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The strike warfare community requires accurate meteorological analyses and forecasts to properly plan and effectively execute tactical operations. This point was vividly illustrated during the Persian Gulf War and documented by the Center for Naval Analyses in its quarterly progress report of April-June 1991: "Analysis of Desert Storm TACAIR operations indicate that unfavorable environmental conditions were responsible for 29 Navy strike mission aborts or cancellations and for 63 strike diversions from the primary target. Moreover, at least one-third of all missions executed by Navy TACAIR were impaired by restricted meteorologic visibility."

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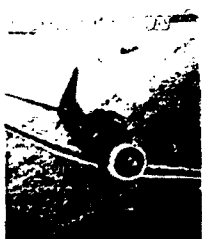
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FRONT COVER – Artist Morgan Wilbur's painting depicts the following flight from Henderson Field, Guadalcanal, on August 28, 1942: Flying a Douglas SBD *Dauntless* dive-bomber, Ensign Harold "Hal" Buell, with gunner ARM 3/C John Villarreal, attacked the Japanese destroyer *Shirakumo*. At dusk, they scored a direct hit on the warship, seriously damaging it and causing a great loss of life to the enemy. The SBD's aircrew then returned safely to their base.

RAdm. Riley D. Mixson

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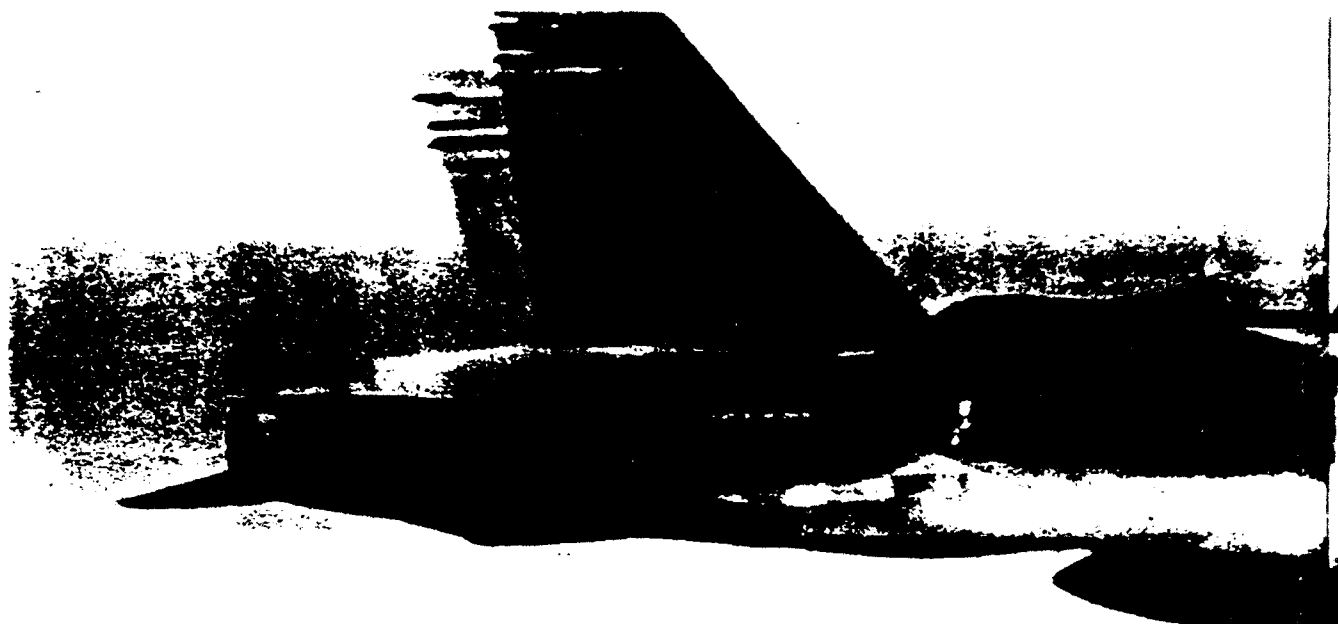
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# Tactical/Environmental Strike

By J. Michael Sierchio and Sam Brand

**T**he strike warfare community requires accurate meteorological analyses and forecasts to properly plan and effectively execute tactical operations. This point was vividly illustrated during the Persian Gulf War and documented by the Center for Naval Analyses in its quarterly progress report of April-June 1991: "Analysis of Desert Storm TACAIR operations indicated that unfavorable environmental conditions were responsible for 29 Navy strike mission aborts or cancellations and for 63 strike diversions from the primary target. Moreover, at least one-third of all missions executed by Navy TACAIR were impaired by restricted meteorologic visibility."

The Air Force Center for Studies and Analyses has examined the expected tactical gain of a land/air strike as a function of improved weather information. This study examined a central European winter tactical air strike scenario with an electro-optical weapons mix. The baseline selected for comparison was the target kill rate for operations for which there was no weather data support. Improvement in tar-

get kill rate was tracked as the level of weather support increased. When limited weather data was available, there was an increase of roughly 22 percent in the target kill rate. When weather data classified as "good" was available, the increase in kill rate was approximately 40 percent. Finally, when the weather forecast provided was "perfect," the increase in target kill rate was 60 percent.

The advent of "smart weapon" technology has resulted in a new arsenal of sensors and weapon systems which are extremely accurate. Unfortunately, as is often the case with sophisticated equipment, this increased accuracy comes at a cost. Not only are these systems expensive, but they are also very sensitive to environmental conditions, such as precipitation. Strike planners must know beforehand if environmental conditions will permit use of such costly systems with a high likelihood of success. Also, aircrews should not be placed at risk carrying a weapon into a hostile zone when environmental conditions would preclude its use.

While meteorological information is important, it is generally more valuable to the tactical decision maker if it is presented in a tactically relevant form. An example of such an environmental tool is the automated electro-optical tactical decision aid (EOTDA) under development at the Naval Research Laboratory, Monterey, Calif. This product was derived from the Mark III EOTDA, which was originally developed at the U.S. Air Force Phillips Laboratory. These EOTDAs (one each for infrared, laser, or television systems) are simply computer programs which process information concerning the target, its background, the weapon system and the environment, and produce output in the form of predictions of system detection or lock-on ranges.

The automated EOTDA under development will reside on the third phase of the Tactical Environmental Support System (TESS (3)). TESS is an on-scene workstation with many environmental applications and a data base containing information from a variety of sources, including numerical model output, meteorological

