Next Generation CB Protective Materials:
Managing the Dynamics between Protection and Thermal Burden

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Dynamic Multifunctional Materials for a Second Skin [D(MS)^2]

D(MS)^2 METRICS

State	Thermal and Moisture Management		CB Mitigation			Dynamics
			Stimulus		Overall Response	
Battledress	MVTR (g/m^2-day)	≥ 4000	N/A		Offeror define inherent protection factor	*N/A*
	Thermal resistance ($m^2 \cdot °CW^{-1}$)	≤ 0.03				
Chemical Protective	MVTR (g/m^2-day)	≥ 1,000	HD, GD, VX Bacillus Anthracis 21 – 49 ºC 15 – 99% RH	Liquid	**Shed** agent with minimal environmental impact	*4 min*
				Vapor	Allow permeation 0.4% Decontamination rate .35 ug/cm^2 per min	
	Thermal resistance ($m^2 \cdot °CW^{-1}$)	≤ 0.03		Aerosol	**Provide:** log 3 kill over 1 hour	

D(MS)^2 PROGRAM AT-A-GLANCE

Program Vision: Create Adaptive C/B IPE

Program Approach: Develop stimuli-responsive (S-R) garment platform

Program Goals:

(Basic) Advance understanding of S-R polymeric systems

(Applied) Exhibit performance of "molecular algorithm" within S-R polymeric platform

(Applied) Assess integration of S-R platform with current garment platforms

BA1 Scientific Objective: Understand the following within S-R polymeric materials

- Influence of stimuli
  - intensity
  - chemical and physical specificity
- Dynamics of response
- Amplitude of response
- Reversibility of response

BA2 Scientific Objective: Engineer S-R garment platforms

- Verify S-R mechanisms (i.e. molecular cascade)
- Validate S-R mechanisms
- Assess performance (chemical protection, MVTR)

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