



7th USA/Europe
ATM 2007
R&D Seminar

**Session report:
Innovative ATM Concepts**

Jacco Hoekstra

General

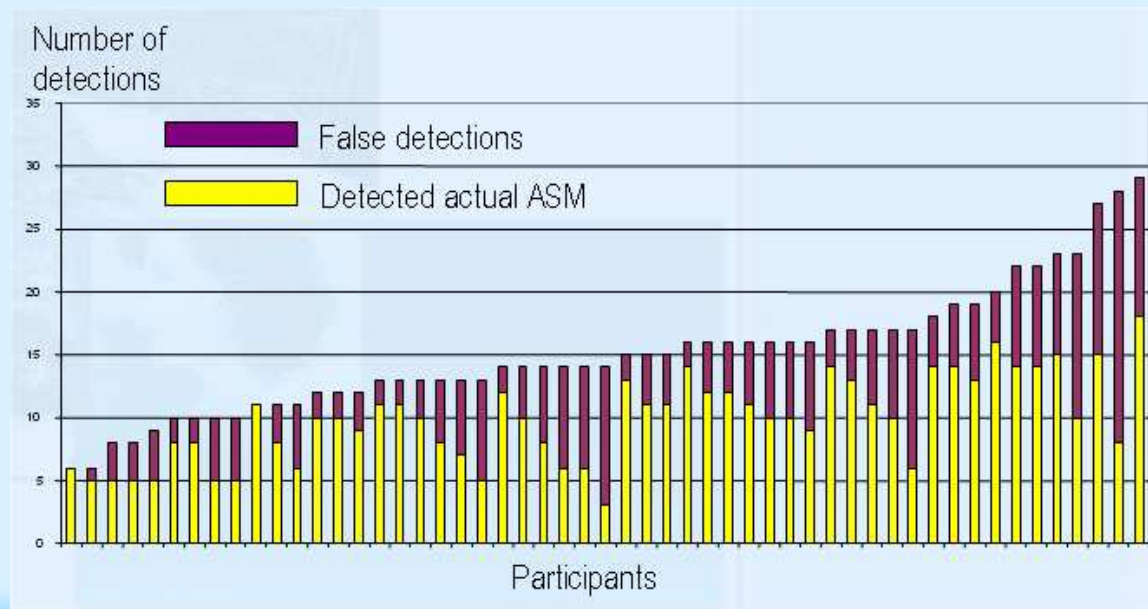
- Some numbers:
 - 10 presentations
 - 6 focussed on en-route
 - 4 focussed closer to airport:
dep/arr/runway ops
 - 5 US - 5 EU papers
 - 2 of the 5 US-based presenters
not able to come due to visa
problems
- Large audience
- Lot of questions
- Broad range of topics



ERASMUS


paper 164

- How subliminal are subliminal speed changes?
- Primary task: comment on conflict solving.
- Secondary task: detect speed changes
- Do it early to keep it subliminal.
- Workload did not influence detection rate!



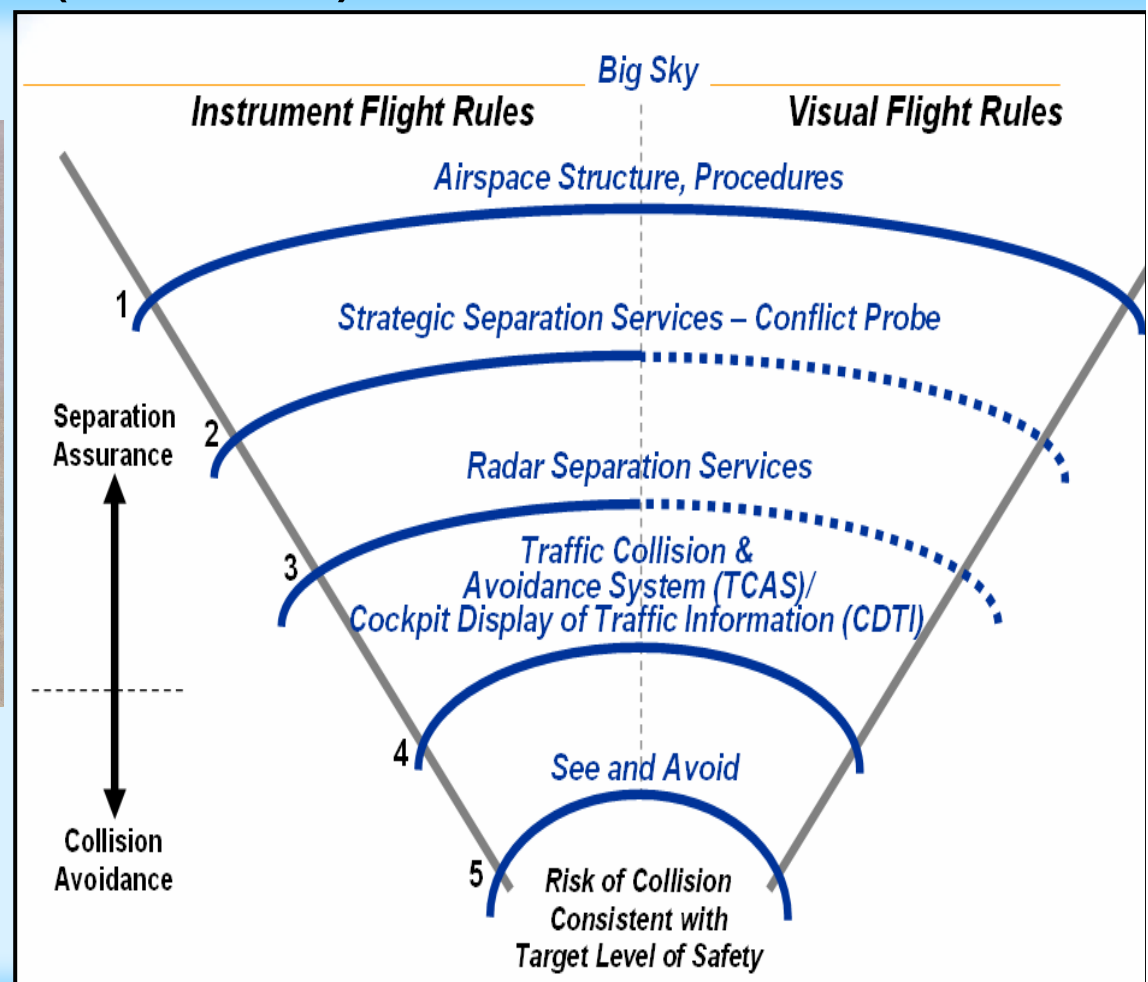
UAS collision avoidance – Andrew Lacher (MITRE)

paper 89

UAV part of UAS 



**New TCAS-like system needed
too soon!!!
Urgency led to interesting
discussion....**



05 July 2007

ATM2007 Barcelona

4

Multi-sector planning

Paul Lee (iso KC) SJSU, Almira Williams CSSI

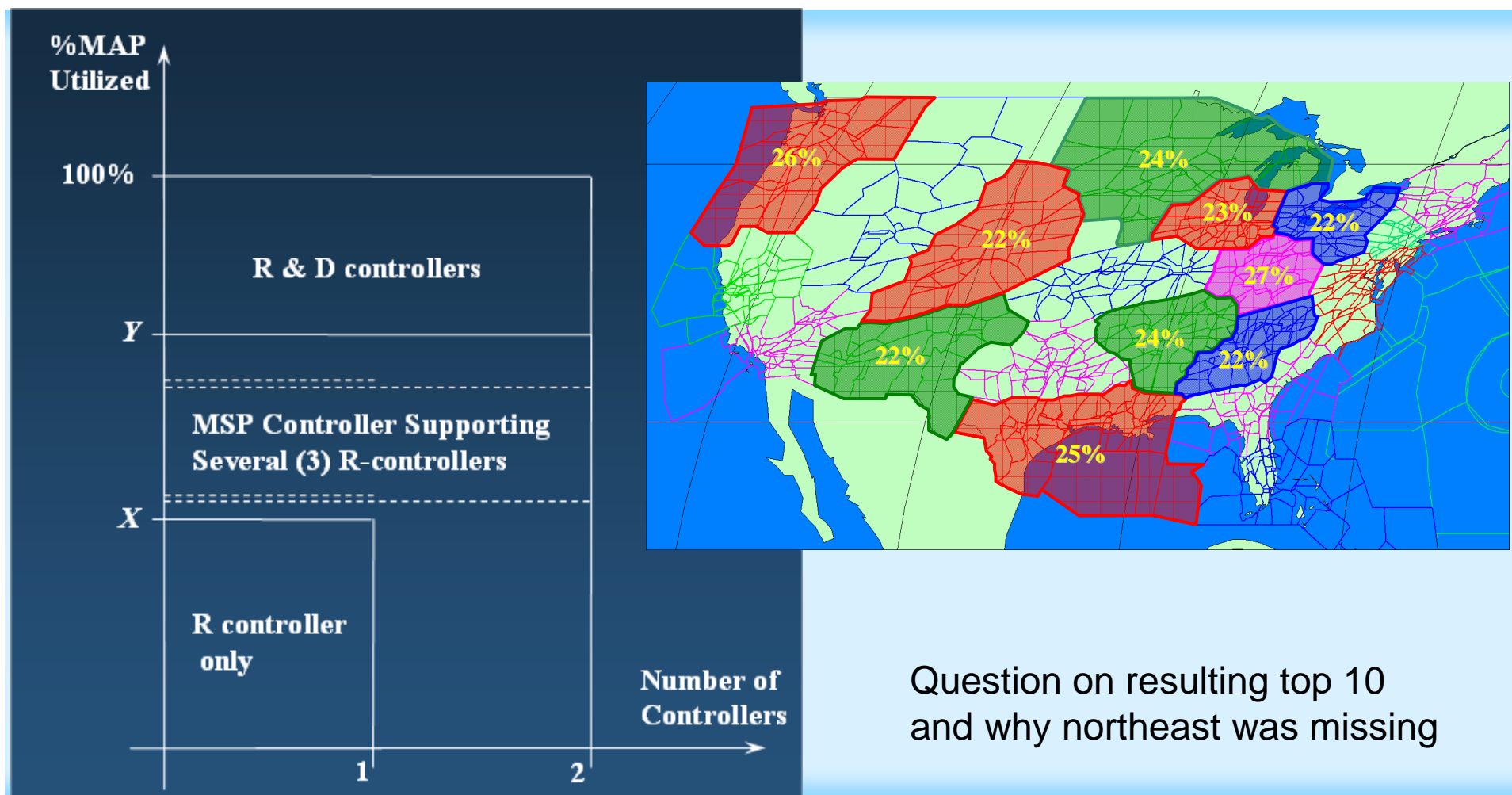
paper 170

- Two options for role of multi-sector planner:
 - Multi-Data controller: conflict probe, R/T
 - Area Flow: less tools, frees up time for cross sector activities
- Human-in-the-loop experiment:
 - Equal benefits in lowering workload
 - Area Flow role showed more benefits in coordination
- Traffic simulation to study benefits:
 - Looking at traffic complexity based on Monitor Alert Parameters (MAP)

Multi-sector planning

Paul Lee (iso KC) SJSU, Almira Williams CSSI

paper 130



Multi-Sector Planning using Constraint Programming

paper 23

- Develop

$$\forall i \in [0, \dots, m]$$

$$N_{nsb}[i, s] =$$

- Solve

- Approx

- Tried
in 20



$$p] = 0 \text{ meters}$$

$$\left. \begin{aligned} + \delta T[f] &\leq hv_{nsb} \\ er + \delta T[f] \\ + i \cdot L &\leq hv_{nsb} \\ m + i \cdot L \end{aligned} \right\}$$

]: zle

ogic

]: busiest day

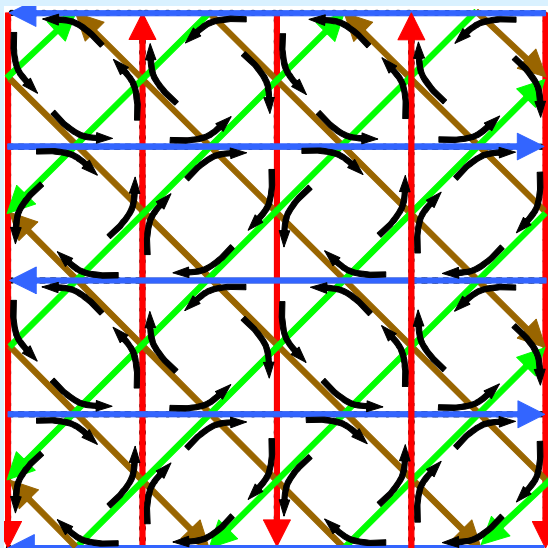
05 July 20

Regular Lattice

Richard Irvine (EEC Brétigny)

paper 115

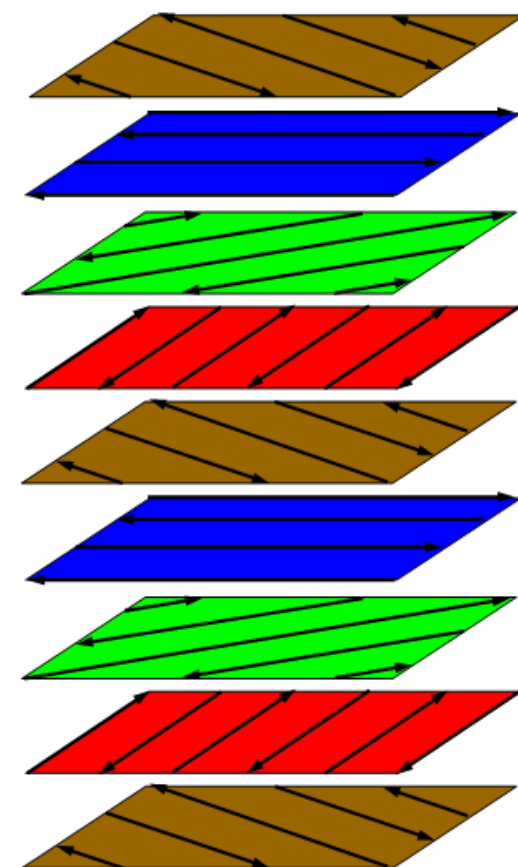
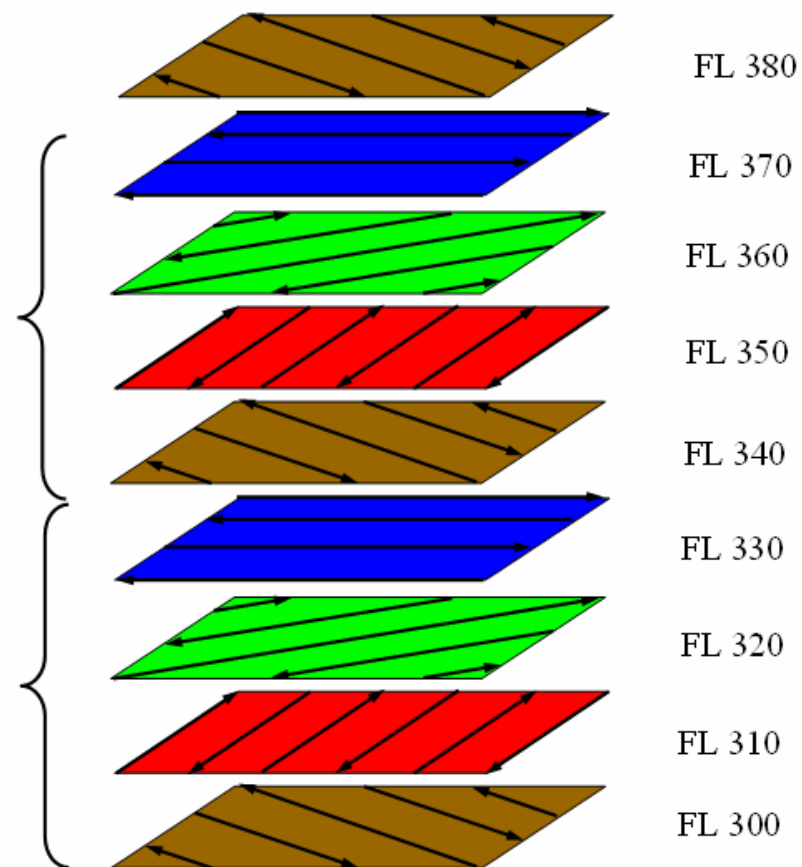
- Out of the box idea:
Lattice i.s.o. semicircular



Largest lattice (70 nm):

- never level conflicts
- only 1.3 % fuel increase

Vertical issues & SUA need resolving



FL 380

FL 370

FL 360

FL 350

FL 340

FL 330

FL 320

FL 310

FL 300

Psychosocial context CDAs

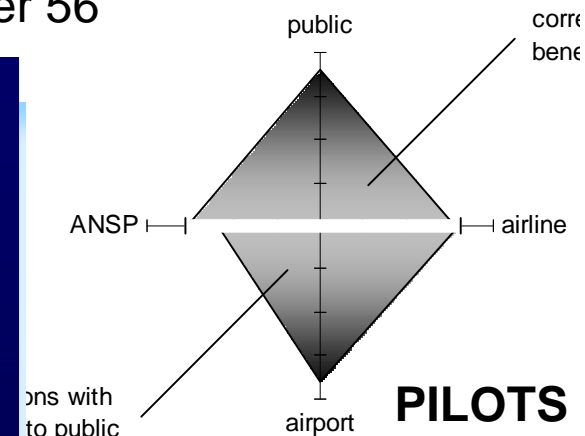
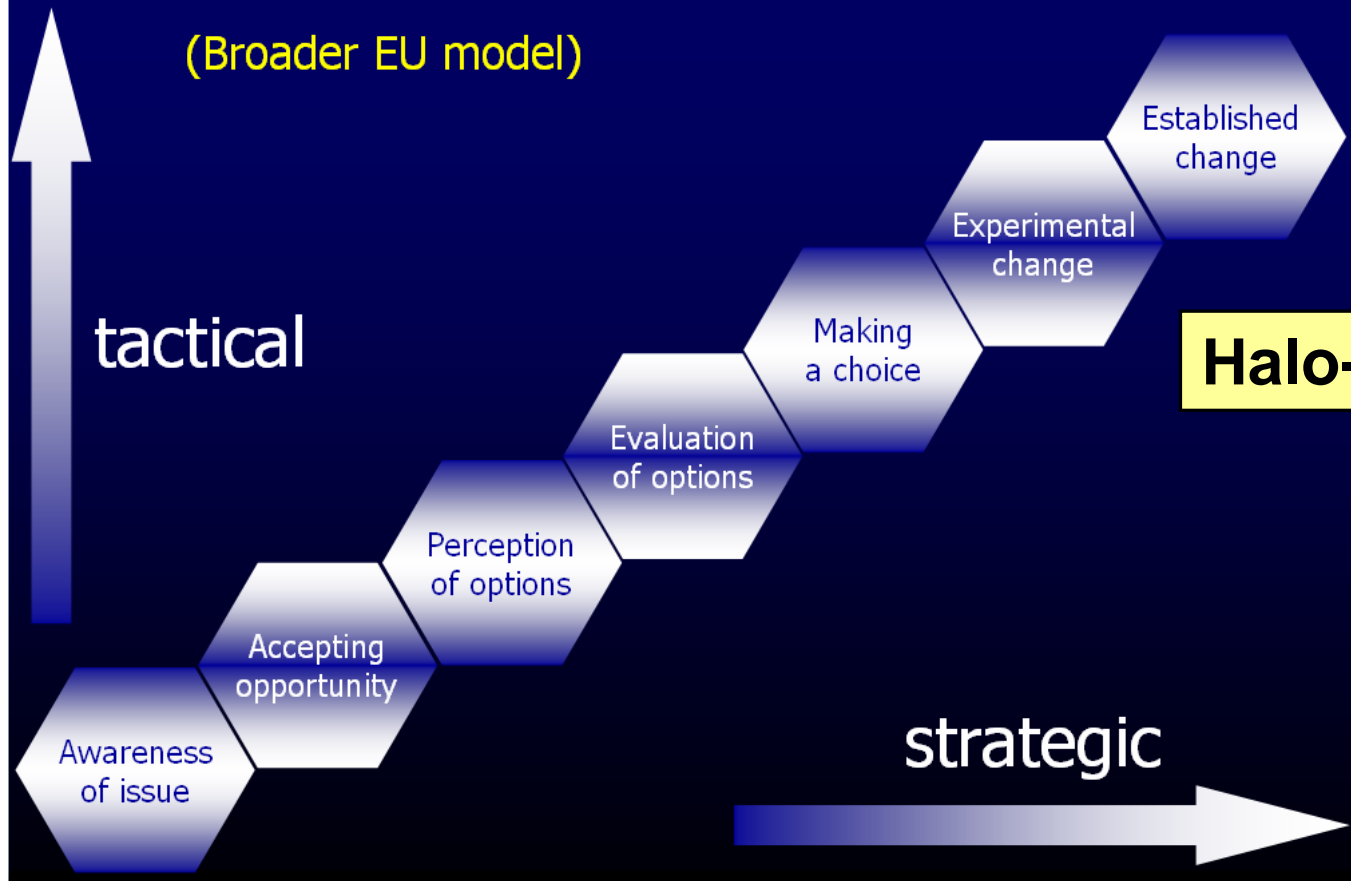
Andrew Cook (Univ Westminster)



paper 56

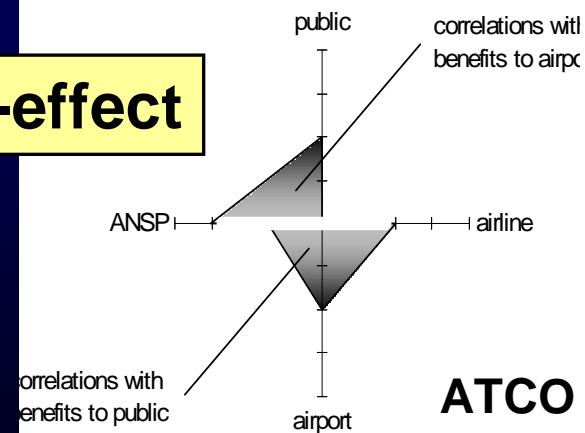
Seven Stages of Change model

(Broader EU model)



PILOTS

Halo-effect



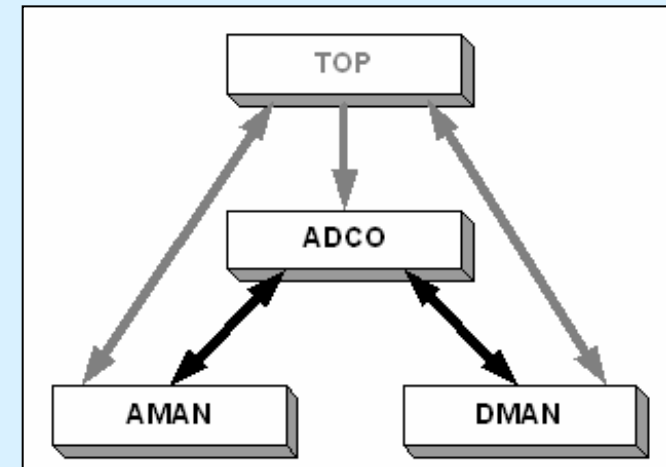
ATCO

Questions about other influences like location, culture

Coordinated Arrival/Departure Management – Dietmar Boehme

paper 102

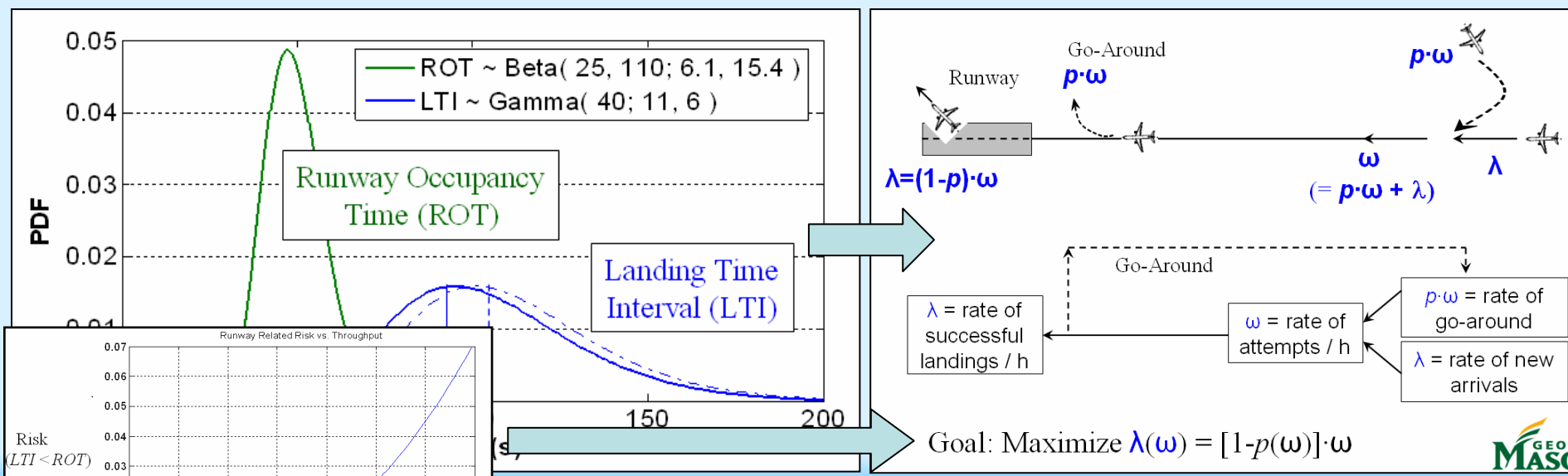
- Use fuzzy logic to create arrival-free intervals by path stretching with arrival manager to be used by the departure manager
- Tried on Frankfurt scenarios
- Questions:
 - multi-airport
 - how to account for different wakes
 - how environment factors in
 - why not use more dynamic runway allocation



Optimality of Runway Landing Operations – Babak Jeddi, John Shortle

paper 162

- What is the safe capacity of a runway? Maximizing risk-free throughput.
- Method for economic trade-off high-arrival throughput vs. increase of go-arounds
- Applying also constraint of avoiding simultaneous runway occupancy wake constraints



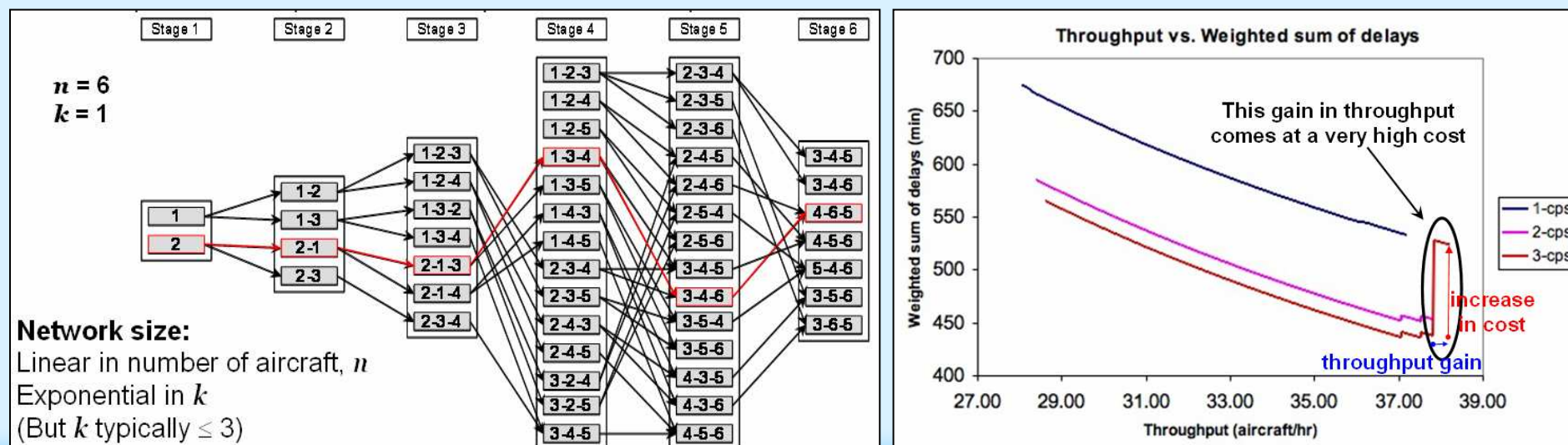
Goal: Maximize $\lambda(\omega) = [1-p(\omega)] \cdot \omega$



New approach to departure scheduling –
Hamsa Balakrishnan, John Hansman, MIT

paper 66

- New method for finding a short path in the network of scheduling solutions using probability distribution functions to account for many uncertainties



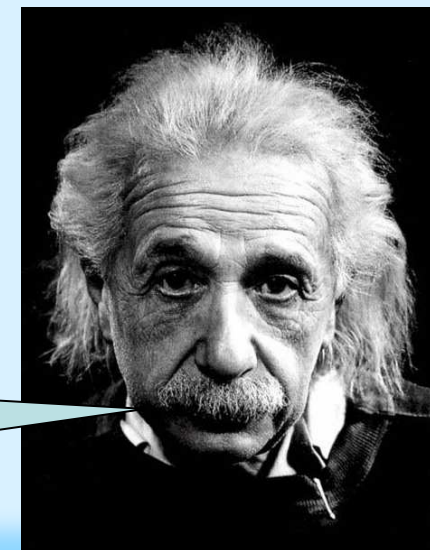
Conclusions of session 1/2

- Innovation mainly focused at increasing capacity while maintaining safety levels both en-route and closer to the airport
- Less focus on the ‘inconvenient truth’ that there is pressure on aviation by the environment, may be because of special session on this topic
- Only one presentation (at the whole conference!) on integrating UA(V)S: vehicles may still be mostly military now, but airspace is civil



Conclusions of session 2/2

- Lots of different approaches start with their own notation and models for the same situation.
- First agree on basic models? Using wikipedia approach to get agreement? And open source simulations using these definitions?
- We need standard notations and models to be able to stand on each others shoulders



If I have seen further than others, it is because I have stood on the shoulders of giants.