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Aviation Aircraft

**A Validation Study of the Air Force Weather Agency (AFWA) JETRAX contrail Forecast Algorithm**

Authors: [Jeffrey D. Shull](#); [AIR FORCE INST OF TECH WRIGHT-PATTERSONAFB OH](#)

**Abstract:** Accurate contrail forecasts allow pilots to avoid levels of the atmosphere which are conducive to contrail formation, reducing their likelihood of being visually detected by enemy forces. The primary objective of this thesis is to evaluate the performance of the JETRAX contrail forecast algorithm currently used by the Air Force **Weather** Agency to support military air operations. A total of 397 ground based contrail observations were collected at Wright-Patterson Air Force Base on 27 different days. Observations were collected with the aid of air traffic **control** radar, which greatly facilitated the positive identification of overflying aircraft and provided necessary information such as aircraft type and flight level. This data set was used to validate corresponding contrail forecasts disseminated to operational users via the Air Force **Weather** Information Network (AFWIN). All forecast products derived from the JETRAX algorithm demonstrated greater skill than persistence, climatology, or other algorithms tested with real time radiosonde data. An 84.4 percent accuracy rate was observed. Based on this research, the Air Force **Weather** Agency is providing excellent contrail forecasts to their operational users, and while there is still room for improvement, no immediate changes to the JETRAX algorithm are warranted.

**Limitations:** ✓ APPROVED FOR PUBLIC RELEASE  
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