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The DLR Project "Weather & Flying"

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A project is introduced which aims at (a) providing timely, tailored and concise meteorological information especially for adverse weather as precisely as possible for air traffic control and management, airline operating centres, pilots, and airports, and (b) building automated flight control systems and evasion-manoeuvre methods to minimise the impact of adverse wind and wake conditions on the flight performance of an aircraft.
Today ATM and ATC most of the time only react on adverse weather when the disruption has already happened or is just about to happen. A future air traffic management should pro-actively anticipate disruptive weather elements and their time scales well in advance to avoid or to mitigate the impact upon the traffic flow.
But "weather" is not a technical problem that can be simply solved. Predicting the weather is a difficult and complex task and only possible within certain limits. It is therefore necessary to observe and forecast the changing state of the atmosphere as precisely and as rapidly as possible. Measures must be taken to minimise the impact of adverse weather or changing weather conditions on air traffic management and tactical manoeuvring, both on ground and onboard the aircraft. Weather and meteorological information (MET in short) is to be considered as an integral part of air traffic management.
In 2008, DLR has initiated a major project "Wetter & Fliegen" (German for "Weather and Flying") to address this inter¬disciplinary challenge. Its goal is to augment safety and efficiency of air transportation, thereby focusing on the two German hub airports in Frankfurt and München. This high-level goal shall be reached by two strands of work:
a) The development of an Integrated Terminal Weather Systems (ITWS) for the air¬¬ports at Frankfurt and München to improve the detection and forecast of weather phenomena adversely affecting airport operations, including deep convection (thunderstorms, hail, wind), wake vortex, and winter weather conditions, and
b) The development of on-board systems for automated control, surveillance and information and the specification of requirements for on-board sensors, to improve the behaviour of the aircraft when confronted with wind gusts, wake vortices and thunderstorms.
The project design and first results will be presented.