EURONCAP


# "MOVING FORWARD"

## 2010 - 2015 STRATEGIC ROADMAP

## DECEMBER 2009

# MOVING FORWARD

2010 - 2015 STRATEGIC ROADMAP

## PREFACE

THIS DOCUMENT OUTLINES the intentions for further development of Euro NCAP in the near and mid term. It is the result of collaboration between the supporting members to identify concrete steps to promote and reward further vehicle safety improvements over the next five years.

The roadmap provides a strategic framework for guiding member efforts based on a clear vision supported by goals and deliverables. It addresses Euro NCAP's most urgent challenges as well as longer-term needs.

The content of this document reflects the strategic discussions held between the members during the period from December 2008 to March 2009 and includes comments received from vehicle manufacturers and suppliers. The final version was adopted at the October 2009 Board of Directors meeting with minor changes incorporated in this document.

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## INTRODUCTION

WITH THE INTRODUCTION OF THE NEW OVERALL RATING SCHEME [1], the Board of Directors has recognized the need to better plan, coordinate and focus Euro NCAP's efforts to improve vehicle safety in the coming years as well as improving its receptiveness to innovation, problems and opportunities. A path forward is required to address critical needs and to secure Euro NCAP's continued success and significance. The roadmap focuses on the goals and priorities for improving the Euro NCAP assessment programme in order to promote and reward further vehicle safety improvements over the next five years.

### ROADMAP OBJECTIVES

THE AIMS OF THIS ROADMAP are:

- To define a consensus-based strategy that articulates the key priorities of the members in the field of vehicle safety;
- To identify key actions to implement in the upcoming period;
- Guide efforts by members and help clarify how each stakeholder can contribute to developing and communicating the results;

The roadmap links society's traffic safety ambitions and targets to the activities of Euro NCAP and builds on recent initiatives taken by the members to address known concerns in the assessment of car safety by today's Euro NCAP protocols, most notably in the area of pedestrian and child occupant protection. Moreover, the roadmap enables a constructive dialogue with automotive industry on the future of automotive safety.

### ROADMAP SCOPE AND CONTEXT

WHILE RECOGNIZING THE IMPORTANCE of other road safety factors, Euro NCAP's roadmap focuses on safety aspects related to (design and use by design of) vehicles. It does therefore not specifically address the safety aspects of infrastructure, driver education, aftermarket, etc. except where these play a critical role in the car's safety performance. The roadmap also does not explicitly take into account possible effects on fuel efficiency or affordability of cars, although these may present challenging boundary conditions during the implementation phase of some of the strategic actions in this roadmap.

The roadmap covers goals, deliverables and needs over the near (0-2 years) and mid term (2-5 years). Needs may include research and development, new technologies, best practices, protocols, implementation and communication strategies. The roadmap priorities and recommendations will help strengthen members' programs designed to improve road safety in the 27 countries of the European Union. The priorities, however, have not been chosen on the basis of formal impact assessments, but reflect the combined opinions of the Euro NCAP members.

## THE PATH FORWARD

The intent of this roadmap is to provide a strategic framework for action in Euro NCAP. While the roadmap contains actionable items and direction, it is not intended to be prescriptive in full detail. Focused project plans, or Terms of Reference, will need to be developed for implementation of individual parts. Execution will require financial resources, knowledge, commitment and leadership. Adoption in the rating scheme of newly developed items finally can only be decided upon when their full impact and context is understood.

A review of the actions implemented by Euro NCAP will need to be done at least every 2-3 years to evaluate the effectiveness of the new test- or rating items. The roadmap document itself will be actualized as part of a continuous process facilitated by Euro NCAP's secretariat.

## SAFETY LANDSCAPE

BETWEEN 2000 AND 2008 THE TOTAL ROAD DEATH TOLL IN THE EU27 has been reduced by nearly a quarter, despite a significant growth in EU road traffic volumes [2]. One important factor is that European cars have become much safer, partly thanks to the vehicle industry's response to initiatives such as Euro NCAP [3].

Despite the technological advances, however, about 40,000 people still die every year in road accidents in the EU27 [2]. Recent studies reveal that significant variations exist between the European regions in terms of the relative risk of fatal road accidents and that the number of fatalities of elderly and female occupants take an increasing share of the total road toll [4].Vulnerable road users, such as the cycling child, or the elderly pedestrian, remain the most at risk [5]. The human suffering and economic consequences of road accidents justify, amongst others, a continued push for safer cars for consumers in Europe.

## EVOLUTION OF EURO NCAP

THE EURO NCAP RATINGS FOR ADULT PROTECTION, CHILD PROTECTION[1] AND PEDESTRIAN PROTECTION have been in common use since 1997 and have become internationally recognised as a reliable indicator of independent consumer information about car safety. Euro NCAP has stimulated the interest for vehicle safety of all parties involved and has had an acknowledged positive effect on car safety over the last decennium.

Historically, Euro NCAP has concentrated on crash safety, its main test procedures and criteria, (for front and side impact and pedestrian protection) firmly rooted to the work of the European Enhanced Safety Committee [6]. Further collaborative accomplishments include: the Seat Belt Reminder (2002), Child protection (2003) and Whiplash (2008) protocols, all of which have been developed by Euro NCAP committee, with or without active involvement from industry.

Recently, more attention has been given to overall safety with the introduction of new "encompass all" rating scheme incorporating Electronic Stability Control and Speed Limitation Devices (2009) [1]. At the same time, Euro NCAP has put on more effort in addressing the large differences in safety equipment between identical car models sold in different regions of Europe by moving towards the lowest safety specification for the models tested [7].

## VULNERABILITIES

DESPITE ITS SUCCESS, THE EURO NCAP PROGRAMME today has a number of known limitations. At the start, the Euro NCAP programme meant to give consumers a better insight into the safety differences between cars in order to influence their buying decision. However, it is uncertain whether Euro NCAP has fully achieved this goal. Today, the vehicle manufactures, striving for the best possible result, seem to make a more direct target group than the consumers. While the responsibility falls on the vehicle manufacturers, over-optimization to Euro NCAP ratings, may draw away the attention from other needed improvements in safety, for instance in the areas of infrastructure and

[1] *Introduced in 2003.*

driver behaviour. Equally so, it may discourage further developments if the benefit (in terms of additional "stars") can not be made visible or may have detrimental effects in other areas beyond Euro NCAP's scope such as the repairability of vehicles.

Unfortunately, Euro NCAP lags behind in recognising real world innovations, notably crash avoidance and driver assist technologies. Another concern is that Euro NCAP's frontal crash tests effectively only assesses the self-protection of the car in a collision with a vehicle of the approximately the same size or class. It does not tell how a real car to car collision could end in practice, neither for the car occupants nor for those in the impacted vehicle. Compatibility between dissimilar vehicles is not addressed by the frontal test.

## FUTURE TRENDS AND DRIVERS

BESIDES ENVIRONMENT, INFORMATION AND LOW COST CARS, SAFETY is expected to remain one of the key areas of future developments in automotive industry. Manufactures will continue to shift their focus from systems that protect the occupants in an inevitable crash to systems that offer crash avoidance and provide driver assistance. There is a move away from traditional active and passive safety toward integrated safety approaches. At the same time there is a shift towards more extensive driver support, not only in the form of seat belt usage reminders, but also regarding speed and alcohol. The vehicle can play a key role in the support of safe driving. In the longer term, innovative communication technologies will open the door to Intelligent Transport Systems (ITS) with potentially significant impact. In this context, it is worth noting that some vehicle manufactures have expressed very ambitious targets towards zero fatalities, injuries, etc.

The vehicle fleet can be estimated to have a larger variety in the future. There is a significant risk that the safety differences will follow that trend. An increasing number of alternative fuel vehicles will bring opportunities for safer designs as well as introduce new potential safety hazards. The next generation of commercial vehicles will combine improved eco-friendliness with enhanced comfort and safety. Light commercial vehicles are already available in a large range of variants, some designed for purely commercial purposes and others, such as "crew" or double cabs, for a combination of passenger and load carrying. The latter category is forming a more and more attractive offering to consumers.

Finally, BRIC countries (Brazil, Russia, India, China) will account for 40% of auto sector assembly growth in the coming years [8]. It is expected that new manufactures will emerge with uncertain intentions regarding safety. The presence of (new) international players on the European market inevitably will lead to a greater push for global safety regulations established through the UN ECE process. Care must be taken to ensure existing safety levels in Europe are not unnecessarily compromised.

## REGULATORY AND OTHER DEVELOPMENTS

EC/ECE (REGULATORS)

Pedestrian Protection – EC Regulation and the Global Technical Regulation

DIRECTIVE 2003/102/EC [9] ALLOWED FOR THE EU WIDE INTRODUCTION of safety legislation aimed at the protection of pedestrian and other vulnerable road users. Under these regulations

certain vehicles were required to pass a number of performance tests - similar but less demanding than those specified by Euro NCAP - in two phases in 2005 and 2010. The scope of the recently approved second phase, Regulation (EC) No 78/2009 [10], however has significantly changed from what was originally intended by balancing trimmed down passive safety requirements with active safety, in particular break assist systems. The regulation demands that all new vehicle types will comply with amended test requirements in 2015. Since 2004, under the sponsorship of the EC, an ad hoc group, working under GRSP in Geneva, has produced a Global Technical Regulation (GTR No.9) on pedestrian safety [11]. The contents of the regulation are on passive safety issues only and are based on the basic sub-system tests contained in the EC Regulation, although it may consider new improved test devices in the future (such as the Flex-GTR lower leg).

Electronic Stability Control - EC Regulation and the Global Technical Regulation

FOLLOWING THE ELECTRONIC STABILITY CONTROL (ESC) RULE MAKING INITIATIVE in the US, in March 2007 an international group of experts has been set up to agree a harmonised technical specification and test method for a GTR on ESC systems intended to be fitted to cars and light vans. The Global Technical Regulation No. 8, adopted in June 2008 [12], covers ESC systems for passenger cars, multipurpose passenger vehicles, light trucks and buses with a GVW up to 4536 kg. Its requirements are based on those of the US FMVSS 126 and include both functional and performance requirements. In May 2008 the EC proposed that all new cars in the Europe Union from 2012 will have to be fitted with an ESC system.

Head Restraints - Global Technical Regulation

IN 2004 AN INFORMAL WORKING GROUP ON HEAD RESTRAINTS was established under GRSP in Geneva to discuss and evaluate relevant issues concerning requirements for head restraints and to make recommendations regarding a draft GTR proposal. Given the level of harmonization that already existed between the US and UNECE, the process of developing a GTR has been particularly difficult and has required a two phase approach. In May 2008, Global Technical Regulation No. 7 Phase 1 [13] was adopted. This created a common regulatory framework between the contracting parties, but, with its predominant ties to FMVSS 202, provided little benefit for Europe. The development of Phase 2, that would include dynamic testing with a more biofidelic dummy similar to Euro NCAP, is ongoing.

Frontal Impact – ECE R.94

AT ITS 144TH SESSION IN MARCH 2008, the World Forum for Harmonization of Vehicle Regulations agreed to set up an informal group amend Regulation No. 94 (Frontal impact) by changing the type of deformable barrier element and revising the testing procedures [14]. At the heart of the proposal is the Progressive Deformable Barrier (PDB) that was originally developed by Renault with UTAC, based on earlier ADAC specifications [15]. The PDB has upper and lower load paths of different stiffnesses. These load paths get progressively stiffer as the PDB is crushed, better managing the different kinetic energies of vehicles of various masses. The target delivery date for the informal group is May 2010.

Child Restraints – New ECE Regulation

IN 2008, A NEW INFORMAL GROUP WAS SET-UP to consider the development of a new regulation for "Restraining devices for child occupants of power-driven vehicles" for consideration by GRSP. In the first phase of the work, the group focuses on the development of the definitions, performance criteria and test methods for ISOFIX Integral "Universal" child seats. The target completion date for this first phase of the work was December 2009 [16] and the development has continued since then.

RCAR (INSURERS)

Accident Avoidance and Mitigation

THE RESULTS OF TESTING BY THATCHAM, the Insurance Institute for Highway Safety, Folksam, GDV and others are shared among the members of the RCAR Primary Safety Working Group ("P-Safe Group"). RCAR is the Research Council for Automobile Repairs [17] and the P-Safe Group is focussed on electronic technologies that prevent crashes from occurring in the first place. ESC is the first of these primary safety technologies that is investigated by the group, however, it is also reviewing other technologies, such as Lane Departure Warnings and Forward Collision Avoidance systems, that show potential for reducing crashes and hence controlling insurance claims in terms of both injuries and damage. The P-Safe group has links with Euro NCAP's PNCAP group and the "Advanced Forward-Looking Safety Systems – vFSS" group in Germany.

EC / EEVC (RESEARCH)

UNDER THE SEVENTH FRAMEWORK PROGRAMME (FP7), the European Commission is proposing a "greener" and "smarter"" pan-European transport system, supported by a research budget of €4.16 billion over seven years. Amongst others, the Commission is calling for the development of Intelligent Vehicle Systems, such as in-vehicle safety systems supporting autonomous braking and methods for design and evaluation of systems. Examples of RTD projects in the area of safety are: "ASSESS - Assessment of Integrated Vehicle Safety Systems for Improved Vehicle Safety"), "eVALUE - Testing and Evaluation Methods for ICT-based Safety Systems", "FIMCAR" on Vehicle Compatibility, etc. (www.cordis.europa.eu).

Under the umbrella of the European Enhanced Vehicle Safety Committee (EEVC) [18], various national and European research activities with regard to vehicle safety are co-ordinated. The EEVC may, if requested, provide impartial advice to European governments, the European Commission and the United Nations Economic Commission for Europe Working Party on the Construction of Vehicles (WP29) on vehicle safety. In this way, the EEVC may support specific research, evaluate technical proposals and define scientific tools (such as biomechanical criteria, test dummies, test procedures) needed for the further development of technical standards. Examples of ongoing activities, relevant in the context of this roadmap, include the advancement of the side impact test procedure, including dummies, barrier and test parameters and the assessment of costs and benefits; recommendations for a low speed rear-end sled test procedure; the development of virtual testing methods and proposals for assessing the compatibility between vehicles.

TERTIARY SAFETY I.E. ALERTING EMERGENCY SERVICES, and providing protection and assistance after an accident, is becoming increasingly important. Automatic emergency call-out systems (eCall) may considerably improve the efficiency of emergency services. ADAC recently has launched a program that supports emergency services to perform "patient-focused rescue" on any car, in other words the fastest possible extrication of casualties considering the pattern of injuries.

## FRAMEWORK FOR SECURING FURTHER IMPROVEMENTS IN VEHICLE SAFETY

CONTINUING THE SUCCESS AND IMPACT OF EURO NCAP on the safety of cars is not an easy task. It requires a comprehensive approach that addresses the urgent concerns of today while preparing for the needs of tomorrow. A coordinated strategy is needed to articulate the essential goals for improving safety, starting with the vision and user expectations.

### VISION

THE UNDERLYING VISION that guides Euro NCAP's strategy is "For Safer Cars". Euro NCAP's mission recognises the importance of dialog, delivery of ratings, inspiring innovation, value for society and effectiveness for its operations (see Annex). Euro NCAP as an organisation values integrity, independence, leadership and empowerment. One of the key tools of Euro NCAP is consumer information by which all stakeholders can be motivated to move safety forwards.

### EXPECTATIONS

WHILE THE AUTOMOTIVE INDUSTRY HAS BEEN EFFICIENT in the delivery of improved safety, Euro NCAP will need to support innovation. In early 2009, a new rating scheme was introduced to provide better balance in the assessment of various safety aspects (in particular regarding emerging crash avoidance and advanced driver assistance technologies) and to add more flexibility in the ratings scheme than was previously the case. With the "Safety Assist Box" [1] now present but sparsely populated, the potential is high to achieve considerable safety improvements in the coming period by rewarding new crash avoidance and driver assistant systems under the new rating scheme.

Euro NCAP ratings are more and more used by fleet owners, insurers and tax agencies. The organization must be committed to provide independent, reliable and accurate data for the most relevant part of the vehicle fleet on European roads, which may include (light) commercial vehicles.

Better car safety does not necessarily jeopardize emission reduction; however safety requirements will be increasingly challenged in the $CO_2$ discussion. Euro NCAP must challenge industry and keep safety on the agenda for the consumer.

### BOUNDARY CONDITIONS

EURO NCAP'S CRITICAL MASS IS TOO SMALL to develop entirely new knowledge by itself within an acceptable timeframe: it must be opportunistic and use information generated by members, third parties (including the vehicle manufacturers and suppliers) or look for co-operation. An effective strategy would consist of three steps: communication first, followed by a "simple" form of assessment and finally, in the last step, the introduction of a more advanced assessment method.

Where ever possible, the strategy must be solidly supported by real world evidence from accident and other data, and should consider harmonization aspects. Where the evidence is contradictory or beyond the reach of current scientific understanding, the "precautionary risk principle" may be followed. This for instance has been the case for whiplash [19], where the biomechanics of neck and spinal injury are not well understood, so actions were taken on the basis of precautionary risk through the application of best-practice.

## STRATEGIC GOALS

A FRAMEWORK EMPHASIZING THESE THREE STRATEGIC GOALS will provide a sound foundation for achieving the vision:

### (1) IMPROVE METHODS TO ASSESS OCCUPANT PROTECTION IN CAR CRASHES

EURO NCAP SHOULD HAVE A THOROUGH UNDERSTANDING of the current state-of-the-art in (adult) occupant protection to determine where the vulnerabilities exist and what actions may be required to address them. In 2010, Euro NCAP, as a first step, will deliver sensible method for assessing heavier vehicles (including those derived from Light Commercial Vehicles) that does not impose additional risks on other, smaller vehicles on the road. In the mid term, Euro NCAP anticipates a change in regulatory domain regarding frontal impact protection and will consider harmonizing its procedures, if feasible. In the long term, Euro NCAP expects to add partner protection assessment in frontal impact to the program. In addition, it will ensure that manufactures have the ability to demonstrate further safety improvements for lateral impact collisions.

Goal (1A): Improved partner protection on European roads: Heavy vehicles

Challenges: The current frontal test procedure drives larger cars to be stiffer than smaller cars. While bringing many good improvements in terms of cabin strength and restraint performance, the introduction of Euro NCAP's test at higher speed has aggravated that trend, potentially increasing the compatibility between different vehicles on the road. For that reason, it is proposed, as a first step, to modify the current assessment applied to larger (heavy) mass vehicles above a certain limit and/or number of seats, such as N1-based people carriers. Any aspects of the future assessment which have the effect of modifying the requirements of the current assessment must take into account any negative impact on the ability of these vehicles to provide adequate self-protection.

In the long run, Euro NCAP considers including both self and partner protection requirements based on a set of "compatibility" tests. In the first place this may be achieved by altering the frontal-off set barrier test and/or adding a full width frontal impact test in the perspective of a changing ECE regulation. In the last phase, requirements for compatibility may be introduced derived from the recommendations of yet uncompleted research. In the above context, the effects of an increasingly older (and female) driving population in terms of dummy stature and biomechanical limits as well as the state-of-the art in crash avoidance technologies will be taken into account.

Priorities: Euro NCAP should broaden the scope of its activities into addressing the stiffness of heavy vehicles and the interaction between various vehicles on the road. The current frontal assessment applied to larger mass vehicles should be modified to avoid that these vehicles are made unnecessarily aggressive. Other areas of Euro NCAP rating such as Whiplash, side impact, child and pedestrian protection assessment may need to be adjusted as well to include flat-fronted N1 based people carriers. This topic will have a short term priority and output applied in the relevant boxes. In the second step, subsequent new test or set of tests should be delivered to appropriately balance occupant protection with vehicle aggressiveness (Box 1).

Goal (1B): Enhanced crash protection in lateral collisions

Challenges: The assessment of protection offered in lateral collision is currently addressed by the mobile deformable barrier and pole tests in Euro NCAP. Up to 2008, a significant percentage of cars tested by Euro NCAP was able to achieve close to full points in side impact, a situation that as of today does not reflect the high number of deaths and seriously injured in lateral collisions on European roads. While more focus has been put on the pole test in the new rating scheme, the mobile barrier test fails to deliver real impact on vehicle performance in side impact beyond the mandatory legal requirements. International research has delivered tangible output in terms of improved specifications for test dummies and mobile barrier, injury risk functions and dummy seating procedures. However, the cost of introduction of these deliverables versus the expected benefits is yet unclear. The challenge consists of updating the side impact test procedure(s) in such as way that it targets the residual problem at acceptable cost. Protection in lateral impact is regulated world-wide and used by all NCAPs. Harmonization aspects therefore must be carefully considered.

Priorities: Euro NCAP will update its procedures based on the research from EEVC, ISO and others. Starting point will be the existing mobile barrier and pole tests. Consideration will be given to front and rear adult occupants of tall to small stature. The topic will have mid-term priority, with a protocol delivery timeline up to 2012. Output will be applied in Box 1.

**(2) SUSTAIN SAFETY IMPROVEMENTS FOR VULNERABLE ROAD USERS**

THE PROTECTION OF VULNERABLE ROAD USERS remains a critical area for Euro NCAP. The inclusion of the pedestrian and child protection scores into the new overall rating is expected to raise the significance of these areas of assessment for the manufacturer. At the same time, this makes Euro NCAP more exposed to the effects of potential shortcomings in the pedestrian and child protection tests. Within the next years, Euro NCAP will have addressed the most important concerns with regards to the existing pedestrian and child protection protocols.

Goal (2A): Real-world effective methods for protection of pedestrians and cyclists

Challenges: The introduction of Euro NCAP's new overall rating coincides with the implementation of the EC Regulation ("the Phase 2") on Pedestrian Protection and the Global Technical Regulation (GTR). In the light of this, a number of concerns regarding reproducibility and possible conflicting requirements have been raised by industry regarding the current assessment of pedestrian protection in Euro NCAP. Euro NCAP takes responsibility for providing clear targets to industry and should steer vehicle improvements in a direction that generates the largest possible impact on road safety, without creating conflicts to regulation. On the other hand, Euro NCAP must challenge the vehicle manufacturer to look for even better ways of protecting vulnerable road users, including the increasing number of cyclists in Europe.

Priorities: In view of the EC Regulation and the increasing demands, resolving the issues surrounding pedestrian testing, including how to assess deployable bonnet systems, has been a short term priority. In a first step, Euro NCAP will apply a new updated pedestrian test protocol in 2010 that is more aligned with the EC Regulation. In second instance, further refinements and extension of the protocol to include measures to protect cyclists as well as improved leg injury assessment (based on Flex-GTR) will be developed. This work will be undertaken acknowledging the potential

of avoidance technologies for the protection of vulnerable road users (see Goal 3). Output will predominately be applied in Box 3, targeting delivery of a new protocol in 2012.

Goal (2B): Improved protection of children (including protection against luggage loading)

Challenges: Euro NCAP has helped driving vehicles to have higher deceleration pulses and this put very stringent demands on child safety (and rear seat occupants in general) in modern cars. Since the introduction of the Child Protection Rating, manufacturers are paying more attention to vehicle - child seat interfaces and correct labelling. On the downside, the assessment has affected only a limited number of child seat manufactures and has not led to major product innovations for child seats in the car. The added value therefore remains small for the majority of European parents that get child seats at local shops rather than the car dealer. An important question is whether the consumers understand that the rating is valid only for the tested car-child seat combination. Furthermore, there are known limitations to the protocol, e.g. the focus on younger children and the limitations in biofidelity of dummies and biomechanical basis of criteria. The protocol insufficiently addresses real-world misuse and regional differences in availability of seats. To improve the Euro NCAP child protection assessment it will be useful to re-think Euro NCAP strategy going forwards. The relevance to real-world can be enhanced by including better tools and criteria available, addressing all relevant child ages, adding misuse aspects and promoting ISOFix and larger rearward facing seats. At the same time, the general protection on the rear seat could be raised including mitigation of the effect of luggage loading.

Priorities: Developing a clear message to consumers on child protection is a matter that requires involvement and cooperation with industry and third parties. Whilst what is done today can continue without major difficulties (but also without much impact), it is better to implement meaningful updates in the midterm. The work will focus on improving rear seat occupant protection, in particular for children and need to be carefully aligned with updates on the frontal and side impact procedures (Goal 1). The output will be applied in Box 2.

**(3) MEASURE AND ASSESS EMERGING CRASH AVOIDANCE TECHNOLOGIES**

THE POTENTIAL BENEFITS OF CRASH AVOIDANCE AND DRIVER ASSIST TECHNOLOGIES are generally recognised. Providing the best opportunity for adding value to the overall rating, it is important that new test methods are developed to assess the performance of these technologies. Unlike in secondary safety, however, the function, limitations and potential impact of crash avoidance and driver assist systems are not that well understood or documented. Facing a large variety of different systems on the market, Euro NCAP has identified three routes that could be considered to incorporate any technology into the assessment: firstly, Beyond NCAP, a new process by which manufacturers bring their technologies and supporting evidence to Euro NCAP for assessment; secondly, a subgroup, established to study a particular technology and to develop a test protocol; and, thirdly, by the adoption of others' results like, for example, those of the "P-Safe" group or industry. Within the next 5 years, Euro NCAP will be able to capitalise on Beyond NCAP output and build partnerships that allow the introduction of a meaningful assessment of two or more established crash avoidance / DAS technologies.

Goal (3A): Implementation of Beyond NCAP technology in overall rating

Challenges: The Beyond NCAP route, through a system of rewarding important safety innovations, is expected to deliver in-depth knowledge on a variety of systems brought forward by the vehicle manufactures. Building on this knowledge, Euro NCAP may effectively introduce new assessments under the overall rating scheme. This route will be preferred for technologies like Lane Departure Warning, Lane Keep Assist, Blind Spot Detection; Adaptive Headlamps; Alco-locks; Parental Keys and Driver Alert. The PNCAP group effectively captures the information and experience gathered and decides how and when to follow-up. For each technology, the three steps described under section "Boundary conditions" could be considered.

Priorities: Most technologies today are promises rather than realities. While credits can be given to some systems based on the Beyond NCAP process, adequate validation of real world performance and technology independent assessment protocols will be required to include these technologies in the rating. Assuming a successful roll-out of Beyond NCAP by early 2010, it is expected that first adoption in the new rating system of safety functions rewarded under Beyond NCAP will take place no earlier than 2013. In principle, output can be applied in Box 1, 2, 3 or 4, the latter being the most likely candidate.

Goal (3B): Assessment of Emergency braking

Challenges: Collision mitigation systems are forward-looking, systems comprised of collision warning and adaptive cruise control (ACC) with active braking. Even though statistical evidence for the safety benefit of these systems is still difficult to establish, recent impact assessments seems to suggest that the potential benefits of such systems in mitigating accidents and/or injuries for both car to car and car to vulnerable road users is good. Euro NCAP expects that introduction of these systems into the vehicle fleet will happen relatively fast, followed by appropriate legislation. In that context, Euro NCAP expresses its interest in pro-actively drive fitment of these systems across all car segments and geographical regions, and ultimately to rate their performance as part of the overall system.

Priorities: In order to develop a methodology to include assessment of forward collision system (for car to car and car to vulnerable road user) into the rating requires cooperation between PNCAP and industry and third parties, especially the P-Safe group and initiatives like Advanced Forward-Looking Safety Systems – vFSS group. Depending on resources made available, first application is feasible in 2013. Output is applied in Box 4.

Goal (3C): Rating driver assist technologies: adaptive speed adaptation, impaired driving

Challenges: As a logical next step to the introduction of Speeds Limiters in the overall rating, intelligent speed adaptation (ISA/Speed alert) systems which warn or support the driver not to exceed the speed limit will be rewarded as part of the overall safety rating. This development will take into account the fast introduction of camera based speed limit information. The PNCAP group will take the lead to extend the current SLD protocol to include ISA/Speed alert.

Priorities: A mid-term priority is given to this topic. Application of ISA/Speed alert protocol can be expected before or in 2012, depending on the uptake rate of systems. Output is applied in Box 4.

Goal (3D): Rating ESC performance

Challenges: With all new vehicle types required to meet ESC legislation as of 2012, Euro NCAP's current ESC fitment requirement will become obsolete. It is however well understood that legislation only ensures a minimum standard for all systems as legislation consisted of just one test, designed to prevent over-steer. Rather than developing a "performance" type test based on the same scenario, which has proven to be very difficult, Euro NCAP could a focus on other challenging scenarios, such as braking in a turn and split-friction braking, hence promoting more robust systems.

Priorities: Euro NCAP will monitor progress of P-Safe group with a view to adopting a test (possibly split-friction and/or braking in a turn) to enhance the GTR by 2012. The protocol needs to be available and evaluated by 2011. Output in Box 4.

Table 1 below provides an overview of the key actions for the 2010-2015 period related to the overall rating scheme.

*Table 1. Overview of key actions in relation to Euro NCAP's areas of assessment (Boxes)*

| ACTION | BOX 1: ADULT OCCUPANT PROTECTION | BOX2: CHILD OCCUPANT PROTECTION | BOX 3: PEDESTRIAN PROTECTION | BOX 4: SAFETY ASSIST |
|---|---|---|---|---|
| (1) | "Heavy vehicles assessment & Compatibility"<br>"Enhanced crash protection in lateral collisions" | ("Heavy vehicles assessment & Compatibility") | ("Heavy vehicles assessment & Compatibility") | |
| (2) | | "Improved protection of children" | "Updated assessment method for VRU" | |
| (3) | ("Implementation of Beyond NCAP technology") | ("Implementation of Beyond NCAP technology") | ("Implementation of Beyond NCAP technology") | "Implementation of Beyond NCAP technology"<br>"Assessment of forward collision mitigation"<br>"Extension to ISA"<br>"Rating ESC Performance" |

## DELIVERABLES AND TIMING

Figure 1 below shows the deliverables and priorities for the three strategic goals. The milestones refer to the *expected delivery date of the test and/or assessment protocols*, not their planned implementation date which will be considered in the context of legislative, industrial and market developments.

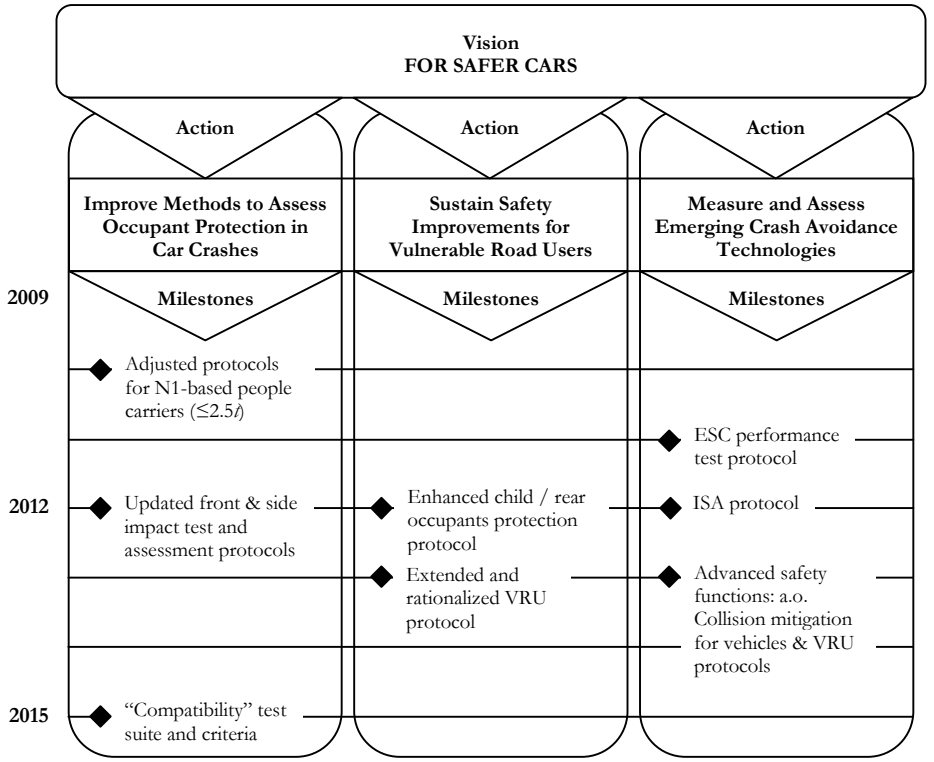


*Figure 1: Roadmap for securing further improvements in vehicle safety. Dates mentioned refer to availability of protocols.*

## ROADMAP IMPLEMENTATION

FOR A SUCCESSFUL IMPLEMENTATION, three main roadmap implementation steps are defined that will result in a Euro NCAP-managed process for launching essential development projects.

- Conduct roadmap discussions with third parties and roadmap refinement; this includes partnership development to help to map existing activities (in and outside Euro NCAP) to roadmap milestones;

- Definition of project plans or Terms of Reference for each item that will ensure delivery of critical roadmap milestones in a timely manner, including allocation of required funding;

- Role definition to identify the best partners for the job.

The precise roles of companies and organizations in implementing this roadmap have not yet been determined for all items. These roles will take shape as the roadmap is disseminated and reviewed by the members. Sufficient resources must be made available at the members, Secretariat and other organizations to carry out the critical tasks allocated in the plans. It is expected that the existing mechanism set up by the Board of Directors is adequate to provide the required oversight, collaboration and decision making to initiate and resource projects and activities. In addition, the Secretariat will provide operational, logistical, and administrative support.

Finally, the value of the roadmap is directly correlated to whether its information is kept current and up to date. Hence, the roadmap review/update process will be incorporated in the annual strategic planning or budgeting cycle.

## COMMUNICATION STRATEGY

A STRONG COMMUNICATION STRATEGY is essential to capitalize on the impact of Euro NCAP's efforts to contribute to overall road safety in Europe and is therefore crucial to the execution of this roadmap. In order to maximize its message, Euro NCAP intends to support and better co-ordinate its activities with its member organizations and other stakeholders as part of a "consumer" targeted dissemination strategy. In particular, with the distribution of this roadmap, opportunities should be explored to increase consumer awareness in EU-27 and emerging regions as well extend the use of Euro NCAP results by other interest groups.

More than in the past, timely and accessible communication should be the primary process that drives Euro NCAP's agenda supported by clear target setting, periodic monitoring of key indicators and the demonstration of return on investment. These activities will focus engagement with all members as to their needs individually and corporately and set a new agenda toward a common purpose. It will help define the message, how to say it, what the content of the communication is and whether Euro NCAP's plans to improve safety in every detailed technical area are designed to create "outputs" which are able to be communicated to the consumers, fleet owners, etc. The primary consumer distribution channels such as the route to printed/website consumer media should be consulted in this process. Euro NCAP's Communication group will facilitate the above strategy.

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## ANNEX

### VISION

For Safer Cars.

### MISSION

To deliver the vision through:

DIALOGUE – With all stakeholders: legislators, industry, research, other NCAP organisations, insurers.

- Act as an advocate for safety.
- Identify new priorities and communicate.
- Integrate best-practice.

RATINGS – Stimulate the market by providing independent information to the consumer.

- Encourage accurate, timely and impartial reports on the safety of new cars.
- Inform media, member organisations, fleet buyers, rental car companies, insurers to reach out to consumers.
- Monitor media impact and effectiveness.

INSPIRE INNOVATION – Setting the highest and most appropriate safety targets for manufacturers.

- Reactively and proactively encourage the development of new technologies.
- Support the safety departments within car manufacturers.
- Set clear, accessible and timely targets.
- Stimulate continuous improvement in industry and internally.

VALUE FOR SOCIETY – Dramatically reducing the number of crash fatalities and accidents on European roads.

- Continued independence and accurate crash-testing.
- Stimulating discussion on safety issues.
- Maintaining independence and credibility.

EFFECTIVE – Measure overall effectiveness of Euro NCAP's activities through accident analysis.

- Measure current performance.
- Inform future direction.