SUBMISSION NO. 4

Raytheon

Level 2, 4 Brindabella Circuit
Brindabella Business Park
Canberra Airport ACT 2609
Australia
Tel: + 61 2 6122 0200
Fax: + 61 2 6122 0204
ACN 063 709 295
ABN 35 063 709 295

Secretary: .....

RECEIVED
28 AUG 2002
HOUSE OF REPRESENTATIVES
STANDING COMMITTEE ON
TRANSPORT AND
REGIONAL SERVICES

28 August 2002

Mr Ian Dundas
Committee Secretary
Standing Committee on the Transport and Regional Services
Parliament House
CANBERRA ACT 2600

Inquiry: Variable Speed Limits -- A Case Study of Intelligent Transport Systems

Dear Mr. Dundas,

Raytheon Australia is replying to a request for submissions to the House of Representatives Standing Committee on the Transport and the Regional Services inquiry into "Variable Speed Limits -- A Case Study of Intelligent Transport Systems". This inquiry centres on the potential application of a variable speed limit system on the F3 Freeway and the Hume Highway between Sydney and Canberra.

Raytheon has significant experience in the implementation of Intelligent Transport Systems. Raytheon Australia has access to state-of-the-art technology, which would allow a satellite based, detailed study and review of the traffic environment on these freeways. The results of these studies would allow a detailed traffic flow map, for all times of day and weather conditions to be created for use in the implementation of an Advanced Active Highway Traffic Management System.

Raytheon Australia believes that current “Variable Speed Limit” systems require further development and refinement before any application on a Freeway the length of the F3 or Hume Highway. Therefore, Raytheon Australia believes that through the combination of developments in satellite technology and meteorological technology with “variable speed limits”, a world leading, exportable, automated, highway traffic flow management system can be developed

Raytheon Australia also notes tha an advance highway traffic management system will result in consistent traffic flow that will reduce the environmental impact caused by vehicle exhaust emissions. Traffic flow predictability and forecasting, as well as real-time traffic flow information will improve the viability of land transportation and could assist in a containment of any transportation cost increases. This, in turn, would improve the sustainability of Australia's primary producers by improving rural transport economics. The location of the freeways would also allow the decentralisation of the high-technology control and support infrastructure into rural and regional centres.

Raytheon believes that through the completion of a detailed two-stage process, significant benefits to traffic flow continuity, safety, the economy and the environment will be realised.

its enquiry submission cover letter
RA File: 11.11

Attachment A is Raytheon Australia is submissions for the hearing. Raytheon word be willing to be represented if necessary. If you require any further information please do not hesitate to contact Mr John Watchman on (02) 8870 6685, or the undersigned.

Ron Fisher
Managing Director
Telephone: 02 6122 0200
Fax: 02 6122 0204

Attachment: A SUBMISSION TO HOUSE OF REPRESENTATIVES STANDING COMMITTEE ON TRANSPORT AND REGIONAL SERVICES - INQUIRY: VARIABLE SPEED LIMITS – A CASE STUDY OF INTELLIGENT TRANSPORT SYSTEMS

Raytheon Australia

HIGHWAY TRAFFIC MANAGEMENT SYSTEMS

Level 2, 4 Brindabella Circuit
Brindabella Business Park
CANBERRA AIRPORT ACT 2609

RAYTHEON AUSTRALIA
HIGHWAY TRAFFIC MANAGEMENT SYSTEMS

SUBMISSION TO
HOUSE OF REPRESENTATIVES STANDING COMMITTEE ON TRANSPORT AND REGIONAL SERVICES

INQUIRY: VARIABLE SPEED LIMITS – A CASE STUDY OF INTELLIGENT TRANSPORT SYSTEMS

MR JON WACHMAN
RAYTHEON AUSTRALIA

TEL: (02) 8870 6685
FAX: (02) 8870 6599
E-mail: jwachman@raytheon.com.au

Level 2, 4 Brindabella Circuit
Brindabella Business Park
CANBERRA AIRPORT ACT 2609

TABLE of CONTENTS

Raytheon Australia

HIGHWAY TRAFFIC MANAGEMENT SYSTEMS

Level 2, 4 Brindabella Circuit
Brindabella Business Park
CANBERRA AIRPORT ACT 2609

1.0 INTRODUCTION

1.1 Scope

1.1.1 Raytheon Australia – Highway Traffic Management Systems (HTMS) has prepared this submission in the response to the House of Representatives Standing Committee on Transport and Regional Services, inquiry into "Variable Speed Limits – A Case Study of Intelligent Transport Systems".

1.1.2 This document concentrates on of the area of Highway Traffic Management Systems. It describes the application of technology advancements to study and improve traffic flow, safety and efficiency and reduce any negative environmental impacts.

1.2 Overview

1.2.1 Raytheon Australia supports and develops road traffic management systems that allow safe and sustainable road usage. Improved and consistent traffic flow reduces the environmental impacts caused by the increased vehicle emissions that occur under stop/start traffic conditions. General conservative predictions are that road traffic will increase by approximately 50 percent by the year 2020[1].

1.2.2 Raytheon Australia considers that following a detailed study and review of current highway environments, traffic flows can be actively managed through the combination and innovative integration of the latest suitable technology highway. These actions will reduce congestion and improve safety, which will, in turn, improve the farm gate to port economics, lower the environmental impact of vehicle emissions and reduce motorist stress levels.

1.2.3 Raytheon Australia believes that current "Variable Speed Limit" systems require further development and refinement before any application on a Freeway the length of the F3. The F3 Freeway will be affected by varying weather conditions over its entire length and this, combined with the impact of early morning and late evening sunlight (both of which coincided with current historical peak periods), impact traffic conditions. Therefore, Raytheon Australia believes that through the combination of advanced developments in satellite technology and meteorological technology with "variable speed limits", the most efficient automated, proactive highway traffic flow management system can be developed.

2.0 GENERAL CONSIDERATIONS

2.1 Environmental Impacts

2.1.1 Australia has positioned itself as a world leader in the control of greenhouse emissions, the predicted increase in traffic over the next 20 years will result in increased emissions that will further damage the environment. Although a reduction in traffic numbers would be the best control of emissions, realistically only traffic flow conditions can be influenced by road traffic management systems. A second environmental benefit from consistent traffic flow is a reduction in fuel consumption, and thus better utilisation of limited natural resources.

2.1.2 The F3 Freeway currently suffers from congestion at various times of day, which results in a stop/start traffic flow environment. A highway traffic management system that results in

[1] The Warren Centre: Moving People Report - 2000

Level 2, 4 Brindabella Circuit
Brindabella Business Park
CANBERRA AIRPORT ACT 2609

consistent traffic flow, albeit slow at times, will reduce the environmental impact through reduced vehicle exhaust emissions.

2.2 Export Potential

2.2.1 Any advanced highway traffic management system that is developed in Australia will have huge export potential as most regions and countries currently suffer from serious traffic congestion. Worldwide traffic numbers will, as predicted for Australia, continue to increase and this, in turn, will require advanced management of all road systems to reduce congestion and improve safety. Australia has the opportunity to become a world market leader for advanced traffic management systems and there such will benefit from the export potential.

2.3 Economic Impacts

2.3.1 Increased traffic congestion results in increased transportation costs which affect the sustainability of rural transport economics. Traffic flow predictability and forecasting, as well as real-time traffic flow information will improve the viability of land transportation and should result in a containment of any transportation cost increases. This would improve the sustainability of Australia's primary producers making their exports even more internationally competitive than they are currently.

2.4 Decentralised Technology Centres

2.4.1 The location of both the F3 Freeway and the Sydney to Canberra Freeway would allow the decentralisation of the high-technology control and support infrastructure. This would see management and support of high-technology systems moved to rural and regional areas.

2.5 Raytheon Australia's Approach

2.5.1 Raytheon Australia proposes a two-stage approach to the application of such a technology leading traffic flow management system. The first stage would be a detailed study and review of current traffic flows to determine highway inflow and outflow requirements as well as determining traffic flow difficulty areas, weather and sunlight impacts, and accident-prone blackspots. The second stage will involve implementation of an advanced automated traffic flow system that adjusts traffic flow based upon weather, time-of-day and actual flow requirements.

3.0 STAGE ONE

3.1 Real-time Highway Flow Study.

3.1.1 The essential first stage of highway traffic system development is the gathering and collating of sufficient data to allow an accurate and current traffic flow map to be developed. This must be completed prior to development and implementation of any automated traffic applications.

3.1.2 The initial step would be to conduct a real-time review of traffic environments on the Sydney F3 Freeway utilising the latest satellite technology and road based resources. Raytheon Australia would utilise its satellite technology to study and map the traffic flow on the F3 Freeway over a suitable period, operating up to 24 hours per day. Utilisation of satellites allows this study to review the F3 as a whole rather than only specific known bottleneck or blackspot areas. It will be used to assess the inflow and outflow requirements of the F3 at all entry and exit points, and determine the optimised speed

Level 2, 4 Brindabella Circuit
Brindabella Business Park
CANBERRA AIRPORT ACT 2609

requirements for consistent traffic flow that will reduce transportation costs, environmental impacts of stop/start traffic flow, and improve overall highway safety.

3.2 Satellite Advantages

3.2.1 The utilisation of satellites for a Highway Traffic Flow Study has two major advantages. The first is that the satellite is able to view major sections, if not the entire, highway in a single sweep. This allows a complete "real-time" data picture to be captured, thus allowing a study of downstream and upstream impacts of traffic flow restrictions.

3.2.2 The second advantage in is that the satellite functions in all-weather conditions, day and night, which allows the detailed study and mapping of the impacts of time-of-day and weather on traffic flow.

3.3 Stage One Output.

3.3.1 The expected outputs from the stage one study would be:

(a) F3 Freeway inflow and outflow requirements.
(b) Optimised "base – speed" calculations.
(c) Traffic congestion points.
(d) Speed adjustment requirements to alleviate congestion points.
(e) Weather and time-of-day hazard points.
(f) Speed adjustment requirements to improve safety at hazard points.
(g) Optimised positioning for automated traffic flow control systems.

4.0 STAGE TWO

4.1 Advanced Active Highway Traffic Management System.

4.1.1 Raytheon Australia proposes the installation of a technology leading "Advanced Active Highway Traffic Management System" initially for the F3 Freeway. Raytheon Australia believes that installation of such a system will result in an improvement of road safety and a reduction in the stop/start congestion. This in turn will reduce the environmental impact of vehicle emissions, reduce driver fatigue and improve the economic use of Freeways.

4.2 System Integration.

4.2.1 Raytheon Australia proposes the integration of the latest technology traffic management hardware under an Advanced Active Highway Traffic Management System. Initial speeds will be set based upon the data gathered through Stage 1. The traffic flow will then be automatically controlled based on congestion, weather and time-of-day.

4.2.2 When the system detects further congestion at a specific point, traffic speed will be reduced on the highway to a distance necessary to allow the congestion area to clear. For example, driver behaviour may cause further congestion at a 3 into 2 lane merge under high traffic flow rate conditions; under these circumstances the automated system will reduce speed limits for a number of kilometres prior to the congestion point to a speed that allows that congestion to clear, and then continues to manage the traffic flow to prevent further restrictions.

4.2.3 When the automated system detects that sun position is such that a traffic safety hazard exists, speed limits will be reduced until the sun position has changed and the safety

Level 2, 4 Brindabella Circuit
Brindabella Business Park
CANBERRA AIRPORT ACT 2609

hazard has reduced. Furthermore, if sections of the highway are experiencing poor weather conditions (from rain, wind or reduced visibility) speed limits will again be reduced in the area of poor weather and for a number of kilometres approaching this predicted congestion point.

4.3 Outline of Equipment

4.3.1 Raytheon Australia would integrate, as a minimum, the following components into an Automated Active Highway Traffic Management System:

(a) Centralised Management System.
(b) Latest technology variable speed limit signs.
(c) Adjustable automated notice signs.
(d) Traffic Flow Sensors.
(e) Weather Sensors.
(f) Time-of-day/Sunlight Sensors.
(g) Digital Speed Violation Cameras.
(h) Traffic Monitoring Cameras.

4.4 Traffic Rules Enforcement

4.4.1 Road users would need to quickly adapt to the new requirements, unfortunately, the new traffic flow rules will require enforcement to ensure all road users enjoy the benefits of the new system. Enforcement would be through digital speed cameras that are automatically adjusted to match the variable speed limit requirements.

4.5 Traffic Flow Information Dissemination.

4.5.1 Current technology would allow road users to access a real-time traffic flow and journey time information through mobile telephone and Internet access. This will allow road users to plan journeys with more thought to time requirements and traffic matters. The data would also be available to logistic/transport companies and could be used to better manage their resources to improve the performance of the freight systems.

4.5.2 Historical data would be made available through Web based access to the centralised traffic control system; this could be used for future planning purposes.

4.5.3 Future advancements in technology should allow the dissemination of the centralised traffic flow information to road users who install suitable information receivers in their vehicles. System links between GPS route planning systems and the centralised traffic control system would allow data transfer to occur prior to departure. Conceptually a road user who had entered route planning data into a GPS road map system would be notified of the expected to journey time based on "real-time" traffic flow. This would allow the user to delay departure or plan an alternate route if required.

4.5.4 Future vehicle technology may include cruise control systems that receive updates from the automated traffic management system, further enhancing road safety and reducing driver fatigue and speed limit violation.

4.5.5 Under the same concept freighter/logistics providers would be able to minimise transit times or replan transit routes to reduce costs and improve competitiveness.

Level 2, 4 Brindabella Circuit
Brindabella Business Park
CANBERRA AIRPORT ACT 2609

5.0 SUMMARY

5.1 The Future – Automated Active Highway Traffic Management Systems

5.1.1 Safety, The Environment, Efficiency and Congestion are the determining factors for the future of road transport in Australia. The total number of road users will continue to increase requiring the road infrastructure to be more accurately and carefully managed to minimise the impact is of traffic increases. Detailed studies of traffic flow conducted over a suitable period, 24 hours per day and in all weather conditions will provide source data that will allow the determination of optimum flow requirements.

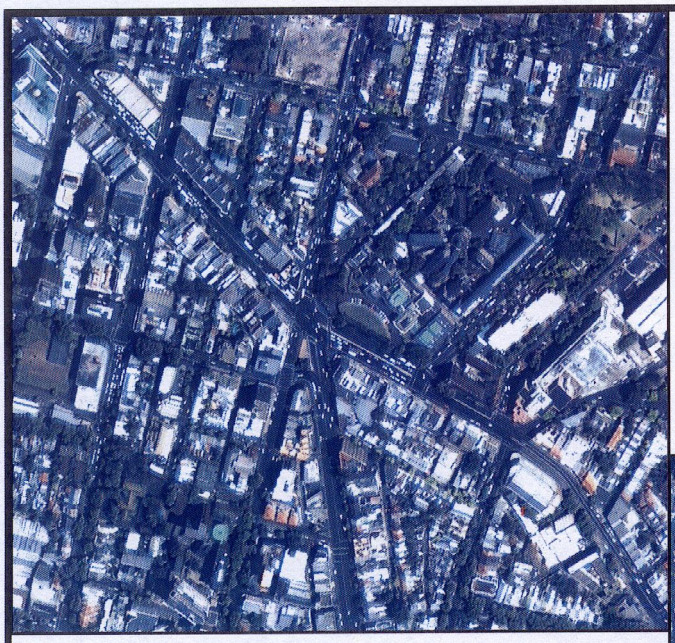
5.1.2 The freeway speed limits would be adjusted in a proactive traffic control system, road users would be required to obey the variable speed signs will minimise congestion, maximise safety and reduce environmental impacts caused by stop/start traffic flow. Raytheon Australia would integrate the latest highway control hardware, weather and daylight sensors with an automated control system to provide Australia with a world leading and exportable "Advanced Active Highway Traffic Management System" product.

5.1.3 Australia has the opportunity to be at the forefront of a dynamic new change in highway traffic management by utilising the latest and most forward thinking technology of the future for the benefit of the environment, and city and rural communities.

Raytheon Australia

The right solutions at the right time

Sydney Traffic - 9:30am



Taylor Square (Left)

Airport Intersection (Right)

Southern Cross Drive (Left)

SPACE IMAGING Authorized Reseller

CARTERRA™ 1 metre

These 1 metre resolution images, collected by the IKONOS satellite, provide an overivew of different roads in Sydney.

The image was collected 24 March 2002.

For further information contact

Susan Crosby-Warren
Director Government Relations
Free call: 1800 RAYTHEON
Direct: 02 6122 0303
Fax: 02 6122 0202
Mobile: 0419 636 879
Email: swarren@raytheon.com.au

4 Brindabella Circuit
Brindabella Business Park
Canberra Airport ACT 2609