The use of Geographical Information Systems to Interpret Research Aircraft Measurements

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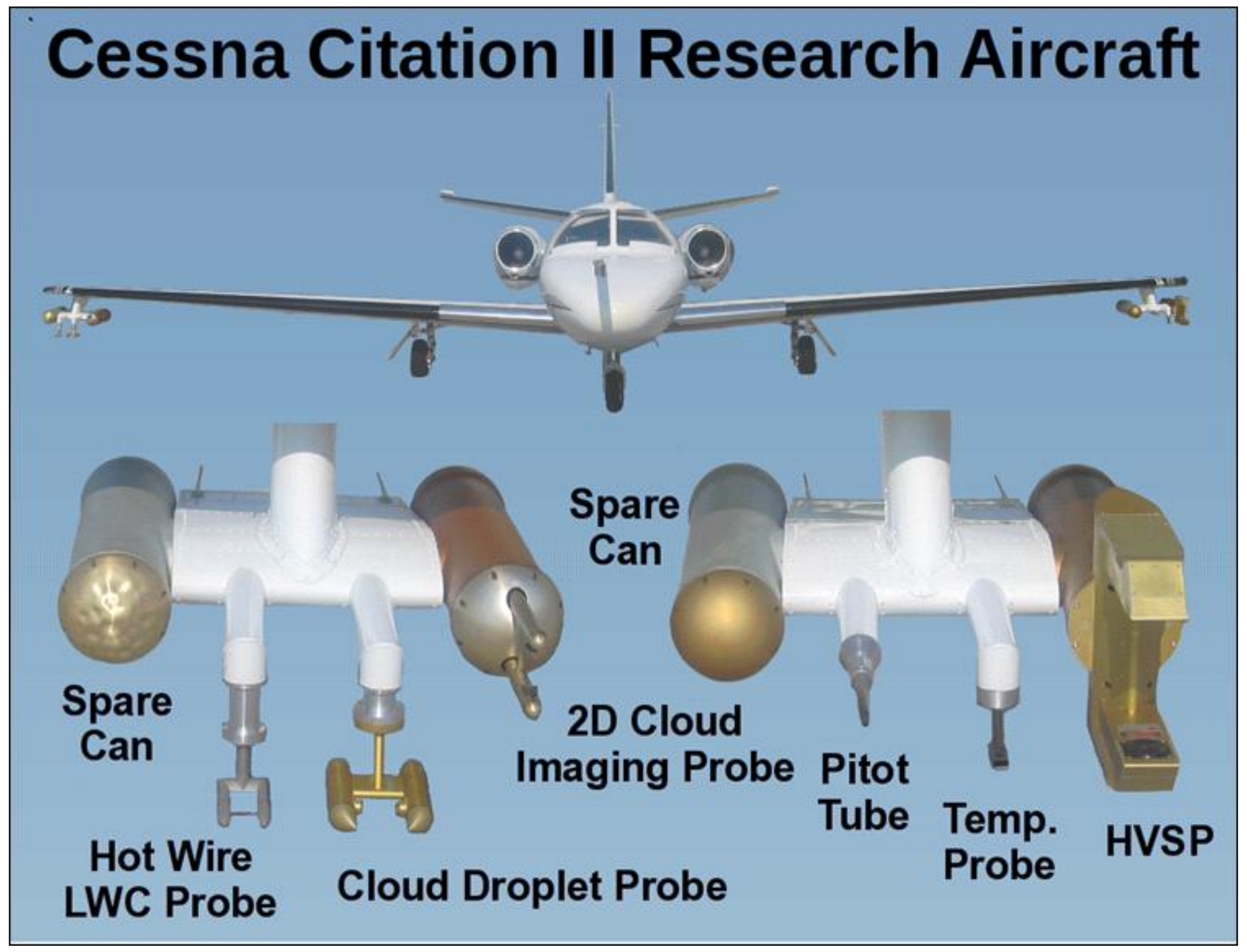
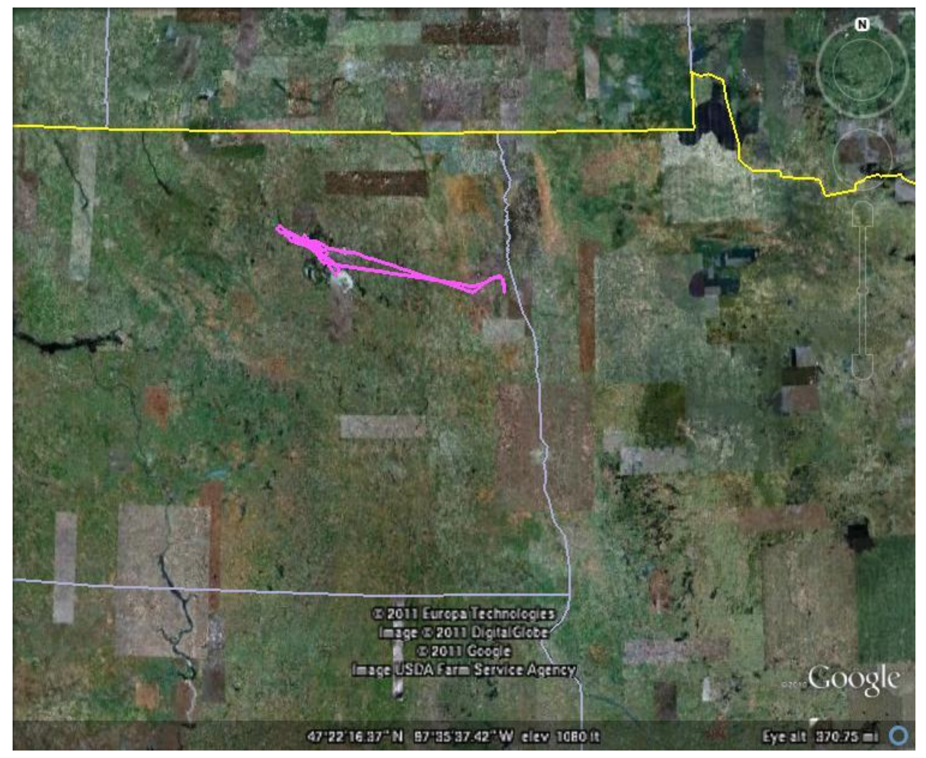
Objective

The objective is to use analysis software, such as the Integrated Data Viewer (IDV) and Google Earth, to correlate aircraft based measurements to the overall storm system. This provides a context for the aircraft measurements which allows for easier analysis and comprehension of the collected data.

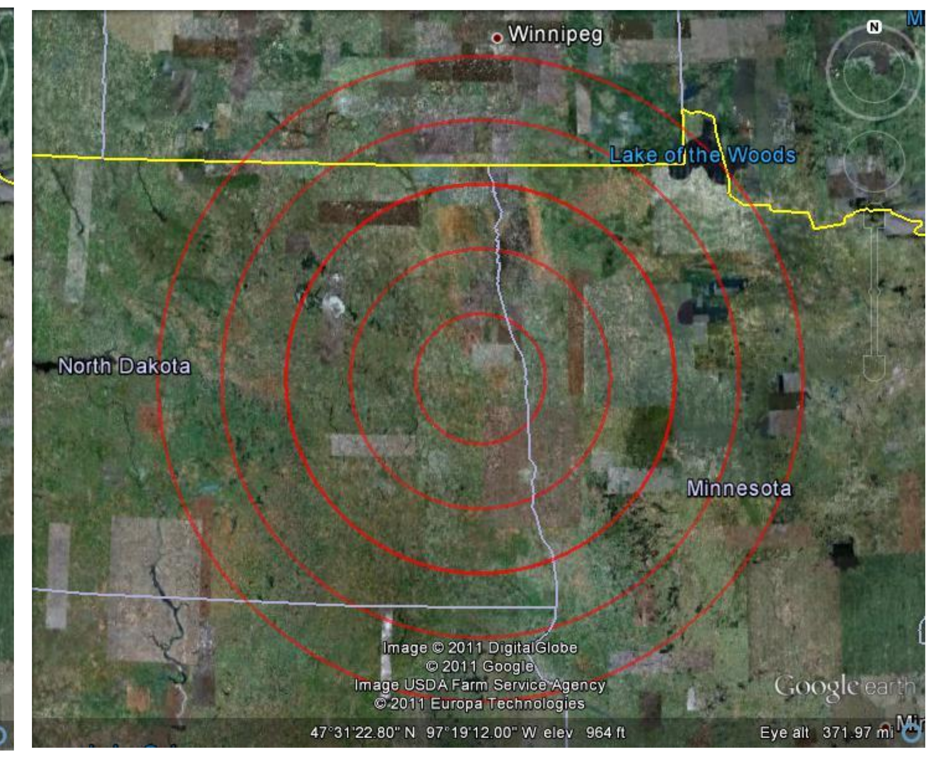


The University of North Dakota (UND) Citation Research Aircraft (tail number N555D5) has made multiple flights as part of an instrument development project for Goodrich Corporation. Each flight consisted of collecting cloud measurements in and around areas of precipitation. The cloud measurements were made with numerous instruments including a Cloud Droplet Probe (measures droplet size distribution from 2 – 50 μm), King Hot Wire Probe (measures liquid water content), Nevzorov Probe (measures total and liquid water content), 2-Dimentional Cloud Imaging Probe (images particles from 30-800 μm in 32 channels) and Cloud Imaging Probe (images particles from 30-800 μm in 64 channels). In addition to in-situ airborne measurements, the clouds were sampled by multiple satellite sensors and the precipitation was sampled by two ground radars. Radars provide area coverage data for each flight at approximately five minute resolution which provides a context for the in-situ aircraft measurements.

Methodology



Google Earth image showing the Citation Research Aircraft's flight track. The flight track is based on 1 Hz GPS data that has been automatically processed to create a kml formatted file which is used by Google Earth.



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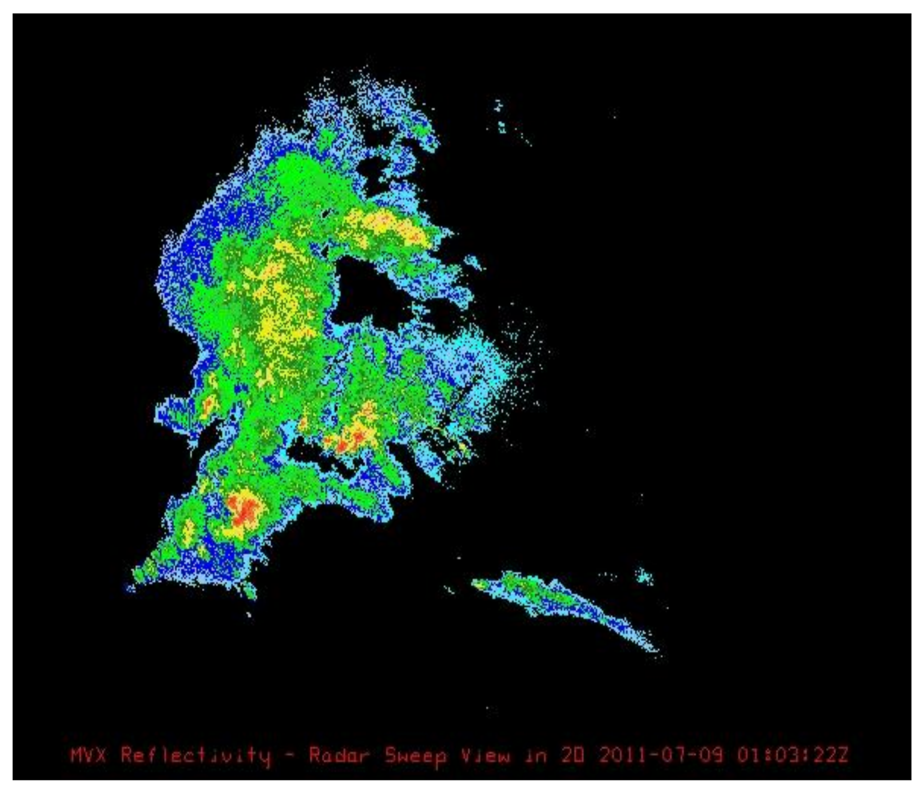
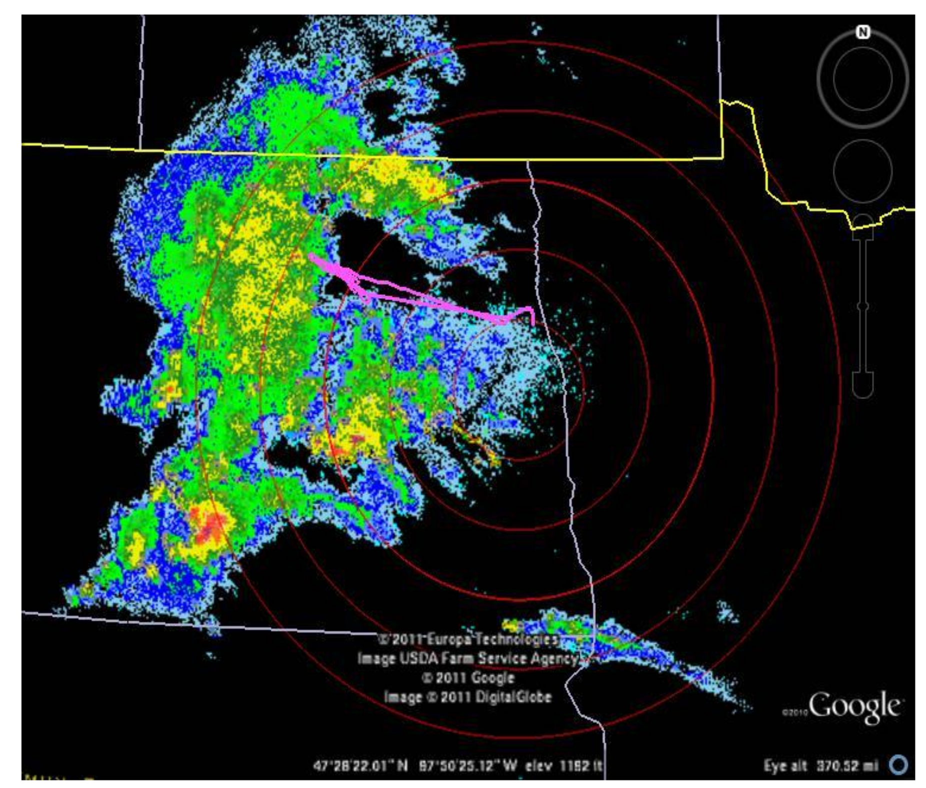
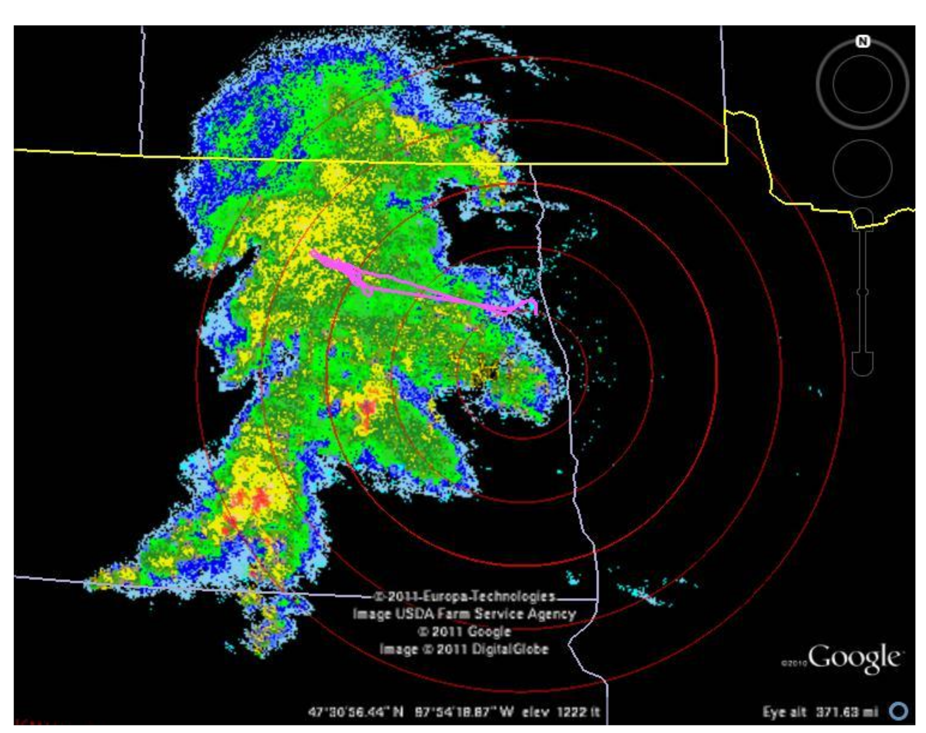
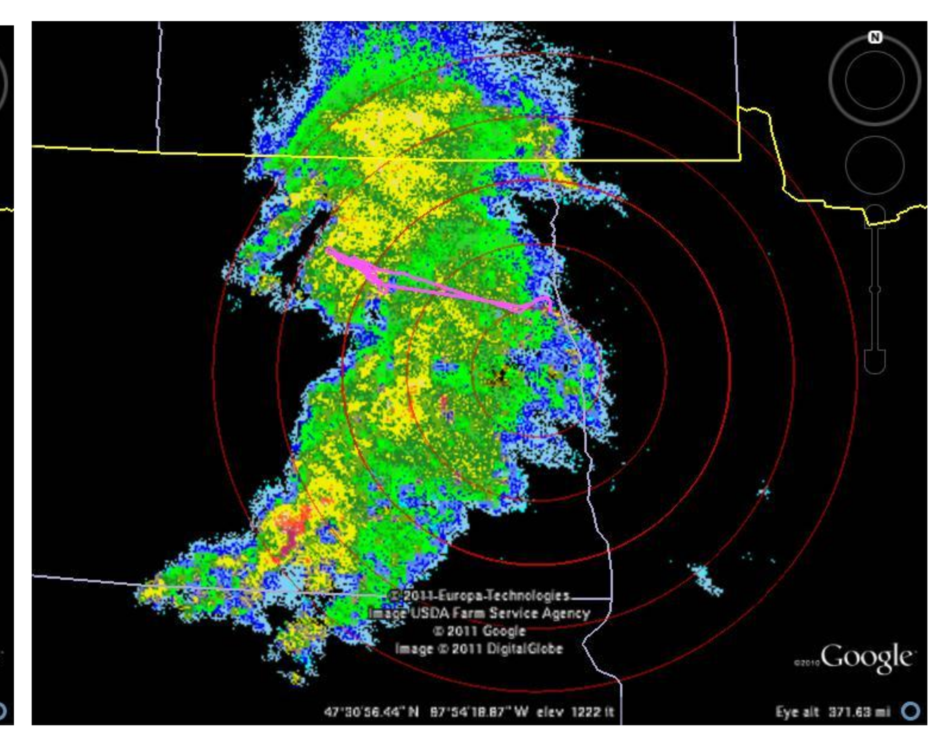




IDV is used to create a JPEG image of the radar reflectivity value. The image is either found remotely through IDV or uploaded from an outside source. The image is then captured and saved as a JPEG.





Conclusions

The overlay of IDV on Google Earth allows for an efficient

Future Work

The combination of Google Earth and the Integrated Data Viewer will continue to be used to allow a graphical reference during our future research aircraft flights. However, for future flights it would also be beneficial to add graphical representation o data, such as areas of liquid or solid precipitation along areas of the flight track path. There are also many additional uses of the overlay of the products