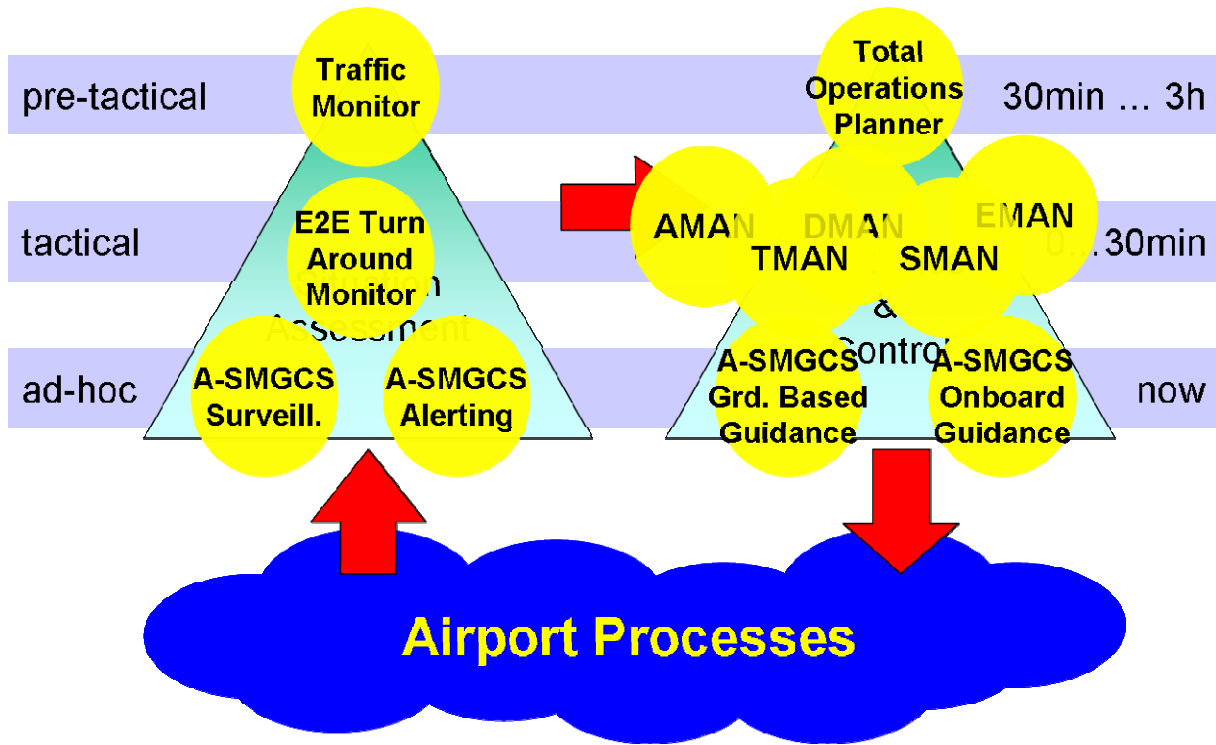


## Department Operations Control



Airports are the main bottleneck of the future Air Transport System. Holistic system approaches are required to especially improve throughput, efficiency, punctuality and predictability of operations in this domain.

Therefore DLR decided to found a new department "Operations Control" in the year 2000, built on the expertise that was gained over more than a decade in the A-SMGCS subject. A-SMGCS can be already considered as a stakeholder-spanning concept, supporting with suitable

technology and procedures the needs of tower controllers, apron controllers, pilots and vehicle drivers – people representing the main airport stakeholders: airspace users, air navigation service providers, airport authority and handling agents. Based on the extensive experience in terms of concept definition, prototyping of core system elements and demonstration and validation of such concepts through field trials – proven during significant national and European projects like TARMAC, DEFAMM, BETA, EMMA, EVA – the objective of

this department is now to mature and demonstrate the **Total Airport Management** concept, which was initially outlined during a EUROCONTROL innovative R&D study in the year 2000.

The Total Airport Management concept is a layered, hierarchical management approach, shown in the above figure, giving also samples for tools developed by DLR currently or in the recent past. In analogy to control theory one could consider this approach as a set of nested control loops.

It comprises three layers with different levels of information granularity on the situation assessment side (left triangle) and different look ahead times on the planning and control side (right triangle). On the lowest level real time control is performed by observing aircraft movements and process progresses and by adhoc decision making and control. The tactical level is condensing the obtained information

modes of airport infrastructure usage (e.g. runway configurations) and setting coarse milestones for the airport processes. On this level as well What-If-Tools are foreseen to enable decision makers to evaluate and modify scenarios for the next three hours in advance. As these pre-tactical decisions should be used later as constraints by the stakeholder-individual optimization support systems (like AMAN, TMAN,

overall plan for the next three hours. This plan is communicated this to their local control centers (AOC, HCC, Tower, Apron Control, ...). Through this Total Airport Management approach the current First-Come-First-Served way of operation is turned into a performance based On-Time-Preferred-Served way, giving the Airspace Users objectives a higher weight in the overall Airport Management.



further, e.g. the 4D-movements into events and is providing tactical plans with a time horizon of approx. 30min by well know tools as AMAN and DMAN, but similarly as well by TMAN, SMAN and EMAN. So these tactical tools developed in the past to optimize process performance of one stakeholder become now an integral part of an overall holistic concept. On the pre-tactical level, information is further condensed, e.g. into capacity and demand considerations and performance figures, and the planning and control side is supporting more strategic decisions such as operational

DMAN...) these decision will have to be made collaboratively between all stakeholders.

Therefore the Total Airport Management foresees an Airport Operations Control Center, where people from the Airline Operation Center(s), the ANSP and the Airport Authority are coming together to assess jointly the situation of the overall airport for the next three hours. They are anticipating critical situations e.g. in terms of demand and capacity, solving them jointly supported by automated planning and What-If-tools and defining a robust

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