Long Term Research Perspectives

why?

- SESAR Definition phase (2006 - 2007)
- After 2020/25 ….

LTI is looking beyond / preparing after 2020
EUROCONTROL Long Term Investigation (LTI) Work Programme

Starting from / considering the SESAR Operational Concept as the baseline;

Drawing/developing long term investigation work programme in the context of SESAR;

Regular Cross-checking / feed back with SESAR Operational Concept Development & Deployment

Need to start thinking about the ATM “2050” now

Need to keep room for ATM innovation – “lateral” / “out of the box” thinking

Need to have a bridge between pure innovation and integration in ATM concept
Envisioning **greener** and **smarter** Air Transport System enabling **sustainable** development.

**Initial studies** focused on an initial **vision(s)** of how the future Air Transport System will function, ensuring coherency with Air-Transport community views, which at this time are strongly influenced by the **SESAR concept (as baseline)**, **ACARE** SRA 2 High Level Target Concepts (HLTC) and NGATS initiative.

Work programme recognising the need of envisioning new paradigm in the field of **Airspace** design, **Airport** of the future, of highly **automated ATM** and of impact of new air vehicle (Unmanned Air Vehicle (**UAV**) and Very Light Jet (**VLJ**)) on ATM.
Highly automated: auto-ATC, subliminal control, flow management (instead of flight control – new role of ATCo);

Contractual air transport, support of Network centric information and decision management;

More responsibilities on the air side: autonomous flight, self separation, 4D trajectory;

New airspace design: more generic (less specific – standard ATCo working procedure, mobility), highway, sector less and flexible/dynamic (meeting both civil & military needs);

UAV, VLJ operation in non segregated airspace.
A decoupled infrastructure: **land side back to the city** and air side far away; **multi-modal** ground infrastructure (integrated in the overall multi-modal transport chain);

- A **network of runways** distributed around the city;
- **Shared runways** between several cities (Hubs?);
- **Combination** of both.
Green airport: underground terminal and green energy;

Automated: high level of automation for ground handling; automated manoeuvre (Enhanced/advanced SMGCS including taxiing, take off and landing), manned or unmanned platform (remote/automated tower, automated airport);

Silent: engine less platform and ground powered/assisted operation.

Eurocontrol fiction picture
LTI proposes to investigate 4 main research threads:

- Network Design & Management;
- Guidance and Control;
- Traffic flow control;
- Air Station.
**Network Design & Management:** System vision

Inter-related resources to be considered and optimised from a holistic and network point of view.

Airspace to be optimised, but also to remain flexible (meeting civil and military requirements) and supporting the Functional Airspace Block principle.

Contract based system (the level of service offered to be guaranteed in form of departure slot, arrival slot and position in the flow);

Information management to support collaborative decision making process at the system level (network centric).

**SuperHighway** (FP6 project) investigating new pan European highway structure.
Long Term Research Perspectives
LTI WP - 4 main research axis

Guidance and Control: considering the Technology as a major driver

- New and advanced detection aids (passives or actives/ground based or embedded), new guidance and control means will increase data accuracy giving more predictability & automation (4D FMS, 4D TP);

- New air vehicles (UAV & VLJ) to be considered requiring new airspace, new procedure, new roles and responsibilities.

ERASMUS (FP6 project) project applying FMS control principles to the ATC system (minor & subliminal adjustments to vertical/horizontal speed to be automated to avoid conflicts);

ASSTAR (FP6 project) project performing research into the operational and safety aspects underlying the introduction of the key ASAS Package II.

ASAS Thematic Network II (FP6 project)

Small Aircraft impact on ATM analysis (PhD work)

EPATS (FP6 project) project defining recommendation for having a research roadmap for small aircraft development.
## Long Term Research Perspectives

**LTI WP - 4 main research axis**

<table>
<thead>
<tr>
<th>Traffic flow control: considering the Human being/Process as a major driver</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New role and responsibilities</strong> for the air traffic controller (more managing flow than controlling flight) but also of the pilot, to become <strong>more efficient</strong>;</td>
</tr>
<tr>
<td>Envisioning <strong>future ATM</strong> system with high level of automation</td>
</tr>
</tbody>
</table>

- **CATS** (Contract based Air Transport System) (FP6 project) assessing the exploitation of Contract of Objectives within a market-driven Air Transport system.

- **Multi Actor Man Machine Interface** (EEC project) assessing new team organisation (cooperative technologies and integrated sector suite).
Air Station: airport capacity is a major concern when considering the traffic growth foreseen for the 20 years to come.

Current airport resources to be maximised such as Airspace (TMA) & Runway Throughput (Wake Vortex prediction & monitoring) or Surface Management, delegation of responsibility for separation to the air;

Enhancing vision enabling H24 & all weather operation (Virtual Tower);

Inter-modal airport to be assessed via the concept of separating the air side from the land side;

Strategic & pre-tactical planning processes: Collaborative Airport;

Level of automation at the airport/tower: Remote tower, automated/unmanned tower and/or airport.

Tower less (PhD work)

Airport of the Future (PhD work) – passenger throughput model
Long Term Research Perspectives

Well .... Any questions ....

... Thank you

Contact: marc.brochard@eurocontrol.int
www.eurocontrol.int