NRC·CNRC

Security Materials Technologies

Superior protection through advanced materials

National Research Council Canada
Conseil national de recherches Canada

Canada

The Security Materials Technologies (SMT) research program is delivered by the National Research Council of Canada in partnership with Defence Research and Development Canada.

1. Rigid Ballistic Composites

- Ballistic resistant material based on aramid fibres and a proprietary thermoplastic matrix for the next-generation of PPE and spall liners
- Superior ballistic protection level-to-weight ratio
- High ballistic protection level-to-cost ratio
- Increased temperature resistance compared with other polymer composites

2. Improved Transparent Armour

- Reduce weight and improve ballistic efficiency and mechanical properties
- Enhance energy transmission and absorption to prevent premature failure at the ceramic-adhesive interface
- Reduce delamination with adhesives that are resistant to temperature, moisture, dust, UV light and process-induced stresses
- Match refractive index of adhesives to eliminate visible edges/gaps between tiles
- Develop hydrophobic hard coatings which are scratch resistant and anti-fog

3. Lightweight Bulk Ceramic-Metal (Cermet) Tiles

- Reduce weight and improve ballistic efficiency and mechanical properties
- Replace traditional alumina, silicon carbide, titanium diboride and/or boron carbide ceramic armour
- Anticipated characteristics:
  - Low density: 2.5 to 5 g/cm^3
  - Hardness: 18-20 GPa
  - Toughness: ≥ 10 MPa·m$^{1/2}$
  - Bending strength: ≥ 400 MPa
  - Compressive strength: ≥ 2000 MPa

4. Flight Disruptor

- Lightweight composite panel
- Reduce a projectile's ballistic efficiency by disrupting the angle of attack and inducing a yaw angle

The National Research Council of Canada is one of the few organizations in the world with integrated world-class expertise in engineered materials processing and performance, currently focused on the design, testing and production of advanced protection products.

Defence Research and Development Canada has unmatched capabilities and experience in assessing and validating novel armour systems.

Together through the Security Materials Technologies program, we are supporting the reduction of areal densities of traditional in-service and next-generation vehicle and personal armour systems, while increasing performance and decreasing cost and time of production.

Photos: Corporal Shilo Adamson, Canadian Armed Forces, Combat Camera ©2010 DND-MDN Canada (cover); MCpl Robert Bottrill, Canadian Forces Combat Camera © 2007 DND-MDN Canada

We can help you make better protection systems by:

- Improving the performance of conventional armour materials;
- Developing new nano-modified or hybrid materials and armour structures;
- Devising improved manufacturing and integration methods;
- Accelerating development and validation of new products; and
- Assessing product performance through testing.

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www.nrc-cnrc.gc.ca/eng/solutions/collaborative/smt.html

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