

- Computer-assisted detection and classification of anomalous events (such as over crowding, vandalism, dangerous situations). This is achieved by modelling the behaviours of individuals and crowds which are of interest to operators. Then deriving behavioural features which provide a robust description of anomalous behaviours, setting and prioritising alarm thresholds to control operator workload.
- Tools for the creation, maintenance and search of a digital video database, using appropriate image coding standards for storing compressed video with automatic annotation according to content, and to assist both in the extraction of information on passenger behaviour and in post-incident analysis.

## ADDITIONAL INFORMATION ON THE PROJECT

The ADVISOR project began on January the 1<sup>st</sup> 2000 and finish at the end of March 2003. The costs sustained are shared between the partners and the European Commission in the framework of the IST research programme (Information Society Technology).

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### Associated metro companies :

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### ADVISOR WEB SITE :

<http://www-sop.inria.fr/orion/ADVISOR/>

# ADVISOR



**Annotated Digital Video for Intelligent Surveillance and Optimised Retrieval**

## ADVISOR

aims at increasing

**SAFETY & SECURITY of PEOPLE & ASSETS**

by means of the intelligent use of

**SURVEILLANCE CAMERAS**



- An ergonomic human computer interface for the display of the annotated live video and diagnostics relating to analysis of activities and events that have been detected. The interface also provides the means for the operator to define alarm conditions, verify alarms that are generated and to access the video database.
- An implementation using standard commercial hardware configured in an open and scalable architecture with an interface to a wide bandwidth video distribution network.



## THE CONTEXT

At many locations, safety and security of people and assets are jeopardised by dangerous and/or criminal behaviour. Installing cameras or using existing cameras may provide a solution, so long as they are adequately monitored. Unfortunately, for various reasons, most of the time, no operator is likely to be watching the monitor at the moment when a dangerous or criminal event occurs and very often no useful recording is available for subsequent review.

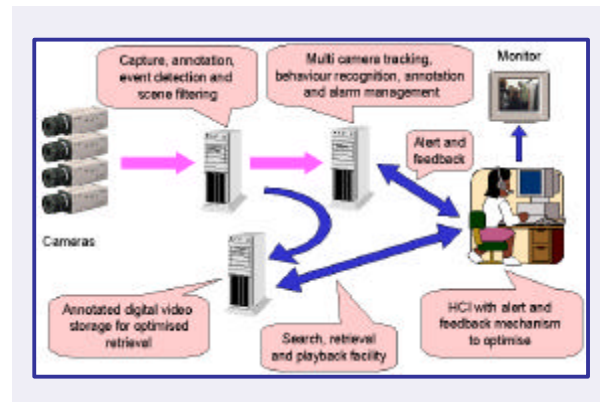
## WHAT IS ADVISOR ?

ADVISOR is a research and development project conducted by a consortium of industrial companies and academic organisations, co-operating to bring solutions to the problems described above.

## THE ADVISOR SYSTEM (SEE FIGURE BELOW)

ADVISOR analyses the output of new or existing cameras installed at strategic locations within the infrastructure to be monitored. It digitises and transmits the images to intelligent modules which process the content of the images and provide relevant information to the security operators. In addition, the images of any detected interesting situation are automatically annotated (with a text-based description) by the system and the visual and associated textual information recorded in a powerful database for possible further retrieval and analysis.

The cameras, the processing modules and the CCTV operators may physically be separated by several kilometres.



## APPLICATIONS AND FIELD OF EXPERIMENTATION

ADVISOR may be used in many applications (shopping malls, banks, airports, sport stadiums, train stations, public transport, etc.) where automatic identification and detection of abnormal (dangerous or criminal) behaviour enables an efficient response from the relevant authorities.

Metro environments were chosen as the application area within which to develop the system. This choice was guided by the European drive to improve the efficiency and security of the public transport infrastructure. Also, by the drive to facilitate the use of such systems by the public, by improving their perception of safety.



## BENEFITS FOR USERS

The benefits for the metro companies are assessed by measuring the reduction in operator workload for current tasks (incident detection, management and analysis of incidents), identifying additional opportunities for the exploitation of surveillance video data to analyse public use of the transport network, demonstrating flexibility in the system design so that it can be configured for different sizes of installations and different operational priorities, and analysing user acceptability in terms of through-life costs, ease of use, complexity in specification, procurement and acceptance.



## HOW ADVISOR WORKS

The use of computer vision techniques enhances the value of the installed surveillance cameras. ADVISOR provides a set of decision support tools to improve the utilisation of the huge data output from hundreds of cameras in a typical installation given the limited human resources available to manage it.

ADVISOR is developed and implemented to provide:

- Automated, real-time analysis of multiple video sequences which provides a full three dimensional understanding of the environment, tracking individuals in the field of view of the cameras and monitoring of crowd-related behaviour.

