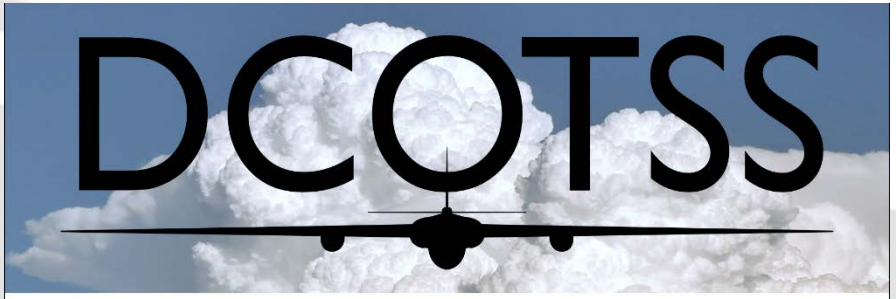
EVS-3 Dynamics and Chemistry of the Summer Stratosphere (DCOTSS)

Start Date:	**January 1, 2019**
Confirmation:	**September 17, 2019 (scheduled)**
End Date:	**December 31, 2023**
Airborne Platform:	**ER-2 (AFRC)**
Data Center:	**not assigned**
Principal Investigator:	**Kenneth Bowman (Texas A&M)**
Investigation Manager:	**Dan Chirca (ESPO/ARC)**
Deputy PI:	**Frank Keutsch (Harvard)**
Program Executive:	**Bruce Tagg (HQ)**
Program Scientist:	**Ken Jucks (HQ)**
ESSP Mission Manager:	**Jennifer Olson (LaRC)**

Project Cost Cap: **$30M over five years (2019-2024)**



NASA Earth Venture Suborbital 3
Dynamics and Chemistry of the Summer Stratosphere

Summary: Strong convective storms in the North American Monsoon Anticyclone (NAMA) regularly penetrate deep into the lower stratosphere (LS). Satellite measurements of water vapor have shown a large enhancement in the LS over North America not seen either in magnitude or at such high latitudes elsewhere around the globe. The Dynamics and Chemistry of the Summer Stratosphere (DCOTSS) investigation will study the coupling of the tropopause-penetrating convection with the large-scale monsoonal motion in this region, as well as the impact of convection on the chemical composition of the LS. Objectives are to understand how much tropospheric air and water is irreversibly injected into the LS by convection and which convective source regions impact the NAMA. Results from DCOTSS will be used to determine what dynamical mechanisms lead to the irreversible injection of material into the stratosphere, what the residence time is for convectively injected air in the NAMA, and how that air is exported to the global stratosphere. In addition, DCOTSS will examine what the composition and potential sources of aerosol in the lower stratosphere over North America.

Implementation: DCOTTS will deploy the ER-2 for one 5-week test series and for three 8-week science deployments out of Salina, KS in spring, middle summer, and late summer. The ER-2 payload will provide in-situ measurements for important trace gases, aerosols, reactive species and meteorological parameters. In-situ measurements will be complemented by the NEXRAD radar network, satellite data products and operational modeling.

NASA Earth Science Relevance: DCOTSS will advance understanding of changes in the Earth's radiation balance, air quality and the ozone layer that result from changes in atmospheric composition and will improve the capability to predict weather and extreme weather events.