EENA Operations Document

Oblique Imagery in Support of Emergency Services

Title:	Oblique Imagery in Support of Emergency Services		
Version:	1.0		
Code:	3.4.2.1_OI_v1.0.doc		
Revision Date:	12-01-2012		
Status of the document:	Draft	For comments	**Approved**

EENA asbl
info@eena.org - www.eena.org

Contributors to this document

This document was written by members of the EENA Operations Committee:

Members	Country / Organisation
Didier Mendel	Blom
Laurent Géradin	Cicade
Maximiliaan Wyns	SIAMU Bruxelles
Cristina Lumbreras	EENA

EENA asbl
info@eena.org - www.eena.org

Table of contents

EENA asbl
info@eena.org - www.eena.org

1 Introduction

Emergency services efforts are concentrated in saving lives and properties and they count only with a limited amount of resources. This is the reason why the employment of such resources has to be optimized.

The use of geographic information systems is very helpful for emergency services. The time to decide best resources to dispatch is very short. Therefore to visualize information as much close to reality as possible helps the decision making. Oblique images give real perspective of the emergency situation emplacement and possibilities to obtain relevant information such distance or height of a building.

This EENA Operations document explains what oblique imageries are and why they are useful for emergency services. Additionally, examples of existing implementations and technology aspects to be taken into account are given. As all EENA Operations document, recommendations and requirements are detailed.

2 What is oblique imagery

2.1 Geographic Information System

Geographic information systems applications allow emergency services to consult, analyse and edit geographical data and maps.

2.2 Oblique Imagery

Oblique images are photographs that are taken at an angle. This way all characteristics of features can be perceived in detailed.

There are oblique imagery taken from the air (aerial oblique imagery) and oblique taken from the ground by Mobile Mapping Systems. In this document we are going to speak only about aerial oblique imagery because they have the advantage to give an overview of all the facades and all the environment of a building whereas mobile mapping systems are only focused on the facades of the street network.

In the example of a building in a city, in an oblique image front, door and windows are visible. This is not possible in traditional aerial photography where only details from the roof would be visible in a picture of a building.

Oblique image

©Blom

Traditional aerial image (ortho imagery)

©Blom

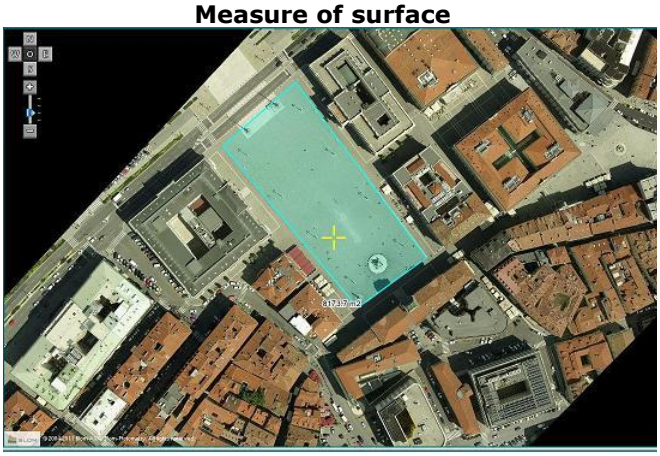
EENA asbl
info@eena.org - www.eena.org

The use of oblique images makes possible to measure height, surface and width of buildings as well as distances to resources and rescue assets.

Measure of height

©Blom

Measure of surface



©Blom

3 Why is oblique imagery useful for emergency services

Oblique imagery can immediately identify how wide access for emergency vehicles is, how large a ladder should be to reach the top of a building, how large other access routes are to where the emergency is located etc. Perhaps more important is that oblique imagery can even give the opportunity to see the emergency environment in daylight hours, while the emergency is happening during the night. Also it is possible to see the environment in normal circumstances in cases of floods or big snow.

Emergency services also have the opportunity of seeing where the high voltage cables or any other potentially dangerous elements are located, which might not be seen at night by first response teams. This information is vital to any efficient and safe emergency unit.

To establish the place and its characteristics helps emergency services to decide what resources are needed to provide assistance. This is the main reason why images shall be as accurate as possible. Information about how to access the place where the emergency is can reduce radically the time of the intervention.

The consultation of building plans can be very useful but later changes could have been made (e.g. veranda). Oblique imageries make possible to see the real state of the building.

It is also worth to mention that oblique images have to be integrated in the PSAP system and, this way be immediately available. They are gathered in the PSAP system and therefore, full control of information and independency from third parties is assured.

We have described some feature of oblique imageries that can be helpful for emergency services:

- See alternate traffic routes to incidents with digital images of the entire area
- Save time by knowing and routing first response crew to true location of incidents
- View each address from multiple angles for entry and escape points
- Save critical time by preplanning best responses for crimes in progress, fires, and vehicle accidents
- Provide assistance to officers on the scene
- Coordinate responses for major structures and facilities
- Measure height, length, width and volumes of buildings as well as distances to resources and rescue assets
- Evaluate sites for obstacles that might not be seen at night such as power lines, trees, dormer windows, etc.
- Provide remote guidance to first response crews on potential dangers to neighboring structures or populations
- Plan for evacuation routes and traffic control
- Difference in level and gradient

4 Technology

Oblique imageries must be integrated in the global technological architecture of the PSAP system. This can be achieved independently from the technology used by emergency services. This flexibility makes also possible that these images could be used in the PSAP, in the field and also in the other departments of the emergency services (e.g. risk management, etc.).

After being acquired and processed, oblique imageries should be integrated in a technical environment to provide access tools to the user (oblique imagery, ortho and other geo data).
This way, users have the possibility to take measures on ortho and oblique images and the capability to overlay, annotate, synchronize multi-views with different data views, access to historical image data for area comparison, etc.

There are two possibilities to access content and tools: online and off-line solutions.

- The online solution is a geographic information server (geoserver) that allows on-line access to all archive products. This server can include high resolution aerial imagery, LiDAR and raster data. The available functionalities allow the users to navigate, measure, export and search geo-information.

  Server should be specially designed to provide fast access to tiled georeferenced data models. The data and functionality can be accessed through a variety of technologies and applications. Standard API's / SDK's are available. This allows users to create their own integrations with intranet solutions or web mapping products. Alternatively users can access the geoserver through pre-developed GIS plug-ins or via viewing applications.

  Availability of different access methods is important to increase flexibility of service and, this way, accomplish all type of customer requirements.

- In the off-line solution content and tools are hosted on the user's site. The user can access the content through pre-developed GIS plug-ins as well as via viewing applications.

5 Examples of implementations in emergency services

SIAMU Brussels, Belgium

The SIAMU, the organisation in charge of handling 112 in Brussels, in Belgium, uses geo referenced oblique aerial images as key integrated component in the daily workflow within the fire brigade. The imagery is used in all the services of the SIAMU: call center and intervention teams for a better coordination during the incident, prevention unit to prepare visits on the field and prediction department in order to prepare the intervention plan on risky areas (e.g. schools, industrial areas). This is the main advantage of the system which will help save time, resources, and, most importantly, lives.

The system, based on oblique aerial images, allows the user to see in relevant properties from up to 12 different views before physically arriving on the scene. Oblique images allow to see every object in an image, such as fire hydrant, manhole, power line, intersection, door, and window, in stunning clarity. The system provides the user with the ability to measure the length of a hosepipe between the fire hydrant and the building, fix the size of a ladder to reach a specific floor plan, and orientate the images, to a degree not previously possible with traditional aerial photography. By combining the oblique aerial imagery with existing traditional maps (vector datasets), users can leverage their geographic information even further. The technology is easy-to-use, whether for preplanning scenarios in major buildings or locations, searching alternative water sources en route, or other tasks where detailed visual information can help improve response time and efficiency for fire brigades. Users can easily obtain vital information such as roof type, or structural composition of properties and buildings.

6 Implementation recommendations

Implementation involves several critical components, including user perceptions of the system, adaptation of the system to the organisation, and adaptation of the organisation to the new environment.

It is recommended to start with an evolutionary and flexible solution. This way, the system can be adapted to future needs of users.

To make available oblique images to PSAP professionals is not only a technical matter. They have to understand the value of these images for their daily work and the implementation has to be as user-friendly as possible. It is very important to integrate oblique images in the PSAP system and ensure this way a more easy to use interface. They can be simultaneously use with vertical images.

Oblique imagery alone is not sufficient. The data should be integrated in a complete system allowing users to make measurements on the imagery and to combine the oblique with other geo information. The system must be integrated in the global technological architecture of the PSAP system.

Additionally, in order to guarantee a fast and reliable access to oblique images, servers, PCs and networks need to have sufficient capacity.

Oblique imagery can also be useful for different public services applications. Precision of images should be compatible with privacy legislation in all cases and this should be considered before using very precise images:

- military reconnaissance and public security
- city planning and development
- analysis of structures: side view of vertical surfaces,
- measurements of doors and windows
- detection of building changes
- communication: touristic or commercial
- 3D model texturing

7 EENA Requirements

Requirements	
Total integration of the oblique images in the operators interface	Available
Access time to oblique images	3s
Precision	10-15cm

EENA asbl
info@eena.org - www.eena.org