



„Technology Roadmap for Small Aircraft Transport Mode” Workshop,
Regione Campania, Brussels, 20 July 2012

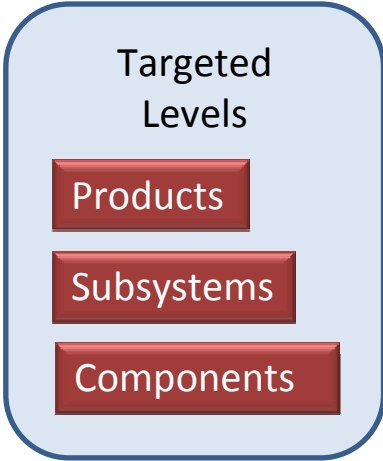
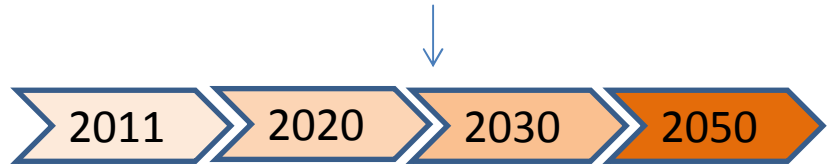
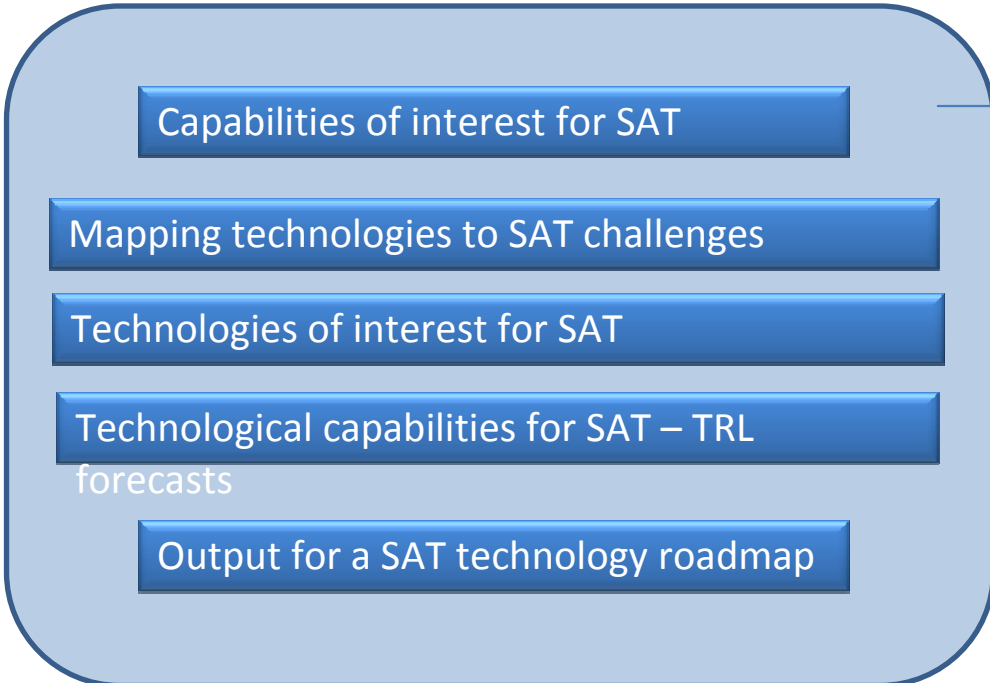
D4.2 Identification of missing capabilities in Europe

Catalin Nae





D4.2 Identification of missing capabilities in Europe





Assumptions for SAT rdm

- Manufacturers are (still!) interested/motivated in technology developments for SAT
- Future small aircraft is able to integrate all available technologies, if “profitable”
- Technology spin-off is feasible and possible (e.g. equal probability, costs, etc.)
- Business model at EU level for aeronautical industry (SAT)
- EU policy for access to technology (EU patent policy)

Specific (Open) issues for SAT rdm

- Mapping technologies to major challenges (cost efficiency, time efficiency, etc.)
- Mapping technologies to indicators (.../pax, /km, /Kg, etc.)
- A technology evaluator (TE) tool for small aircraft ?
- Definition of a representative “technology demonstrator” for 2020/2050

For SATrdm, *technological* capabilities are evaluated using TRL

-Not existing/missing : TRL<4

-Available : TRL >6

Capabilities of interest for SAT in EU

❑ Technological capabilities

- Major drivers (including TRL)
 - ✓ Conceptual design
 - ✓ Aerostructures
 - ✓ Engines & alternative fuels
 - ✓ Systems & avionics
- Associated tech. capabilities
 - ✓ Maintenance issues
 - ✓ IPR issues

❑ Industrial capabilities

- Industrial processes
 - ... for “old” materials
 - ... for “new” materials
 - Production line
 - Product integration
 - Quality control
 - Airworthiness compliance
- Supply chain
 - ✓ Virtual enterprise
- Industrial integration
 - ✓ Group policy

❑ System capabilities

- Integration into airspace
- Ground support
- Maintenance

Technologies of interest for SAT

❑ Airframe

- Active flow control (HLD)
- Active load alleviation/control
- Drag reduction coatings
- Variable camber with control surfaces
- Wingtip fence
- Blended winglet
- Landing gear drive

- Advanced alloys
- Composite primary/secondary structure
- Fluoropolymers
- Glare
- High strength glass
- Aircraft graphic film
- Friction stir welding
- Laser beam welding

❑ Engines

- Advanced combustor
- Variable geometry chevron
- Variable fan nozzle
- Advanced blades

- More efficient gas turbine
- More efficient energy management
- Advanced heat-resistant materials

- Lithium batteries for secondary power

❑ Systems & avionics

- Single pilot operation
- All weather operation

- Data Link Communications (VHF-ACARS and VDL Mode 2, SATCOM and HF)
- PBN – Performance Based Navigation
- ADS-B Automatic Dependent Surveillance Broadcast
- ADS-C Automatic Dependent Surveillance Contract
- Auto-loading FMS with data link instructions
- FMS Required Time of Arrival



Main Results from D4.2 - Technological capabilities for SAT – TRL forecast

Technology drivers **(CS-23)**

- Airframe technologies
 - Includes associated systems for ***active airframes***
- Engines (& associated systems)
 - Includes ***alternative fuels***
- Air traffic management
 - Includes ***on-board*** and associated ***on-ground*** systems

Implementation modalities

- Retrofit
- Update/upgrade
- New aircraft



D4.2 - Conclusions

- Missing *technological* capabilities for SAT (@2010 vs. 2020 targets)
 - Fuel burn reduction : TRL 4-6
 - Noise reduction : TRL 4-5
 - NO_x reduction : TRL 4-6
 - DOC reduction : <TRL 4
 - D2D time reduction : <TRL 4

 - Passenger comfort : TRL6
 - Passenger safety : <TRL4



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