehicle safety at Chalmers and researcher at VTI, and Secretary Ms Daniela Michael, are currently responsible for Traffic Safety Analysis. Thirteen partners are active within the reference group and, on average, 7 meetings are held annually.

Traffic Safety Analysis (TSA) aims at developing expertise and methods within the area of field data, where activities for data collection, data storage, data analysis, and effect analyses are in focus, mainly dealing with accident investigation (statistical, in-depth) and naturalistic driving studies (field operational tests, naturalistic driving

studies). The reference group coordinates the research within the area and develops the project portfolio.

The competence group regularly reporting to the TSA reference group is “Field Data”, which will be described later in this document. The competence areas “Behavior in Accident Causation” and “Human Factors Design” have occasionally reported activities to the reference group.

The focus topic mostly related to the reference group is Incidents and accidents – priorities and effect analysis but “Methods for evaluation of Vehicle and Traffic Safety” is also relevant for TSA even though it is organized under Pre-Crash.

### ***Incidents and accidents – priorities and effect analysis***

#### ***Driving studies***

The area of driving studies covers activities within Field Operational Tests (FOT) and Naturalistic Driving Studies (NDS). Data from normal driving in real traffic with vehicles equipped with different types of sensors, cameras etc. will help understanding causes of incidents and accidents, including driver behavior characteristics as driver action/reaction, and adaptation to new vehicle systems. This area has developed significantly during the last years within SAFER and has given SAFER a prominent position in the international cooperation within the area.

Through strategic planning and investments and strong commitment from the SAFER partners, SAFER has built up expertise in the area and is now established as a world-leader in the field. A base was established with the projects BasFOT and BasFOT2 which continued to the end of 2011, with a possible extension to 2012. Investments in the research infrastructure are ongoing and projects like SeMiFOT ND Database (C21) and ND platform for international traffic safety research (C25) have been initiated or funded by SAFER.

A number of important research projects related to FOT/NDS studies have been initiated or were ongoing in Fiscal Year 6:

- EuroFOT (C2) – a European large-scale Field Operational Tests on vehicle systems, is wrapping up and SAFER has archived a unique European database.
- SeMiFOT (C3) – Sweden Michigan Naturalistic Field Operational Test finished in December 2009, and was reported during 2010. This project gathered 13 organizations from the automotive industry, Swedish road authority and academia around the topic of development of the *Naturalistic FOT method*. This method combines elements from both Naturalistic Driving Studies and field Operational Tests. A new project SeMiFOT2 (C12) started in April 2010 and continued to mid-2011.
- The project FOT-Net (C6), which was essentially a project for networking, was completed in 2010 and was followed by FOT-Net2 (C15) which started early 2011.
- Drive C2X (C16) deals with FOT cooperative systems, and a comparative analysis of driver behavior between US and EU based on FOT test data.

Noteworthy projects that were initiated in year 6 include:

- SHRP 2 S08 - Analysis of the SHRP 2 Naturalistic Driving Study Data. A pre-study (C19) led to a project proposal that was awarded by the US National Academy of Sciences (C27). This is a significant result as it is the first non-US application that has been awarded. This project highlights SAFER researchers as leading experts in the analysis of FOT/NDS data.
- Global Inattention Taxonomy Definition (C20) was an activity to follow international activities connected to the annotation and coding of events in FOT/NDS driving studies.
- UDrive is a newly awarded FP7 project that is currently under contract negotiation. This is a new FOT data collection and analysis project with SAFER taking on the leadership of database development and analysis activities in the project.

### ***Incidents and accidents – priorities and effect analysis***

#### ***Accident investigation***

The area of accident investigation has been of high priority for many years, and several of the SAFER partners have a long tradition and extensive knowledge in the field. The goal is to maintain a leading position in the area and continue to be an internationally attractive collaboration partner.

During the past year many large projects have been on-going or initiated. INTACTII is a project with Swedish partners from the industry, Chalmers, and the Swedish Transport Administration. The first INTACT project (C14) finished in 2010 and resulted in a database and data collection methodology. Chalmers was recently awarded a VR (Vetenskapsrådet) project to continue data collection activities for 3 years. SAFER will support the project with an administration project (C28).

Another ongoing project is DaCoTA (C5, C9), which started 2009 and will finish 2012. This is an EU-project, which is a preparatory project for a possible future European data collection activity. Discussions are now underway to identify how European accident data can be harmonized. SAFER has been invited to some of the planning sessions and the INTACT project provides Sweden with a foundation for future collaboration. SAFER has conducted a small project, Accident Data Collection Scheme Comparison (C26) to compare the INTACT (and DaCoTA) database with GIDAS (Germany) to benchmark the two main European systems.

Electronic Data and Reconstruction (C22) was a small project researching the quality and application of EDR and on-scene accident data.

## **4. THE RESEARCH ENVIRONMENT, OPEN INNOVATION AND INTERNATIONAL CO-OPERATION**

### **The research environment**

SAFER is a meeting place with a physical work area of 1500 sqm situated on the 2<sup>nd</sup> floor in the main building of Lindholmen Science Park. SAFER moved here in August 2010, to get a bigger and more functional office connected to other open innovation activities such as Security Arena, Open Arena Lindholmen and Test Site Sweden (TSS). The previous office was in the neighbor building.

The space is a mix of workplaces (approx. 100), small meeting/dialogue rooms, conference rooms and project areas. 45 persons have this as their permanent work place while all other SAFER people use the facilities temporarily. Reference group meetings and project meetings are taking place within the facility as well as informal lunch seminars. This makes SAFER a multidisciplinary and diverse meeting place.

### **SAFER people**

Each person belonging to SAFER is employed by a partner. People who need access to SAFER environment on a more regular basis may get a key to the facilities. Presently SAFER has 242 “key people”. Of this 104 are employed by Chalmers, and 141 are from other partners. Of these “key-people” 20 are academic PhD students and 16 are industrial PhD students thus making the PhD students 18 percent of the total staff. One third of the key people are women. The number of master students is currently 27.

### **Open innovation**

SAFER is studied by a research project “Management of Open Innovation”. This project is running from 2008 – 2012 and is conducted by three senior researchers at Chalmers and one full time PhD student.

The interview sections of this research project was presented and discussed with the partners in a workshop on October 27<sup>th</sup>, 2011. A general finding is that all interviewed partners value the partnership and SAFER as such, but want to more actively utilize SAFER's full potential. SAFER is said to give an increased credibility for the partner through its affiliation. Although several of the partners meet in other constellations, they find that SAFER has a unique value and an important role to play as an open innovation centre where collaborative multi-stakeholder research enhances the partner organisations competitiveness and ability to contribute to a transport system with “near zero” fatalities and serious injuries. Furthermore, many partners appreciate the possibility to influence the perspectives on future transport systems and also find it politically important to be able to influence and have insight into the “safety agenda”.

## **Internationalisation**

SAFER has a strategy for creating global links, including an action plan for the first phase of the execution of the strategy.

The aim of the strategy is to create strong links to world class research environments, an inflow of international researchers and a high rate of exchange of young researchers. It also aims at achieving a reputation as a highly innovative melting pot where collaboration between industry and academy is outstanding. This will also make it possible to influence the international research agenda.

During this year the MoU with MOVEO in France has been developed further with one research project on elderly started January 2012. VTI and VCC are the main SAFER partners. The Director presented SAFER at MOVEO yearly meeting in December 2011. Also the HTAS MoU is active on a partner visit level. SAFER is active in EARPA, both in the Safety group and in the board via prof. Per Lövsund. SAFER is part of the application for an EU-project on “Priorities for Road Safety Research in Europe” preparing for research issues in Horizon 2020. An EU project on clusters of clusters – SAGE – has just started with SAFER as one of the Swedish participants. VGR (Västra GötalandsRegionen) is the coordinator.

Several SAFER researchers have been present at conferences in US, EU and Japan. Following a visit to Childrens hospital of Pennsylvania (CHOP), where SAFER was presented to the Center for Child Injury Prevention Science ( CChIPS), an interesting collaboration has been signed where SAFER gets access to this network through a collaborative project on mild brain injuries to teenagers.

The Director presented SAFER to a conference at Tokyo University of Agriculture and Technology (TUAT) in March 2012 and visited at the same occasion also Nagoya University and Tokyo University ITS centre to discuss collaborations. She has also been involved in discussions concerning collaborations with China.

This all fits into a new Global Link Benchmarking Project that was started December 2011 to give input to enhanced international collaborative efforts. The goal is to identify 2 -5 international Research and Innovation environments that SAFER should develop collaboration with and describe, in measurable terms, what is needed to be an attractive partner to these.

Lindholmen Science Park has a project leader in place for the collaborative project with Brazil on the establishment of a Science Park in Sao Paulo. SAFER will be supportive and encourage the setting up of FOT-activities.



## **Vision Zero Academy**

The forming of Vision Zero Academy is well on its way with The Swedish Transport Administration, Chalmers and VINNOVA as the parties in the steering committee. The final structure is not yet set, but activities are initiated to form the researchers' network that can substantially contribute to research on implementation and innovation for traffic safety. A conference is in planning for the fall of 2012. VZA is a valuable collaboration partner to SAFER and enhance SAFERs ability to reach the vision.

## **5. EDUCATION, COURSES, SEMINARS and CONFERENCES**

### **Chalmers Area of Advance**

SAFER is part of the Chalmers Transport Area of Advance and the director is part of the AoA Transport management team. The active research fields within the profile Traffic Safety are very close to the Focus Areas and the Chalmers researchers within traffic safety are encouraged to contribute to these fields. Presently some 58 senior researchers at Chalmers are active within Traffic Safety and get strategic research funding and all together more than 140 researchers and PhD students at at least eight departments engage in traffic safety related research.

### **SAFER Insight**

SAFER researchers are involved in teaching at all levels within Chalmers. However, to strengthen the education in the safety area Chalmers has granted SAFER resources to develop a more complete programme, presently named SAFER Insight. During year 5, some complementary courses were developed and during year 6 the concept for a web-based portal for all SAFER partners has been developed for implementation during year 7.

### **Guest researchers**

During SAFER year # 6, SAFER has had several guest researchers and visitors from all over the world; USA, Japan, Europe. Most of these researches have given an open SAFER seminar (listed below), which is excellent knowledge sharing.

Dr Jac Wismans is continuously a part-time guest professor and active within biomechanics and novel electric vehicles. Adjunct professor Dr Michael Regan from IFSTTAR (prev. INRETS) has been highly involved in the Driver Distraction and

Inattention Conference September 2011 and active within the road user behavior area.

Dr Kristy Arbogast from Children's Hospital of Philadelphia (CHOP) has visited SAFER five times in total, one time during SAFER year #6, and had fruitful discussions within the child safety project (B5).

Prof Tim Gordon, University of Michigan, USA, is strongly connected to the vehicle dynamics competence area and visits SAFER regularly. Dr John Lee, University of Wisconsin-Madison, USA, has visited SAFER a couple of times during year 6. Stephen Ridella, NHTSA, USA, has visited SAFER once during the last year.

From Japan, Jacobo Antona, JARI, is working at SAFER for a year during his PhD student education. Professor Pongsathorn Raksinchaoensak from Tokyo University of Agriculture and Technology (TUAT) visited SAFER in February 2012.

## **Seminars and conferences**

### ***Internal***

SAFER has established weekly lunch seminars for internal cross-fertilization of knowledge and ideas. During the autumn the seminars were arranged every other week. 23 seminars with 48 speakers have been conducted during year 6.

### ***External***

Conducted external SAFER seminars during year #6 include:

- "SAFER Project Day" is an event when we present recent research conducted at SAFER. 2011 we had 7 project presentations.
- "Inattention and accidents"
- "Workshop on Cognitive Work Analysis (CWA) and Ecological Interface Design (EID)"
- "Vilken roll spelar distraktion i förarmiljön för trafiksäkerheten?" (What role does driver distraction play regarding traffic safety?) SAFER and NTF
- "Workshop: Non-technical aspects of automated transport"
- Clay Gabler: "Event Data Recorders - Data Collection and Analysis in the US"
- Brian Fildes: "Protecting occupants in far side impacts"
- "Workshop on medical imaging for model generation"
- Tim Gordon: "Lane departure warning and lane departure prevention"
- "Trötthet i trafiken - ett seminarium du inte bör sova dig igenom" SAFER and NTF Väst
- Gunnar Flötteröd: "Synchronizing multi-agent simulations with the behavior of real actors"

- Stephen Ridella: “Update on NHTSA research activities”
- Kristy Arbogast: “Setting the Future Agenda for Child Occupant Protection”
- SAFER had a session about Drowsyness and Distraction at the conference “Transportforum” in Linköping in January 2012. Anna Nilsson-Ehle also took part in a panel discussion about research funding.

### **Conferences**

- “BARN, LIV OCH TRAFIK - säkrare trafikvardag för barn och unga” March 7, 2012. A one-day conference initiated and arranged by SAFER, NTF Väst, City of Gothenburg, and VGR.
- “2<sup>nd</sup> International Conference on Driver Distraction and Inattention (DDI2011)” September 5-7, 2011. A three-day conference arranged by SAFER and IFSTTAR. 150 participants from 20 countries, peer-reviewed papers, exhibitors and gala dinner. Highly appreciated and regarding a very current topic.

## **6. REPORTS**

### **Research reports: Dissertation and licentiate thesis’**

**Since April 1<sup>st</sup> 2011 , the following PhD Students working in the SAFER environment have written their dissertation thesis:**

Andersson M. (2012) Child Safety in Car Crashes - A Modeling Approach for Safety System Improvements. Dissertation thesis, Department of Applied Mechanics, Chalmers University of Technology, Gothenburg.

Brännström M. (2011) Decision-Making in Automotive Collision Avoidance Systems. Dissertation thesis, Department of Signals and Systems, Chalmers University of Technology, Gothenburg.

Othman S. (2011) Safety Evaluation of Road Characteristics - Addressing a Road, Vehicle and Driver System by Exploiting Diverse Data Sources. Dissertation thesis, Department of Applied Mechanics, Chalmers University of Technology, Gothenburg.

Engström J. (2011) Understanding attention selection in driving: From limited capacity to adaptive behaviour. Dissertation thesis, Department of Applied Mechanics, Chalmers University of Technology, Gothenburg.

**Since April 1<sup>st</sup> 2011, the following PhD Students working in the SAFER environment have written their licentiate thesis:**

Nilsson J. (2011) On the interaction between driver assistance systems and drivers in situations of system failure. Licentiate thesis, Department of Signals and Systems, Chalmers University of Technology, Gothenburg.

Yang D. (2011) Post Impact Vehicle Path Control in Multiple Event Accidents. Licentiate thesis, Department of Applied Mechanics, Chalmers University of Technology, Gothenburg.