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Optimizing driver performance monitoring and feedback: An innovative approach utilizing a global mobile interactive e-platform

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Conflict of Interest Disclosure

- Objective Safety and the EMS Safety Foundation are assisting Telematicus with gratis pilot sites and infrastructure for evaluation of this technology in the EMS and mobile health care environment

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To quote this morning's excellent presentation by Ian Faulks

Encouraging the use of in-vehicle safety technologies

- Need to establish a business case for encouraging or supporting vehicle safety technologies – assess these factors:
  - Trauma reduction
  - Technical readiness
  - Regulatory & organisational hurdles
  - Infrastructure and data needs
  - Potential growth through government initiatives
  - Costs
  - User acceptance

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Background:

- Obstacles faced in attempting to implement purely safety fleet technologies
- Business case for safety alone is a hard sell to industry
- Fleet Management Tool, linking:
  - Safety
  - Environmental Impact
  - Efficiency
- Two way technology

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

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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???

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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

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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.

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- The smartphone devices and e-platform were implemented initially in pilots in small fleet settings in 5 countries, UK, USA, Ireland, Switzerland and Australia.

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Integrated Business Solution

Combining innovative smartphone technology to drive safety behaviour change

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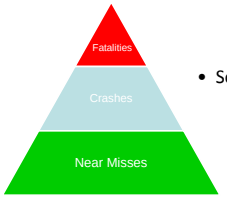
Pilot Associates – 20 Countries

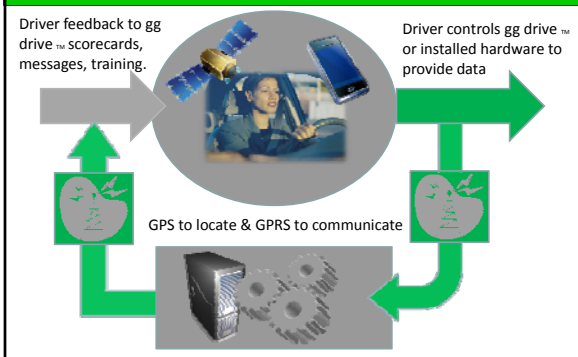
Focus **global green drivers**



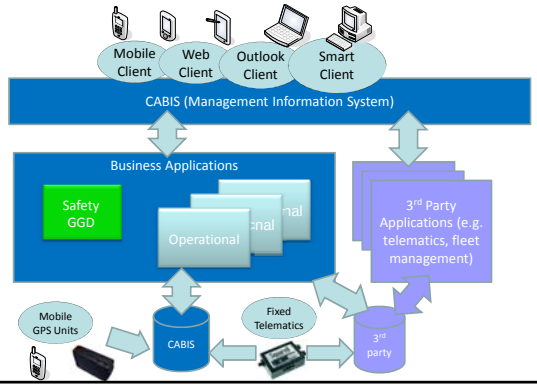
- "Drivers rather than vehicles"
- Holistic approach to driver behaviour change
  - safety, environment, efficiency
  - The roots of the tree "near misses"
- Business approach
  - expenses management
  - continuous loop system
- Software technology
  - enterprise business system
  - proprietary phone & business applications
  - Real time data gathering and feedback

Two way system

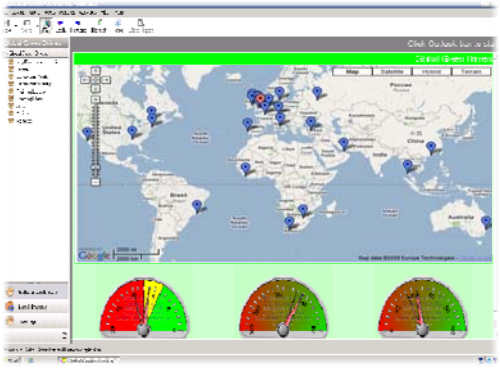
- End User terminal - smartphone is configured with a downloadable software application (app) with telematics Global Green Drive (GGD),
- GGD operates via an e-platform integrated with GPS and GPRS, and capable of immediate auditory driver feedback
- Fleet analysed for real time driver performance data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



gg drive business application ™ records , analyses & actions data in real time



Fleet Management Screen

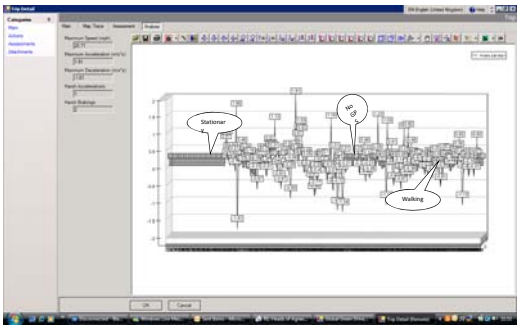


Example of Trace Assessment in GGD System - Map View

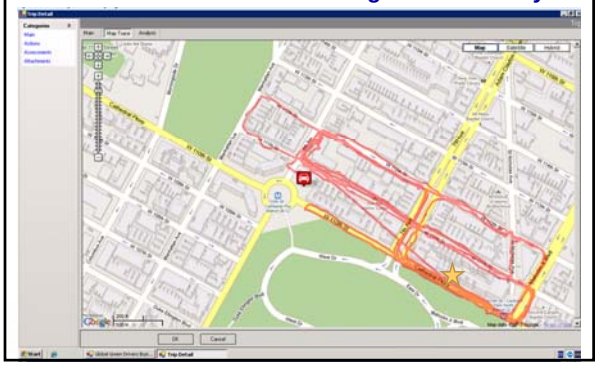
Location - Pisa Airport - Italy

- Mode of Transport
  - Bus from Car Hire Depot to Drop off at Terminal Bus Stop (D), walking on foot to the Terminal Building
- Assessment
  - This is a low speed trace (bus and walking) and the max speed was 20MPH, with a max acceleration of 1.91 m/s2 and a max deceleration of -1.81m/s2
  - These a low thresholds as the default setting we use for both Harsh Braking and Harsh Acceleration is 4.4 m/s2

The analysed system data that sits behind each Trace Assessment



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



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.

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End User Instructional Path

- "Learn"
  - All Trips recorded (start trip/stop trip)
  - 2,000 Trips collected
  - Alarm Active
- "Guide"
  - Speed feedback activated
  - Driver Clinics
  - Automated Application update
- "Sustain"
  - Messaging
  - Incident Management
  - ISA

3 Phase Study

These data are pre-implementation 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.

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- Outcomes for harsh braking and other incidents for Phase I has been analysed 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 analysed
- Phase II and III are being implemented

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2010 UK pilot

The Phase I pre-implementation data – Rainbow Trust (Child Hospice care outreach)

- Total number of trips fully completed in the system >1400 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.

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Pilot Group

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- North
  - Managers taking the lead
  - Wide region
  - Kendal, Durham & Manchester
- South
  - Managers taking the lead
  - Local clusters
  - Surrey, Swindon, London
- Challenges
  - Phone reception in the North West (20 miles from GPRS)
  - Travel around airports in the South (Heathrow)
  - Application updates

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Management Calibration

- Management Calibration - (5th Jan) - Senior Management Team+ - 12 people - full day
- Driver Clinic - (17th June) - Northern Mgt Team - (all users) - 2.5 hours
- Driver Clinic - (30th July) - Southern Mgt Team - (all users) - 2.5 Hours

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Driver profile

The driver cohort were:

- All were health care providers
- Non professional drivers
- Predominantly Older
- Predominantly Female
- Technophobes/Technologically inexperienced

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Data Entry Key Issues

Data entry

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

GGD views

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GGD views

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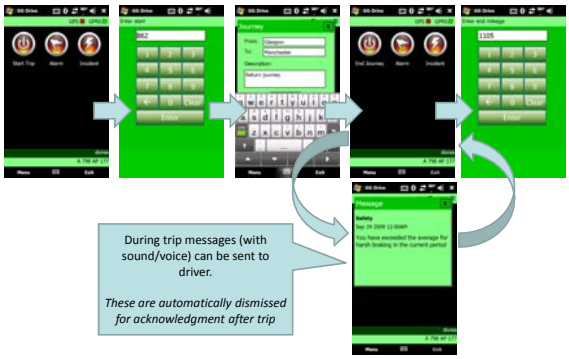
If the Alarm is raised on the phone then automatically SMS messages and emails are sent to nominated people. The SMS messages links to the GPS position where alarm raised. During Pilot (one test) no incidents of alarm being raised (have never been in 20 years of org)

gg drive™ views

global green drivers



gg drive™ views

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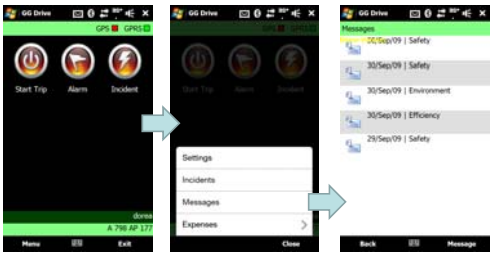

Review and acknowledgement of messages using the application whilst not driving

GGD views

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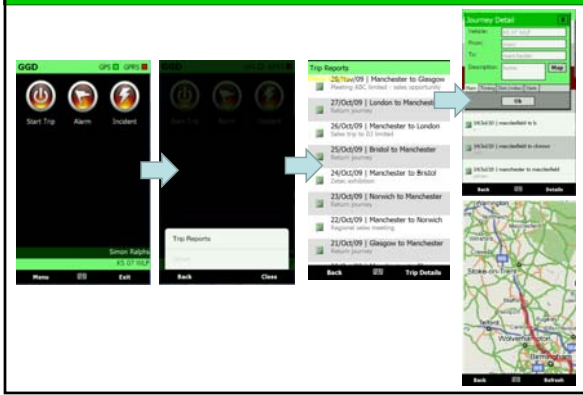

GGD views

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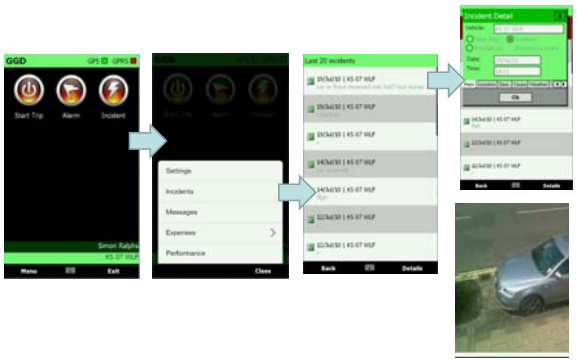

GGD views

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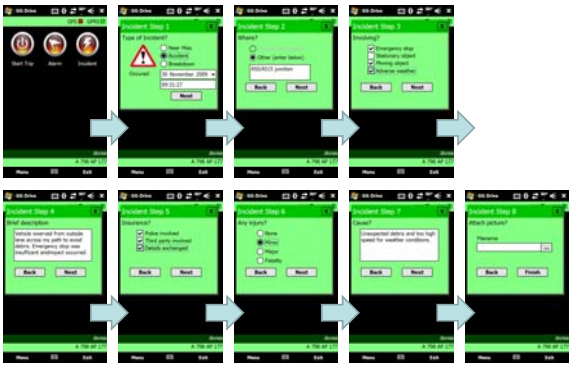

GGD Smartphone views

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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.**

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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

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How did the UK pilot drivers perform??

Name	Total distance (Miles)	Total number of trips	Distance per Trip	All Breaking < 0.0	Harsh breaking < -4.0	Severe Harsh breaking < -4.6	Breaking/ 1,000 Mile	Harsh breaking/ 1,000 Mile	Severe HB/1,000 Mile	Break/Trip	Harsh breaking/ 100 Trips
Driver 9	11,972	194	62	16,066	25	16	1341.96	2.09	1.34	83	12.89
Driver 2	12912	394	33	5,217	19	7	404.04	1.47	0.54	13	4.82
Driver 11	7,433	136	55	5,164	7	5	694.74	0.94	0.67	38	5.15
Driver 10	5,733	96	60	2,169	5	1	378.34	0.87	0.17	23	5.21
Driver 6	6939	261	27	9,254	6	3	1333.62	0.86	0.43	35	2.30
Driver 8	2,365	47	50	768	2	1	324.74	0.85	0.42	16	4.26
Driver 1	9179	144	64	9,972	7	3	1086.39	0.76	0.33	69	4.86
Driver 13	7,337	321	23	2,000	5	4	272.59	0.68	0.55	6	1.56
Driver 4	7,556	164	46	1,463	4	1	193.62	0.53	0.13	9	2.44
Driver 3	9,479	231	41	2,394	5	2	252.56	0.53	0.21	10	2.16
Driver 12	5,497	63	87	1,516	1	1	275.79	0.18	0.18	24	1.59

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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.

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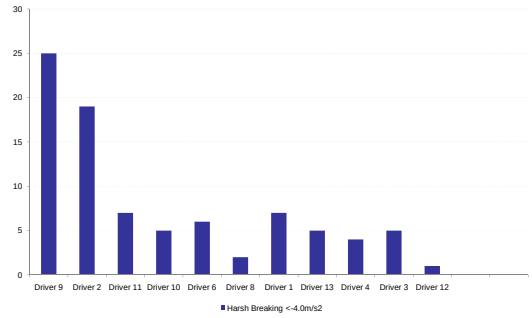
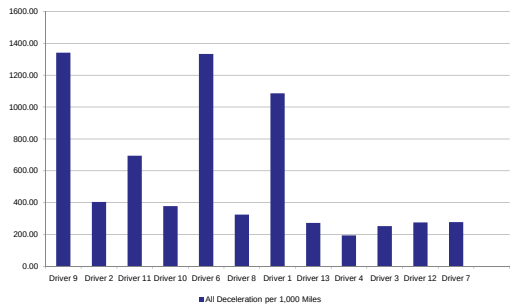
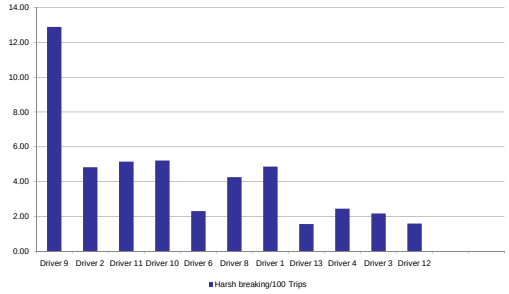
Episodes of Harsh Braking



All decelerations per 1,000 miles



Harsh Braking per 100 trips



Discussion

- Fleet performance data capture can be achieved by use of a smartphone terminal
- Technologically unskilled and non professional drivers can effectively manage the invehicle data smartphone terminal
- There is a wide spectrum of driver performance in harsh braking alone
- Harsh braking data alone maybe a valuable near miss safety tool

Limitations

- Small pilot
- Conceptual obstacles to the consideration of use of a smart phone AS a safety tool
- Preliminary implementation
- Phase II and III - Routine cell phone use disable feature, and Real time ISA yet to be implemented

To address the challenges outlined this morning by Ian Faulks…

Impediments to in-vehicle safety technologies

- Despite the promise of these technologies to improve road safety and reduce road trauma, there are impediments to their implementation, including:
  - Unproven technology - particularly "fail safe" issues;
  - Lack of infrastructure provision to support a technology;
  - Cost;
  - Availability for a wide range of vehicles;
  - User acceptance;
  - Lack of understanding of potential road safety benefits by consumers and decision makers;
  - Legal issues such as radio spectrum allocation;
  - Tax and insurance disincentives

Promising aspects

- Unproven technology - preliminary data promising
- Lack of infrastructure provision to support a technology
  - Minimal Infrastructure required - Lean platform – app driven
- Cost - Is highly cost effective requiring no vehicle retrofit or hardware
- Availability for a wide range of vehicles - Not relevant!!
- User acceptance; & Lack of understanding of potential road safety benefits by consumers and decision makers;
  - Needs focused education
- Legal issues such as radio spectrum allocation; - N/A
- Tax and insurance disincentives - An important implementation strategy
- ASSISTS IN ADDRESSING A KEY AND CRUCIAL ROAD SAFETY HAZARD

Summary

- There has been acceptance of the technology and the pilot project by the majority of the participants
- 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
- Scope for Phase II and III ISA driver feedback implementation and to simultaneously remove driver distraction from mobile phone hazards

Thank you!
Any Questions??

a .pdf handout of this presentation awaits you online at:

www.objectivesafety.net

Resources/Presentation Handouts