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Project acronym: EPATS

Project title: European Personal Air Transportation System STUDY

Instrument: Specific Support Action

Thematic Priority: Integrating and Strengthening the European Research Area

Deliverable reference number and title:

### D6.1.3 - EPATS Activity Report – Final

Organization name of lead contractor for this deliverable: **Institute of Aviation (IoA),  
EPATS Contractors**

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Approval Status (date, signature)			
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WP & Task Leaders			

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Project coordinator organization name: <b>INSTITUTE of AVIATION</b>	Duration: 18 month

Project funded by the European Commission within the Sixth Framework Programme (2002-2006)		
<b>Dissemination</b>		
<b>PU</b>	Public	<b>X</b>
<b>PP</b>	Restricted to other programme participants (including the Commission Services)	
<b>RE</b>	Restricted to a group specified by the consortium (including the Commission Services)	
<b>CO</b>	Confidential, only for members of the consortium (including the Commission Services)	

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## **1. EPATS STUDY Project Synopsis**

### **1.1. Project objectives**

**The EPATS (European Personal Air Transportation System)** focuses on the future Highly Customer Oriented and Time, and Cost Efficient Air Transport System. It fills niche between Surface and Scheduled Air Transport. Future mobility cannot be satisfied only through investments in hub and spoke, or rail - and highway systems.

This future EPATS system will provide a wide choice of transportation mode - and **the wider use of small aircraft, served by small airports, to create access to more communities in less time.**

The goal of the EPATS proposal is to demonstrate the needs and potential of small aircraft business development and to propose recommendations for the introduction of this new European Air Transportation System in the context of the European Research Areas.

**The SSA EPATS STUDY project** will address the following issues:

- The potential new market for personal aviation up to 2020.
- The potential impact of this new way of transport on the European ATM, and airport infrastructures, as well as the environmental, safety and security issues involved.
- The EPATS general specification and R&D Roadmap

The studies will be carried out by a Consortium supported by representative experts of the EPATS stakeholder community.

The deliverables of these studies will be rapports containing a joint vision of the personal air transportation system in Europe to 2020 and proposals for developing this new small aircraft business at a European level.

### **1.2. Report objectives**

**The SSA EPATS STUDY project** consist on 6 Work Packages, and 19 deliverables. Some deliverables consist on “sub-deliverables”.

This Report relate to Deliverable D6.1.3 "Final"

This Report is intended to fulfill Consortium obligations defined in Contract Agreement II.7 – Reports and deliverables. It consist Periodic Activity Report – Final.

The reporting period is: **January 1, 2007 – June 30, 2008**

### **1.3. The Consortium Details**

Proposal N°:	044549
Contract N°:	ASA6-CT-2006-044549
Duration:	18 months
Starting date:	1 January 2007
Number of Contractors:	10

## 1.4. The Contractors

EPATS Contractors are listed below:

<i>Contractor No.</i>	<i>Contractor name</i>	<i>Contractor short name</i>	<i>Name of the Contractor's Project Manager</i>	<i>Country</i>
1	Institute of Aviation	<b>IoA</b>	Krzysztof PIWEK	Poland
2	Eurocontrol Experimental Center	<b>EEC</b>	Marc BROCHARD	Europe
3	M3Systems	<b>M3S</b>	Isabelle LAPLACE	France
4	National Aerospace Laboratory	<b>NLR</b>	Frans VAN SCHAIK	Netherlands
5	Polskie Zakłady Lotnicze sp. z o.o. w Mielcu	<b>PZL M</b>	Janusz PIETRUSZKA	Poland
6	Rzeszów University of Technology	<b>RzUoT</b>	Andrzej MAJKA	Poland
7	WSK PZL Rzeszów S.A.	<b>PZL Rz</b>	Antoni GNOT	Poland
8	Budapest University of Technology & Economics	<b>BUTE</b>	Jozsef ROHACS	Hungary
9	Windrose Air Jet Charter GmbH	<b>Windrose</b>	Maciej WALKOWIAK	Germany
10	AD Cuenta	<b>AD Cuenta</b>	Adriaan DE GRAAFF	Netherlands

## 1.5. The Coordinator

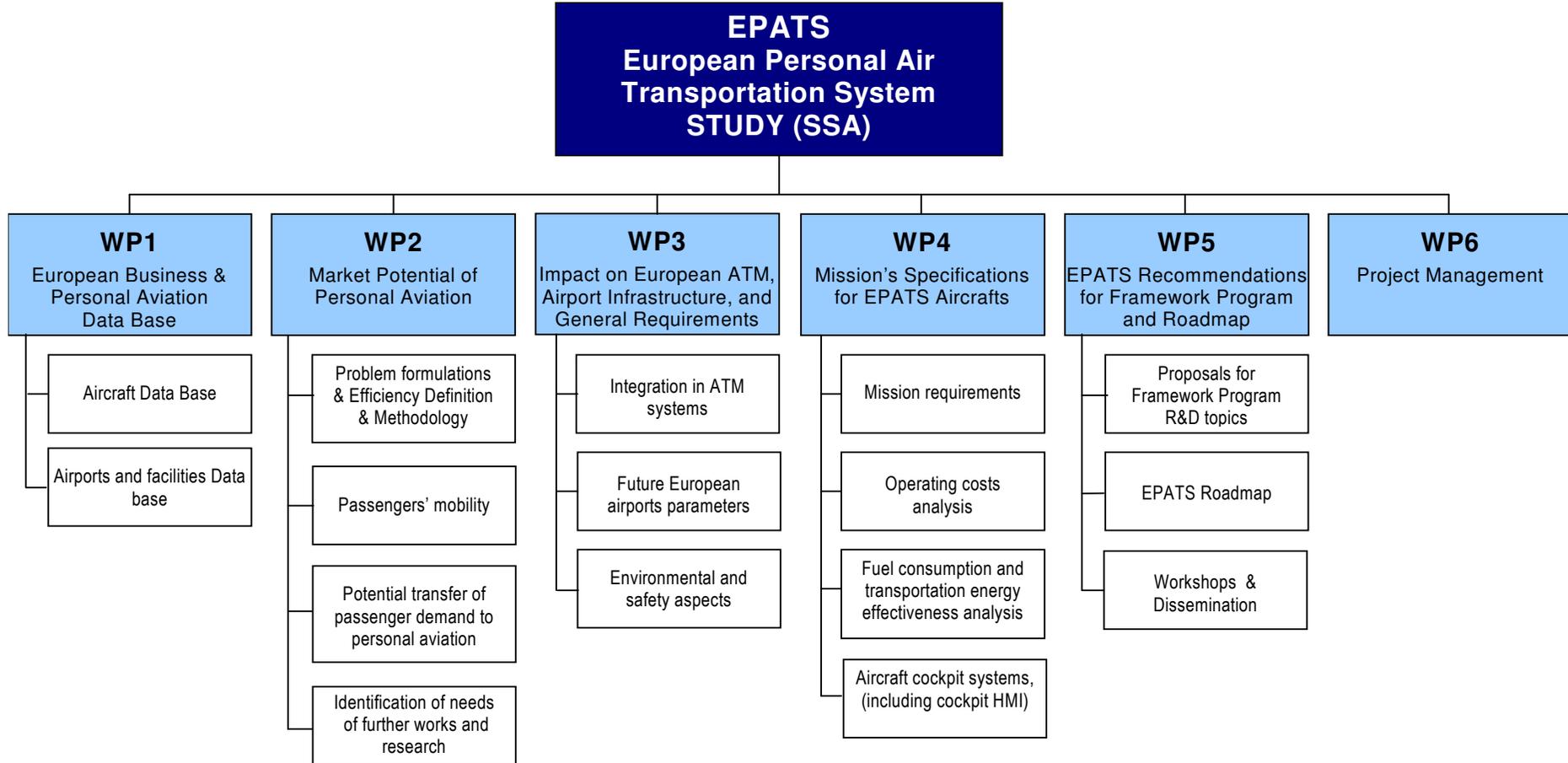
The contractual coordinator of EPATS Study is Institute of Aviation, Warsaw, Poland. Institute of Aviation nominates as:

- major coordination contact (Project Coordinator) – **Krzysztof PIWEK**. He is responsible for the day to day work and is the contact person for all operational matters. He has support in technical and administrative matters as stated below.
- contact for technical matters (Technical Manager) – **Alfred BARON**
- contact for administrative matters (Administrative Manager) – **Andrzej IWANIUK**

## 1.6. The EC Project Officer

The European Commission has assigned following Project Officers for EPATS:  
**Jean-Luc MARCHAND** - from 1 January 2007 up to 31 January 2008,  
**Remy DENOS** – from 1 February 2008 up to 6 April 2008,  
**Stephanie STOLTZ-DOUCHET** – from 7 April 2008 up to now.

### 1.7. EPATS Project Structure



**1.8. EPATS – Project timetable and Workpackage Leaders**

SPP	Work package/ Task/ Deliverables	Y1												Y2					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<b>WP1</b>	<b>European Business &amp; Personal Aviation Data Base (IoA)</b>	█																	
T1.1	Aircraft Data Base_ <i>(IoA, Windrose)</i>	█																	
T1.2	Airports and facilities Data base_ <i>(RzUoT)</i>	█																	
D1.1	Report on European Business & Personal Aviation Data Base and findings						↓												
<b>WP2</b>	<b>Market potential of personal aviation (M3S)</b>	█																	
T2.0	Problem formulations, air transport efficiency definition and modal distribution methodology workshop ( <i>M3S, IoA, RzUoT</i> )	█																	
T2.1	Passengers' mobility in European countries_ <i>(M3S)</i>	█																	
T2.2	Potential transfer of passenger demand to personal aviation by 2020 <i>(M3S, IoA)</i>	█																	
T2.3	Identification of needs of further works and research <i>(M3S, IoA)</i>									█									
D2.1	Potential transfer of passenger demand to personal aviation by 2020 and needs of further R&D works														↓				
D2.2	Expert seminar			↓															
<b>WP3</b>	<b>Impact on European ATM, Airport Infrastructure and General Requirements (NLR)</b>	█																	
T3.1	Integration in ATM systems_ <i>(Eurocontrol)</i>	█																	
T3.2	Future European airports parameters (general requirements)_ <i>(NLR)</i>	█																	
T3.3	Environmental and safety aspects_ <i>(NLR)</i>	█																	
D3.1	EPATS ATM General requirements & related issues to be solved <i>(Eurocontrol)</i> .																↓		

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SPP	Work package/ Task/ Deliverables	Y1												Y2					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
D3.2	EPATS Airports General requirements, safety and environmental aspects & related issues to be solved ( <i>NLR</i> ).																		
<b>WP4</b>	<b>Missions Specifications for EPATS Aircraft (IoA)</b>																		
T4.1	Mission requirements ( <i>IoA, PZL M, PZL Rz, RzUoT</i> )																		
T4.2	Operating costs analysis. ( <i>IoA</i> )																		
T4.3	Fuel consumption and transportation energy effectiveness analysis ( <i>RzUoT</i> )																		
T4.4	Aircraft cockpit systems, (including cockpit HMI) ( <i>NLR</i> )																		
D4.1	EPATS aircraft missions requirements ( <i>IoA</i> )																		
D4.2	Operating Costs Analysis Report ( <i>IoA</i> )																		
D4.3	Fuel consumption and transportation energy effectiveness Analysis Report ( <i>RzUoT</i> )																		
<b>WP5</b>	<b>EPATS recommendations for FP and Roadmap. (IoA)</b>																		
T5.1	Proposals for Framework Program R&D topics ( <i>all participants</i> )																		
T5.2	EPATS Roadmap ( <i>all participants</i> )																		
T5.3	Workshops and dissemination ( <i>all participants</i> )																		
D5.1	EPATS Research and Development Program ( <i>all part-s</i> )																		
D5.2	EPATS Roadmap ( <i>all participants</i> )																		
D5.3	Joint meeting with SESAR																		
D5.4	Joint meeting with CESAR																		
D5.5	Workshop																		
D5.6	Berlin Airshow Conference																		
D5.7	EPATS presentation CD Rom																		

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SPP	Work package/ Task/ Deliverables	Y1												Y2						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
<b>WP6</b>	<b>Project Management (IoA)</b>																			
T6.1	Activities to reach kick-off project (concept freeze)																			
T6.2	Activities to reach midterm review (design freeze)																			
T6.3	Activities to project finalizing and results dissemination																			
D6.1	Management reports of kick-off, mid-term progress, final	↓										↓							↓	
D6.2	Project management Plan					↓														
D6.3	EPATS Internet Website creation																↓			
D6.4	Financial statements (end year, final)												↓						↓	

## 1.9. EPATS – Deliverables and Persons responsible for deliverables

Del. No.	Deliverable name	WP No.	Lead participant	Persons responsible	Delivery date <sup>1</sup> (proj. month)
D1.1	Report on European Business & Personal Aviation Data Base and findings.	WP1	IoA	<b>Alfred BARON</b>	M6
D2.1	Potential transfer of passenger demand to personal aviation by 2020 and needs of further R&D works.	WP2	M3S	<b>Isabelle LAPLACE</b>	M12
D2.2	Experts seminar	WP2	IoA	<b>Adriaan de GRAAFF</b>	M4
D3.1	EPATS ATM General requirements & related issues to be solved.	WP3	EEC	<b>Marc BROCHARD</b>	M15
D3.2	EPATS Airports General requirements, safety and environmental aspects & related issues to be solved.	WP3	NLR	<b>Frans J. van SCHAIK</b>	M15
D4.1	EPATS aircraft missions specification	WP4	IoA	<b>Włodzimierz GNAROWSKI</b>	M15
D4.2	Operating Costs Analysis Report	WP4	IoA	<b>Włodzimierz GNAROWSKI</b>	M12
D4.3	Fuel consumption and transportation energy effectiveness Analysis Report	WP4	RzUoT	<b>Andrzej MAJKA</b>	M12
D5.1	EPATS Research and Development Program	WP5	IoA	<b>Alfred BARON</b>	M18
D5.2	EPATS Roadmap	WP5	IoA	<b>Alfred BARON</b>	M18
D5.3	Joint meeting with SESAR	WP5	EEC	<b>Adriaan de GRAAFF</b>	M11
D5.4	Joint meeting with CESAR	WP5	IoA	<b>Adriaan de GRAAFF</b>	M9
D5.5	Workshop with SESAR JU (second)	WP5	IoA	<b>Adriaan de GRAAFF</b>	M18
D5.6	Berlin Airshow Conference	WP5	AD Cuenta	<b>Adriaan de GRAAFF</b>	M17
D5.7	EPATS presentation CD Rom	WP5	IoA	<b>Andrzej IWANIUK</b>	M18
D6.1	Management reports of kick-off, mid-term progress, and final	WP6	IoA	<b>Krzysztof PIWEK</b>	M1, 9,18
D6.2	Project Management Plan	WP6	IoA	<b>Krzysztof PIWEK</b>	M3
D6.3	EPATS website, and flimsy	WP5	IoA	<b>Andrzej IWANIUK</b>	M16
D6.4	Financial statements (end year, final)	WP6	IoA	<b>Krzysztof PIWEK</b>	M12, 18

<sup>1</sup> Month in which the deliverables will be available. Month 1 marking the start of the project, and all delivery dates being relative to this start date.

## **2. MAJOR ACHIEVEMENTS AND CRITICAL ITEMS OF EPATS STUDY PROJECT**

### **2.1. Major Achievements**

#### **WP1 European Business & Personal Aviation Data Base**

- A literature and European and US GA databases review was done. Databases contents published on the Web by various aviation institutions, offices and statistical centres were analyzed (Eurostat, Eurocontrol, FAA and others).
- All available information on European airports and airfields was searched and analyzed in terms of availability and possibility of use in EPATS system
- Basing on the available sources personal and business aircraft characteristics comparison was done, out of which, a reference group was selected for EPATS.
- A basic characteristics of all existing airports and airfields in respective countries was prepared. The characteristics were analyzed in terms of use in EPATS system.
- A comparison analysis of information sources on General Aviation in Europe and the United States, in terms of data gathering methods and their analyzing, as well as capacity and fleet structure and usage indicators.
- The conclusions and suggestions on European General Aviation aircraft and airports monitoring mechanisms improvement were presented.
- The need for Central Survey and General Aviation Statistics Office, especially for EPATS, was suggested.
- The document “D1.1 Report on European Business& Personal Aviation Data Base and Findings” has completed.

#### **WP2 Market potential of personal aviation**

- Efficiency definitions used in air transport were verified and a New definition assumed for EPATS efficiency analysis was presented.
- The Generalized Cost of travel Minimization method based on international mobility development for EPATS aircraft demand forecasting was justified.
- The results of so far long distance mobility analysis in the framework of European Programmes and their fitness for high speed interregional transport development was evaluated.
- Continuing further research on interregional mobility in EPSON 2013 program framework with adjusting objectives and scope of the analysis to EPATS planning needs was suggested: creating a full image of passenger flows
- A simplified optimal transport mode choice model basing on Generalized Travel Costs Minimization was created. The Generalized Costs model was assumed based on out of pocket costs and indirect costs, that are the result of costs generated during travel
- The volume of interregional flow was assumed for several different scenarios. The ESPON Programme data were used as a source. Lack of full knowledge on flows structure caused the need for extra analysis and making assumptions on missing structure components (travelers value of time (income) categories, flow fluctuations over time (year, month, day))
- The number of aircraft forecast and volume of expected air traffic of EPATS was calculated. The calculations were done using MS Excel and Mathcad.

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- Based on experience acquired during the study and as a result of missing statistical data (passenger flows, socioeconomic data), a further analyses topics required for more accurate demand forecasting in air transport.
- Important workshop discussing the definitions and efficiency measurement of personal air transport, assumption to the methods for demand estimation on aircraft has performed by Eurocontrol in Bretigny on 19 April 2007. The document “D2.2 EPATS Expert Workshop Report” has completed.
- The document “D2.1 Potential transfer of passenger demand to personal aviation by 2020” has completed.

Below are provisional results EPATS examination:

### AIRCRAFT TRAFFIC IN EUROPE – CURRENT AND FORECASTED

Tentative data

	Aircraft	2006	2025	
			SESAR forecast	EPATS forecast
<b>Number of Aircraft</b>	Commercial Aircraft	5 000	8 000	8 000
	Business & Air Taxi	1 500	2 500	-
	EPATS	-	-	90 000
	<b>Total</b>	<b>6 500</b>	<b>10 500</b>	<b>98 000</b>
<b>Number of Flight Daily</b>	Commercial Aircraft	30 000	60 000	60 000
	Business & Air Taxi	2 000	3 600	-
	EPATS	-	-	43 000
	<b>Total</b>	<b>32 000</b>	<b>63 600</b>	<b>103 000</b>
<b>Number of connections</b>	Commercial Aircraft	4 000	Not reported	Not reported
	Business & Air Taxi	6 000	Not reported	
	EPATS	-	-	16 000

### WP3. Impact on European ATM, Airport Infrastructure and General Requirements.

- Inventory of the major consequences of the expected EPATS number of aircraft on ATM, taking into account the typical personal use of those aircraft, the expected ATM and Avionics technology and the projected routes to be flown,
- Production of a report with that inventory and recommendation for future Research and Development “D3.1 - EPATS ATM General requirements & related issues to be solved”,
- Inventory of the major consequences of the expected EPATS aircraft on European airports, environmental aspects and safety matter,
- Production of a report with that inventory and recommendations for future Research and Development “D3.2 - EPATS Airports General requirements, safety and environmental aspects & related issues to be solved”.

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### **WP4. Missions Specifications for EPATS Aircrafts**

- The report on EPATS aircraft family requirements, which sets a vision on their basic parameters was prepared. The requirements were applied in the optimal transport mode choice and for EPATS aircraft demand calculation.
- A document “Small aircraft propulsion manufacturers” presenting manufacturing situation and development in the area of small aviation propulsion and following conclusions in the EPATS context.
- Operational cost calculation model for EPATS class aircraft using Mathcad software and MS Excel was prepared. A thorough cost analysis basing on present, averaged material, equipment, fuel, services and labor prices was conducted.
- Respective aircraft and flight profile impact on unit cost were done, what will allow to estimate EPATS aircraft requirements more rationally.
- The conclusions coming from the analyses were presented and further indispensable research topics in the area were suggested.
- Fuel consumption analysis according to basic aircraft parameters and flight profile using a model and software was completed.
- Conclusions drawn from fuel consumption analysis were presented and further research topics in the area were proposed.
- An EPATS Aircraft Cockpit avionic & human machine interface requirements was analyzed.
- The documents “D4.1 EPATS Aircraft Mission Specification”, “D4.2 Operating Cost Analysis” and “D4.3- Fuel consumption and transportation energy effectiveness analysis” have completed.

### **WP5 Recommendations for Framework Program and Roadmap**

- The proposed research and development project vital for EPATS project realization was prepared based on the so far analyses outcomes. This document has completed as “D5.1 “Proposals for Framework Program R&D Topics”.
- A roadmap outline of “EPATS Roadmap Vision” was prepared and sent to all Participants and the EC Officer in March 2007. This document was under constant changes in whole project realization period as result of remarks and further studies. This document has completed as “D5.2 EPATS Roadmap”.
- In the September 2007, the CESAR consortium met in Amsterdam, where EPATS idea was presented and initiating a cooperation in range of EPATS aircraft requirements and VII European Framework research projects was proposed. The Coordinator of CESAR Programme was favorable towards the idea and present the position in a written form. The document has completed as “D5.4 Joint Meeting with CESAR”.
- EPATS project representatives took part in “2<sup>nd</sup> ATM R&D Projects Coordination and Networking Meeting” in November 2007 in Brussels, invited by SESAR Consortium. They presented EPATS project concept and its relations to SESAR. The report of this meeting was included in “D5.3 Joint meeting with SESAR”. The report includes comments on SESAR conference materials and cooperation initiative in IPATS project realization (Interactive Personalized Air Transportation System).
- A separate meeting was held with the new SESAR JU on 24 June 2008 in Brussels. The EPATS results were discussed. The SESAR JU took note of the EPATS estimates and understood the need to look into the issue of managed versus unmanaged airspace in connection to flight levels. The SESAR JU representative, Alain Siebert, encouraged EPATS to stay in close touch with AOPA, Mr. Michael Erb, as AOPA is seen as the principal advisor to the SESAR JU for general Aviation matters. As Mr. Erb was present in the meeting, a direct

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contact was established and as a follow up, papers were exchanged between AOPA and EPATS. The EPATS initiative is seen as a stimulus for AOPA in their struggle to get attention for EPATS type of flying. The document has completed as “D5.5 Workshop with SESAR JU (second)”.

- On 28 may the EPATS results were successfully presented at the ILA in Berlin. In the audience was Bruce Holmes, the father of the NASA AGATE/PATS program and currently associated with Dayjet, the first US air taxi operator. The presentations were well received. The general rehearsal of the presentations in the extra management meeting 24 April in Poland helped to make the presentations high level and uniform. The document has completed as “D5.6 ILA Air Show Conference”.
- On 21 July a separate presentation was provided to Mr. Liam Breslin at the EU. The presentation was well received. Mr. Breslin suggested to have a dedicated meeting on EPATS at the Commission. He advocated to publish a nice glossy brochure with the highlights of the EPATS study. This brochure titled “Welcome to the EPATS” can find as attachment to the report D5.7 “EPATS Presentations CD-Rom” .

## **2.2. Critical Items**

Among critical issues worth being mentioned belong as follows:

- Lack of multiple statistical information in the area of transport (volume and interregional flow structure, wealth structure, state of airport and airfield network, state of General Aviation, air traffic of General Aviation, personal transport costs, etc) forces to use many simplifying assumptions.
- No access to interregional airline connection planning methods prevents from critical analysis of demand satisfaction possibility for interregional air transport and estimating the volume level of passenger traffic, at which regional airlines start to neighbor with EPATS.
- Disproportionate to tasks and challenges, very small financial means given for EPATS studies considerably limit time for its realization and prevent initiating wide consultations and engaging experts for problem solutions
- Difficulties in reaching aviation Stakeholders. Limited answers to questions and proposals.
- More emphasis on the environmental impact of EPATS.

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**2.3. Deliverable Reports and Technical Reports**

DELIVERABLE REPORTS

P/D/T	Document Number	Title	Organization Responsible	Issue Date	Report Type
WP1/D1.1	EPATS D1.1-RoEB&PADBase-V1	D1.1 Report on European Business & Personal Aviation Database and Findings	<b>IoA</b>	2007.12.12	Deliverable Report
WP2/D2.1	EPATS D2.1-V1	D2.1 Potential transfer of passenger demand to personal aviation by 2020	<b>M3S</b>	2008.02.22	Deliverable Report
WP2/D2.2	EPATS D2.2-Exp Wp Report-V0	D2.2 EPATS Expert Workshop Report	<b>IoA</b>	2007.07.13	Deliverable Report
WP3/D3.1	EP D3.1-Impact ATM-V0	D3.1 EPATS ATM General requirements & related issues to be solved	<b>EEC</b>	2008.05.16	Deliverable Report
WP3/D3.2	EPATS D3.2 Airports General Requirements	D3.2 EPATS Airports General Requirements including Safety and Environmental Issues	<b>NLR</b>	2008.06.13	Deliverable Report
WP4/D4.1	EP D4.1-MissionSpec-V2.7	D4.1 EPATS aircraft missions specification	<b>IoA</b>	2008.07.04	Deliverable Report
WP4/D4.2	EP D4.2 OperCostAnal V2.5	D4.2 Operating Cost Analysis	<b>IoA</b>	2008.06.30	Deliverable Report
WP4/D4.3	EPATS D4.3-SFC-V0	D4.3 - Fuel Consumption and transportation energy effectiveness analysis	<b>RzUoT</b>	2008.02.04	Deliverable Report
WP5/D5.1	EP D5.1-FPR&DTopics-V2	D5.1 Proposals for Framework Program R&D topics	<b>IoA</b>	2008.07.30	Deliverable Report
WP5/D5.2	EP D5.2-EPATS_Roadmap-V0	D5.2 EPATS Roadmap	<b>IoA</b>	2008.06.30	Deliverable Report
WP5/D5.3	EP D5.3-JntMtngSESAR-V0	D5.3 Joint Meeting with SESAR	<b>IoA</b>	2007.12.31	Deliverable Report

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**DELIVERABLE REPORTS CD**

WP/D/T	Document Number	Title	Organization Responsible	Issue Date	Report Type
WP5/D5.4	EP D5.4-JntMtngCESAR-V0	D5.4 Joint Meeting with CESAR	<b>IoA</b>	2007.12.31	Deliverable Report
WP5/D5.5	EP D5.5-MtngSESAR-V0	D5.5 Second Meeting with SESAR	<b>IoA</b>	2008.09.30	Deliverable Report
WP5/D5.6	EP D5.6-ILA Conference-V1	D5.6 ILA Air Show Conference	<b>Ad Cuenta</b>	2008.06.27	Deliverable Report
WP5/D5.7	EP D5.7-CD-V0	D5.7 EPATS Presentation CD-Rom	<b>IoA</b>	2008.09.30	Deliverable Report
WP6/D6.1	EPATS D6.1.1-KoM Report-V0	D6.1.1. EPATS Kick-Off Meeting Report	<b>IoA</b>	2007.07.13	Deliverable Report
WP6/D6.1	EPD6.1.2-ActvRprt 1-V2	D6.1.2 - EPATS Activity Report - Period 1	<b>IoA</b>	2008.02.23	Deliverable Report
WP6/D6.1	EPD6.1.3-ActvRprt 2&F-V1	D6.1.3 - EPATS Activity Report - Period 2 and Final	<b>IoA</b>	2008.11.27	Deliverable Report
WP6/D6.2	EPATS D6.2-MngmntPlan-V0	D6.2 Project Management Plan & Handbook	<b>IoA</b>	2007.07.13	Deliverable Report
WP6/D6.3	EP D6.3-www-V0	D6.3 EPATS website, and flimsy	<b>IoA</b>	2008.09.30	Deliverable Report
WP6/D6.4	EP-D6.4.1-MngmRprt 1-V0	D6.4.1 – EPATS Management Report – Period 1	<b>IoA</b>	2008.03.27	Deliverable Report
WP6/D6.5	EP-D6.4.2-MngmRprt 2&F-V1	D6.4.2 – EPATS Management Report – Period 2 and Final	<b>IoA</b>	2008.11.28	Deliverable Report

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Document Number: **EP-D6.1.3-ActvRprt F-V2**

**TECHNICAL REPORTS**

WP/D/T	Document Number	Title	Organization Responsible	Issue Date	Report Type
WP1/T1.1	EPATS T1.1-AcftBase-V0	Aircraft Data Base	<b>IoA</b>	2007.09.20	Technical Report
WP1/T1.2	EPATS T1.2-ArptsDB-V0	Airports and Facilities Data Base	<b>RzUoT</b>	2007.09.20	Technical Report
WP2/T2.1	EPATS T2.1-Mobility-V1	Mobility in European Countries	<b>M3S</b>	2007.12.03	Technical Report
WP2/T2.2	EPATS T2.2-V1	Potential transfer of passenger demand to personal aviation by 2020 and first estimation of EPATS fleets	<b>M3S</b>	2008.02.22	Technical Report
WP2/T2.2.1	EP T2.2.1-SynthEstimMthd-Results-InptWP3-V1	Synthesis of the EPATS estimation method and results. Inputs for WP3	<b>M3S</b>	2008.02.22	Technical Report
WP2/T2.2.2	EP T2.2.2-EstimationReport-V1	Potential transfer of passenger demand to personal aviation by 2020 and first estimation of EPATS fleets	<b>M3S</b>	2008.01.15	Technical Report
WP2/T2.3	EPATS T2.3-V1	Identification of needs of further works and research	<b>M3S</b>	2008.02.22	Technical Report
WP4/T4.1.1	EP T4.1.1-InputData WP2, WP3-V0	Reference Vehicle and EPATS Aircraft Mission's Characteristics to be Used for Demand 2020 Calculation; Input Data for WP2 & WP3	<b>IoA</b>	2007.11.28	Technical Report
WP4/T4.1.2	EP T4.1.2-SmAircraftPropuls-V0	Small Aircraft Propulsion Development	<b>PZL Rz</b>	2007.12.31	Technical Report
WP4/T4.1.3	EP T4.1.3-SmPropulsManuf-V0	Small Aircraft Propulsion Manufacturers	<b>PZL Rz</b>	2008.01.18	Technical Report
WP4/T4.1.4	EP T4.1.4-ProdCapab-V0	ASSESSMENT OF PRODUCTION CAPABILITIES OF EPATS AIRCRAFT IN EUROPE	<b>PZL M</b>	2007.12.18	Technical Report
WP4/T4.2.1	EP T4.2.1-AcftProdCost-V0	EPATS Aircraft Production Costs	<b>PZL M</b>	2007.12.18	Technical Report
WP5/T5.3	EPATS T5.3-SAReq&PotDem-V0	Small Aircraft Requirements & Potential Demand methodology & Assumptions, Synergy Need	<b>IoA</b>	2007.09.06	Technical Report

## 2.4. Person Month Status Overview

### Person-Month Status Table

CONTRACT No: ASA6-CT-2006-044549

ACRONIM: EPATS

**PERIOD 1: 1-st Jan. 2007 to 31-st Dec. 2007**

		Partner - Person - month per Workpackage										AC own staff			
		TOTAL PARTICIPANTS	IoA	EEC	M3S	NLR	PZL M	RzUoT	PZL Rz	BUTE	Windrose	AD Cuenta	AC TOTALS	RzUoT	BUTE
1. European Business & Personal Aviation Data Base	Actual WP total:	3,35	2,45					0,90					0,90	0,90	
	Planned WP total:	3,50	2,40	-	-	-	-	0,90	-	-	0,20	-	0,90	0,90	
2. Market potential of personal aviation	Actual WP total:	12,40	3,20		8,40			0,80					0,80	0,80	
	Planned WP total:	9,90	3,20	-	5,90	-	-	0,80	-	-	-	-	0,80	0,80	
3. Impact on European ATM, Airport Infrastructure and General Requirements	Actual WP total:	1,19		0,64		0,55							-		
	Planned WP total:	10,61	-	8,70	-	1,91	-	-	-	-	-	-	-	-	
4. Missions Specifications for EPATS Aircrafts	Actual WP total:	6,35	2,34			0,23	1,30	0,70	1,78				0,70	0,70	
	Planned WP total:	9,19	3,60	-	-	0,99	1,80	1,00	1,80	-	-	-	1,00	1,00	
5. EPATS Recommendations for Framework Program and Roadmap	Actual WP total:	1,59	0,06							0,90		0,63	0,90		0,90
	Planned WP total:	9,95	4,94	1,74	-	0,35	-	-	-	1,30	0,30	1,32	1,30	-	1,30
6. Project Management	Actual WP total:	0,49	0,18	0,11		0,10						0,10	-		
	Planned WP total:	1,46	0,80	0,16		0,25						0,25	-		
<b>Total Support activities</b>	<b>Actual WP total:</b>	<b>25,37</b>	<b>8,23</b>	<b>0,75</b>	<b>8,40</b>	<b>0,88</b>	<b>1,30</b>	<b>2,40</b>	<b>1,78</b>	<b>0,90</b>	<b>-</b>	<b>0,73</b>	<b>3,30</b>	<b>2,40</b>	<b>0,90</b>
	<b>Planned WP total:</b>	<b>44,61</b>	<b>14,94</b>	<b>10,60</b>	<b>5,90</b>	<b>3,50</b>	<b>1,80</b>	<b>2,70</b>	<b>1,80</b>	<b>1,30</b>	<b>0,50</b>	<b>1,57</b>	<b>4,00</b>	<b>2,70</b>	<b>1,30</b>

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**Person-Month Status Table**

CONTRACT No: ASA6-CT-2006-044549

PERIOD 1+2 (Final): 1st January 2007 to 30th June 2008

		Partner - Person - month per Workpackage										AC own staff			
		TOTAL PARTICIPANTS	IoA	EEC	M3S	NLR	PZLM	RzUoT	PZLRz	BUTE	Windrose	AD Cuenta	AC TOTALS	RzUoT	BUTE
1. European Business & Personal Aviation Data Base	WP total:	3,35	2,45	-	-	-	-	0,90	-	-	-	-	0,90	0,90	-
	WP total period 2:	-											-		
	WP total period 1:	3,35	2,45					0,90					0,90	0,90	
	Planned WP total:	3,50	2,40	-	-	-	-	0,90	-	-	0,20	-	0,90	0,90	
2. Market potential of personal aviation	WP total:	13,98	3,20	-	9,98	-	-	0,80	-	-	-	-	0,80	0,80	-
	WP total period 2:	1,58			1,58								-		
	WP total period 1:	12,40	3,20		8,40			0,80					0,80	0,80	
	Planned WP total:	9,90	3,20	-	5,90	-	-	0,80	-	-	-	-	0,80	0,80	
3. Impact on European ATM, Airport Infrastructure and General Requirements	WP total:	3,89	-	1,39	-	2,50	-	-	-	-	-	-	-	-	-
	WP total period 2:	2,70		0,75		1,95									
	WP total period 1:	1,19		0,64		0,55									
	Planned WP total:	10,61	-	8,70	-	1,91	-	-	-	-	-	-	-	-	-
4. Missions Specifications for EPATS Aircrafts	WP total:	9,82	4,43	-	-	0,39	1,90	1,00	2,10	-	-	-	1,00	1,00	-
	WP total period 2:	3,47	2,09			0,16	0,60	0,30	0,32				0,30	0,30	
	WP total period 1:	6,35	2,34			0,23	1,30	0,70	1,78				0,70	0,70	
	Planned WP total:	9,19	3,60	-	-	0,99	1,80	1,00	1,80	-	-	-	1,00	1,00	
5. EPATS Recommendations for Framework Program and Roadmap	WP total:	8,79	6,19	0,01	-	-	-	-	-	1,30	-	1,29	1,30	-	1,30
	WP total period 2:	7,79	6,13	0,01						0,99		0,66			0,99
	WP total period 1:	1,00	0,06							0,31		0,63			0,31
	Planned WP total:	9,95	4,94	1,74	-	0,35	-	-	-	1,30	0,30	1,32	1,30	-	1,30
6. Project Management	WP total:	1,86	0,94	0,27	-	0,10	0,30	-	-	-	-	0,25	-	-	-
	WP total period 2:	1,37	0,76	0,16			0,30					0,15			
	WP total period 1:	0,49	0,18	0,11		0,10						0,10			
	Planned WP total:	1,46	0,80	0,16		0,25						0,25	-		
<b>Total Support activities</b>	<b>WP total:</b>	<b>41,69</b>	<b>17,21</b>	<b>1,67</b>	<b>9,98</b>	<b>2,99</b>	<b>2,20</b>	<b>2,70</b>	<b>2,10</b>	<b>1,30</b>	<b>-</b>	<b>1,54</b>	<b>4,00</b>	<b>2,70</b>	<b>1,30</b>
	WP total period 2:	16,91	8,98	0,92	1,58	2,11	0,90	0,30	0,32	0,99	-	0,81	1,29	0,30	0,99
	WP total period 1:	24,78	8,23	0,75	8,40	0,88	1,30	2,40	1,78	0,31	-	0,73	2,71	2,40	0,31
	<b>Planned WP total:</b>	<b>44,61</b>	<b>14,94</b>	<b>10,60</b>	<b>5,90</b>	<b>3,50</b>	<b>1,80</b>	<b>2,70</b>	<b>1,80</b>	<b>1,30</b>	<b>0,50</b>	<b>1,57</b>	<b>4,00</b>	<b>2,70</b>	<b>1,30</b>

### **3. WORKPACKAGE PROGRESS**

#### **3.1. WP1 European Business & Personal Aviation Data Base**

**Lead Contractor:** IoA

**WP1 Leader:** Alfred BARON

**List of Tasks:**

Task 1.1 – Aircraft Data Base (IoA)

Task 1.2 – Airports and facilities Data Base (RzUoT)

**Main Objectives of WP1:**

The main objectives in WP1 in the project period are:

- Gathering of data of European Business & Personal Aviation
- Identification of needs of furthers works to be made in the domain of statistical data collection

**Overview of progress achieved:**

**The WP1 is “closed” in period 1 and “completed” in period 2**

The results are presented in Deliverable D1.1 “ Report on European Business & Personal Aviation Database and Findings “ which has two attachments:

Task 1.1 – Aircraft Data Base, which includes business & personal aircraft characteristics

Task 1.2 – Airports and facilities Data Base – an inventory and overview of all European airports and landing facilities.

Statistical data concerning European Business & Personal Aviation and operations are incorporated in Deliverable D1.1 “ Report on European Business & Personal Aviation Database and Findings “.

The structure of data corresponds to US General Aviation Statistical Data book . The European and US statistical data are compared. They includes:

- Fleet size by aircraft type and use,
- GA aircraft production and shipments,
- Flight hours by type and use,
- Operations statistics,
- Calculated DOC and current price of Air-Taxi services
- Age of aircraft fleet,
- Pilot certificate and rating
- Total and fatal accidents rate by aircraft type and operators
- Eurocontrol and FAA forecast scenario,

For most of cases data for Europe are missing, because they are not reported or available.

**Conclusions of WP1:**

1. The analysis performed in WP1 do not support the position, that the existing gap between the EU and the US in General Aviation development is caused by differences in area, wealth nor surface transport infrastructure. The position was true when Europe was devided and there was no sign of common market and European sky.

The Fleet and volume of passenger-kilometer by General Aviation in the USA is nearly 5 times greater than the one of Europe, whereas the national income of the EU prevails over the GDP of the USA, the distances separating outlying regions are similar, and the land transport infrastructure comparable.

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2. The reasons behind the US General Aviation favourable position can be found in conditions created in the US by the administrations and involvement of society and local public government for the benefit of local and personal air transport.
3. One of the major obstacles in conducting an effective study on general aviation in Europe is the lack of adequate statistical information. Deep knowledge about the current state is the fundament of development planning.
4. The knowledge is gained from American statistical surveys by FAA, is highly valued. It is confirmed by many research programs. Especially the continuously undertaken: „General Aviation and Air Taxi Activity and Avionics (GAATAA) Surveys”, are of great value and were used for the comparison tables. The information collected in this survey helps to understand more about general aviation activities, assess the impact of general aviation activities on the National Airspace System, and show the need for increased traffic facilities and services in Europe. Federal, state and local governments; general aviation associations; and private industry and individuals use the summary data for safety analyses, planning, forecasting, and research and development. For example, more accurate information on hours flown and aircraft activity leads to more accurate safety measures, which in turn impacts general aviation insurance rates.
5. As regards to safety, the partial data available gives only some indication as to the main causes of fatal accidents. There are no European wide comprehensive statistics on safety of General Aviation Aircraft .
6. Also in Air Traffic Management and Control the number of General Aviation operations at GA airports is much larger in USA than in EU; compare 768 operations per day for the first ranked airport in USA with 131 business operations per day for the first ranked airport in Europe (comparing the total operations – itinerant and local- the difference will be even larger). That means, that at the current level of ATM- ATC, there is a large potential for GA airports capacity in Europe.
7. Our knowledge of current state of GA in Europe (as it is clearly visible at the comparison tables) is poor. Up to date comprehensive data describing the General Aviation sector in Europe is not available. Most of the existing data concern almost exclusively the commercial air transport sector and usually refer to airlines and airports. Even if some statistics for GA on country level are available from different sources, it is hard to compare them because they are prepared on the basis of different criteria and using different definitions. For example, because of the lack of common definition:
  - Eurocontrol define business aviation via a list of aircraft types.
  - SESAR (Deliverable D1) defines General Aviation as all aircraft except those of airlines, business aviation and state-owned aircraft,
  - Eurostat “Draft Glossary version 6 on air transport statistics” defines GA operations - commercial to includes Air Taxi and others renumbered operations, and in GA operations – non-commercial includes State Flight, Business flying and other.
8. Creation of a comprehensive European Business & Personal Aviation Data Base is indispensable for research & development planning. As in USA appropriate statistical surveys on EU level should be made.
9. There are no European wide comprehensive statistics on safety of General Aviation Aircraft without which research efforts are problematic and safety improvement are hard to measure.
10. Air transport fatality statistics refer mainly to scheduled flights. Air travel fatalities on unscheduled (charter) and General Aviation flights are only surveyed and reported by FAA and only partially reported by international air transport organisations.

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11. On the basis of US American General Aviation Safety data operating both under Parts 91 and 135 of the American Code and the analysis of above mentioned sources we can say, that Personal Aircraft Transportation System have an accident rate factor lower than Road Transportation Mode and have the potential to be near the Part 121 air carriers safety level. Apart from improving the aircraft design, the potential improvement of safety will mainly come from new technology that is aiming to facilitate flying and from new training systems.
12. There is no systematically collection of information about General Aviation in EU and the existing sources are not reliable. The lack of data makes analysis and valuation not enough trustworthy. There is a need of systematically GA information gathering and creating a complex and reliable database for the benefit of the European aviation community.

### **Needs of further works to be made in the domain of statistical data collection:**

1. It is recommended to initiate activities leading to the establishment of a European Center for Civil Aviation Statistical Analysis, especially for General Aviation. The center would be responsible for gathering data and data processing concerning the status and activities of GA in Europe. Also the center could initiate forecasting studies of the GA sector (aircraft, airports, ATM infrastructure, air traffic and its structure). The center could be located within EASA or EUROCONTROL.
2. Initiating stocktaking of all airport and landing facilities in the EU Member States and Strategic Plan of European Airport Modernization including, all the existing, as well as the new airports and airfields. Similar to the US “National Plan of integrated Airports Systems” (NPIAS) and “Airport Improvement Program” (AIP), a European plan and program should be prepared and implemented. The program should be implemented by different entities, consulted with the adequate institutions and coordinated by EC DG Energy and Transport.
3. As in US, a European Transportation Safety Board (ETSB) responsible for maintaining European database on General Aviation should be appointed. The Safety Board’s Accident/Incident database should be the official repository of aviation accident data and causal factors. (The existing European Transport Safety Council do not involve surveys and is not a repository of civil aviation accident data).

### **Deliverable Report issued in the WP1:**

**Document Title: “D1.1 Report on European Business & Personal Aviation Database and Findings”**

**Document Number: EPATS D1.1-RoEB&PADBase-V1**

**Status of Deliverable Report: “closed” in period 1 and “completed” in period 2**

#### *3.1.1. Task 1.1 – Aircraft Data Base*

**Lead Contractor: IoA**

**T1.1 Task Leader: Włodzimierz GNAROWSKI**

#### **Main objective of Task 1.1:**

The main objective of Task 1.1 is gathering characteristics of small airplanes designed for passenger transport and to create a Reference Data Base for EPATS mission specification.

#### **Progress achieved:**

**The Task 1.1 “closed” in period 1 and “completed” in period 2**

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A database was elaborated for the purposes of EPATS program. The database contains technical and economical data concerning airplanes destined for passenger transport and meeting requirements of FAR-CS23 in two categories:

- Normal, i.e. one and multi engine airplanes, having a seating configuration excluding pilot seats, of 9 (nine) or less and a maximum certificated takeoff weight of 5670kg (12500lb),
- Commuter, i.e. two engine airplanes that have a seating configuration excluding pilot seats of 19 (nineteen) or less, and a maximum certificated takeoff weight of 8618kg (19000lb) or less.

Airplanes gathered in the base are divided into three groups depending on type of propulsion:

- Pistons: single and multiengines
- Turbo-props: single and multiengines
- Jets: single and multiengines

There are 120 airplanes collected in the database. The database was elaborated with care regarding confirmation of the credibility of the acquired data by checking them at many sources.

Airplanes were chosen to create an EPATS Reference Airplanes Data Base.

For this purpose the following criteria were chosen:

- Fulfilling assumptions of forecasted mission for EPATS programme.
- Fulfilling requirements FAR/CS –23 with supplementary requirements.
- Designed or modernized after year 2000.
- Large production quantity.
- Credible and confirmed specifications and performance data.

An EPATS Airplanes Reference List and Data are presented below in the technical report: “Aircraft Data Base”, Document Number EPATS T1.1-AcftBase-V0

### **Technical report issued in the T1.1:**

**Document Title: “Aircraft Data Base”**

**Document Number: EPATS T1.1-AcftBase-V0**

### **Individual Partner Activities:**

**Windrose Air JetCharter GmbH**

#### Objectives:

This partner was involved in activities related to the Aircraft Data Base elaboration. The basic objective was :

- To provide operational data of aircraft used in European Air-Taxi Companies,
- To support the elaboration of Aircraft Data Base,
- Consultations concerning air-taxi operational data

#### Progress achieved:

Windrose Air JetCharter GmbH has provided information's and consultations concerning air-taxi operational data and has contributed to the Aircraft Data Base elaboration.

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**EPATS Piston Airplanes  
 Reference List and Data**

EPATS AIRCRAFT REFERENCE LIST	SINGLE-ENGINE PISTONS		MULTI-ENGINE PISTONS	
				
<b>PART 1</b>				
Manufacturer Model	Cirrus SR-22	Piper Saratoga II TC	Diamond DA-42 Twin Star	Piper Seneca V
Price [1000 €]	274	425	395	567
Certification Year	2000	1997	2004	1995
<b>Characteristic</b>				
Seating	1 + 3	1 + 5	1 + 3	1 + 5
<b>Dimensions Internal [m]</b>				
Length	3.3	3.16	3.40	3.15
Width	1.24	1.24	1.10	1.24
Height	1.27	1.07	1.00	1.07
Est. Cabin Volume [m³]	3.797	4.793	3.740	4.179
<b>Power</b>				
Engine	Teledyne Continental IO-550-N	Textron Lycoming TIO-540-AH1A	Thielert Centurion v. 2.0	Teledyne Continental TSIO-360-RB
Price [1000 €]			30	
Output [kW]	231	224	99	164
Weight	187	245.8	149.8	149
SFC			0.22	
TBO [h]	2000			1800
<b>Weights [kg]</b>				
Max. TO	1542	1633	1786	2154
Max. Payload				428
Useful Load	531	516	532	562
Max. Fuel	301 (251 usable)	301 usable	265 l (Jet-A)	332
<b>Performance</b>				
Max. Cruise Speed [km/h]	343	343	335	300
Service Ceiling [FL]	175	200	180	150
Rate of Climb [m/min]	426		390 (1702 kg)	446
TO Distance to 15 m [m]	486	552	527 (1702 kg)	671
Est. DOC/(pax*km)	0.105	0.082	0.177	0.146
Est. SFC - Block (litre/(pax*km))	0.044	0.040	0.050	0.059
<b>Range</b>				
Range (max. payload) [km]	1502	1563	1698	1533

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**EPATS Turboprops  
 Airplanes Reference  
 List and Data**

EPATS AIRCRAFT REFERENCE LIST	SINGLE-ENGINE TURBOPROPS		MULTI-ENGINE TURBOPROPS		
					
<b>PART 2</b>					
<b>Manufacturer Model</b>	Epic Dynasty	Pilatus PC-12	Plaggio Avanti II	Beechcraft King Air 350	BAE Jetstream 32EP
<b>Price [1000 €]</b>	1 444	2 24	5.85	4 422	
<b>Certification Year</b>	2008	1994	2006	1990	1997
<b>Characteristic</b>					
Seating	1 + 5	1 + 9	1 + 9	2 + 15	2 + 19
<b>Dimensions Internal [m]</b>					
Lenght	4.57	5.16	4.55	5.94	7.39
Width	1.40	1.53	1.85	1.37	1.85
Hight	1.49	1.47	1.75	1.45	1.8
<i>Est.</i> Cabin Volume [m <sup>3</sup> ]	9.533	11.605	14.731	11.800	24.609
<b>Power</b>					
Engine	P&WC PT6-67A	P&WC PT6A-67B	P&WC PT6A-66B	P&WC PT6A-60A	Garett TPE331-12
Price [1000 €]					
Output [kW]	895	895	2 x 634	2 x 783	2 x 761
Weight [kg]	230	234	213	216	182
SFC [kg/(kW*h)]	0.333	0.332	0.377	0.333	0.333
TBO [h]	3000	3500	3000	3600	5000
<b>Weights [kg]</b>					
Max.Ramp/TO [kg]	3314	4740	5466	6804	7360
Max. Payload [kg]	613	1123	907		2042
Useful Load [kg]		1873	1950	2531	2400
Max. (Usable) Fuel [kg]	856-1070	(1227)		1639	1489
<b>Performance</b>					
Max. Cruise Speed [km/h]	630	500	737	578	491
Service Ceiling [FL]	310	300	410	350	250
Rate of Climb [m/min]		480	899	832	
TO Distance 15 m (BFL) [m]	488	(917)	(1295)	(1006)	1432
<i>Est.</i> DOC/(pax*km)	0.259	0.186	0.250 /	0.169	0.119
<i>Est.</i> SFC - Block [litre/(pax*km)]	0.076	0.052	0.069 /	0.063	0.043
<b>Range</b>					
Range (max. payload) [km]	2870	2583	2453	1737	915

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EPATS Jets Airplanes Reference List and Data

EPATS AIRCRAFT REFERENCE LIST	SINGLE-ENGINE JETS		MULTI-ENGINE JETS			
						
<b>PART 3</b>						
Manufacturer	Diamond	Eclipse	Cessna	Evation	Grob	Cessna
Model	D-Jet	500	Citation Mustang	EV20 Vantage	SPn	Citation Encore +
Price [1000 €]	1 080	1 126	1.881	2.407	5 800	6 290
Certification Year	2007	2007			2008	
Characteristic						
Seating	2 + 3	1+4 / 5	2 + 4	2 + 8	1(2) + 8	2 + 9 / 11
Dimensions Internal [m]						
Length	3.53	3.76	2.97	5.26	5.10	5.28
Width	1.42	1.42	1.42	1.65	1.52	1.47
Height	1.44	1.27	1.37	1.57	1.64	1.45
Est. Cabin Volume [m <sup>3</sup> ]	7.218	6.781	5.778	13.626	12.713	11.254
Power						
Engine	Williams FJ33-4A	P&WC PW610F	P&WC PW615F	Williams FJ44-1AP	Williams FJ44-3A	P&WC PW535B
Price [1000 €]						
Output [kN]	6.99	2 x 4.0	2 x 6.5	2 x 8.77	2 x 12.5	2 x 15.12
Weight [kg]	136.2			208.8		
SFC [kg/(kW*h)]				0.475	0.456	
TBO [h]		3500	3500	3500	4000	5000
Weights [kg]						
Max. Ramp/TO [kg]	2300	2719	3925	4200	6300	7634
Max. Payload [kg]				908		
Useful Load [kg]	1018	1089	1444	1907	2205	2917
Max. (Usable) Fuel [kg]		765	(1171.3)	1249		2449
Performance						
Max. Cruise Speed[km/h]	583	685	630	790	754	793
Service Ceiling [FL]	250	410	410	410	410	450
Rate of Climb [m/min]		1044	917.4	914.4	1320	
TO Distance to 15 m (BFL) [m]	620	714	(947.9)	762	(914)	(1073)
Est. DOC/(pax*km)	0.268	0.282 /	0.365	0.200	0.282	0.253 /
Est. SFC - Block [litre/(pax*km)]	0.094	0.104 / /	0.147	0.069	0.103	0.1122 /
Range						
Range (max. payload) [km]	1426	1426 / 1019	1865	2228	3093	2188/39

*3.1.2. Task 1.2 – Airports and facilities Data Base*

**Lead Contractor:** RzUoT

**Task Leader:** Andrzej MAJKA

**Main objective of Task 1.2:**

The main objective of Task 1.2 was:

- inventory of available data about all European landing facilities and overview current airport characteristics in ECAC airspace by Country
- to plot share of population via distance to landing facilities for different categories of airports

**Progress achieved:**

**The Task 1.2 is “closed” in period 1 and “completed” in period 2**

The database was designed for the purposes of EPATS programme. The data base contains technical characteristics of current European airports (the definition for airports in the law refers to any area of land or water used or intended for landing or takeoff of aircraft). At the data base regarded all European airports (except HUBs) as General Aviation Airports.

All airports collected in the data base were divided into two categories:

- airports which are registered by ICAO (which have ICAO code), called airports,
- remaining airports and landing fields (airstrips), called landing fields

There are about 1270 airports and 1300 landing fields (all together 2567) collected in the base currently. The base was elaborated with care regarding confirmation of the credibility of the acquired data by checking them at many sources.

Airports gathered in the base are divided into two groups depending on legal status and technical characteristics:

- airports,
- landing fields.

The data were collected for 34 European countries (27 countries that have joined the European Union and 7 other countries).

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*Number of airports and all landing fields in Europe*

<b>No.</b>	<b>Country</b>	<b>Number of Airports</b>	<b>Number of Airfields</b>
1.	Austria	9	20
2.	Belgium	18	36
3.	Bosnia and Herzegovina	4	4
4.	Belarus	7	7
5.	Bulgaria	36	36
6.	Croatia	14	14
7.	Cyprus	3	3
8.	Czech Republic	18	90
9.	Denmark	23	41
10.	Estonia	6	6
11.	Finland	51	84
12.	France	199	454
13.	Germany	154	434
14.	Greece	52	58
15.	Hungary	12	12
16.	Iceland	12	12
17.	Republic of Ireland	11	36
18.	Italy	78	116
19.	Latvia	3	3
20.	Lithuania	7	7
21.	Luxembourg	1	2
22.	Malta	1	1
23.	Kingdom of the Netherlands	17	27
24.	Norway	37	67
25.	Poland	118	222
26.	Portugal	31	61
27.	Romania	22	22
28.	Slovakia	8	25
29.	Slovenia	6	10
30.	Spain	66	113
31.	Sweden	74	158
32.	Switzerland	19	57
33.	Ukraine	25	25
34.	United Kingdom	126	304
<b>Summary</b>		<b>1268</b>	<b>2567</b>

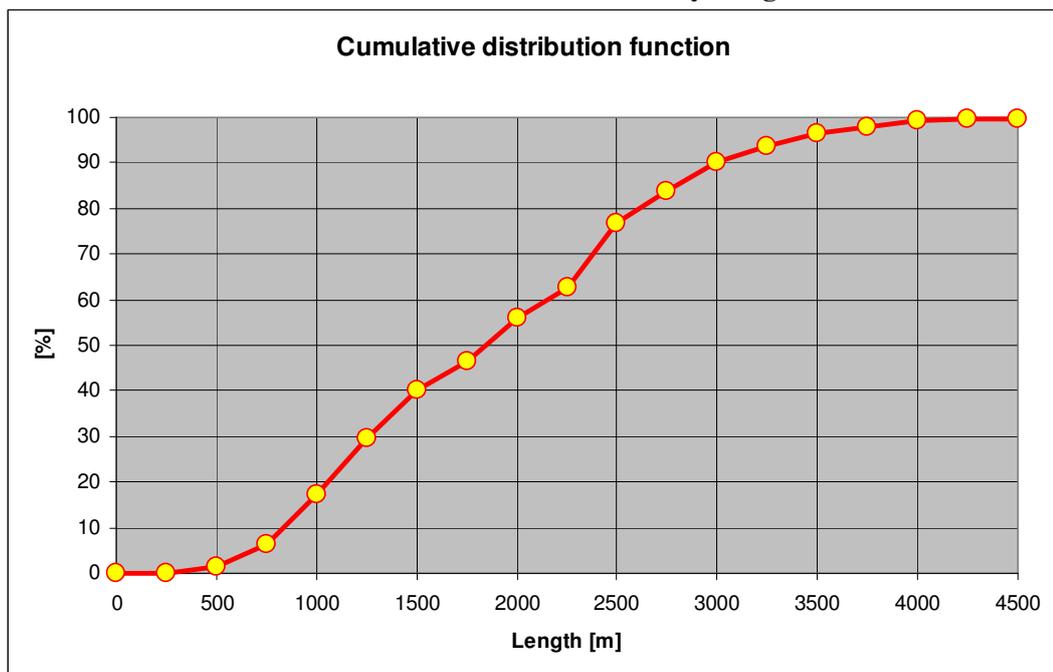
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## All European airports location



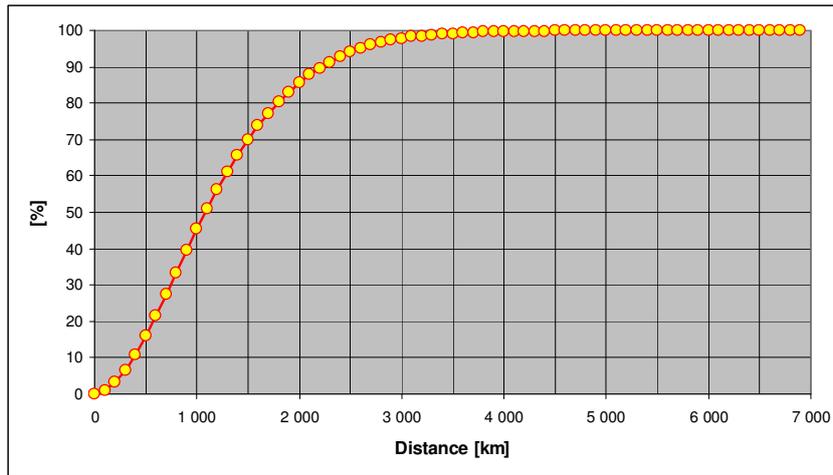
## Cumulative distribution of runways length



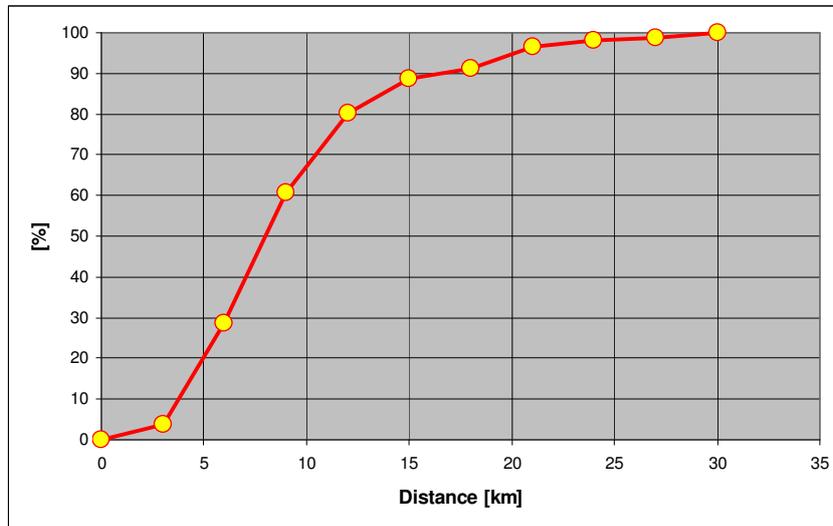
**EPATS Activity Report – Final**

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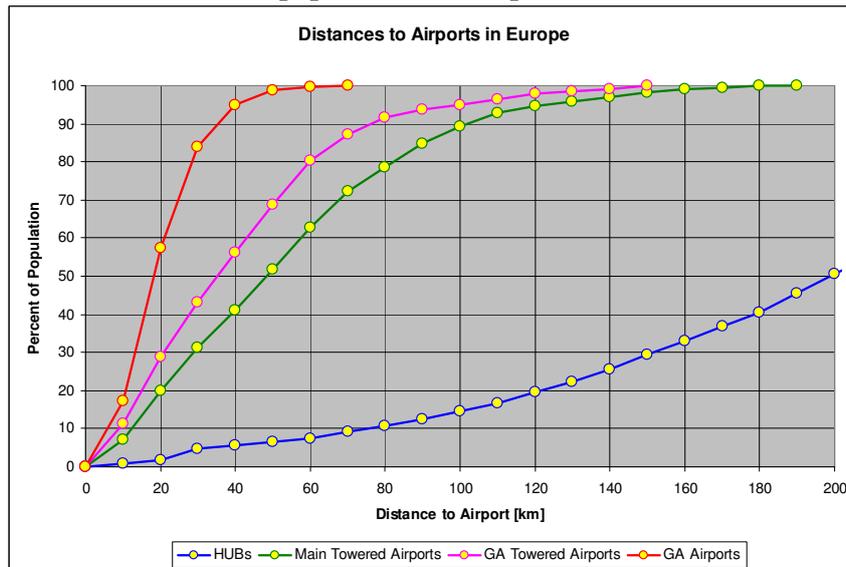
**Cumulative distribution of length between all landing facilities connections**



**Cumulative distribution function of distances from main European city to the landing facilities**



**Cumulative distribution function of population within particular radius of aerodromes in Europe**



## **Conclusions of T1.2**

Final conclusions and recommendations based on the analysis of current airport characteristics overview (as result of “Airports and Facilities Data Base” preparation) are presented below.

Europe is a special area with unique features favouring the development of regional passenger air transportation system, since:

1. It has about 1,270 airports and 1,300 landing fields, which means that for the most densely populated regions there is one airport per 2850 km<sup>2</sup> (one landing field per 1200 km<sup>2</sup>), and 390 000 inhabitants per one airport (170 000 inhabitants per one landing field),
2. In the most densely populated regions, the nearest airport lies within a distance of less than 40 km for more than 95 % of population (within less than 20 km for 60 % of population),
3. For most European cities, the nearest airport is located within 15 km (90 % of cities),
4. There are many airports in the vicinity of the largest European cities (not fewer than 10 airports within 50 km radius of each city) – passengers can freely choose the most suitable airport,
5. Most European airports are sufficiently equipped to be utilized for normal operational purposes by GA aircraft (other landing fields should be modernized).

Based on the analyses conducted, one can formulate the following recommendations:

1. There is no uniform classification method of European airports. That is why a classification should be proposed.
2. Not a single reliable source of information about European GA airports and landing fields existed and it is difficult to verify the information available.
3. No unified technical database of European airports exists, especially of those utilized by GA. There are no data concerning air traffic density and passenger flows at GA European airports. For all European GA systems, it is necessary to create a system for tracking and collecting data on air traffic and passenger flow density.

### **Technical report issued in the T1.2:**

**Document Title: “Airports and facilities Data Base”**  
**Document Number: EPATS T1.2ArptsDB-V0**

## 3.2. **WP2** Market Potential of Personal Aviation

**Lead Contractor:** M3S

**WP2 Leader:** Isabelle LAPLACE

### **List of Tasks:**

Task 2.0 - Problem formulations, air transport efficiency definition and modal distribution methodology workshop. (IoA)

Task 2.1 - Passengers' mobility in European countries. (M3S)

Task 2.2 - Potential transfer of passenger demand to personal aviation by 2020 (M3S, IoA)

Task 2.3 - Identification of needs of further works and research. (M3S, IoA)

### **Main Objectives of WP2:**

Estimation of potential transfer of passenger demand to personal aviation by 2020 by analyzing mobility and modal-split on case study routes in four representative EU countries. Task carried-out through the building of a micro-economic modal-split model. First estimate of EPATS fleet according to cost/speed/capacity scenarios.

### **Overview of progress achieved:**

The WP2 is “closed” in period 1 and “completed” in period 2

### **Deliverable Reports issued in the WP2:**

**Document Title: “D2.1 Potential transfer of passenger demand to personal aviation by 2020 and first estimation of EPATS fleets”**

**Document Number: EPATS D2.1-V1**

**Status of Deliverable Report: “closed” in period 1 and “completed” in period 2**

**Document Title: “D2.2 EPATS Expert Workshop Report”**

**Document Number: EPATS D2.2-Exp Wp Report-V0**

**Status of Deliverable Report: “completed” in period 1**

### *3.2.1. Task 2.0: Air transport efficiency and its measures*

**Lead Contractor:** IoA

**T2.0 Task Leader:** Alfred BARON

### **Main objective of Task 2.0:**

The main objective of Task 2.0 is to define what is the definition of air transport efficiency and the way to measure it.

### **Progress achieved:**

The Task 2.0 is completed in period 1.

An Expert Seminar was hold at Eurocontrol Premises on 19 April 2007. A report was then written relative to the air transport efficiency and its measure when dealing with:

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- Time efficiency
- Energy efficiency
- Materials effectiveness
- Impacts on environment by costs externalities measurements
- Affordability and accessibility

The main results are the following:

1. When we are dealing with efficiency, definition and measurement level must be given
2. Levels of measurement influence efficiency evaluation significantly.
3. The shorter distances and larger aircraft, the wider differences.
4. Despite the fact, that larger aircraft have better weight ratio and energy consumption characteristics, it is small aircraft, which provide higher efficiency in particular situations.
5. Mode efficiency should be measured at the national/European economy level considering social efficiency.
6. Air transport is safer, environmentally friendlier and more energy and resource efficient than car.
7. The greatest disadvantage of contemporary modes of high-speed transport (scheduled air, hi-speed train) are infrastructure development limitations, low nodes accessibility causing unbalanced regional development as a side effect.
8. The EPATS keeping all advantages of air transport enables negative externalities limitation and contributes to a more cohesive territorial development of EU-27.

In conclusion, the main natural determinants of personal transportation system efficiency are:

- Traveling time as an effect of a mode speed, infrastructure, traffic management system and accessibility
- Energy used (fuel) on the realization of one passenger kilometer at given speed
- Resources used for the mode of transport and infrastructure production on one passenger kilometer
- Impacts on ecology

The global determinant including all factors expressed in monetary form is the generalized cost of transport of one passenger-kilometer.

These quantities will be used to evaluate the effectiveness of EPATS and to compare its to others transportation modes

### General Definition of Air Transport Efficiency – suggestion:

At the system level Air Transport Efficiency is defined as energy consumption or costs needed to shift one passenger (or kg) on representative (average) origin to destination Great Circle Distance in time according to a fixed plan and complying specifications requirements, including safety and environmental costs.

### Issue in the task T2.0:

**Title of chapter of Deliverable Report D2.1 : “2. Air transport efficiency and its measures”**

**Document Number: EPATS D2.1-Mobility-V1**

**Status of report: “closed” in period 1 and “completed” in period 2**

### *3.2.2. Task 2.1: Passengers' mobility in European countries*

**Lead Contractor:** M3Systems

**Task Leader:** Isabelle LAPLACE

**Main objective of Task 2.1:** is to analyse the main characteristics of the mobility in Europe when particularly focusing on the mobility features on the connections where personal aviation could potentially operate. Besides this general analysis of mobility in Europe we also focus on the mobility analysis in two particular countries: France and Poland. Both indeed belong to the countries with the highest traffic level in old European countries and new European countries.

**Progress achieved:**

**The Task 2.1 is “closed” in period 1 and “completed” in period 2**

The mobility analysis made at a EU 15 level highlights that the long-distance journeys characteristics change according to the customer profile: business and leisure traveler do not travel the same way (difference in terms of transport mode, duration, traveler features (age, gender, etc.)). Characteristics of long-distance mobility therefore vary a lot according to the trip purpose. The analysis also highlights that providing a similar mobility analysis at a EU27 level is unfortunately not feasible due to the lack of detailed data on long-distance traffic.

As a consequence, data is lacking to perform a detailed deep mobility analysis on the connections where the personal aviation would be pertinent, i.e. on connections associating bad accessibility levels, economic attractiveness and significant traffic flows.

We indeed identify that **15 223 connections** between 27 countries can be considered as **EPATS potential connections**. All together these potential connections represent **24%** of the total existing NUTS 2 connections in Europe.

Despite the lack of detailed data on the traffic occurring on these connections the analysis manage to provide very interesting and important information on the current traffic levels and modal splits. The total traffic on the potential EPATS connections is 2400 billion passengers amongst whom 436 million travel to and from France and 93 million to and from Poland. The analysis also highlights the large market share of the road transport mode on these connections since 79% of the passengers travel by car. The air transport market share often exceeds the road one for distance over 1500 Km and reaches 100% for distances over 2000 Km.

The road transport mode preponderance on the potential EPATS connections hence tend to mean that the traditional air transportation is often less competitive than the road transport mode. But could a different way of travelling by air such as the personal aviation be an alternative to the traditional air transport as well as to road transport?

The answer to this question is the next step of the analysis aiming at assessing the traffic that could be potentially transferred to EPATS by 2020 as well as the EPATS aircraft fleet that would be necessary to satisfy this demand.

**Technical report issued in the T2.1:**

**Document Title: “Mobility in European Countries”**  
**Document Number: EPATS T2.1-Mobility-V1,**

### 3.2.3. Task 2.2: Potential transfer of passenger demand to personal aviation by 2020

**Lead Contractor:** M3S

**Task Leader:** Isabelle LAPLACE

**Main objective of Task 2.2:** is to evaluate the potential transfer of passenger demand to personal aviation by 2020 and the fleet of EPATS aircraft that would be needed to satisfy this demand.

**Progress achieved:**

**The Task 2.2 is “closed” in period 1 and “completed” in period 2**

The potential transfer to EPATS of passenger demand is estimated on connections where EPATS is relevant. Such connections are identified in the mobility analysis performed in the task 2.1. However, only **11682** among all the 15223 **identified potential connections between NUTS 2** of 27 countries are used to estimate the potential demand transfer to EPATS. The reason is that ASSESS forecasts only concern 21 countries: Austria (AT), Belgium (BE), Czech Republic (CZ), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece (GR), Hungary (HU), Ireland (IE), Italy (IT), Luxembourg (LU), Netherlands (NL), Norway (NO) Poland (PL), Portugal (PT), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH) , and United Kingdom (UK).

As a consequence other countries considered in ESPON (i.e. Bulgaria (BG), Cyprus (CY), Estonia (EE), Latvia (LV), Lithuania (LT), Romania (RO), Slovakia (SK)) are not considered for the estimations. The developed estimation method is based on the minimization of the generalized cost.

When a traveller with a value of time  $V_t$  compares two transport modes, mode  $i$  and mode  $j$ , he will choose the one having the smallest generalized cost, i.e.:

The traveller chooses the mode  $i$  if:  $C_{g_i} < C_{g_j}$

Or if:  $C_{travel_i} + V_t \times T_{travel_i} < C_{travel_j} + V_t \times T_{travel_j}$

The developed estimation method consists in linking the indifference curves to the expected results i.e. to the potential transfer of passenger-km. The combination of both elements, indifference curves between two modes and passenger-km distribution by value of time and distance, can be used to obtain a modal split. We can use a model split to compare EPATS with another transport mode, and determine a passenger’s preferred choice.

We consider to perform estimations in the context of ASSESS scenarios that have been developed in order to evaluate the effects of the White Paper measures. The particularity of the ASSESS study is that the **scenarios share common assumptions concerning the macroeconomics trends** (Population, GDP, Fuel price, etc). Actually, the scenarios differ in term of degree of implementation of the White Paper policy measures: there are the Null, the Partial, the Full and the Extended scenarios.

Six EPATS aircraft types are considered in the estimations:

- ACP-1- Single-Engine Piston
- ACP-2 – Twin-Engine Piston
- ACT-1 – Single-Engine Turbo-prop
- ACT-2 – Twin – Engine Turboprop
- ACJ-1 – Twin-Engine Very Light Jet (<5000 kg)
- ACJ-2 – Twin-Engine Light Jet (< 7000 kg)

At both European and national level, ACP-2, ACT-2 and ACJ-2 aircraft types proved to be aircraft generating the highest potential transfer of traffic to EPATS. That is why we considered only these three aircraft types in our estimations.

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Estimations of the number of flights as well as estimations of the EPATS fleet have been derived from the estimated number of transferred passengers to EPATS and from the category of EPATS aircraft that is considered on each connection. We attributed one category of aircraft per NUTS 2 connection using the following rule:

- Piston aircraft used for trip distances between 200 and 300 Km
- Turboprop aircraft used for trip distances between 300 and 1000 Km
- Jet aircraft for trips between 1000 and 2500 Km

Estimations of the potential transfer of traffic to EPATS are obtained for Europe, France and Poland:

1. **EUROPE:** the total transfer of traffic from road and air transport modes to EPATS would reach 43 million flights in Europe in 2020, made by around 90 000 personal aircraft. 53% of these EPATS aircraft would be Piston aircraft, 15% Turboprop aircraft and 5% Jet aircraft.

In total, we estimate that around:

- 23 million flights will be performed with Piston aircraft at Flight level 250
- 15 million flights will be performed with Turboprop aircraft at Flight level 250
- 5 million flights will be performed with Jet aircraft at Flight level 350

2. **FRANCE:** the total transfer of traffic from road and air transport modes to EPATS would reach 4.6 million flights in 2020 with 8.400 aircraft (71% of piston aircraft, 23% of turboprop aircraft and 6% of jet aircraft). Estimations are performed on 302 French domestic connections.

In total, we estimate that in France around:

- 2.6 million flights will be performed with Piston aircraft at Flight level 250
- 2.0 million flights will be performed with Turboprop aircraft at Flight level 250
- 44 000 flights will be performed with Jet aircraft at Flight level 350

3. **POLAND:** the total transfer of traffic from road and air transport modes to EPATS would reach 4 million flights in 2020 with 7 000 aircraft (87% of Piston aircraft and 13% of turboprop aircraft). Estimations are performed on 70 Polish domestic connections.

In total, we estimate that in Poland at least:

- 3 million flights will be performed with Piston aircraft at Flight level 250
- 1 million flights will be performed with Turboprop aircraft at Flight level 250

Estimation of traffic and fleet obtained in the first reporting period are based on estimated operating costs for EPATS aircraft provided in WP1. However these costs could increase when for instance adding new materials in aircraft so as to be compliant with SESAR requirements or when adding new environmental taxes, etc. It is therefore particularly interesting in the second reporting period to test the sensitivity of the estimated potential EPATS demand to an increase in the unit operating cost of EPATS aircraft. We choose to consider two cases: an increase in the EPATS cost of 20% and an increase of 30%.

The analysis of impacts of increases in the EPATS cost on these estimations, shows the very high sensitivity of the EPATS traffic to cost increases reaching 30%. The impacts on the EPATS traffic would be particularly important in Poland since the number of flights would decrease by 95%, while this reduction is around 65% in Europe or France. Impacts on the fleet of personal aircraft needed to satisfy this potential demand would then be very strong since the EPATS fleet would decrease from 72% in Europe to 80% in France and 97% in Poland.

### Technical reports issued in the T2.2:

**Document Title: “Synthesis of the EPATS estimation method and results. Inpts for WP3 “**  
**Document Number: EP T2.2.1-SynthEstimMthd-Results-InptWP3-V1,**

**Document Title: “Potential transfer of passenger demand to personal aviation by 2020 and first estimation of EPATS fleets “.**

**Document Number: EP T2.2.2-EstimationReport-V1,**

*3.2.4. Task 2.3: Identification of needs of further works and research*

**Lead Contractor:** M3S

**Task Leader:** Isabelle LAPLACE

**Main objective of Task 2.3:** is to identify the needs of further works and research in EPATS.

**Progress achieved:**

**The Task 2.3 is “closed” in period 1 and “completed” in period 2**

These needs of further works concern two domains: European data on mobility and the method of estimation of EPATS traffic.

Needs of further works in mobility database:

Despite huge amount of gathered data and analysed it was not possible to depict complete image of interregional passenger traffic structure in the European Union.

A coherent and sustainable European Union transport system development and implementation in European regions, which is one of the main aim of EPATS project, requires undertaking common initiatives at the levels of the European Union, Member States and regional powers in order to create a common platform to plan, coordinate and monitor research concerning a European transport system, mobility, accessibility to public goods and future needs of personal transport forecasting.

In the light of the preceding, we recommend the following:

1. Creating a European Centre for Personal Interregional Transport as a common research platform of the EU Members and taking responsibility for preparation of fundamentals for political decisions taking regarding interregional personal transport development.
2. Planning and initiating research on EPATS interactive transport system aligned to research on 4-dimensional flight planning system. EPATS Interactive Transportation Management Centre (ITMC) initiative should be correlated to System Wide Information Management – Inter-Operability Centre (SWIM-IOP)
3. Planning and initiating a European interregional passenger transport modelling and forecasting using authoritative mobility database especially taking under consideration EPATS transport subsystem.
4. Including adequate research to the prepared ESPON 2013 programme in order to verify potential EPATS connections and forecasted volume of transport transferred from personal car transport.
5. Initiating close cooperation among European programmes responsible for personal air and surface transport in interconnected topics and including common goals. This is especially true for ESPON 2013, SESAR and EPATS programmes. It is coherent with SESAR and ESPON 2013 performers intentions, which the application for further research writes the following sentences: *“A user-oriented approach shall be adopted for the ESPON 2013 Programme. The ESPON 2013 Programme shall, through committed involvement and awareness raising, offer targeted analytical deliveries upon demand, responding to needs.”*

Needs of further works in EPATS traffic estimations:

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The use of specific data for national estimations (i.e. for the French and Polish estimations) representing the specific behaviour of national travellers helped to refine the estimations obtained at a European level. Hence, when comparing estimations on domestic connections (in France and Poland) obtained in the European and in the national estimations, we observed that the European estimations tended to underestimate the traffic and fleet levels compared to national estimations. Performing national estimations also help to identify that a potential share of the transferred traffic to EPATS would occur for leisure purpose while European estimations are not able to provide estimated leisure transferred traffic.

Hence, the rough estimations obtained using a European model could be significantly refined if we were to apply the methodology at national level (on domestic and inter-countries traffic) to all European countries.

Other needs of improvements would also concern the estimation methodology based on the generalised cost method by including qualitative factors.

An additional methodology improvement would also concern the way to identify the type of EPATS aircraft needed for each flight.

According to the above mentioned, it is proposed:

1. To refine the generalised cost formula when including qualitative factors so as to better characterize travellers behaviours.
2. To perform a deep analysis on the most accurate aircraft type according to the traffic volume and characteristics to refine the fleet estimation per aircraft type.
3. To make estimations of the potential EPATS traffic from each European country to obtain the total traffic at the whole European level.

### **Technical reports issued in the T2.3:**

**Document Title: “Identification of needs of further works and research“**

**Document Number: EPATS T2.3-V1,**

### 3.3. **WP3** Impact on European ATM, Airport Infrastructure and General Requirements

**Lead Contractor:** NLR

**WP3 Leader:** Frans van SCHAIK

**List of Tasks:**

- Task 3.1 – Integration in ATM systems (Eurocontrol)
- Task 3.2 – Future European airport parameters (NLR)
- Task 3.3 – Environmental and Safety aspects (NLR)

**Main Objectives of WP3:**

1. Identifies and describes the issues to be solved in order to be able to accommodate the expected EPATS traffic in the European ATM system within the boundaries of safety, capacity and environment.
2. Identify the issues to be solved that are related to the required airside infrastructure for the various types of airport to accommodate EPATS aircraft.
3. Identify environmental and, safety issues for EPATS.

**The main objectives in WP3 were:**

- Desk research on the potential consequences and constraints of the expected EPATS development (ATM, Airports, Environment and Safety)
- On going identification of needs of further works to be made in the domain of statistical data collection
- Production of the final deliverables for this task:
  - D3.1 - EPATS ATM General requirements & related issues to be solved
  - D3.2 - EPATS Airports General requirements, safety and environmental aspects & related issues to be solved
- Provision of these results to dissemination work package WP5

**Overview of progress achieved:**

All WP3 tasks were waiting the results of WP1 and WP2, like the expected EPATS traffic volumes and routes in 2020 from WP2 and the expected number of EPATS type of aircraft from WP4 (e.g. MTOW, max. number of passengers per aircraft, piston, turboprop, jet etc. In spite of a late start, the work could be completed in time producing two important deliverables: D3.1 and D3.2. The main environmental and safety results have been presented on the ILA 2008 in Berlin.

**The WP3 was “started” in period 1 and “completed” in period 2**

#### 3.3.1. *Task 3.1 – Integration in ATM system*

**Lead Contractor:** EEC

**T3.1 Leader:** Marc BROCHARD

**Main Objectives of task:**

The main objective of the Task 3.1 of the WP3 is to specify the main characteristics of the expected Air Traffic Management (ATM) system for accommodating the added European Personal Air Transportation System (EPATS) traffic. This task covers the following main issues:

- defining the major Air Traffic Control (ATC) / ATM parameters and its constraints in 2007,
- assessing the impact of small aircraft load on the ATM parameters,
- proposing perspectives/visions (or recommendations and proposals) to support EPATS traffic.

**Overview of progress achieved:**

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The task 3.1 started as planned. The work performed so far is mainly for preparing the assessment of the impact of small aircraft (SA) on the European ATM system.

In April 2008, EEC produced the **EPATS ATM Impact assessment (D3.1)** listing EPATS ATM General Requirements and related issues to be solved with a specific focus on SESAR issues. The assessment was performed following a structured approach:

1. Defining the ATC / ATM parameters and its constraints in 2007,
2. Assessing the Impact of Small Aircraft load on ATM parameters:
  - Differences in needs of SA and traditional traffic ATM requirements,
  - ATM constraints due to SA,
3. Proposing ATM perspectives and visions for supporting SA .

According to the WP2, EPATS would represent from 42 924 291 to 44 179 030 movements a year by 2020, and call for 99 000 and 89 000 aircraft, respectively for the Case A and Case B estimations. Using the EUROCONTROL and the European Commission findings, this investigation distinguished EPATS IFR and EPATS VFR flights.

The EPATS IFR flights are found to grow from less than 1 million (as in 2007) to 2 944 105 or 2 860 539, respectively for the Case A and Case B projections. Knowing the targets of SESAR, it is clear that these personal IFR flights fit in the envisioned ATM capacity. Results also indicate that the maximum EPATS IFR traffic that could be handled by SESAR in 2020 is 12.59 and 12.56 million flights respectively for the Case A and Case B estimations. This is about 3.5 more than the predicted personal IFR traffic. The found capacity gap appeared in the results of the COSAAC simulation, which showed that the impact of the EPATS IFR flights on the traditional movements is limited, and therefore the personal IFR movements are not leading to congestions at the airports or waypoints. On the other hand, EPATS IFR might generate further traffic complexities, if the aircraft performances/characteristics are different from the traditional flights, and therefore horizontal/veridical interactions or even wake vortex problems are faced.

On the other hand, the EPATS VFR segment is expected to grow from about 15 million flights a year (as in 2007) to 41.2 million for the Case A and 40 million with respect to the B prediction. The impact of the personal VFR flights on the ATM is an unknown problem, since these movements are not clearly addressed in the targets of the coming ATM. Nevertheless, this investigation showed that personal VFR movements flying at low altitude will meet the arrival / departure flows of the traditional traffic at the airport vicinities. Therefore, EPATS VFR will affect these regions, and call for advanced methods to cope with the two classes of traffic together (EPATS and traditional). If not feasible, the deviation or the separation of the flights will be needed.

With respect to the total EPATS traffic, this investigation showed the evidence for the fact that the geographical distribution of the envisioned EPATS flights is different from those of the rest of the airspace users. More particularly, the results indicate that generally personal movements keep off the most crowded regions of the traditional flights. However, EPATS will influence the rest of the airspace users in Italy; Greece; Portugal; Spain; the Southern regions of France, England; the South-Eastern areas of Poland and the North-Western locations of Germany. With respect to the impact of EPATS on the most preferred airports of the traditional flights, Athens, Rome, Madrid Barcelona, Warsaw, London are found to be the most influenced, while the most congested locations such as Frankfurt, Amsterdam or Paris are indicated to be less concerned. The cruising altitude distribution showed that 60 % of the personal movements take place in the airspace below FL 100, in which only 2 % of the traditional flights are present.

Major findings of the analysis suggested that future decisions concerning the airspace organization should take into consideration that (in 2020) about 40 million personal flights would rely on the see-and-avoid concept, from which a significant percentage would take place below FL 100. Beside, a particular focus on the terminal area management is also proposed to cope with the EPATS and the traditional flights at the airport vicinities. Finally, it is also suggested to address the business model of EPATS in order to clarify whether the flights will take place by scheduling or by request, and how these will fit in the SESAR business trajectory process.

*3.3.2. Task 3.2 Future European airports parameters*

**Lead Contractor:** NLR

**T3.2 Leader:** Frans van SCHAIK

**Main Objectives of task:**

Specify main characteristics of EPATS airports (general requirements) and identify the R&D issues to be solved that are related to the required airside infrastructure for the various types of airport to accommodate EPATS aircraft.

**Overview of progress achieved:**

NLR continued desk research for the EPATS airport infrastructure and operations. The Very Light Jet Integration Platform as organized by Eurocontrol served as valuable input to this task, providing more detailed information about market perspectives and the attitude of Eurocontrol towards the Very Light Jet development.

**Consequences for airports for the future**

EPATS aircraft and their assumed gradual increase to about 100.000 aircraft in 2020 can be accommodated by the existing 2000 regional airfields in Europe. A typical European airfield will see a typical increase from 25 or 50 aircraft to 100 or 125 aircraft. The big difference will be that EPATS aircraft are assumed to be used at least once or twice a day, while present day GA aircraft are probably flown just a few hours per week or month. The intensified use of small airfields will require willingness of the surrounding population to accept more noise and pollution. It will also require more ATC control and service. No extra runways are needed.

If more airfields and infrastructure shows to be needed, it can be developed in time and in phase with the EPATS evolution. The same applies to the airport facilities. Local economy should drive and have benefit from the evolution.

The infrastructure of airports in terms of parking, maintenance and passenger facilities should follow the gradual increase in personal flights and market mechanisms are supposed to fill in this need.

Some Extra Navigation and Communication investments could make regional airport more attractive for personal IFR flights. Think about installation of an ILS, MLS, Differential GPS, Remote Tower Operations and VHF radio connections. The development of the Navigation equipment on board of the EPATS aircraft will deliver better and safe avionics and procedures for IFR approach, landing and taxiing without the traditional Tower Control Services.

*3.3.3. Task 3.2 Environmental and safety aspects*

**Lead Contractor:** NLR

**T3.3 Leader:** Frans van SCHAIK

**Main Objectives of task:** Identify the environmental aspects (noise and pollution) and safety impact

**Overview of progress achieved:**

The most important environmental effects of EPATS were studied within the budgetary limits of the project. It gives also an indication of important subjects for further research. The discussion about the environment was divided into two subjects: noise and emissions.

Estimations were made on basis of the expected change in transport from car to Personal Aircraft: about 100.000 additional EPATS aircraft till 2020, resulting in about 93 extra movements per regional airport per working day and 24000 extra flights on average per European regional airfield per year.

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**Noise estimation**

Comparing different aircraft types is difficult because a lot of factors contribute to the noise production. For a good comparison all aircraft should have comparable weight (except for VLJ since these aircraft are designed to be lighter compared to other small jet aircraft), year of design (engines became quieter during the years), maximum range (the longer the range, the more fuel will be needed, which means that the weight of the aircraft increases) and number of passengers (to find the noise production per passenger).

The decision was made to base our estimations on public data for existing small aircraft close to what is expected to become EPATS aircraft. All noise data presented here are obtained from [M. McClintock, *The new light jets and their noise and air traffic implications*, September 22, 2006 <http://www.aviation-noise.org/events/2006Conf/Presentations/McClintock.pdf>, January 30, 2008]. Table 3-1 shows these noise data for several aircraft, furthermore the maximum take-off weight (MTOW) in kilograms, year of introduction (year), maximum number of passengers (pas), range in kilometres and aircraft type (P = piston, TP = turboprop, J = jet and VLJ = very light jet) are given. The noise values (LA) are given for take-off (TO) and approach (APP); the noise values are estimations, given in dB(A). The two final columns show the take-off and approach noise levels, corrected for the number of passengers.

**Table 3-1: Comparison of noise production of different aircraft types**

Aircraft + type	year	MTOW	pas	range	LA TO	LA APP	LA TO corr	LA APP corr
Cessna Citation Encore (J)	1998	7634	11	7634	58.3	83	54.9	79.6
Mitsubishi MU300 Diamond I (J)	1996	7394	7	2744	71.9	77.2	70.4	75.7
Cessna Citation 525 CJ (J)	1998	4853	5	2408	60.3	81.7	60.3	81.7
Piper PA-42 Cheyenne (TP)	1977	5125	6-9	3015	70.3	77.1	67.7	74.5
Beech Super King Air B200 (TP)	1981	5670	13	3251	68.8	77.8	64.7	73.7
Cessna 421C (P)	1976	3103	8	2756	61	74	59.0	72.0
Beech Bonanza A36 (P)	1970	1633	3-5	1291	67.8	64	67.8	64.0
Eclipse 500 (VLJ)	2007	2719	5	2408	54.9	72.8	54.9	72.8

New aircraft with considerable weight reduction and new engines result in a reduction of the noise production. As could be expected aircraft with single piston engine have lower approach noise level. It can be concluded that using VLJ instead of regular light jets is desirable in order to reduce the noise impact. Furthermore the use of single and twin piston engines and turboprops gives better or comparable noise characteristics during the approach, while the VLJ produces less noise during the take-off. It should also be noted that use of EPATS aircraft replaces equivalent transport by car and that it reduces as such the noise produced by cars. The design of noise abatement routes and silent take off and approach procedures will reduce the noise impact.

**Emissions**

In order to make a good comparison between different types of aircraft, information about the type of engines and emission indices (amount of emitted pollutant per kilogram fuel used) for the different pollutants is needed. However, obtaining all emission indices for a set of different aircraft was outside the scope of this study. For this reason only a comparison of the specific fuel consumption (SFC) for existing look alike EPATS aircraft was made. The amount of fuel used is directly linked to the amount of CO<sub>2</sub>, H<sub>2</sub>O and SO<sub>x</sub> emissions.

The SFC in table 3-2 is given in kilograms of fuel used per passenger kilometre (kg/pas.km). Due to a lack of data the SFC values were calculated by dividing the maximum fuel weight (MFW) in kilograms by the maximum range of the aircraft times the number of available passenger seats.

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**Table 3-2: Comparison SFC of different aircraft types**

Aircraft + type	year	MTOW	pas.	range	MFW	SFC
Cessna Citation Encore (J)	1998	7634	11	3313	2449	0.067
Mitsubishi MU300 Diamond I (J)	1996	7394	7	2744	2228	0.116
Cessna Citation 525 CJ (J)	1998	4853	5	2408	1461	0.121
Piper PA-42 Cheyenne (TP)	1977	5125	6-9	3015	1757	0.065
Beech Super King Air B200 (TP)	1981	5670	13	3251	1653	0.037
Cessna 421C (P)	1976	3103	8	2756	647	0.029
Beech Bonanza A36 (P)	1970	1633	3-5	1291	225	0.035
Eclipse 500 (VLJ)	2007	2719	5	2408	765	0.064
Piper PA-46 Mirage (TP)	2006	1967	6	2491	364.8	0.024
Beech Bonanza G36 (P)	2007	1656	4-5	1391	201	0.029

The table shows that modern turboprop aircraft are much more fuel efficient than VLJs. Since turboprop aircraft have a much lower cruise speed than VLJs, they are best suited for travelling over relatively short distances. Due to higher cruising speed VLJs are better suited for transport over longer distances than aircraft with piston engines.

EPATS was also compared with the fuel consumption of cars supposed to be replaced by EPATS. It showed that the car is most fuel efficient but only if all cars are fully loaded. The load factor has a large impact on the amount of fuel used per passenger kilometre. For this reason it is of great importance that the load factor of the aircraft in the EPATS concept is as high as possible.

Both the noise and the emission aspects of EPATS can be predicted better if more detailed and mature data become available for the EPATS aircraft of the future.

### Safety and EPATS

An overview was made of safety aspects of EPATS in the areas of: aircraft manufacturing and certification, flight operations, training and qualification, airport and air traffic control, safety programs and safety oversight. The assumption was made that JAR-23 Airworthiness will be enhanced to obtain the same safety level as JAR-25.

### Recommendations for further research and development include:

- Analyse to what extent the current regulations are appropriate for certification of new designs and new technologies, production techniques and materials within EPATS.
- Research into automation that supports safe single pilot operations, in particular flight envelope protection and further automation of flight in EPATS aircraft. In addition, further research is proposed into intuitive displays and the effect of cockpit design, automation and advanced avionics on pilot workload, decision-making etc.
- The applicability and appropriateness of the current regulations for pilot qualification and pilot training programs shall be evaluated.
- The safe integration of EPATS aircraft in the air transport system of today has to be studied in more detail to identify and assess the risks of EPATS in the airport and ATM domain. The focus should be on air-ground communication and the effect of single pilot operations on ATC-pilot interaction.
- The safety implications of workload of air traffic controllers in EPATS.
- The tailoring and application of commercial aviation safety programs to EPATS operators and outsourcing of safety programs shall be studied.
- The identification of solutions to improve general aviation data collection and analysis.
- To deal with the challenge of safety oversight in EPATS, research shall address inspector resource planning and risk-based oversight and inspection programs.
- It is still an open question whether the countries in the European Union will be able to train and supply enough EPATS pilots (200000 pilots during 20 years). It could be, however attractive for business people to fly their own aircraft in business models like buy-in of hours or shared ownership. This will have safety aspects, that have to be solved.

## 3.4. **WP4** Missions Specifications for EPATS Aircraft

**Lead Contractor:** IoA

**WP4 Leader:** Włodzimierz GNAROWSKI

### **List of Tasks:**

Task 4.1 – Mission requirements (IoA, PZL M, PZL Rz, RzUoT)

Task 4.2 - Operating costs analysis (IoA)

Task 4.3 - Fuel consumption and transportation energy effectiveness analysis (RzUoT)

Task 4.4 - Aircraft cockpit systems, (including cockpit HMI) (NLR)

### **Main Objectives of WP4:**

1. To set up missions requirements for EPATS aircraft as a result of population needs and to give support to aeronautical industries Stakeholders decisions concerning personal aircraft development in Europe.
2. Identification of issues to be resolve in order to fulfil EPATS aircraft missions.

### **Overview of progress achieved:**

With the expanding European Union and ever greater mobility in and between its member States, alternatives to long distance car trips and scheduled air transport need to be considered. Even with the emergence of high speed railways, these benefit only the large cities. With this in mind, general aviation can provide an alternative. Small aircraft providing affordable, personal air transport services will greatly improve accessibility and economical potential between central and remote areas. This will also alleviate ground traffic and relieve the already congested air traffic at large commercial hub airports by allowing operations from smaller non hub airports. People will be able to travel to and from destinations closer to their home and work in a more efficient way.

The report is the attempt to define the requirements for airplanes which can meet such challenges. In study were used results of work which was led in WP1 and WP4 EPATS program:

Task 1.1: “Aircraft Data Base”

Task 1.2: “Airports and Facilities Data Base”

Task 4.2: “Operating Cost Analysis”

Task 4.2.1: “EPATS Aircraft Production Costs”

Task 4.3: “Fuel consumption and transportation energy effectiveness analysis”

Task 4.4: “Aircraft cockpit systems & human machine interface requirements”.

The characteristics of EPATS airplanes taking into account the forecast results CESAR and SESAR programs and American forecast.

In order to define mission requirements for further EPATS family aircrafts, wide variety of activities were performed. They could be divided into 4 steps.

1. Creation of aircraft data base. It includes over 120 constructions of normal and commuter categories (up to 19 passengers and up to 19 000 lb=8550 kg maximum take-off weight). Three types of propulsion systems are represented: pistons, turbo-props and jets. Nearly 50 parameters per aircraft have been collected.

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2. The EPATS Aircraft Reference List has been created. It includes 15 constructions. The following criterion (with a few exceptions) have been taken under account for airplanes evaluation:

- Fulfilling forecasted mission for EPATS fleet
- Fulfilling requirements CS-23 with supplementary requirements
- Designed or modernized after year 2000
- Credible and confirmed specifications and performance
- Traditional Value index including airplane Price (TVI-P)

The preliminary calculation for one selected distance 926 km (500 nm) and one utilization level (600 block hours) have been performed. Mission data based on publications.

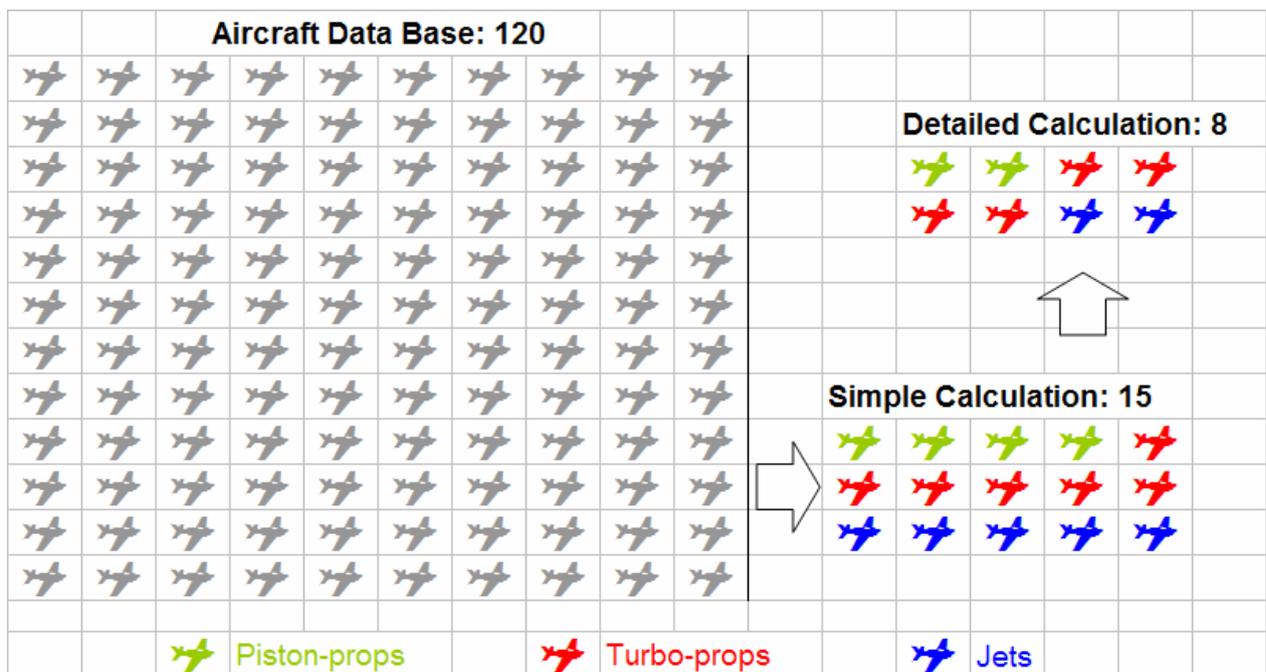
3. Detailed analyses for 8 most promising airplane. These are:

- Cirrus SR-22
- Piper Seneca V
- Epic Dynasty
- Pilatus PC-12
- Piaggio Avanti II
- BAE Jetstream 32
- Eclipse 500
- Grob SPn.

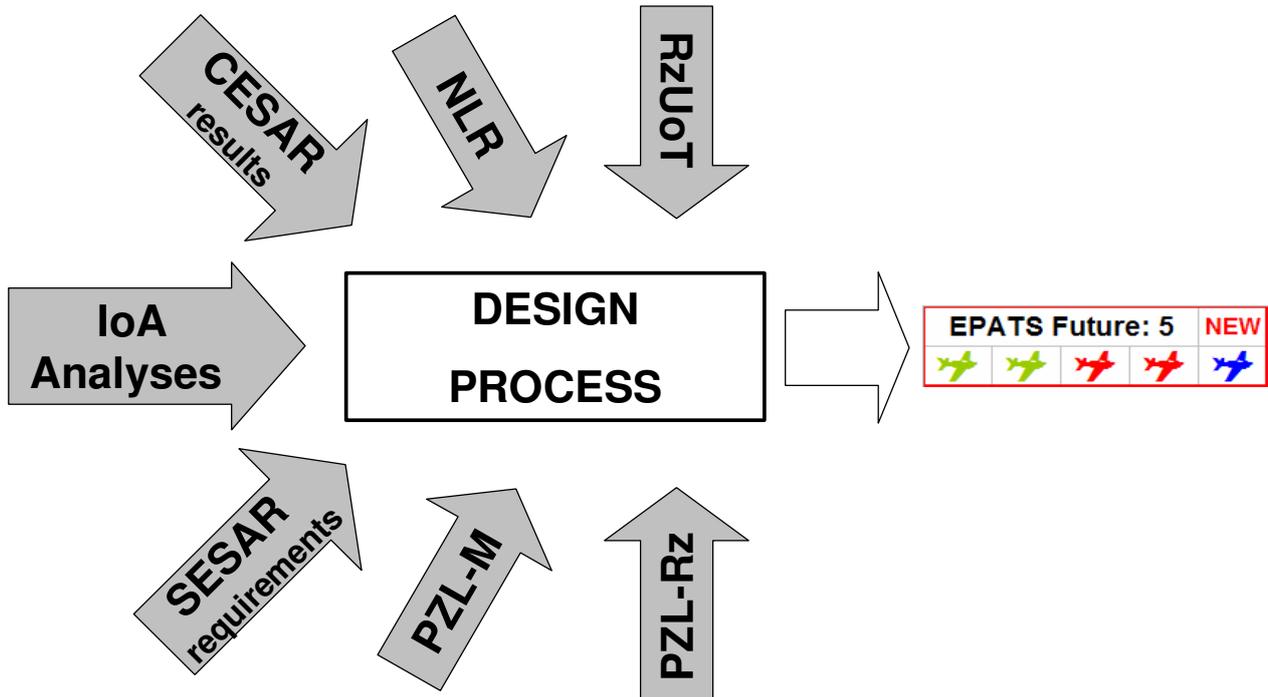
In this step for particular airplanes either aerodynamics and propulsion characteristics have been reconstructed. Also flight mechanics model was created. Such a way is flexible and full of potential, however it is also more time consuming. 4 distances, 3 flight levels per distance and annual utilization levels from 200 to 2000 block hours have been analyzed.

4. EPATS aircraft requirements. Using data obtained during previous steps and taking under account outer sources such as CESAR, SESAR (presented in NLR - Memorandum ASAS – 2007 – 066, Ref. [16] ), American forecasts, a requirements proposal has been created. In fact it is not a full conceptual design. That is because EPATS program is too small to manage such an effort.

An overview of mentioned activities is presented below.



**Reference aircraft selection and analyses.**



#### WP4 - Design process overview – a common effort.

The analyses shows that affordable personal transport is real and the most suitable for the mission are pistons and turbo props. However several actions must be taken to reach this goal:

1. Airplanes must be fitted to needs in terms of their
  - Size (range, comfort, speed)
  - Performance (airport accessibility, operating cost, fuel consumption)
  - Available airspace (flight performance)
2. Operating must be optimised (to reduce DOC):
  - High utilization intensity
  - Low Indirect Cost fraction
3. Technical and production improvements are needed
  - Lower design, production and operating costs (e.g. excepted CESAR results)
  - Avionics needed to fly into future airspace (SESAR requirements)

Further work if successful, requires closer cooperation with manufacturers, operators and other European programs(e.g. CESAR, SESAR). In general detailed data and feedback information are needed (current and future predictions):

- airplanes characteristics,
- engine characteristic,
- avionics
- materials
- production technology,
- avionics,
- business models,

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We identify several topics which might be the scope of future European programs. There should help to reach the EPATS goal: affordable, accessible, fuel efficient, environmental friendly, personal air transport.

- Diesel-pistons (high fuel efficiency)
- Modern propellers (efficient and silent)
- Geared turbofan: new propulsion system- intermediate between turbo-prop and turbo-fan (jet)
- Aerodynamics: new technologies and configurations:
- Avionics/ATM which combine safety and low prices; improve and/or eliminate flight holding patterns (flight straight lines between points).
- Research and development cost reduction program (CESAR)
- New materials (light, high strength, affordable)
- Manufacturing cost reduction – close cooperation with automotive industry.

The proposal of future activities (EPATS 2):

- Choice of rational structure of park of small transport aircrafts for future local, interregional mini-airline network of middle-west Europe
- EPATS aircraft requirements versus CESAR, SAFAR, CREATE, SOFIA, HAPATS project representatives
- Workshop EPATS – Users – FP projects (CESAR, SAFAR, CREATE, SOFIA, HAPATS)
- Agreed EPATS aircraft requirements with R&D Community to fully deploy of EPATS system in Europe.
- Definition of future improved PTS technologies in relation to ATM, Environment, Safety, Security, Cost

**The WP4 was “started” in period 1 and “completed” in period 2**

**Deliverable Reports issued in the WP4:**

**Document Title: “D4.1 EPATS aircraft missions specification”**

**Document Number: EP D4.1-MissionSpec-V2.7**

**Status of Deliverable Report: “started” in period 1 and “completed” in period 2**

**Document Title: “D4.2 Operating Cost Analysis”**

**Document Number: EP D4.2-OperCostAnal-V2.4**

**Status of Deliverable Report: “closed” in period 1 and “completed” in period 2**

**Document Title: “D4.3 – Fuel Consumption and transportation energy effectiveness analysis”**

**Document Number: EP D4 3-SFC-V0**

**Status of Deliverable Report: “closed” in period 1 and “completed” in period 2**

**Tasks progress achieved:**

**Task 4.1 was “started” in period 1 and “completed” in period 2**

Current airplanes mission analysis was done:

- first step: 15 aircraft were selected as an „Aircraft Reference List”, simplified calculations,
- second step: 7 aircraft from „Aircraft Reference List”, detailed analyses.

For each airplanes were elaborated the following data: technical, economic, mission data and evaluation indexes. The results are presented in Report „Operating Cost Analysis” – Chapter 6.3.1: „Missions Results Summary”.

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Participants done in overview period:

T 4.1.1 – Input data for WP2 & WP3 was done by IoA,

T 4.1.2 – Report “Small aircraft propulsion development” was done by PZL Rz,

T 4.1.3 - Report “Small aircraft propulsion manufacturers” was done by PZL Rz.

Reports include a review of current manufacturers of turbo, piston and jet engines, and notices an evolution trends of fuel consumption and environment pollution.

### **Technical reports issued in the T4.1:**

**Document Title: “Reference Vehicle and EPATS Aircraft Mission Characteristics to be used for Demand 2020 Calculation; Input Data for WP2 & WP3”**

**Document Number: EP T4.1.1-InputData WP2, WP3-V0**

**Document Title: “Small Aircraft Propulsion Development”**

**Document Number: EP T4.1.2-SmAircraftPropuls-V0**

**Document Title: “Small Aircraft Propulsion Manufacturers”**

**Document Number: EP T4.1.3-SmPropulsManuf-V0**

### **Task 4.2 was “started” in period 1 and “completed” in period 2**

Operating costs analysis was done by IoA and PZL M. It includes current airplanes DOC analysis, calculations:

- for 15 aircraft simplified method and calculations
- for 7 aircraft from „Aircraft Reference List” detailed method.

Analysis cost production “EPATS Aircraft Production Costs” was done by PZL M and was used to set up price of airplanes, includes calculation of prices for all consider types of airplanes.

Summary results are presented in Deliverable Report “D4.2 Operating Cost Analysis”

Document Number: EP D4.2-OperCostAnal-V2.4

### **Technical report issued in the T4.2:**

**Document Title: “EPATS Aircraft Production Costs”**

**Document Number: EP T4.2.1-AcftProdCost-V0**

### **Task 4.3 was “started” in period 1 and “completed” in period 2**

Fuel consumption and transportation energy effectiveness analysis was done by RzUoT.

Analysis was done for 9 airplanes, 3 pistons, 3 turboprops and 3 jets. Result was presented in Deliverable Report “D4.3 – Fuel Consumption and transportation energy effectiveness analysis”

Document Number: EP D4 3-SFC-V0

### **Task 4.4 was “started” in period 1 and “completed” in period 2**

Aircraft cockpit systems, (including cockpit HMI). First of this task was done by NLR. Results are presented in NLR-Memorandum ASAS-2007-066 “European Personal Air Transportation System (EPATS) study Cockpit avionics & human machine interface requirements”. Report contains: project overview in avionics area, aircraft definitions, concept of operations, reference aircraft avionics, avionics requirements for each type of airplane.

EPATS aircraft avionics reference list 15 airplanes was done.

### **3.5. WP5 EPATS Recommendations for Framework Program and Roadmap**

**Lead Contractor:** IoA

**Participants:** IoA, NLR, EEC, BUTE, Windrose, AD Cuenta

**WP5 Leader:** Alfred BARON

**List of Tasks:**

- Task 5.1 – Proposals for Framework Program R&D topics (all Participants)
- Task 5.2 – EPATS Roadmap (all Participants)
- Task 5.3 – Workshops and dissemination (all Participants)

**Main Objectives of WP5 in the project period are:**

- To provide recommendations about EPATS research needs for European Research Areas and proposals for Framework Program R&D topics
- To prepare a roadmap for the feasibility of EPATS implementation.
- To prepare and attend dissemination workshops and conferences.

**Overview of progress achieved:**

The WP5 was “started” in period 1 and “completed” in period 2

**Deliverable Reports issued in the WP5:**

**Document Title: “D5.1 Proposals for Framework Program R&D Topics”**  
**Document Number: EP D5.1-FPR&D Topics-V2**  
**Status of Deliverable Report: “started” and “completed” in period 2**

**Document Title: “D5.2 EPATS Roadmap”**  
**Document Number: EP D5.2-EPATS\_Roadmap-V0**  
**Status of Deliverable Report: “started” in period 1 and “completed” in period 2**

**Document Title: “D5.3 Joint Meeting with SESAR”**  
**Document Number: EP D5.3-JntMtngSESAR-V0**  
**Status of Deliverable Report: “completed” in period 1**

**Document Title: “D5.4 Joint Meeting with CESAR”**  
**Document Number: EP D5.4-JntMtngCESAR-V0**  
**Status of Deliverable Report: “completed” in period 1**

**Document Title: “D5.5 Second Meeting with SESAR”**  
**Document Number: EP D5.5-MtngSESAR-V0**  
**Status of Deliverable Report: “started” and “completed” in period 2**

**Document Title: “D5.6 ILA Air Show Conference”**  
**Document Number: EP D5.6-ILA Conference-V1**  
**Status of Deliverable Report: “started” and “completed” in period 2**

**Document Title: “D5.7 EPATS Presentation CD-Rom”**  
**Document Number: EP D5.7-CD-V0**

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### Status of Deliverable Report: “started” and “completed” in period 2

#### Task 5.1 (IoA + All Participants) - “started” in period 1 and “completed” in period 2

EPATS concept implementation program based on conclusions included in separate Work Packages and system requirements feasibility analysis . Each of Work Packages contains conclusions and recommendations (in justified cases) concerning the needs of further works and research. In spite of not all Work Packages are completed, the work, which has been doing up to the present indicate main fields of future Research & Development works and allow to set preliminarily organizational and legal activities needed for EPATS implementation.

The main Research & Development areas are:

1. Surveys on interregional passenger traffic.
2. Development of aircrafts.
3. Small airports modernization.
4. CNS/ATM systems progress – SESAR program.
5. Interactive EPATS project
6. General Aviation statistical surveys and data base
7. Adaptation of training system to EPATS – CESAR requirements
8. Legal and administrative regulations – creating of data bases

Description of R & D areas will be included in Deliverable Report: **“D5.1 Proposals for Framework Program R&D Topics” Document Number: EP D5.1-FPR&D Topics-V2**

Draft of the document had sent to EPATS Participants for comments and in order to complete by Work Packages and Task Managers according to Description of Work. All suggestions has rectified in final version of this document (V2).

#### TASK 5.2 EPATS Roadmap. (IoA + All Participants) - “started” in period 1 and “completed” in period 2

Roadmap draft was presented in document titled: „EPATS Roadmap Vision”, which was sent to all Participants and to EC Project Officer in March 2007. As result of recommended notices and still conducted research final new document was issued. Document Title: “D5.2 EPATS Roadmap”  
Document Number: EP D5.2-EPATS\_Roadmap-V0.

#### TASK 5.3 Workshops and dissemination (IoA + All Participants) - “started” in period 1 and “completed” in period 2

It was organized 7 workshops, and 4 Project Management Committee Meetings. It was Performing active information about EPATS (NASA, EGAMA, SRG, and others). Project results of dissemination see chapter 4 PLAN FOR USING AND DISSEMINATION THE KNOWLEDGE.

Following Deliverable Reports was issued: “D5.3 Joint Meeting with SESAR”, “D5.4 Joint Meeting with CESAR”, “D5.5 Second Meeting with SESAR”, “D5.6 ILA Air Show Conference”, “D5.7 EPATS Presentation CD-Rom”.

## **3.6. WP6 Project Management**

**Lead Contractor:** IoA

**WP6 Leader:** Krzysztof PIWEK

**Main Objectives of WP6:**

- a. Co-ordination of project activities
- b. Support delivery of outputs
- c. Support dissemination of results
- d. Hold meetings and workshops

**List of Tasks:**

- T6.1 – Activities to reach kick-off project
- T6.2 – Activities to reach midterm review
- T6.3 – Activities to project finalizing and results dissemination

**Overview of progress achieved:**

**In the Period 1 (January 1 – December 31, 2007)** following progress achieved:

- Kick-off Meeting preparation, carry out and worked out reports (IoA, Warsaw Feb 1-2, 07)
- Project Management Committee established and carry out two meetings (IoA, Warsaw Feb 2, 07 and NLR, Amsterdam Sept 10, 07),
- Project Management Plan and Handbook issued,
- Important Workshop organizing and take part:
  - o EPATS Expert Workshop (EUROCONTROL Bretigny Apr 19, 07),
  - o Very Light Jet Workshop (EUROCONTROL Brussels May 4, 07),
  - o Joint meeting with CESAR (NLR-CESAR, Amsterdam Sept 11, 07),
  - o Joint meeting with SESAR (DG TREN-SESAR, Brussels Nov 14, 07),
- Performing active information about EPATS (NASA, EGAMA, SRG, and others) – using document “EPATS Roadmap Vision” and others,
- Validating work progress for each of the partners in each WP and task, examination the raised problems, the proposed solutions and their coherence with the overall project budget and deadlines,
- Dividing and supply first bath funds to the Contractors (75% obtained from EC funds – 139 975 Euro),
- Interface with EC Project Officer Jean-Luc Marchand (sending docs to evaluation, keeping informed about EPATS progress),
- Preparing Period 1 Activity and Management Report

**In the Period 2 (January 1 – June 30, 2008)** following progress achieved:

- EPATS Project Management Committee Meeting No3 (23-24 January 2008, IoA Warsaw)
- EPATS Project Management Committee Meeting No4 (24-25 April 2008, IoA Warsaw)
- Important Workshops and Meetings organizing and take part:
  - o EPATS Conference “Personal Air Transportation in Europe and opportunity for a revival of the small aircraft manufacturing” (28 May 2008, ILA Berlin)
  - o EREA Members Presentations “EPATS and its perspective” (29 May 2008, ILA Berlin)
  - o SESAR-EPATS Synergy - Meeting with SESAR JU (24 June 2008, Brussels)

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- Performing active information about EPATS (NASA, EGAMA, SRG, and others) – using document “EPATS Roadmap Vision” and others,
- Validating work progress for each of the partners in each WP and task, examination the raised problems, the proposed solutions and their coherence with the overall project budget and deadlines,
- Run EPATS web site ( <http://epats.eu> )
- Dividing and supply second bath funds to the Contractors : 85 982.16 Euro
- Interface with EC Project Officer Jean-Luc MARCHAND, Remy DENOS, and Stephanie STOLTZ-DOUCHET (sending docs to evaluation, keeping informed about EPATS progress),
- Preparing Period 2 and Final Activity and Management Report

### **Deliverables Reports issued in the WP6:**

**Document Title: “D6.1.1 EPATS Kick-Off Meeting Report”**

**Document Number: EPATS D6.1.1-KoM Report-V0**

**Status of Deliverable Report: “started” and “completed” in Period 1**

**Document Title: “D6.1.2-EPATS Activity Report – Period 1”**

**Document Number: EP D6.1.2-ActvRprt1-V2**

**Status of Deliverable Report: “started” in Period 1 and “completed” in Period 2**

**Document Title: “D6.1.3-EPATS Activity Report – Period 2 and Final”**

**Document Number: EP D6.1.2-ActvRprt2&F-V0**

**Status of Deliverable Report: “started” and “closed” in Period 2**

**Document Title: “D6. 2-Project Management Plan & Handbook”**

**Document Number: EPATS D6.2-MngmntPlan-V0**

**Status of Deliverable Report: “started” and “completed” in Period 1**

**Document Title: “D6.3 EPATS website, and flimsy”**

**Document Number: EP D6.3-www-V0**

**Status of Deliverable Report: “started” and “completed” in Period 2**

**Document Title: “D6.4.1-EPATS Management Report – Period 1”**

**Document Number: EP-D6.4.1-MngmRprt1-V0**

**Status of Deliverable Report: “started” in Period 1 and “completed” in Period 2**

**Document Title: “D6.4.2-EPATS Management Report – Period 2 and Final”**

**Document Number: EP-D6.4.2-MngmRprt2&F-V0**

**Status of Deliverable Report: “started” and “closed” in Period 2**

**Contractors Project Status Acceptance.** Contractors had accepted status of project realization; it was noted that contacts with Windrose is very limited; Windrose hadn't supply to Coordinator any reports from Period 1 and Period 2.

## **4. PLAN FOR USING AND DISSEMINATION THE KNOWLEDGE**

### **Project visibility:**

The EPATS project was presented at Eurocontrol, at the CESAR project meeting, at the SESAR symposium, in a meeting with the SESAR JU as well as at the European Commission.

At the Eurocontrol and SESAR meetings in 2007 it became clear that Eurocontrol is still thinking in terms of business aviation, not in terms of large scale GA operations including air taxi operations. Initial EPATS estimates are for 90.000 additional small aircraft generating 43 million flight movements to serve the European market. The focus of Eurocontrol up to now is on the 6.5 million flight movements by big airliners and the limited number of business jets in Europe.

The main concern at Eurocontrol seems to be the introduction of VLJ's, that fly at the same altitude as the big airliners but at lower speeds thereby blocking capacity of the European airspace. It became clear that Eurocontrol has not yet incorporated any plans for large scale GA operations in Europe. These aircraft may fly at lower altitudes than the current generation of airliners. However with the introduction of new airliners that may be powered by propfans and fly at lower altitudes a potential conflict with GA aircraft may occur. Also there will be a tendency to use point to point connections in commercial aviation to lessen the effect of the introduction of the ETS (Emission trading system). This could create a potential conflict with GA in terms of airport approach and departure capacity.

**The first SESAR meeting took place in Brussels in November 14, 2007** at SESAR consortium invitation to „2<sup>nd</sup> ATM R&D Projects Coordination and Networking Meeting”. In this meeting representatives of all European programs related to SESAR project implementation took part. On EPATS side in meeting were participated Krzysztof Piwek and Alfred Baron.

The EPATS project concept and relation with SESAR program was presented. SESAR was recommended to take into account of air traffic generated by development of small aircraft market. EPATS showed the potential forecast of the EPATS development. The Meeting report was included in “D5.3 Joint meeting with SESAR”. The report contains comments on documents presented at the SESAR meeting and a proposal of cooperation in the EPATS project.

**A second meeting with the SESAR JU was organized on 24 June 2008** in which the final results of the EPATS project were highlighted.

At the meetings it became clear that SESAR has not yet agreed on a refined operational concept for future ATM. EPATS recommended to take the development of the personal air transport system into account in future refinements of the SESAR concept. SESAR JU advocated a close relationship with AOPA. See Deliverable Report “D5.5 Second Meeting with SESAR”

**CESAR and EPATS consortiums meeting took place in Amsterdam in 11 October 2007.** During the meeting concepts and goals of both project was presented. EPATS Coordinator transmit to CESAR Coordinator document titled: „Small Aircraft Requirements & Potential Demand. Methodology & Assumption. Synergy Need”,

The CESAR EU-project is investigating short term solutions for advanced commuter airplanes. The time horizon of EPATS may be a bit further out. During the joint workshop, CESAR was very interested in the market analysis done in EPATS. Relevant information was provided to CESAR.

It became clear during the project that Europe has not yet discovered the potential of small personal air transport. Therefore the topic was also raised at the workshops in the frame of the Out of the Box project that was funded by the European Commission. This led to a separate topic in the second call for aeronautics in the EU 7<sup>th</sup> Framework program. See Deliverable Report “D5.4 Joint Meeting with CESAR”

The EPATS consequences were also provided to the ACARE strategic Review Group that has recommended to give personal air transport more visibility in the SRA3

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### **Project dissemination:**

During the ILA in Berlin, the results of the EPATS project were presented. The methodologies to estimate modal shift, the results of the analysis for both Poland and France in terms of passengers and airplanes needed and the characteristics of future EPATS aircraft were shown. A conference CD-Rom is available to serve the European (aviation) press. See Deliverable Report “D5.6 ILA Air Show Conference” and “D5.7 EPATS Presentation CD-Rom”.

The workshop resulted in one negative article in Der Spiegel, suggesting that investments in small airports were not economical and EPATSs would create a substantial environmental burden. The comments were made by a German green action group. Apparently Der Spiegel did not understand that EPATS would substitute car travel for air travel. Car travel is much more harmful for the environment than a system of air taxis where people share the same flight. EPATS would still represent a small fraction of the total European travel. And it is not realistic to expect that fast trains will be available all over Europe in view of the very high cost of the ground infrastructure (some 40 Million € per KM).

The final workshop at the end of the project will address the project results as well as the recommendations related to institutional improvements (databases on aircraft, movements and safety records at European level as well as the databases on European airports). The final workshop will focus on the EU Commission interests.

As a follow up of the EPATS project a new project has been proposed to the EU Commission as a CSA in the second call of FP 7. The new project will elaborate on and recommend new technologies to be developed for EPATS types of aircraft. These could be incorporated in the 3<sup>rd</sup> call for proposals of the aeronautics program in FP 7 that is planned in 2010. The scope of the study is to investigate the technical, operational, economic and regulatory issues relevant to the development of an interactive air transportation system which exploits existing and potential news aircraft, airports, ATM and new information technologies in optimum way from the standpoint of seamless capacity and effectiveness of the system as well as providing best choice to passengers, while respecting environmental constraints and safety.

It is also expected that the EPATS project results will be taken into account by the new Group of Personalities that will be established in 2009 and will issue new long term goals for the European civil aviation sector in 2010. This will be the stepping stone for the new Strategic Research Agenda of ACARE which is planned for publication in 2012.

### **Exploitation:**

It is expected that the EPATS results will encourage both new business models in Europe and new products.

The new business models that may emerge from EPATS could be focused on a wide spread European air taxi business with a new operational concept. Already new businesses are being established like the new company that bought 120 Eclipse aircraft to start air taxi operations in Turkey. That company will built these aircraft in Russia.

These new business models are also mentioned in the Addendum to the SRA2 of ACARE which was prepared by the ACARE strategy group. One possible model is to operate air taxi's in the same way as road taxi's. Air taxi operations could be monitored via central or regional centers that could act as brokers for the operators, as is already a practice with business jet operations.

It is expected that the EPATS report will stimulate the manufacturing industry in Europe to develop new generations of GA aircraft that will satisfy the needs identified in the EPATS report. The technologies for these aircraft could be acquired via participation in the EU Framework program. Novel configurations of GA aircraft may be developed that can compete with the next generation of GA aircraft in the US. There is a potential for a large market of GA aircraft that could be filled by European products.

***Document Change Log:***

Version	Author /Organisation	Date of Release	Description of the release	Modifications (sections affected and relevant information)
0a	K.Piwek/IoA	11 VIII 08	EPATS Activity Report – Period 2	Initial proposal
1a	K.Piwek/IoA	08 IX 08	To Consortium analysis	Up grade
1b	K.Piwek/IoA	30 IX 08	After Consortium analysis	Up grade
1	K.Piwek/IoA	27 XI 08	After audits	Up grade
2	K.Piwek/IoA	22 VI 10	Modification of the dissemination level (CO → PU)	Up grade

***Document Distribution List:***

Number	Company	Company's short name	Company's Country	Name of the Company's Project Manager	Marking
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