SBIR 06.2 PHASE I - AWARD DETAILS	
ORGANIZATION	ARL
TOPIC NUMBER	A06-082
CONTRACT NUMBER	
YEAR OF AWARD	
AWARD START DATE	
AWARD COMPLETION DATE	
PROPOSAL NUMBER	A062-082-2760
TITLE	Multifunctional Erosion Resistant Coatings for Turbine Engine Components
PROJECT MANAGER	Derek D. Hass (434) 977-1405 derekh@directedvapor.com
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KEYWORDS	thermal barrier coatings, erosion, multifunctional coatings, foriegn object damage, physical vapor deposition
ABSTRACT	Advanced thermal barrier coating systems are desired for gas turbine engines. These coatings will increase the durability of hot-section engine components to significantly improve the time “on-wing”, safety and readiness of these engines. In this work, we will use novel coating synthesis techniques that enable the deposition of advanced compositions and microstructures to achieve a comprehensive thermal barrier coating system that provides vastly improved resistance to damage from erosion. A low cost, high throughput processing approach for the application of this TBC system is also envisioned. The proposed Phase I effort will identify erosion protection concepts that are anticipated to meet the performance goals at both current and future engine operating temperatures and demonstrate the feasibility of applying these concepts using our advanced processing techniques. The successful completion of the Phase I work will lead to a follow-on Phase II program focused on down-selecting candidate approaches for optimization and applying the new coating onto real aircraft components. Success in this objective will offer the military a pathway toward production implementation of these advanced coatings and the new deposition processing capabilities required for applying coatings of this type onto engine components.
BENEFITS	This research is anticipated to result in a thermal barrier coating system that provides unprecedented protection from erosion induced failures. This will enable the realization of many advanced gas turbine engine designs while leading to several percent thrust improvement or specific fuel consumption reduction for current turbine engines. These advances will not only benefit military engines and aircraft, but also commercial gas turbine engines. In addition, the innovative approach proposed here will reduce the time and

	expense for refurbishing and repairing blades during engine overhauls, thus improving military readiness and reducing the cost of maintaining commercial aircraft.