

H2020 - BES - 5 - 2015

Research Innovation Action



Intelligent Portable ContROl SyStem



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 700626

D8.7 Annual Report 2			
Report Identifier:	D8.7		
Work-package, Task:	WP8	Status - Version:	1.00
Distribution Security:	CO	Deliverable Type:	R
Editor:	ED		
Contributors:	ALL		
Reviewers:			
Quality Reviewer:	ED		
Keywords:	Progress report		
Project website: www.iborderctrl.eu			

1. Progress of Work Plan in the period

The first 18 months of the project (M1-M18) are described in the previous submitted deliverables namely D8.3 Periodic Progress Report (M1-M6), D8.4 Annual Report (M7-M12) and D8.5 Periodic Progress Report II (M13-M18) and also in the official periodic and financial report concerning the first reporting period (M1-18) submitted to the ECAS system. In this deliverable the progress between M19 and M24 of the project will be analysed.

1.1 General progress

iBorderCtrl project continued its progress during its fourth semester through seven (7) WPs: WP1: Ethics requirements, WP3: Technological Components and Subsystems Development, WP4: Development of the iBorderCtrl software platform and related interfaces, WP5: Integration and technical testing, WP6: Pilot Deployment and system evaluation, WP7: Dissemination, Exploitation, Communication and WP8: Project Management and Quality Assurance. WP2: Relevant EU Legislation, Requirements Analysis and Reference Architecture was finalized on M8. The main objectives of this period were:

- a) the development of the second (and final) version of all technological tools and iBorderCtrl subsystems and submission of respective deliverable D3.3;
- b) the implementation of the second (and final) version of the iBorderCtrl software platform, related applications and interfaces and submission of respective deliverable D4.2;
- c) the preparation of the integration plan to be followed and submission of respective deliverable D5.1;
- d) the implementation of the early version of the integrated prototype and submission of respective deliverable D5.2;
- e) the implementation of the early version of the portable unit for border guards and submission of respective deliverable D5.3;
- f) the design of a specific methodology for executing the experimental evaluation and pilot deployment preparation, the planning of each test phase and submission of respective deliverable D6.1;
- g) the documentation of a concrete iBorderCtrl exploitation plan and submission of respective deliverable D7.5;
- h) the documentation of the dissemination activities of the second year (D7.6: Yearly communication report including communication material) and the description of the dissemination and communication plan for the third year of the project (D7.8).

Any issues related to the integration of the software and hardware components of the iBorderCtrl system were resolved via frequent meetings between technical partners that included numerous teleconferences, communication via Github in order to resolve any integration issues and a plenary meeting. 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),
- creating a new updated version of the project flyer (D7.7) and the project Poster,
- presenting the iBorderCtrl outcomes in publications in scientific journals,
- participating to a number of international conferences and relevant dissemination and communication events and

- co-organising a special session named “The Role of Computational Intelligence Technologies in Controlling Borders on the IEEE World Congress on Computational Intelligence.

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 'ethics requirements'. During this period (M19-M24) the “Informed Consent” file for the travelers, the “Terms of Use” of the TUA application file and the “Privacy Policy” file were updated by LUH taking into consideration the new General Data Protection Regulation (GDPR) that is applicable as of May 25th, 2018 in all member states to harmonize data privacy laws across Europe. Moreover a “Joint Controllers Agreement” file was prepared to be signed among all data controllers according to art. 26 of the GDPR. The purpose of this is to define responsibilities among the iBorderCtrl partners, i.e. with regard to allowing data subject's to properly exercise their rights.

WP 2: Relevant EU Legislation, Requirements Analysis and Reference Architecture. This work package was successfully finalized at M8.

WP 3: Technological Components and Subsystems Development. The development of the main system components continued during this period (M19-M24) and as a result the [REDACTED] the Biometrics Module incorporating fingerprints and palm vein technologies (BIO), the Face Matching Tool (FMT), the Document Authenticity Analytics Tool (DAAT) and the Hidden Human Detection Tool (HHD) were finalised. All work carried out continued the work already done in the previous semester with the finalisation and refinement of all tools and subsystems.

The final version of all subsystems involved in WP3 is documented in D3.3: Second version of all technological tools and subsystems for integration (Portable unit, [REDACTED] DAAT, portable radar, FMT, Avatar based dialogue, HHD). This deliverable describes the final technology functionalities of each of the subsystems, additional important implementation details (not included in D3.2), the methodology of the calculation of the provided risk score and respective performance test results.

WP 4: Development of the iBorderCtrl software platform and related interfaces. The finalization of all the iBorderCtrl software tools and the relevant interfaces has progressed as planned. D4.1: Second version of the iBorderCtrl software platform was submitted on time and presents the final technology functionalities of RBAT, ELSI and BCAT. Moreover the calculation methodology of the provided risk score, additional important implementation details (not included in D4.1), and performance test results were also presented in this deliverable.

WP 5: Integration and technical testing. The main objective of this work package is the integration of all components and technologies developed in WP3 and WP4 and their merging into functional prototypes. A detailed integration plan was prepared and submitted on time (D5.1) 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.

In parallel to the delivery of the second version of all technological (in WP3) and software (in WP4) system components, their integration into an early integrated prototype progressed as well. The integration approach followed a step by step integration of the main system components; the avatar and [REDACTED] backend service were successfully incorporated to the Traveller User Application (TUA) and the process continued with the integration of the rest of the components. In addition, major focus was given to the development of the communication protocols and connections between the main iBorderCtrl database and the various system modules along with the integration of the various hardware sensors and scanners to the iBorderCtrl portable unit.

In D5.2 Early version of the integrated prototype (limited functionality) the three finalized iBorderCtrl user Applications and interfaces (Traveller User Application-TUA, Border Guard User Application-BGUA and Border Manager User Application-BMUA) are presented with screenshots of the applications and

explanations on the functionality offered per screen. Additional information regarding the implementation and deviations from the functionality presented in D4.1 were also included.

In parallel to the above, the actual deployment of the radio network in all pilot sites has already been initiated. Preparatory actions concerning the internet service providers' engagement and the installation surveys along with purchasing the pending equipment are evolving towards their successful finalization.

In parallel to the development of the different user applications, an intensive work has been done in order to optimize the design and functionality of the portable unit. This unit integrates all the different sensors / scanners / readers. The first iteration of the design has been reviewed by the end users within the consortium and based on their comments a new enhanced and more advanced design of the portable unit (taking into account ergonomics and wear ability issues pinpointed by the end users) was proposed.

Additional options of hardware layout are being developed –following the same principles and software implementations at the backend- to fulfil expectations of the end-users; proving the modularity and hardware-independent design of the system architecture. In D5.3, “Early version of the portable unit for border guards”, the integrated portable unit prototype was described.

Various integration tests have been scheduled between components to issue, report and tackle bugs, to identify problems and to address requests with aim to successfully realize the integration process. The same approach will be followed towards the Final version of the integrated prototype and portable unit (full functionality) to be ready on M30. The three GitHub repositories created during the previous semester (iBorderCtrl-integration, iBorderCtrl-documentation, iBorderCtrl-management) are continuously being used to facilitate the integration procedure and communication between all partners' developers' teams and resolve any integration issues.

WP 6: Pilot Deployment and system evaluation. The main aim of this Work Package is to undergo the verification and validation procedures of the prototypes developed in WP3, WP4 and the complete integrated prototype with real end users. A specific methodology for executing the experimental evaluation was planned during this period in order to capture the end-user feedback in a unified and consistent manner in the deployment sites. The recruitment methodology for volunteers which are going to participate to the pilots was also thoroughly planned (use of leaflets in 3 languages, billboards signs, posters, social media campaigns etc.). Certain scenarios and case studies have been drafted to facilitate the more systematic usability and stress testing of the iBorderCtrl system. In addition, the baseline methodology to be used for the validation of the iBorderCtrl system was documented including the types and roles of each participant, the evaluation methodology to be followed (quantitative and qualitative feedback) and respecting Key Performance Indicators. The locations of the four pilot sites were also described along with any identified dependencies. Moreover, details on the iBorderCtrl deployment and the necessary pilot installations related to the communication between system components were provided, however some administrative work still has to be done before access points may become operational (especially in Hungary, Border Crossing Points are under strict regulations regarding installation of communication equipment). The whole implementation plan mentioned above was included in D6.1 (Experimental Design for Pilot Deployment and Evaluation), submitted with delay in order to take into consideration all relative aspects, especially to follow recent and upcoming regulatory framework changes with adapted test scenarios. The purpose of this deliverable is to act as a manual to support partners in the pilot deployment phases (test phases 0-2) of iBorderCtrl and to present a concrete validation plan to gather the end-users feedback during all test phases in a common way in order to be able to draw accurate evaluation conclusions.

WP 7: Dissemination, Exploitation, Communication. In the framework of dissemination activities, iBorderCtrl consortium organized a special session named “The Role of Computational Intelligence Technologies in Controlling Borders” to the “2018 IEEE World Congress on Computational Intelligence” that was held in Rio de Janeiro, Brazil on the 8-13th of July 2018.

Four scientific

papers were accepted for publication and presented in this special session by iBorderCtrl consortium delegates whereas another publication related to iBorderCtrl was presented at the IEEE International Joint conference on Artificial Neural Networks (IJCNN) in Rio de Janeiro, Brazil on the 8-13th of July 2018. Moreover, iBorderCtrl also participated at the 4 important events: a) the World Border Security Congress on the 20th-22nd of March 2018, Madrid, Spain, b) the Trailblazing Technology Conference: The Future Impact of AI and Tech on Manchester on the 23rd of March 2018, organized by pro-Manchester business development organization, c) the “Physiological Profiling with Artificial intelligence” research talk at the University of Vigo, Spain on the 14th of June 2018 and d) the FLYSEC Info Day and Risk-Based Security Projects Cluster Meeting, in Brussels on the 28th of June 2018. In parallel, the iBorderCtrl web portal has been extended with additional content to enhance the visibility of the project.

Two deliverables were due on M24: D7.6 Yearly communication report including communication material and D7.8 Dissemination and communication plan. The key purpose of the D7.6 was to report on the iBorderCtrl dissemination activities conducted throughout the period M12-M24. The report covered the activities conducted online as well as through physical interaction or participation in relevant events. Dissemination activities of iBorderCtrl, in the period M12-M24, also included the preparation of scientific publications and promotional materials. All of the project related materials produced within the reporting period has been presented in the report. The deliverable D7.8 provided updates to information on the iBorderCtrl dissemination strategy and objectives for the third year of the project. The purpose of this document was to describe all planned communication and dissemination actions during the project funding period, to ensure relevant stakeholders reach iBorderCtrl public reports and project events.

WP 8: Project Management and Quality assurance. The Project management at this period was very intense to manage effectively the coordination of the project implementation teams, to ensure the quality and on time delivery of the submitted deliverables and also to organize the preparatory actions required for the 1st official EC review meeting. The maintenance and update of the project collaboration space in Alfresco located at ED premises continued. Two major face-face meetings were organized; one in Brussels (official EC review meeting) and one in Limassol (plenary meeting). The work carried out also included the organization of numerous teleconferences.

Project physical meetings during this period			
Place	Dates	Type	Participants
European Dynamics Belgium premises (26 th) and REA premises (Research Executive Agency) (27 th), Brussels, Belgium	26-27 April 2018	Official review meeting	ALL
Stremble Ventures Ltd premises "Conti-Campus", Limassol, Cyprus	27-28 June 2018	Plenary Meeting	ALL

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

Nothing to report.

1.4 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 for the period between M1-M24 is depicted in the table below. Grey rows are the KPIs which are not applicable during this period.

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) <u>Achieved up to M24:</u> Ethical Advisor submitted his first report on M18.
	1-2 Ensure proper implementation of ethics requirements	1-2-1 Periodic reports in M18 and M36 to be submitted to the European Commission. Related feedback from the pilot implementation.	Target: Positive (on going process) <u>Achieved up to M24:</u> Ethical Advisor submitted his first report on M18.
	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	Consent from 100% of test participants. Zero deviation from the mitigation plan, no violations of ethical requirements. <u>Achieved up to M24 activities (surveys, etc.):</u> 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%
	2-4 Minimizing risks on architecture development to ensure compliance of components and interfaces to system requirements (taking also	2-4-1 Alternative solutions examination, benchmarking with reported similar architectures, mitigation and backup plans in D2.2. Reference architecture to be assessed between M14-M16	≤ 10% deviations of customised components' content and of their related interfaces in respect to initial requirements,

	into account the DoW related roadmap).	following feedback from the first development stages of WP3 and WP4 to identify deviations from initial end-user requirements and system architecture and apply corrections and modifications.	after identifying deviations and apply corrections. <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 100%</u>
WP3 – Technological Components and Subsystems Development	3-1 System components functionality compliance with respect to architecture and system requirements	3-1-1 Reduced deviations of all system components' functionality and of their related interfaces from initial end-user requirements. Alternative solutions examination, mitigation and backup plans to be employed so that to result in the foreseen results.	≤ 10% deviations at final stage of development <u>Achieved up to M24</u> : Compliance more than 95%
	3-2 Unit testing of individual sub-systems	3-2-1 Running of pre-defined unitary test per sub-system	100% compliance at final stage
	3-3 Progress in development of individual sub-systems	3-3-1 Monitoring of time deviations against predefined Gantt charts	Target: ≤ 20% (Cumulative, at any given control time) <u>Achieved up to M24</u> : Successful finalisation of individual sub-system developments
WP4 – Development of the BorderCtrl software platform and related interfaces	4-1 Software platform architecture acceptance	4-1-1 The percentage of partners that accept the developed system design	≥ 60% at first stage of development 100% at final stage <u>Achieved up to M24</u> : 100%
	4-2 Alignment between requirements and software platform architecture and interfaces.	4-2-1 Relationship between end-user system requirements and software platform architecture and development. Reduced deviations from end-user requirements and system architecture	Reasonable consistency, deviations should be documented, reviewed by the consortium and approved by the coordinator. ≤ 10% deviations at final stage of development. <u>Achieved up to M24</u> : Full coverage of IT and functional requirements (100%)
	4-3 Provision of adequate platform integration between components, databases and interfaces.	4-3-1 Unique key identifiers per subject must be defined and used consistently to measure adequate linkage across each platform component in order to ensure that integration in WP5 can be achieved.	A table linking unique identifiers between 100% of the components.

	4-4 Independent testing of each component	4-4-1 Each platform component must pass preliminary independent testing to ensure it meets relevant requirements.	100% of components completed at final stage of development (demonstrate they meet all requirements in testing). <u>Achieved up to M24: 100%</u>
	4-5 System components (mobile app)	4-5-1 Mobile app compatibility tests among the pilot user's devices handsets	≥ 90% pass the tests at final stage of development
WP5 – Integration and technical testing	5-1 System components testing/demonstration	5-1-1 Component testing success rate 2 months (at the latest) before delivery date	≥ 50% <u>Achieved up to M24: 100%</u>
		5-1-2 Component Critical tests success rate on delivery date	100% <u>Achieved up to M24: 100%</u>
	5-2 System integration	5-2-1 Deviation of complete system functionality from end-user requirements and system architecture	≤ 10% at final stage of development <u>Achieved up to M24: =0%</u>
		5-2-2 Integrated System success rate 2 months (at the latest) before delivery date	≥ 50% <u>Achieved up to M24: >80%</u>
		5-2-3 Integrated System success rate on the delivery date	100% <u>Achieved up to M24: 100%</u>
		5-2-4 Amount of days for resolving an integration problem (system availability, bug, etc), 3 rd party (external provider) component issues excluded	≤ 20 (working days) <u>Achieved up to M24: ≤10 (working days)</u>
	5-3 Adherence to the integration roadmap and schedule, including release of the platform versions.	5-3-1 Number of days between the actual achievement date and the scheduled deadline	1 month delay as long as other critical path activities are not jeopardized <u>Achieved up to M24: No delay so far according to the workplan</u>
	5-4 Use case coverage	5-4-1 Percentage of use cases covered by the test cases	=100% (allow for ≥ 85% in case of force majeure or inevitable problems).
	5-5 System requirements coverage	5-5-1 Percentage of system requirements covered by the test cases	=100% of requirements (allow for ≥ 85% in case of force majeure or inevitable problems).
	5-6 Platform validation	5-6-1 Percentage of successfully passed test cases	=100% (allow for ≥ 85% in case of force majeure or inevitable problems).
5-7 System components functionality final compliance with respect	5-7-1 Deviation of all system components' functionality and of their related interfaces from initial	≤ 10% at the end of the project <u>Achieved up to M24:</u>	

	to end-user requirements and overall system's architecture	end-user requirements and system architecture	=0%
WP6- Pilot Deployment and system evaluation	6-1 Quality of the test environment and test cases	6-1-1 Number of open deployment issues with priority/criticality degree higher than "low" for all pilot test environments and test cases	=0 before the final piloting / deployment phase <u>Up to M24:</u> =0
	6-2 On-time validation of system components to give feedback for the final prototypes development and testing	6-2-1 Provisioning of the needed capacity (equipment, software platform, subsystems etc) to operate iBorderCtrl platform	100% before the final piloting / deployment phase <u>Up to M24:</u> =60%
		6-2-2 Number of days of delay for training and demonstration of components to each pilot site's authorisation personnel	≤ 15 <u>Up to M24:</u> =0
	6-3 Completion level of pilot site installation	6-3-1 Number of days of delay for installation without jeopardising the project's workplan	≤ 30 (allow for up to 2 months delay in case of force majeure or inevitable problems as long as other critical path activities are not jeopardized)
	6-4 Development of experimental and evaluation methodology	6-4-1 Minimum period for baseline test of the early prototypes	1 to 2 months <u>Achieved up to M24:</u> Currently 7 months of testing is foreseen.
		6-4-2 Development of a common checklist for assessing baseline tests per site	≤ 2 weeks before the initiation of baseline tests <u>Achieved up to M24:</u> Common validation procedure for all test phases described in D6.1
		6-4-3 Amount of days for resolving a pilot test technical issue (system availability, bug, etc.)	≤ 10 (working days) for trivial issues. Allow for 1-2 months in case of harder technical problems (depending also on the project's critical path).
	6-5 End-user evaluation and feedback reporting	6-5-1 Number of officers participating in the pilot sites evaluation	≥ 5 officers per site
		6-5-2 Minimum period of pilot site evaluation and testing	min 3 months per site depending on deployment scheduling and availability of basic infrastructure (12 months cumulatively in all sites)
		6-5-3 Number of passengers using the system	≥ 100 passengers cumulatively in all pilot sites



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 M24:</u> 38387 unique visitors
		7-1-2 Number of written and electronic publications (in academic and technical media)	Target (overall): ≥ 5 <u>Achieved up to M24:</u> 12
		7-1-3 Number of written and electronic publications (in industrial, business and public media)	Target: ≥ 3 per year <u>Achieved up to M24:</u> 4
		7-1-4 Number of website / newsletter articles via partner's channel	Target: ≥ 5 per year <u>Achieved up to M24:</u> 14
		7-1-5 Number of presentations (in symposiums, meetings, congresses)	Target: ≥ 6 <u>Achieved up to M24:</u> 15
		7-1-6 Number of Project workshops	Target: ≥ 1 <u>Achieved up to M24:</u> 2
		7-1-7 Number of followers on Twitter	Target: ≥ 50 per year <u>Achieved up to M24:</u> 59
		7-1-8-Number of followers on LinkedIn	Target: ≥ 50 <u>Achieved up to M24:</u> 34
		7-1-9 Number of publications on LinkedIn	Target: ≥ 5 per year <u>Achieved up to M24:</u> 9
		7-1-10 Number of Communication videos	Target: ≥ 1 <u>Achieved up to M24:</u> 0
7-2 Innovation creation and exploitation activities	7-2-1 Number of third party organisations contacted for technology licensing	≥ 1	
	7-2-2 Participation to industry leading events	≥ 3	
	7-2-3 Number of partners integrating part of the Project's technology within own product range	≥ 2	
7-3 Business Modelling and Socio-economic Sustainability	7-3-1 Number of new technologies for advanced border control defined and evaluated	≥ 3	
	7-3-2 Expected socio-economic impact of the project solution based on the data from the pilot studies and evaluation assessment or derivation of best practices.	Positive	
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% <u>Achieved up to M24:</u> 100% Justifiable delay occurred in the submission of D6.1. However, the delay did not jeopardize the achievement of this target.

	8-2 Quality of deliverables	8-2-1 Percentage of re-work requests (over the total number of deliverables)	$\leq 20\%$ <u>Achieved up to M24:</u> $=0\%$ According to the official EC review, all deliverables were accepted
	8-3 Standardization Activities	8-3-1 Presentation of iBorderCtrl activities, in terms of standardization, to a Standardization Committee	≥ 1 participation/presentation

2. Deliverables

Grey rows represent the Deliverables that were submitted during M19-24.

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
D1.1	Report by the ethics advisor	ED	CO	1	28 Feb 2018	Yes, final		
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		
D3.1	Data Collectio	ITTI	PU	3	30 Nov 2017	YES, final		

	n Devices - specifications							
D3.2	First version of all technological tools and subsystems (Portable unit,  , DAAT, portable radar, FMT, Avatar based dialogue)	EVR	PU	3	28 Feb 2018	YES, final		
D3.3	Second version of all technological tools and subsystems for integration (Portable unit,  , DAAT, portable radar, FMT, Avatar based dialogue)	ICCS	PU	3	31 August 2018	YES, final		
D4.1	First version of the iBorderCtrl software platform	STR	PU	4	28 Feb 2018	YES, final		
D4.2	Second version of the iBorderCtrl	ED	PU	4	31 August 2018	YES, final		

	software platform							
D5.1	Integration Plan	ED	CO	5	30 April 2018	YES, final		
D5.2	Early version of the integrated prototype (limited functionality)	ED	CO	5	31 August 2018	YES, final		
D5.3	Early version of the portable unit for border guards	JAS	CO	5	31 August 2018	YES, final		
D6.1	Experimental Design for Pilot Deployment and Evaluation	HNP	CO	6	30 April 2018	YES, final	Delayed until October 2018	
D6.2	Feedback of components evaluations with end users	HNP	CO	6	29 June 2018	No	Postponed until November 2018	It was decided to submit D6.2 after the end of the first month of testing/validation phase. A GA amendment is in progress including aforementioned change.
D7.1	Project Web Portal	ED	CO	7	30 November 2016	YES, final		
D7.2	Project flyer	ED	CO	7	28 February 2017	YES, final		
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	YES, final		
D7.5	Exploitation plan	EVR	CO	7	31 August 2018	YES, final	Delayed until October 2018	
D7.6	Yearly communication report including communication material	ITTI	PU	7	31 August 2018	YES, final		
D7.7	Project Flyer 2	ED	PU	7	30 April 2018	YES, final		
D7.8	Dissemination and communication plan 2	ITTI	CO	7	31 August 2018	YES, final		
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		
D8.4	Annual Report	ED	CO	8	31 Aug 2017	YES, final		
D8.7	Annual Report 2	ED	CO	8	31 August 2018	YES, final		

3. Milestones

Grey rows represent the Milestones achieved during M19-24.

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		
MS2	First version of all tools	3,4	EVR	(M18) 28 Feb 2018	Yes		

MS3	Early version of the integrated prototype (limited functionality)	5	ED	(M24) 31 Aug 2018	Yes		
-----	---	---	----	-------------------------	-----	--	--

4. Critical Implementation Risks and Mitigation actions

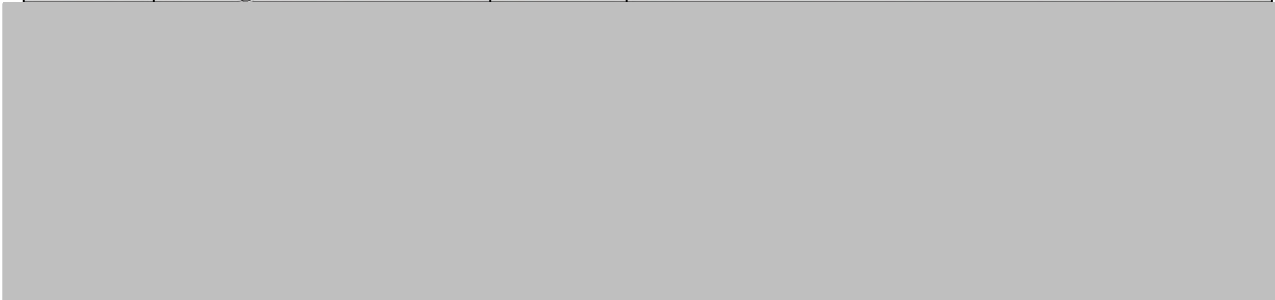
4.1 Foreseen Risks (risks already identified prior the initiation of the project, see Annex 1)

Grey rows represent the Risks related to the period M19-24.

Risk N°	Description of Risk	Related WP N°	Proposed risk-mitigation measures
---------	---------------------	---------------	-----------------------------------

[This area contains a large greyed-out table, likely representing risks for the period M19-24 as mentioned in the text above.]			
--	--	--	--

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.



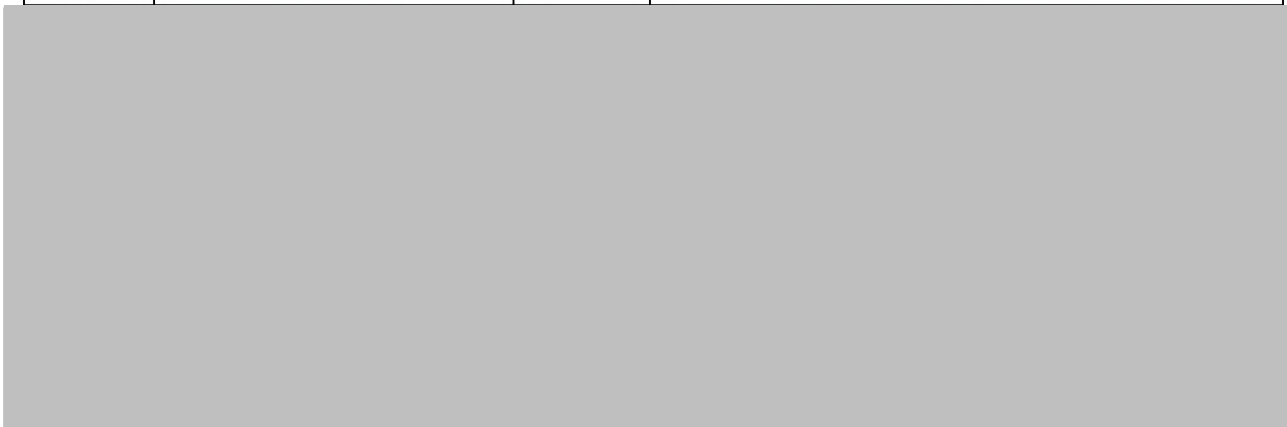
R7	Low ability of through-the-(metal)wall hidden human detection	3	The HHD module for hidden humans' detection is meant to be a portable alert tool and not a high profiling device with high resolution. Simple development allows for easy updates and alternative techniques. The HHD module is based on an already tested prototype, while for metal containers, acoustic sensors will be used which are better for penetration. The outcomes of the developments within the framework of D3.3 are quite encouraging that R7 risk is appropriately tackled.
R8	RBAT thresholds are not optimal	4	RBAT thresholds will be defined and tested iteratively in order to arrive at the optimum. It is possible however, that even during the tests several additional tests will be needed to ensure their values. This is why the tool foresees ways to review the risk estimation procedure and change the values of the thresholds.
R9	Integration is too complex and time consuming	5	The integration plan is developed in parallel to the system design. The aim is to understand the potential complexity and risks as early as possible to develop the integration plan accordingly. In addition Github repositories have been created to facilitate the integration procedure. This will allow to have daily software builds with automatic test cases in order to identify bugs and issues as early as possible.

4.2 Unforeseen Risks

Grey rows represent the new ones during M19-24.

Risk N°	Description of Risk	Related WP N°	Proposed risk-mitigation measures
UR1	Not enough answers to the online questionnaire in the set time frame	2	More survey leaflets were printed and distributed at the borders. A short extension in the time frame was given 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 teleconferences 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 7 th 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 2017, 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	The iBorderCtrl Consortium already has native speakers of the most common languages among all project partners. 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 assessed if required.



UR6	Not enough followers on twitter and LinkedIn members due to the project name change and replacement of all previous accounts.	7	Dissemination via social media will be continued and will intensify, especially due to the upcoming project pilots. Short updates will be reported on social media. The pilots are also likely to draw more attention from the public. This will be reflected in increased number of Twitter followers and LinkedIn members.
UR7	Some impact on [redacted] optimisation and integration testing due to unexpected reduction of MMU	3	Other members of the MMU have put in additional hours on the project to assure that milestones and deadlines are met which is reflected in individual timesheets.

	team availability (health reasons)		
--	---------------------------------------	--	--

5. Work plan for the next period

5.1 Planned activities in the next period

WP 1: The project's activities relevant to ethics will be continuously monitored. All partners (end-users, tech partners) should be in close collaboration and communicate with LUH and the external ethics advisor, in order to get a common understanding of the different needs and legal requirements with regard to the technical implementations of the project's foregrounds and the test pilots.

WP 5: Following the Delivery of D5.2 (Early version of the integrated prototype (limited functionality) and D5.3 (Early version of the portable unit for border guards), WP5 is foreseen to occupy most of the partners' activities in the following months in parallel to the WP6 implementation and towards the final version of the integrated prototype and portable unit (with full functionality) on month 30. The continuous definition, development and execution of manual and automated integration tests as part of the test plan for black-box testing, based on functional and non-functional requirements will be intensified. The timely resolution of raised issues (bug fixing) across all modules of the system by relevant partners will also be a priority during the next period.

WP 6: Deployment of the communication system components will be carried out, establishing access points necessary for testing at BCPs. Testing will be commenced in a continuous 7 months period in parallel at all BCPs involved. The collection and analysis of the evaluation of the individual components and the early integrated prototype will start to calculate the performance of the system across multiple measures (validity, sensitivity, specificity).


WP 7: The partners will engage further with the identified related stakeholders to establish the most likely exploitable outcome. 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. It should be noted that during the next few months iBorderCtrl has been invited to participate in many different events which is a perfect opportunity and timing to start demonstrating tangible results of the project and creating a footprint of iBorderCtrl. The detailed list of upcoming events is presented in section 5.2.

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.

iBorderCtrl consortium members actively seek relevant opportunities to present and promote the project objectives and results. An indicative list of the upcoming planned meetings, activities and iBorderCtrl presentations is presented below:

- a. EAB-PRC Conference in Darmstadt on the 24th -25th of September 2018
- b. 
- c. Demonstration of iBorderCtrl results to the EC REA and DG HOME Units/Agencies, 22nd -23rd of November 2018. This will be a joint activity with the H2020 PROTECT project led by the University of Reading.

- d. iBorderCtrl is proposed by EC for participation in the exhibition area of the Security Research Event 2018 (SRE 2018), on the 5th -6th of December 2018. This event is jointly organised by the European Commission (DG HOME) and the Austrian Ministry for Transport, Innovation and Technology. For SRE 2018, an audience of 800 participants is expected, representing a wide range of security stakeholders and is an excellent opportunity to disseminate the results of iBorderCtrl.
- e. Key note lecture working title “Automated Physiological Profiling: From Deception to Comprehension” at the 10th International Joint Conference on Computational Intelligence conference, September 18 - 20, 2018, Seville – Spain.
- f. Meeting with internationally significant lead distributor of the Hungarian security market discussing selling channels for iBorderCtrl system in Hungary and around the globe.
- g. Meeting with the Business Incubation Centre of the European Space Agency freshly opened in Hungary to discuss funding schemes for bringing iBorderCtrl into production through an incubated exploitation startup company.
- h. Paper submitted to the Behavioural Analysis Conference 2019 held in Minneapolis.

The list below contains events with potential dissemination interest for iBorderCtrl.

Conference	Date, Place	Paper Submission	Comments
The 7th International Conference on Pattern Recognition Application and Methods 2018	19 - 21 February 2019, Prague	October 1, 2018	http://www.icpram.org/
ICB 2019 The 12th IAPR International Conference On Biometrics	4 - 7 June 2019, Greece	December 15, 2018	http://www.icb2019.org/
World Border Security Congress 2019	19 - 21 March, Morocco	-	http://world-border-congress.com/conference/registration-fees/
CORES 2019 The 11th International Conference on Computer Recognition Systems	Polanica-Zdroj, Poland, 20-22 May 2019	January 11, 2019	http://cores.pwr.edu.pl/
27th European Signal Processing Conference 2019	2 – 6 September 2019 Coruña, Spain,	January 21, 2019	http://eusipco2019.org/

6. Dissemination and exploitation of results

6.1 Scientific Publications

Grey rows represent the new ones, accepted/published during M19-24.

Type of scientific publication (journal/conference proceedings/workshops/workshops/ book/	Authors, Title, Publisher, Place of publication, Volume/Number of issue, date, Relevant pages, ISSN or eSSN.
---	--

monograph/ dissertation/ etc.	thesis/ etc.
(Online)-Journal	J. Stoklas, "Europäischer Grenzschutz 2.0 – Ein Überblick über datenschutzrechtliche Herausforderungen", ZD-Aktuell, Beck, Munich, Heft 21, 16.12.2016, (2016, 05418), 2192-5593.
Scientific Conference	C. I. Kourogorgas, A. D. Panagopoulos, R. Makri, "A Copulas-Based Time Series Synthesizer for Mobile Satellite Communications Operating Above 10 GHz", 11 th European Conference on Antennas and Propagation 2017 (EuCAP Conference), Paris, France, 19-24 March 2017. https://doi.org/10.23919/EuCAP.2017.7928349
Scientific Conference	Sz. 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, Sz. Zoltán, Ł. Szklarski, A. Malamou, G. Boultradakis, "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, Beck, Munich, Heft 12, 28.06.2017 (2017, 05684), 2192-5593.
Scientific Conference	Sz. 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.
Scientific Conference	P. Bilski, J. Modelski, B. Kosciug, J. Olejnic, I. Badaczewska, A. Malamou, R. Makri, "Application of the RFID technology in the European Union border control system", International Conference on RFID Technology and Applications, Warsaw, Poland, September 20-22, 2017.
Evidence for Government Policy Formation	O'Shea, J. "Dr James O'Shea - written evidence" (to the UK House of Lords Artificial Intelligence Select committee), AIC0226, published 26 October 2017, http://www.parliament.uk/business/committees/committees-a-z/lords-select/ai-committee/publications/
Scientific Conference	T. Kruegel, B. Schuetze and J. Stoklas, "Legal, ethical and social impact on the use of computational intelligence based systems", 2018 IEEE World Congress on Computational Intelligence, Special session: The Role of Computational Intelligence Technologies in Controlling Borders, Rio de Janeiro, Brazil, 8-13.07.2018.
Scientific Conference	L. Rodriguez Carlos Roca, I. Hupont Torres and C. Fernandez Tena, "Facial recognition application for Border Control", 2018 IEEE World Congress on Computational Intelligence, Special session: The Role of Computational Intelligence Technologies in Controlling Borders, Rio de Janeiro, Brazil, 8-13.07.2018.
Scientific Conference	J. O'Shea, K. Crockett, W. Khan, P. Kindynis, A. Antoniadis and G. Boultradakis, "Intelligent Deception Detection through Machine Based Interviewing", 2018 IEEE World Congress on Computational Intelligence, Special session: The Role of

	Computational Intelligence Technologies in Controlling Borders, Rio de Janeiro, Brazil, 8-13.07.2018.
Scientific Conference	J. O'Shea, K. Crockett, W. Khan and Z. Bandar, "A hybrid model combining neural networks and decision tree for comprehension detection", 2018 IEEE World Congress on Computational Intelligence, Special session: The Role of Computational Intelligence Technologies in Controlling Borders, Rio de Janeiro, Brazil, 8-13.07.2018.
Scientific Conference	K. Crockett, S. Goltz, M. Garratt, "GDPR Impact on Computational Intelligence Research", IEEE International Joint conference on Artificial Neural Networks (IJCNN), Rio de Janeiro, Brazil, 8-13.07.2018.

6.2 Progress regarding market uptake and exploitation

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. In addition, iBorderCtrl already implements many of the features planned to be included in the Entry/ Exit (EES) and the European Travel Information and Authorisation (ETIAS) Systems both proposed by the European Commission to enhance the border control check procedures. Moreover, iBorderCtrl solution paves the way towards the interoperability of EU systems for security, border and migration management as envisaged by the EC. These are considered as major assets towards the implementation of a concrete exploitation plan.

6.3 Dissemination and Communication activities

Grey rows represent the new ones, held during M19-24.

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
<p>iBorderCtrl Dissemination as part of STEM Outreach Activities</p> <p>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.</p> <p>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.</p>	2

Featured Article about iBorderCtrl: "Avatar interviews and portable scanners to speed up border crossings" in the EU Research & Innovation Magazine (8 th 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
██████████ (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 31 st March 2017. Details: https://www.eventbrite.co.uk/e/how-to-be-a-successful-researcher-in-the-21st-century-tickets-32582004653#	1
The iBorderCtrl project was presented in detail in a Special Session dedicated on the iBorderCtrl at the "4th edition of the EAB Research Projects Conference", 18-19 September 2017, Fraunhofer IGD, Darmstadt, Germany in the framework of EAB (European Association on Biometrics) activities. The presentation was made by the Coordinator and the Technical Manager.	1
iBorderCtrl Dissemination as part of STEM Outreach Activities: IEEE Day for United Kingdom and Ireland Talks, Profiling Women in Engineering, STEM event, 7 th October 2017 at the University of Westminster, ██████████ (MMU) presented iBorderCtrl on Panel session AI and Ethics.	1
██████████ (MMU) gave invited talk on Women in Engineering and showcased iBorderCtrl project at the IEEE Workshop on IoT, Liverpool, 17th October 2017	1
Presentation of iBorderCtrl at the "Borders, Eastern Conference and Border Protection Fair" 25-26 October 2017, Lublin, Poland.	1
iBorderCtrl was presented at the World Border Security Congress on the 20th-22nd of March 2018, Madrid, Spain.	1
Presentation of the silent talker and related Artificial Intelligence Psychological Profiling at the Trailblazing Technology Conference: The Future Impact of AI and Tech on Manchester, 23rd March 2018, organised by pro-manchester business development organisation.	1
Event disseminating iBorderCtrl to various Directorates and divisions of Hellenic Police (2/4/2018)	1
Industry day - Biometric on Move held on 25th of April 2018. The event was organised by Frontex. The aim of this event was to present products/services to an audience consisting of representatives of Frontex.	1
Research talk "Physiological Profiling with Artificial intelligence" with focus on the iBorderCtrl project at the University of Vigo, Spain on the 14th of June 2018.	1

Participation and presentation of iBorderCtrl to the FLYSEC Info Day and Risk-Based Security Projects Cluster Meeting, in Brussels on the 28th of June 2018. Details: http://www.fly-sec.eu/agenda.html	1
Participation and presentation of four iBorderCtrl related papers to the 2018 IEEE World Congress on Computational Intelligence, Special session: The Role of Computational Intelligence Technologies in Controlling Borders, Rio de Janeiro, Brazil, 8-13.07.2018	4
Participation and presentation of one iBorderCtrl related paper to the 2018 IEEE International Joint conference on Artificial Neural Networks (IJCNN), Rio de Janeiro, Brazil, 8-13.07.2018.	1

7. Ethical issues monitoring during the reporting period

The ethics dimension of the project activities are being constantly monitored. As the test pilots are about to start, a particular focus has been on updating the consent forms and the implementation to obtain consent in the TUA, as well as the platform privacy policy. In addition, a joint controllers agreement in accordance with art. 26 GDPR has been developed for negotiation and signature among the responsible partners.

8. Overview on use of resources





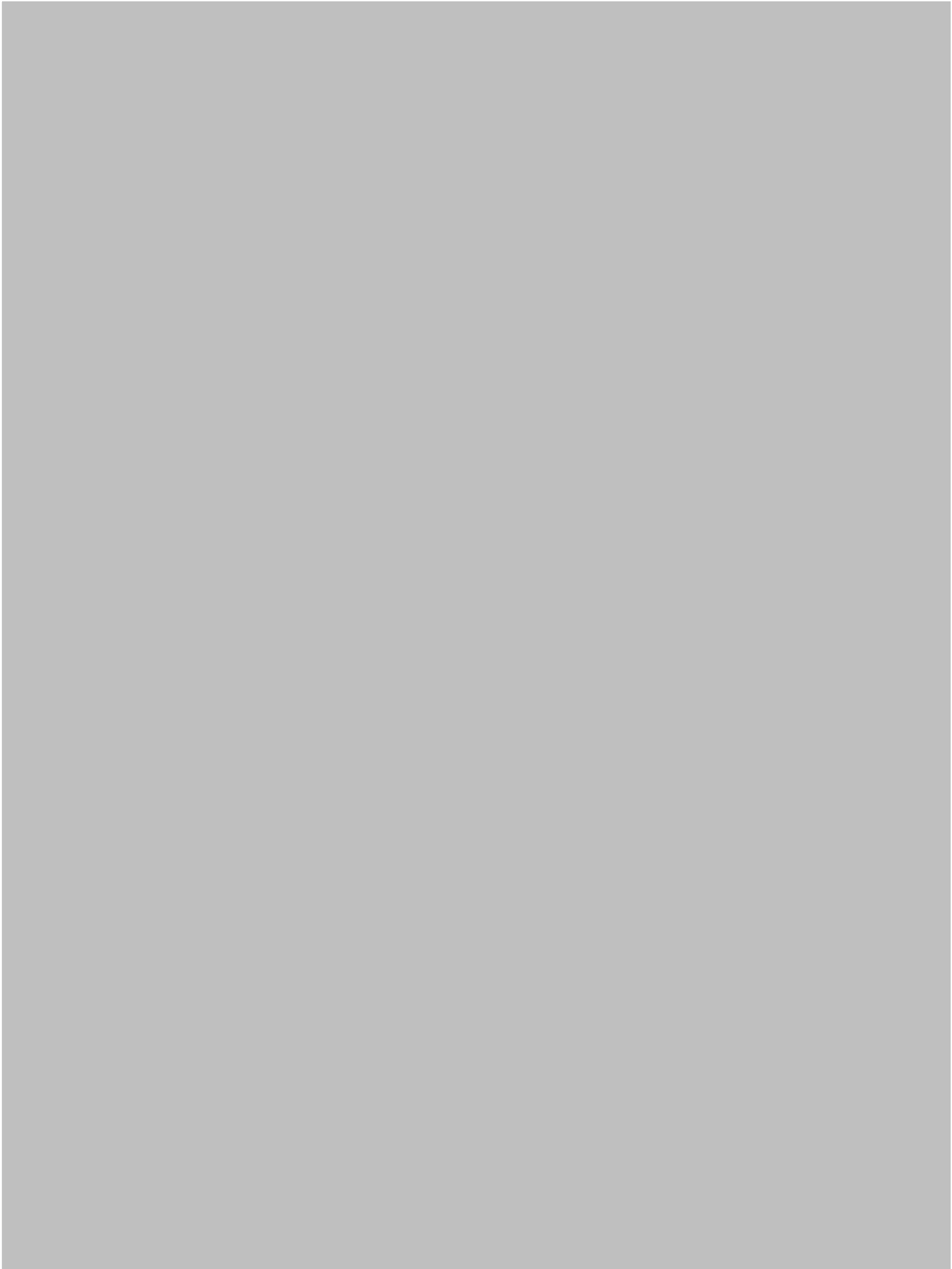


D8.7: Annual Report 2



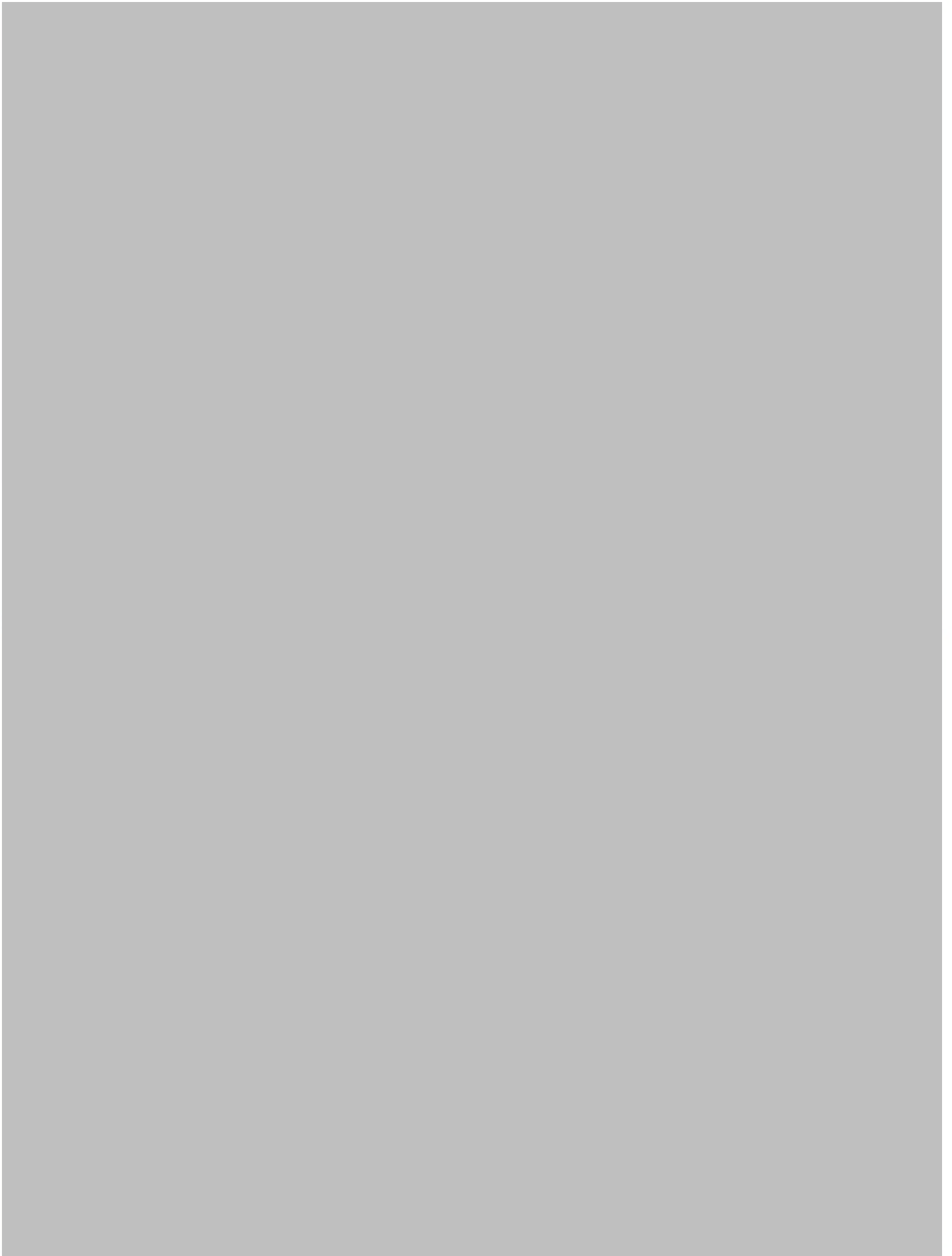


D8.7: Annual Report 2



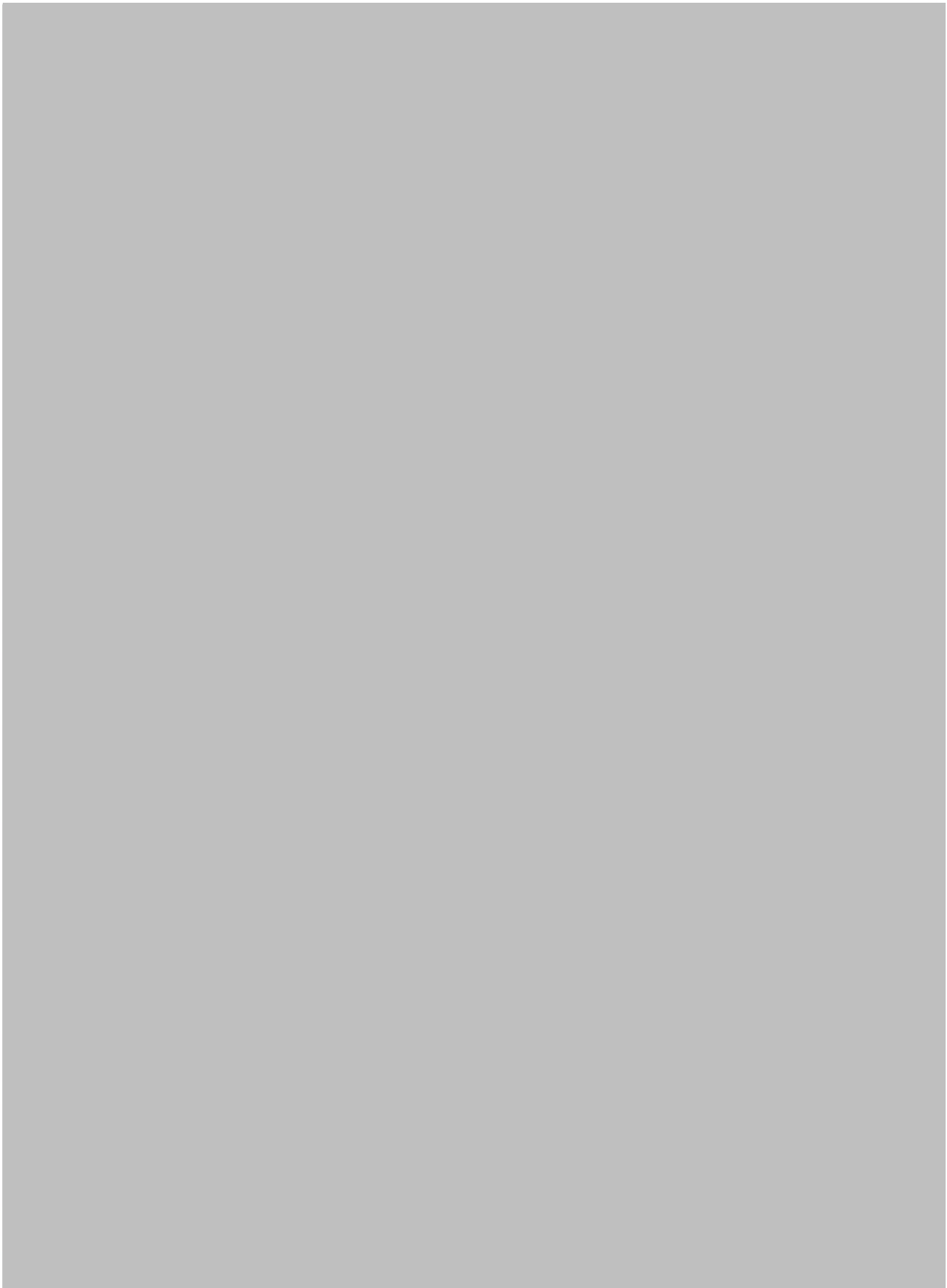


D8.7: Annual Report 2





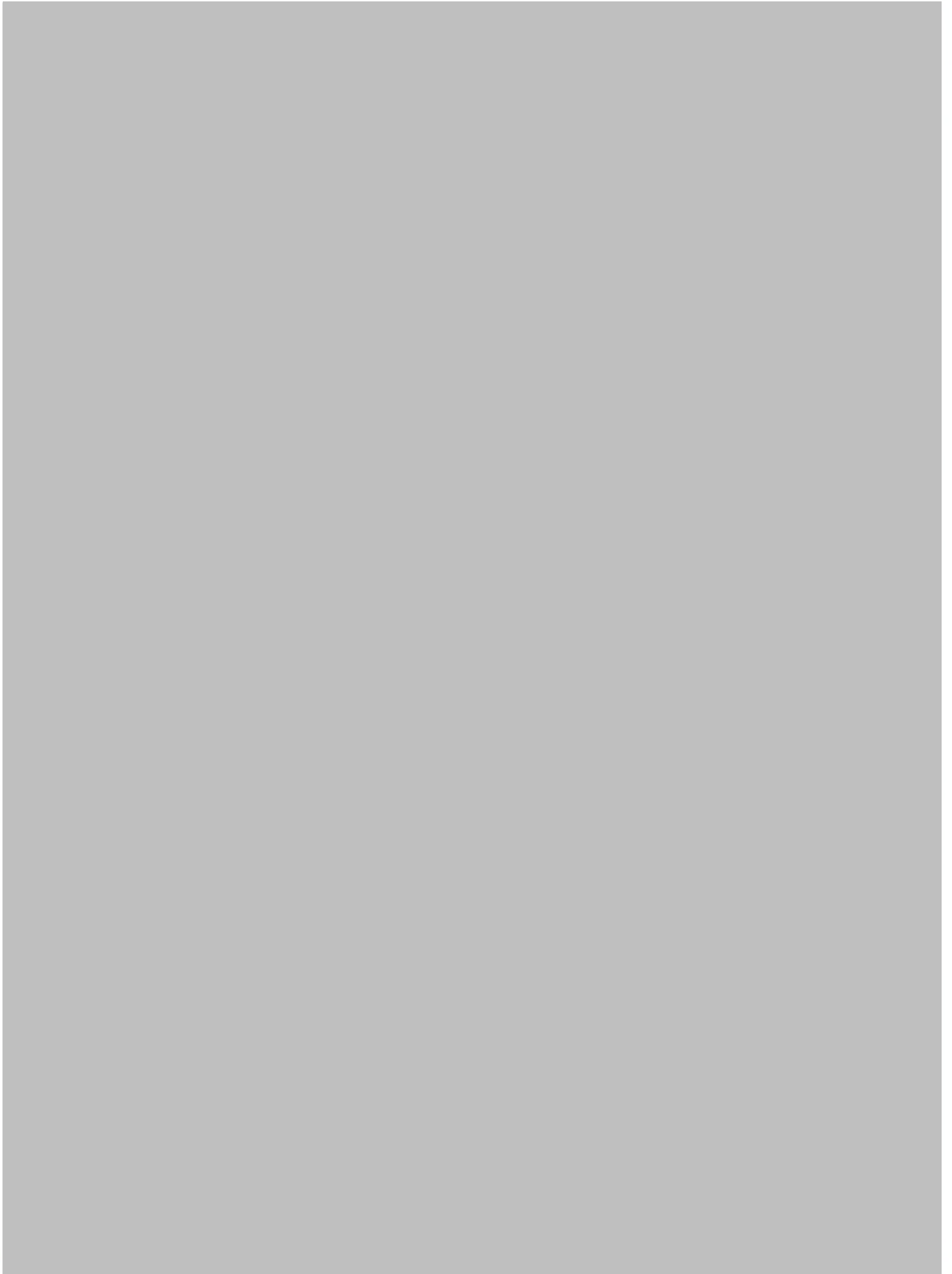
D8.7: Annual Report 2





D8.7: Annual Report 2







D8.7: Annual Report 2

