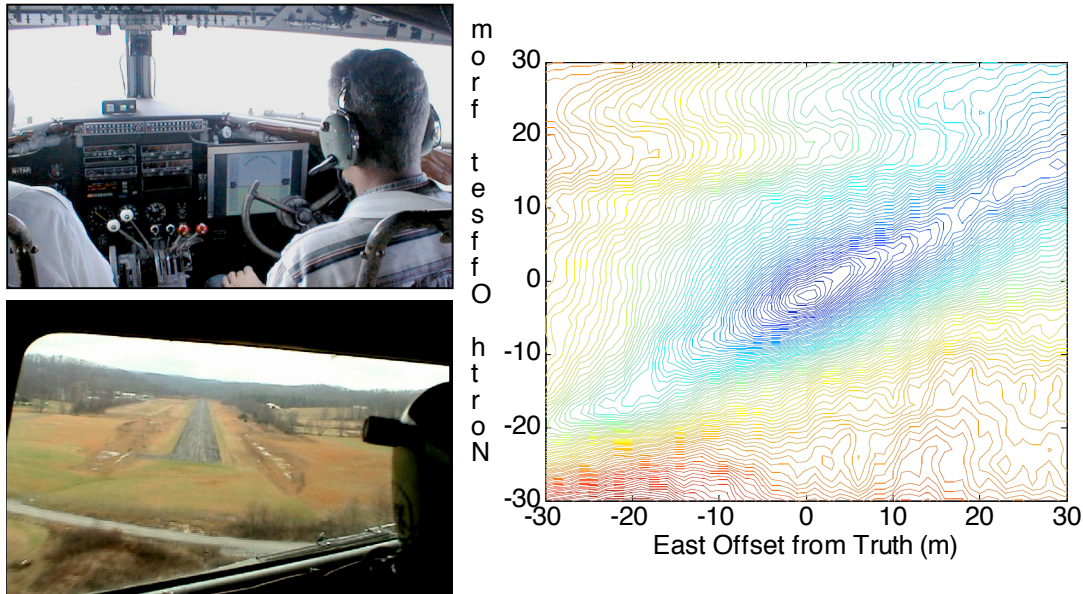


Terrain-Referenced Ladar/Inertial/WAAS Precision Approach

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Sponsors: Ohio University, National Aeronautics and Space Administration (NASA),
Federal Aviation Administration (FAA)



Precision Approach to Braxton County Airport (K48I), WV. Top left: Delphins Tunnel-in-the-Sky guidance system in the DC-3. Bottom left: Short final to K48I. Right: Terrain correlation gradient search with correct position in the middle of the plot.

Aircraft precision approach guidance systems require accurate positioning relative to the runway with a high level of integrity. To reduce the reliance on ground-based installations, a terrain-referenced precision approach and landing guidance system was prototyped using a Scanning Airborne Ladar (ALS), an inertial reference unit, and a Wide Area Augmentation System (WAAS) receiver for system initialization.

On January 14, 2005, Ohio University AEC demonstrated the first precision approach using this system. This proof-of-concept system achieved real-time position solutions with accuracies comparable to aircraft autoland requirements. While accuracy is only one of the requirements for an aircraft precision approach and landing system, it is the opinion of the investigators that continued research into this technology, system integrity and safety will result in an operationally effective and robust system. Key to the high accuracies is the use of a meter-level terrain database that is created using a laser mapping system.

Further reading: J. Campbell, M. Uijt de Haag and F. van Graas, "Terrain Referenced Precision Approach Guidance," *Proceedings of the Institute of Navigation Technical Meeting*, San Diego, CA, 24-26 January 2005.