

# C•A•M•V•I•T

Cambridge Vehicle Information Technology Ltd.

## The Future of Desktop and Vehicle Navigation Systems

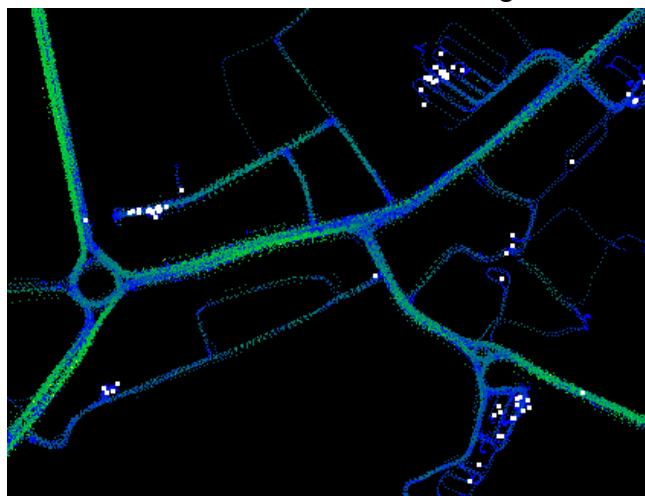
### Technology Overview

Our vision is of a navigation system that is much more of an expert navigation assistant than a route guidance tool. We have developed a set of technologies that can make this concept a reality.

Our system offers route choices (where available), advises of unusual conditions only if the driver is likely to encounter them, and learns the drivers' habits to tailor its advice to them. A guiding principle is to remove the need for any user input. Roads are avoided if the driver normally avoids them, routes are recommended that the driver is familiar with, and it will even guide the driver to and from home to park on their favourite side of the street. Expert users will find that they no longer have to do anything when making habitual journeys, and inexpert users will never have to read a manual or enter a destination, yet will still benefit greatly from the system. All users will find the system more effective and more fun.

### Familiar Routing, Automatic Navigation and Choice Routing

Three techniques contribute to this vision: Familiar Routing adapts guidance to the driver's own habits, Automatic Navigation removes the need for most user input, and



Choice Routing puts the driver back in control of the choice of route.

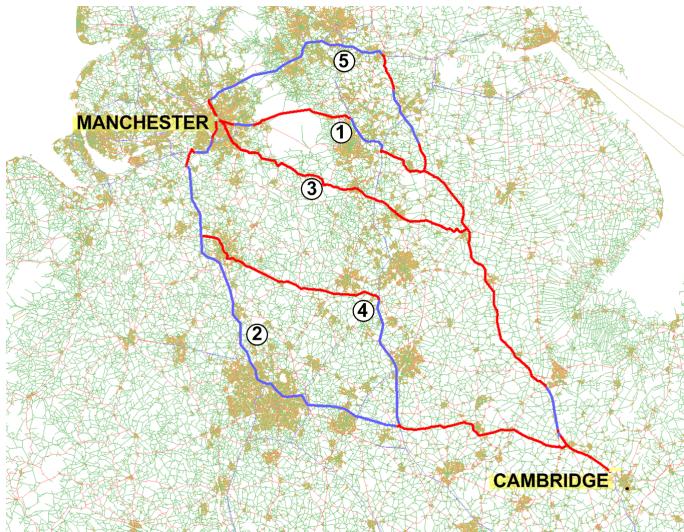
**Familiar Routing** is the ability to cause route computations to favour roads that the driver has used most often, and most recently. The bias towards frequency of use allows the system to favour commonly used routes over those that are less frequently used. A bias towards recently used routes allows new route preferences to supersede older ones as driving habits change.

**Automatic Navigation** gives the vehicle the ability to predict future behaviour based upon the stored behaviours from the past. It can predict destinations, distinguishing between stops for petrol or meals and the ultimate destination that was the reason for the journey. It can predict which manoeuvres the driver may be about to make, and so estimate times at which the driver is likely to be less busy, and ready to take in information about future route choices or incoming telephone messages. It matches past behaviours based on the roads that are driven, the times of day and days of the week that they are traversed, and even whether the roads have been traversed in the opposite direction, as is commonplace after a destination has been visited for the first time.

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**Choice Routing** is a technique for computing a set of alternative diverse routes between two locations.



These routes are not minor variations on each other, nor are they generated by excluding parts of the road network or artificially changing the drivers routing preferences. They are the best set of routes that could get the driver to their destination by using different sets of roads, and often have surprisingly close journey times and distances. By presenting these choices to the driver along with up-to-date traffic, POI, weather, and other information, the driver can make

an informed, personal decision about which way to go. The choice can either be made at the beginning of the journey by selecting one of the routes, or while driving by joining one of the other routes at the few junctions where choice routes diverge. Web-based air and rail journey planners already offer alternative choices, and our technique can extend this to road journeys.

Each technique can stand on its own to improve the user experience of their navigation system. Together, they make possible a powerful new generation of navigation assistant, which is less demanding, more informative, and much more responsive to the user's own habits and requirements.

## Working with Camvit

Camvit Limited is ready to help with workshops, tools, consultancy, trials and licensing. We have over 15 years experience of in-vehicle trials, and can supply advanced tools for experimentation and analysis of these technologies. We would back these up with consultancy to enable an effective transfer of the technology into existing systems, help with the design, implementation and analysis of trials, and finally, license the technologies and support their future development with improvements and adaptations.



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Computation and Storage capacities have now increased to the stage where features such as these can become an indispensable part of future navigation systems. Not only do they add compelling new features to existing systems, but they simultaneously make them easier to use and more reliable. Early adopters of these technologies can share in renewed market growth, partly from those users who are uninterested in pressing buttons and programming preferences, and partly from those who demand higher functionality and automation than present systems can provide. Systems without these features will seem old fashioned, and hard to sell at any price.

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## Company profile

Cambridge Vehicle Information Technology is a private limited company formed by several research engineers from AT&T Laboratories Cambridge Limited (previously Olivetti Research Limited). Our past projects encompassed most areas of that Laboratory's work since its formation 18 years ago including networking, multimedia and tracking systems.

From this unique standpoint we have developed vehicle navigation technologies which will lead to a new generation of commercial systems. We are keen to pursue some of these ideas in partnership with established companies. Camvit has a long-standing close relationship with Cambridge University Computer Laboratory where both Directors are Visiting Fellows. Recent joint research work includes a Wireless Broadband WAN and consultancy for research into Traffic Flows.

Cambridge Vehicle Information Technology Ltd. was formed from [Cotares Ltd.](#), a Cambridge-based Consulting and Research Company.

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A summary of our ideas is found on our website <http://www.camvit.com>, where pdf brochures can also be downloaded in English, German, French and Japanese.



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