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Title: The North Dakota Citation Research Aircraft Measurement Platform

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Abstract: The North Dakota Citation Research Aircraft is a Cessna Citation II twin-engine fan-jet aircraft modified to be an atmospheric research platform that has been used on many field projects since the 1970s. The typical sampling speed of the modified Citation II is 160 knots indicated air speed (IAS), with sampling at altitudes up to 12.1 km (40,000 ft). The Citation Research Aircraft was operated by the University of North Dakota (UND) for many years but is now operated by Weather Modification International (WMI) of Fargo, North Dakota. WMI and UND together provide a unique test facility that is capable of deploying a wide range of instrumentation. WMI has the experience to install the custom instrumentation required for a specific field project and the expertise to conduct the most demanding aircraft sampling, including thunderstorm in-situ measurements. UND provides scientific know-how on obtaining measurements at the required accuracy and experience to ensure instruments are performing well. Robust, open-source software tested for over 15 years provides the ability to quickly process data to enable analysis to begin shortly after completion of an aircraft flight. Visualization software allows observations to be efficiently quality-assured, which enables timely creation of a final data set that can be analyzed to meet each project's scientific objectives. Past and ongoing projects include working with large and small companies to test airborne instruments and conduct natural icing studies. Specialized data processing methods have been implemented to obtain the liquid and total water content measurements at high accuracy. With continuing reduction in the size and power requirements of instrumentation, the future will allow the North Dakota Citation Research Aircraft to make an increasing number of observations which utilize more sophisticated processing software.