Field Operational Test of Intelligent Speed Adaptation, Following Distance Warning and Seatbelt Reminder Systems: Methods and Findings from the Australian TAC SafeCar Project

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TAC SafeCar Project

- First Australian FOT of Advanced Driver Assistance Systems (ADAS)
- Started June 1999; finished August 2005
- 3 project partners:
  - Transport Accident Commission of Victoria (TAC)
  - Monash University Accident Research Centre
  - Ford Motor Company of Australia
Aims

- evaluate technical operation of three ADAS technologies – ISA, FDW and SBR
- evaluate driver attitudes to and acceptance of these technologies
- determine impact of technologies on driving performance - separately and together
- estimate safety and other benefits
- ultimately, stimulate societal demand for ADAS
Phases

Phase 1. Identification of candidate ADAS technologies likely to have large safety benefits.

Phase 2. Fitment and pilot testing of ADAS technologies identified in Phase 1 to two pilot vehicles.

Phase 3. Equip 15 Ford passenger cars with Intelligent Speed Adaptation, Following Distance Warning, and Seatbelt Reminder systems.

Phase 4. Run FOT and associated simulator study (on ISA effectiveness)
Final Reports


Available: www.monash.edu.au/muarc/reports/rpts06.html
Journal Articles – So Far…


Phase 4 FOT: Overview

- 15 ADAS-equipped Ford vehicles – SafeCars
- 9 corporate car fleets from in and around Melbourne
- Participants: 23 car fleet drivers aged 25 to 64 years
- Each participant drove a SafeCar for 16,500 kms
- Equated to approx 5 months driving per driver
SafeCar Display and Support Systems

- Following Distance Warning + audio warning
- Seat Belt Reminder + audio warning
- ISA + upward accelerator pressure
- Reverse Collision Warning audio warning
Intelligent Speed Adaptation

Following Distance Warning
+ audio warning

Seat Belt Reminder
+ audio warning

ISA
+ upward accelerator pressure

Reverse Collision Warning
audio warning
Following Distance Warning

- + audio warning
- ISA
  - upward accelerator pressure
- Reverse Collision Warning
  - audio warning

Seat Belt Reminder
Seat Belt Reminder

Following Distance Warning + audio warning

ISA + upward accelerator pressure

Reverse Collision Warning audio warning

Seat Belt Reminder
Participants

• **Treatment Group:**
  – 14 males & 1 female
  – Mean age: 43.7 yrs (SD= 8.5)

• **Control Group:**
  – 7 males & 1 female
  – Mean age: 44.5 yrs (SD= 9.23)
Phase 4 FOT: Design

- 15 Treatment participants
- exposed to all 3 ADAS – ISA, FDW and SBR

Diagram:
- Familiarisation 200 km
- Before 1 1,500 km
- During 1 3,000 km
- After 1 1,500 km
- During 2 3,000 km
- After 2 1,500 km
- During 3 3,000 km
- After 3 1,500 km

ISA or FDW or Both
ISA or FDW or Both
ISA or FDW or Both

SBR & RCW
Phase 4 FOT: Design

- 8 Control participants
- exposed to SBR only

- SBR & RCW

- Control 1
  - 1,500 km
- Control 2
  - 15,000 km
- Familiarisation
  - 200km
Conclusions

- ISA, FDW and SBR all had a positive effect on driving behaviour.

- But these effects did not persist when the systems were turned off.

- The speed reduction effects of ISA were more pronounced when ISA operated in conjunction with FDW – but not vice versa.
Lessons Learned

Activity 1: Convene teams/people
- don’t let sponsor co-manage FOT – complicated, timely and costly
- Choose contractors with backup
- Keep steering committee in the loop
- Over-resource rather than under-resource

Activity 2: Aims, objectives, research questions etc
- Talk a lot with people who have run FOTs

Activity 3: Develop project management plan
- Budget more money and time than you think necessary
- Bring on side those who can’t see the point of FOTs
Lessons Learned

Activity 4: Stakeholder communication
- We underestimated media interest
- Didn’t anticipate requests for early data

Activity 5: study design
- Didn’t anticipate cut in project size
- Too many questionnaires
- Keep questionnaires simple, and relatable to logged data

Activity 7: select/obtain vehicles
- Much easier to use production systems in production vehicles
Lessons Learned

Activity 8: obtain systems and functions
- Selecting, sourcing and procuring systems very time consuming

Activity 9: Data collection and transfer
- Too much driver involvement eg flash cards
- Not enough computer grunt for boot up and system operation
- Not enough spare parts in stock

Activity 11: Equip vehicles with technologies
- Not all systems operate identically across vehicles
Lessons Learned

Activity 12: Driver feedback systems
- Fuel dockets – terrible problem

Activity 13: Data storage and management
- Didn’t decide early what to do with post-project data

Activity 14: Acceptance testing
- Lots of flat batteries
- Corrupted flash memory cards over time

Activity 15: Recruitment strategy
- Company drivers a nightmare to recruit and keep
- Women MUCH harder to recruit than men
- Hard to adhere to ethics requirements for company drivers
Lessons Learned

Activity 16: develop driver training and briefing materials
- Very time consuming!!

Activity 17: Pilot testing
- Not long enough to reveal some problems

Activity 18: Run FOT
- Don’t assume that systems are working and recording data
- Drivers need regular reminding and follow up if you want them to do things for you
Lessons Learned

Activity 18: Run FOT
- Automate subjective data collection if possible eg use internet

Activity 19: Data Analysis
- Run reality checks on data regularly to ensure they are “clean”
- Sponsors may want supplementary analyses done

Activity 20: Write minutes and reports
- Don’t allow sponsor review of final deliverables to drag out
Lessons Learned

Activity 21: Disseminate Findings
- Sponsor delayed dissemination
- No funding left for major EC-style workshop

Activity 22: Decommission FOT
- Lost momentum at end – took a while to implement recommendations. Not enough lobbying.
Conclusion

- FOT was ahead of its time in Australia
- But plenty of ISA activity now in Australia
- Most new Australian cars equipped with SBRs
- ISA high on political agenda, and society now ready for it