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Research Innovation Action

Intelligent Portable ContROl SyStem

D8.4 Annual Report			
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1. Progress of Work Plan in the period

The first six months (M1-M6) of the project are described in D8.3 Periodic Progress Report. In this deliverable the progress between M7 and M12 of the project will be analysed.

1.1 General progress

iBorderCtrl project continued its progress during the 2nd half-year period though six (6) WPs: WP1: Ethics requirements, WP2: Relevant EU Legislation, Requirements Analysis and Reference Architecture, WP3: Technological Components and Subsystems Development, WP4: Development of the iBorderCtrl software platform and related interfaces, WP7: Dissemination, Exploitation, Communication and WP8: Project Management and Quality Assurance. The main objectives of this second period were the finalization of the Reference Architecture and components specifications (D2.2), the report of EU wide legal and ethical review (D2.3) and the study of the ethics of profiling and the risk of stigmatization of individuals/groups in the context of WP2, along with the possibility of false positives and an appropriate mitigation plan (D1.2). Deliverables D2.2 and D2.3 have been submitted with a slight delay due to the synchronous (to the submission deadline) announcement of the recent (as of 7th of April 2017) amendment of the Regulation (EU) 2016/399 by Regulation (EU) 2017/458 that should be also considered and ensure compliance with.

D2.2 included technical requirements derived from the analysis of the functional (end users) and general requirements, legal / data privacy and security, maintainability, extensibility/scalability, hardware and additional constraints identification, of the use cases, scenarios and workflows definition, of the overall iBorderCtrl functional architecture design and the description of the three user interfaces (travellers', border guard agent and border managers' interfaces). Any issues related to the complexity of the iBorderCtrl system were resolved via frequent meetings between technical partners that included numerous teleconferences, one technical meeting and a plenary meeting. The work within WP3 and WP4 continued with the development of all technological components and subsystems and the development of the iBorderCtrl software platform and related interfaces. Furthermore, the project has continued to work on the dissemination activities, by enhancing the content of its web site and its presence in the social media (Linkedin, Twitter), by presenting the outcomes so far in publications in scientific journals and by participating to a number of international Conferences and relevant dissemination and communication events.

1.2 Progress on all work packages against initial objectives

WP 1: Ethics requirements. The main objective of this work package is to ensure compliance with the 'ethics requirements'. During this period (M7-M12) the ethics of profiling and the risk of stigmatization of individuals and groups were addressed in the context of WP2 and linked to the possibility of false positives. For this reason D1.2 OEI - Requirement No. 2 was submitted. Furthermore, an appropriate mitigation plan was included in D2.2 (Reference Architecture and Components Specifications).

WP 2: Relevant EU Legislation, Requirements Analysis and Reference Architecture. This Workpackage was successfully finalized during this period. Activities were focused on the development of the iBorderCtrl Reference Architecture (in the framework of Task 2.2 / D2.2) along with an overview of the legal and ethical framework (Task 2.3 / D2.3 that evolved in parallel). The work performed included the following aspects:

<u>Concerning the iBorderCtrl Reference Architecture (D2.2)</u>: The work performed included the following steps, which were also represented as specific Chapters of the relevant Deliverable D2.2:

    a) Analysis of the user requirements that were extracted in Deliverable D2.1 and their translation into functional and technical requirements, of the overall iBorderCtrl system, for each stage of actions (pre-arrival, background check, border check phases along with general requirements),

b) a functional description of each one of the hardware / software modules within iBorderCtrl, accompanied with specific technical requirements related to the State of the Art (SOTA) analysis (performed in the previous Deliverable D2.1) and some additional technical requirements derived at this point from the architecture of each module,

c) description of the general system constraints mainly related to the security and privacy of the data that will be stored in the system and the system itself, together with a summary of the legal issues and constraints that are thoroughly analyzed in deliverable D2.3. The iBorderCtrl solution will follow the ten OWASP principles, while potential legal issues will be monitored throughout the project. The specific description also incorporated and an abstract of the Risk Mitigation Plan (of D1.2) covering both the Research and the Exploitation project Phases,

d) analysis of the different use cases for the system, both in the preregistration phase and during the actual crossing of the Border Control Points (BCPs) - distinguishing specific scenarios for both EU citizens and Third Country Nationals (TCNs) – along with the respective workflows further defining the functional architecture of iBorderCtrl,

e) creation and definition of the general iBorderCtrl reference architecture along with the architectural framework for all the different modules that consist the iBorderCtrl system, including conceptual elicitation of the software stack and the iBorderCtrl database. The recent amendment of the Regulation (EU) 2016/399 by Regulation (EU) 2017/458 (as of 7th of April 2017) was considerably taken into account both for the elicitation of the Reference architecture and the various use case scenarios,

f) description of the three user interfaces of the system (for travelers, Border Guards and Border Guard Managers) along with detailed flow of events for each one,

g) since the D2.2 is meant also to act as a reference document within the partnership, a traceability matrix between the technical requirements and each respective iBorderCtrl module responsible to realize each requirement was developed, in order to ensure that every requirement is covered, the consortium has a clear reference and that the final functionality of the iBorderCtrl system meets the needs described by the end-users in Deliverable D2.1.

Concerning the legal and ethical framework (D2.3): The work performed included the following steps, which were also represented within the relevant Deliverable D2.3:

a) description of the different components of the iBorderCtrl platform, in order to setup the basis on which the legal analysis is conducted at this stage of the project,

b) description of the legal framework, in order to provide an overview of the existing various legislation aspects that should be considered, and how they interact with each other,

c) subsume the technical descriptions under the current legal framework,

d) description of the iBorderCtrl functionalities which are not yet covered by a legal basis and will require changes in national laws or a new legislation framework that provides for their application,

e) assessment of the legal situation depending on the overall scenario in which personal data will be processed – as a test pilot or in actual border control situation – since different legal regimes apply to both and

f) preparation of all necessary contractual agreements that are required to ensure legal compliance of the test pilots: Terms of Service and a Data Privacy Policy for the iBorderCtrl platform, a letter of informed consent, a non-disclosure agreement and individual agreements with border guards participating in the test pilots.

WP 3: Technological Components and Subsystems Development. An in-depth and comprehensive SWOT analysis of biometric sensors (i.e. fingerprints, face and vein), either commercially available or

in research stage, is being finalized to be included in D3.1: Data Collection Devices – specifications, taking into account newest trends and aspects of their overall integration within the iBorderCtrl software/ hardware platforms. The analysis also encompasses state-of-the-art document authentication instruments to comply with current and future procedures, considering also outcomes of other relevant research projects, along with the inclusion of sensors and techniques for hidden humans' detection (taking into account both the relevant tools already used at the Border Control Points as well as the integration and testing of additional ones, as foreseen from the user requirements analysis). In parallel, the technical partners responsible for the selection and use of devices (e.g. cameras, scanners, QR code readers and other) were/are in continuous discussions in order to identify the optimized solution for each device selection and its integration within the iBorderCtrl solution.

The development of all subsystems involved in WP3 continued from the previous semester [   ] [   ] biometrics identification (fingerprints and palm vein), Document Authenticity Analytics Tool (DAAT), Face Matching Tool (FMT), hidden human detection tool (HHD), avatar based dialogue] and is currently evolving taking into account the work already done in WP2 in order to comply with the definition of the reference architecture and the user requirements. In parallel to the development of the different subsystems, the design of the portable unit that will include the different sensors / scanners / readers identified or selected is currently in progress.

WP 4: Development of the iBorderCtrl software platform and related interfaces. The work on the initial design of the iBorderCtrl software tools and the relevant interfaces is progressing as planned. More specifically, the Risk Based Assessment Tool (RBAT), the external, legacy and social interfaces module (ELSI), the mobile application, the Border Control Analytics Tool (BCAT) and the three application/interfaces (for travelers, Border Guards and Border Guard Managers) are currently under development. Moreover, appropriate solutions are being defined for integrating local and remote cloud-based storage and data processing frameworks, capable of respecting Digital Rights Management restrictions in content processing while maximizing platform scalability. Finally, subsystems are being enriched with features based on the user requirements identified in WP2 and are presented in the traceability matrix included in D2.2. The data privacy and security constraints derived from the legal framework is also respected, according to D2.2 provisions. Although still under prototype development for all modules, the work is well underway and on schedule to deliver initial prototypes on M18 as planned. Designs and workflows exist for each subsystem, while the software architectures has been finalized in a way that addresses the outcomes of the requirements' analyses. Frequent meetings (mostly through teleconferences or VOIP-based but also in combination with technical in-person meetings) between technical partners ensure the interoperability and accountancy between partners fostering the quality of the iBorderCTRL platform.

WP 5 and **WP 6** have not started yet, according to the time plan. However, integration aspects are already been considered in the framework of WP3 and WP4 developments.

WP 7: Dissemination, Exploitation, Communication. iBorderCtrl, via Tasks 7.1 and 7.2 has continued the work towards outlining the project's innovation-oriented exploitation strategy and progressing the communication, dissemination and awareness raising activities. To this respect, the Deliverable 7.3: Dissemination and communication plan has already been finalized. In this deliverable, the iBorderCtrl dissemination and communication objectives and strategy for identifying the targeted stakeholders and user groups, the appropriate dissemination tools (basically organized in four dissemination channels), along with the already performed and foreseen relevant communication and dissemination actions are thoroughly described. In addition, D7.4: Early Business Plan included the identification of target markets and customers, an overview of existing business models, potential routes to market and relevant penetration channels, while it identified discrete exploitable outcomes as they have so far been envisaged by the consortium. Furthermore, in the framework of dissemination activities, two scientific publications should be mentioned; a paper presented at the 11th EUCAP Conference, Paris, March 2017 addressing scientific and technical issues and an accepted journal paper, already published at the Biometrics Technology Today Elsevier Journal. iBorderCtrl was

also presented in the Workshop organized by FRONTEX on "Border Security related EU funded projects" on the 8th June 2017, Warsaw, Poland. In parallel, the iBorderCtrl web portal has been extended with additional content to enhance the visibility of the project. It is worth highlighting that the first, initial awareness raising phase has already been completed, and all pre-defined related objectives were met. To this end, all activities planned for this period were carried out successfully.

WP 8: Project Management and Quality assurance. The Project management at this period was very intense to manage effectively the trademark issue (described in section 1.3), the coordination of the project teams and to integrate all contributions towards the architecture design and technical specifications. Two major face-face meetings were organized; one in Athens (technical meeting) and one in Madrid (plenary meeting). The work carried out also included the organization of numerous teleconferences for the finalization of WP2 and technical progress in WP3 and WP4, as well as various project pending tasks, financial arrangements and payments, preparation of document templates and the maintenance of the project collaboration space in Alfresco located at ED premises.

Project physical meetings during this period			
Place	**Dates**	**Type**	**Participants**
ICCS premises, within the National Technical University of Athens, Athens, Greece	22-24 March 2017	Technical meeting	ED, ICCS, EVR, STR
ICCS premises, within the National Technical University of Athens, Athens, Greece	4-5 April 2017	Technical meeting to initially identify hardware sensors and scanners for the portable unit	ED, ICCS, JAS
EVERIS premises, Madrid, Spain	25-26 July 2017	Plenary Meeting	ALL (except BIO)

1.3 Identified deviations, problems and corrective actions taken in the period

Progress regarding performance indicators

An initial table of Key Performance Indicators has been compiled and included in deliverable D8.1 in M3. The performance assessment based on those KPIs will be conducted in subsequent periods.

WP – Activities	Performance Indicator	Framework for Metrics	Target Values
WP1 – Ethics requirements	1-1 Ensure compliance with the ethics requirements	1-1-1 Advice from an external Ethical Advisor	Target: Positive (on going process) Achieved up to M12: Ethical Advisor successfully appointed, ethics of profiling and risk of stigmatization of individuals and groups was addressed in the context of WP2 and linked to the possibility of false positives.
	1-3 Minimise risks of stigmatization of individuals and groups	1-3-1 Request of full consent from people involved in piloting. Mitigation plan to be included in D2.3, according to international and European legislation	≥ 90% full consents. Zero deviation from the mitigation plan Correction: 100% full consent. Zero deviation from the mitigation plan Achieved up to M12 activities (surveys,

			etc.): 100% Mitigation plan was included to D2.3
WP2 –Relevant EU Legislation, Requirement Analyses and Reference Architecture	2-1 Ensure proper understanding of the user needs at border crossing points	2-1-1 Usage of effective means to address the user groups (questionnaires, interviews etc).	Target:≥ 60% total responses in respect to the various users addressed. <u>Achieved</u>: 100%
	2-2 Ensure extraction of adequate (functional and non-functional) user requirements and formulation of the consequent use case scenarios.	2-2-1 Comprehensive and in depth related qualitative and quantitative analysis according to predefined methodology. Assess consistency of scenarios among the involved border crossing points.	Target: Feasibility and tangibility of user requirements and scenarios mapping. Positive feedback from the end-users. <u>Achieved</u>: 100%
	2-3 Alignment between user's requirements and reference architecture	2-3-1 Interpretation of user's requirements to system requirements, taking into account the SoTA and technology trends. Relationship between end-user system requirements and system architecture technical & functional specifications.	Target: Reasonable consistency. Inevitable deviations should be explainable and fully justifiable in terms of feasibility according to SoTA. <u>Achieved</u>: 100%
	2-5 Compliance with EU-wide legislation	2-5-1 D2.3: EU-wide legal and ethical report	Target: Reasonable consistency, inevitable deviations should be explicitly discussed and documented <u>Achieved up to M12: 100% D2.3 EU-wide legal and ethical report submitted</u>
WP3– Technological Components and Subsystems Development	3-3 Progress in development of individual sub-systems	3-3-1 Monitoring of time deviations against predefined Gantts charts	Target: ≤ 20% (Cumulative, at any given control time) <u>Achieved up to M12: 5%</u>
WP7– Dissemination, Exploitation, Communication	7-1 Effectiveness and Impact of Dissemination activities	7-1-1 Visibility of the public iBorderCtrl website	Target: Approximately 500 visitors per year <u>Achieved up to M12: 5494 unique visitors</u>
		7-1-2 Number of written and electronic publications (in academic and technical media)	Target (overall): ≥ 5 <u>Achieved up to M12</u>: 5
		7-1-3 Number of written and electronic publications (in industrial, business and public media)	Target: ≥ 3 per year <u>Achieved up to M12</u>: 3
		7-1-4 Number of website / newsletter articles via partner's channel	Target: ≥ 5 per year <u>Achieved up to M12</u>: 5
		7-1-5 Number of presentations (in symposiums, meetings, congresses)	Target: ≥ 6 <u>Achieved up to M12</u>: 4

		7-1-6 Number of Project workshops	Target: ≥ 1 Achieved up to M12: 2
		7-1-7 Number of followers on Twitter	Target: ≥ 50 per year Achieved up to M12: 28
		7-1-8-Number of followers on LinkedIn	Target: ≥ 50 Achieved up to M12: 15
		7-1-9 Number of publications on LinkedIn	Target: ≥ 5 per year Achieved up to M12: 5
WP8 – Project Management and Quality Assurance	8-1 On time submission of deliverables	8-1-1 In time project progress: Number of deliverables submitted on time	Target: ≥ 80% Achieved up to M12: 100% Short but justifiable delays occurred in the submission of 2 Deliverables. However, the delays were not large enough to jeopardize the achievement of this target.

2. Deliverables

Grey rows represent the Deliverables that were submitted during M7-12.

Del. N°	Deliverable name	Lead Beneficiary	Type/ dissemination level	WP N°	Delivery date from Annex I	Delivered (yes/no) and status (draft/final)	Forecasted delivery date	Comments on progress
D1.2	Ethics of profiling and the risk of stigmatization	ED	CO	1	31 May 2017	Yes, final		
D1.3	Ethics Advisor	ED	CO	1	30 November 2016	YES, final		
D2.1	Requirement Analysis Report	MMU	CO	2	30 December 2016	YES, final		
D2.2	Reference Architecture and components specifications	ICCS	CO	2	28 April 2017	YES, final		
D2.3	EU wide legal and ethical review report	LUH	CO	2	28 April 2017	YES, final		
D7.1	Project Web Portal	ED	CO	7	30 November 2016	YES, final		
D7.2	Project flyer	ED	CO	7	28 February	YES, final		

					2017			
D7.3	Dissemination and communication plan	ITTI	CO	7	31 August 2017	YES, final		
D7.4	Early Business Plan	ED	CO	7	31 August 2017	NOT YET	Middle of October 2017	The D7.4 is almost in its final stage. The finalization of the D7.4 needs to consider refinements of the technical solution that will be discussed in the forthcoming technical meeting scheduled for 2-3 October in Athens, and will be submitted soon after.
D8.1	Quality Management Plan	ED	CO	8	30 November 2016	YES, final		
D8.3	Periodic Progress Report	ED	CO	8	28 February 2017	YES, final		

3. Milestones

Milestone N°	Milestone Title	Related WP N°	Lead Beneficiary	Delivery date from Annex I	Achieved (yes/no)	Forecasted achievement date (if not achieved)	Comments on progress
MS1	Reference Architecture and components specifications	2	ICCS	(M8) 28 April 2017	Yes		Minor delay as the submission date was synchronous to the announcement of the amendment of the Regulation (EU)

						2016/399 by Regulation (EU) 2017/458 as of 7th of April, which should be taken into account.

4. Critical Implementation Risks and Mitigation actions

4.1 Foreseen Risks (risks already identified prior the initiation of the project, see Annex 1)

Risk N°	Description of Risk	Related WP N°	Proposed risk-mitigation measures
R3	Difficulty in collecting and analysing end-users requirements	2	The detailed methodology developed during Task 2.1 thoroughly described how to collect and analyse the relevant data. Partner's expertise was a major factor to overcome this risk. Therefore, no major issue occurred.
R4	Requirements of the pilot users are not aligned	2	The border control officers have addressed similar problems. No significant issues occurred.
R5		3	
R6	Internet or radio connectivity fails	3	In case of loss of internet backhaul connectivity, investigation of alternatives through synergetic wired and wireless/satellite access techniques will be used. In case of loss of radio connectivity due to propagation phenomena, then employment of diversity techniques to minimize the outage periods will be followed.
R7	Low ability of through-the-(metal)wall hidden human detection	3	The HHD module for hidden humans' detection is meant to be a portable alert tool and not a high profiling device with high resolution. Simple development allows for easy updates and alternative techniques. The HHD module is based on an already tested prototype, while for metal containers, acoustic sensors will be used which are better for penetration.

4.2 Unforeseen Risks

Grey rows represent the new ones during M7-12.

Risk N°	Description of Risk	Related WP N°	Proposed risk-mitigation measures
UR1	Not enough answers to the online	2	More survey leaflets were printed and distributed at the borders. A short extension in the time frame was given

	questionnaire in the set time frame		to gather more answers.
UR2	Due to the system's complexity, a small delay to the architecture design may be observed.	2	All partners were cooperating and communicating with frequent telcos in order to avoid any possible delay regarding the submission of the D2.2. An architecture physical workshop with involved partners has been scheduled in M7, to assure the progress of the design of the reference architecture and the editing of the respective deliverable. Despite that the amendment of the Regulation (EU) 2016/399 by Regulation (EU) 2017/458 took place on 7th of April (towards the finalization of D2.2) the project managed to quickly uptake the needed changes presenting only a short delay in delivering it.
UR3	Selection of the second language for the avatar still pending. This could impact in the avatar development.	3	A study of the most used languages in the different pilot sites has been done. During the plenary meeting that took place at the end of July, it was decided that the two European male and female border guard avatars will be implemented in three languages: English, Russian, Hungarian based on the statistics of the nationality of people crossing the iBorderCtrl pilot sites.
UR4	Need of native speakers in the selected languages of the avatar in order to produce the recordings for the avatar	3	Between all the partners we have native speakers of the most common languages. In case it's not possible to find a native speaker in a specific language the possibility of subcontracting the recording of the questions will be analysed.
UR6	Not enough followers on twitter and LinkedIn members due to the project name change and replacement of all previous accounts.	7	One of the detrimental effects of legal issues connected with the project name was the necessity to cut down all social media activity and shut down LinkedIn and Twitter accounts. This resulted in clearing all activity that was performed throughout the project duration. Eventually, it was necessary to set up the accounts anew and invite members and followers again. This is a really demanding and time-consuming process, so engagement of all project Partners is expected. Partners shall use their networks of contacts for information sharing. Moreover, a synergy with other H2020 project is expected to be established in September 2017. This offers a possibility to reach even more audience.

5. Work plan for the next period

5.1 Planned activities in the next period

WP 1: A report by the ethics Advisor must be prepared and submitted to the EU with the periodic reporting. All partners (end-users, tech partners) should be in close collaboration and communicate with LUH, in order to get a common understanding on the different needs and on technical implementations.

WP 2: This WP was successfully completed with the submission of D2.2: Reference architecture and components specifications and D2.3: EU-wide legal and ethical review report. These Deliverables are also meant to be used as reference documents for the work to follow. To this respect, technology developers in WP3 and WP4 should make sure that they meet D2.2 and D2.3 requirements (traceability matrix and legal constraints) as mentioned in the respective deliverables.

WP 3: Next steps include the finalization of the data collection devices definition (D3.1). All partners will also continue their work with the developments of each respective module. A first version of all technological tools and subsystems (Portable unit, Biometrics (BIO), Document Authenticity Analytics Tool (DAAT), Face Matching Tool (FMT), Hidden Human Detection in vehicles (HHD), Radio Network Design and Development) is expected by the end of M18. During this process, any unforeseen issues will be detected as early as possible and in parallel provide useful capability insights. A unit test plan for each subsystem will be defined in order to guarantee the performance of the different components in the system. Several technical meetings, both face-to-face and by electronic telco / conference, will take place to ensure that the different interfaces between the subsystems are aligned in order to minimise the risk of connectivity problems further on within the project.

WP 4: The development of the iBorderCtrl software tools and relevant interfaces will continue (Secure Cloud Based Storage, Processing and Data Protection, Risk Based Assessment Tool (RBAT), External, Legacy and Social Interfaces capabilities (ELSI), Mobile application (Traveler User Appl.), Integrated Border Control Analytics Tool (BCAT), Border Manager Appl., Border Guard Appl.). To study and demonstrate the potential impact of incorporating analytics from social media interfaces, twitter has been identified as the target platform to incorporate data from and work has begun on linking through an API. The legacy data, databases that already exist and are deployed at the border have been identified (N-VIS, SIS, national black lists), all available information and guidance has been studied and decisions on how they will be incorporated were made, based on the publically available guidelines. Great effort is put towards the development of the iBorderCtrl system so that simulated data are only used when access to real data isn't available; even in this case we ensure that simulated data will be easily replaced with links to the real ones once iBorderCtrl deploys post production.

BCAT has progressed and initial development steps are currently taking place; the development has primarily focused in helping the consortium identify and link all data that BCAT needs to have access to for the analyses, and on preliminary data analytics designs to maximize the potential quality of actionable outcomes from the module.

The Traveler User Appl. has progressed with the identification of the underlying software engineering decisions to ensure that its three different aspects work together seamlessly. The information needed to be collected for the application has been split into segments i.e. providing information in a questionnaire type form, providing digital versions of documents and defining the questions the avatar will pose to the travelers to quantify their intend of deception.

A first version of the iBorderCtrl software modules is expected by the end of M18.

WP 5: This WP will begin (M15) with the development of the iBorderCtrl Integration plan, to act as the specification of the whole integration, ensuring there are no conflicting requirements of the individual components, defining the integration cycles and the tasks of each step. Moreover, the aim is to specify a detailed roadmap for a continuous integration of the developed components and platforms, describing the integration process and responsibilities of the partners and setting the objectives of each integrated prototype. The development of the Integration Plan will go in parallel with the experimental methodology of WP6 since strong interactions between the two WPs (WP5 and WP6) will be held, in order to provide a solution that meets user needs. Furthermore, the infrastructure needed for the successful realization of the integration process will be deployed.

WP 6: A specific methodology for executing the experimental evaluation will be provided to capture the end-user feedback in a unified and consistent manner in the selected deployment sites. Qualitative and quantitative evaluation criteria will be defined in line with the user requirements analyzed in WP2 and the physio-psychological factors that should be considered. The methodology will focus on evaluating the end-users' perception of usability and efficiency and several metrics regarding the overall border control effectiveness in various combinations of automated / human execution with automation support / human execution to conclude to the optimal solution.

WP 7: The partners will engage further with the identified related stakeholders to establish the most likely exploitable outcome, and will translate this objective into a well-detailed route to market and exploitation plan. Efforts will also be made to start getting traction on social media with targeted campaigns to various target groups, and to achieve widespread dissemination via media and advanced academic publications. All partners and especially the universities, continuously investigate future events (conferences, paper publications) where the iBorderCtrl project and corresponding research and activities could be presented.

WP 8: The coordinator and corresponding partners will continue to effectively monitor the project in administrative, technical and financial terms, to ensure its strategic and everyday management, and to guarantee the adherence of the work to the overall project plans, available resources and timing.

5.2 Planned meetings, activities related to market uptake and dissemination activities

Frequent meetings and teleconferences are planned at various levels to ensure that the progress is well monitored. In October 2017, a technical meeting is already scheduled to be held in Athens, Greece to facilitate the different modules' development process and communication between them. In addition, the next plenary meeting is currently being organized for January 2018 in order to discuss the project progress.

iBorderCtrl consortium members actively seek relevant opportunities to present and promote the project objectives and results. The indicative list of the potential upcoming meetings which might be of interest for the consortium partners include the following events:

- **EAB-PRC Research Projects Conference (The European Association for Biometrics (EAB) in cooperation with the Joint Research Center (DG-JRC) of the European Commission, and Fraunhofer IGD)**– 18-19 September 2017, Darmstadt (Germany)
- **Smarter Border 2017 Conference** –7 November 2017, London (United Kingdom)
- **The 7th International Conference on Pattern Recognition Application and Methods** – 16 – 18 January 2018, Funchal, Madeira (Portugal)
- **11th Annual Border Security conference and exhibition** – 21-22 February 2018, Rome (Italy)
- **World Border Security Congress** –20-22 March 2018, Madrid (Spain)
- **Mediterranean Conference on Pattern Recognition and Artificial Intelligence 2018** – 27-28 March 2018, Rabat (Marocco)

- **13th IAPR International Workshop On Document Analysis Systems** – 24 – 27 April 2018, Vienna (Austria)
- **Security of Things World** – 2-3 July 2018, Berlin (Germany)
- **IEEE WORLD CONGRESS ON COMPUTATIONAL INTELLIGENCE** – 8-13 July 2018, Rio de Janeiro (Brazil)
- **26th European Signal Processing Conference 2018** – August/September 2018
- **European Conference on Computer Vision (ECCV)** – 8 – 14 September 2018, Munich (Germany)
- **25th IEEE International Conference on Image Processing (ICIP) 2018** – 7- 10 October 2018, Athens (Greece)
- **XXIX International Biometric Conference (IBC 2018)** – 8-13 July 2018, Barcelona (Spain)
- **Thirty-second Annual Conference on Neural Information Processing Systems (NIPS)** – 3 – 8 December 2018, Montreal (Canada)
- Action to attend a future **ACI Europe Event** - ACI EUROPE organises a range of events and workshops every year, including dedicated conferences on airport economics & finance, commercial activities, regional airports, human resources and operations, e.g. the November 2016 ACI EUROPE Security & Crisis Management Summit in Brussels.
- Workshop with **Spanish National Police and other Spanish end-users**: Small workshop in EVR premises to present the project and the results achieved to several end-users raising awareness of the project and creating expectations.

Submission of a Special Session Proposal

Academic dissemination will include the submission of a proposal for the organization of a technical Special Session at the 2018 IEEE World Congress on Computational Intelligence, entitled "The Role of Computational Intelligence Technologies in Controlling Borders". The IEEE World Congress on Computational Intelligence is a premier conference in the field of computer intelligence and associated technological applications dating back to 1994 when it was held in the USA. It has since been held in international locations including Canada, Hawaii, Beijing, Hong Kong and Barcelona

The general aim of the proposed special Session is to firstly provide a forum for new computational intelligence methodologies / techniques and systems which contribute towards improving border crossing efficiency and security within border control solutions; secondly to investigate the social and ethical implications of using computational intelligence technology on the travelers themselves. Thirdly the session provides a forum for which the novel sub-systems developed as part of iBorderCtrl can be submitted for peer review and if accepted, be presented to an international audience comprising both academics and industry.

Papers in Preparation

- Piotr Bilski, Jozef Modelski, Bartocz Kosciug, Jacek Olejnik, Iwona Badaczewska, Anna Malamou and Rodoula Makri, *"Application of the RFID Technology in the European Union Border Control System"*, to be submitted to the "8th annual IEEE International Conference on RFID Technology and Applications 2017 (IEEE RFID-TA 2017)", Warsaw, Poland, 20-22 September 2017.
- S. Zoltán, "BorderCtrl and BBA242: Examples for research and innovation in border security at European and national level", 2017 CEPOL Research and Science Conference 'Innovations in Law Enforcement', Budapest, 28-30.11.2017.
- K. Crockett, J. O'Shea, W. Khan, A. Antoniades: An initial paper on ADDS architecture and results from the external experiment to be submitted to IEEE International Conference on Artificial Neural Networks – 15th January 2018

6.   Dissemination and exploitation of results

6.1   Scientific Publications

Grey rows represent the new ones, held during M7-12.

Type of scientific publication (journal/ conference proceedings/ workshops/ book/ monograph/ thesis/ dissertation/ etc.	Authors, Title, Publisher, Place of publication, Volume/Number of issue, date, Relevant pages, ISSN or eSSN.
(Online)-Journal	J. Stoklas, "Europäischer Grenzschutz 2.0 – Ein Überblick über datenschutzrechtliche Herausforderungen", ZD-Aktuell, Beck, Munich, Heft 21, 16.12.2016, 2192-5593.
Scientific Conference	C. I. Kourogiorgas, A. D. Panagopoulos, R. Makri, "A Copulas-Based Time Series Synthesizer for Mobile Satellite Communications Operating Above 10 GHz", 11th EUCAP Conference, Paris, France, March 2016.
Scientific Conference	S. Zoltán, "The Intelligent Border Control System and the future of Integrated Security Management in Public-Private Cooperation", Tourism and Security, in Nagykanizsa, Hungary, 2016.
Journal	K. Crockett, J. O'Shea, S. Zoltán, Ł. Szklarski, A. Malamou, G. Boultadakis, "Do Europe's borders need multi-faced biometric protection?", Biometrics Technology Today journal, Elsevier, Volume 2017, Issue 7, July–August 2017, Pages 5-8.
(Online)-Journal	J. Stoklas, "Sicherheit im Schengen-Raum: Eine unendliche Datensammelei?", ZD-Aktuell 2017, 05684.

6.2   Progress regarding market uptake and exploitation

The initial work of defining and describing an early business plan for D7.4 is currently being finalized for submission. This deliverable also investigates thoroughly the land border control and security market, the positioning of the iBorderCtrl integrated solution in that market, the competitive offerings and possible routes and channels for market penetration. Moreover this work has been also extended to develop early exploitation plans and identify exploitable results for all iBorderCtrl partners, in terms of target markets, competitive products, market trends, public acceptance etc. Partners of the consortium have already included on their websites and dissemination channels their expansion of services based on the outcomes of the project to enhance both the dissemination of the project as well as to cultivate potential collaboration beyond the consortium partners on future projects that will build on top of the technologies developed in iBorderCtrl.

6.3   Dissemination and Communication activities

Grey rows represent the new ones, held during M7-12.

Type of communication and dissemination activities	Number of activities
On 14th December 2016, an iBorderCtrl end-user workshop on new intelligent portable control systems for land border checks was held with the participation of the Hungarian project team and external experts from law enforcement, private security sector, research and academia.	1
iBorderCtrl Dissemination as part of STEM Outreach Activities 1)5th December 2016, iBorderCtrl presentation of the aims and core of objectives of the projects to a wide and varied audience at the event Fun Tech Jobs - A series of short talks on Engineering and Computer Science, designed to Inspire, Educate and Engage! The overview of the traveller's pre-registration system was well received and was followed by a discussion of the ethical and social use of artificial intelligence to detect deception. The event was sponsored by the School of Computing, Mathematics & Digital Technology at Manchester Metropolitan University, IEEE Women in Engineering United Kingdom and Ireland, and IEEE Women in Computational Intelligence. 2)15th December 2016, short talk on Artificial Intelligence, Artificial Neural Networks and the iBorderCtrl application to pupils aged 11 – 14 at Levensulme Girls High School in Manchester (United Kingdom). The pupils asked many questions about how the iBorderCtrl Pre-Travellers system would work, especially for Schengen and Non-Schengen countries. The majority had experienced European travel and they felt that anything to speed things up at borders would be very good.	2
Featured Article about iBorderCtrl: "Avatar interviews and portable scanners to speed up border crossings" in the EU Research & Innovation Magazine (8th of February 2017). https://horizon-magazine.eu/article/avatar-interviews-and-portable-scanners-speed-border-crossings_en.html	1
Presentation of iBorderCtrl at the FRONTEX Workshop on EU funded border security research projects, 8th June 2017. The presentation was made by the Coordinator.	1
Crockett (MMU) gave a key note talk entitled "Automated Deception Detection for EU Borders'" at the British Academy / Goldsmiths Sponsored Event at Manchester Metropolitan University on 31st March 2017. Details: https://www.eventbrite.co.uk/e/how-to-be-a-successful-researcher-in-the-21st-century-tickets-32582004653#	1

7. Ethical issues monitoring during the reporting period

During the reporting period, several ethical and legal issues have been addressed and monitored. They both concern the iBorderCtrl-Project as a whole as well as certain individual aspects. In D1.2 we have raised the risk of stigmatization, which is associated with data accuracy and quality depending on the data sources used to calculate the risk scores. There is a risk of false positives and negatives and iBorderCtrl must implement appropriate redress mechanisms to ensure that inaccurate data will be disregarded. In particular, it may be possible that travelers are stigmatized through inaccurate (third party) information. In order to counter such risks the system must ensure that false/inaccurate information may be detected and disregarded either in the registration or during the border crossing. Furthermore, ethical issues raised by the profiling of travelers and categorizing them into certain

groups have been addressed. Moreover, automated decision making is another issue raising ethical concerns. In this context, it is important to discuss algorithm bias.

Aside from the above ethical concerns related to the impact of human machine interaction are present. The iBorderCtrl relies on an avatar interview as a distinct item of the registration phase that, inter alia incorporates a technique of Non-verbal behaviour analysis (NVB), which shall be employed to detect untruthful answers. The issue of informed consent raises further ethical concerns. As iBorderCtrl relies on consent as legal justification to process personal data (during the research phase as well as exploitation), it is a legal – ethical question to what extent one could rely on informed consent as a legal basis. It also is an additional ethical question to what extent, iBorderCtrl devices and their functionalities should be transparent; Hence, it is vital to strike a balance between the interests of border guards to protect information on the functions of iBorderCtrl devices. On the other hand, travelers should be informed on how their personal information will be processed both during preregistration and during the border crossing phase.

Furthermore, we have commenced to review technical trials plans carried out at MMU in order to insure compliance with MMUs as well as iBorderCtrl's code of ethics. In addition to that and due to changing requirements raised at the steering committee meeting on 25-26.7.2017 (Madrid) further ethical work has been done to update the consent managemen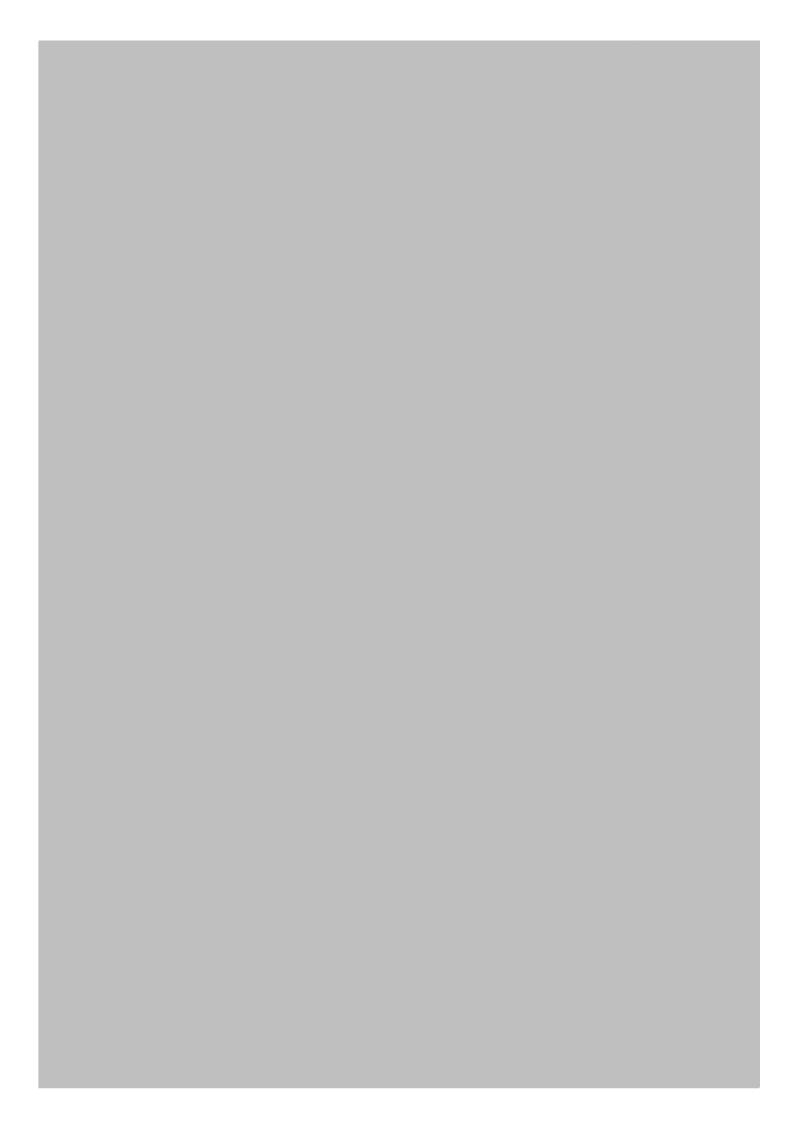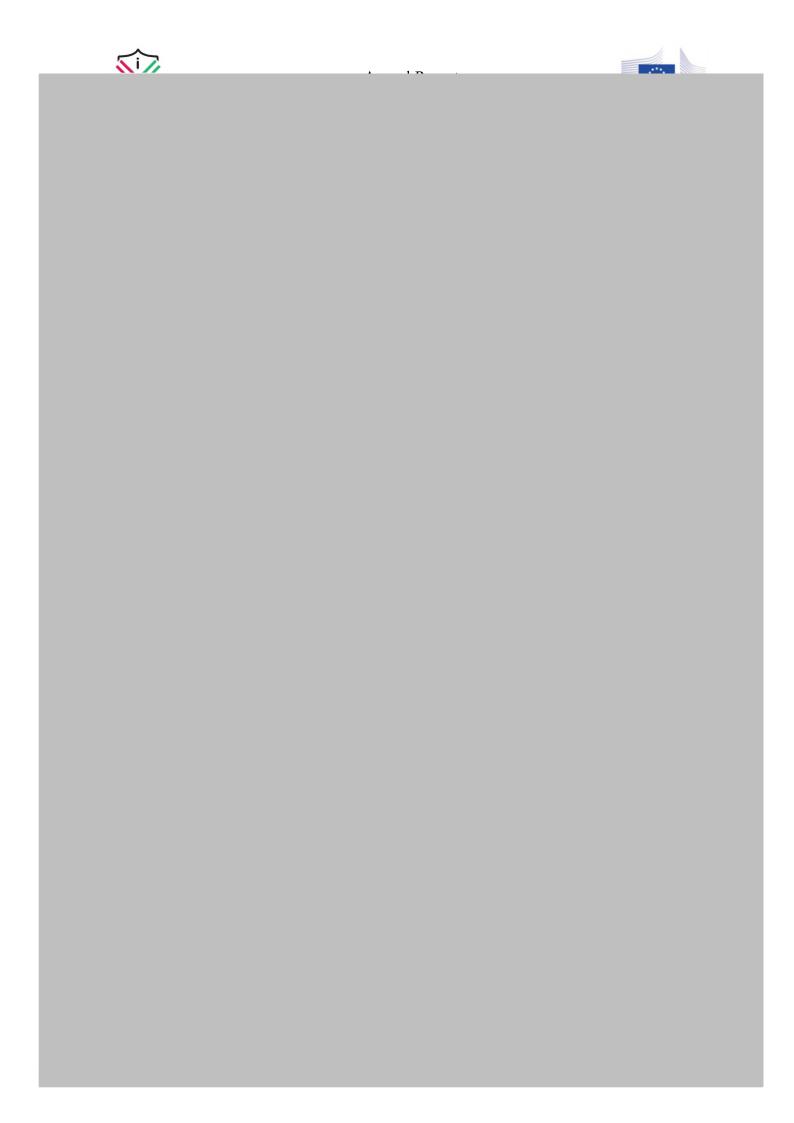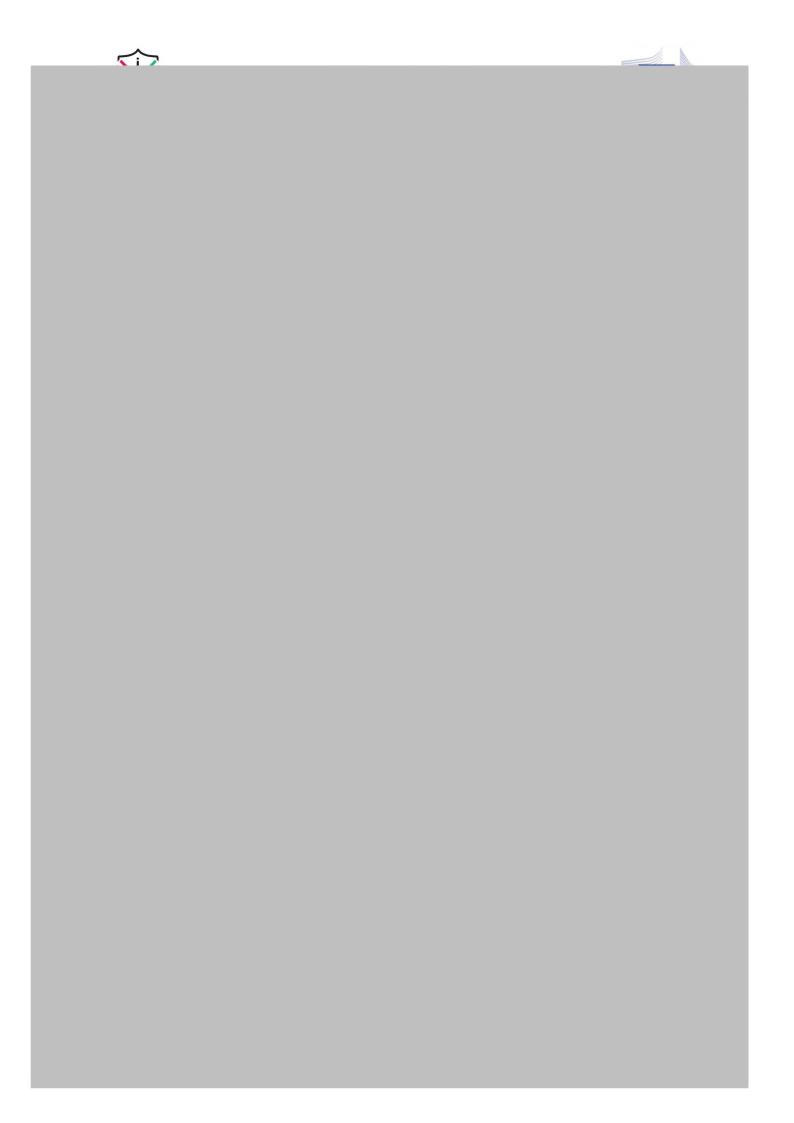t especially 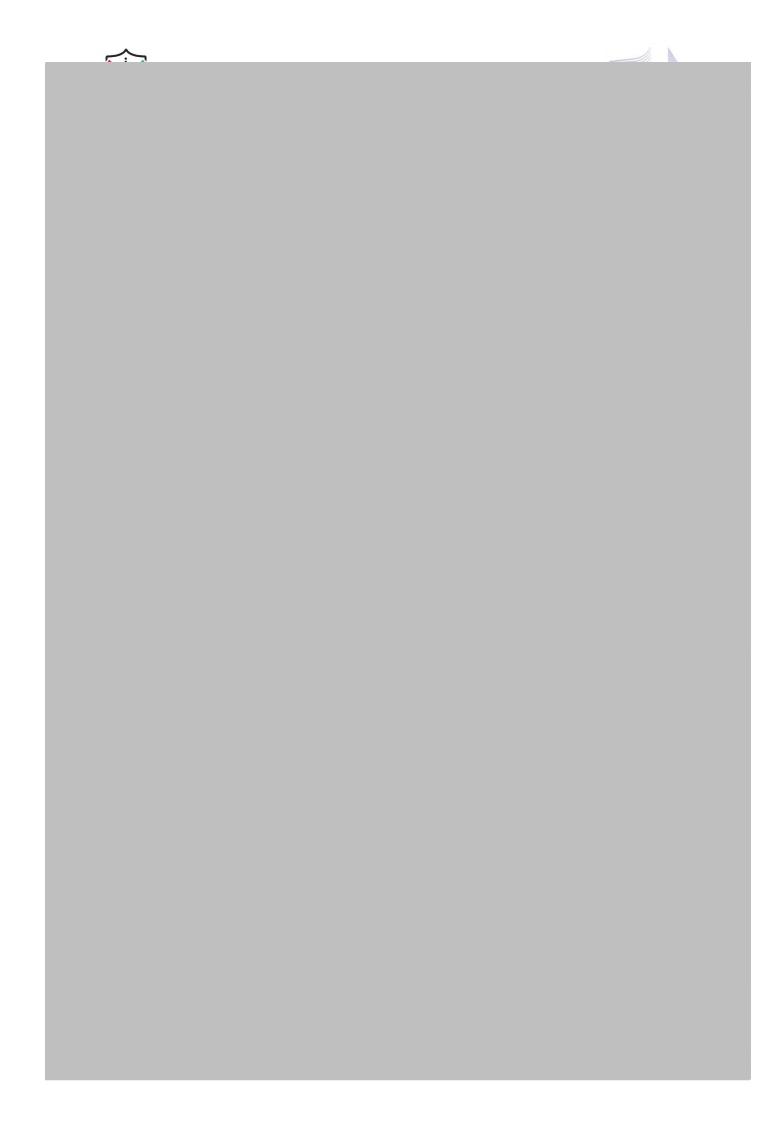the consent forms of the project.