



STUDENTS  
INTERNSHIP AND END OF STUDY WORK

2018-2019

## Table of contents

1. Realization of a "heatmap" and analysis of unusual movements of offenders under electronic surveillance.....	3
1.1. Scope of work.....	3
1.2. Duration.....	3
1.3. Type of study.....	3
2. Addition of big data functions related to location and time in an electronic surveillance system for litigants.....	4
2.1 Scope of work.....	4
2.2 Duration.....	4
2.3 Type of study.....	4
3. Mobile offender monitoring solution.....	5
2.4 Scope of work.....	5
2.5 Duration.....	5
2.6 Type of study.....	5
4. Offender devices test automation.....	6
2.7 Scope of work.....	6
2.8 Duration.....	6
2.9 Type of study.....	6
5. Stock Management for Offender Monitoring System.....	7
2.10 Scope of work.....	7
2.11 Duration.....	7
2.12 Type of study.....	7
6. Mechanical optimization of an offender Monitoring bracelet.....	8
2.13 Scope of work.....	8
2.14 Duration.....	8
2.15 Type of study.....	8

## 1. Realization of a "heatmap" and analysis of unusual movements of offenders under electronic surveillance

The Electronic Monitoring system developed by Upstream consists of the supervision of different nodes (bracelets) deployed throughout a country from 1 or 2 centralized platforms.

The persons under surveillance are monitored by means of a communicating electronic bracelet, which sends back data on the location of the persons under surveillance to centralized platforms developed by Upstream. These data can then be consulted by the surveillance officers.

Some studies have shown that people about to commit a new crime tend to change certain habits. Although this does not constitute an offence, surveillance officers and legal assistants would like the system to be able to draw their attention to suspicious and/or unusual movements so that potential problems can be prevented.

### 1.1. Scope of work

The work consists of:

- The implementation of a movement analysis function that determines the clients' habits (for example, the usual route to get from home to work) and makes it possible to report changes
- The realization of a function allowing to identify suspicious movements. For example: individuals meeting regularly at defined times, several individuals independently going to the same place on a regular basis (which could lead to a drug dealer).

### 1.2. Duration

The minimum duration for this study is 8 weeks

### 1.3. Type of study

- INTERNSHIP
- ~~END OF STUDY WORK~~

## 2. Addition of big data functions related to location and time in an electronic surveillance system for litigants

The Electronic Monitoring system developed by Upstream consists of the supervision of different nodes (bracelets) deployed throughout a country from 1 or 2 centralized platforms.

The persons under surveillance are monitored by means of a communicating electronic bracelet, which sends back data on the location of the persons under surveillance to centralized platforms developed by Upstream. These data can then be consulted by the surveillance officers.

Today, location data are presented as points on a map. Each point has a time indicator corresponding to when the position was taken. It is then up to the supervisory officers to interpret the meaning of these points to obtain relevant information. For example: the offender was at his home, at his ex-wife's home, at his children's school, prowling around a jewellery store,... The aim is to simplify the task of the surveillance officers by sending back data that can be more easily interpreted

### 2.1 Scope of work

The work consists of:

- The implementation of functions that return directly interpretable qualitative information such as predefined points of interest or a qualitative indication of the place concerned (home, school, café, place of worship, pharmacy, etc.)
- Cross-referencing with other available information sources (online press, social networks, report database, etc.) in order to obtain an even richer interpretation. For example: correlation of the offender's position with a crime scene and time, a prohibited demonstration, a riot,... and reporting the results

### 2.2 Duration

The minimum duration for this study is 12 weeks

### 2.3 Type of study

**INTERNSHIP**

**END OF STUDY WORK**

### 3. Mobile offender monitoring solution

The Electronic Monitoring system developed by Upstream consists of the supervision of different nodes (bracelets) deployed throughout a country from 1 or 2 centralized platforms.

The persons under surveillance are monitored by means of a communicating electronic bracelet, which sends back data on the location of the persons under surveillance to centralized platforms developed by Upstream. These data can then be consulted by the surveillance officers.

Today, the offender monitoring job is performed from a central location by dedicated person. A mobile application is to be considered as a complementary solution for the monitoring center allowing a surveillance in urgent situations.

#### 2.4 Scope of work

The work consists of:

- The analysis of the ergonomics and the formalisation of graphical propositions.
- The implementation of all the monitoring functions on a mobile device based on Android such as a smartphone or a tablet.
- The integration of the mobile solution in the existing Upstream's offender monitoring system.

#### 2.5 Duration

The minimum duration for this study is 12 weeks

#### 2.6 Type of study

- ~~INTERNSHIP~~
- END OF STUDY WORK

## 4. Offender devices test automation

The Electronic Monitoring system developed by Upstream consists of the supervision of different nodes (bracelets) deployed throughout a country from 1 or 2 centralized platforms.

The persons under surveillance are monitored by means of a communicating electronic bracelet, which sends back data on the location of the persons under surveillance to centralized platforms developed by Upstream. These data can then be consulted by the surveillance officers. The offender's home presence is verified by means of a device placed at the offender's house.

The production of very high quality devices for the Upstream's Offender Monitoring Solution is mandatory. At each step of the production, tests have to be performed in order to verify technical modules and functions behaviours.

### 2.7 Scope of work

The work consists of:

- The definition of a global testing solution strategy.
- The implementation of all end to end testing solution including a test application running on a server and the counterpart software modules on the devices.

### 2.8 Duration

The minimum duration for this study is 8 weeks

### 2.9 Type of study

- INTERNSHIP
- ~~END OF STUDY WORK~~

## 5. Stock Management for Offender Monitoring System

The Electronic Monitoring system developed by Upstream consists of the supervision of different nodes (bracelets) deployed throughout a country from 1 or 2 centralized platforms.

The persons under surveillance are monitored by means of a communicating electronic bracelet, which sends back data on the location of the persons under surveillance to centralized platforms developed by Upstream. These data can then be consulted by the surveillance officers. The offender's home presence is verified by means of a device placed at the offender's house.

A stock solution is a powerful tool accompanying the Customers handling thousand of devices in their day to day job.

### 2.10 Scope of work

The work consists of:

- The definition of a customer offender devices stock management in line with the processes in place during the solution operation.
- The implementation of a customer stock management prototype interfacing with the existing Offender Monitoring Solution of Upstream

### 2.11 Duration

The minimum duration for this study is 12 weeks

### 2.12 Type of study

- INTERNSHIP
- ~~END OF STUDY WORK~~

## 6. Mechanical optimization of an offender Monitoring bracelet

The Electronic Monitoring system developed by Upstream consists of the supervision of different nodes (bracelets) deployed throughout a country from 1 or 2 centralized platforms.

The persons under surveillance are monitored by means of a communicating electronic bracelet, which sends back data on the location of the persons under surveillance to centralized platforms developed by Upstream. These data can then be consulted by the surveillance officers. The offender's home presence is verified by means of a device placed at the offender's house.

Offender bracelet worn to the wrist is a disruptive concept enabling new capabilities in the electronic surveillance of offenders. The size, the shape, the resistance and security concepts related to this innovative solution need to be analysed in order to fit with the user's behaviours.

### 2.13 Scope of work

The work consists of:

- The mechanical analysis of the existing solution in order to propose an optimized shape, material, size and resistance solution.
- Adaptations mechanical propositions for resistance to IP67 and ATM30.

### 2.14 Duration

The minimum duration for this study is 16 weeks

### 2.15 Type of study

- INTERNSHIP
- END OF STUDY WORK