Intelligent Speed Adaptation
The Past, Present and Future of driver assistance

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What is ISA?

* technology to:
  * advise on
  * voluntarily control
  * mandatory control
  * the speed of your vehicle

It does not track you or log you or report you to big brother – it is a choice whether you use it, a private decision that you make.

I DO NOT WANT ANYONE TELLING ME HOW FAST I CAN DRIVE MY VEHICLE.
why bother?

* improvements in safety
  * up to 42% reduction in fatal crashes in some scenarios¹

* improvements in fuel efficiency
  * up to 10% (calculated), 5% realistically possible

* less chance of getting a speeding ticket

* more uniform traffic flow leading to less congestion

¹DFT/Leed University ISA Investigation
can you build a system which can:

(a) tell the driver that they are exceeding the speed limit

and….

(b) intervene to reduce the speed of the vehicle if they don’t move back into compliance

…..with acceptable accuracy?
…..which users will embrace?
/technical challenges

* matching map data against roads in a 3D environment with limited positional information
* actively managing the speed of the vehicle
* presenting a simple, intuitive and non-distracting user interface
* collecting map data with sufficient accuracy
* updating on-board map data in real time

.....and several others.
/a bit of history…

*2004: Belonitor
* speed monitoring and tail gating

*2006: ISA demonstration system
* road safety awareness

*2008: Transport for London ISA trials
* advisory and voluntary ISA

*2009: Gallileo Speed Warning (GSW)

*2010: Dutch Ministry of Infrastructure
* speed monitor and speed lock
the MobiBoxx
devices deployed across the TfL fleet

* Initially 26 vehicles
* mixed fleet (car, taxi....)
* interest from Boroughs
* good response from press
* recurring concerns appearing
  * big brother
  * taking control of the vehicle
* General feedback; The technology works, but the jury is out on the desirability the function
Community of habitual speeders
Implement voluntary and mandatory ISA

Multi-stage process;
– Observe ‘normal’ behaviour
– Introduce system and observe change
– Observe changes after system removal
Kandidaten melden zich voor snelheidsslot in auto

Zo werkt het snelheidsslot

1. GPS-satelliet geeft positie door aan ontvanger in auto.
2. Computer stelt vast wat de toegestane snelheid in het gebied is.
4. Wordt dit genegeerd dan besluit systeem in te grijpen en kan er geen gas meer worden geven.

Martijn Hurks van flitservice.nl, de website die zich al jaren verzet tegen de ‘overdreven jacht op automobilisten’;

VEILIGER
Hoeval het premie-effect op de snelheidsslot zorgvuldigheden van de Stichting Weerbaar Onderzoek Verkeer (SWOV). "Als het systeem dwingend is, dus gij knop erop." Toch noemt de SWOV hier geraadpleegde nauwekeurigheid om de automobilist overal te wijzen op de snelhardslimiet en om eventueel in te grijpen. "We gebruiken dan nuwkeurige kaarten voor vertelt Femke Terpstra van

Nieuw systeem beïnvloedt maximum snelheid

Binnenkort wordt tijdens een proef een systeem geïntegreerd automobilisten die vaak te hard rijden, adviseert en beïnvloedt om zich te houden aan de maximum snelheid te houden.

Het systeem, dat is ontwikkeld door Technolution, bestaat uit een adviseur en aanpassingsmodus waardoor "Snelheidsslot" alleen de maximale snelheid op het display nooit als advies en bij het herhaaldelijk verzuimen van de maximale snelheid na de hulp van de Stichting Weerbaar Onderzoek Verkeer (SWOV). "Als het systeem dwingend is, dus gij knop erop." Toch noemt de SWOV hier geraadpleegde nauwekeurigheid om de automobilist overal te wijzen op de snelhardslimiet en om eventueel in te grijpen. "We gebruiken dan nuwkeurige kaarten voor vertelt Femke Terpstra van

Again...
Case

* Start: July 2010
* Repeat offenders: hand in drivers license, or…

* Speed Monitor and Speed Lock
  * Smart monitoring algorithm limits speed for set, or indefinite, period of time, to allowed speed limit

* Digital maps have specific attention
  * Provinces of North-Holland and South-Holland
  * Smart map updating functionality

* April 2011 start of six month trial with 80 vehicles
  * All types and kinds
  * Candidates were selected with €300 cash reward
  * 2 month observation, 3 month with system, 2 month post-trial observation
  * User survey, acceptance survey, interviews, experiments
* 500+ applications!
* Many dropouts (not a notorious offender, never in the covered area, no license, no car or lease car, on vacation, no electronic accelerator, rather not, etc….)
* 57 participants (51 to for whole duration)
* Representative but the offending business driver is overrepresented

* During pre-trial;
  * 4% of distance travelled 20-50km/h too fast by 23 participants from the 57.
results

* Magnitude and extent of speeding considerably reduced
* Other primary indicators also improved
* Effect slightly larger on ‘notorious violators’

* Frequently use the emergency override
* Users pay little attention to speed warnings and frequently enter the ‘lock’ state
* Positive impact on other behavioral factors (aggression, racing etc.)
* Reduced fuel consumption

* Other road users tailgate more
* Conflict at low/unrealistic speeds
* Encourages more overtaking maneuvers

* Up to 36% (advisory) or 47% (mandatory) reduction in the risk of fatal incident.

² From NVC2012 Paper 64
and into the future...

>the right development
The CARAT Stick

Carats: 1325
Hitrade: 75%

Absolute CARATS earned

LCD Backlight changes colour if user is earning CARATS

CARATS Earned as a percentage of maximum available

General HMI Button

Graphical representation of CARATS earned percentage

Please Drive Carefully Through our Village

and you’ll be entered into our monthly prize draw
What is an Electronic Horizon? (a)
What is an Electronic Horizon? (b)

1. Find current position
2. Find all possible paths
3. Calculate probabilities

**Electronic Horizon**

4. Starting from current position, follow highest probable path

**Most Probable Path**
Four levels of support to a vehicle driver

Intervention
- electronic stability control
- autonomous cruise control
- lane departure warning
- collision avoidance

Inform
- travel times
- traffic jams
- (location & lengths)
- weather
- obstructions

Warn & Advice
- traffic conditions
- conditions road surface
- weather conditions
- route guidance
- speed alert
- driving & rest times

Instruct (directive)
- traffic control at intersections and junctions
- dynamic speed limits
- opening / closure of traffic lanes, hard shoulder, and so on
- diversions

Service Provider

ADAS  ←  IVIS  ←  ATM

Traffic Manager

ADAS: Advanced Driver Assistance Systems
IVIS: Intelligent Vehicle Information Systems
ATM: Advanced Traffic Management Systems
/CCC, an integrated speed, headway and lane use advice

- Vehicle dynamics
- Direct surroundings (e.g. 2 km)
- Regional network

- Enhanced positioning
- GNSS
- (Vehicle sensor data)
- Intelligent camera
- Current speed limit from traffic sign
- Speed advice based on local traffic situation
- eHorizon
- Speed advice based on oncoming road geometry and speed limits
- Dynamic maximum speed
- CCC Service Centre
- Traffic Management Centre
- Speed, headway and lane use advice
- Dynamic maximum speed
Vehicle detection in adverse weather conditions
If you want to improve your fleet drivers safety, we can help.

> the right development

/ thanks for listening