



# RadThermIR<sup>®</sup>

## Thermal/IR Analysis Software



### Principal Features

#### Complete Thermal Analysis

- Multi-bounce Radiation
- Solid, Planar, Cylindrical & Spherical Conduction
- Convection, 1D Fluid Streams
- Import CFD Results
- Natural Environments
- Ballistic & Standard Glass

#### EO/IR Signature Prediction

- Multiband Radiance & Apparent Temperature Prediction
- BRDF Rendering
- Terrain and Sky Reflection
- Spectral Paint Surfaces & Camouflage Texturing
- Faceted Backgrounds

#### Accurate Backgrounds

- Terrain, Foliage, Multiple Surface Types
- First Principles and Measured Backgrounds

#### Benefits

- Integrated Thermal & EO/IR Solutions
- Faster Product Development
- Interfaced to Scene Simulators

### Advanced IR Analysis

RadThermIR is an advanced thermal and infrared program from ThermoAnalytics. RadThermIR will let the infrared analyst or specialist perform complete thermal modeling and infrared analysis within an integrated, easy-to-use interface.

#### Benchmark Speed & Accuracy

RadThermIR's highly-optimized algorithms handle even the most complex IR questions. Written entirely in C++, RadThermIR maintains speed and cross-platform compatibility across Windows, Linux, and Unix computers. A state-of-the-art voxel-based ray tracer is used to compute view factors, solar projected (apparent) areas, radiosity, apparent temperature and BRDF solutions. This ray tracer provides the fastest thermal and infrared solver on the market.

#### Realistic Natural Environment

Natural environments are supported through weather data files and solar loading based on global position. RadThermIR can also use atmospheric data from MODTRAN. Multi-bounce solar radiation is automatically calculated including greenhouse effects from solar radiation transmitted through glass. Faceted terrains provide full background interactions, including reflections and shadowing.

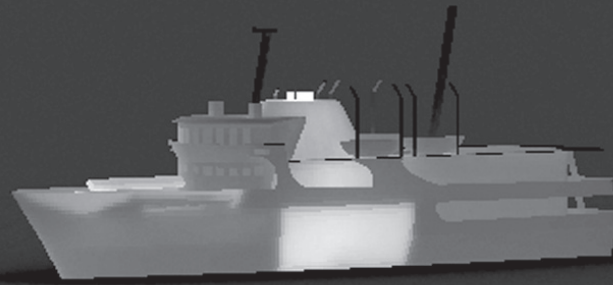
#### Near-IR Module

The Near-IR Module extends the effective sensor band range in RadThermIR and supports four environmental sources of radiance across the Near-IR waveband: lunar glow, atmospheric glow, skyshine, and urban glow.



# ThermoAnalytics<sup>®</sup>

v10.1



## New RadThermIR Features

### Transient Solid Conduction

Support for 3D solid and shell conduction  
Temperature dependent properties  
Internal imposed heat rates  
Clipping plane display of internal temperatures

### Human Thermal Simulation

Accurate human physiological models  
Supports complete range of body types  
Multi-nodal clothing layers  
Berkeley sensation and comfort output

### Advanced Rendering Module

Multi-Bounce BRDF model  
BRDF per pixel rendering  
Sub-pixel oversampling

### Near-IR Module

Includes four environmental sources: lunar and atmospheric glow, skyshine, and urban glow  
Simulation of night vision systems  
Survivability and probability of detection in low-light engagements

### Complex Multilayer Parts

Planar, cylindrical and spherical with up to 25 layers  
Mixed solid, air, vacuum, or transparent layers  
Multilayer conduction rules and links

### Battery Thermal Module

Perform coupled thermal-electrical analysis  
Transient charging and discharging cycles  
Analysis of individual cells, battery packs, and vehicle systems

## Total Thermal Solutions

**Predict Signature Data** – The EO/IR Signature post-processor displays physical temperatures, in-band radiances and apparent temperatures for every element or facet. Running the BRDF solver allows the user to predict target and background specular radiance images into a pixelized format.

**Improve Your Design** – Import your model geometry and change designs with ease. Manipulate the geometry within MuSES to optimize heat management and understand IR signatures relative to a time-varying environment or operating conditions.

**Utilize Faceted First Principle Backgrounds** – To predict accurate target-background contrast levels, MuSES fully supports faceted backgrounds. Create or import a faceted terrain and apply one or multiple background types to your geometry. Calculate accurate temperature/signature solutions—including full target background interactions.

**Integrate with CFD** – Seamless integration with CFD air flow results provides increased accuracy for convection.

