



Integrated Technology Demonstrator for Small Aircraft Transport Mode in the framework of CS 2 Green Regional Aircraft

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CRUCIAL TRANSPORT GOALS IN FP 2050

Meeting Societal and Market Needs

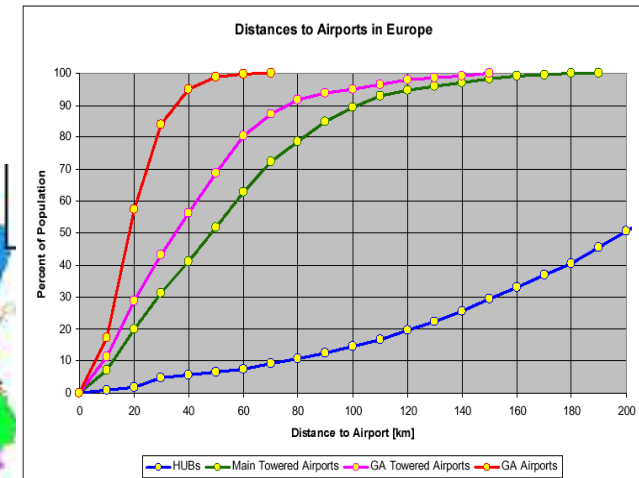
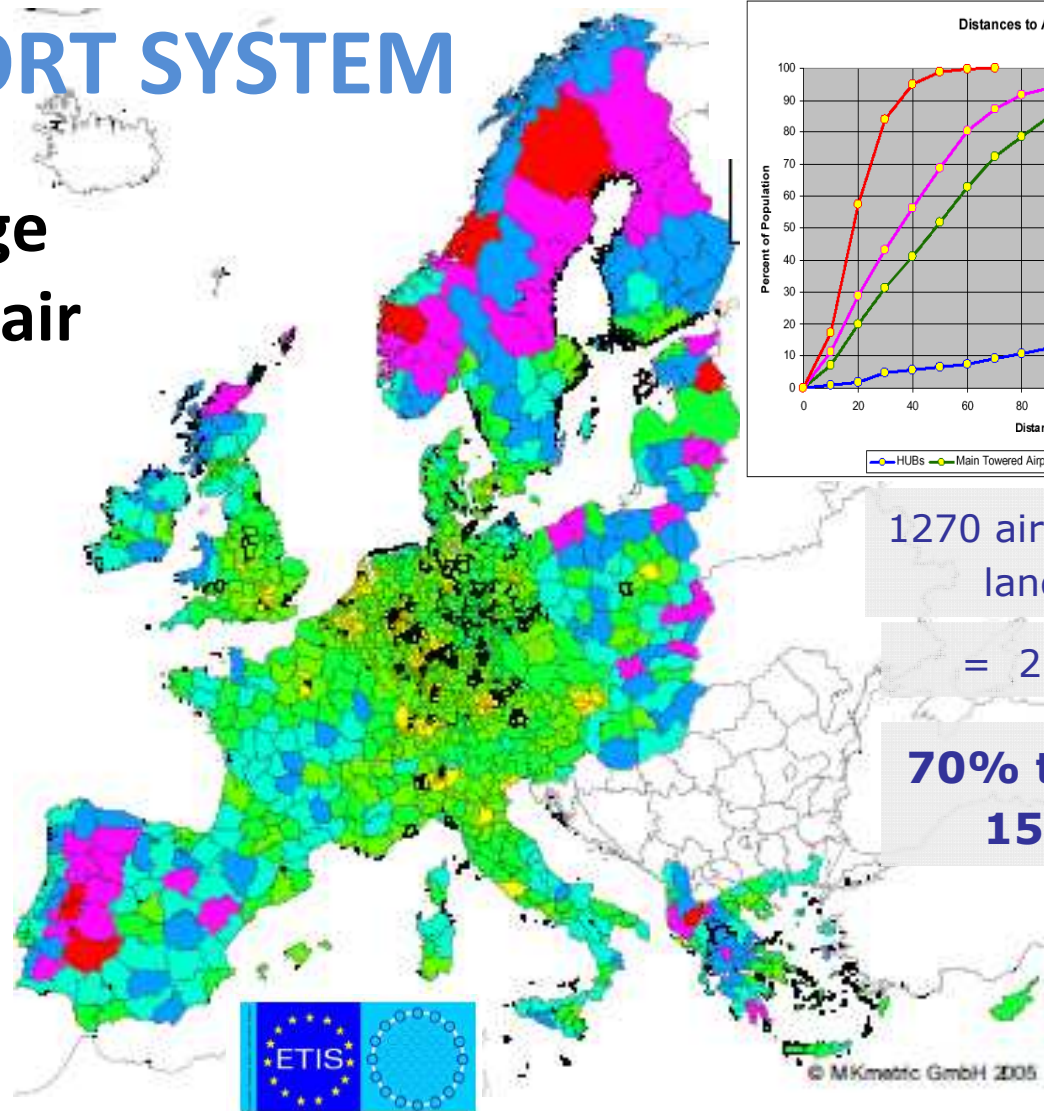
- European citizens are able to make **informed mobility choices**
- **90% of travellers within Europe are able to complete their journey, door-to-door within 4 hours.**
- Flights arrive **within 1 minute** of the planned arrival time
- Air traffic management system is capable of handling **25 million flights** a year in Europe
- A coherent **ground infrastructure** is developed



90% D2D WITHIN 4 HOURS IN 2050 = EUROPEAN PERSONALIZED AIR TRANSPORT SYSTEM



What is average travel time by air transport for regions?

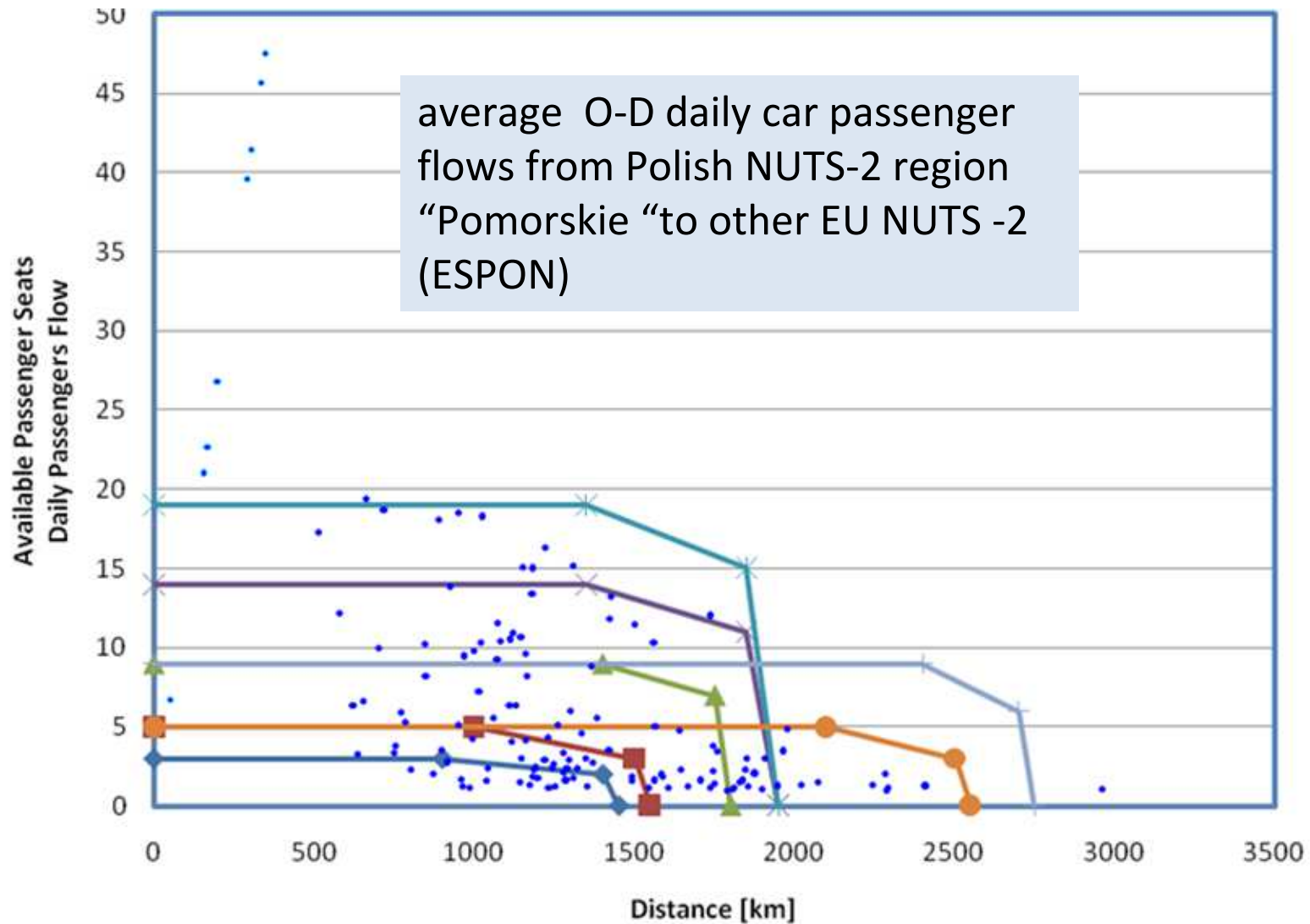


1270 airports and 1300 landing fields

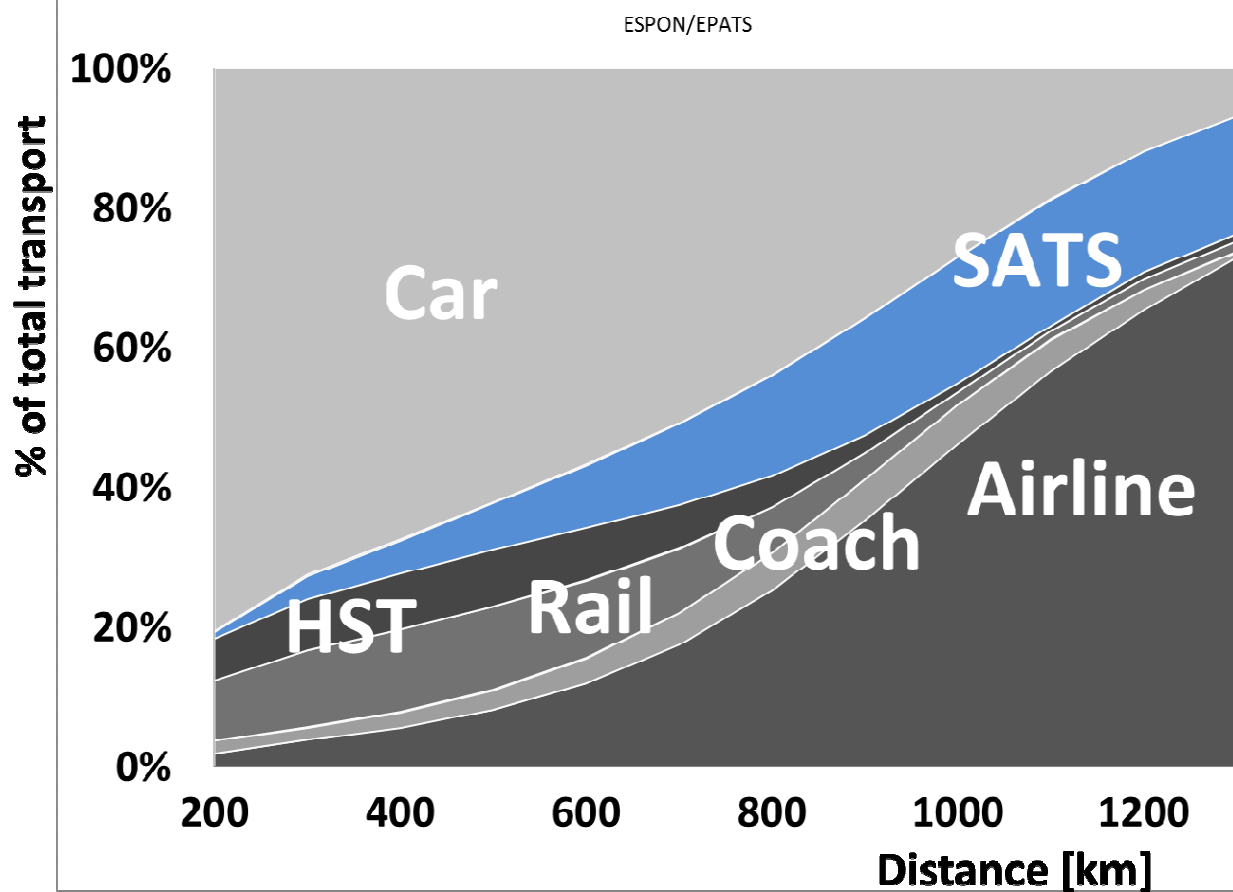
= 2570 airfields

70% traffic = top 15 airports

MOBILITY → AIRCRAFT CAPACITY



Modal split of trips in Europe. 2020



MAIN FINDING
SHORT HAUL NICHE

MAIN IDEA
To shift part of long distance trips from **cars to small aircrafts**

What is the Small Aircraft Transport Mode?

<http://epats.eu>

<http://sat-rdmp.eu>

It is a segment of high-speed transport market,
that serves local and regional low traffic connections

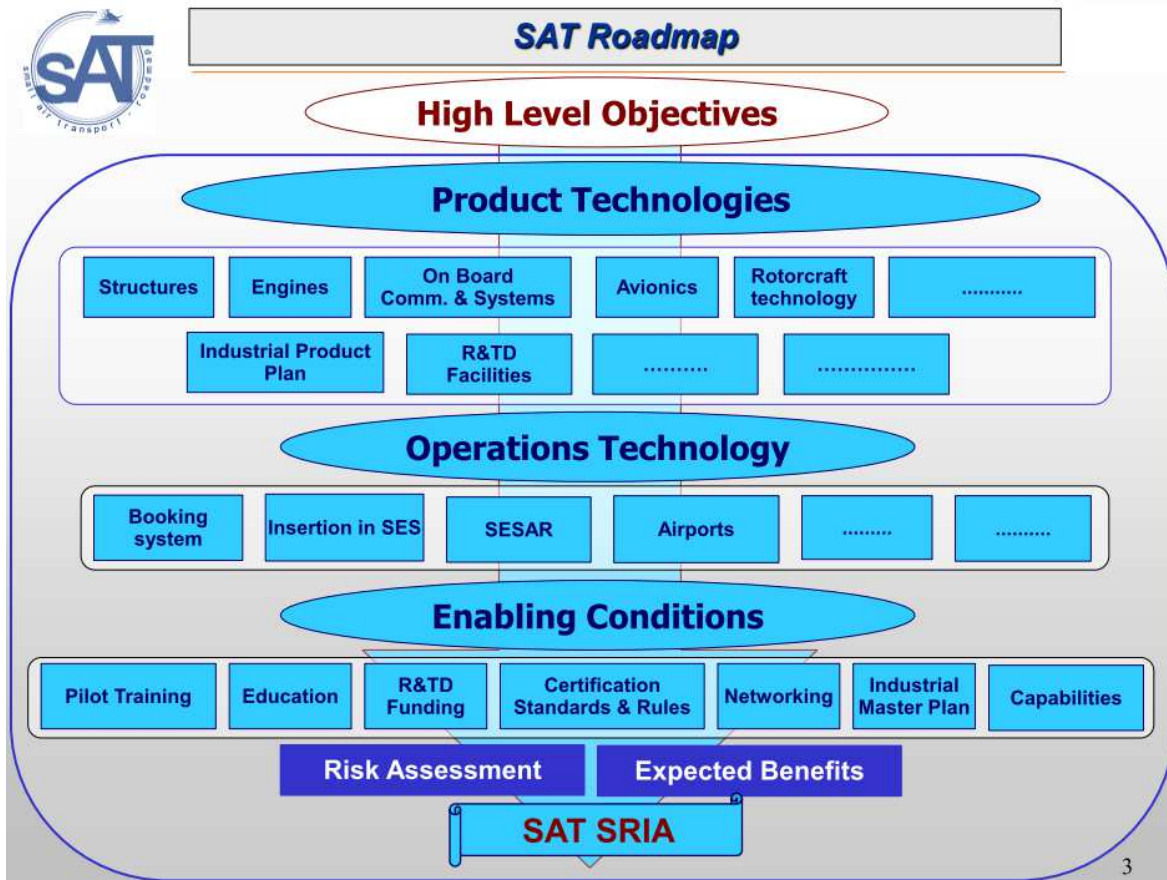
Aircraft - small 4 to 19 seats, that are low DOC, green, safe, and secure

Infrastructure on the ground and in the air - Regional Airports + ATM/ATC services
integrated in SESAR

Net – Centric Management & Acquisition – ICT based logistic and
management system for SATS, integrated within the SESAR's System Wide
Information Management (SWIM)



COMMON VISION & ROADMAP:



		15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
	exploratory and basic research																						
	technology integration																						
	technology demonstration																						
	year																						
	Topic																						
	RTD issue																						
Configurations	standard aircraft configurations																						
	Novel configurations like BWB																						
	QSTOL																						
	QVTOL																						
	container aircraft																						
	formation flight/ morphing																						
Structures	folding rotor aircraft																						
	Alternative lifting configurations																						
	metallic structures																						
	composite structures																						
	hybrid structures																						
	Composite repair																						
	advanced coatings																						
	new advanced coatings																						
	fully recycling																						
	advanced manufacturing/ robotic composite repair																						
Engines	Follow on Level 2 ESPOSA																						
	novel electric engine																						
	superconductivity																						
	endurance testing bio fuels																						
	Solar power																						
	Hydrogen fuel cells alternative power sources																						
Aerodynamics	High lift devices																						
	gust alleviation																						
	novel propeller design																						
Equipment	low cost all weather operations																						
	cabin equipment for small aircraft																						
	advanced cockpit																						
	autonomous flight/ ASAS																						
	remote control																						
MRO	integration VFR/IFR																						
	self healing/ reconfiguration																						
Certification	HUMS for SATS																						
	Fully modelled certification																						
Airspace	airspace reorganisation																						
	low cost SESAR																						
	SWIM connection																						
	flight planning																						
Energy storage	new batteries																						
	low cost investment																						
Airport equipment	virtual tower																						
	virtual tower																						
Training	PC based training																						
	Virtual reality training																						
Crashworthiness	structures																						
	bird strike prevention																						
IT support systems	booking system																						
	broker system for air taxi																						
	multimodal travel system																						
Research and education																							
Networking																							

TECHNOLOGIES TO BE INTEGRATED IN DEMONSTRATOR:

examples:

- **Efficient power plant** in the range of 250 -1000 hp and low noise efficient propeller + biofuels (follow-up CESAR/ESPOSA project) ,
- **FbW** for small aircraft with EMA (f-up SAFAR project and Actuation 2015),
- **low cost** out-of autoclave **composite airframe** (f-up Clean Sky 1 and CESAR projects),
- Advanced, low cost, low weight and small volume **GA avionics compatible with SESAR**, (f-up SAFAR, ACROSS),
- high voltage power electric generator for **more electric aircraft** systems (f-up CS 1),
- Innovative **anti-ice** system (electro mechanical expulsive f-up Clean Sky1),
- Landing gear intelligent absorbers (f-up Adland),
- Reduced cabin noise for improved **passenger comfort**,
- Improved **low speed performance** with innovative flap system (f-up Helix),
- Active load alleviation for better **ride quality**,
- operation by a **single pilot** today or remotely located pilot in future (f-up SOFIA, PPlane),
- net-centric and automated fleet and transport service management (f-up EPATS, SAT, PPlane),
- IT support **multimodal travel system** (f-up EPATS, SAT, PPlane).

SOLUTIONS:

■ L3 „Family of Modular and Green, 4-19 seat aircraft - flying demonstrator”

Technologies to be integrated in Demonstrator : examples shown on previous slide

■ Supporting projects:

■ „Advanced, low cost, low weight and small volume avionics compatible with SESAR”,

■ „ IT net-centric and automated fleet and transport service management simulated in virtual multimodal travel system” ,

■ „Methods and means to assure reliable and safe flight operations during defined weather conditions and perform landings at „virtual tower” airfields”

■ tbd

Modular means a sets of common modules (components, design solutions, systems, subsystems, procedures, equipment etc.) that are shared among an aircraft family;

Green means – low energy consumption and improved environmental impact compared with the previously used mode of transport (mainly car).

EP RESOLUTIONS:

■ **An Agenda for Sustainable Future in General and Business Aviation – Feb 2009**

- “general and business aviation complements regular air transport performed by commercial airlines”
- „Current regulations govern the operation of highly complex commercial aircraft place a disproportionate burden on operators of small aircraft. Therefore , one-size-fits-all regulatory approaches to different aviation sectors have proven inappropriate!”

■ **On the future of regional airports and air services in the EU – May 2012**

- „whereas the connectivity offered by aviation to citizens in EU regions, and in particular in inaccessible regions and islands, is extremely important and helps ensure the economic viability of such areas”;
- „Takes the view that regional airports, should be considered eligible to apply for financing under EU funds, recommends that the Commission take into consideration the opportunities offered by regional airports as part of the European central transport network”;



BASED ON PROJECTS AND PARTNERS:

