An Innovative Approach to Enhancing Driver Performance, Monitoring and Feedback with Cellular and Cloud Based Technologies

Background:
- Two high priority goals for fleet safety management are:
  - Effective real time driver performance data
  - Isolating the driver from the use of talk and text on cell phones
- This presentation outlines an innovative approach to addressing both priorities in an applied business model – addressing safety, efficiency and environmental impact.

Can we harness the foe??
- Smartphones are becoming ubiquitous
- The dangers of talking/texting and driving are clear and serious
- Education and policing have limitations
- Can we harness the enemy to advance and enhance road safety???

Convergence of Technologies
Integrated Business Solution
Combining innovative smartphone technology to drive safety behaviour change
Innovative and cost effective solutions for driver and vehicle efficiency, safety, and minimal environmental impact across the automotive vehicle spectrum.

OK, so this is in total contrast to current ethos of the relationship btw cell phones and vehicle safety

Lean performance data capture – what matters?
- Whilst there are numerous fleet telematics platforms that capture extensively detailed information – a goal of this project was to identify lean data capture and basic driver performance profiles in a cost effective and technology efficient manner
Introduction

- Pilot study of preliminary implementation of a real-time driver behavior monitoring & feedback.
- Uses a smartphone integrated e-platform with scope to be configured to:
  - Capture real-time two-way vehicle operations data
  - Enhance Intelligent Speed Adaptation (ISA),
  - Also simultaneously remove driver distraction from routine mobile phone calls and texting.

Data terminal features

- The smartphone is capable of detecting:
  - Vehicle motion and speed via both the accelerometer and changes in GPS and GPRS location
  - Has the capacity to identify harsh braking
  - Software configuration can also disable the use of texting and non-emergency calls whilst the vehicle is in motion.

Two way system

- End User terminal - smartphone is configured with a downloadable software application (app) with telematics Global Green Drive (GGD).
- GGD operates via an e-platform integrated with GPS and GPRS, and capable of immediate auditory driver feedback.
- Fleet analyzed for real-time driver performance data for fleet management oversight.

Data Entry Key Issues

- To be completed ONLY before trip commences and after end of trip.
- ONLY whilst vehicle is stationary.

Closed loop system

Driver feedback to gg drive TM scorecards, messages, training.

GPS to locate & GPRS to communicate

Driver controls gg drive TM or installed hardware to provide data

Management System

gg drive business application TM records, analyses & actions data in real time.
Example scorecard of comparative driver performance from the ggdrive business application.

The scorecard is created using telematics data from dedicated on-board telematics device and is presented in traffic light format against benchmark and set targets.

Example trip trace from the ggdrive business application.

This trace is automatically created using GPS data sent from gg drive and can be used to analyse speed, distance, acceleration (deceleration), and time during the trip.

### HTC
- Windows/Android based touch screen device
- GGD application installed
- Co-Pilot Sat Nav installed

### Installation
- Drivers provided with standard goose neck holder
- Power lead provided.

### Challenges
- Getting used to a touch screen phone (mini computer)
- Making sure the power lead is plugged in
- Getting a GPRS signal to connected to the system.
- What is an application, what can the device do

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**Front end Driver smartphone interface**

**Integration of driver and vehicle and asset management**

- Harsh Acceleration & Harsh Braking
  - Where (shown on map)
  - Change parameters

- Speed
  - Actual speed displayed
  - Link to parameters

**Last nights shuttle ride**
The analyzed system data that sits behind each Trace Assessment

GGD Data Capture
- Real time
- Key details
- Photographs
- Details on application

Business System
- Individual records linked to drivers and vehicles
- Action planning and assignment
- Attachments e.g. photos

Reports
- Launch accident reporting process
- Export to Excel for manipulation
- Scorecard or crystal reporting

GGD Smartphone views

Driver’s Individual performance against company set performance targets in the system
- Needle points to individual driver performance against targets
- Green area represents the difference between standard and stretch targets
- Goals can be varied by region, market, team as required
- Performance is updated and presented in real time.

2010 UK pilot
The Phase I pre-implementation data – Rainbow Trust (Child Hospice care outreach)
- Total number of trips fully completed in the system >2000 trips
- Drivers a pool of 23 people
- 21 of these people are female and 2 male, across the UK approximately 50% in the North and 50% in the South
- Data captured over a 5 month period

Driver profile
The driver cohort were:
- All were health care providers
- Non professional drivers
- Predominantly Older
- Predominantly Female
- Technophobes/Technologically inexperienced

Outline
- Preliminary pre-implementation evaluation data captured as quality assurance (QA) data for a 6 week period
- To identify rectifiable operational and implementation issues
- Demonstrate user functionality for non-professional drivers, device stability and performance on a range of diverse mobile phone handsets and environments.
3 Phase Study

These data are initial data part of a 3 phase cohort study:
- Phase I – capturing vehicle distance travelled and speeds in excess of limits without real time driver feedback and harsh braking
- Phase II – Disabling texting, non-emergency features whilst the vehicle is in motion
- Phase III - Implementation of auditory driver feedback alerts and messages.

Outcomes for harsh braking and other incidents for Phase I has been analyzed and pre-implementation and preliminary data for those drivers from Phase I are presented in this study.

Outcomes for any reductions in speed violations is currently being analyzed

Phase II and III are to be implemented

Harsh Braking thresholds

- The default setting for both Harsh Braking and Harsh Acceleration threshold is 4.4 m/s².
- 4.4m/s² is considered to be the level that ABS starts to kick in. Harsh braking data was captured based on this threshold.
- Automated messaging and performance feedback for Phase II will be based on these criteria.

All decelerations per 1,000 miles

Harsh Braking per 100 trips
### Phase I Data

<table>
<thead>
<tr>
<th>Driver</th>
<th>Total distance (Miles)</th>
<th>Total number of trips</th>
<th>Harsh breaking &lt; -4.0</th>
<th>Severe Harsh breaking &lt; -4.6</th>
<th>Breaking/1000 Mile</th>
<th>Harsh breaking/1000 Mile</th>
<th>Severe HB/1000 Mile</th>
<th>Harsh HB/Trip</th>
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</table>

### Limitations
- Small pilot
- Not professional drivers
- Preliminary implementation
- Phase II and III - Routine cell phone use disable feature, and Real time ISA yet to be implemented

### Discussion
- Lean platform – app driven, minimal infrastructure required
- Cost effective requiring no vehicle retrofit or hardware
- Rapidly and easily updated not fixed to the vehicle
- Conceptual obstacles to the consideration of use of a smart phone as a safety tool
- Phase II and III has scope to assist in addressing a key and crucial road and fleet safety hazard

### Summary
- The preliminary data has demonstrated that it is possible to monitor fleet safety performance with a software application on a standard smartphone as a data terminal device
- Harsh braking data alone maybe a valuable near miss safety tool
- Scope for Phase II and III ISA driver feedback implementation and to simultaneously remove driver distraction from mobile phone hazards

### Thank you!

Any Questions??

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www.objectivesafety.net
Harsh acceleration was closely correlated to harsh deceleration

Preliminary end-user operations issues and solutions
- Constant power source
  - Phone needs to be plugged in (via cigarette lighter outlet) all of the time
- Getting a connection
  - App modified to cache data at the start of a trip and send the data next time it gets a signal
- Time it takes to get into the app from phone start up
  - Modified the app for “quick start”
- Less than 50% of users used a cradle to hold the phone whilst in trip
  - Using a cradle to hold the phone at all times whilst the vehicle is in motion

Realtime mapping from London for 2.5hr of a trip of attempting to park in NYC after a snow storm and whilst ‘Law and Order’ filming was underway