

ThermaGRAM[®]

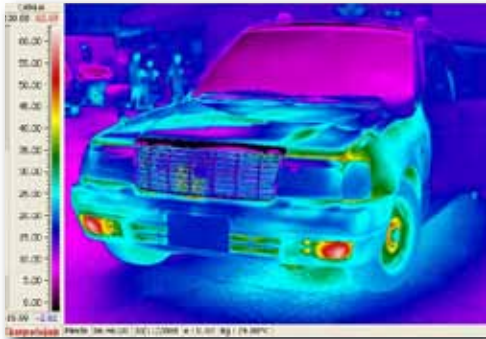
Real-time Thermal Analysis for Scientific and Industrial Applications



ThermaGRAM®

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What ThermaGRAM does...



ThermaGRAM is the mature, industry-standard thermal image analysis package for real-time data streams.

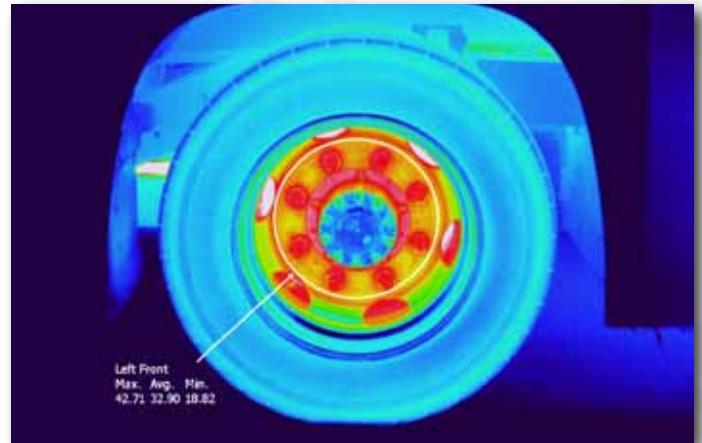
ThermaGRAM's graphical user interface performs detailed analysis of live or recorded data sequences and allows you to collate your data into professionally presented, easy to read charts, data sets and reports.

Multi camera vendor image format support:

ThermaGRAM analyses static images from a wide range of cameras as well as live sequences from Thermoteknix camera models.

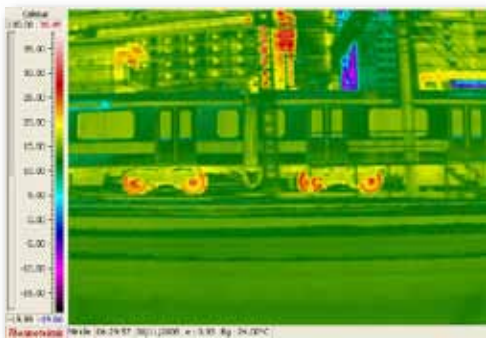
ThermaGRAM Static image support:

Thermoteknix	IR50, VisIR Ti-100, VisIR Ti-200, VisIR 640
FLIR	P60, Flir P40, T cam, "E" Range, PM 5XX, PM 6XX, Omega
NEC	7100, 7800, 9100
Inframetrics	6xx, 7XX, PM2XX, PM3XX, SC1000
AVIO	TVS -600, -700
Mikron	7600, 7604, 78XX



ThermaGRAM Live image support:

Thermoteknix	VisIR Ti 200, VisIR 640, Miricle 110K, 307K
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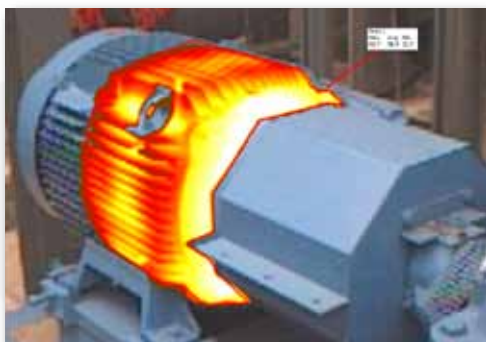
Export data in standard ASCII or JPEG formats:

Users very often need to get measurements made in ThermaGRAM into third party packages such as Mathcad for more detailed mathematical analysis of data. ThermaGRAM offers a number of ways in which data can be freely exported.

Data from measurement tools can be live linked to other packages that support windows OLE to allow data formatting and reporting in third party software such as Microsoft Excel. In addition, user defined area tools can be exported as ASCII tables from static frames in sequence files.

Live image feed

ThermaGRAM can receive live radiometric or non-radiometric feeds via the following input sources:

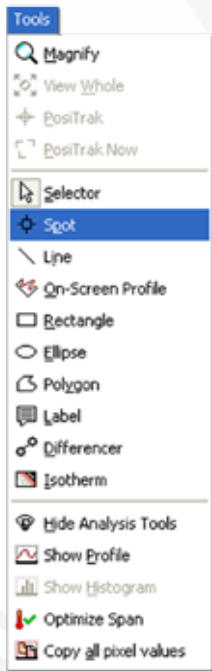


Input format	Cameras supported
IEEE 1394 firewire	FLIR Omega, Thermoteknix VisIR Ti200
USB 2	Thermoteknix Miricle 110K & 307K, Thermoteknix VisIR 640
GiGE (Pleora Iport)	Miricle 110K, 307K*, VisIR Ti200**

* Use of Miricle cameras with Pleora Iport requires purchase of optional LVDS de-multiplexer hardware.

** Use of VisIR Ti 200 with Pleora Iport requires purchase of Omega LVDS to Pleora interface device.

Image Analysis...

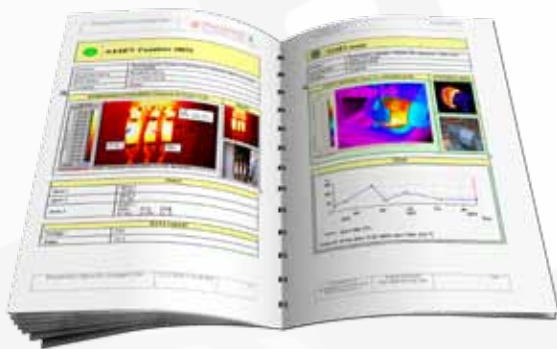
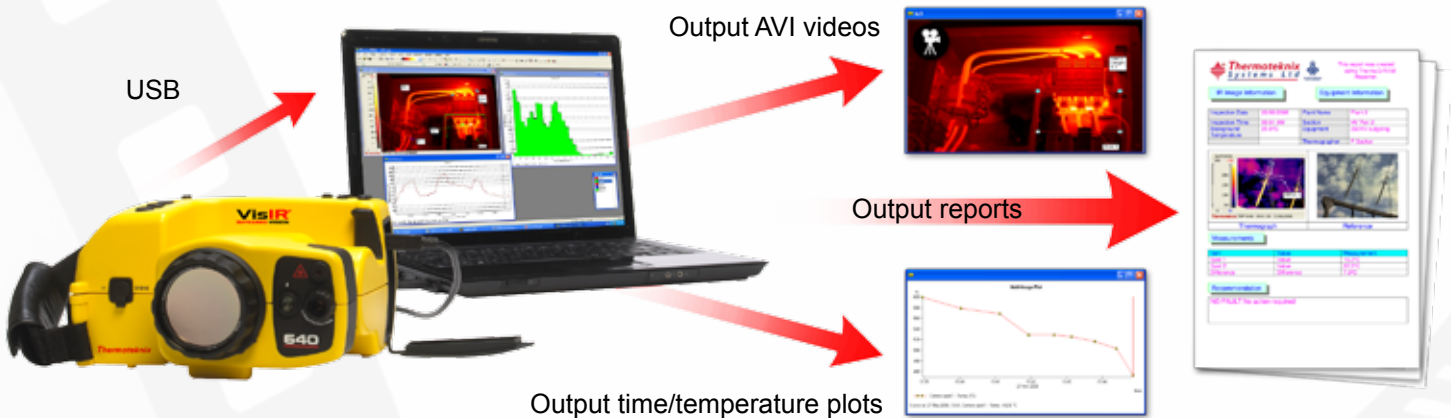


Static & real-time images can be processed from a wide range of thermal imaging cameras.

Analysis tools:		
Tool type	Description	Outputs
Spot tool	Provides measurement of pixel under the tool. An unlimited number of spot tools can be used on an image.	<ul style="list-style-type: none"> • Single value
Line tool	Two point (Single) or multipoint (Poly-line) tool with freehand Line tool option. An unlimited number of line tools can be used on an image.	<ul style="list-style-type: none"> • Line length • Max, Avg, Min Value • Input to line chart tool
Line Profile	An overlay on the thermal image showing a graphical representation of the temperatures under the single line between two points in the image. Includes Max, Average and Min line options as well as a moving cursor for on-screen temperature measurement. A single line profile can be used on an image.	<ul style="list-style-type: none"> • Line length • Max, Avg, Min Value
Rectangular area tool	User definable rectangular area tool. All pixels within the area are processed to calculate Max, Ave and Min Values	<ul style="list-style-type: none"> • Area • Max, Avg, Min value • Data within area saved as ASCII
Ellipse Area tool	User definable elipsoidal area tool. All pixels within the area are processed to calculate Max, Ave and Min Values	<ul style="list-style-type: none"> • Area • Max, Avg, Min value • Data within area saved as ASCII
Polygon area tool	User definable polygon area tool, drawn between discrete points or as a "freehand" line. All pixels within the area are processed to calculate Max, Ave and Min Values	<ul style="list-style-type: none"> • Area • Max, Avg, Min value • Data within area saved as ASCII
Difference tool	User can select any two measurement tools and the difference tool will output the value. User can select one or more variable (Max, Avg, Min) from multi-output tools.	<ul style="list-style-type: none"> • Difference value (spot) • Difference for Max, Avg, Min (multi-output tools)
Text label	Ability to add text labels to images	<ul style="list-style-type: none"> • Text in display output
Isotherm tool	User defined Isotherms (10-off) with individual upper and lower temperature limits. Individual Isotherms can be false coloured with single or Palletised range of colours	<ul style="list-style-type: none"> • Isotherms appear in display output.

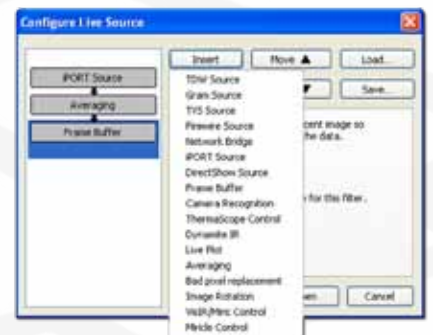
Connect...

The ThermoGRAM Work Flow



Report generation

The ThermoGRAM package can also be used in association with the "Reporter" software module to facilitate quick report generation via Microsoft Word templates. Users can select one or more images for inclusion in reports based on pre-defined templates or templates designed to the user specification. Both visible and thermal images are incorporated in report templates along with optional features such as charts and graphs.



Flexible Pipeline Configuration

The image processing pipeline in the ThermoGRAM software can be configured to suit the user application and latency needs or requirements.

Pipeline process	Type	Description
TDW source	Input source	Recalled live sequence from *.tdw file
Direct Show Source	Input source	Used when the input source is from a USB2 device (Used with Miricle and VisIR 640)
Firewire Source	Input source	Used when the input is via IEEE 1394 firewire device (Used with VisIR Ti 200 or FLIR Omega)
Iport Source	Input source	Used when the input source is from a GiGE Device (Used with Miricle cameras in conjunction with LVDS De-multiplexer)
Frame buffer	Timing buffer	Used at the end of pipeline to ensure whole frame is available
Dynamite IR	Storage	Enables frames to be spooled to disk in real-time.
Live Plot	Plotting	Enables "Plot" to generate a time Vs temperature chart from incoming frames.
Averaging	Frame average	Allows multi-frame averaging for noise reduction in low dynamic scenes.
Image rotation	Rotation	Allows rotation of the output display
Miricle control	Interface	Allows Radiometric data to be accessed, for use with Miricle and VisIR 640 camera types.

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Real-time image sequence storage and recall



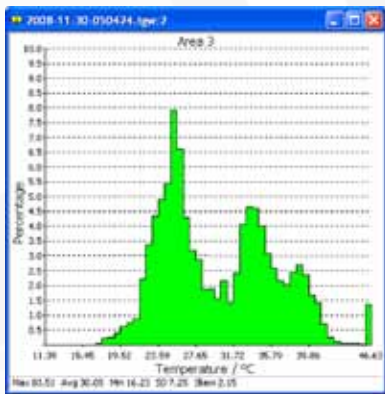
ThermaGRAM has an integrated real-time sequence recording and replay system. Image sequences (Video) is recorded into a proprietary file format which retains radiometric data (TDW). The storage facility can be initiated by a keyboard or mouse click, or by data within the video reaching trigger events.

During recall the user can select the playback speed and crop the video to show only the most important sections of the video. A sequence information display window also shows information such as, Real-time sequence start & Finish, plus sequence duration and current position within the sequence. Users can step through a sequence one frame at a time if so desired. The playback

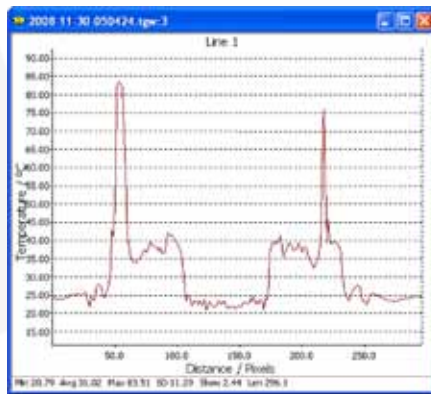
can also be used in conjunction with the Real-time tools such as areas, spots and the PLOT facility. This ensures that time critical events can be post-processed at the user's convenience.

Integral charting and graph generation (Live data)

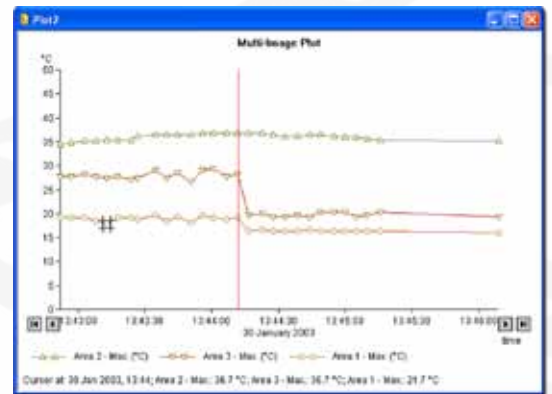
There are a number of integral graphical charting tools within the ThermaGRAM package:



Histogram



Line Profile Chart



Plot Chart

Histogram - This chart generates a live histogram of the pixels contained within any of the three (Rectangular, Ellipsoidal and Polygon) area tools. Graphs of live or static data can be exported to third party software supporting Microsoft's OLE (Object Linking and Embedding). Compliant packages include, Excel, Word and Open office.

Line Profile Chart - This chart Generates a live display of the pixel values for a line tool in a new window. Graphs of live or static data can be exported to third party software supporting Microsoft's OLE (Object Linking and Embedding). Compliant packages include, Excel, Word and Openoffice.

Plot Chart - This chart generates a time / temperature chart for one or more tool variables. The chart can be generated from a number of individual static images or "On the fly" from a live data source such as VisIR 640.

Image filters - ThermaGRAM can also be used to apply industry standard and unique Convolution filter techniques to the incoming images.

Multi-image averaging, trending, peak pick, valley pick - Process frames of information and pick maximum (Peak), Minimum (Valley) or Average values in a sequence.

Export live data via OPC: (Optional) - In addition to the OLE (Object linking and Embedding) Facility within ThermaGRAM there is a secondary option to add an OPC server to the ThermaGRAM package. OPC allows data from tools or whole areas of an image to be output from ThermaGRAM using the platform independent OPC interface over any available local network connection.



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Real-time Thermal Analysis for Scientific & Industrial Applications

ThermaGRAM is a real time data acquisition, storage and analysis solution for thermal imaging systems.



Authorised Thermoteknix Agent



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Specification subject to change.

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