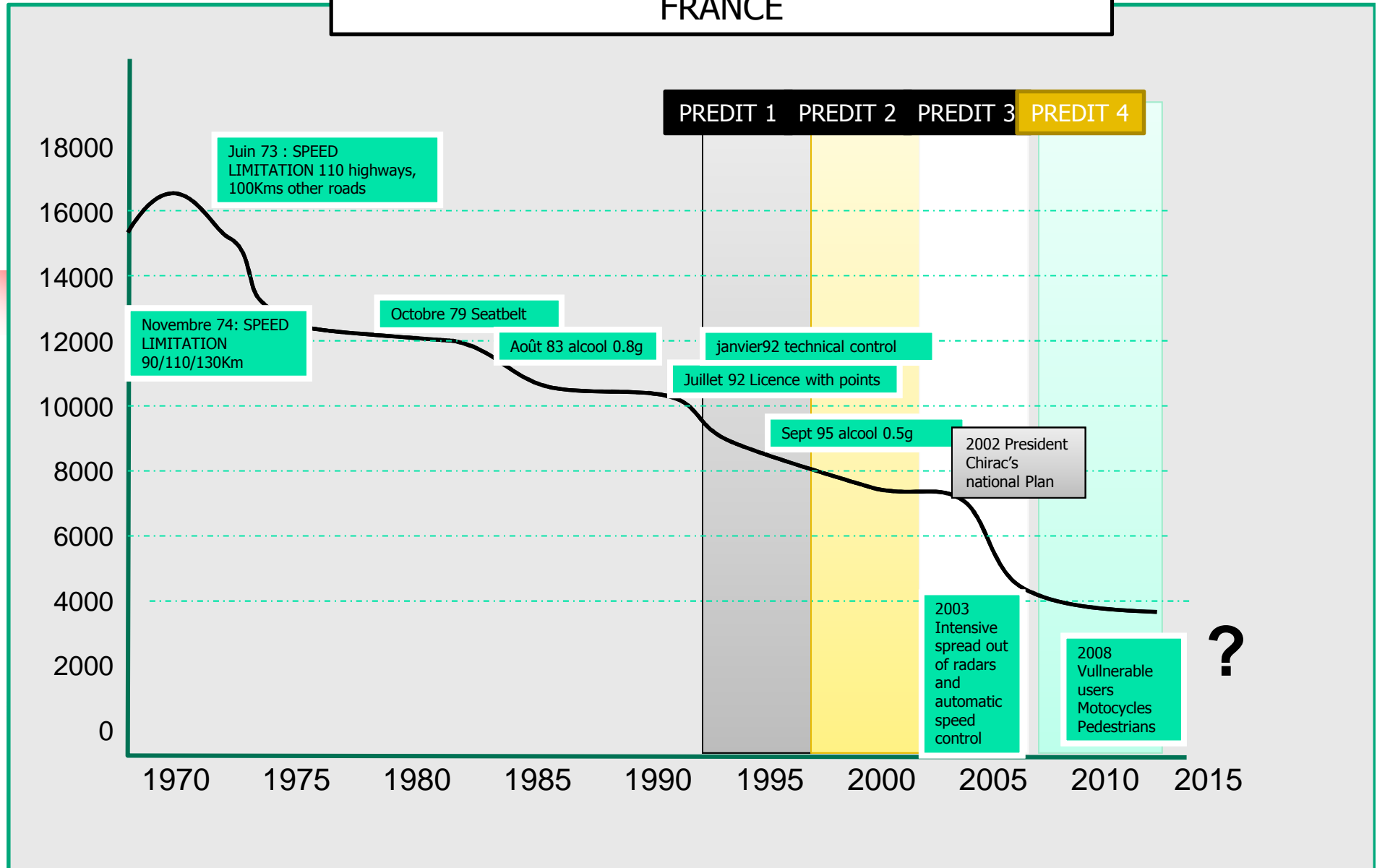


René Amalberti, Prof, MD, PhD
President expert group 2 of PREDIT IV
Quality and Safety in Land Transportation

AGING POPULATION AND TRANSPORT: RESEARCH ISSUES

ROAD FATALITIES 1971-2010 FRANCE





Aging and driving

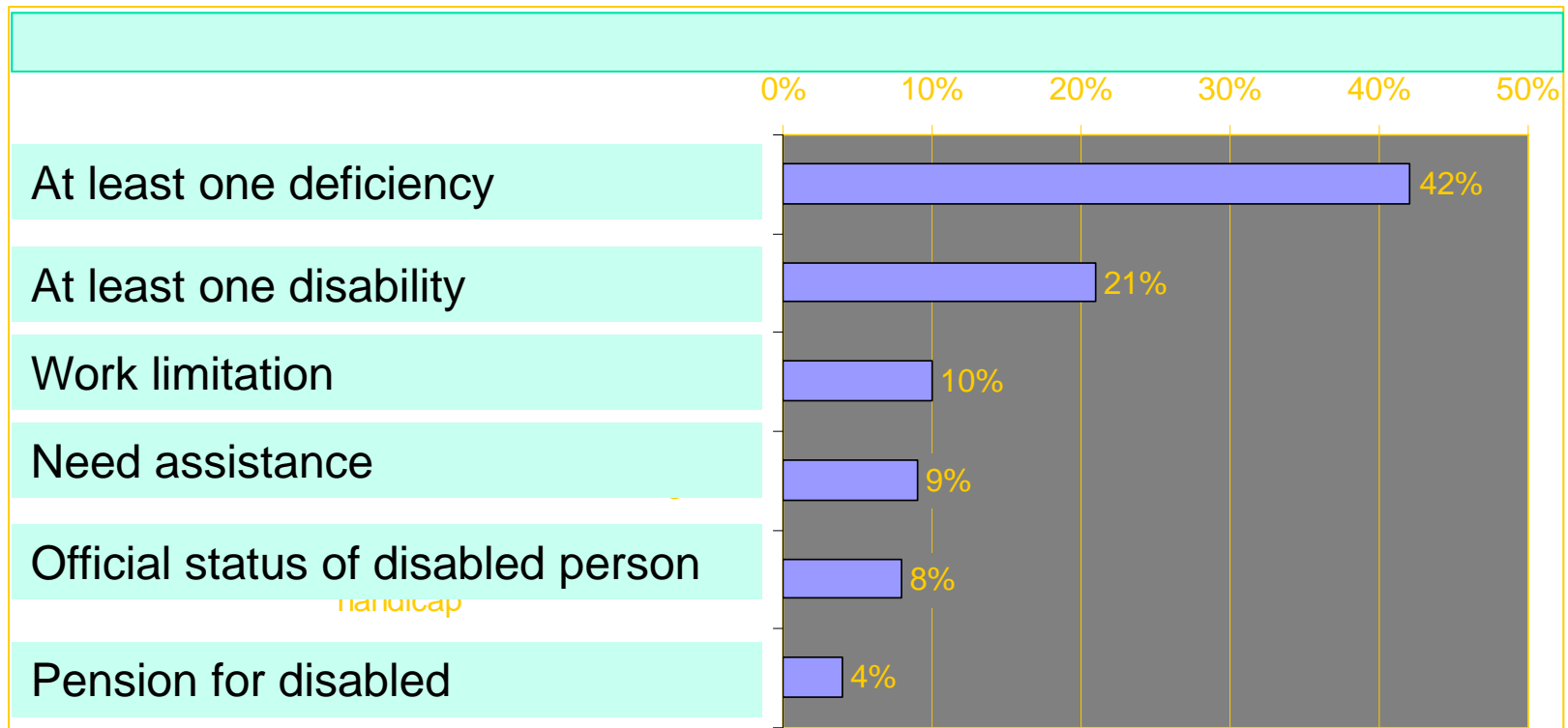
- 62% of persons over 65 use to drive
- 49% of persons over 65 use to drive everyday
- 29% of persons over 74 use to drive
- Last car
 - 10% of males and 24% of females over 70 having the driving licence have no more car
 - 36% of males and 58% of females over 80



Challenges

- A central topic for modern societies
 - 20% of people aging over 60 in 2016/2020 in France
- A land of contrasted objectives
 - Better Access
 - Better Mobility, Autonomy
 - Better (road) Safety
- An economic force :
 - Public health perspective
 - maintaining autonomy and mobility of aging person may represent over 1.5 point GDP, and even more
- Leading to needed Compromises and global approach

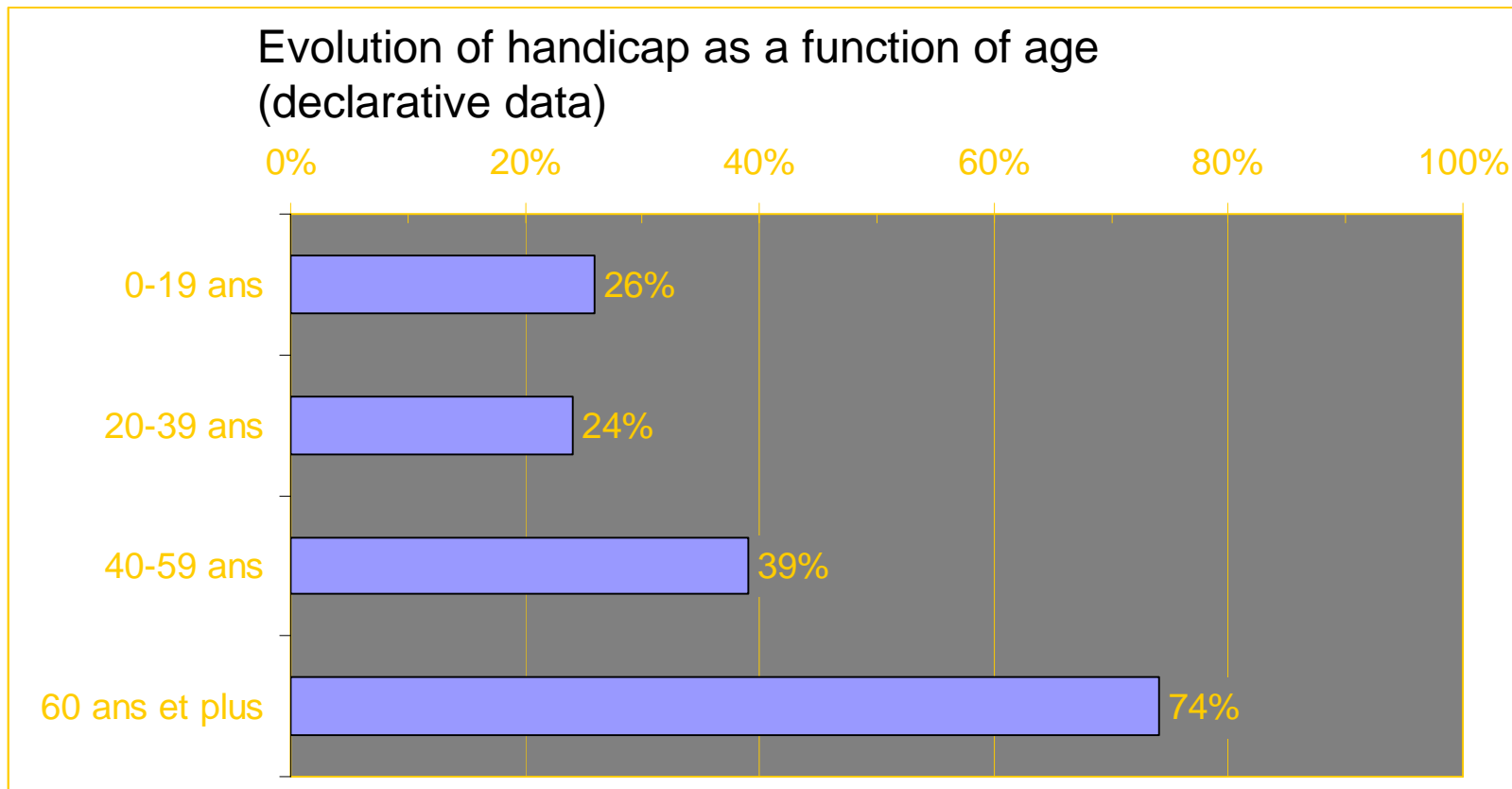
Disabled persons, Handicap



From IFSTTAR Lyon



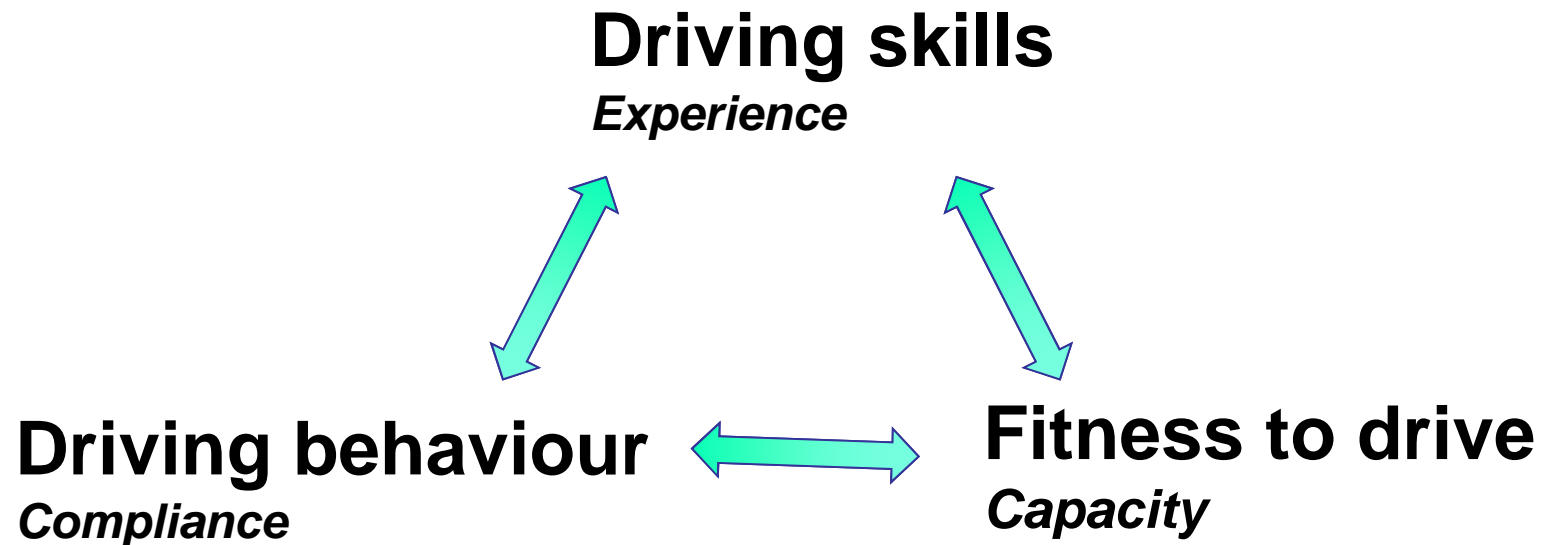
THE HANDICAP



From IFSTTAR Lyon



Driving abilities



The cognitive Challenge (1/3)

- **'normal' Aging** is mechanically impairing cognition
 - Spatial memory, attention
 - Motor skills, reduction of muscular forces, arthroses
 - Hearing, Vision

- **Compensatory mechanisms exist**
 - For long the deficits are compensated
 - by adaptation of the task (reduction of ambition in planning novel trajectories, reduction of mobility, routines)
 - by adaptation of the speed of action
 - Possible trade offs between objective impairments and risk

- **No over risk of driving accident associated with aging**
 - The myth of increased crash risk
 - Objective lower risk accident compared to younger driver
 - Even with corrected data (low yearly mileage)
 - Accidents mode differ from younger drivers



The cognitive Challenge (2/3)

- But over risk of death and injury in accidents
- How far can we develop a consistent decision strategy for GPs giving aptitude to drive ?
 - Individual approach needed
 - Aptitude decision based on compensatory mechanism rather than cognitive disability
 - Little competencies given to GPs

ROAD ACCIDENT	R.
Overmortality for persons aging over 75	Inc.
Pedestrians	4,75
Car passengers	1,28
DRIVERS (vs 18-74 ans)	0,79
DRIVERS (vs 35-74 ans)	1,09
ALL USERS	1,25

The cognitive Challenge (3/3)

- **'Pathological' Aging** is impairing cognition much faster (degeneratives diseases)
 - Parkinson disease
 - Alzheimer disease (1.9% persons over 65)
 - Cumulated data: all pathologies may represent 19% of persons over 75

- Compensatory mechanisms are limited
 - Low metacognition on impairment
 - Low self corrections
 - Objective over risk of accident

- How far can we develop a consistent decision strategy for GPs giving aptitude to drive ?
 - Diagnosis is not a solution for removing aptitude



Walking for seniors

- A basic need
- Older people account for nearly half of pedestrian fatalities (53% in France)
- Handicap of aging people
 - Sometimes good effort and laying to help aging people walking safely in the street
 - But usual short and high risk transitions in the journey of the aging person
 - Crossing sections
 - Road work



Social Challenges

- Driving has long been considered as the main issue
 - Medical issue, aptitude to driving
- But Access and Mobility in public transportation is as important as driving
 - Access to public transportation
 - Time table, availability of means
 - Pedestrian transitions between two modes
 - Pedestrian and soft mode transportation
 - Social organization and social consistency
 - Why proposing a rendez-vous for aging people at rush hour?
 - Finalize route/days/hours of service
 - Assistance of social workers, Taxis, Swedish models
- Considerable research needed

Access to new technology

- New technology is invading the modern environment
 - Ticket dispensers
 - Telephones with guiding capacity
 - Electronic displays

- Handicap of aging people
 - few good design in transportation for older persons' specific abilities
 - Fear of failure, renunciation of mobility



Conclusion (1/2)

- Is there an increase risk of having accident :NO
- Is there an increased risk of injury or death : YES
- Is driving the main safety problem : NO
- Is walking the main safety problem: YES
- Is Road safety the main problem of aging and transportation : NO
- Mobility and access as main problems : YES



WHAT TYPE OF RESEARCH?

- HUMAN SCIENCES
 - LIFE SCIENCES
 - SOCIAL SCIENCES
 - ECONOMICS
 - ENGINEERING
- THE NEED FOR A MULTI-SPECIALITY APPROACH

Safety Vs System Resilience



- Safety

- Capacity building of avoiding accidents
- Actions : System organization, training, ruling and monitoring compliance

- Résilience

- Capacity building of resisting to unanticipated degraded conditions. Unstable systems
- Actions: Training to autonomy, capacity on on line adaptation, local assistance



Conclusion (2/2)

SAFE MOVE

SAFE MOVE for older drivers

- Priority goal of PREDIT IV : maintaining access and mobility
- Avoid Jack-in-the-box solutions
- Postponing cognitive impairment and isolation
 - Medical challenge
 - Social challenge (isolation)
- Developing specifics
 - Training and education, including GPs and relatives
 - Global ergonomics
 - Common tools for specifics use
 - Global design (transitions, vehicles)
 - Global information for dedicated targets
 - Global territories for leaving
 - Social consistency
 - Assistance

Predit IV: Researches on Aging and Transportation

Titre de la recherche	Auteur	Organisme	Autres partenaires	Financeurs	Date de démarrage	Date de fin	Remarques
MG-CogCAPA Détection, en médecine générale de troubles cognitifs pouvant altérer la conduite auto chez les personnes âgées	Laumon B.	IFSTTAR	CNRS	ANR	juillet 2007	2012	
Projets de vie et de mobilités durables pour bien vieillir dans les territoires en 2030	Kaplan	FING		DRI	2009	été 2012	C. Espinasse mb du projet
VOLHAND – VOLant pour personnes âgées et/ou HANDicapée : Direction Assistée Electrique Personnalisée adaptée au conducteur à mobilité réduite	Pudlo P.	Université de Valenciennes	CHRU Lille ; Fondation Hopale ; GIPSA ; INRETS ; JTEKT R&D	ANR	octobre 2009	avril 2013	
Le renoncement aux différents modes de transport collectif, de la part de Parisiennes et Parisiens âgés	Espinasse C.	-	-	DRI	nov. 2010	nov 2012	
Communication, information, billettique dans les transports collectifs : quelles conséquences sur l'usage par les populations âgées ?	Jeannenot M.	Mobhilis	Université de Rennes, AGIR	DRI	janvier 2011	janvier 2013	présenté à Deufrako Strasbourg mai 2012
MAPISE. La marche à pied pour les séniors : un mode de déplacement « durable » ? Pratiques, contraintes, accessibilité et exposition au risque d'accident	Huguenin-Richard F.	CNRS	IFSTTAR, INRS	DRI	janvier 2011	janvier 2014	présenté à Deufrako Strasbourg mai 2012
Ageing & SPAtial Memory (ASPAM). Vieillesse & Mémoire spatiale : évaluation et compensation des déficits en conduite automobile	Dufour A.	Université de Strasbourg	Centre de réadaptation fonctionnelle de Mulhouse, Renault	DRI	janvier 2011	janvier 2014	présenté à Deufrako Strasbourg mai 2012
SAFE MOVE for older drivers	Marin-Lamellet C.	IFSTTAR	Continental, Peugeot Citroën, CNRS, INSERM, Oktal	ANR	décembre 2011	mai 2014	
VOIESUR : Véhicule Occupant Infrastructure Etudes de la Sécurité des Usagers de la Route	Chauvel C.	LAB	Cete Rouen, Ceesar, Ifsttar	ANR	janvier 2012	janvier 2015	