INTERRACTION COMPONENT

STATE-OF-THE-ART

DELIVERABLE D6.1.1

By

C2TECH

Due date of deliverable : t0+ 6

Actual submission date: t0+ xxx
## DOCUMENT HISTORY

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SUMMARY

Bla, bla, bla
1. **SCOPE**

2. **ASSOCIATED DOCUMENTS**

   **2.1 APPLICABLE DOCUMENTS**
   
   Beginning of example (style: Retrait A)
   
   A1   Project Full Proposal. SPY
   
   A2   Title and reference

   End of example

   **2.2 REFERENCE DOCUMENTS**
   
   Beginning of example (style: Retrait R)
   
   R1 :   Title and reference

   End of example
3. TERMINOLOGY

3.1 ABBREVIATIONS

N/A  Non Applicable
TBC  To Be Completed

3.2 DEFINITIONS

Beginning of example (style: Definition)
Aaaaaa Bbbbb Cccc  Definition 1 Definition 1 Definition 1 Definition 1 Definition 1 Definition 1
Definition 1 Definition 1 Definition 1 Definition 1 Definition 1 Definition 1
Definition 1 Definition 1 Definition 1 Definition 1
azerazerazerazer  Def 2 Def 2 Def 2 Def 2 Def 2 Def 2 Def 2 Def 2 Def 2 Def 2 Def 2 Def 2
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End of example
4. VISUALIZATION COMPONENT

This chapter details the State of the Art of Visualization task and its sub-components in SPY - Surveillance imProved System. We present a central monitoring system allowing user access to SPY – surveillance cam videos, sensor data like GPS, traffic monitoring data and also plate recognition data.

Contributors on architecture: (CTECH, ?, ?)

4.1 GENERAL ARCHITECTURE OF COMPONENT

Figure 1: Conceptual Design of Visualization Component
4.2 VISUALIZATION TOOL

Visualization tool provides an interface to track the events on a digital map and to get necessary information to interfere them by using the resulting data set of the central fusion tool.

Fusion tool creates a data set in which a row indicates an event and relevant information coming from multiple sources. Each event has a unique ID number to make tracking easier. Visualization tool make little queries to fusion DB and classifies the events.

Visualization tool could have three layers:

1. The digital map
2. Event indicator
3. Event details

Digital map is a vectorized image file which includes coordinates and street address data. It is the main background of the visualization tool and as default it is focused on the city where the command and control center is situated. Its default location might be changed manually.

As soon as a new event data is created in the fusion DB, an event indicator appears on the map over the location of the event. According to the priority of the event this indicator might have different colors and shapes.

This indicator is clickable and clicking on it triggers the event details window. Event details window shows the data like location, event type, nearest police station and mobile teams, a brief video of the event, physical attributes of the objects involved in the event like color, shape, number of people, direction and speed. User can select the police teams to be alerted and a little package is sent to the mobile equipments of the teams. This little package includes the same information in a packed format not to overload the bandwidth.

4.2.1 Central Monitoring - Man Machine Interface

Display options based on show gathered data from context to user instantly with geographical data. This Central Monitoring System allow to user access surveillance cam videos, sensor data like GPS, traffic monitoring data and plate recognition data. This data created object recognition techniques in sensor and fusion center analysis.

4.2.1.1 Input Data

Central monitoring system needs input data above;

- Data from cameras
  - Surveillance, tracking and traffic camera data
  - Cam position for display icon on map
  - Captured data includes object info, plate or motion video.
  - Cam status like look angle and zoom level

- Data from microphones
  - Audio data

- Data from sensors
  - GPS data
  - Fire alarm sensor data
  - Unauthorized access alarm sensor data

- GIS data (Provided by used map API)
  - Geographical coordinate and altitudes
  - Layered satellite images
  - Road maps
4.2.1.2 Display Functions and Visual Outputs

Monitoring technology serves these actions
- GIS map with slide, zoom and layer abilities
- Cam icons on real geographical position at the map
- Sensor icons on map
- Alarm window
- Car pass, plate query tools
- Object tracking data

4.2.1.3 Central Monitoring Technology

Video data life cycle to show in user interface is above;

<table>
<thead>
<tr>
<th>Map API</th>
<th>Description</th>
<th>Technology</th>
<th>Development Language</th>
<th>Advantages</th>
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<td>Google Earth</td>
<td>Most popular GIS service provided by Google</td>
<td>API gives KML to developers</td>
<td>JavaScript</td>
<td>Fast for image view in 3D user interface. Google has satellites for update images frequently uses simple developing KML file. Easy to find examples.</td>
<td>Earth 3D visual world slower then Bing maps. Visual effects are simple then others.</td>
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Monitoring service is designed like show input results on Geographical Map. Base on this design we have 4 powerful option of map API. These map API information and comparison table is above:
<table>
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<tr>
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<th>Developed by Microsoft to compete Google Maps</th>
<th>Bing released web based Silverlight component version</th>
<th>Silverlight is based on XAML file for development. With XAML file can create object with vector points. This gave us to deploy very flexible interface. XAML supports animations and video playing on current Bing Maps Silverlight application. Also Bing in web page can support Java Script based web page application abilities too.</th>
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Table 1 Center Visualization Map API comparison table.
4.2.1.4 Central Monitoring Commands

Command and Control Center Command Definitions

4.2.2 Mobile Monitoring - Man Machine Interface

Mobile monitoring system has same data like central monitoring system but quality or resolution of data will be reduced for fast mobile data transfer. Mobile monitoring system has limited functions because of low bandwidth, weak processing units and small screen to show results. Mobile teams have a lighter version of the visualization database. It has the map data in its local database so that it doesn’t need to get map data from the main server unless a map update is available. The received package contains the location data so that mobile teams visualize the event in the same way the main server does. It has a little map instead of the alerting part.

4.2.2.1 Input Data for Mobile

Central monitoring system needs reduced to light version of input data above;

- Data from cameras
  - Surveillance, tracking and traffic camera data
  - Cam position for display icon on map
  - Captured data includes object info, plate or motion video.
  - Cam status like look angle and zoom level
- Data from microphones
  - Audio data
- Data from sensors
  - GPS data
  - Fire alarm sensor data
  - Unauthorized access alarm sensor data
- GIS data (Provided by used map API)
  - Geographical coordinate and altitudes
  - Layered satellite images
  - Road maps
  - State, city, place tags
- Alarm data
  - Alarm level, alarm type and alarm info data

4.2.2.2 Mobile Display Functions and Visual Outputs

Monitoring technology serves these actions

- GIS map with slide, zoom and layer abilities
- Cam icons on real geographical position at the map
Sensor icons on map
- Alarm window
- Car pass, plate query tools
- Object tracking data

### 4.2.2.3 Mobile Monitoring Technology

Video data life cycle to show in user interface is above:

Monitoring service is designed like show input results on Geographical Map. Base on this design we have 4 powerful option of map API. These map API information and comparison table is above;

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<td>Bing has Ajax V7</td>
<td>New Silverlight</td>
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**SPY - Surveillance imProved System**

<table>
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<th>D6.1.1 INTERACTION COMPONENT</th>
<th>V01</th>
<th>Page</th>
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<td>Yahoo! Maps</td>
<td>Provided by Yahoo!</td>
<td>Uses Java Script based image locating system and Action Script 3.0 Adobe Flash API and Flex API</td>
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4.2.2.4 **Mobile Monitoring Commands**

Mobile Terminal Commands Definitions

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Table 2 - Visualization Map API comparison table.
5. INFRASTRUCTURE RELATED COMPONENTS:

5.1 NETWORK RELATED INFRASTRUCTURE
TBD

5.2 DATABASE & COMPUTING INFRASTRUCTURE
TBD

5.3 MEDIA PROCESSING & ENCODING
TBD

5.4 SESSION & TRANSPORT PROTOCOLS
TBD
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Table 3: Center Visualization Map API comparison table.