

**SBIR 06.2 PHASE I - AWARD DETAILS**

<b>ORGANIZATION</b>	AMRDEC (M)
<b>TOPIC NUMBER</b>	A06-016
<b>CONTRACT NUMBER</b>	
<b>YEAR OF AWARD</b>	
<b>AWARD START DATE</b>	
<b>AWARD COMPLETION DATE</b>	
<b>PROPOSAL NUMBER</b>	A062-016-0685
<b>TITLE</b>	Weather Encounter Software Modeling Environment using Climatological and High-Resolution Weather Data
<b>PROJECT MANAGER</b>	Bill Coirier (256) 726-4800 <a href="mailto:tsb@cfdr.com">tsb@cfdr.com</a>
<b>COMPANY</b>	CFD Research Corporation 215 Wynn Dr., 5th Floor Huntsville AL 35805  Minority Owned: No Woman Owned: Yes Veteran Owned: No Number of Employees: 85
<b>KEYWORDS</b>	Global Climatological Analysis Tool (GCAT), Missile Weather Encounter, Particle Demise
<b>ABSTRACT</b>	<p>Weather encounter models for missile and flight vehicle system requirements are presently based upon simplistic and often misrepresentative conditions, particularly with respect to the spatial and probabilistic depictions of rain, ice, snow, dust and other particulates. We propose to address this deficiency by incorporating regional, three-dimensional climatological weather databases within a script-based weather encounter modeling environment. The modeling environment will produce operational statistics through Monte-Carlo simulations by virtually "flying" the flight vehicle model through the synthetic atmosphere, accounting for encounters with weather events such as rain, ice, snow and dust. The weather model is based upon the Global Climatological Analysis Tool (GCAT) that has been developed for the National Ground Intelligence Center (NGIC) by the National Center for Atmospheric Research (NCAR). We will evaluate the use of the GCAT model to produce statistically consistent weather realizations, stored in a gridded three-dimensional weather database and accessed during the missile trajectory fly-through. The AeroThermal Analysis Code (ATAC) will be used to demonstrate the coupling of this weather database through the use of the Python scripting language. The Python-based framework provides the construction of operational statistics through hundreds of model runs, flying the missile model through geographically, climatologically and statistically consistent synthetic atmospheres.</p>

**BENEFITS**

This new capability will provide critical technology to both the Government and Private sectors for evaluating the effects of weather encounter upon flight vehicles including missiles, aircraft and rotorcraft. All-weather capability for crucial missile defense systems and the effects of weather upon the operation and sustainment of flight vehicles and related systems may be more accurately and realistically assessed using this new capability. The potential commercial applications range from providing the synthetic weather capability to DoD Government contractors, non-DoD agencies, such as the National Aeronautics and Space Administration (NASA), as well as to other Private Industry stakeholders concerned with the Federal Aviation Administration (FAA) and National Oceanic and Atmospheric Administration (NOAA). The weather library and synthetic atmospheres may also be sold as add-ons to existing Modeling and Simulation environments for use in flight vehicle and battle management simulations.