Suna Traffic Channel

Overview
Overview of Suna Traffic Channel

Suna Traffic Channel is taking Australian vehicle navigation and driver convenience to a new level.

Suna Traffic Channel is an affordable automotive grade service that helps motorists avoid unexpected traffic congestion, enables the freight and logistics sector to schedule more effectively, and brings traffic to web sites and mobile phone services.

*Electronic Traffic Avoidance is being rolled out across Australia.*

A standards-based approach - TMC

In an Australian first, Suna Traffic Channel will offer a traffic-feed compliant with the International Standard ISO 14819¹ (TMC). Suna Traffic Channel is engineered ready to plug into any TMC-compliant navigation, logistics or mapping system.

Traffic is frequently most useful in combination with navigation systems (or related technologies like mapping and logistics engines), so Suna Traffic Channel is designed as an ingredient for best of breed 3rd party applications.

There are three distinct elements to the Suna Traffic Channel solution:

- The Suna Traffic Channel Content
- The Suna Traffic Channel access method
- The end-user device or user-interface

Content

At the heart of the Suna service is traffic information encoded using the Traffic Message Channel (TMC) standard. TMC encodes a spectrum of dynamic information describing road network conditions.

Access

In another first for Australia, Suna Traffic Channel is being broadcast using the Radio Data System (RDS). RDS-TMC is the technology that already enables millions of navigation systems to receive real-time traffic information across Europe and North America. The huge international popularity of RDS-TMC has ensured that the cost of a plug-in or integrated receiver is minimal.

However Suna Traffic Channel is designed to support traffic information services independent of delivery method. To enable integration with navigation system supporting packet switched data, and other online services, Suna traffic information is also available via an internet-based XML feed.

User interface

Because Suna Traffic Channel is fundamentally a content service, just how traffic information is used and presented to end-users is entirely up to the application developer or navigation device manufacturer. Ultimate flexibility for differentiation and evolution is provided.

¹ Suna Traffic Channel is fully compliant with ISO 14819 - 1, 2, 3 & 6. Suna Traffic Channel utilises an encrypted broadcast signal fully compliant with TMC Conditional Access.
The Australian Challenge
In Australia, the impact of congestion for both motorists and industry is experienced overwhelmingly within our congested urban areas. Road-building is not keeping pace – delay caused by peak-hour congestion is trending upward in all our major cities. Consequently, Intelematics has been focused since 2003 on designing a service that addressed the Australian congestion problem – the urban main road network.

Our approach differs to most international TMC service providers, whose technologies necessitate a focus on inter-city freeway links, with limited coverage of urban corridors. Intelematics’ Suna Traffic Channel TMC traffic service will be optimised for Australian conditions and provide deep urban arterial coverage from launch.

Australian Travel by Road (Melbourne)

Financial Year (ending 30 June)

Source: VicRoads & Transurban

Graph showing necessity of deep arterial road coverage for an Australian traffic service
Is traffic congestion a problem in Australia?
If you travel to work by car in any Australian capital city you probably already know the answer to this question.

The chart below shows the delay experienced by motorists in Australia’s major cities.

The Bureau of Transport Economics has estimated the cost of traffic congestion to the Australian economy was $12.75 billion in 1995 and by 2015 is forecast to reach $30 billion pa. There is no doubt traffic congestion is a serious problem, and getting worse.

A unique technical solution to Australian traffic
Whereas journalistic information (traditional eye-in-the-sky traffic reports) is adequate for radio traffic spots, navigation systems require a real-time view of major incidents and congestion on the entire arterial network in order to provide appropriate urban guidance advice.

The opportunity to provide an affordable urban TMC service in Australia is only possible through the combination of several advanced ITS (Intelligent Transport System) technologies, in particular the traffic light control systems (SCATS & STREAMS)² and specialist traffic flow modelling technology developed by the Australian company Custom Traffic Pty Ltd. Intelematics has been exploring the potential to harness these technologies for several years through a number of tests and pilot projects.

Our most important source of raw traffic flow data is derived from the loop sensor network embedded in the road pavement on the approach to signalised intersections. Virtually all urban (and many regional) signalised intersections are networked to central traffic light control systems in each state. By agreement with the respective road authorities to value-add this data, we are able to develop and drive near real-time link-by-link congestion models.

² SCATS (Sydney Coordinated Adaptive Traffic System) was developed by the NSW RTA, and is used in all Australian states except Queensland. STREAMS is a similar system and is in use in Queensland by the Department of Main Roads (DMR), it is managed by Transmax, a wholly owned subsidiary of Qld DMR. Currently Brisbane City Council use their own BLISS system. Suna Traffic Channel can interface to all these systems.
How Suna Traffic Channel calculates congestion across the urban road network

Diagram of SCATS controlled intersection

This diagram shows a typical SCATS controlled intersection with loop detectors on each lane. The information gathered by these detectors is used to drive the SCATS signal system, the same information is also used by Suna Traffic Channel to provide input into our Travel Time Generator (TTG).

Information within the SCATS system lets us build a model of the road network made up of possible traffic flows at each intersection.

Road Network Model

The diagram at left shows a simple schematic of a section of the road network with intersections 1 to 9. The Suna Traffic Channel - Travel Time Generator (TTG) creates a model similar to this for the entire urban arterial road network.

Each intersection is modelled as shown in the diagram at intersection 6, which is the same as is shown in the diagram above. Using SCATS data and mathematical models developed for Intelematics by the Australian Co., Custom Traffic, a delay or average speed for each link in the arterial road network is created. This occurs continuously at approximately 3 minute intervals.

Freeway and Toll Road data is generally provided via specific sensors in the road that measure speed directly. Queensland data is provided via the STREAMS system, which differs from SCATS in its method of operation.
Travel Time Generator (TTG) Output

The diagram left shows the output of the TTG for two road segments over the majority of a day. It shows a typical weekday profile with slow travel times, congestion, corresponding with the morning and afternoon peaks. It also shows the general trend of a longer peak in the afternoon than in the morning.

TTG output becomes one of the inputs to the Traffic Message Channel (TMC) module. TTG is the prime generator of ‘flow’ data or congestion delay.

The output of a congestion model is only the start of creating a TMC service, and only one of several key information sources used to create the complete traffic service. Intelematics has entered into an exclusive agreement with ITIS, a European leader in TMC technology for the encoding and broadcast component of the Suna Traffic Channel service. By teaming with a European leader in this field we are further minimising implementation effort required by the navigation industry as many organisations will already be working with ITIS in Europe.

Creation of TMC congestion message

The diagram at left shows the creation of a TMC message for a single section of arterial road. Within TMC each major intersection is linked to a specific Location Code. Between two Location Codes a traffic event can be coded, in this case a code indicating traffic flowing at approximately 20kph. The Location Codes are grouped with the Event Code and form the basis of the TMC message transmitted to the navigation system.
In addition to the creation of a delay or congestion TMC Message, Suna Traffic Channel uses operators to input incident data that provides a description of what is causing the delays. Incident data can be information describing vehicle accidents, vehicle breakdowns, road works, and other activities such as floods, signal failures, etc., coded in a similar way to congestion information for transmission.

Suna Traffic Channel is a service that knows the major traffic conditions on all the arterial roads and freeways all the time. This information is sent via a broadcast signal to a navigation unit. This unit then navigates you to your destination calculating the quickest way and avoiding any major traffic jams.

**The traffic service is provided using the following basic steps**

1. Traffic data is collected from a range of sources. Intelematics will be using data from the state road authorities where available as well as other sources such as direct from motorists.
2. This data is processed to produce Flow data or average speed on a road segment.
3. Incident data such as road closures, traffic accidents, snow on road etc is added via our operators.
4. The flow and incident data is then converted into TMC coded messages containing information on the specific traffic event and the location using -
5. Location Codes linked to the digital maps used by the navigation systems.
6. The TMC information is then encrypted and broadcast out as a silent digitally encoded message as part of the normal FM transmission using the RDS standard.
7. Finally it is received by the car or portable navigation unit, decrypted, decoded and used by the navigation unit to calculate the best route from A to B taking the prevailing traffic conditions into account. Alternatively the TMC data can be provided via an XML feed suitable for input to web and wireless applications.

**About TMC**

TMC, the International Standard for digital traffic information services, had its origins in Europe in the mid 1990’s. Since then, TMC services have been
launched across Europe and North America, and are beginning to be seen in Asia. Intelematics is a member of TISA (Traveller Information Services Association), previously the TMC Forum, the body that manages the TMC operating environment.

There are over 5 million TMC users in Europe and more than 1.5m in North America. It is estimated that over two million new TMC users are added every year.

Many Navigation system suppliers have indicated that they will be supporting TMC traffic services in their Australian products, as have both digital map suppliers, Navteq and Sensis.

The following diagram shows the key elements of a TMC message

**TMC - basic elements**

TMC is a very efficient method of coding traffic events & their locations: The core codes are

- Location Codes. These are pre-defined, pre-coded & stored with the digital map in the navigation system with a maximum of 63487 locations
- Event Codes. These are pre-defined and stored in the navigation device with a maximum of 2048 possible event codes

Adopting TMC ensures that traffic-ready navigation hardware and other end-user applications designed for Europe or North America will operate with little or no modification in Australia. As well as enabling rapid deployment of traffic solutions for both vehicle manufacturers and aftermarket products, this approach enables Australian consumers to benefit from the global economies of scale that has rendered TMC an incredibly affordable addition to vehicle and portable navigation platforms. TMC allows near real-time delivery of traffic information directly into navigation systems. This direct input adds a high safety factor as the driver is not distracted by traffic messages as the navigation system can be set to automatically find a faster way to your destination.
Broadcasting TMC messages

Once the traffic information is coded to the TMC standard, it is broadcast out as a silent digital signal on the FM sideband of a standard FM broadcast. Suna Traffic Channel uses RDS (Radio Data System) as the standard for broadcasting the TMC traffic information. RDS utilises the “subcarrier” channels on the FM radio band. A subcarrier is a separate analogue or digital signal that carries encoded information alongside a main radio transmission. This information does not interfere with a normal broadcast and only radio receivers with RDS decoders are able to access the encoded information.

Suna Traffic Channel utilises Australian Radio Network (ARN) for the broadcast of Suna Traffic Channel via RDS. Suna radio encoding equipment is co-located with the ARN transmission facilities in each city. The Suna Traffic Channel TMC signal is sent to the transmitter site where it is encoded as part of the normal FM transmission via our RDS encoders.

The Australian Radio Network owns and operates commercial radio stations in Australia, with a dual brand strategy of MIX and Classic Hits music stream they operate in nearly every capital city in Australia.

<table>
<thead>
<tr>
<th>Classic Hits</th>
<th>Mix</th>
<th>Hit Music</th>
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<tbody>
<tr>
<td>Sydney's 101.7 WSFM</td>
<td>Sydney's MIX106.5</td>
<td>The Edge 96.1</td>
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<tr>
<td>Melbourne's GOLD104.3</td>
<td>Melbourne's MIX101.1</td>
<td></td>
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<tr>
<td>Brisbane's 4KQ</td>
<td>Brisbane's 97.3FM</td>
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<tr>
<td>Adelaide's 5DN</td>
<td>Adelaide's MIX102.3</td>
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ARN is also a 50% shareholder in the Perth FM licence Nova 93.7 and Brisbane's 97.3FM is also joint venture with DMG Australia. In addition, ARN is a joint shareholder in Canberra's MIX106.3 and FM 104.

TMC messages broadcast via RDS

These two charts show the volume of messages (vertical axis) transmitted over a 24 hour period.

The weekday peak hours are clearly indicated by the volume of congestion and traffic incident messages being sent out, while the Sunday message volume reflects the distinctly different traffic patterns on the weekend.
The above diagram shows the end to end steps in the creation, broadcast and reception of a TMC message.

1. The first step is the creation of the traffic information in standard format that can be used to generate traffic messages. This involves two basic types of information, flow data – which indicates levels of congestion across the road network, and incident information – which provides a description of what is causing the congestion.
2. This traffic information is then coded into TMC ready for broadcast. (Suna Traffic Channel utilises Conditional Access, the TMC standard for encryption).
3. The TMC information is digitally encoded into the Radio Data System (RDS) standard and transmitted as part of a normal FM broadcast.
4. The RDS TMC signal is received by an RDS TMC receiver, decoded and presented to the navigation system.
5. The navigation system uses the traffic information to calculate a route that minimises delays due to traffic. The navigation system is also able to present only traffic information on the route. This feature allows the hundreds of traffic messages transmitted by Suna Traffic Channel to be reduced to a small number that directly affect the driver.

TMC in the future

The TMC standard is robust and likely to be the foundation of global traffic services for the foreseeable future. TMC, while optimised for FM broadcast, is bearer neutral. It can be carried by any digital bearer including GPRS (mobile data) DAB (Digital Audio Broadcast) and digital satellite radio. Suna Traffic Channel via its XML TMC feed supports the use of TMC via GPRS and other bearers.

The TMC standard continues to evolve and one of many future additions is support for enhanced car parking information. There is also a next generation TMC standard, TPEG, which provides a less compact but more flexible location referencing and other enhancements. Suna Traffic Channel is
designed to be TPEG compatible. Suna Traffic Channel will be in a position to support TPEG via DAB in Australia in future.

Suna Traffic Channel XML TMC
As well as supporting RDS TMC, Suna Traffic Channel provides an XML feed that can support many applications including traffic on web sites and mobile phone applications. The following images show how traffic can be displayed on web sites as well as on mobile phones.

Traffic on Web and Mobiles

Suna Traffic Channel XML TMC feed can support a large range of third party developed applications. TMC has become the de facto standard for traffic information and many digital mapping platforms are designed to support an XML TMC input of traffic information.

This web application shows a simple traffic application where traffic incidents are overlaid on a map. Suna Traffic Channel can also support web based navigation applications where the route is calculated to minimise traffic on the journey. In future, historic traffic data will also be available to support navigation.

A large range of mobile applications can be supported by Suna Traffic Channel XML TMC including:
- Push SMS services, providing users with information on a specific route only when there is a traffic incident
- Delay times, relating to major roads
- Traffic near me, utilising the location capability of the mobile network

Voice services via IVR or an operator are also a practical way to deliver traffic information.

Business Applications built on Suna Traffic Channel XML TMC
As well as consumer services many opportunities exist for improving the performance and efficiency of business activity using Suna Traffic Channel. Any organisation operating a fleet that travels through urban traffic will benefit from taking advantage of Suna Traffic Channel. At its most basic this can be by utilising consumer traffic enabled navigation within the business environment. For organisations operating more sophisticated fleet management and dispatch systems, Suna Traffic Channel can be directly integrated into these applications. As well as providing route optimisation, taking traffic into account can help to better forecast time of arrival time allowing greater customer satisfaction to be achieved.
Suna Traffic Channel today – January 2008
Today Suna Traffic Channel is operating a full service in Melbourne. We are testing with the leading suppliers of Portable Navigation Devices and embedded navigation systems for vehicles. In December 2007 the MIO (MiTAC) and Navway (Medion) PNDs went on sale in Melbourne Suna Traffic Channel enabled.

Companies interested in participating in the Suna Traffic Channel test program can do so by entering into a simple Test & Evaluation Agreement with Intelematics Australia.
Suna Traffic Channel Coverage
Melbourne is fully operational with coverage of the Greater Melbourne Metropolitan area.

Sydney & Brisbane are expected to be available for commercial service end Q2 08 with test services available end Q1.

NOTE: RDS Reception.
Green represents average signal strength greater than 30 dBmV, as measured in an independent survey conducted by N-COM for Intelematics in 2007. Radio reception can be affected by the built environment, topography, atmospheric and other conditions. These maps should be used as a guide only and do not represent guaranteed signal strength at a particular location.
Who is behind Suna Traffic Channel?

Established in 1999, Intelematics Australia is a wholly owned subsidiary of Royal Automobile Club of Victoria (RACV). The company is a global leader in telematics development and service delivery, and focuses on vehicle safety and security systems, in-vehicle information assistance, and traffic, travel & entertainment services.

Intelematics Australia creates seamless 'white-label' interface solutions in partnership with Australia’s leading automotive manufacturers, importers and aftermarket service providers. The company provides customised services to meet the needs and demands of its customers through a wide range of in-vehicle and other mobile technologies.

Intelematics Australia is a founding member of Global Response – a strategic telematics alliance drawing together the leading automobile clubs in Europe, the United States and Canada. The global alliance draws on the strength of more than 80 million club members worldwide, providing Intelematics with access to shared technology and a connection to consumer, automotive and mobility trends.

Suna Traffic Channel key technology partners include

Organisations associated with the provision Suna Traffic Channel service include

For more information please contact Intelematics Australia

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