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ITEA 3 is a EUREKA strategic ICT cluster programme

2017-H2 Project Progress Report

INSIST

Integrated service delivery for citizens' safety and comfort

Edited by: Özgür Devrim Orman
Date: 05.03.2017

Project key data

ACRONYM and full-length title

13021	INSIST
Program Call	ITEA 2 Call 8
Full-length Title	Integrated service delivery for citizens' safety and comfort
Roadmap Challenge	Safety and Security

Project duration and size

Size	Effort: 42.65 PY	Costs: 2.7 M€
Time frame	Start: 01-01-2016	End: 31-12-2018 (36 months)

Coordinator

Turkey	Bor Software inc.
Type	Small and Medium sized Enterprise
Contact person	Ozgur Devrim Orman
Email Address	ozguro@boryazilim.com

Project Status

Latest FPP	Change Request (05-01-2016)
Latest PPR	Progress report in 2016 (semester 2)
Latest Review	INSIST #1 (a.m.) (21-02-2017)
Upcoming Review	INSIST #2 (p.m.) (17-01-2018)
PCA status	PCA has not been signed yet

Consortium

Country	Funding Status	National Coordinator (Company)	Total Effort (PY)	List of Partners
Finland	Funded (Y)	Johannes Peltola (VTT Technical Research Centre of Finland Ltd.)	3 PY	Valve, VTT Technical Research Centre of Finland Ltd.
Turkey	Funded (Y)	Özer Aydemir (Bor Software inc.)	39 PY	ARGEDOR Information Technologies Ltd., Bor Software inc., KoçSistem, Verisun Informatics Ltd

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1. Project one page description

The urban spaces are full of stand-alone sensor based installations of different services designed according to their own purpose and requirements. For example the municipalities provide several services to the citizens: public lighting, safety and security services of citizens in the streets, traffic management, etc. These services rely mostly on street-implemented infrastructure, such as lighting poles, cameras, sensors, induction loops. In addition local businesses have their own illumination systems, advertising infrastructure including neon signs, public displays etc. They also monitor customer behaviour using various sensor systems. The INSIST project proposes an integration of these sensor based systems into a wider perspective. The INSIST project aims to develop a smart connected ecosystem for public spaces, where the sensor data provided by the different INSIST sensor systems can be efficiently used for not only the proprietary infrastructure services, but also to offer value added services based on data fusion from multiple sensor systems in the business areas of:

- traffic management
- advertising and atmosphere
- business intelligence and building management

INSIST builds upon previous projects in the Security and safety domain such as Cantata and Vicomo. The building blocks from previous projects have reached a degree of maturity that allows us to add this next step in INSIST by integrating quantifiable data from multiple sources into models, workflow support and evaluation of effectiveness and efficiency. Therefore, it perfectly fits in the ITEA living roadmap Security and Safety.

INSIST ecosystem aims at new intelligent services e.g. for business intelligence or intelligent advertising and atmosphere creation.

Management of transportation flow using intelligent systems has major impact on the life of people. It helps to enhance public safety, to reduce traffic congestion and it allows improving access to transit information. On the other hand the quantity and quality of transport infrastructure as well as the traffic management affect significantly the spatial and economic development of cities and regions (e.g. saving costs due to optimization of transport of goods, transport of people to work, to shopping sites, to touristic sites etc.). By combining traffic management with the previously mentioned services, e.g. lighting can be adjusted depending on traffic conditions such as traffic density or car accidents or the intelligent advertisement can adapt to people behaviour based on traffic information.

Advertising systems in urban spaces are currently often stand-alone digital signage installations or part of limited networked systems. The latest digital signage advertisements often include interactive elements, which have limited capability to react to the people behaviour or changes in the surrounding local environment. The atmosphere adaptation can currently be done for example with large projections or illumination. However also these cannot adapt to changes in the space in real-time and the stand-alone installations are expensive. By combining the intelligent advertising with smart lighting systems and sensor-based business intelligence services we can offer new opportunities to automatically adapt the advertising content and interaction to match the current status in each position. The INSIST ecosystem will also make possible new type of ambient and atmosphere creation by smart lighting control.

Other challenges to consider when designing traffic management, building infrastructures,

intelligent advertising and atmosphere creation are the psychological aspects of comfort and security from user perspective.

The goal of the INSIST project is to increase comfort and safety of public spaces by integrating sensor based INSIST services and technology into a smart connected ecosystem to overcome current limitations of these systems and services. In order to increase knowledge and create proof points in the unexplored area of comfort and security perception of public systems and services. Finally, the collection of data from INSIST systems into a connected ecosystem with intelligent data analysis and knowledge management features will allow to investigate new digital services beyond lighting delivery, surveillance and traffic management.

The INSIST project will address:

• An architecture supporting real-time video-based presence sensing, an open database accessible by INSIST services to exchange information and events, and supporting big data analysis (e.g. city planning). The analysis of large amount of historic data will also allow identifying trends and automating several aspects of system configuration, thus allowing lower installation costs. INSIST will apply a distributed, extensible, flexible architecture with network interfaces for the exchange of information. Such a loosely coupled architecture will safeguard the integrity of the system components.

• A more intimate integration of data analytics and statistical data mining into the embedded hardware platform to collect and summarize the most salient sensor data information, so that it can be transmitted and stored efficiently across the INSIST ecosystem.

INSIST brings together top, experienced embedded software device, sensor specialists, smart advertising systems and research institutions to address the burden of the citizen's safety and security in Europe. It will allow Europe to take the lead in the design and manufacture of a new class of smart connected ecosystem for public spaces with unprecedented advanced functionality. This will permit the first steps towards market leadership within Europe and eventually worldwide in the large and rapidly growing market of intelligent sensor based security systems.

2. Project overall status

2.1. Top 4 overall targeted innovations

1. Intelligent advertisement will adapt to real-time traffic information.

Main contributors: Bor, KoçSistem, Verisun, Argedor

Description for innovation and state-of-the-Art:
Traffic surveillance systems can detect the traffic density in certain locations where the camera systems are installed. However, the traffic is significantly influenced by the city events, such as concerts, sport activities, traffic accidents, etc. INSIST platform is fed with the city events' data. The social sensor of the INSIST platform collects data from official traffic accounts, processes the data using machine learning techniques. Advertisements can be selected based on the current citizen wait times at the bus stations.

2. Integration of the live bus and stop information into the INSIST platform.

Main contributors: Verisun

Description for innovation and state-of-the-Art:
Real-time municipality live bus and stop information is lacking in the most of current external traffic solutions. INSIST platform was connected to the municipality bus information system. It can currently get the live bus and stop information.

3. 1. Development of a big data analysis ready open database accessible by INSIST services to exchange information and events.

Main contributors: Bor, Argedor

Description for innovation and state-of-the-Art:
Contex broker based services are available for smart spaces but there is not any flexible and information flow based solution.

4. 1. A distributed, extensible, flexible architecture, supporting real-time video-based presence sensing, including network interfaces for the exchange of information.

Main contributors: Bor, Argedor, KoçSistem

Description for innovation and state-of-the-Art:
There exists smart city applications without having real time video-based presence sensing and loosely coupled architecture. INSIST platform has a camera sensor which can measure the real-time traffic density.

2.2. Top 4 overall targeted business impacts

1. *Better monitoring the road network and providing intelligence to decision makers by using cameras and social media technologies*

Description: HD camera facilities and related hardware expenses are getting less costly compared to previous years. This makes easy for stakeholders to invest in surveillance infrastructure with good price and high rentability of system. Monitoring in HD format with reasonable investment costs takes market attention to develop smart software to recognize the human face and generate reports. These developments assure effective monitoring and city security.

Besides this development in monitoring technologies, people contribution is the on rising with the help of social media integration. Recent years, the amount of public engagement with municipalities over the social media platforms is dramatically augmented.
Main contributors: KoçSistem, Verisun
Market/competitors:
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2. Facilitate city officials to gain a clearer view of how people move around within the city and how the existing transportation systems and public services could be

Description: People awareness of traffic status is facilitated by reaching the information instantly on social media platforms. Also, city officials have found a direct ground to touch people and understand their intentions. Peoples direct involvement in public services lead officials to take actions quickly on public needs. Communication problems of previous decades are handled easily thanks to the internet platforms and social media services.
Main contributors: Verisun, Argedor
Market/competitors:
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3. Creation of new services benefiting from the sensor information acquired from the urban sensor-based services

Description: New services creation from the sensors which are distributed over the city is very crucial as well. Public needs are never-ending and providing life facilitating solutions are important. In order to enhance the capacity of provided services and offer new solutions, sensor usage is one of the best solutions. Sensor-based data collection has to be processed logically in backend systems. It is now very expected by the community to serve these processed data over the mobile applications. The very good example is public transportation services where people can follow line information and know in advance the status of their travel. This takes the level of stress in the society where the time management is always hard to manage.
Main contributors: KoçSistem, Argedor, Verisun, Bor
Market/competitors:
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4. Intelligent outdoor advertisement distribution to the screens relevant to the local situation defined by the processed camera and sensor data

Description: All data derived from either camera or sensors give us an opportunity to guide people via advertorials on the screens. Advertorials are not welcomed all the time unless you hit the correct subset of people. That is why it is a must to interpret human behaviours in the city.

Once you know human attitudes, it is easy to reach them on their attending time in the stops. INSIST project is a good example of integrating these needs and ideas where advertorials match human attitudes by recognizing their intentions thanks to the data flow over the different sources and providing the best matching advertorial at the correct time which is most of the time unscheduled ones on the city stops.
Main contributors: Bor, KoçSistem, Verisun, Argedor
Market/competitors:
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2.3. Top 4 overall project result KPIs

	Initial value	Targeted value	Current value
1. Intelligent outdoor advertisement distribution based on traffic data	0%	100%	70%

It is the completed amount of planned work in the design and development of the end to end system processes

2. Intelligent outdoor advertisement distribution based on sensor data	0%	100%	70%

It is the completed amount of planned work in the design and development of the end to end system processes

3. Detection of the congestion points in the daily traffic flow	0%	100%	40%

Successfully detected points percentage comparing to the real number of congestion points

4. Abnormality detection based on social media inputs	0%	70%	55%

Successfully detected abnormalities percentage in comparing to the real number of the abnormalities.

2.4. Top 4 overall risks

	Severity	Probability
1. Problem to access public traffic load images.	Low	Rare

Avoidance action:
Stakeholders will keep on contacting with well-known data sources; such as Google and Yandex.
Back-up / mitigation plan:

Data from previous applications is available in stakeholders.

2. Problem to access sensory data.	Low	Rare

Avoidance action:
Making regular coordination meetings with the data sourcing organizations.
Back-up / mitigation plan:
Either synthetic or pre-recorded sensory data is used in simulating the real-time sensory info.

3. Unavailability of the public transportation info.	Low	Rare

Avoidance action:
Verisun and Argedor already have contracts with some municipalities including rights to have such data.
Back-up / mitigation plan:
Data from previous applications is available in stakeholders.

4. NLP relevant problems in understanding social media.	Medium	Possible

Avoidance action:
NLP relevant problems in understanding social media.
Back-up / mitigation plan:
Simple N-gram based statistics might give not impressive but enough results in categorising social media data.

2.5. Changes in the technology and business during the reporting period

Smart city technologies are in the commercialization state hence there is not a tremendous effort on the research side but innovation, however, the following list collected by Cisco indicates expected trends on smart city technologies in 2018:
Introduction of city-wide digital platforms
Development of Connected Intersections
Use of computing at the edge
Merging of GIS, big data, and analytics
Public safety vehicles as digital hubs
Growth in connected vehicle capabilities
Greater real-time citizen interaction
Linking autonomous vehicles with government sensors/networks
Increased focus on human-centric technologies
Adoption of smart city requirements into municipal codes

3. Exploitation

3.1. Partners' market access

Bor Software inc.	sme	TUR	10 PY
Bor would like to extend its solutions on video streaming through analytics applications and advertisement solutions. Bor also works on developing new services based on smart city management. Service platform developed in the project will enable Bor to integrate its various solutions to smart city domain and to expands its market coverage.			
KoçSistem Information Communications Services	ifc	TUR	10 PY
The main outcomes of INSIST project for KoçSistem are traffic-related data collection methods, OpenStreetMap integration, and traffic density data of Istanbul. KocSistem aims to integrate these outcomes as an ITS module which will be included Smart City Product Family of KoçSistem. On the other hand, KoçSistem is developing machine learning-based smart algorithms that collect and detect traffic-related events in the INSIST project. KoçSistem is planning to use this experience in its other data science-based R&D and product development projects.			
Verisun Informatics Ltd	sme	TUR	10 PY
Verisun works with directly to the municipalities. our main customers İstanbul metropolitan, Ankara metropolitan, İzmir Metropolitan, Kocaeli Metropolitan, Kayseri metropolitan, Gaziantep, Kahramanmaraş and other 15 cities in anatolia. Projet results will directly applied to existing customers. Here are the recent heads ups on exploitatiton: Kocaeli Metropolitan Municipality: Communicated with municipality contacts and explained the project benefits. Verisun requested a demo from the municipality. Karaman Municipality: Communicated with municipality and project benefits explained. Eskisehir Metropolitan Municipality: Demo is completed. Bus line information is reflected to the screen combined with smart advertisement on the same screen. Kayseri Metropolitan Municipality: Data retrieval on bus status and line information is achieved during field tests. Route abuses by each bus driver can be identified and reports are successfully generated			
ARGEDOR Information Technologies Ltd.	sme	TUR	8 PY
Argedor plans to collect the data which comes from vehicle-vehicle and vehicle-traffic sensors then modelling current situation and creating the real time reports. Modelling possible traffic forecasts when the traffic lights are located in different coordinates. Forecasting the traffic in specific time by using machine learning and data mining methods. Argedor will utilize the outcomes of INSIST to enhance its existing business solutions and to develop new solutions in data mining and recommend systems.			
VTT Technical Research Centre of Finland Ltd.	res	FIN	4 PY
VTT will further expand its R&D in the domain of advertisement and signage technology. The cooperation with SMEs is significant, so that they expand in the discipline of signage applications and underlying technology components including people behaviour monitoring means, data management and decision making services, intelligent user interfaces and adaptation techniques. VTT will actively communicate the project outcome in national and international research forums. People and crowd behavior monitoring tools will have extremely large market potential in several application fields, such as retail, marketing, public buildings, smart city and health. The analytics market is growing fast, providing markets for new technology in the analytics field.			
Valve Vanguard	sme	FIN	1 PY
Valve works with media, television and digital signage companies.			
EZERIS NETWORKS GLOBAL SERVICES SL	sme	ESP	0 PY

3.2. Top 8 overall partners' Exploitation Related Achievements

1	Exploitation	Collaboration	Contact to Eskisehir M. Municipality	Realised
Summary		The first demo is completed. Bus line information has reflected the screen combined with a smart advertisement on the same screen.		
Impact		Sales potential. (quantification: -1)		

1	Exploitation	Collaboration	Contact to Eskisehir M. Municipality	Realised
Partners		ARGEDOR Information Technologies Ltd., KoçSistem Information Communications Services, Verisun Informatics Ltd, Bor Software inc.		

2	Exploitation	Collaboration	Contact to Karaman Municipality	Realised
Summary		Communicated with municipality and project benefits explained. A demo is requested.		
Impact		Sales potential. (quantification: -1)		
Partners		ARGEDOR Information Technologies Ltd., KoçSistem Information Communications Services, Verisun Informatics Ltd, Bor Software inc.		

3	Exploitation	Collaboration	Contact to Ankara M. Municipality	Realised
Summary		Bus Line information and data on traffic status is gathered successfully.		
Impact		Sales potential. (quantification: -1)		
Partners		Verisun Informatics Ltd		

4	Exploitation	Collaboration	Contact to Kayseri M. Municipality	Realised
Summary		Data retrieval on bus status and line information is achieved during field tests. Route abuses by each bus driver can be identified and reports are successfully generated.		
Impact		Sales potential. (quantification: -1)		
Partners		KoçSistem Information Communications Services, Verisun Informatics Ltd		

5	Exploitation	Collaboration	Contact to Kocaeli M. Municipality	Realised
Summary		Communicated with municipality contacts and explained the project benefits. Verisun requested a demo date from the municipality.		
Impact		Sales potential. (quantification: -1)		
Partners		Verisun Informatics Ltd		

6	Exploitation	New service	Interview with the Istanbul Municipality	Realised
Summary		We planned an interview with the authorities of the Istanbul Metropolitan Municipality for real-time traffic information and predictive traffic information technologies that we worked on in the INSIST project (Use Case 1 - Estimated Time Arrivals). In the next reporting period, we are expecting to realize the interview. The municipalities we plan to meet after the first interview that; Kocaeli, Kayseri, and Eskisehir.		
Impact		According to outputs of this review, there might occur some market development opportunities not only in Istanbul but also in the largest cities in Turkey; as is mentioned above. (quantification: 1000)		
Partners		ARGEDOR Information Technologies Ltd., KoçSistem Information Communications Services, Verisun Informatics Ltd, Bor Software inc.		

7	Dissemination	Conference	Paper / Presentation at ISITES 2016	Realised
Summary		Collecting Traffic Related Data from Traffic Density Map Screenshots Using Image Processing Techniques Abstract: This paper presents an alternative method in order to gather traffic density data. The presented method uses the screenshots of traffic density maps and processes them by image processing algorithms.		
Impact		Making others aware of the project and the proposed methods. (quantification: -1)		
Partners		KoçSistem Information Communications Services		

8	Dissemination	Conference	Poster Presentation at ICAS 2016	Realised
Summary		The Key Role of the Smart Traffic Applications in Smart City Systems Abstract: INSIST project is an international Itea2 research and development project. The goal of the INSIST project is to increase comfort and safety of public spaces by integrating sensor based INSIST services and technology into a smart connected ecosystem to overcome current limitations of these systems and services.		
Impact		Making others aware of the project and the proposed methods. (quantification: -1)		
Partners		KoçSistem Information Communications Services		

3.3. Realised Exploitation Related Achievements

Dissemination	Exploitation	Standardisation	New company	Patent	Human capital
Total: 4	Total: 6	Total: 0	Total: 0	Total: 0	Total: 0

4. Project progress during the reporting period

4.1. Overarching work progress during the reporting period and issues

4.1.1. Top 4 Technical Achievements

1. A data model for high-end applications based on sensors data processing for surveillance, traffic monitoring and advertising is determined.

The main data source in INSIST ecosystem is sensors and advertisements. Sensors varies for the purpose. There are several sensors such as visual sensor, social sensor and map sensor. Data types changes accordingly. The sensor types and data types that are used as an input on INSIST ecosystem and how they are stored and retrieved from data users are determined.

2. Systems connections are determined.

Based on the Activity 4.1 a common database platform is developed for the interoperability of diverse systems. The required information for system connection is determined and document.

3. 3. Advertisement video streaming between partners is achieved.

The advertisement video streaming to a dedicated IP address which is assumed to be the address corresponding to a screen on a bus stop is achieved. The delays of the arriving bus lines to a bus stop are collected from the common open database, where this data is provided by Verisun, then the streaming list to that bus stop is organized according to both arriving lines (cause the customer might want to show the advertisement for the passengers of a specific bus line) and available time to play (there should be different length video contents in streaming in case of the changes - early or late arrivals of the coming bus because of the traffic - on the available screening time).

4. 4. A smart electronic panel was developed.

The smart panel has a digital screen and we can able to reflect relevant live data about line information and traffic status from several sources including social media, sensors, and data collected from other devices to that digital screen. In order to facilitate the public transportation, the test panel combines those data, applies filtering algorithms and achieved to reflect the precise calculation of arrival time and delay status on the dynamic screen of the electronic panel.

4.1.2. Top 4 next technical targets

1. Integration of Ezeris to the Common Open Database.

Our new partner Ezeris from Spain, will be integrated to the Common Open Database, however this integration is not expected to be a one shot issue, firstly the integration is two sided hence common open database including connection and data structure definitions will be updated according to the partner requirements.

2. Insist mobile application will be developed.

The mobile application that will be developed is going to define arrival estimation and define alternative routes based on the driver's profile and preferences.

3. Surveillance system will be integrated to the Common Open Database.

Surveillance applications are developed by KoçSistem will be integrated to Common Open Database. Furthermore, this integration will give us better event generation and streaming video selection capabilities on the platform.

4. Smart Advertising Video Streaming will be improved.

Current version takes into account only the coming bus line and available time for screening, but there can be better decision making approach than the current one; for instance selective and sorted broadcasting is not much different than the usual recommendation applications, hence better intelligence in streaming can be build based on recommendation theory.

4.1.3. Top 4 issues

1. Late signing of the local project agreement.

Details:
Local project agreement in Turkey was signed in November 2017, however the project started January 2016.
Impact:
It was so hard to keep the consortium alive where there were many disambiguation about the future of the project, there were definitely a lack of focus condition.
Mitigation action:
We did not left making regular coordination meetings, and keeping the activities alive even it was very hard sometimes and ambiguities slow down the process.

2. Early left of the Finnish partners.

Details:
Finnish partners left the consortium at the beginning of 2017.
Impact:
Project pilots and outputs were designed according to having them on-board and planned to be developed in collaborating with them, hence when they left we not only lost their future contributions but also their field experience also.
Mitigation action:
Pilots were updated according to this situation, and project focus was shifted to infotainment in public bus transportation domain.

3. Difficulty of finding a partner to an ongoing project

Details:
After Finnish consortium left the project, we started to search for a new partner / partners, but it was very difficult to find anyone for an ongoing project where one third of duration had passed.
Impact:

Some decisions on pilot applications and project workflow were very difficult to made and left as TBD.
Mitigation action:
We tried to expand our search by requesting help from ITEA and our business network.

4. <title>

Details:
< >
Impact:
< >
Mitigation action:
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4.1.4. Status of deliverables

	Due by the reporting period	Already finalised	Total
Number of deliverables	7	7	14
Delayed deliverables more than 2 months	4 D1.1.2 Use case definition and user requirements specification D1.2.1 System requirements specification D5.1.1 Data collection D6.3 Initial dissemination, exploitation and standardisation plan		

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4.1.5. Project statement on progress during the reporting period

The major competence of the Insist project is planned to be the data gathering from various sensors and integration of this data on the common open database which is open for only the project partners now, but is going to be also available for 3rd parties (who would like to develop smart city applications, especially public bus transportation oriented) until the end of the project. Sensor (visual sensor, social sensor and map sensor) data collection, and sharing on the common open database has been achieved, also intelligent streaming which takes into account the public bus transportation traffic data was developed.

4.2. Details of technical progress per work package

WP 1: Requirements & system definition
The role of this work package is to investigate the SoTA and gather the requirements on the smart systems targeted by the INSIST project, and their development flow. In this work package, functional requirements of the traffic monitoring and advertising systems will be both captured and analyzed. The operational and functional requirements for the integration and compatibility of the traffic monitoring and advertising systems are under development.

In this reporting period, all the previously developed deliverables had been updated because of the inclusion of a new partner into the project. However, our major focus was especially on the demonstrator definition, hence the descriptions of the basic demonstrator components and integrated demonstrator systems are documented in deliverable D1.3.1 “Specification of basic demonstrator components and integrated system demonstrators”.

WP 2: Sensing & feature extraction algorithms
The goal of WP2 is to develop a set of tools and algorithms to collect the traffic related information of the pilot cities. The developed tools and algorithms collect data from various sources: (1) traffic surveillance (city cameras), (2) social media (twitter), (3) public traffic density maps (google maps). In WP2, three data collection modules are being developed: (1) visual sensor, (2) social sensor, (3) map sensor. Visual sensor calculates traffic density by processing city camera data. This task was started during this reporting period. The social sensor collects all traffic-related information from Twitter and implements keyword-based data mining techniques. In addition to the real-time accident information, the city events which may affect the traffic flow are being detected by the social sensor using machine-learning techniques. Map sensor collects the screenshots of Google Map's traffic density map and implements image processing techniques on those images.

In this reporting period (1) we have completed keyword-based data mining technique (2) we have completed the machine learning-based detection technique (3) completed OpenStreetMap (OSM) integration and collected geographical data of Istanbul, Helsinki, Ankara, and Madrid. In the next period (1) we will complete the visual sensor development, (2) change the data source of the map sensor from Google Maps to Yandex due to the limited license of Google Map data.

WP 3: Integrated Connected Systems for Citizen's Safety & Comfort
In WP3, all WP3 partners worked on designing and implementing high-level data algorithms enabling several system functionalities. In line with the task 3.1 Multimodal data management and processing first deliverable of this work package “D3.1.1 – High Level Data Processing Algorithms” document is finalized. Deliverable is uploaded to ITEA web site.
Results of the task 3.1 is used in the task 3.2 in order to federate data. Partners started to develop the algorithms designed in the task 3.1. Work package partners also have started to design basic HMI designs.
The status of tasks are monitored by regular WP3 meetings.

WP 4: Infrastructure & Data Representation
Systems such as traffic management as well as people behavior monitoring systems for advertising, collect different type of data, analyze different aspects, and calculate a broad set of results. Insist project aims at providing a common platform for the interoperability of those diverse systems. Communication and interoperability of those systems will be provided by the infrastructure that will be developed in this work package.

In this reporting period T.4.1 "Definition of system connections" lead by Bor and T.4.2 lead by Argedor were completed, T.4.3 "Content management" lead by Verisun was developed inconsistently to the project plan proposed in the FPP. Furthermore, development in T.4.4 "Hardware communication interfaces" lead by KocSistem was started as planned.

System connections which are going to provide an interface to the common data and computation infrastructure of Insist, which is named as COD "Common Open Database", have defined and details were documented in the D.4.1.1 "Definition of System Connection and Data Models". The

requirements of the data structure format which is critically important for the interoperability between the advertising and traffic monitoring systems of INSIST are determined and documented in D.4.2.1 "Data Structure/Standard Requirements Specification". The development of D.4.3.1 "Privacy & Policy Management Specifications" deliverable is ongoing, which is slightly delayed because of the integration of the new partner to the consortium and the workflow.

WP 5: Applications & Field Tests
Thanks to the achievements in previous WPs, INSIST has found a ground to integrate these developments in an electronic panel. The smart panel has a digital screen and we can able to reflect relevant live data about line information and traffic status from several sources including social media, sensors, and data collected from other devices to that digital screen. In order to facilitate the public transportation, the test panel combines those data, applies filtering algorithms and achieved to reflect the precise calculation of arrival time and delay status on the dynamic screen of the electronic panel.

We are able to combine the line arrival status with the appropriate advertising on the screen as well. The duration of the selected advertisement depends on the status of the delay duration which will best suit for the audience.

During our tests on the field, we ensure that the time calculation and delay status is highly reliable.

WP 6: Project Management, Exploitation & Dissemination
The management and internal communication of the project are carried out in this work package. The main objective here is to support the technical, financial and contribution aspects of the other work packages. Project reporting and monitoring follow strictly ITEA3 guidelines and requirements. The dissemination, exploitation, and demo activities are also taking place within this work package.

In this reporting period our regular management activities (coordination telcos, communication with ITEA and PAs) have done properly, and our partner Verisun did many successful exploitation and demo activities to the Turkish big-city municipalities on behalf of the consortium.

4.3. Per partner progress during the reporting period

4.3.1. Partner's main contribution and effort

Partner	Planned effort	Actual effort	Contact
ARGEDOR Information Technologies Ltd.	5.1	1.85	Emine Ferraro
	Main contributions during the reporting period: Main task of Argedor is to develop common database platform in order to leverage on each partners's hardware and software infrastructures. Inline with this task draft requirements for the common database system gathered from each partner. Algorithms are defined and development of the Common Database Platform has started. During this period Argedor also contributed to all delivered project documents.		
	Discrepancy explanation: Because of the status of the national application, project has slowed down for a while. Some tasks and deliverable would not prepared on time. For this reason Argedor spent less effort than planned.		
KoçSistem Information Communications Services	6.8	0.725	Cigdem Cavdaroglu

Partner	Planned effort	Actual effort	Contact
	Main contributions during the reporting period: KoçSistem has added "EventDetail" parameter to the social sensor parameters. The other new feature of the social sensor is to collect the future city events, which can affect the traffic flow, such as concerts, sports activities, festivals, etc. During this period, KoçSistem has started to develop the visual sensor. KoçSistem has completed the OpenStreetMap integration task. The spatial data of Ankara, Helsinki, Istanbul, and Madrid were collected and stored in the platform.		
	Discrepancy explanation: KoçSistem had to reduce its efforts due to the uncertain funding status. However, in the next period, we are planning to spend the required effort to complete the targeted tasks, since the local agreement signed on November 2017.		
Bor Software inc.	6.7	6.7	Özer Aydemir
	Main contributions during the reporting period: In the WP1, previously delivered outputs had been updated in the reporting period because of the inclusion of a new partner to the consortium. In the WP3 and WP4, an early version of smart outdoor advertising application interfacing to the Common Open Database developed and tested. In WP6, Bor organized weekly coordination meetings and a technical workshop during the reporting period, comunication with ITEA anb PAs was also held by Bor.		
Verisun Informatics Ltd	7.9	7.9	Sadullah Uzun
	Main contributions during the reporting period: Demos and field tests are achieved together with the municipalities. The main achievement is that the data provided by different sources gathered in a digital panel and bus line information is shared on electronic screen together with traffic status estimation which are precisely calculated and reflected to the screens. Smart screen also supports smart advertorial activities which is one of the main goal during the INSIST project.		

4.3.2. Actual vs. Planned effort overview

Report	Reported actual effort up to reporting period (PY)	Planned effort up to reporting period (PY) - total: 42.65 PY
Progress report in 2016 (semester 1)	5.87	6.925 (16% of total)
Progress report in 2016 (semester 2)	10.25	13.85 (32% of total)
Progress report in 2017 (semester 2)	20.425	31.55 (74% of total)

5. Feedback to previous STG remarks

The following comments were received from the evaluators for the last PPR.
1. Availability of sensor and camera data is crucial. Effective and targeted mitigation actions need to be defined.
The defined mitigation actions are shared on the Risks section of this report.

2. The potential increase in data streams (especially from video cameras) will dramatically increase the need for additional computing power and storage capacity.
The Common Open Database, which includes the common database that can be accessed through a REST API, and event generating mechanisms where their outputs can be queried into the database, is held on the cloud, and that enables us on the scalability sense for both storage and computation.

3. It is not clear how this project critical issue will be addressed (e.g. pre-processing inside the camera/device, cloud based via data centre scaling,...what will be the impact on costs...).
Since any raw data traffic is not aimed into the project between the parties or between parties and the Common Open Database (COD) we are not expecting to be faced with a huge scalability problem on the cloud side, however, the in time emergency alerting of the people on the public bus stops is a critical issue for us, and we are aiming to providing high availability on the cloud side and frequent pulling of the COD.