

DEFENCE **R&D** DÉFENSE

**Environmental Applications of Hyperspectral Remote Sensing**  
Ongoing activities at DRDC Valcartier

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*Workshop on Environmental Science, Technology and Society (ENTS), RMC, Kingston, 28-29 Jan 2010*

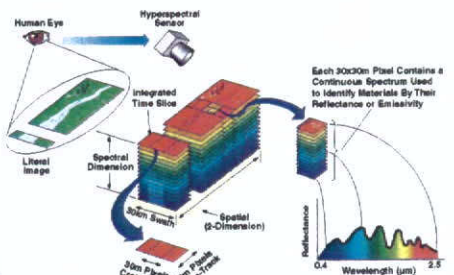
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**Presentation Outline**

- Hyperspectral 101
- Sustainable training
- Mapping invasive species at CFB Suffield
- Trafficability tool for environmental applications
- Search and rescue
- Sea oil spills
- Toxic industrial chemical (TIC) effects on vegetation
- TIC detection

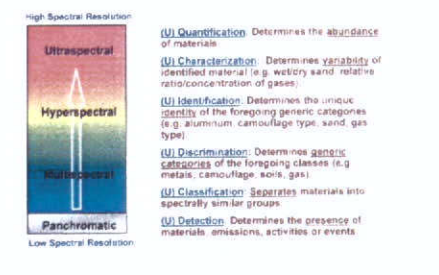
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**Hyperspectral Imagery**



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**Spectral Resolution**

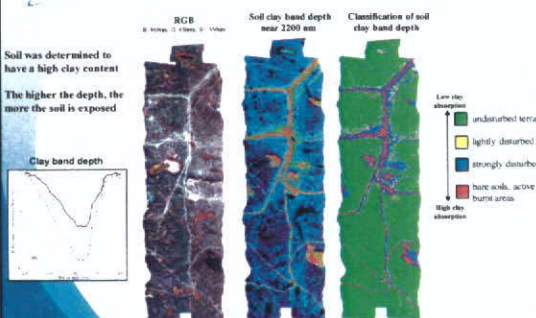


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**Environmental Monitoring for Sustainable Training**  
CFB Suffield training areas

Soil was determined to have a high clay content. The higher the depth, the more the soil is exposed.

Clay band depth



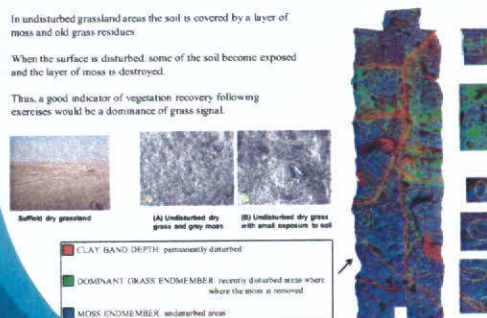
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**Environmental Monitoring for Sustainable Training**  
CFB Suffield training areas

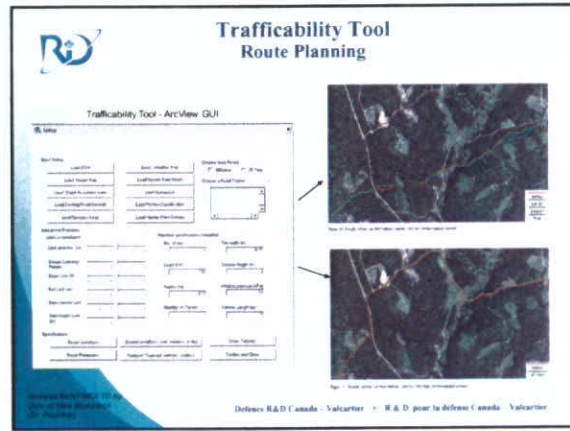
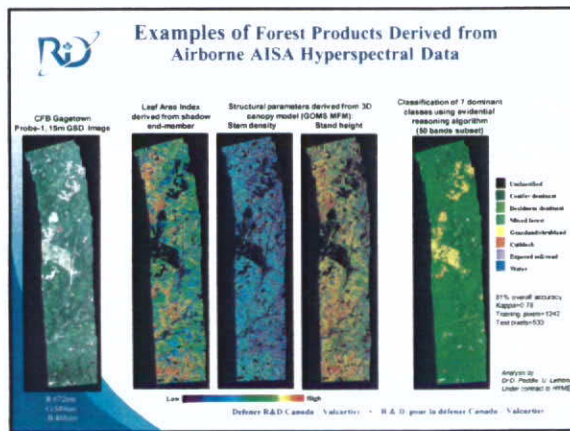
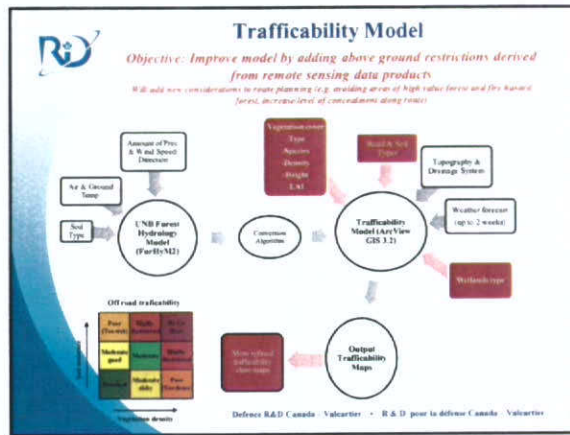
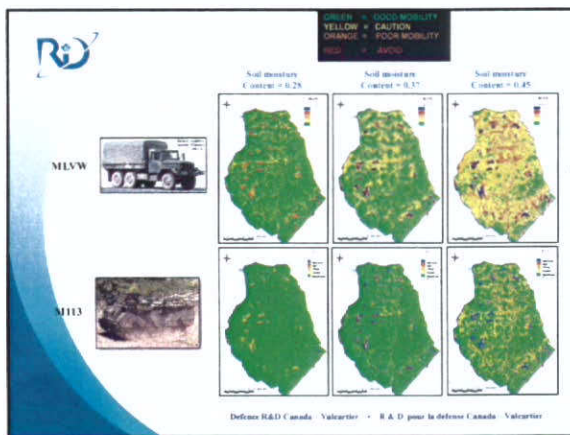
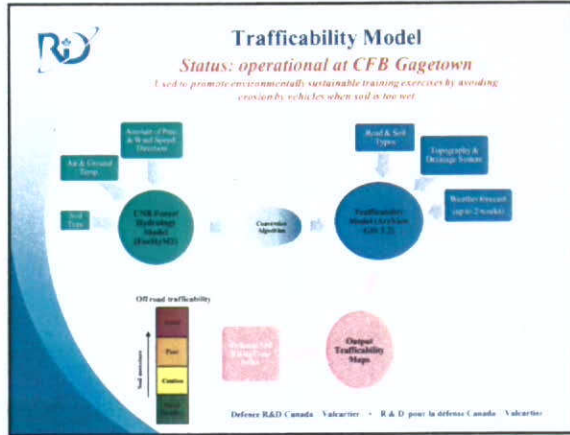
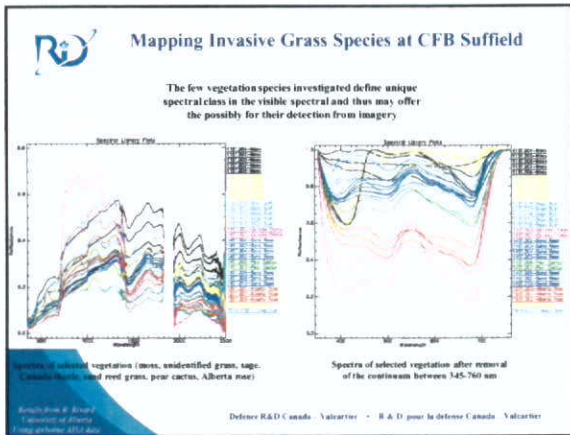
In undisturbed grassland areas the soil is covered by a layer of moss and old grass residues.

When the surface is disturbed, some of the soil become exposed and the layer of moss is destroyed.

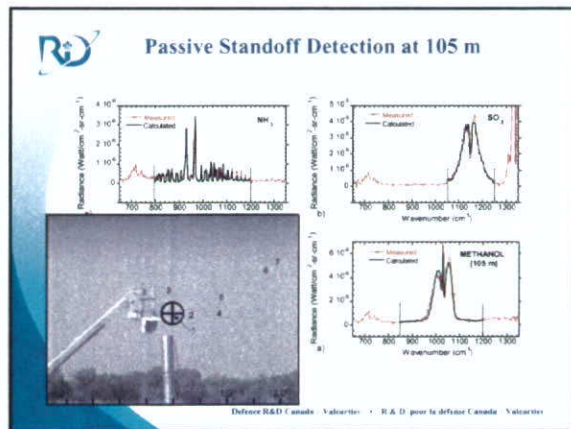
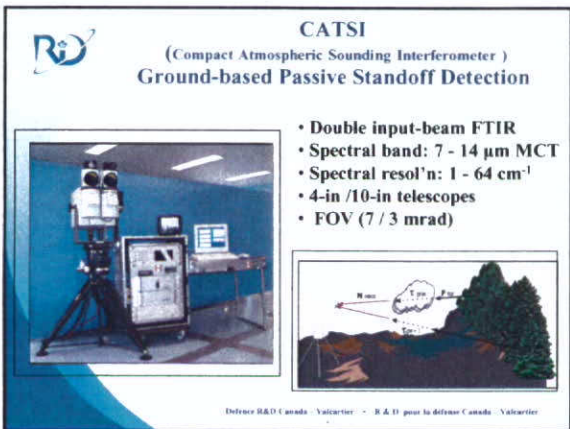
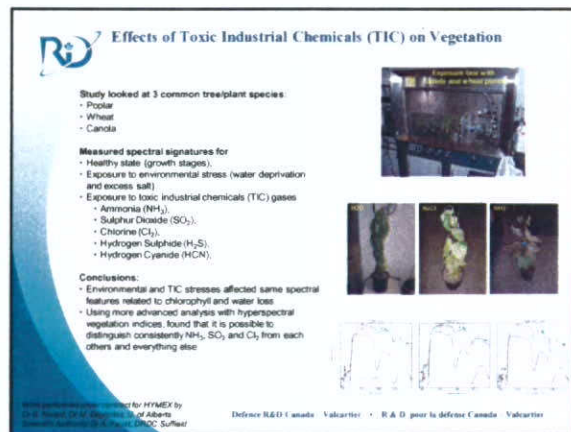
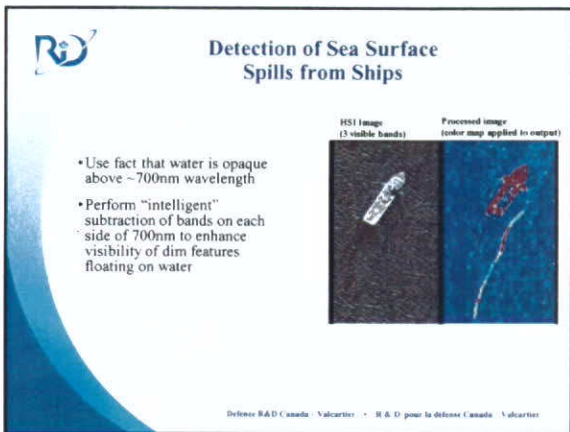
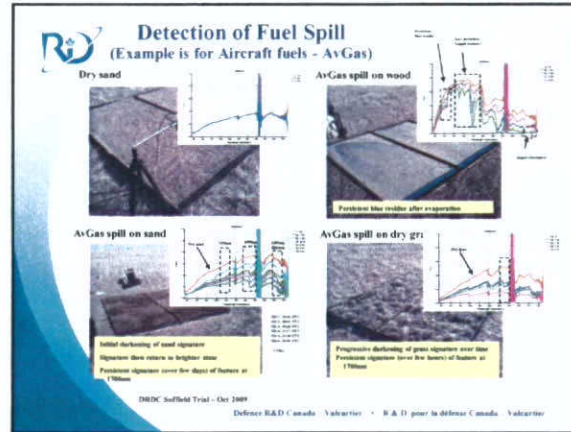
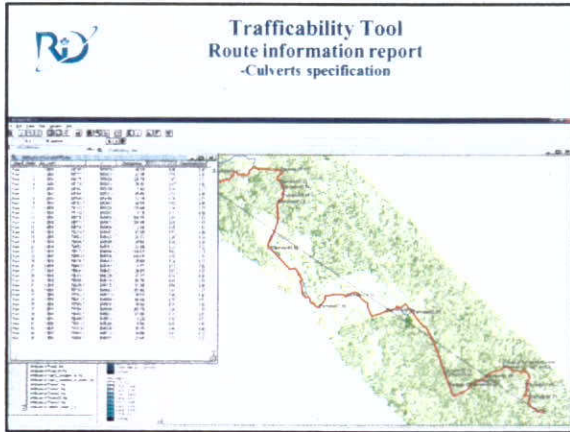
Thus, a good indicator of vegetation recovery following exercises would be a dominance of grass signal.



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### Passive Standoff Detection at 6 km

Chimney vent      Source gas

FOV @ 6 km

SF<sub>6</sub>

Spectrum (RL)

Real-time detection

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### Telops Hyper-Cam – Airborne HSI Sensor

IMC mirror

LW      MW

Gyro-stabilization

- FOV = 6.4° x 5.1°, 320x256 array, IFOV=350 µrad
- 8-11.5 µm spectral resolution: 0.25-150 cm<sup>-1</sup>
- Light weight – 29 kg, low power – 150 W on 28VDC
- On-Board Real-Time Processing (4 GB SDRAM)
  - Image windowing, pixel co-addition
  - Calibration
- 2 internal calibration blackbodies
- Integrated bore sight visible camera

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### Airborne Detection of SO<sub>2</sub> at Industrial Site Using Telops Hyper-Cam

Industrial Chimney

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Thank you!

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