

Global Turbulence Decision Support for Aviation

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Turbulence is widely recognized as the leading cause of injuries to flight attendants and passengers on commercial air carriers, yet legacy decision support products such as SIGMETs and SIGWX charts provide relatively low spatial- and temporal-resolution assessments and forecasts of turbulence, with limited usefulness for strategic planning and tactical turbulence avoidance. A new effort is underway to develop an automated, rapid-update, gridded global turbulence diagnosis and forecast system that addresses upper-level clear-air turbulence, mountain-wave turbulence, and convectively-induced turbulence. This NASA-funded effort, modeled on the U.S. Federal Aviation Administration's Graphical Turbulence Guidance (GTG) and GTG Nowcast systems, employs NCEP Global Forecast System (GFS) model output and data from NASA and operational satellites to produce quantitative turbulence nowcasts and forecasts. A convective nowcast element based on GFS forecasts and satellite data provides a basis for diagnosing convective turbulence. An operational prototype "Global GTG" system has been running in real-time at the U.S. National Center for Atmospheric Research since the spring of 2009. Initial verification based on data from TRMM, Cloudsat and MODIS (for the convection nowcasting) and AIREPs and AMDAR data (for turbulence) are presented. This product aims to provide the "single authoritative source" for global turbulence information for the U.S. Next Generation Air Transportation System.