Abstract
This paper discusses the provision of GIS to non-GIS users. Intelligence plays a vital role in combating not only international terrorism, but also domestic crimes. In order to explore the full potentials of the intelligence materials available, GIS technology shall be made more accessible to non-GIS users, such as frontline police officers and other law enforcement agents. A standalone police/security application is currently being developed for a consortium of police departments and other agencies in the United Kingdom using ArcObjects and MapControl. Potential applications include the development of a full range of task-specific custom-build software modules.

Background
In 1998, the British Parliament has passed an act which placed new obligations on the Police, Local Government Authorities, Health Authorities and Local Probation Committees to work together in order to reduce crime and disorder in their area. The act, known as the Crime and Disorder Act 1998, emphasizes on the formulation and implementation of multi-agency crime-fighting strategies. A rapid exchange of timely data and sharing of intelligence between these Agencies are essential to this crime and disorder reduction effort.

Crime Mapping and GIS
Amongst these crime and disorder data and intelligence, the majority of which can be visualized in a geographical context. There have been many successful applications of Geographic Information Systems (GIS) for crime mapping and analysis over the years. Although the benefits of these systems for crime prevention and crime detection are well proven, their deployments are limited as they require frequent input from specially trained analysts or experienced operators. The challenge ahead lies in the provision of specialist GIS tools, for the analysis of timely crime and disorder data, to non-GIS trained personnel such as front line operational police officers.

Project DRAGON
Project DRAGON is the new information infrastructure for crime and disorder reduction in Wales, United Kingdom. The information infrastructure takes advantage of the best solutions Information and Communication Technologies (ICT) can offer. It includes a centralized multi-agency data hub and custom-built tools for specific scenarios.

Multi-Agency Data Hub
Section 115 of the Crime and Disorder Act 1998 clears the way for the exchange of data and the sharing of information between the Statutory
Agencies\(^1\). Once the institutional barriers for the release of data is overcome, Project DRAGON coordinates the processing of de-personalised and non-personal data from the Statutory Agencies and other participating organisations on behalf of the their respective Crime & Disorder Reduction/Community Safety Partnerships. Project DRAGON receives data from the Statutory Agencies and other organisations on a regular basis. This transfer of data is strictly regulated by protocols. It also takes advantage of a number of existing ICT infrastructures such as the Government Secure Intranet (GSI) and the Police National Network (PNN). The centralized multi-agency data hub also provides an all-important function for the translation of tabular data sets into a GIS-ready data format.

**Custom-Built Tools**
Apart from providing a centralized multi-agency data hub, Project DRAGON liaises with specific user-groups on the development of easy-to-use tools for certain well-defined application scenarios. These tools are designed by users for users. They directly support the methodology of problem-oriented policing. The tools are custom-built using ESRI’s ArcObjects (and MapControl). One of the main emphases is to spare the end-users from all unnecessary technical details. In doing so, help to focus their attention on the tasks in hand.

**ESRI GIS Technology**
The requirement of providing GIS to non-GIS trained personnel has excluded the direct deployment of ArcView GIS. Project DRAGON has identified a number of possible channels for providing timely crime and disorder information to its end-users. They are:

(a) ArcIMS
(b) MapObjects
(c) ArcObjects

(a) ArcIMS
ArcIMS provides an attractive way for the dissemination of data for a wide audience using either the Internet or Intranet. The advantage of using ArcIMS is that there is little software requirement on the end-users apart from an up-to-date Internet Browser. The cost for setting up an ArcIMS-based system is primarily on the server. The disadvantage is that the applications developed using ArcIMS is relatively lightweight compared with functions provided by a standard GIS, e.g. ArcView.

(b) MapObjects
MapObjects provides a middleweight compromise. It struck a balance between the GIS functionality and deployment costs. The GIS functions are provided in a programmable objects model. Its moderate deployment costs allow limited deployment on individual end-user’s systems. It is a logical step forward as far as GIS functionality is concerned.

\(^1\) The Statutory Agencies, as defined by the Crime & Disorder Act 1998, are the Police, Local Government Authorities, Health Authorities and Local Probation Committees.
(c) ArcObjects
In contrast, ArcObjects (with MapControl) provides a complete objects model that replicates ArcGIS in its entirety. It provides a heavyweight solution for users to design their own GIS systems using ESRI technology. The main disadvantage is its cost as every deployment requires at least a full ArcView licence.

Police and Security Users
Project DRAGON has identified three distinctive user groups within the Police and Security community. They are (a) the General Users, (b) the Analysts, and (c) the Performance Managers.

(a) General Users
General Users form the largest user-group within the Police and Security community. They are the priority group as far as day-to-day policing is concerned. This is the user-group which requires timely access to the most up-to-date crime and disorder data down to individual incidents. The tools to be provided to this user-group must be robust and “fool-proof”.

(b) Analysts
This is the only GIS-trained user-group within the Police and Security community. Analysts are usually tasked with the analysis of crime patterns with respect to not only their geographical locations, but also their temporal instances.

(c) Performance Managers
Performance Managers are perhaps the most important user-group of all as they decide the deployment of not only day-to-day police resources, but also the formulation and implementation of long-term crime-fighting strategies.

Operational Field Trial
In August 2002, Project DRAGON and one of the Police Forces in Wales had reached an agreement for an Operational Field Trial of an application scenario in a busy Section of one of their Divisions. The context was the provision of an effective tasking and deployment tool. The targeted users were the operational front line police officers. An independent software module, entitled Police (Operational Briefing) Module, was developed by Project DRAGON over a period of time. The standalone system was deployed in the Section from mid-September 2002 onwards. Data from the Police’s Command-and-Control System, Crime Information System and Stop-and-Search System were sent to a secure office of Project DRAGON electronically via GSI and PNN. These police data, together with other de-personalised and non-personal data from the Fire Service, Youth Offending Team (holding data on youth offenders aged between 10 and 17) and the Charter Housing Association, were subsequently translated into the appropriate GIS format. The formatted data sets were then sent back to Section, again using the secure links in time for the afternoon briefing sessions at 2 pm. Access to the system is protected by passwords. An audit trial is also maintained. The system is usually operated by the Parade Sergeant of the afternoon shift. The
geographical patterns of crime and disorder could be vividly displayed with the minimum delays.

Figure 1 shows the data flows between Project DRAGON’s multi-agency data hub in relation to other Agencies, with special reference to the Police Operational Field Trial. Figure 2 shows the user-interface of Project DRAGON’s Police (Operational Briefing) Module. Figure 3 shows some of the simple selection tools of the Module.

Figure 1. Data flows between Project DRAGON’s multi-agency data hub in relation to other Agencies, with special reference to the Police Operational Field Trial
Preliminary Results
The preliminary results of the Operational Field Trial are encouraging. The Police (Operational Briefing) Module sheds new light on the most up-to-date patterns of crime and disorder both in relation to their geographical locations.

\[\text{Disclaimer: All graphical representations are for visual comparisons only. They by no means indicate the precise locations or associations of the data themes.}\]

\[\text{Figure 2 is based upon the Ordnance Survey map by Project DRAGON with the permission of Ordnance Survey on behalf of the Controller of HMSO. Licence No. GD272221.}\]
and time. It encourages front line operational police officers to think “geographically” and to work smarter. It promotes multi-agency joined-up working for the purpose of crime prevention and detection. It undoubtedly helps to facilitate an informed decision-making on the effective tasking and deployment of resources. At the time of writing, the participating Agencies have agreed to extend the Operational Field Trial until the end of 2003.

In order to reach a larger audience, the Intranet version of the Police (Operational Briefing) Module has been implemented on the Force’s Intranet facilities as from May 2003.

The Future
Learning from the experience of the Operational Field Trial of the Police (Operational Briefing) Module, plans are currently being drawn up for a number of other problem-oriented Modules. This includes a Fire (Arson) Module and a Partnership (Intervention, i.e. Anti-Social Behaviour) Module. The generic nature of the Modules will allow their deployments across different Crime & Disorder Reduction/Community Safety Partnerships and Basic Command Unit (BCU) families.

Plans are also being drawn up on the use of wireless devices to access confidential data sets on an “on-demand” basis. The applications will be developed using ArcPad in association with wireless GPRS network.

As crime and disorder remains high on the political agenda, future releases of these specialised tools are keenly awaited.

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