D8.7 Final Exploitation Plan

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Dissemination and Exploitation

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Abstract The FLYSEC Exploitation Plan intends to maximise the impact of the project. The document is summarising partner perspectives with regard to further use of project results in marketable products or services or for further scientific work.
The document takes up the initial Plans for Exploitation and Dissemination of Results provided in Annex I of the Grant Agreement and drives these ideas ahead towards business plans under consideration of knowledge gained and experiences made during project work.

Project Information

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List of Acronyms and Abbreviations

ACRONYM	EXPLANATION
CG	CG SMARTECH LTD
CEN	Comité Européen de Normalisation
EASC	European Aviation Security Center e.V.
EC	European Commission
EU	European Union
EMZA	EMZA Visual Sense LTD
EPSGR	Epsilon International SA
ETSI	European Telecommunications Standards Institute
ERAU	Embry Riddle Aeronautical Deutschland GmbH
EXODUS	Exodus Anonymos Etaireia Pliroforkis
FLYSEC	Optimising time-to-FLY and enhancing airport SECurity
ICTS	I.C.T.S. (U.K.) LTD
NCSRD	National Center for Scientific Research “Demokritos”
SAG	Stakeholder Advisory Group
UL	Universite du Luxembourg
ESL	Elbit Systems LTD
LuxAirport	SOCIETE DE L AEROPORT DELUXEMBOURG SA
PEDR	Plan for Exploitation and Dissemination of Results

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1 EXECUTIVE SUMMARY

Exploiting project results is in the interest and responsibility of each individual project partner, as no joint venture is going to be established.

Components, sub-systems or services are owned by individual project partners and present a variety of Technology Readiness Levels.

Initial Plans for the Exploitation and Dissemination of Results (PEDR) have been described already in the project proposal. Taking this as a starting point and based on Proof-of-Concept experience, the partners have developed and matured the ideas for the use of results in a simplified business plan like structure.

Perspectives and plans for valorisation of project results are highly individual therefore. The description of each project consortium member is of different degree of detail.

As the document is at dissemination level “public”, but potentially contains confidential information, some partners have concerns with regard to contribution to the document.

This document is an update to the interim exploitation plan (FLYSEC Deliverable D8.4) including updated information and any additional contributions from participating large companies, SMEs and all partners, as a result of FLYSEC work maturity and final evaluation.

2 INTRODUCTION

2.1 Purpose of the Document

The FLYSEC Exploitation Plan intends to maximise the impact of the project. The document is summarising partner perspectives with regard to further use of project results in marketable products or services or for further scientific work.
The document takes up the initial Plans for Exploitation and Dissemination of Results provided in Annex I of the Grant Agreement and drives these ideas ahead towards business plans under consideration of knowledge gained and experiences made during project work.

The document considers the Clarification on "Business Plan" and "Synergies with ESIF", as far as related to "Business Plan", published by the Commission services at March 20th, 2014[1].

2.2 Intended Audience

The document will be made available to the PUBLIC.

[1] http://ec.europa.eu/research/participants/portal/doc/call/h2020/nmp-16-2015/1602622-clarification_business_plan_and_synergies_esif_20march14_en.pdf

3 OBJECTIVES OF EXPLOITATION

By exploitation and dissemination of results the impact of the project can be maximized.

FLYSEC will generate exploitable technical solutions and services leading to

- enhanced security and enabling a paradigm shift from responsive alerts and event-driven systems to proactive and risk-driven monitoring,
- improved passenger experience through reduced average waiting times,
- increased airport security throughput thus reducing costs and providing a better Quality of Service to passengers,
- improved use of given airport capacity especially in peak hours due to improved queue management in security services,
- benefits from the "security as a service" concept, creating opportunities for subsequent innovative airport services.

Compatible with IATA's roadmap, results of FLYSEC will offer exploitation opportunities to industry partners though new processes facilitating risk-based screening, integration of new technologies and repurposing existing solutions while focusing on customer service and security as service concept through measurable throughput improvement and a whole new level of Quality of Service.

While industrial partners intend to continue the development work towards marketable products or services and to generate revenues one day, academic partners are gaining benefits from increased visibility, from sales of licence fees on protected intellectual properties and from turning foreground into background in follow-up project activities.

From the societal perspective, the exploitation of project results will increase comfort, performance and security in the aviation industry if solutions developed by the project will come into regular use.

Market Stakeholders, SMEs and partners from the private sector will use the FLYSEC results to expand and promote their products and services into the airport security market. The passenger-centric approach of the project, along with the innovative security concept proposed offers an exploitation framework with multiple opportunities, to both consortium partners and external stakeholders following the project.

Finally, an important aspect for exploitation lies within the favourable conditions of the web and mobile internet entrepreneurship, such as e.g. the low investment needs and good Return on Investment rates for innovative mobile applications and services.

4 TARGET GROUPS

4.1 Scientific and professional community

The knowledge gained in the FLYSEC project shall not only generate benefits for the members of the consortium, but also a wider community like experts, professional associations and networks. They are important drivers of standardisation and development of the regulatory framework.

4.2 The Aviation Sector

Aviation authorities, operators of airlines and airports and providers of related services will benefit directly or indirectly from exploitation of FLYSEC results. Enhanced security along with increased capacity and improved service quality is of interest of all organisations involved in the aviation business.

4.3 Flight Passengers

By use of the FLYSEC mobile app, flight passengers may save time in queues at airports and win comfort. If combined with contextual information services, passengers as well as service providers and shopkeepers may benefit from FLYSEC results.

5 VALORISATION OF PROJECT RESULTS

As the project consortium consists of partners of different sectors –science, industry, consultancy and services- perspectives on valorisation of project results are divers and described partner by partner hereafter.

An initial Plan for Exploitation and Dissemination of Results (PEDR) was made up by the consortium members prior to project start. The PEDR provides the starting point for elaboration of a more detailed and realistic exploitation plan which is based on the research and development work performed so far and especially on experiences gained in the Proof-of-Concept of the integrated FLYSEC solution.

5.1 NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS" (NCSRD)

The partner's initial exploitation plan:

Planned use of project results	Timeframe for (commercial) use	Target market
Airport security is a topic which has been in the research roadmap of NCSRD since 2008. Following the successful completion of TASS project (Total Airport Security System, FP7-SEC-IP), NCSRD aims to expand TASS results, focusing on passenger facilitation and user acceptance through FLYSEC project, and in order to come closer to commercially exploitable products. Such products could be subsequently commercialised in the context of a spin-off SME. Moreover, given NCSRD's role as the largest multi-disciplinary research centre in Greece, FLYSEC will assist with further pursuing research goals in the area of airport security, strengthening collaboration with existing Greek and European ecosystem of multiple stakeholders.	3-5 years	Aviation Security sector

5.1.1 Key exploitable results and their expected key areas of application

In the time span of the FLYSEC project so far, NCSRD has achieved to exploit and expand previous projects results delivering a platform and an application that focus on passenger facilitation and user acceptance in an airport. By the end of the project NCSRD will have developed a fully functional platform for indoor navigation and guidance operated by the airport and providing all the relevant information to the passengers through a user friendly mobile app. Operators will use the platform for managing indoor spaces, available services and security processes within the airport, notifying the visitors and the passengers accordingly. Through the app passengers receive instructions, alerts, news, updates while visiting an airport. This app will be highly customised for each passenger with personal preferences depending on their personal available information (flights, destinations, waiting hours, etc). This fully featured passenger-centric solution is expected to be one of the main outcomes for NCSRD with a great potential of application under difference circumstances and in different markets.

Indoor navigation is one of the Unique Selling Points (USP) of this service that distinguishes it among similar competing solutions in markets, facilitating passengers flow within massive and quite complex buildings. Easy navigation, time management, time optimisation, passengers/visitors' experience improvement, are all addressed by this solution.

Another key exploitable area for NCSRD is the new areas of research that have been revealed by coordinating this project. NCSRD has a well-developed national and global network of security stakeholders coming from various sectors: Industry, Government and Academia. Thus NCSRD has built a strong presence in security field, a significant competitive advantage leading to the constant enhancement of its know-how welcoming and establishing important collaborations with robust stakeholders and successful research consortia.

5.1.2 Exploitation Team

NCSRD with a staff of over 45 full-time highly skilled researchers and developers covering a differentiated field of sciences will set up a team of professionals that will design the strategy for driving results towards the market. Professionals with high technical and managerial background will be the core team supported and guided by business and marketing professionals under the advice of a law professional for IPR issues, commercialization law and business sustainability. Documentation of the process will include the description of the product/service, the strategy that will be adopted, the marketing plan (i.e. target audience, channels of distribution, promotional/advertising activities, reporting) and the constant monitoring of KPI's and performance of all actions.

5.1.3 The Market

Having identified the Border Security Market as the main target market for exploitation of the provided platform and mobile application, we need to clarify that initially besides the aerial, also the ground and underwater border security system market will be examined as the potential market place for the services provided by NCSRD.

Based on the new market research report "Border Security System Market by Environment (Ground, Aerial, Naval), System (Laser, Radar, Camera, Wide Band Wireless Communication, Perimeter Intrusion, Unmanned Vehicles, C2C, Biometric Systems), and Geography - Global Forecast to 2022", the border security system market is expected to grow to USD 52.95 Billion by 2022, at CAGR of 7.16% between 2016 and 2022[2]. Based on the environment, the border security system market is categorized into underwater, ground and aerial. The growth of Border Security system market is attributed to the need for advanced border security solutions technology, rising territorial conflicts and geopolitical instabilities, and increasing adoption of unmanned solutions.

The major challenges faced by ground border security are conventional international disputes, cross-border infiltration, illegal migration, smuggling, and other forms of criminal activity. There would be a significant increase in the biometric systems of the border security system market, and it is estimated that it would grow at CAGR higher than any other industry between 2016 and 2022 owing to the adoption of Biometric systems on a-large scale to tackle

[2] http://www.marketsandmarkets.com/Market-Reports/border-security-system-market-103309188.html

illegal immigration, human trafficking among others. Schemes such as development of national IDs, e-passports, and e-visas are expected to be the main drivers for it.[3]

The cost of border security

The free movement of goods, services, capital and citizens within the EU single market has the potential to contribute up to a 14% increase in EU GDP over the period 2011-2020[4], these benefits should not be overlooked when internal border controls are reconsidered.

- It is estimated that the number of European Border and Coast Guard Agency personnel will stand at 1000 by 2020[5]. The number of U.S. Border Patrol agents nearly doubled from Fiscal Year (FY) 2003 to FY 2016[6].
- **Trade in goods and services**: With 57 million vehicles a year and 1.7 million workers a day crossing Europe's frontiers, the European Union could face up to 18 billion euros each year in lost business by newly installed checkpoints at busy highways across Europe. Indicatively, the delays are costing the Danish Rail Company, €1.2 million a month in lost business as trains are canceled and commuters opt to drive.[7]
- The transportation sector indicates that the total cost of controls that have already happened amounted to an estimated € 320 million in waiting time losses[8]. The cost of time losses at the border **in case the Schengen zone is fully disbanded** is estimated at between €2.5 and €5.1 billion euro annually. Depending on the intensity of the checks, the estimated time lost is 10-20 minutes for passenger cars and 30-60 minutes for heavy duty vehicles such as trucks and buses[9]. The time value cost to commuters will be between €3.4 billion and €12.2 billion.
- The one-off costs relating to the physical re-establishment of border checks amount to €7.1 billion **in case the Schengen zone is fully disbanded**.
- The tourism and hospitality industries could face non-trivial losses due to a decline in trips (especially short trips and day visits) as a result of the loss of time arising from crossing borders.

5.1.4 The business model

Fulfilling the threefold exploitation task documented in FLYSEC namely: a. The Durability, (the lead up of tested solutions to regular use in the implementation area) b. The Expandability / up-scaling (the extension of solutions in the implementation "environment") and c. The Transferability (the widening of use scale by transfer into other use cases, places and environments), NCSRD will follow a business model that covers all the above elements. The

[3] http://www.marketsandmarkets.com/PressReleases/border-security-system.asp

[4] http://ec.europa.eu/public_opinion/archives/eb/eb83/eb83_first_en.pdf

[5] European Agenda on Migration: Securing Europe's External Borders". *europa.eu*. European Commission. Retrieved 15 December 2015.

[6] U.S. Government Accountability Office, "U.S. Customs and Border Protection: Review of the Staffing Analysis Report under the Border Patrol Agent Reform Act of 2014," May 2016, http://www.gao.gov/assets/680/677475.pdf.

[7] https://www.nytimes.com/2016/03/02/business/international/europes-new-border-controls-exact-a-cost.html?mcubz=0

[8] http://www.gdr-elsj.eu/wp-content/uploads/2017/05/Cout-de-non-Schengen-et-Marche%CC%81-inte%CC%81rieur.pdf

[9] http://www.gdr-elsj.eu/wp-content/uploads/2017/05/Cout-de-non-Schengen-et-Marche%CC%81-inte%CC%81rieur.pdf

solution offered by NCSRD can be applied in various environments and different markets proving the expandability and transferability aspects of the service.

NCSRD will proceed with the commercialisation of the previously described service solution through a spin-off SME forming partnerships that will assist the distribution of the service and the market penetration.

Some indicative areas or markets of application are:

1. Other Border security markets such as:
   - Ground (i.e. Railway stations)
   - Sea (i.e. Ports)
2. Commercial markets
   - Industry Events
   - Expos
   - Trade shows
   - Commercial Centers (i.e. Malls) & Retail Complexes
   - Warehouses i.e. logistics
3. Entertainment markets
   - Festivals
   - Cruises
   - Resorts
4. Academic/Scientific Events
   - National and International Conferences

5.1.5 Financial projections

A detailed financial plan forecasting 5 years sales will be designed after thorough investigation of relevant direct and indirect costs that will set the market price. All different funding opportunities will be examined from 3rd parties of the private sector or public funds through other European or national programs. Coming closer to the readiness of the service the financial plan will be documented including facts, numbers and figures.

5.1.6 The commercialization roadmap

With the completion of the FLYSEC project NCSRD aims to own a service very close to the level of being ready and marketable. Next steps include more development, failures mitigation, feature testing, synchronisation and adaptability. All steps will be accomplished through trial and error processes demos and pilots with beta releases. NCSRD will identify the strengths, the weaknesses the opportunities and the threats of commercialising this service through a SWOT analysis. Regulations, price policies, competitors, social instability and politics may be identified as potential barriers entering the market.

5.1.7 Risk Assessment

risk	Likelihood (high/medium/low)	Impact (high/medium/low)	mitigation
Classified results may hinder the uptake and dissemination required for proper promotion and exploitation of FLYSEC products	High	Medium	De-classification will be considered for some products. Declassified versions, demos and videos will be produced
Low interest for commercialisation on behalf of End Users (i.e. Airports)	Medium	High	Include commercial/services departments of airport in stakeholders and FLYSEC event guests, keep them close when producing end user requirements, calibrate developments according to early and intermediate end user feedback
Regulatory/standardisation issues may hinder uptake of results and products	Low	High	D8.5 standardisation activities and relevant task to assess early in the design and development relevant standards and regulatory schemes as well as associated obstacles. Assessment and feedback from partners active in relevant standardisation bodies (ICTS)

5.2 EXODUS ANONYMOS ETAIREIA PLIROFORIKIS (EXUS AE)

The partner's initial exploitation plan:

Planned use of project results	Timeframe for (commercial) use	Target market
EXODUS is a fast growing, innovative software company. It operates internationally across several sectors. By already participating in 3 security projects it is now seeking to expand its security portfolio internationally. FLYSEC will provide EXODUS with great exploitation potential and will enhance and expand its core product portfolio. It complements the organisation's strategic aims and aspirations – to develop new promising areas of research which in the long term will fuel further products and services. The project provides EXODUS with a new promising exploitation path in two directions: With the knowledge gained in FLYSEC EXODUS will expand its security DSS system which is aligned with company's intention for the production of such a system and thus find new economic opportunities especially in the field of aviation security. Moreover, the overall intelligence from the integration activities of such a complex project is considered to be reusable know-how and can be applied to other areas of research / product development (big-data, health, creativity and learning and banking software), having as a vertical axis the provision of data services. EXODUS anticipates that the know-how, technological expertise and scientific visibility of published work gained through the project will lead to new successful collaborations with both existing and new customers and partners in the area of services and security applications world-wide.	Release of integrated software solution for security projects including an advance DSS, able to process large volumes of data 3 years after the end of the project.	Banking sector, Security sector, Health sector, Creativity sector.

5.2.1 Key exploitable results and their expected key areas of application

Expected development Status

key exploitable results	key areas of application
1. Advanced Integration procedure and technology	Other RND projects under H2020, main core product of the company (EFS)
2. Know-how and development of an end-to-end Integration platform	Other RND projects under H2020, main core product of the company (EFS)

3. EXODUS Integration Lab	EXODUS Financial Suite (EFS)
4. GUI of DSS	EXODUS Web and Mobile

Differences from existing/competing solutions/products/services

FLYSEC DSS can be exploited by non-technical people through the Graphical User Interface implemented by EXODUS.

Reduce systems complexity using the Integration Lab created for FLYSEC

Codeless tools modified by end users according to their will.

5.2.2 Exploitation Team

Dimitris Kanakidis-Head of Innovation

Dimitris Petrantonakis-Head of Security Department

Iskanter Bensenousi-Research Consultant

5.2.3 The Market

The integration infrastructure will be introduced in the main core product of EXODUS which is the EFS. EXODUS is already providing the best loan collection software in the world, according to FORBES, in more than 23 countries globally as depicted in the figure below. The integration procedure followed in FLYSEC will be disseminated as a technical expertise throughout the upcoming EFS presentations.

FIGURE 1: MARKET SIZE OF EXODUS' MAIN CORE BUSINESS

5.2.4 The business model

Integration Infrastructure Business Model Canvas

<table>
<tr>
<td>Problem
1)
1. Complexity of heterogeneous systems and sensors.
2. Investigation of cutting-edge integration technologies to satisfy the needs of FLYSEC
3. Continuous integration and testing approach and validation metrics identified.
4. Security issues with respect to the integration and scale out of FLYSEC System</td>
<td>Solutions
4)
1. Introduction of a 3-layer integration model to address all the heterogeneous FLYSEC Systems.
2. Dockerized Environment introduced to all partners and Docker Swarn included to satisfy the scale out of FLYSEC and for security reasons
3. EXODUS Integration Lab maintained through the timeframe of FLYSEC for security reasons</td>
<td rowspan="2">Value proposition
3)
Cutting edge technologies used, ensuring (a) the interoperability of the components, and (b) the security of the system.</td>
<td>Unfair Advantage
7)
None</td>
<td rowspan="2">Customer segment
2)
The know-how of the integration model used in FLYSEC will be used in other relevant security project. EXODUS used a similar integration architecture in INACHUS which is an EU-funded disaster resilience societies project. Moreover, EXODUS will use the integration expertise to the main core product of the company.</td>
</tr>
<tr>
<td></td>
<td>Key Metrics
8)
Key aspects/activities you need to measure for a feedback
Detailed Validation of integration excel mapping sheets were created in order to validate and discover any issues with respect the integrated FLYSEC prototypes.</td>
<td>Channels
5)
On top of everything else, the know-how of the integration will be exploited in company’s internal integration procedures</td>
</tr>
</table>

5.2.5 Financial projections

EXODUS intends to use the integration know-how developed in FLYSEC to break even after 2.5 years.

5.2.6 Risk Assessment

risk	Likelihood (high/medium/low)	Impact (high/medium/low)	mitigation
Technological outdate	medium	high	Compatible with new technologies

5.3 ELBIT SYSTEMS LTD (ESL)

The partner's initial exploitation plan:

Planned use of project results	Timeframe for (commercial) use	Target market
ESL will use its established access to the Home Land Security (HLS) market in order to promote FLYSEC's artifacts, particularly the training and simulation related. ESL is going to do so in the following ways: - Marketing through ESL's established network of contacts and distributors; - Presenting in professional exhibitions and conferences	2 – 3 years	- Aviation Security sector - Control rooms OEMs

5.3.1 Key exploitable results and their expected key areas of application

As part of the FLYSEC project ESL has enhanced its simulation capabilities and adapted it to the domain of airports. These adaptations were done in multiple areas: creation of a virtual 3D model of an airport, simulation of crowd flow and behaviour within an airport, integration / simulation of operational systems (e.g. cameras, scanners, etc.), creation of specific reports / metrics, such as average waiting time for a passenger and overall efficiency of the airport. Having these assets allows ESL a better starting point in approaching potential training audience, such as airports' security managers and other relevant key personnel from the industry.

5.3.2 Exploitation Team

The unit in ESL that has worked directly on FLYSEC is the Training & Simulation department. This department consists of ~350 personnel, divided to software engineering, system engineering, Subject Matter Experts (SME), and marketing and Business Development. Specifically for the exploitation activities, it will be the marketing and business development team to take the lead and execute the activities that were mentioned in section 5.3.

Several key members within this group are:

- Mr Tal Cohen – **Land,** Training & Simulation Manager
- Mr Ofir Rozenberg – **HLS,** Training & Simulation Manager

5.3.3 The Market

ESL has expertise in the field of Simulation and Training and during the last three decades as developed several Simulation and Training systems including military and paramilitary simulators. In the past few years ESL developed models for HLS simulation and invested vast research and development resources in the field of tactical training for decision makers.

The Homeland Security field (HLS), especially and particularly with respect to public safety, is one of the few fields with continuous growing tendency, whereas more "traditional" markets as the military market are in recession. HLS solutions are numerous and include sensors, command and control products, electronic gates and fences etc., some of which are highly complicated and require operational expertise. The HLS training field has been consistently growing for the last years; within it, the virtual training sector status has been established. The advantages of the simulated reality are increased when the scenarios are complicated, vast, occurring in a complex urban area and in cooperation with civilian population. In most cases, it is practically impossible to replicate these scenarios in actual settings for live training exercises, mainly due to enormous costs, complications and in some cases for lack of efficiency. We believe that the market growth will provide the PYRONES simulation solution a market opportunity within organizations trusted with public safety such as fire fighters, paramedics, municipalities etc.

The dynamic market of the training solutions has witnessed a shift during the last year from traditional live training systems to innovative virtual training due to multiple reasons:
Traditional trainings costs and limited tools for statistic gathering and efficient learning;

- The operational challenge has become more complex and is difficult to recreate in an urban hectic environment without an extensive interruption of the city's daily routine.
- Technological improvements in the virtual field
- The introduction of advanced technical systems to the field such as command and control applications and a need of an expertise in their operation.
- Environmental law restrictions

5.3.4 The business model

ESL has a comprehensive Training & Simulation framework for the HLS domain. These applications allows (near) real time modelling of thousands of entities in complex indoor and outdoor environments. The simulation is based on high end, accurate modeling of the actual structures and of human crowd behaviour, and by that allow testing and optimizing the various concepts for airports' security, as well as the efficient and effective training of the security operation chain.

ESL Training & Simulation unit will market its products in one or more of the following ways:

- Turnkey solutions – ESL will deliver a tailor made comprehensive solution including the software package, hardware, facility adaptation, etc. to the client per his needs.
- Services – ESL will offer a service based model in which the client pays for the actual trainings he has consumed.
- The system will be offered for rent, consultancy and purchase as a SaaS cloud with system support. Training courses for creating models for simulation, crowd and buildings, perform hazard analyses, safety concepts and emergency planning will be offered.

5.3.5 Financial Projections

At this point of time ESL can't point on an actual opportunity / lead that is related to FLYSEC's outcomes. ESL will keep pursuing these leads.

5.3.6 The Commercialization Roadmap

ESL will promote FLYSEC's outcomes and artifacts through its diverse and broad marketing channels. These channels include sales and marketing personnel operating in a broad geographical spread, participation in national and international conferences and seminars, penetration via existing programs, etc.

5.3.7 Risk Assessment

risk	Likelihood (high/medium/low)	Impact (high/medium/low)	mitigation
Other products that offer similar solution	Low	medium	To this point no other products with similar capabilities have been identified by ESL.
Price is too high for the market	medium	high	Providing a pay-per-use service (SaaS) option to customers

5.4 ICTS (UK) LTD (ICTS)

The partner's initial exploitation plan:

Planned use of project results	Timeframe for (commercial) use	Target market
Use within aviation clients and integration with existing support systems within the company. Airport security is one of the key operation themes of ICTS. Focusing on passenger facilitation and user acceptance through FLYSEC project, and in order to come closer to commercially exploitable products. FLYSEC will assist with further pursuing operational goals in the area of airport security, strengthening collaboration with existing clients across the EU.	2-3 years	Aviation Security sector

5.4.1 Key exploitable results and their expected key areas of application

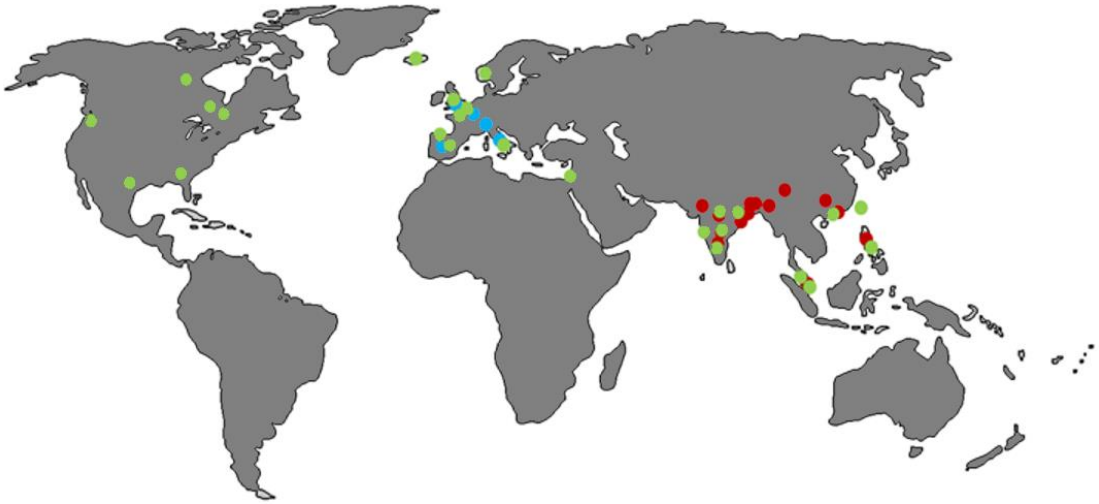
In the time span of the FLYSEC project so far, ICTS has achieved to exploit and expand previous projects results delivering a platform and an application that focus on passenger facilitation and user acceptance in an airport. By the end of the project ICTS will have developed a fully functional platform for serving its airline and airport clients and providing all the relevant information to the passengers through a user friendly mobile app. Operators will use the platform for managing its security and customer services, notifying the passengers on its benefits and SLA. Through the app passengers receive guides, alerts and updates while visiting an airport. This app will be highly customised for each passenger with personal preferences depending on digital token integrated with airport services. Facilitating passengers flow especially under peak time is a key feature for our clients.

5.4.2 Exploitation Team

ICTS have over 18,000 employees across Europe, with over 4,000 staff across the UK operation. ICTS Europe systems is the software house of the group and has a team of 50 technical experts and technical support.

5.4.3 The Market

ICTS Europe systems clients map – Our clients across EU and all over the world.



The cost of border security

Our partners in FLYSEC (NCSRD) have predicted the free movement of goods, services, capital and citizens within the EU single market has the potential to contribute up to a 14% increase in EU GDP over the period 2011-2020, these benefits should not be overlooked when internal border controls are reconsidered. The financial cost, in case of changes within EU regulation (Schengen for instance) could be huge thus technology can help EU to adapt.

- It is estimated that the number of European Border and Coast Guard Agency personnel will stand at 1000 by 2020[10]. The number of U.S. Border Patrol agents nearly doubled from Fiscal Year (FY) 2003 to FY 2016[11].

ICTS can step into this area by offering solution and senses to its clients where problems may arise.

5.4.4 The business model

FLYSEC can be a platform for ICTS to test, scale and assess the impact of such products in order to offer its clients a full solution.

5.4.5 Financial projections

FLYSEC offer ICTS research and relevant experience within the highest EU institutions to offer its clients with relevant experience to be able to add to its services.

[10] European Agenda on Migration: Securing Europe's External Borders". *europa.eu*. European Commission. Retrieved 15 December 2015.

[11] U.S. Government Accountability Office, "U.S. Customs and Border Protection: Review of the Staffing Analysis Report under the Border Patrol Agent Reform Act of 2014," May 2016, http://www.gao.gov/assets/680/677475.pdf.

5.4.6 The commercialization roadmap

ICTS board expect to receive full details of the FLYSEC project and expect to guide all subsidiaries to integrate into its purpose to clients start in 2018.

5.4.7 Risk Assessment

risk	Likelihood (high/medium/low)	Impact (high/medium/low)	mitigation
EU regulations are on hold	Low	Medium	Amended to meet the need
Schengen regulation change	Medium	High	ICTS solutions are already in position to adapt to change.
Different regulations within EU countries	Low	High	ICTS in position to adapt its services.
Increased security / terror threat	Medium	High	ICTS to adapt its services to meet the new demands.

5.5 EMZA VISUAL SENSE LTD (EMZA)

The partner's initial exploitation plan:

Planned use of project results	Timeframe for (commercial) use	Target market
The sensor that Emza will develop for the FLYSEC project is in the main business line of Emza, which has dedicated itself from its founding to developing autonomous visual sensors. Emza is actively developing the business case for autonomous visual sensors that can understand and interpret the area in their responsibility, identify events that are potentially dangerous or require action to be taken. In particular our sensors are people – oriented, identifying and counting people in a room, a lobby, waiting for an elevator or inside an elevator. Queue monitoring is an important part of such applications, providing information on the size of the queue, the number of people in it, its motion characteristics and its potential energy for staying organized or becoming chaotic, including estimation of the potential for violence or emergency. During the framework of the FLYSEC project, emza has made considerable advances in its technology, markets, and business situation. In technology, we have miniaturized our sensors into button-sized autnomouns ultra-low power units, we have turned our main attention into the IoT world, and as a company emza was bought by Taiwan chipmaker HiMax.	Within 2018-2019	Smart buildings (elevator control)

5.5.1 Key exploitable results and their expected key areas of application

As part of the FLYSEC project emza has developed sensors with built in capabilities to track people in the crowded airport terminals, monitor queues, identify people in restricted zones, provide queue monitoring data, and identify irregular behaviour (eg running). While these sensors as part of the FLYSEC project were demonstrated on relatively large platforms consuming a few hundreds of milliwatts, these abilities will be relatively straightforward to port to our ultra low sub-milliwatt sensors that can operate off of small batteries for a few years. This work will be done with specific customer requirements specifications. Currently all the relevant IPR is emza background, however in future additional IP may be produced.

5.5.2 Exploitation Team

Mr. Yoram Zylberberg, emza CEO

Mr. Roni Gorlicki, VP business development

Dr. Zeev Smilansky, emza CTO

5.5.3 The Market

The Occupancy Sensor Market is expected to witness a CAGR of 13.72% between 2017-2023 to grow to US$5.317 billion by 2023, increasing from US$2.795 billion in 2018 (Research and Markets Jan 24, 2018). This market is spread practically across all continents. The trends for the connected home, IoT, and smart devices will drive this increase. The main advantages of emza's sensors are cost, autonomy (=battery operated), intelligence and privacy, since all analysis is done on-board and no images are stored or sent to a server or the cloud. The main competition is from traditional passive IR (PIR) sensors, which excel in power consumption which is practically zero, but lack intelligence and are blind to non-moving people and in hot temperatures.

5.5.4 The business model

Our model is building an OEM sensor for large clients according to their specifications. Sample clients we will contact include:

- United Technologies Company (UTC)
- Johnson controls
- Legrand
- Tyco
- Osram
- Siemens

5.5.5 Financial projections

We estimate the cost of building a new sensor as follows:

- Design incl. finalization of algorithms – $450k
- Hardware design incl. prototyping - $250k
- Collateral - $100k

We estimate sales to be in hundreds of thousands of units per deal, and the sensor selling price around $10. At this point it is too early to give more accurate numbers.

All the required investment will be made from internal resources.

5.5.6 The commercialization roadmap

Our roadmap includes meetings with potential customers, attendance at trade shows (such as CES which we attended in January in Las Vegas), developing a product roadmap with customers through proof of concept (POC), reference design, and final product design. Proof of concept may include offline analysis of sample videos followed by sensor evaluations in field trials and pilot installations.

Currently, there are no standards concerning visual sensors nor are there regulatory requirements, with the exception of wireless communication which is subject to the standard requirements in this field.

The main barriers are proving the performance of the sensors in terms of

- Accuracy of data provided
- Performance under extreme conditions (low light, temperature variations, connectivity)
- Costs

All these are dealt with through improvements of the system in terms of hardware, software and algorithms, and exposing the sensors to increasing datasets and field trials.

5.5.7 Risk Assessment

risk	Likelihood (high/medium/low)	Impact (high/medium/low)	mitigation
Inaccurate measurements	Medium	Medium	Increasing input datasets and field trials
Poor performance at low light	Medium	Medium	Tightening the interaction processor-imager
High power consumption	Low	Medium	Selection and optimization of processor

5.6 CG SMARTECH LTD (C.G - SMARTECH)

The partner's initial exploitation plan:

Planned use of project results	Timeframe for (commercial) use	Target market
The exploring new system had been identified as an important opportunity to help our security customers	1 year	CG Smartech Customer base

5.6.1 Key exploitable results and their expected key areas of application

Using commercial cooperation to exploit CG as initiator of EU proposal and projects.

5.6.2 Exploitation Team

The team consist of Dr. Chanan Gabay (CEO) and Keren Hananel-Stoler.

5.6.3 The Market

The domestic Israeli security industry and its technological providers.

5.6.4 The business model

FLYSEC solution and its recommendations are planned to be use as part of our consulting package provided to our customers, as well as in our lecturers in conferences and in other opportunities. The business model is based on the consulting fee for each project.

5.6.5 Financial projections

Finance is deeply impacted by the type of EU calls and projects participated in.

5.6.6 The commercialization roadmap

Analysis the expected security calls towards being ready to market.

5.6.7 Risk Assessment

risk	Likelihood (high/medium/low)	Impact (high/medium/low)	mitigation
Low success rate	High	High	New business arena

5.7 EASC EV (EASC)

The partner's initial exploitation plan:

Planned use of project results	Timeframe for (commercial) use	Target market
EASC as a non-profit research organisation does not intend to explore research results economically. Instead, we intend to use knowledge gathered in the project for scientific publications, conference and workshop presentations, active stakeholder involvement to enable regular use of technologies and as a starting point for further own research work. Furthermore, our intention is to work on the development of train-the-trainer concepts and tutorials to support the implementation of new technologies and systems in daily operations.		
Publications	during project lifetime and beyond	stakeholders in public administrations and politics, potential end users, scientists, technicians and practitioners
training	following to project duration	trainers and practitioners

5.7.1 Key exploitable results and their expected key areas of application

- Within the project, a Proof-of-Concept testing of the integrated FLYSEC system has been organised by EASC at Schönhagen Airport. EASC could deepen its networking and cooperation relationships, mainly within the Berlin Capital region. This, together with the experiences gained in the testing period delivers increased skills in implementing large scale tests of newly developed technologies in the aviation sector. The preparation of new test projects funded under the German Research and Innovation Programme for the Secure Society is on the way already.
- Contacts to the members of the stakeholder advisory group has been established or deepened. Cooperation activities outside the project were started.

5.7.2 Exploitation Team

The exploitation team is led by Prof. W. Rehak (Member of the Board) and H. Zeiser (Senior Project Engineer) at EASC. Further EASC-team members are supporting individual activities.

5.7.3 The Market

- EASC is a non-profit organisation. Our market is in Research and Innovation activities, both European and nationally funded. Our target groups are innovative companies, authorities

and scientific institutions with the mission to joint projects in the aviation security sector and in accordance to the triple helix concept.

5.7.4 The business model

There are three main pillars our business model is based on: conferences and workshops for professionals, network management and stakeholder involvement, RDI projects.

5.7.5 Financial projections

We do not expect to generate any revenue out of FLYSEC results.

5.7.6 The commercialization roadmap

- There is no plan to commercialize FLYSEC results. But we will capitalize on project results. Also Schönhagen Airport, subcontracted by EASC; has proven its capacity as a testbed for new technologies and solutions in the aviation business. EDAZ gained increased visibility, not only as an airport of general aviation. The cooperation between EASC and the airport operator has been deepened by the joint work in the FLYSEC project.

5.7.7 Risk Assessment

risk	Likelihood (high/medium/low)	Impact (high/medium/low)	mitigation
No access to technical documents generated by the project resulting in limited opportunities to make use of results	high	high	none

5.8 SOCIETE DE L AEROPORT DE LUXEMBOURG SA (LuxAirport)

5.8.1 Key exploitable results and their expected key areas of application

- LuxAirport provides its facilities to perform a Proof-of-Concept test in real operational environment. Out of this experience, knowledge will be generated and used to improve the security at the airport. In case, FLYSEC results will become applicable for day-by-day operations at airports, LuxAirport might be among the frontrunners to make use of them.

5.8.2 Exploitation Team

The team led by the Security Manager of the Airport.

5.8.3 The Market

- There is no market targeted, but the implementation of project results at own operational premises is considered.

5.8.4 The business model

Our business is to operate an airport in a safe and secure way.

5.8.5 Financial projections

There are no direct financial projections in relation to the FLYSEC project.

5.8.6 The commercialization roadmap

- Not applicable yet.
-

5.8.7 Risk Assessment

risk	Likelihood (high/medium/low)	Impact (high/medium/low)	mitigation
Project results not applicable in near future due to existing framework conditions	h	m	Promoting results among professional contacts

5.9 UNIVERSITE DU LUXEMBOURG (UL)

5.9.1 Key exploitable results and their expected key areas of application

Although consortia educational institutes are not planning to undertake direct exploitation of project results, indirectly the concepts, ideas, and successes of the project are factors that contribute towards and enrich the research and education environment of these partnering Universities and in particular add value:

- by enhancing the quality of courses and programmes offered to students;
- by improving the status and calibre of university research capabilities, and in doing so, enhancing the institution itself and its attractiveness in securing future commercial and industry partnering opportunities;
- by enhancing its public profile and reputation through its association with high-profile and successful projects.

Research also provides a range of direct business benefits to end users with its core elements of concepts and ideas, basic and applied research, studies, simulations, laboratory tests demonstrations, field tests etc. The FLYSEC project has all the required attributes to be considered a quality scientific and technology study as well as a project that can readily transfer the FLYSEC solution from a research environment to a capability and product ready for market.

Ideas for FLYSEC Research exploitation:

- FLYSEC has the power to create 'spin-offs' and establishing new business in the market,
- Results of the FLYSEC business model can be used as basis for Horizon 2020 initiatives with high potential for continuous research-commerce cooperation.

To achieve these aims, the following has been undertaken or is planned to be actioned beyond the project duration:

- Identification of stakeholders to be targeted for 'awareness-raising' of FLYSEC research results,
- Preparation of business plans by appropriate partners,
- Elicitation of feedback on our business plans from project supporters and end users assisting in the evaluation of the project results
- Identification of FLYSEC's strength and weaknesses,
- Creating use cases and services for both public and commercial organizations,
- Elaboration of a strategy to introduce the FLYSEC solution to the market,
- Definition of promotion phases,
- Expansion of ideas for future research in the field.

5.9.2 Exploitation Team

The exploitation team is composed of University members involved in the FLYSEC project.

5.9.3 The Market

The University of Luxembourg has been actively cooperating with LuxAirport since the beginning of the project. Once the needs of LuxAirport were clearly outlined, solutions were designed and offered by FLYSEC to be applied in the airport's daily operations. The technology will be tested in near real airport conditions during a demonstration at LuxAirport in 2018. The demonstration is also a possibility to address neighbouring markets in France and Belgium.

Across Europe the commercial and supplier environment for security responder services operates rather like a microclimate for the larger and more generic ICT world, consisting of product manufacturers, service providers and system integrators that specialise solely or predominately in capabilities for public emergency and safety services. These actors have long running contracts with end-user agencies and have considerable influence on the selection of technological innovation options. Therefore, such actors cannot be ignored during the deployment stage of a new generic security tool such as FLYSEC.

5.9.4 The business model

The University of Luxembourg focuses on designing and developing optimal processes and guidelines on how to include FLYSEC solutions into airport security systems. These processes take into account, and rely on participation from, end users and project supporters from Luxembourg. It is therefore important to define timeframes and key stakeholders in the use of FLYSEC solutions. Additionally, FLYSEC is a project developed in part by the Interdisciplinary Centre for Security, Reliability and Trust (SnT).

SnT is an internationally leading research facility that together with external partners establishes Luxembourg as a European centre of excellence and innovation for secure, reliable, and trustworthy information and communication technologies (ICT). In this context, the Centre achieves excellence by targeting research topics that create high impact – well beyond the strict remits of the academic community.

This requires a balance between high-risk and long-term research activities and a goal-oriented, demand-driven approach. To achieve its objectives, SnT's long-term research is rooted in a thorough comprehension of societal and industrial challenges. The promising outcomes and results from the high-risk research are refined by tackling precisely defined, relevant problems and investigate solutions that are applicable and scalable in actual industrial and societal contexts.

Against this highly competitive academic background, SnT focuses on partnership development, interdisciplinarity and competitiveness on an international level:

- Cooperation with external partners is critical to the Centre's success. A partnership program allows external partners with a long term interest in developing secure and reliable ICT systems to contribute to the development of SnT at all levels.

- Achieving secure, reliable and trustworthy ICT requires input from several research disciplines. SNT application area focus fosters an interdisciplinary environment bringing together expertise from engineering, natural, law, and human/social sciences to address common challenges.
- Excellence in research requires the Centre to be highly competitive at an international level. Within strategic areas, SnT's portfolio of European projects funded by the European Commission and the European Space Agency plays key role in establishing critical mass.

The FLYSEC platform will be presented to SnT and consortia industrial partners as a possibility to widen their service portfolio for their clients.

5.9.5 Financial projections

At this stage of project there are no financial projections. The University of Luxembourg recognizes the importance of end-user **awareness** regarding the solution. Therefore, all available opportunities to date to enhance user awareness about FLYSEC's capabilities and benefits have been exploited. FLYSEC validation activities have also included live demonstrations with the involvement of a wide range of end-user organizations whose feedback will be collated and analysed.

5.9.6 The commercialization roadmap

Awareness: There is no success without awareness. Awareness is a required success factor for any solution. Potential users not only need to be aware about the innovations FLYSEC introduces but also the added value and benefits it brings to them as well.

Legal environment: The legal environment will have both negative and positive impacts on project results exploitation. From one perspective security responder organizations operate under and are framed by clear legal obligations and statutes regarding their roles and responsibilities; however, there are also legal regulations that can inhibit security particularly as regards the free exchange of information between the agencies.

Budgetary limitations: Agencies are continuously facing budgetary pressures limiting their options for infrastructural innovation.

Commercial aspects: Throughout Europe the commercial and supplier environment for security responder services operates rather like a microclimate of the larger and more generic ICT world in that it consists of product manufacturers, service providers and system integrators that specialise solely or predominately in capabilities for public emergency and safety services. These actors have long running contracts with end-user agencies and have considerable influence regarding the selection of technological innovation options. Therefore, they cannot be ignored at the deployment stage of a new generic security tool such as FLYSEC.

5.9.7 Risk Assessment

risk	Likelihood (high/medium/low)	Impact (high/medium/low)	mitigation
Technology ownership	high	high	Involvement SME partners to spin-off creation

5.10 Embry-Riddle Aeronautical Deutschland GmbH (ERAU)

The partner's initial exploitation plan:

Planned use of project results	Timeframe for (commercial) use	Target market
Publications and conference presentations to the entire security community in Germany		
Detailed discussions on the symmetry between security and ethics	Subsequent to the project finalization	Authorities, aviation security associations and providers, academia
Lectures and seminars at Universities	Subsequent to the project finalization	Academia and students

5.10.1 Key exploitable results and their expected key areas of application

The ethical issues ERAU is responsible for in the running project form a kind of corrective tool wherever security measures are at stake. They represent the legal borders for interventions of a government that infringe the personal rights of the individuals concerned. That means that the results of the running project can be exploited in governmental or EU projects regarding any kind of aviation security measures. ERAU will make efforts to participate in such projects.

5.10.2 Exploitation Team

The exploitation team consists mainly of Embry-Riddle Aeronautical University Deutschland members involved in the FLYSEC project.

5.10.3 The Market

The potential market is theoretically worldwide because ethical issues are relevant all over the world, at least in constitutional states. However, it is fair to say that the market covers at any rate the domestic and EU market that is mainly represented by security associations and providers as well as authorities and academic institutions. When it comes to projects, the EU and the German government will be potential financiers.

Competitors could be other academic institutions that deal with ethical issues. However, the tension between security and ethics is a unique feature that is now part of ERAU´s particular profile.

5.10.4 The business model

ERAU´s business model consists of contributing to the awareness of ethical issues wherever aviation security issues are at stake, such as:

- Conferences,
- Publications,
- Projects,
- Lectures and seminars,
- Discussions with stakeholders (authorities, security associations and providers).

5.10.5 The commercialization roadmap

Given the addresses of ERAU´s planned activities, a commercialization is feasible only to a limited extent. Participation in future projects may form an exemption.

5.10.6 Risk Assessment

risk	Likelihood (high/medium/low)	Impact (high/medium/low)	Mitigation
Limited success rate	high	high	Low

5.11 EPSILON INTERNASIONAL ANONYMI ETAIREIA MELETON KAI SYMVOULON (EPSILON INTERNATIONAL SA)

The partner's initial exploitation plan:

Planned use of project results	Timeframe for (commercial) use	Target market
EPSILON through its associated company in Munich, Germany named avionTek GmbH (http://aviontek.com) - which deals with aviation software technologies development – will disseminate projects' results to all German airports for future cooperation. EPSILON has developed 3d models for all big airports in Germany through the 3D-Aerodromes project described above and has established good communication channels with the majority of the German airports.	5 years	500.000 € rough estimation

5.11.1 Key exploitable results and expected key areas of application

EPSILON contribution to FLYSEC project was related to technical requirements and the system architecture definition. The task was fulfilled at the beginning of the project in collaboration with other project partners and the project coordinator.

OpenLS and IndoorGML technology was incorporated with the FLYSEC platform according to specifications and guidelines from OGC, Esri Support for Geospatial Standards: OGC and ISO/TC211, GeoAPI 3.0 Implementation Standard with corrigendum, IndoorGML as an application schema of OGC standards GML 3.2.1.

EPSILON work included an extended review for the required standards that "parts and pieces" of FLYSEC should follow. EPSILON was also reviewed the required standards for Sensors Technologies, RFIDs, iBeacons, Cameras, TravelDocs applications and smart Boarding passes according to IATA and ACI. Last but not least, a roadmap towards the certification of FLYSEC platform was developed according to ETSI and CEN.

5.11.2 Exploitation Team

EPSILON has workforce of 20 full-time highly skilled managers and researchers covering environmental, aviation, maritime and GIS sciences. A team of professionals, under the support and instructions of a project manager, will decide the exploitation strategy and will identify the potential benefits for the company. EPSGR aims to achieve the initial plan of 5-year timeframe for commercialization and to a target market of 500.000 Euros. Collaboration with project partners after the project is significant to achieve this. Write articles and present FLYSEC in the Greek press, Web portals, Social media, aviation related workshops and congresses, etc.

5.11.3 The Market

The market outlook is can be targeted to:

- Target markets for installing FLYSEC pilots: German, Greek, Maltese airports. In reference to this business market, EPSILON contacted in July the Airport of Augsburg, that is waiting to receive a more detailed to proposal in September on the FLYSEC systems to be installed an additional pilot to the Berlin one.
- Request further funding for developing FLYSEC as a commercialization product.
- Propose FLYSEC philosophy for marines, harbours, train stations, bus stations, theatres, opera house, shopping malls etc.
- Request further funding for extend the main idea of FLYSEC to other security and safety applications e.g. guidance and way-finder in a ship, cruise-ships, extreme hazard situations etc.
- Achieve a certification from IATA and ACI for FLYSEC and cooperate with them to achieve a better understanding of the market needs.

5.11.4 The Business Model

FLYSEC can be a pilot platform for EPSILON achieve further development and improvement to achieve enhanced security applications. FLYSEC can be installed as a pilot to several cooperating airports e.g. German, Maltese, Greek with a minimum cost that will cover the basic equipment and maintenance. An example is to split the cost to 50% charges to the airport, 50% charges to a supportive bank and a minimum fee will apply for support and maintenance. Feedback and continues practical improvements and customizability of the platform for each airport could be the key to expand services to other airports and why not to a complete passenger management platform.

5.11.5 Financial Projections

EPSILON will use the integration of the know-how developed in FLYSEC to break even after 2 years. Different funding opportunities will be examined from 3rd parties of the private sector or public funds through other European or national programs. Coming closer to the readiness of the service the financial plan will be documented including facts, numbers and figures.

5.11.6 The commercialisation roadmap

Request further funding for developing FLYSEC as a commercialization product. Adapt FLYSEC and include other areas of interest (guidance and way-finder in a ship, cruise-ships, extreme hazard situations etc.) with easier market penetration and commercialization opportunities.

5.11.7 Risk Assessment

risk	Likelihood (high/medium/low)	Impact (high/medium/low)	mitigation
Technological outdate	medium	High	Adapt to new technologies
Different regulations within EU countries	Low	High	Adapt to new services.
Increased security / terror threat	Medium	High	Adapt services to meet the new regulations.
Compatibility issues ANDROID – iOS – Windows mobile	Medium	Medium	Adapt services offer updates and continues improvement of the platform
GDPR	Medium	High	Adapt with new regulations
Technology ownership	High	High	Achieve new partnerships

6 PATENTS, TRADEMARKS AND OTHER IPR ISSUES

At this stage, the participants of the project have not applied for patents or trademarks directly resulting from project activities.

7 CONCLUSIONS

The project has delivered the Proof-of-Concept and Field Test in realistic operational environment and has achieved TRL6. This provides a good opportunity to address other support schemes to bring the concept and integrated solution closer to readiness for market.

Components and sub-systems owned by individual project partners might be even more advanced, partially even commercialized products or services.

Adjustments in the existing framework of regulations and technical delivery conditions are required to enable the implementation of the integrated FLYSEC concept at airports. To enable the implementation of IATA's Airport of the Future concept requires to draw the perimeter line already at the entrance to the airport terminals or even outside into the airport grounds. In general, no unidentified person, independently of being passenger, visitor or staff, should be allowed to enter the site.