Airneth Conference 2007

Optimising Airport Airside Capacity with intelligent Software

The case of LSZH

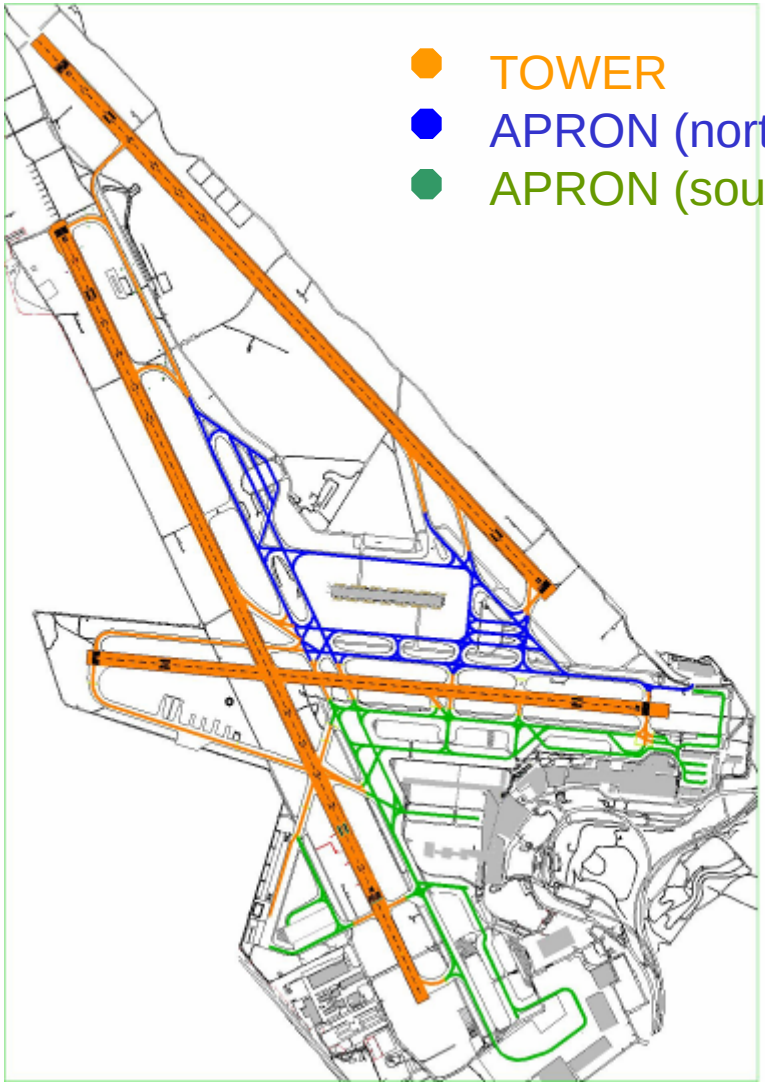
Andreas Gammel
Expert Airport Operations
Unique (Flughafen Zürich AG)

12th of April 2007

unique

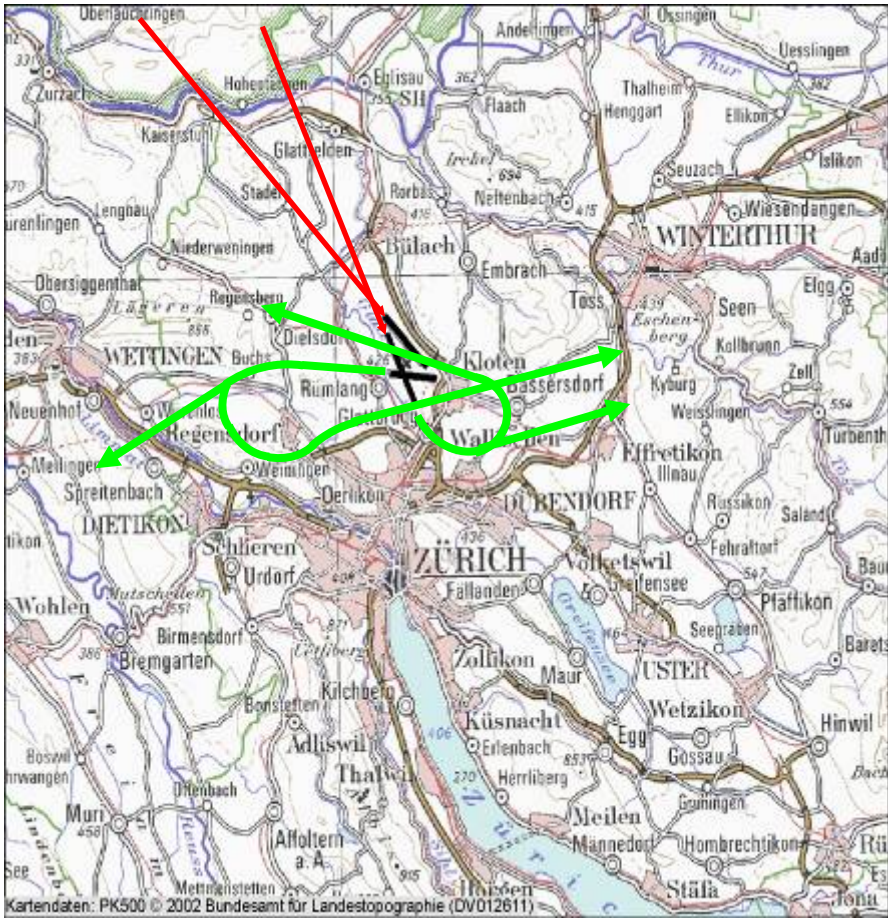
Layout, figures, responsibilities

- 3 Runways
- 260’000 Movements in 2006
- 19.2 Mio PAX in 2006
- Served 326’000 mvt in 2000
  up to 1000 mvt per day
- Tower is function of ANSP,
  responsible for safe & efficient
  operations on the runways
- Apron is function of Airport,
  responsible for safe & efficient
  operation on taxiways including
  timely delivering & sequencing of
  departures



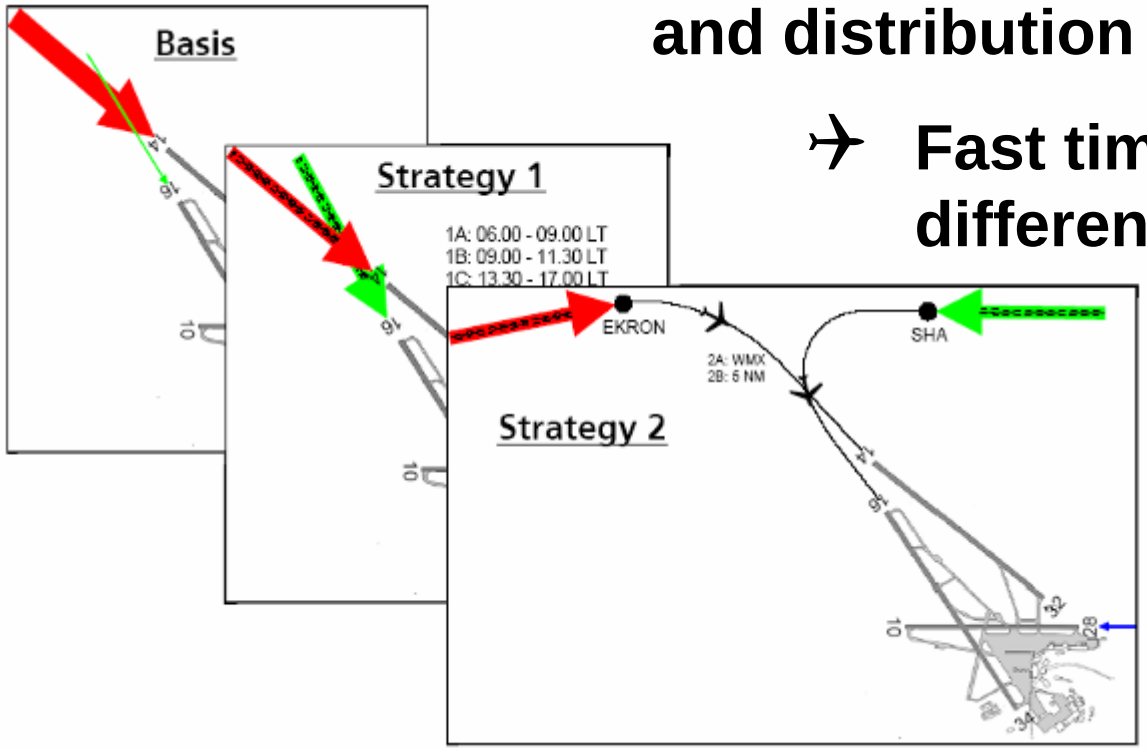
Impulse for the development

- Equal arrival distribution on two runways (14 & 16)
- Downsize the departure delays
- Better co-ordination of traffic between TWR & GRO
- Increase the over all traffic figures



Research study

- Cooperate initiative of Airport, AO and ATC
  - Research study launched to DLR in 1993
    - Feasibility study for better organisation and distribution of the traffic
      - Fast time simulations with different scenarios



✓ with an optimised sequence, the delay will be reduced or throughput increased

Possibility to increase traffic figures

- **When Collaborative Decision Making (CDM) process will be implemented**
- **When all partners working on the turnaround process give commitments to the status of processes**
- **When all individual processes will be harmonised to a common agreed goal**
- **When the airport community will be supported by a over all planning & management system**
  ☑ “*darts*”

Prototype development of *„darts“*

- **Sept 1996: Order for system development including prototype**
- ***darts* Prototypes:**
  1. **Phase 1 – Pure Departure planning**
  2. **Phase 2 – Departure planning in consideration of arrivals**
  3. **Phase 3 – Integral Arrival / Departure planning**
- **Spring 1999: 4 weeks of system tests - darts phase 1 & 2 with controllers in real time tower simulation**
- **Autumn 1999: 1 week of system tests - darts phase 3 with controllers in real time tower simulation**

Results from prototype test phase

Phase 1 & 2

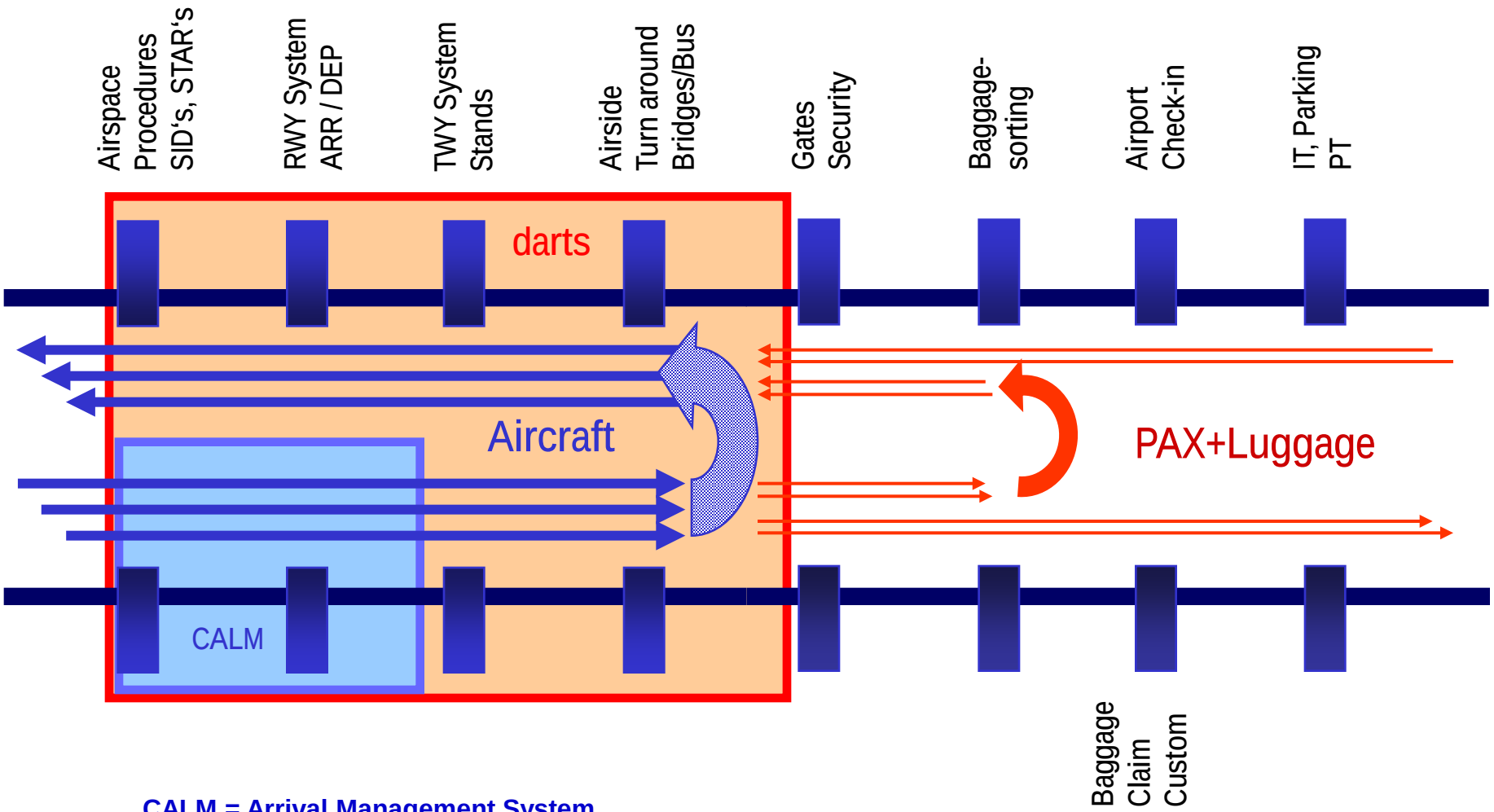
- ✈ **Enhancement of traffic volume during peak hour**
- ✈ **Reduction of departure delays**
- ✈ **Equal workload for controller due to**
  - ✓ **Permanent & automatic planning of the sequence (no mental planning by the controller)**
  - ✓ **Execution of the sequence to the controller**
  - ✓ **Less radio transmissions with flight deck crew**
  - ✓ **Less coordination of traffic between TWR & GRO (silent coordination via system)**

Results from prototype test phase

Phase 3

- Additional enhancement of traffic volume during peak hour
- Optimising the over all airport airside system
- Equal workload for controller

Airport airside processes within reach of *darts*



CALM = Arrival Management System

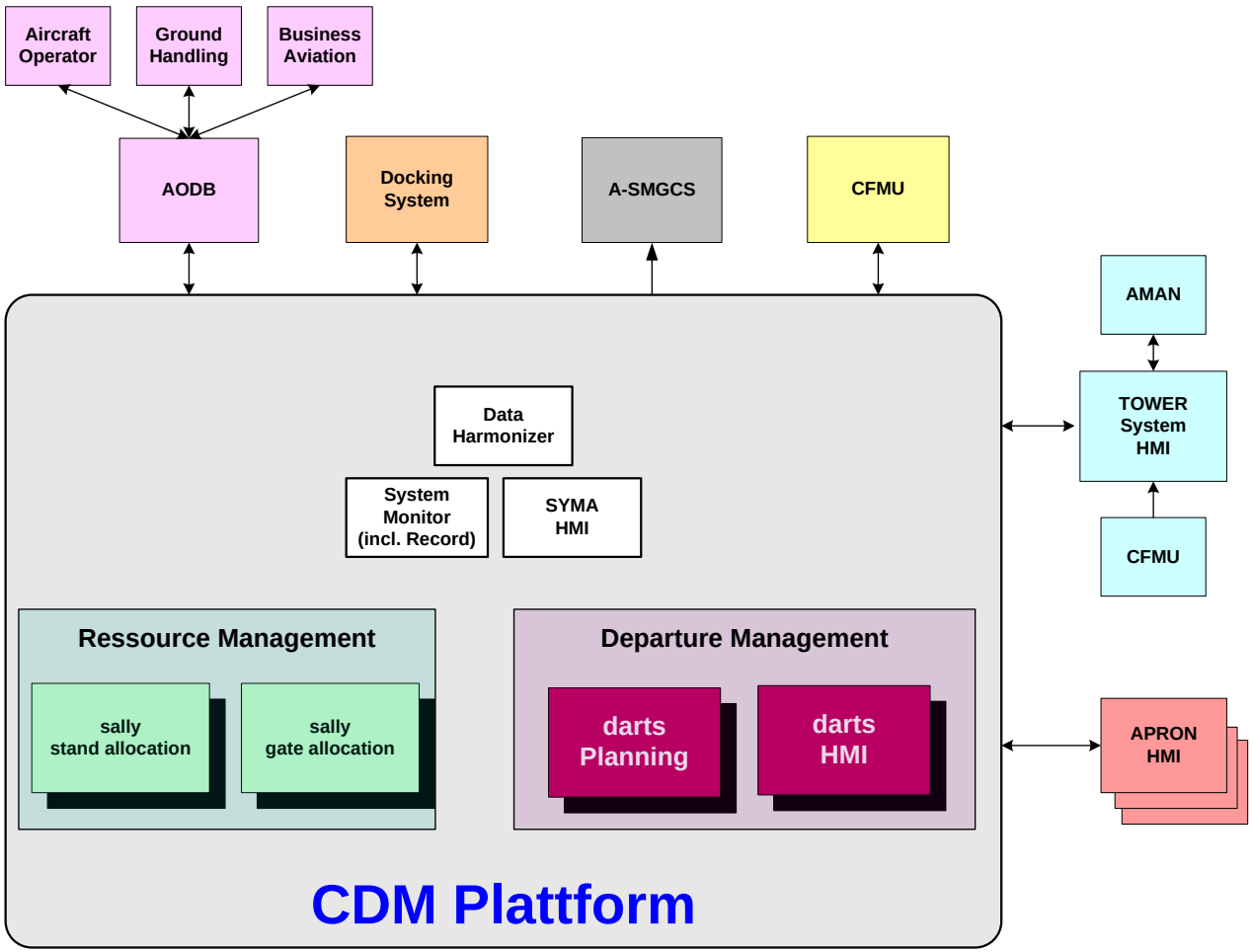
Planning basics of *darts*

Based on the ATC flight plan, the airport slot, the RWY concept, the restrictions and limitations of the airspace, the wake turbulence category, the a/c speed class and the departure fix, *darts* calculates the best possible take off time.

According to the start up and/or pushback times, the taxi times from the stand to the RWY, darts calculates the adequate off block time.

If the scheduled time of a flight is changing, the operators or the handling agents must update the data's following the actual status, to indicate the estimated (ETD-Management).

Operational implementation



- Project started in 2000
- MoU with partners
- Deep involvement of Partners in project (Customer board)
- Adapt procedures
- Information, training
- *darts 1* start operation in March 2003
- Opening of new TWY-system in May 2003
- October 2002 / 2003 new OPS concept due to politics

Benefits

- ☺ **Unlock existing, available airport airside capacity**
- ☺ **Dependable, harmonised and timely accurate data**
- ☺ **Continuous, steady traffic flow on the manoeuvring area**
- ☺ **Punctuality improvement**
- ☺ **Predictability and robustness of airport airside operations**

- ☺ **Reduction of taxi times = Reduction of air pollution**
  - ✓ **Study baseline: Year 2004 – 270’000 movements**
  - ✓ ***Reduction of taxi emission by 4.1%***
  - ✓ ***Less jet fuel of 1’150 t***

Difficulties

- 😐 **punctuality measurement:**
  off block time versus actual take off time

- 😐 **change management:**
  continuous and challenging process with
  ground handlers, aircraft operators and controllers
  (change of behaviour and culture)

Conclusion

The wheel is invented

- **The approach and methodology achieved sustainable success**
- **Departure management system is real and operational**
- **One system – three major benefits**
  - **higher airport airside capacity**
  - **cost savings for airlines**
  - **lower aircraft emissions on ground**
- **Integrative arrival- / departure management system is feasible**


Thank you
for your attention
SWISS
Zürich