Petty cRiminality diminution through sEarch and Analysis in multi-source video Capturing and archiving plaTform

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Annexes

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1. Overview

The DoW describes this deliverable as:

D5.1) Trials Scenarios: This deliverable will provide definition and design of realistic and detailed test case scenarios based on the End-User partners' experience. This deliverable will also embody letters of confirmation stating that the locations are made inaccessible to the general public [month 20].

The aim of this document is to provide the description of related to petty crime scenarios to be used for the demonstration and evaluation of P-REACT technological solutions during the project final trials that will take place in Athens and Bologna, respectively. Along with the scenarios' description this document provides a detailed plan for the realisation of the final trials including Technological, Legal and Operational Constraints.

The rest of the document is composed by the following sections:

- Section 2 Trials Plan: In this section, we provide the management structures for the implementation of the trials along with responsibilities and assessment of possible risks.

- Section 3 Scenarios: In this section, we provide related scenarios associated with event lists to provide a better understanding on P-REACT reactions to external events for the end-users and evaluators.

- Section 4 Execution: In this section, we provide details on the trial areas, the trials roadmap with associated tasks and identified constraints.

- Section 5 Evaluation: In this section, we provide an overview on the evaluation frameworks and the adopted one for the evaluation of the trials.

- Section 6 Conclusion: In this section, we conclude the document with reference to future work related to the assessment of the evaluation results.

2. Trials Plan

Deliverable 5.1 describes trial scenarios, outlines the constraints related and maps out a plan for the trials preparation and execution. We have based this work on previous experiences in other FP7 projects, as well as, best practices in systems engineering.

According to system design there are generally four types of system tests [1]. Type 1 testing relates to early stage design while Type 2 testing is related to development of the system prototype and its components. Type 3 testing has to do with formal tests and demonstrations of post system prototype development. Type 3 testing requires that the system will be tested and evaluated in near to operational environment and conditions. Type 4 testing relates to continuous system testing after the actual deployment for further improvements.

In the P-REACT case, the planned trials fall into Type 3 testing, as we will test the system prototype towards real life operational conditions. In terms of Technology Readiness Level (TRL), P-REACT can be regarded as a TRL-6 level prototype after post successful trial completion.

This plan sets in place the basic rules for conducting the trials, defines the management structure, the partners' roles, and possible risks and provides key selected scenarios under which the system will be tested. Evaluation and reporting are also major parts of the trials. In this deliverable, we will discuss the selected evaluation framework to be used, and will define user evaluation criteria. However, reporting will be documented in D5.2, after we finish the trials and collect users' feedback.

We need also to clarify that the trials plan is dealing only with the final project trials and not for any intermediate lab testing phase, which is part of the project integration efforts in WP4.

2.1. Management

In this section we provide the main management structure for the trials along with the associated roles of project key persons (Figure 1).
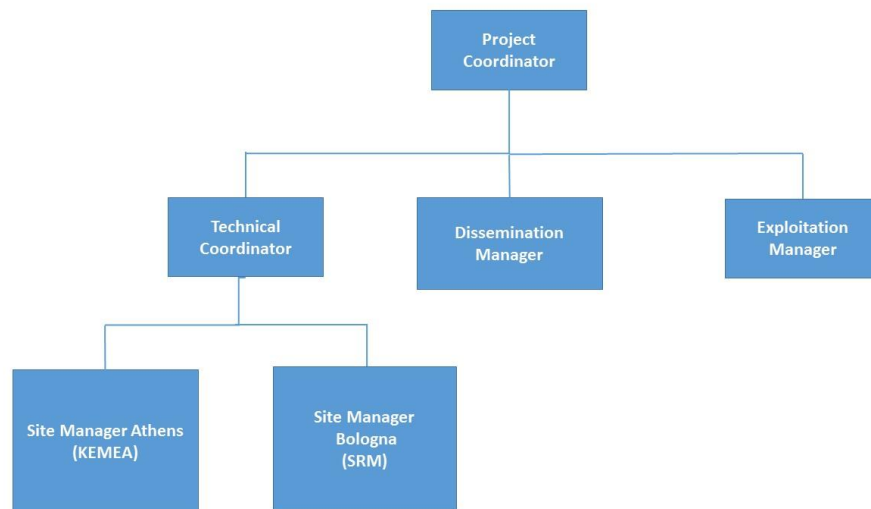
Figure 1 – Trials management scheme

2.2. Roles and Tasks

Project Coordinator (VICOM): Responsible for the overall management of the project and the main Point of Contact for conflict resolution.

Technical Coordinator (KINESENSE): Responsible for all technical issues regarding the trials with the support of WP 2, 3, 4 and 5 Leaders. In addition, the Technical Coordinator has to make sure that any technical issues will be properly addressed prior to the pilots.

Dissemination Manager (KEMEA): Responsible for:

- Production of promotional materials before the trials

- Production of promotional materials after the trials

Exploitation Manager (KINESENSE**):** Coordinating the setup of an exhibition area in each one of the trial sites for exploitation purposes.

Site Managers (KEMEA, SRM): Responsible for the following tasks in Greece and Italy, respectively:

- Availability of trial sites

- Availability of the required telecommunications infrastructure based on technical Coordinator instructions

- Availability of venue for setting up the P-REACT control room and hosting project and external participants

- Logistics support

- Ensure that pilot sites are inaccessible to public

- Invite stakeholders and EUAB members for the final trials. Any expenses for invitees will be covered by KEMEA and SRM, respectively within the allocated project budget

2.3. Risks and Mitigation

In this section, we provide a list of identified risks and mitigation actions (Table 1).

Risk	Prob.	Impact	Mitigation Plan
Weather Conditions not appropriate for external trials due to winter conditions, especially in case of rain.	High	High	Embedded systems should be able to operate under winter time conditions (water proof resistance).
Non availability of a trial site (Athens, Bologna)	Medium	High	The test and validation of P-REACT is planned to take place in two locations, one in Athens and one in Bologna. KEMEA can offer as a back-up option the Hellenic Police Training and Demo Centre (previous installation of the Olympic 2004 shooting centre) and needed resources for the execution of a final trial in a controlled environment.
Low participation of end-users during the trials for final evaluation.	Low	Medium	The consortium so far has developed strong links with the end-user community including Police, private security companies, commerce champers, transportation sector, small shop owner etc. We anticipate large participation at least from key stakeholders that are part of the P-REACT EUAB.
Social concerns related to CCTV systems	High	High	The project solutions are related to existing CCTV systems in private areas. Surveillance in private space is permitted by both the Italian and Greek legislation. However, to avoid any implications the trials will be conducted in areas not accessible to public.
Network speed might not be enough (upstream DSL connections might not provide sufficient speed)	Low	Medium	The consortium will ensure that adequate network resources exist at the trial sites and will evaluate possibility for a backup option based on 3G/4G network infrastructure both available in Athens and Bologna.

Risk	Prob.	Impact	Mitigation Plan
Network can also be down for a period of time	Low	Medium	Video files can be stored locally (encrypted).

*Table 1 - **Risks and mitigation plan***

2.4. Milestones

The list of milestones is described below in Table 2.

Trial Milestone number	Milestone name	Date	Means of verification
TM1	Finalisation of trial scenarios	M20	Submission of final scenarios as part of D5.1.
TM2	Data Privacy and Ethical issues	M20	Submission of data privacy and ethical requirements as part of D5.1.
TM3	Testing of video streaming and cloud infrastructure	M21	Technical tests in KEMEA (December 2015) prior to internal trials
TM4	End-user participation	M21	-A newsletter is released -Invitations are prepared and sent to end-users
TM5	Internal Trials	M22	Tests in actual trial sites. P-REACT operates as expected.
TM6	Final trial in Athens	M23	Successful completion of the trial as planned.
TM7	Final trial in Bologna	M24	Successful completion of the trial as planned.

*Table 2 – **List of milestones***

3. Scenarios

In this section, we provide a short description of two representative petty crime scenarios. These scenarios will be the means to better explain and illustrate P-REACT innovative solutions to end users that will be invited to attend the final trials and participate in the evaluation process. Therefore, the scenarios should be simple and easy to grasp by the end users.

WP2 undertook an analysis of petty crimes, their frequency and types. Please see D2.1 [2] for further information. Therefore, the consortium decided to focus on a number of crime types based on the work conducted in D2.1.

The Athens scenario will demonstrate break-in and assault, as two of the prominent issues identified by retailers. The trials will take place in a small shop and a gas station. As of the time of writing, 2,595 thefts in shops and gas stations were reported in the first semester of 2015 in Athens [3].

The Bologna scenario focuses on detecting petty crimes outlined as prevalent by the transportation

sector. The focus here will be on detecting vandalism, graffiti, anti-social behaviour and bag snatching against the people waiting in bus stations.

An associated event list is also provided along with the scenarios for better illustration of P-REACT operational concept and technological solutions.

3.1. Small Shop and Gas Station Scenario

"Happy Coffee" is a small coffee shop in the eastern part of Athens close to a market area. During working hours the coffee shop is full of people relaxing. However, when the market is closed, the area is vacant. Happy Coffee has been broken in to a number of times in the past. The owner has decided to deploy the P-REACT system where detected events are reported to P-REACT control room and alerts sent to Police.

Late afternoon around 7 p.m., the shop is closed. A motorcycle with two people arrives outside of the shop. One passenger gets off while the driver waits. The culprit breaks the window (A1) with a heavy screwdriver, enters in the coffee shop and removes the cash drawer. The P-REACT system detects the unauthorized intrusion using audio analytics that detect the breaking glass, and video analytics (A2) for motion detection/perimeter intrusion in the closed shop. Immediately after the detection of the event, already buffered video content from P-REACT cameras, is transmitted to the P-REACT cloud infrastructure to assist post-investigation of the incident (A3). An alarm is initiated to P-REACT monitoring system (A4). After the event is verified by the Control Room operators, the alert is transmitted to Police (A5) while P-REACT actively transmits video clips. As a result of the alert, the neighboring CCTV cameras covering the area outside of the coffee shop are activated for motion detection and transmit clips of interest to the control room. (A6). The culprit, however, jumps onto the motorcycle and the two suspects make off at high speed.

The two thieves have not finished yet their criminal activity. Next target is a nearby Gas Station that has been held up a few times in the past. The owner of the Gas station has signed up to the P-REACT system. The criminals arrive at the gas station and ask from the owner to fuel the motorbike. One of them walks inside the station shop pretending to pay for the petrol. When he approaches the cashier he bends over the counter and tries to remove the cash. The cashier is trying to push back the thief and screams. The event is detected by both audio (screaming) (A7) and video analytics (fighting) (A8). Like earlier, already buffered material, preceding the event, is transmitted to the cloud. Activated cameras of the gas station transmit captured clips to the P-REACT data centre (A9). The triggering of the alarm initiates a notification to the P-REACT control room (A10) and it is propagated to Police (A11) while

surrounding systems are automatically alerted. The thief, however, gets the money from the till and joins his companion outside and departs. At this stage the Police after having received the alerts from both the coffee shop and the petrol station have sent a patrol car while on their way they receive description of the suspects' vehicle and clothing as well as their direction of heading.

Figure 2 – Escape route

The event list related to Athens scenarios is presented below in Table 3.

Event	Short Description	P-REACT Responsiveness	Definition of Success	Technical requirements & Constraints
A1	Window breaks	Audio algorithm detection; 'Breaking glass"	A clip is generated of the suspect entering the shop	Need to confirm microphone placement to ensure detection of breaking glass.
A2	Perimeter Intrusion	Video algorithms detection: 'Motion detection'	A clip is generated which contains the thief entering the shop	Lighting and camera placement requirements need to be determined. Also need to see if the same sensor be used for A1 and A2.
A3	Video camera recording	Video clips are sent to data centre	Clips from A1 & A2 are displayed in the control room GUI	
A4	Alarm initiation	Alarm is shown in P-REACT control room	Alert appears in on alert list and sensor icon changes colour	
A5	Monitoring Personnel review alarm	Reviewing of alerts in the GUI	Monitoring personnel clicks on link to review clip(s) which he can playback. The Monitoring Personnel can also watch live stream	

Event	Short Description	P-REACT Responsiveness	Definition of Success	Technical requirements & Constraints
			from that camera.	
A6	Situational awareness from neighboring camera's	The initialisation of alerts on the shop's camera trigger the outside neighbouring cameras' to start sending clips based on motion detection.	Neighbouring cameras' to start sending clips	Neighbouring cameras' need to be configured to start sending clips based on motion.
A7	The clerk screams	Audio algorithms detection; screaming	A clip is generated which highlights the thief at the cashier	Distance: The microphone needs to be placed to detect the screaming needs to be confirmed
A8	The clerk pushes back the thief	Video algorithms detection	Video algorithms detect the action	Lighting and camera placement requirements for fighting need to be determined. Also need to see if the same sensor be used for A7 and A8.
A9	Video camera recording	Video clips are sent to data centre	Clips from A7 & A8 are displayed in the control room GUI	
A10	Alarm initiation	Alarm is shown in P-REACT control room	Alert appears in on alert list and sensor icon changes colour	
A11	Monitoring Personnel reviews the alarm	Reviewing of alerts in the GUI	Monitoring personnel clicks on link to review clip(s) which he can playback. The Monitoring Personnel can also view live stream from that camera.	

Table 3 – Athens Scenarios – Event List

Below we provide few screenshots of the PREACT GUI. Figure 3 shows an overall view of locations where P-REACT systems are installed; on the bottom left a street view of the selected location is shown. The status of each embedded system is indicated based on a colouring scheme where green icons represent that the ES is online, red icons indicate alarms, and finally grey icons indicate a lost connection to the system.
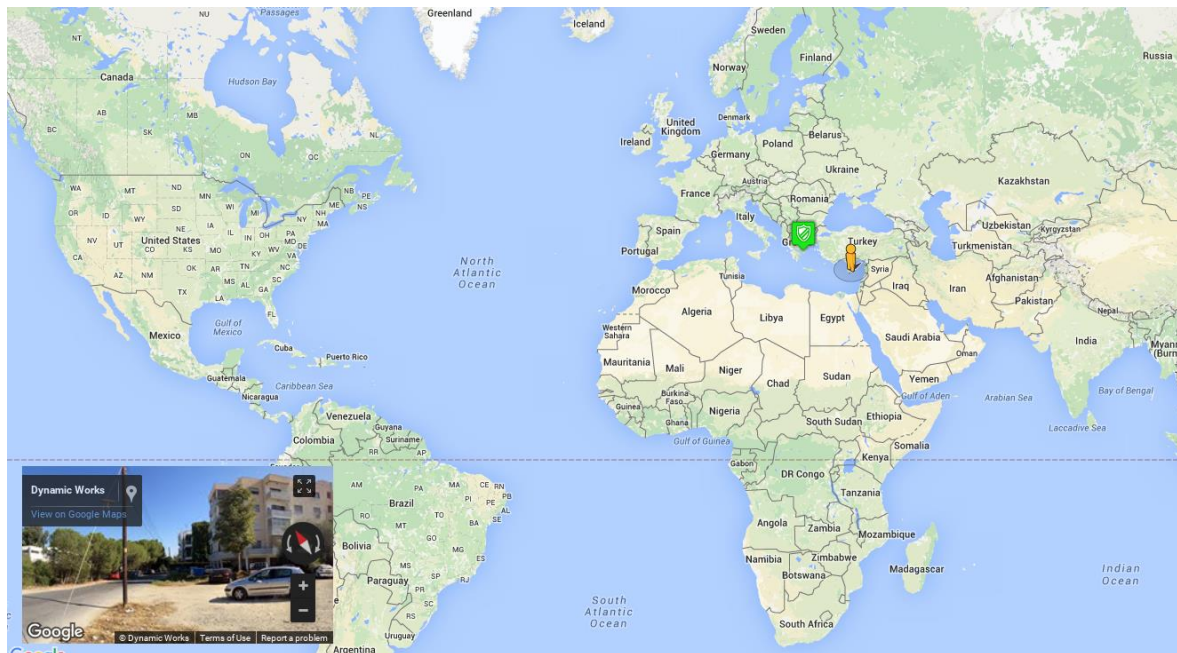
Figure 3 – P-REACT GUI map view

Upon the detection of abnormal activity, the P-REACT interface instantly generates an event. On the right hand side of Figure 4 the operator is capable of viewing event alarms as these occur. The Embedded system will change colour to red if an event alarm has been generated from this embedded system and be clearly visible on the GUI map.
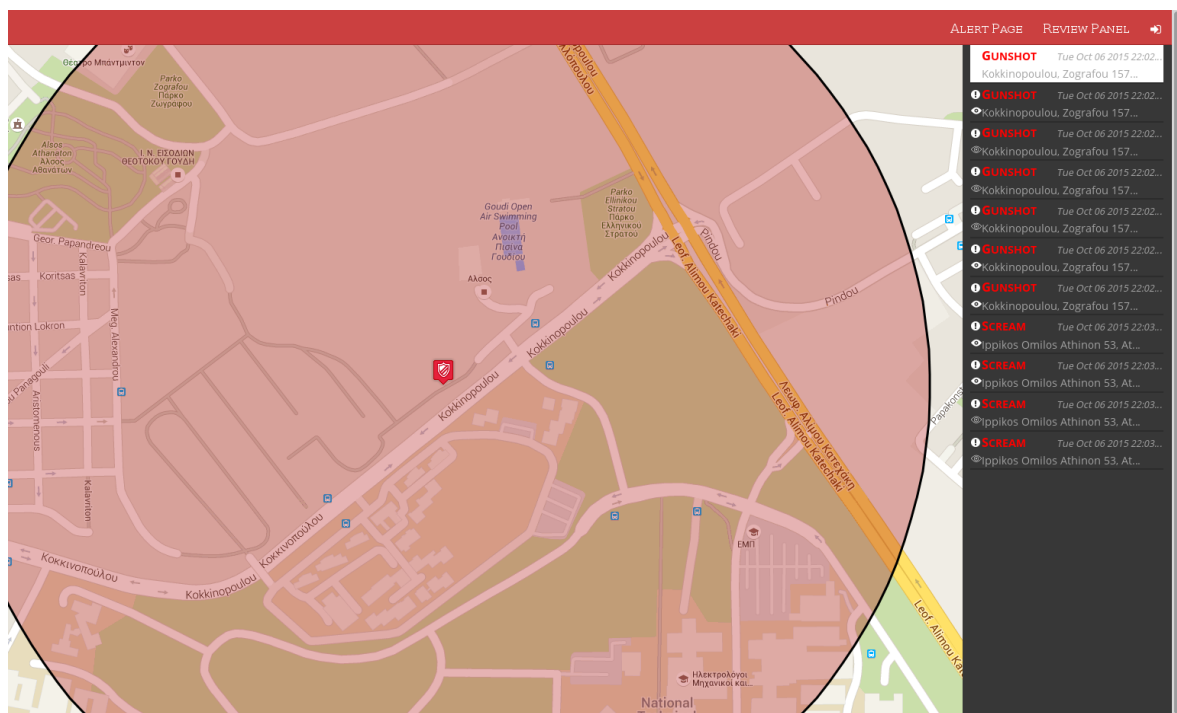
Figure 4 – P-REACT GUI triggered embedded system with alerts bar

Confidentiality: PU

To review an event, the control room operator can click on the alert and a panel with more details about the event is displayed, side by side to the street view map. The operator can then click to review the event clip and review a live stream from that camera. (Figure 5). Finally, Figure 6 shows a snapshot of the interface when multiple events occur at different locations.
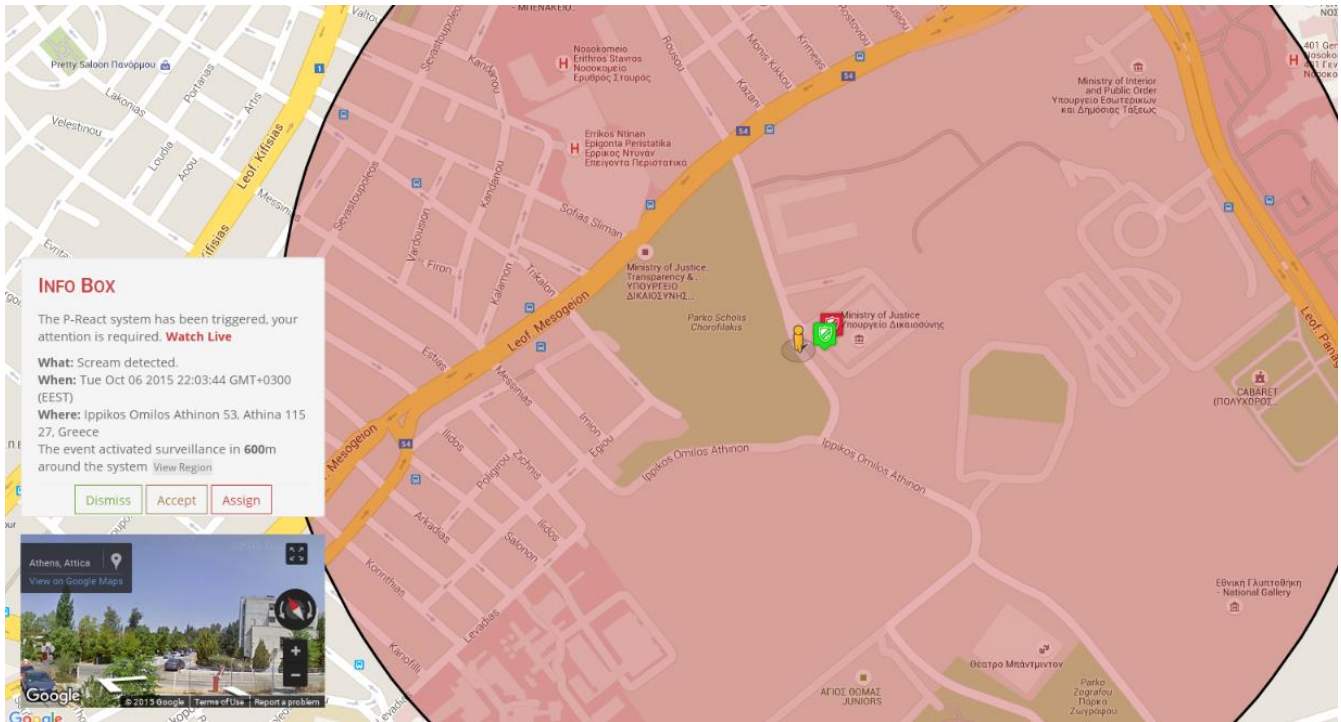

Figure 5 – PREACT GUI triggered embedded system with alerts bar
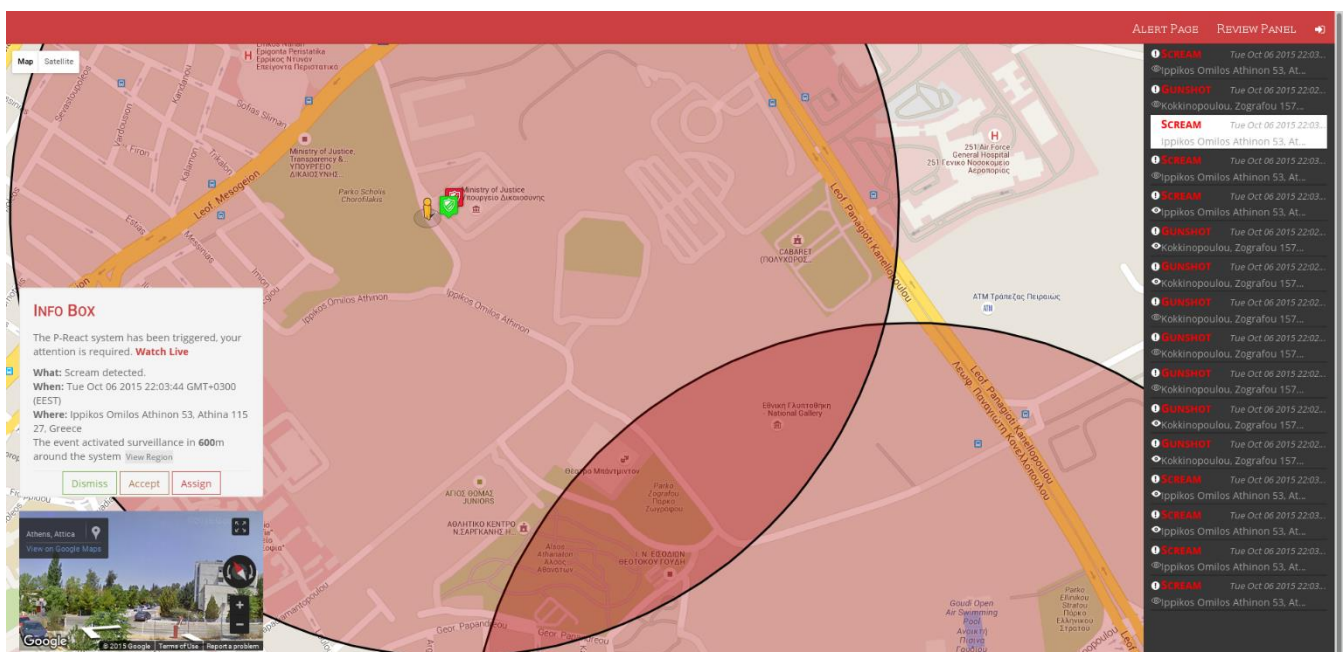

Figure 6 – Multiple events occurred at different locations as presented in the PREACT GUI

3.2. Transportation Sector Scenarios

Despite fencings and other security solutions already in place to prevent accessing the depot areas, PTU suffers intrusions from mainly youngsters who vandalize the parked vehicles (often by writing and painting the exterior of the buses). Vandalism can represents a considerable loss to the company over a period of time and the cost for removing graffiti from buses is considerable. For this reason, PTU has decided to install the P-REACT system to detect graffiti and automatically alert security personnel, in the depot area. One afternoon, an unknown person jumps over the PTU fence and heads towards the bus depot. The intruder starts to spray the exterior of a parked bus. The P-REACT system uses video analytics especially developed to detect graffiti (B1). The system starts uploading video clips (B2) initiating a response in the P-REACT control room (B3) and alerting the security personnel. As a result the intruder is detained and delivered to Police.

PTU, however, is facing even a bigger security challenge. Passengers have recently become victims of both physical attacks and bag snatching while waiting at bus stops. Indeed, Police records show that there have been several attacks by small groups against passengers at bus stops in the city.

In the light of latest complaints, PTU have installed P-REACT cameras at bus stops, in the city suburban area, where several attacks were recently reported. In the first week of P-REACT operation, the system detects a security incident involving aggressive behaviour by a small gang against a passenger waiting in a bus stop. The gangs start insulting a young person waiting at the bus stations who is trying to escape. Video analytics detect the event (B4) and video clips are uploaded to P-REACT data centre (B5). An alarm is initiated to P-REACT control room (B6).

In another occasion, the same gang is involved in bag snatching of another young person. P-REACT video analytics detect the event (B7) and video clips are uploaded to P-REACT data centre (B8). An alarm is initiated to P-REACT control room (B9). Police has now access to digital forensics based on P-REACT video clips stored in P-REACT data centre and manages to solve the case.

The event list related to Bologna scenarios is presented below in Table 4.

Event	Short Description	P-REACT Responsiveness	Definition of success	Technical requirements & Constraints
B1	Graffiti detection	Video algorithms detection; Graffiti	A clip is generated which shows the intruder(s)spray painting	The lighting and camera placement requirements for graffiti detection need to be determined based on where the bus will be parked
B2	Video camera recording	Video clips are sent to data centre	Video clips successfully uploaded to data centre	
B3	Alarm initiation	Alarm is shown in P-REACT control room	Alert appears in on alert list and sensor icon changes colour.	
B4	Anti-social behavior	Video algorithms detection; fighting	A clip is generated which highlights the group and victim at the bus stop	Lighting and camera placement requirements need to be determined
B5	Video camera recording	Video clips are sent to data centre	Video clips successfully uploaded to data centre	
B6	Alarm initiation	Alarm is shown in P-REACT control room	Alert appears in on alert list and sensor icon changes colour.	
B7	Bag snatching	Video algorithms detection; Bag snatching	Video algorithms detect the event	Lighting and camera placement requirements need to be determined
B8	Video camera recording	Video clips are sent to data centre	Video clips successfully uploaded to data centre	
B9	Alarm initiation	Alarm is shown in P-REACT control room	Alert appears in on alert list and sensor icon changes colour.	

Table 4 – Bologna Scenarios – Event List

4. Execution

In this Section, we provide in more detail about the two trial locations (Athens, Bologna). These locations will be inaccessible to the public during the internal and final trials. The trial roadmap provides time details, actions to be taken, and responsibilities allocation to project partners. We also describe the trial process and the legal and technological constraints.

Project
Petty cRiminality diminution through sEarch and Analysis in multi-source video Capturing and archiving plaTform

Phase
WP5 – Trials and End-User Feedback

4.1. Athens, Greece

The Athens trial will take place in two different locations. The first one, a small coffee shop, is located inside the campus of the Ministry of Citizen Protection, in the urban area of the city of Athens. KEMEA offices and control room are located in the same campus. The second location used for simulating the gas station theft is inside another Police campus few kilometres from KEMEA. We have already coordinated with the Hellenic Police and permission was given in order to use the Police gas station in all phases of the trial.

The invited experts and project partners will be accommodated in the KEMEA control room, which has all required infrastructure and IT services for the trial execution including a pair of projectors, video wall screens, white boards, large size touch screen etc. The control room set up and utilities fully supports all trial phases.
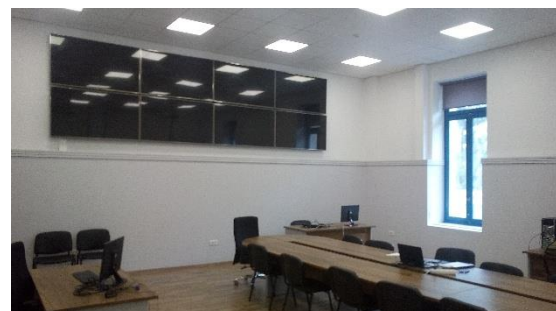
Figure 7 – KEMEA control room

In relation to external experts the consortium will invite stakeholders from those organisations that are part of the P-REACT End-user Advisory Board including security companies, Police departments, shop owners associations, representatives from Municipalities etc.

A tentative list of external experts from various business areas related to petty crime is shown in Table 5.

Organisation	Business Area	Location	Comments
ENLETS	EU Police Network	EU	
Hellenic Police	Public Sector	Athens	
Trainose S.A, Greece	Public Railway company	Athens	

Organisation	Business Area	Location	Comments
ICTS Hellas	Private Security Company	Athens	
ISS Security S.A	Private Security Company	Athens	
PYRSOS Security S.A	Private Security Company	Athens	
Municipality of Athens	Public Sector	Athens	
Municipality of Amarousion	Public Sector	Athens	
Athens Traders Association	Private sector	Athens	
Attika Gas Station Association	Private sector	Athens	

Table 5 – Athens Trail – List of Tentative End Users

4.2. Bologna, Italy

The trial in Bologna will be conducted within the depot area managed and operated by TPER (the company in charge for providing the public transport service in the city of Bologna), where buses are maintained at the end of their service, or parked waiting for maintenance. The depot is located in the first suburbs of the city, and is close to the SRM premises (approx. 5 kilometres), where the Control Room for the trial will be hosted.
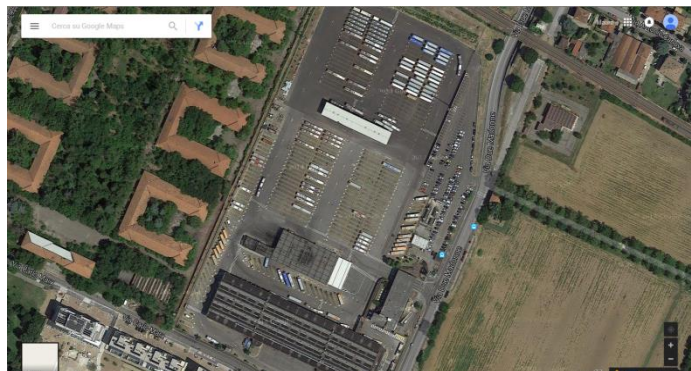
Within the depot, TPER will provide an area of about 1,500 m^2 to host the trial, and it will be physically restricted to authorized people (for technical and privacy reasons). The area is completely flat and paved, and on one side boarded by a 5 meter grass verge. A platform roof will be conveniently placed in the area, simulating a bus stop (model: URBUS, approx. 10x1.5 meters). Electric power and 4G technology is available in the area. Two lampposts are present (for possible installation of cameras), having different thickness. TPER will provide a bus to be used for graffiti.

The Control Room will be arranged in the SRM premises, where project partners, external experts and reviewers will be hosted, and introduced to the project and the trial. End-users and stakeholders, and in general people potentially interested in the P-REACT system (Table 6) will be invited to attend the trial, and contribute to the evaluation of the P-REACT system.
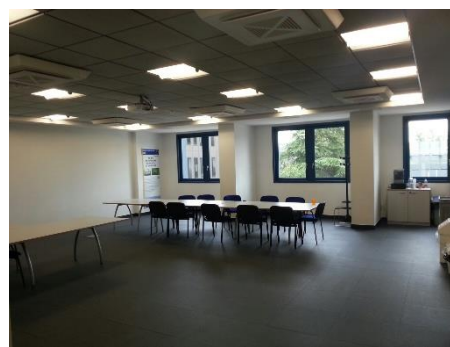
Figure 8 – SRM control room

Organisation	Business Area	Location	Comments
TPER	Public Transport Operator	Bologna, Ferrara	
SETA	Public Transport Operator	Modena, Reggio Emilia, Piacenza	
START	Public Transport Operator	Forlì, Cesena, Ravenna, Rimini	
TEP	Public Transport Operator	Parma	
Horarios do Funchal	Public Transport Operator	Funchal (PT)	
Roma Servizi per la Mobilità	Public Transport Authority	Roma	
AMAT	Public Transport Authority	Milano	
TEMPI	Public Transport Authority	Piacenza	
SMTP	Public Transport Authority	Parma	
AMI	Public Transport Authority	Ferrara	
Agenzia per la Mobilità di Reggio Emilia	Public Transport Authority	Reggio Emilia	
aMo	Public Transport Authority	Modena	
AMBRA	Public Transport Authority	Ravenna	
ATR	Public Transport Authority	Forlì, Cesena	
Agenzia per la Mobilità di Rimini	Public Transport Authority	Rimini	
Aeroporto di Bologna	Air Transport Operator	Bologna	
Interporto Bologna	Intermodal Logistic Platform	Bologna	
COTABO	Taxi driver Association	Bologna	
Confesercenti	Trade Association	Bologna, Italy	

Organisation	Business Area	Location	Comments
Confcommercio	Trade Association	Bologna, Italy	
Confartigianato	Trade Association	Bologna	
Camera di Commercio di Bologna	Trade Association	Bologna	
ASCOM	Trade Association	Bologna	
Polizia Municipale di Bologna	Law Enforcement Agency	Bologna	
Carabinieri – Legione Emilia-Romagna	Law Enforcement Agency	Emilia-Romagna Region	
Prefettura di Bologna	Law Enforcement Agency	Bologna	
Questura di Bologna	Law Enforcement Agency	Bologna	
Regione Emilia-Romagna	Public Administration	Emilia-Romagna Region	
Città Metropolitana di Bologna	Public Administration	Bologna	
Comune di Bologna	Public Administration	Bologna	
Università di Bologna	University	Bologna	
Ordine degli Ingegneri della Provincia di Bologna	Professional Board of Engineers	Bologna	
POLIS (and members)	Network of EU Cities and Regions for innovative local transport	Europe	
CIVITAS members	Network of EU Cities for sustainable urban transport strategies	Europe	

Table 6 – Bologna Trail – List of Tentative End Users

4.3. Roadmap

The trials will be conducted in two phases:

PHASE-1: This phase is related to the initial trial set up and the execution of intermediate trials prior to the final field trial. During this phase, the consortium will set up and test P-REACT in conditions similar to the final trials in order to identify and solve any critical issues. The end state of this phase will be the readiness of the consortium to execute the final trial.

PHASE-2: This phase is the actual final trial effort. The duration of this phase will be three (3) days. Two (2) days prior to the final trial will be used for final tests and fine-tuning. The final trial will be conducted

in the last day with the participation of external experts and evaluators within existing budget resources.

A timetable with the two trials and the phases is presented in Table 7.

Phase	Dates	Action	Time required	Responsible Partner	Comments
PHASE-1	30 November 2015	-Finalisation of the scenarios -Definition of the evaluation framework and how the evaluation will be realized -Definition of Evaluation criteria	1 month	KEMEA SRM KEMEA CERTH KEMEA	KEMEA for the Athens Trial SRM for the Bologna Trial
	31 December 2016	- Ensure all technical requirements for each one of the trial sites are met -Draft of P-REACT presentations for the final trials -Prepare list of end-users to be invited to the final trials -Prepare Newsletter for the trial	3 months	KINESENSE VICOM KEMEA SRM KEMEA	Technical requirements to be provided by the Technical Coordinator who has the overall responsibility of all technical issues in the project. -Presentations will be reviewed and modified if needed -Final version
	15 January 2016	-Confirm readiness of trial sites for internal trials -Preparation of Banners	1 month	KEMEA SRM All partners	-KEMEA and SRM to report to PC readiness of Trial sites -Draft trial agenda Banners will be designed and prepared by each one individual partner. Printing expenses will be covered by KEMEA dissemination budget.
	25-26 January 2016	Conduct internal Trial in Bologna	2 Days	SRM	-1 Day to install and test the equipment -1 Day to conduct the trial -Feedback will be used to fine-tune the final Trial (finalise agenda, check storyboard against test

Phase	Dates	Action	Time required	Responsible Partner	Comments
					cases, etc.) -24 January travel day to Bologna
	28-29 January 2016	Conduct internal Trial in Athens	2 Days	KEMEA	-As above -27 January travel day to Athens
	31 January 2016	-Finalise Agenda -Finalise Invitations to external experts and End-Users -Send Invitations to End-Users	2 Days	KEMEA SRM	-Final version
PHASE-2	23-24 February 2016	Preparation for the final trial in Athens	2 Days		-22 February 2016 for travel -Conduct drills
	25 February 2016	Final Trial in Athens	1 Day		Final Trial and Evaluation
	29-30 March 2016	Preparation for the final trial in Bologna	2 Day		-28 March 2016 for travel -Conduct drills
	31 March 2016	Final Trial in Bologna	1 Day		Final Trial and Evaluation

Table 7 – Trials roadmap

4.4. Trials Process

The trials process is based on the accumulative experience of the consortium partners in other related projects. P-REACT will follow almost the same process that KEMEA followed during the execution of the final demonstration in the FP7 PROACTIVE project [4], in which a rich panel of end user experts participated in the execution and the final evaluation of the project's results.

Real time video streaming will show the actual events as part of the trial scenario along with views from the P-REACT control room. Additional information will be provided through other dedicated screens and panels, while a facilitator will describe and comment the actions. A complete agenda will be prepared prior to the final trials as part of the trial Roadmap (Section 4.3).

Therefore, the whole procedure will be based on the following steps:

- Step 1: End users and other external invited experts will be presented the project concept, main objectives and achieved results (Project Coordinator & Technical Coordinator).

- Step 2: The host partner (KEMEA in Athens, SRM in Bologna) will present the trial site and the storyboard of the trial scenarios.

- Step 3: During the execution of the various events the most important P-REACT components will

be presented on real-time and the audience will be asked to observe the behaviour of the system and take notes (Project Coordinator & Technical Coordinator).

- Step 4: After the conclusion of the previous steps the evaluation procedure will be explained to the end users and other external experts (KEMEA).

- Step 5: The end users will be asked to fill in structured questionnaires in order to provide their feedback (KEMEA).

- Step 6: An open discussion will be initiated where all participants will take place, providing additional feedback and areas for improvements (Project Coordinator).

4.5. Data Privacy and Ethical Requirements

In this subsection, we will define data privacy and ethical requirements for commencing the project trials. Before setting up the set of requirements, we provide some related notes on how the trials will be commenced in both locations, and more specifically:

- In Athens, the consortium will make use of existing CCTV system installed in the small shop, which is located in the KEMEA campus. The second area related to trial scenario in Athens, is a Gas Station that is own by the Hellenic Police and is located in a Police campus, with existing CCTV systems installed.

- In Bologna the consortium will make use of existing CCTV systems installed in the depot area of TPER (the company in charge for providing the public transport service in the city of Bologna).

- Actors for the trails will be selected from project partners' organisations. In the Athens trial, the actors will be selected among the active Police Officers from KEMEA. In the Bologna trial, the actors will be selected from SRM personnel.

- Video files will not be kept after the execution of the trials, as the scope of the trails is to show case the P-REACT efficiency and functionality without any further data processing or data re-use.

Therefore, by taking into account the aforementioned facts, we define the following set of requirements that must be met by the Consortium in both trials. The requirements have been derived in close cooperation with the Ethical Board and are part of P-REACT Deliverables D1.5 "Privacy Impact Assessment" and D1.6 "Guidelines for Ethical, Privacy and Data Protection Issues". For a better presentation and indexing, we define the requirements in Table 8, along with responsibilities and due date. A final compliance report related to data privacy in regards to trials will be submitted at the end of the project, as part of the final project report.

Requirement Number	Name	Description	Submission Date	Responsibility
DP1	DPA notifications	Notification to Greek and Italian DPAs for the processing of End-user feedbacks after the trials.	December 2015	KEMEA SRM
DP2	Inaccessibility document	Prepare and sign inaccessibility documents for trials locations	December 2015	KEMEA SRM
DP3	Safety requirements	Compliance with Safety requirements imposed by the site authorities for the performance of the trials (official request by the site authority to the P-REACT Consortium for ensuring that no harm will be done to the volunteers (actors) during the testing activities).	December 2015	Project Coordinator
DP4	Data security level confirmation document	The cloud provider must sign a security level confirmation document before each trial.	December 2015	FINT
DP5	Letter of Request	A Letter of Request to seek participation in the P-REACT trials. A template has already defined within P-REACT Deliverable D1.6 (Section 5.1). The Letter of Request will be written in English, Italian and Greek languages.	December 2015	KEMEA SRM
DP6	P-REACT Informed Consent Form	Actors (officers of the security forces, volunteers1, or project partner's representatives2) who will be accordingly captured by the P-REACT system in real-time, prior accessing the trials site, will be requested/asked to sign the P-REACT Informed Consent Form. The Informed Consent Form will include details on the exercise (Exercise Plan Form and Actor Role Form with possible risks). The consent form template is provided in ANNEX III. The consent form will be translated in Greek and Italian Languages.	November 2015	KEMEA SRM
DP7	Representation of EAB during the trials	Ensure participation of at least 1 EAB member in each trial. Mrs. Mitrou will participate in the Greece trial and Mr. Alfonsi in Italy. Ms. Teodoro should at	January 2015 (Greece) March 2015	EAB

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[1] Volunteers (participants) need to be informed of the cameras on the trial site and have the right to give or refuse authorisation to be recorded.

[2] The inclusion/exclusion criteria will be defined such that each voluntary participant will be selected for their acting role in the exercise. All necessary steps will be taken to eliminate bias within the selection process in order to avoid discrimination based on physical and cognitive aptitude and political, social, religious and cultural, gender orientation. Under no circumstances will vulnerable subjects be selected as a P-REACT actor; this includes persons under the age of 18 and any other person unable to give the informed consent.

Requirement Number	Name	Description	Submission Date	Responsibility
		least attend one of them, if EAB budget allows it.	(Italy)	
DP8	Evaluation report of pilot sites	EAB should prepare a short evaluation of each pilot which will be included in the respective Deliverable D5.2 after the end of the trials.	March 2015	EAB
DP9	Data destruction confirmation letter	Project Coordinator to prepare a collected and processed data destruction confirmation letter.	March 2015	Project Coordinator

*Table 8 – **Data Privacy and Ethical Requirements***

Following we provide (Table 9 and Table 10) a detailed exercise description, along with specific actors' roles and associated risks for both trials. A template for the P-REACT Exercise Plan Form and Actor Role Form is included in ANNEX III, as part of the P-REACT Informed Consent Form.

Event	Exercise Description	Actor's Role	Data Type Captured	Associated Risks
A1, A2	The culprit breaks the window with a heavy screwdriver, enters in the coffee shop and removes the cash drawer. The P-REACT system detects the unauthorized intrusion using audio analytics (A1) that detect the breaking glass, and video analytics (A2) for motion detection in the closed shop.	The Actor will simulate the break-in in a small coffee shop by breaking the window. A camera will capture this action. Video from the cameras will be streamed to the P-REACT control room located in KEMEA	Image of the actor	As video files will be transmitted via the existing public network (Internet or 3G/4G network) there is always the risk of eavesdropping, as this is the case with all public communications networks. Secure transmission protocols must be in place with end-to-end encryption algorithms.
A6	As a result of the alert, the neighboring CCTV cameras covering the area outside of the coffee shop are also being activated and transmit clips of the surrounding – to the event – area (A6).	The Actor after the beak-in will go outside of the shop and will set off with a motorcycle. A video camera will capture this action. A second Actor will act as the driver of the motorcycle. A camera will capture this action. Video from the cameras will be streamed to the P-REACT control room located in KEMEA	Image of the actors	As above

Event	Exercise Description	Actor's Role	Data Type Captured	Associated Risks
A7, A8	The criminals arrive at the gas station and ask from the owner to fuel the motorbike. One of them walks inside the station shop pretending to pay for the petrol. When he approaches the cashier he bends over the counter and tries to remove the cash. The cashier is trying to push back the thief and screams. The event is detected by both audio (A7) and video analytics (A8).	The Actor will simulate a thrift action by removing the money from the cashier. This event will be captured by a camera. A second Actor will act as the clerk in the gas station. Video from the cameras will be streamed to the P-REACT control room located in KEMEA	-Image of actors -Voice of actors -Image of actor -Voice of actor	As above
A9	Like earlier, already buffered material, preceding the event, is transmitted to the cloud. Activated cameras of the gas station transmit captured clips to the P-REACT data centre (A9).	The Actor after the robbery will go outside of the shop and will set off with a motorcycle. A video camera will capture this action. A second Actor will act as the driver of the motorcycle. A camera will capture this action. Video from the cameras will be streamed to the P-REACT control room located in KEMEA	-Image of actor -Image of actor	As above

Table 9 – Athens Trial – Actors' Roles

Event	Exercise Description	Actor's Role		Associated Risks
B1	One afternoon, an unknown person illegally trespasses PTU fence and heads towards the busses depot. The intruder starts to spray the exterior of a parked bus. The P-REACT system used video analytics to detect graffiti (B1).	The Actor will simulate an intruder in the depot area managed and operated by TPER (the company in charge for providing the public transport service in the city of Bologna). A camera will capture this action. Video from the camera will be streamed to the P-REACT control room located in SRM premises.	-Image of actor	As video files will be transmitted via the existing public network (Internet or 3G/4G network) there is always the risk of eavesdropping, as this is the case with all public communications networks. Secure transmission protocols must be in place with end-to-end encryption algorithms.
B4, B5	The gangs start insulting a young person waiting at the bus	Two Actors will play the role of gangs.	-Image of actors -Voice of actors	As above

Event	Exercise Description	Actor's Role		Associated Risks
	stations who is trying to escape. Video analytics detect the event (B4) and video clips are uploaded to P-REACT data centre (B5).	Another Actor will play the role of the victim. Video from the camera will be streamed to the P-REACT control room located in SRM premises.		
B7, B8	In another occasion, the same gang is involved in bag snatching of another young person. P-REACT video analytics detect the event (B7) and video clips are uploaded to P-REACT data centre (B8).	Two Actors will play the role of gangs. Another Actor will play the role of the victim. Video from the camera will be streamed to the P-REACT control room located in SRM premises.	-Image of actors -Voice of actors	As above

Table 10 – Bologna Trial – Actors' Roles

4.6. Operational Constraints

This section outlines some of the key operational constraints to be taken into account during the deployment of a video surveillance system. These factors have been taken into account during the design of the solution, the scenarios and preparation for the trials.

Context, environment, asset and risk	➢ **Context** (all factors that influence the threat environment, but are not actually part of it): Factors such as weather conditions including lighting, rain etc. are important factors for video analytics. The dynamics of changing weather conditions are also an important factor. Audio analytics are affected by background noise and as such need to be calibrated. The hardware will be proofed against such environmental factors but these factors may affect the analytics and therefore increase false alarms rates. Security awareness and perceived risk is important as it will affect how people can be influenced. The use of actors will always affect behaviour. As much as possible, actors will be given guidance to act as natural as possible. ➢ **Environment** (all factors that directly interact with the threat, the asset or the surveillance system): The type of the environment i.e. indoor/outdoor, the type of object under surveillance- person/object (bus/door etc.) and the density of objects mostly related to moving objects are important factors. These factors have been taken into account in the given scenarios. Density is one issue which may affect the false alarm rate in the given scenarios. ➢ **Risk** (all factors that have a cause and impact effect):

	The threat level, motivation, frequency or probability and the impact are important factors. Also the responsibility and modus operandi are relevant factors to take in to account as it determine show the surveillance system should be designed and deployed. These factors have been considered in relation to accounts of end users but may not be applicable to all potential users at the trials.
Surveillance system: sensors, situational awareness and threat assessment	➢ **Sensor** Cameras and audio sensors have been chosen that work with the Embedded system and meet the requirements of the individual audio and video analytics. Equally important will be the placement of the sensors so that they can capture the FOV/range and detect the activity they were designed for. The cameras will be static and not capable of pan and tilt. ➢ **Situational awareness (**Situation awareness is the perception of the environment with respect to time and/or space) The functionality of the system has been designed in order to provide optimum spatial and time references to the monitoring personnel in relation not only to an event alarm but also to the connected camera's, which provide insightful. Suspect tracking from one camera to another will however not be fully automatic. It will require human observation. ➢ **Threat assessment (**The threat assessment is the process which uses the situational awareness to estimate the concrete threat.) The function of the system has been designed to provide the operator with sufficient views towards conducting a threat assessment. This includes an overview map of the city, colour codes for sensors according to assessment, alarm clip and real-time streaming, and decision making processes. The reliability of the system in terms of detection rates and false alarms will directly affect threat assessment. If the solution provides too may false alarms, valid threats may be rejected by users.

The above described factors have been taken into account in the given scenarios and as such technical constraint comments have been added to Table 3 and Table 4. Such influencing factors will be explored during the private trials in more detail. The private trials will be instrumental in preparing for the public trials. In advance of such trials taking place, a tentative (subject to change) list of technical items and responsibilities has been drafted.

Item	Athens	Bologna
Cameras & cabling	Coffee shop : 2 (1 indoor for A1& A2, 1 outdoor for A6) Petrol station: 2 (1 indoor, 1 outdoor) 2 Live wide field of view camera's streaming an overview at each location	Bus Graffiti : 2 (1 for B1, possibly a second for perimeter intrusion) Bus shelter: 2 (for Anti-social/assault detection) 2 Live wide field of view camera's streaming an overview at each location

Item	Athens	Bologna
Embedded Sensors	Embedded sensors for camera's above	Embedded sensors for camera's above
Cabling	To be advised	To be advised
Electricity points	TBA	FINT
Transmission card and service	4G card (x 4) with coverage range for 2KM. 3 months no limit restriction	4G card (x4) with coverage range for 2KM. 3 months no limit restriction
Camera mounting poles and mounting attachments	4-6 poles	4-6 poles
Computers	1-2	1-2
Monitors	TBA	TBA

Table 11 – Trial Technical Requirements

5. Evaluation

In this Section, we provide an overview of widely used evaluation procedures. This review will assist the consortium on the selection of the evaluation framework that better fits to planned trials and evaluation scheme. This facilitates the selection of components for the proposed methodology, illustrates the thought-process behind it and further ensures that no aspect of the evaluation is neglected given existing capacity.

5.1. Evaluation Frameworks Review

Evaluation techniques are many and varied in their domain. However, when broken down into their fundamental components specific parameters and taxonomies emerge. These are based on criteria such as timing, the way of conducting them and their purpose.

More specifically, timing of the evaluation follows the taxonomy below:

- *Ex ante* evaluation [5] is carried out before the implementation of an intervention, but it needs to be planned, i.e. defined with some degree of detail. An ex ante evaluation allows the assessment of the relevance and coherence of an action because its findings are taken into account before final decisions are made. It also allows the assessment of any problems in the development phase, whether the strategy and objectives are relevant, whether there is any inconsistency among them and whether the desired impact is realistic.

- *Ad interim* evaluation [5] covers the whole horizon of implementing an intervention, and since it takes place during the monitoring of outputs and outcomes, it is often confused with that activity, even though they are distinct. This evaluation consists of a series of detailed studies, since it

includes further analysis on evaluation issues arising during implementation. It allows a consistent and effective collaboration between the evaluator and the person who manages and carries out the intervention, and therefore it generates better and more appropriate conclusions and recommendations.

- *Ex post* evaluation [5] is carried out not before the intervention is terminated and after a reasonable period of time. It seeks to estimate the efficiency and effectiveness of an intervention, to identify factors of success or failure, to assess the sustainability of results and impacts and to draw conclusions that can be generalized to other interventions. For this reason, the ex post evaluation must be conducted with a delay relative to the end of the implementation.

As far as way of conducting an evaluation we have the following types:

- *Internal* evaluation [6] is carried out by organizations, groups or communities directly involved in the implementation of the intervention. It is usually used with other forms of external evaluation and it is useful to allow those who participate in the implementation to improve their performance and adjust their running programs.

- *External* evaluation [6] is carried out by external specialists who are not employed within the organization responsible for the object of evaluation and who have no personal, financial or direct interest in the object. Thus, external evaluations guarantee a more critical distance and a more neutral assessment of the object to evaluate than is possible in the case of internal evaluation, but on the other hand internal evaluation allows a deeper and faster access to information and a wider awareness of the product.

Lastly, the purpose of an evaluation defines it as:

- *Formative* evaluation [7] when used to support the actors, such as managers and persons directly interested and involved, and helps them improving their decisions and their activities in general. It is mainly applied during the implementation of an intervention and as such, aims to assess its effectiveness and its relevance.

- *Summative* evaluation [7] when it aims to determine the effectiveness of an intervention. It is carried out for the benefit of external spectators or decision makers (who are not directly involved in the development of the intervention). Summative evaluation is conducted, for example, for reasons of accountability, for reporting on research results or justifying expenses.

5.2. P-REACT Evaluation Framework

For the scope of P-REACT, our pilot evaluation will be:

- **ex-post** in terms of timing since it takes place after the development of the P-REACT system.

- **external** in terms of how it will be conducted since it will be demonstrated and evaluated by representatives of the end-user community not related to the consortium.

- **summative** in terms of its purpose since it will be used for reporting on research results.

Having defined the main characteristics of the evaluation, we need to select the appropriate evaluation tools to implement given existing limitations and resources available. Generally speaking, the most commonly used tools and techniques for evaluation purposes are [8]:

- Observation

- SWOT analysis

- Questionnaire survey

- Case studies

- Analytical models

- Expert panels consultation

- Cost-benefit analysis

- Multi-criteria analysis

Considering the particular design and nature of P-REACT evaluation, which is based heavily on end-user Observation the most appropriate tools are a Questionnaire survey and case studies (scenario presentation).

Consultation techniques will play a particularly significant role in our evaluation since user feedback through the use of a questionnaire is the cornerstone of our evaluation methodology. To that end, the most widely used consultation techniques to help us achieve high quality end-user feedback are:

- *Interview* (or face to face): Usually the interviews are based on a thorough face-to-face discussion with an individual, in order to gather specific information on individual issues. The interview technique is used to gather qualitative information and opinions of the people involved in a particular program or project, in its context or the outcome or impact. Various forms of talk can be distinguished, each of which carries a different purpose: the informal interview, the semi-structured interview guide-based and structured interview (the stricter approach).

- *Focus groups*: These are interviews/debates aimed at a homogenous group of subjects composed of a number of people (usually from 6 to 12) whose attention is focused on a specific topic that is explored in depth. A moderator directs and leads the discussion among participants

and facilitates the interaction. The technique is often applied with a soft qualitative evaluation approach that is when it is appropriate to use assessments, judgments, opinions expressed by professionals, experts and users/customers to gather the different points of view on a subject, a process, a result, a product etc.

- *Delphi technique*: Unlike the focus group where experts are called together to respond to questions prepared by the facilitator on the objectives of the consultation, the Delphi technique is based on an indirect interaction and structured communication between experts. It also called "repeated interview" in the sense that the same experts answer at least two ladders of questions that need to be gradually more and more structured on the basis of the results of the previous round of interviews. Compared to the focus group this technique requires more time but it is certainly easier to organize the experts to carry out one at a time whereas the focus group must be drawn in the same place, same time and for the same time experts.

- *Nominal Group Technique*: This technique differs from Delphi as the experts, while at the same place at the same time, usually do not interact directly with one another but always through the researcher who collects and processes from time to time statements provided verbally or in writing. The technique requires that the experts involved know the answers provided by other interviewees and express their opinions or make additions, but only during their turn, without replying directly to the author of the intervention.

- *Brainstorming*: Brainstorming is one of several non-group techniques developed for the assessment, with the special devotion to facilitate creativity and production of new ideas. The traditional version of brainstorming involves a group of people, better if led by a moderator. The group is asked to produce new ideas rather than comments on old ones, regardless of their value.

As expected these techniques have different limitations and drawbacks. However, common problems that crop up during evaluation regardless of technique are missing data, simple or subjective classification of data, insignificant or not generalizable information gathering, biased or unreliable answers, arbitrary selection of information, ambiguity of results etc. That is why specific problems derived from a single kind of evaluations could be mitigated by the use of a composite analysis. Therefore, the overall evaluation design and strategy is based upon examining three main parameters of the P-REACT system. These are:

- it's **intuitiveness**: how the estimations produced by the P-REACT system match those of the end-users or seem/expected reasonable to them

- it's **usability**: ease of use, GUI functionality, output usefulness

- and ultimately it's **marketability**: usefulness to the end-user, willingness to buy

Due to the optimal management of time and effort and given that the focus of the evaluation is not to test P-REACT from a purely technical point of view or based on a software evaluation approach only a small subset of all above mentioned areas will be used. More specifically, the usability and intuitiveness parameters will be examined through the use of a questionnaire which will feature a combination of probe questions relating to performance expectation, ease-of-use, understandability, reliability, functionality, image (GUI) and efficiency.

5.3. End-User Evaluation Guidelines

For P-REACT pilot evaluation we will take into account and answer the following issues:

- What has to be evaluated?

The functionality of P-REACT, the intuitiveness of the underlying technologies as well as the overall marketability of the end-product of P-REACT will be evaluated.

- Who is interested in the evaluation?

The primary beneficiary of the evaluation will be the consortium in its entirety. All partners will receive valuable feedback regarding the P-REACT system on various levels including the technical development, efficiency of the system, etc.

- What critical issues have to be tackled?

The evaluation will be considered to have provided positive feedback when end-users reply to the questions posed by the questionnaire or express opinions in the focus groups which indicate that P-REACT is:

- performing well and provides useful information

- easy to use

- easy to understand, learn to operate and ultimately facilitates decision making

- reliable, works flawlessly and without a hitch

- equipped with an easy-to-follow interface and features an ergonomic GUI

- providing added value to the end-users and increases the efficiency of their day-to-day activities

- What has to be measured?

The main indices that will be measured through the questionnaire are:

- performance expectation

- ease-of-use

- understandability

- reliability

- functionality

- image (GUI)

- efficiency

- How the evaluation has to be performed?

The evaluation will be conducted in the following steps:

- Test scenarios are presented to the end-users.

- A related questionnaire is presented to end-users to assist them in the evaluation process.

- The trials are conducted in real time and the end-users form a focus group which is asked to evaluate the different aspects of P-REACT system collectively. This is where end-users views are put in perspective within the group and additional conclusions are drawn.

- Who is involved in the evaluation?

The end-users and stakeholders of the P-REACT project have been extensively identified. These are:

- Law Enforcement Agencies

- Security stakeholders

- Private companies operating in the security sector

- Experts and stakeholders in the transportation sector

- Owners of Small Shops and Gas Stations

Evaluation criteria will be in a suitable form for end-users, and they will take into account technical criteria that are defined in P-REACT D2.2 "P-REACT Local Embedded framework and system on the cloud requirements" [9].

As for the production of the evaluation results along with end-users feedback, these will be reported after the conclusion of the trials in D5.2 "Trials results evaluation".

5.4. Questionnaire Organisation

The questionnaire is split into four main sections each aimed at examining a different aspect of the end-users' view on the P-REACT system. These sections will additionally facilitate the reporting of the feedback collected as they set the pillars upon which the evaluation is based. These are:

General Information

This is the introductory part of the questionnaire where the end-user identifies himself and provides information about his role/expertise along with some contact information. This is done to facilitate data analysis and help draw useful conclusions regarding the point of view of each end-user and how that affects its answers.

Intuitiveness

In this section, the end-user evaluates the overall framework of P-REACT on its efficiency, speed and accuracy based on their expertise and experience using similar tools wherever applicable. Several indicators are used to estimate overall satisfaction and credibility of produced output as well as identify suggestions for improvements and use cases which the tool facilitates. If the end-users appear to be positively disposed towards the P-REACT's intuitiveness answers like "Strongly agree" or "Agree" are expected to arise since all questions are "positively expressed". This would be a clear indication of a favourable evaluation of the soundness of the P-REACT system and additionally it would indicate that P-REACT offers significant advantages over existing procedures and tools currently employed.

Usability

This section is used for the evaluation of P-REACT on a more technical/user-experience basis. Indicators of ease of use and convenience are used along with questions regarding potential problems with actual use, speed and user interface.

Marketability

This section of the questionnaire is particularly designed to aid in the understanding of the tool's market and provide added value to exploitation of project results. The end-user is asked questions pertaining to the perceived value of P-REACT. Furthermore, indicators relating to the willingness to acquire P-REACT or its related services are also present along with an evaluation of the P-REACT's innovation aspect and utility. In addition, data concerning the organization the end-user represents are gathered in an effort to formulate a more precise image of the project's market.

The complete final version of the questionnaire is presented in ANNEX IV.

6. Conclusion

We described in this document the P-REACT trial scenarios along with a plan for early preparation and identification of critical issues towards the final trials.

The main part of the plan was based on previous FP7 research projects and the accumulative experience of project partners in the field. We defined the main roles and key functions for the preparation of the trials with associated risks, mitigation actions and a list of milestones.

The trial scenarios presented in Section 3 were based on the analysis of petty crimes in many European countries and were targeted to petty crimes in small shops and the transportation sector. An events list was defined to better map the P-REACT technological solutions with the storyboard of the scenarios and expected reactions by the system.

In Section 4, we provided details of the trail areas and a roadmap with specific actions from the preparation to the execution phases. One important part of the preparation phase was to define the data privacy and ethical requirements to ensure that participation of actors, video and audio capture by CCTV systems would be in line with current EC and National directives and applicable laws. To this end, the consortium prepared in close collaboration with the P-REACT EAB a list of data privacy requirements and an Informed Consent Form template in line with P-REACT Deliverables D1.5 "Privacy Impact Assessment" and D1.6 "Guidelines for Ethical, Privacy and Data Protection Issues". We also agreed that the EAB should be represented in the final trials with the participation of at least one representative of the EAB. That would ensure a proper response to any late identified gap related to data privacy and ethics during the final trials.

The evaluation part of the final trials was presented in Section 5. Special attention was given for the selection of the evaluation framework, after taking into account the type of the trial, the participation of end-user experts and a set of well-defined evaluation frameworks. To this end, an *ex-post, external* and *summative* evaluation framework was decided. A related questionnaire to help us grasp the end-user feedback was also defined and prepared as part of this document. Trail results will be reported in D5.2.

Finally, it is worth highlighting that D5.1 was designed in such a way not only to cover the specific aspects of the P-REACT project but also to be used as a reference document within any on-going and future research project.

ANNEX I. GLOSSARY AND ACRONYMS

Term	Definition / Description
CCTV	Closed-Circuit television
EAB	Ethical Advisory Board
IaaS	Infrastructure as a Service
LEA	Law Enforcement Agency
PaaS	Platform as a Service
FOV	Field Of View
PIA	Privacy Impact Assessment
VCMS	Video Content Management Server
VPN	Virtual Private Network
VSaaS	Video Software as a Service

Table 12 - Glossary and Acronyms

ANNEX II. REFERENCES

The table below shows the most significant references used and/or cited to prepare this document:

Reference	Source
[1]	Benjamin S. Blanchard, Wolter J. Fabrycky, "Systems Engineering and Analysis (5th Edition)", Prentice Hall International Series in Industrial & Systems Engineering, ISBN-13: 978-0132217354, ISBN-10: 013221735X.
[2]	P-REACT Deliverable D2.1 "Petty Crimes Analysis and Initial Glossary", available on-line at http://p-react.eu/wp-content/uploads/P-REACT_Deliverable_D2.1_v2.01.pdf.
[3]	Hellenic Police Statistics, available on-line: http://www.astynomia.gr/
[4]	PROACTIVE FP7 project, Contract Number: 285320, http://www.fp7-proactive.eu/.
[5]	F. Bourguignon, Francisco H, G. Ferreira, P.G. Leite, "Ex-ante evaluation of conditional cash transfer programs: the case of Bolsa Escola", Issue 2916 Policy research working papers, World Bank Publications, 2002.
[6]	B. Volkov, M.E. Baron, "Internal Evaluation in the 21st Century", John Wiley & Sons, ISBN: 978-1-118-20430-6, 2011.
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[8]	L. G. Morra-Imas, R. C. Rist (2009), "The road to results: designing and conducting effective development evaluations, World Bank Publications, ISBN-13: 978-0821378915, ISBN-10: 0821378910, 2009.
[9]	P-REACT Deliverable D2.2 "P-REACT Local Embedded framework and system on the cloud requirements", available on-line at http://p-react.eu/wp-content/uploads/P-REACT_Deliverable_D2.2_FINAL_4.6.pdf.
[10]	P-REACT Deliverable D2.3 "P-REACT Conceptual Architecture", available at http://p-react.eu/wp-content/uploads/P-REACT_Deliverable_D2.3_v3.0.pdf.

ANNEX III. P-REACT INFORMED CONSENT FORM

P-REACT

Informed Consent Form

Name/description of the Organization/Consortium

P-REACT Consortium Contact Person (s): Juan Arraiza Irujo

This Informed Consent Form has two parts:

Information Sheet

Certificate of Consent

You will receive a copy of the filled and signed Informed Consent Form

PART I – P-REACT INFORMATION SHEET

Purpose of the research and of data collection:

- P-REACT project involves human research subjects.

- The purpose of P-REACT project is to design and develop a low cost surveillance platform that will ensure communication between key users with a focus on increasing the ability of Law Enforcement and security personnel to respond to   minor crime events such as theft, trespassing etc. The solution will encompass intelligent video and audio sensors to detect volume crime incidents, a cloud based monitoring, alert detection and storage platform. Your participation to this research is on a voluntary basis. P-REACT is funded by the European Union's Seventh Framework programme under Grant Agreement 607881.

- The video files will be transmitted by using the public network with end-to-end encryption protocols.

- The video files will be stored during the trial day on a private P-REACT cloud infrastructure with dedicated firewalls and security protocols in place.

- The video files collected during the trial will be used only on the day of the trial to show case the effectiveness and the efficiency of P-REACT. No any other processing will be performed after the end of the trial.

- The video files related to trial will be available only to the consortium partners. The video files will be securely erased after the end of the trial.

- Should you have any further questions, or wish to withdraw at any time from the

research without consequences, please contact:

- [Project Coordinator / Pilot Partner Contact Details]

Participant selection	
Participants to facilitate the overall organization of the single testing event/exercises are selected among the personnel of the project partners.	
Chair of Selection Panel of Voluntary Participant	
Name and Surname	
Address	
Email	
Telephone	
Fax	
Exercise details	
Exercise Plan Form	(details for information purposes)
Actor Role Form	(details for information purposes)
Possible Risks	
	[to be specified – if any -according to the specific plan and role forms].
Incentives:	
□	Research credits (to be specified further)
□	Course credits (to be specified further)
x	Certificate for participation in the project
Types of data to be collected	
Image and audio data will be produced by your participation in the trials.	
Exercise Plan Form	(details for information purposes)
Actor Role Form	(details for information purposes)
Name of the partner/person responsible for the "exercise"	
Name and Surname	
Address	
Email	
Telephone	
Fax	

PART II - CERTIFICATE OF CONSENT

Voluntary Participant Data:	
Name and Surname	
Profession	
Email	
Telephone	
Fax	

Voluntary participation and Right to withdraw:
Your participation in the P-REACT project is completely voluntary.

You are free to withdraw from the project [within the time limits outlined in the Information Sheet], without giving a reason for my withdrawal without any consequences to my future treatment by the researcher.

You retain all rights provided by the applicable data protection legislation (access, deletion, correction etc.)

If you decide to withdraw from the project, please contact the P-REACT contact person (s).

You should know that you may be withdrawn from the project for any of the following reasons:

- If you don't follow the Consortium instructions.
- If you don't attend the scheduled data collection sessions.
- If the whole project is stopped, for reasons not known now.

Confidentiality
The P-REACT researchers who see/access this information will keep it confidential.

Applicable Laws/Directives	***Italy*** The Charter of Fundamental Rights of the European Union (2010/C 83/02). The Constitution of the Italian Republic. The Legislative Decree. 30 June 2003, n. 196 (so called Privacy Code). The Provision of the Guarantor for the Protection of Personal Data no. 2 of 16 June 2004 (Code of Ethics for the treatment of personal data for statistical or scientific purposes). The Guidelines and other measures of the Guarantor for the Protection of Personal Data. ***Greece*** The Charter of Fundamental Rights of the European Union (2010/C 83/02). The Constitution of the Hellenic Republic. Law No 2472/1997 on Protection of Individuals with regard to the Processing of Personal Data [transposition of Directive 95/46/EC], as effective, which applies to all matters in connection with the provision of electronic communications services that are not regulated explicitly by the above mentioned legal framework.
Date and Place	<Date, place>
Declaration	I have read the foregoing information; I have had the opportunity to ask questions about it and questions have been answered to my satisfaction. By signing the Form, I acknowledge that I have understood and agreed to the above terms. *Signature*

ANNEX 1 TO INFORMED CONSENT FORM

P-REACT Exercise Plan Form

<Event Code> (details for information purposes)

Name of the partners/persons responsible for the "exercise"	
Name and Surname	
Address	
Email	
Telephone	
Fax	

DETAILED EXERCISE SINGLE EVENT DESCRIPTION

P-REACT ACTOR ROLE FORM

P-REACT

Actor Role Form

Chair of Selection Panel of Voluntary Participant	
Name and Surname	
Address	
Email	
Telephone	
Fax	

Name of the partner/person responsible for the "exercise"	
Name and Surname	
Address	
Email	
Telephone	
Fax	

PARTICIPANT SELECTION

Participants to facilitate the overall organization of the single testing event/exercises are selected among the personnel of the project partners.

DETAILED ROLE DESCRIPTION

Types of data to be collected	
<e.g. Voice, Image>	
Date and Place	*Signature*
	_____

ANNEX IV.   END-USER QUESTIONNAIRE

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 607881

Questionnaire Final Trial

Place, date

Instrument: Research and Innovation Action

Thematic Priority: FP7- SEC - 2013.7.2-1

Grant Agreement: 607881

Project Summary

Petty Crimes (also known as Volume Crime) take place on a daily basis affecting citizens, local communities, business owners and infrastructure owners. Petty Crime incidents such as theft, criminal damage and anti-social behaviour are on the rise in Europe due to the economic crisis and in turn incidents adversely impact the local socioeconomic environment.

Existing surveillance solutions installed are often positioned incorrectly and generate poor image quality unsuitable for evidential purposes. Furthermore, disparate systems coupled with non-existent communication channels, make video exploitation by law enforcement agencies nearly impossible. Effective communication and coordination between police, retailers, private security and those operating transport and other infrastructure owners is key.

The P-REACT project will design and develop a low cost surveillance platform that will ensure communication between key users with a focus on increasing the ability of on the ground police and security personnel to respond. The solution will encompass intelligent video and audio sensors to detect petty crime incidents, a cloud based monitoring, alert detection and storage platform.

Low-cost intelligent sensors (image and audio) will be installed in small business' premises and Transport infrastructure locations. These intelligent sensors will be connected to the cloud-based Video Content Management System (VCMS), where reported incidents will be constantly monitored and responded to. An incident detected by sensors will initiate a work flow including alerting relevant Security Personnel and/ or police with the relevant video and intelligence information ensuring the appropriate response. The solution will encourage community participation in the reporting of petty crime and as such will be designed to receive information (images, video) captured by mobile smart devices or unconnected surveillance system.

Technology trends in computer vision, motion detection, video retrieval, semantic video analysis and cloud technology will be exploited. The project will ensure that legal, ethical and end user needs are properly balanced and addressed ensuring a 'Privacy-by-design' solution approach.

The project will also analyse petty crime in Europe encompassing crime definitions, categorization, crime analysis, gaps and impact. The research undertaken will help the P-REACT consortium to understand the challenges related to petty crime which are experienced by the users and design a fit for purpose solution to the challenges.

To this end, the present questionnaire aims at capturing end-user observations and recommendations based on pilot results. **Your answers are of highly importance for the European Research efforts to increase the security of European citizens and thus they will be very much appreciated.**

Part A: General Information[3]

Your name:	
Organization name:	
Your function:	
Address:	
Telephone:	
E-mail:	
Website:	

1.   **What profile describes your entity best?**

   ☐ Small business owner ☐ Transport Company ☐ Security integrator

   ☐ Security provider ☐ Law enforcement

2.   **Is your entity, private or public owned?**

   ☐Private   ☐Public

3.   **What is the geographic operational scope of your entity?**

   ☐Local   ☐Regional   ☐National   ☐International

4.   **Choose which revenue bracket most closely represents your entity's annual turnover:**

---

[3] The personal information in this questionnaire will be used only by the P-REACT project as part of the evaluation process. Any information given will be kept confidential.

☐ <100,000 p.a.   ☐ >100,000/ <500,000 p.a.

☐ >500,000/ <2,000,000 p.a.   ☐ >2,000,000/ <10,000,000 p.a.

☐ >10,000,000 p.a.

Part B: P-REACT Framework Validation – Intuitiveness

5.   What is your first reaction to P-REACT?

☐ Very Positive

☐ Somewhat Positive

☐ Neutral

☐ Somewhat Negative

☐ Very Negative

6.   How innovative is the P-REACT offering?

☐ Extremely Innovative

☐ Very innovative

☐ Somewhat innovative

☐ No so innovative

☐ Not at all innovative

If 'Not at all innovative', could you please elaborate?

7.   Do you agree that P-REACT could reduce petty crime in your business area?

☐ Strongly agree   ☐ Agree   ☐ Disagree   ☐ Strongly disagree

If you strongly agree or agree, could you please elaborate?

8.   In your own words, what are the things that you like most about P-REACT?

9.   In your own words, what are the things that you would most like to improve in P-REACT?

Part C: P-REACT Product Assessment - Usability

10.   The P-REACT system works the way I expected it to work

☐ Strongly agree   ☐ Agree   ☐ Disagree   ☐ Strongly disagree

11.   The P-REACT end-user interface is generally easy to learn how to use.

☐ Strongly agree   ☐ Agree   ☐ Disagree   ☐ Strongly disagree

If you strongly agree or agree, could you please elaborate?

12.   I think the P-REACT's user interface is (please tick all that apply):

☐ Well-designed/Ergonomic   ☐ Simple   ☐ Intuitive   ☐ Needs modifications

Could you elaborate your answer?

13.   I find the information provided by P-REACT to Control Room to be:

☐ Very detailed   ☐ Detailed enough   ☐ Less detailed   ☐ Lacks of details

Could you elaborate your answer?

14.   I find the P-REACT's responsiveness to be:

☐Very fast   ☐Reasonably fast ☐Underwhelming   ☐Too slow

15.   Did you encounter errors during the P-REACT use in the related pilot scenario?

☐ YES   ☐ NO

If yes, in which area did you encounter these errors (please define)?

16.   Overall, I find P-REACT to be:

☐Very reliable   ☐Reliable enough ☐Not very reliable ☐Unreliable

17.   Could you rank please the following features of P-REACT in terms of usefulness

	Very useful	Useful	Don't Know	Not useful
Video analytic: Motion detection/ perimeter intrusion				
Video analytic: Indoor assault detection				
Video analytic: Bag snatching				
Video analytic: fighting				
Audio analytic: Screaming				
Audio analytic: Key word				
Audio analytic: Glass breaking				
Clip reviewing of events				
Live real-time monitoring				
Situational awareness from related camera's				
Map of embedded sensors				

18.   What other information or functionality would you like to see in P-REACT?

19.   Do you have any further comments about P-REACT usability?

Part D: P-REACT Business Model - Marketability

20.   **If P-REACT were available today, how likely would you be to buy it?**

☐ Extremely likely

☐ Very likely

☐ Somewhat likely

☐ Not so likely

☐ Not at all likely

21.   **If you are not likely to buy P-REACT, why not?**

☐ Do not need a product like this

☐ Do not want a product like this

☐ Satisfied with competing solutions currently available?

☐ Cannot pay for a product like this

☐ Not willing to pay for a product like this

Other (please specify):_____

22.   **How would you rate the P-REACT solution in terms of competitive offerings you are familiar with?**

☐ Much better

☐ Somewhat better

☐ The same

☐ Worse

☐ Don't know

23.   If you were to buy the P-REACT solution, how many cameras would you need to monitor?

☐ 1-5   ☐ 5-15

☐ 15-50   ☐ 50-100

☐ 100 -1000

24.   If you were to buy the P-REACT solution, what would you be interested in purchasing? Please tick all that interest you

☐ Video analytics

☐ Audio analytics

☐ Camera with remote access

☐ Video management system

25.   If you were to buy the P-REACT solution, would you want it integrated with your existing surveillance system:

☐ Yes

☐ No

26.   If you were to buy the P-REACT solution, how would you like to pay?

☐ One-off   ☐ Yearly fee

27.   How much would you expect to pay for a solution like P-REACT per camera per year?

☐ €100

☐ €500

☐ €1,000

☐ €3,000

☐ Other (please detail)

28.   How likely is it that you would recommend P-REACT in a friend or colleague?

Not at all likely   Extremely likely

0	1	2	3	4	5	6	7	8	9	10

Part E: Comments

Please provide any comments in any area related to P-REACT.

ANNEX V.   CONFIRMATION LETTERS

KeMeA ΚΕΝΤΡΟ ΜΕΛΕΤΩΝ ΑΣΦΑΛΕΙΑΣ
CENTER FOR SECURITY STUDIES

REF. NUMBER.: 12957

Athens, 26 November 2015

To:

Mr. Juan Arraiza Irujo

VICOMTECT-IK4

Donostia - San Sebastián - Spain

Tel: +[34] 943 30 92 30

e-mail: jarraiza@vicomtech.org

Info:

Mr. Georgios Kioumourtzis

P-REACT WP5 Leader

<u>**Subject: Letter of Confirmation for P-REACT Project**</u>

Dear Sir,

The Center for Security Studies is planning to execute final trials as part of the P-REACT project (Grant Agreement No 607881) in the period 23rd – 25th of February 2016.

KEMEA will make use of two trial sites as follows:

a.   The campus of the Ministry of Citizens Protection.

b.   A second Police campus in Athens close to Ministry.

KEMEA has already made all proper arrangements with the Hellenic Police Authorities for getting permissions for the project trials and access for the project personnel and external end-users/evaluators.

Although both sites are inaccessible to public, KEMEA will make sure that during the project trials neither unauthorized personnel nor public will have any access to trial areas.

To this end, KEMEA confirms that the trial areas will be inaccessible to the public and un-untheorized personnel.

Vasilios Gkrizis

Police Major General (rtd)

KEMEA Director

P. Kanellopoulou 4, T.K. 101 77, Αθήνα, Tel.: 210 7481630, 210 7481347, Fax: 210 7481995

SRM
RETI E MOBILITÀ

Bologna, 27th of November 2015

To:
Mr. Juan Arraiza Irujo
VICOMTECT-IK4
Donostia - San Sebastián - Spain
jarraiza@vicomtech.org

Ref. n° 73 /2015

Subject: Letter of Confirmation for P-REACT Project

Dear Sir,

As you know SRM is working for arranging a final trial as part of the P-REACT project (Grant Agreement N° 607881) in the month of March 2016.

As trial site, SRM will make use of an area within a bus depot located in Bologna, formally owned by SRM itself and managed by TPER (the company appointed to provide public transport service in the city).

Although the site is ordinarily inaccessible to the general public, SRM will anyway implement the most suitable measures in order to avoid the access of the public and unauthorized personnel to the trial area during the project trial.

To this end, SRM confirms that the trial area will be made inaccessible to the public and unauthorized personnel.

Your sincerely.

Dora Ramazzotti
(General Affairs Manager)

Confidentiality: PU