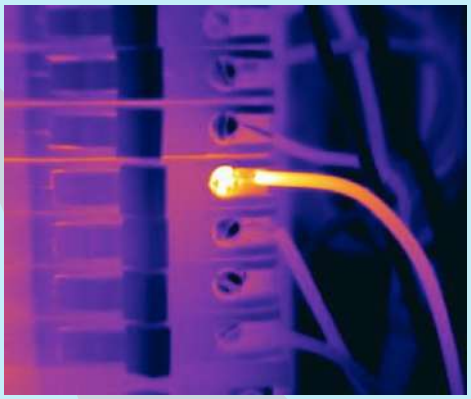
AGILE MICROSYS (P) LIMITED

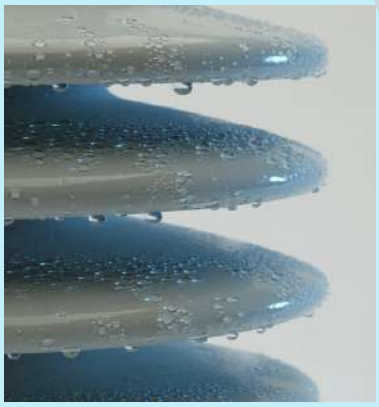


THERMAL IMAGING & AUTOMATION ENGINEERING

CABLE FAULT LOCATOR & MEASUREMENT INSTRUMENTS

Electrical Mechanical Leaks Steam Traps Lubrication

ULTRASOUND INSPECTION TEST SOLUTIONS



RTV SILICONE COATING

AGILE MICROSYS Pvt. Ltd.

Condition Monitoring Equipment's

Principal Company – SDT Ultrasound Solutions, Canada

Ultrasound Monitoring & Inspection

Ultrasound monitoring is a universal multi-purpose tool for mechanical & electrical inspections.

Typical application in Mechanical sector includes

Leak Detection of Compressed Air, Vacuum, Specialty gasses, Steam Traps / Valves
Bearings Condition Monitoring, Analysis and Lubrication

Typical application in Electrical sector includes

Detection of Corona/ Tracking/ Arcing in all type of insulators
Detection of Partial Discharges in live Power Transformers
Detection of Partial Discharges in live closed HT/LT Panels

Ultrasonic Inspection kit i.e. Ultraprobe comes in varied models along with vast option of sensors like Non-contact sensor, Magnetic sensor, Telescopic sensor, Touch type sensor etc.

Principal Company – FLIR Systems, Sweden

Thermal Imaging Camera

Best Non-contact Hot Spot detection Infrared Camera with vast options of various models to suit every possible need and pocket

Major Highlights -

- Camera starts from INR 25,000/- only
- 80x60 pixels to 1024x768 pixels
- Available up to 2000 deg. C
- 10 years warranty on Infrared Detectors (The costliest part of unit)

AGILE MICROSYS Pvt. Ltd.

Instrumentation

Principal Company – FLIR Systems, Sweden

Borescope

Rugged design varied options of Cameras with length of cable from 1 mtr to 30 mtr

Test & Measurement Range

- ✓ Multi Meters with Inbuilt Thermal Imaging Camera
- ✓ Clamp Meters with Inbuilt Thermal Imaging Camera
- ✓ Infrared Thermometers
- ✓ Moisture Meters with Inbuilt Thermal Imaging Camera

Principal Company – Extech, USA (A FLIR Company)

Major product includes:

- ✓ Carbon Dioxide/ Carbon Monoxide meters
- ✓ Particle Counters
- ✓ Battery Tester
- ✓ Electromagnetic Field Meters
- ✓ Force Gauges
- ✓ Natural/ Combustible/ Refrigerant Gas leak detectors and analysers
- ✓ Earth Ground Resistance Testers
- ✓ Humidity/ Moisture Meters
- ✓ Oscilloscopes
- ✓ Phase Sequence/ Motor rotation Testers
- ✓ Thickness Gauges
- ✓ Vibration Meters

AGILE MICROSYS Pvt. Ltd.

Instrumentation

Principal Company – FLIR Systems, Sweden

Automation Grade Thermal Imaging Camera

Vast options of Infrared Camera for 24 x 7 Thermal Automation application and requirements with possibility of customized solution designing.

Major Highlights -

- Customized Software application as per requirement
- Major application includes
  - Coal Fire Monitoring
  - 24x7 Substation Thermal monitoring
  - Process automation and control based on temperature
  - Molten metal monitoring and control
  - 24x7 Hot spot detection in open areas like Petro-chemicals, Refineries, Fertilizer plants etc.

UAV Grade Cameras –

Gimbal based Thermal Cameras installed over UAV/ Drones in 2 resolutions as follows-

- High Resolution (640x512 pixels) with Radiometric feature to measure temperature of any spot with in entire image
- Low Resolution (336x256 pixels) with Radiometric feature to measure temperature of any spot with in entire image

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Instrumentation

Principal Company – SONEL S.A, Poland

Major product includes:

- ✓ Insulation Resistance Tester
- ✓ Tower Foot Resistance Meter
- ✓ Power Quality Analyser
- ✓ Cable Fault Locators
- ✓ UV Cameras to detect Corona
- ✓ Earth Resistivity Meters
- ✓ Micro-Ohm Meters
- ✓ Pyrometers

Load Banks

We design & Deliver Load Bank (Resistive or Inductive)

- 24V to 750 V AC/DC
- 2Amp to 2000 Amp.

Purpose of load bank is to accurately mimic operational or "real" load that power source will see in actual application. However, unlike real load, which is likely to be dispersed, unpredictable and random, load bank provides organized and fully controllable load enables user for accurate testing/ inspection.

Applications –

- ➢ Factory testing of power equipments such as Engine diesel Generator, Turbines,
- ➢ Reduction of wet stacking problems,
- ➢ Periodic exercising of stand-by engine generator sets,
- ➢ Battery/ UPS testing,
- ➢ Ground power testing,
- ➢ Load optimization in Prime Power applications,
- ➢ Removal of carbon build-up on piston rings
- ➢ Load Rejection test etc.

AGILE MICROSYS Pvt. Ltd.

AGILE's Thermal Automation Division (AGILE-Therm)

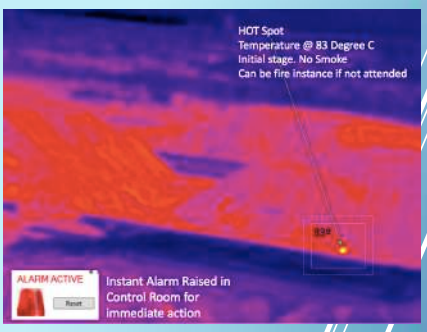
Agile-Therm designs solution in order to cater Temperature based Automation needs of Railways, Power Sector & Process Industries. Overlay of solution revolves around Thermal Imaging Cameras manufactured by world leading organization in Infrared Imaging technology i.e. FLIR SYSTEMS.
Courtesy team of Thermal Image processing experts backed up by their global exposure, the solution is designed exactly as per Indian customer/ environment.

Major Solutions designed by Agile-Therm and finding its pace are as follows:

1. OHE Catenary Hot Spot Detection Solution

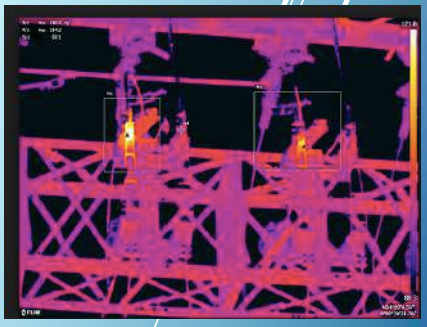
- Thermal Camera installed over Roof Top of Train,
- Detects Hot Spot over OHE Cable,
- Log the hot spot alarm with details like Hot Spot Temperature, Date & Time, GPS Location, Nearest Railway Pole No., Hot Spot Thermal Image

2. Coal Pile Thermal Monitoring



- Thermal Cameras installed over high mast in Coal yard at strategic location
- Cameras rigged with Pan/Tilt to ensures minimum cameras requirement.
- Hot spot alarm logged in control room having wireless connectivity
- Alarm event saved with information's like Hot Spot Temperature, Date & Time, Location of hot spot, Hot Spot Thermal Image

3. Grid Thermal Remote Monitoring



- Thermal Cameras installed over high mast in Switch yard at strategic location
- Cameras rigged with Pan/Tilt to ensures minimum cameras requirement.
- Hot spot alarm logged in control room having wireless connectivity
- Alarm event saved with information's like Hot Spot Temperature, Date & Time, identification of hot spot, Hot Spot Thermal Image

4. Miscellaneous Thermal Automation Solutions for process Industries

AGILE MICROSYS Pvt. Ltd.

OHE Catenary Hot Spot Detection Solution

With revolutionary increase in electrification in Indian Railways, load on OHE Catenary is increasing day by day. OHE cable encounters regular friction & electric spark due to high current. This results in Hot spot over OHE which can lead to break down if not attended well in time.
Conventionally, Thermal Imaging camera is used manually across the line to detects Hot spots. To scan hundreds of Kilometers for every zone is very time consuming & cumbersome procedure with chances of human error.

Solution designed by Agile-Therm uses automation grade Thermal Camera from Flir and eliminates human intervention for Hot Spot Detection.

- FLIR's camera installed over Roof Top of Train in IP66 enclosure over Pan/Tilt for camera operation in all weather conditions with controlled camera positioning

- Detects Hot Spot instantly from a distance till +120 KMPH train speed

- Image Processing Unit installed in Train coach Log the hot spot alarm with details like Hot Spot Temperature, Date & Time, GPS Location/Nearest Pole No., Hot Spot Thermal Image

7/19/2011 12:45:28 PM
"120/62, "120/63", 6.5, 71°C, "DN SL", "HWH"

Date & Time
Start Pole, End Pole, Distance from Start pole, Max. Temp., Division, Section

- Alarm log downloaded in excel format for further action

S.No	AlarmTime	MaxTemperature	Location	Section	Distance from Pole(mtr)	Latitude	Longitude	Image Link
1	6/11/2018 10:21	50.1 °C	8/21	VASI PF	6	28.65032	77.3404667	Show Image
2	6/11/2018 10:26	52.5 °C	8/21	VASI PF	6	28.65032	77.3404667	Show Image
3	6/11/2018 10:33	51.0 °C	23/47	Dwarka Sec.13 - Dwarka Sec.12	10	28.597645	77.03276	Show Image
4	6/11/2018 10:36	51.0 °C	25/35	Dwarka Sec.12 - Dwarka Sec.11	2	28.5874983	77.0479167	Show Image
5	6/11/2018 10:39	51.8 °C	26/39	Dwarka Sec.11 - Dwarka Sec.10	4	28.5818883	77.056325	Show Image
6	6/11/2018 10:47	65.8 °C	29/57	Dwarka Sec.8 - Dwarka Sec.21	56	28.5592833	77.064415	Show Image
7	6/11/2018 10:49	66.6 °C	29/57	Dwarka Sec.8 - Dwarka Sec.21	56	28.5592833	77.064415	Show Image
8	**6/11/2018 11:03**	**71.2 °C**	**25/26**	**Dwarka Sec.11 - Dwarka Sec.12**	**1**	**28.5886133**	**77.0462067**	**Show Image**
9	6/11/2018 11:17	69.7 °C	17/69	Uttam Nagar (W) - Nawada	11	28.6218783	77.0565067	Show Image

AGILE MICROSYS Pvt. Ltd.

Coal Pile Thermal Monitoring - CPTM

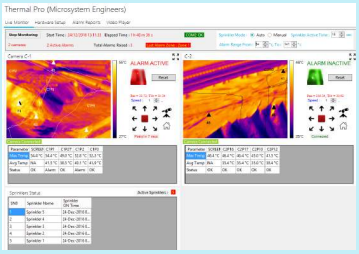
Spontaneous combustion in coal piles is a critical problem which lead to burning of coal. This results in Coal wastage, CV value deterioration, Emission of hazardous gases like methane/ Carbon Monoxide, Fire accidents and thus loss of revenue due to damage and production halt.
It is therefore of utmost importance to detect and locate hot spots in Coal Pile in early stage so that, immediate action can be taken to avoid coal fire.

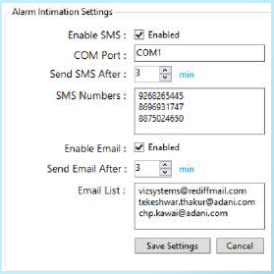
But Coal Piles are fairly big sized making it impossible to detect/ locate hot spot instantly. Hence, fully automated solution is required.

Solution designed by Agile-Therm uses automation grade Thermal Camera from Flir and eliminates human intervention to detect and locate Hot Spot with option of auto sprinkler activation for respective hot spot area only.

- Cameras installed over 20-25 mtr high mast in Coal Yard at strategic location in IP66 enclosure over Pan/Tilt for operation in all weather conditions with camera movement on both axis.

- Wireless/ wired interface with Server in Control room. Software accommodates up to 8 cameras. Hot spot detected instantly and extends Audio/Visual/SMS/E-mail alarms. Intelligent software application ensures NO FALSE ALARMS like hot spot in moving objects etc.

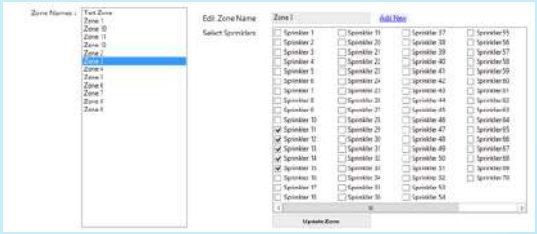




- Alarm extended with all details including location of hot spot

Hot Spot id - 1594
Alarm Time - 23-Dec-2017 11:53:50
Zone Name: Zone 8
Point Name: C1P3
Hot Spot Temp: 156 Deg. C

- CPTM can be configured with existing sprinklers to activate sprinklers of Hot-Spot zone only



- Alarm log downloaded in excel format for further action

S.No	Camera	Zone	Point	Max Temperature	Alarm Time	Image Link
1	C-2	Zone 11	C2P23	122.2 °C	21/03/17 15:51	Show Image
2	Camera C-1	Zone 7	C1P39	80.1 °C	21/03/17 15:41	Show Image
3		Zone 2	C1P22	78.5 °C	21/03/17 14:48	Show Image

AGILE MICROSYS Pvt. Ltd.

Grid Thermal Remote Monitoring - GTRM

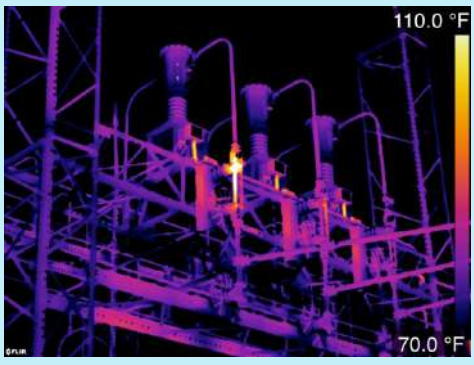
Electrical Substation have lots of complex electrical arrangement and any anomaly in the substation likely to start with initialization of Hot Spot. For decades, portable Thermal Cameras were serving the purpose of detecting Hot-spots. But with electrical advancement, utilities also face costly unplanned maintenance/ break-downs.
It is therefore of utmost importance to detect and locate hot spots in sub-station instantly so that, immediate action can be taken to avoid heat loss and break-downs. Hence, fully automated solution is required.

Solution designed by Agile-Therm uses automation grade Thermal Camera from Flir and eliminates human intervention to detect and locate Hot Spot with option of multi level alarms.

- Cameras installed over 20-25 mtr high mast in substation at strategic location in IP66 enclosure over Pan/Tilt for operation in all weather conditions with camera movement on both axis.

- Wireless/ wired interface with Server in Control room. Software Application accommodates up to 8 cameras. It detects hot spot instantly with Audio/Visual/SMS/E-mail alarms.

- Alarm extended with all details including location of hot spot



Hot Spot id - 1594
Alarm Time - 23-Dec-2017 11:53:50
Zone Name: Zone 8
Point Name: CT 23 Phase R
Hot Spot Temp: 80 Deg. C

- Alarm log downloaded in excel format for further action

S.No	Camera	Zone	Point	Max Temperature	Alarm Time	Image Link
1	C-2	Zone 11	T/f 2 Bushing R Phase	122.2 °C	21/03/17 15:51	Show Image
2	C-1	Zone 7	CT 23 Ph R	80.1 °C	21/03/17 15:41	Show Image
3	C-1	Zone 2	T/f 3 P8	78.5 °C	21/03/17 14:48	Show Image

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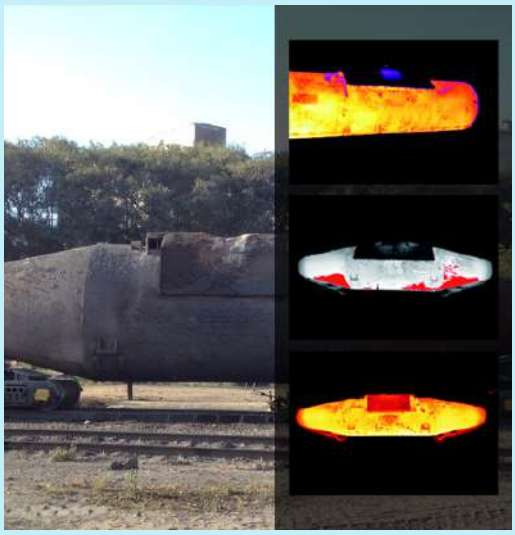
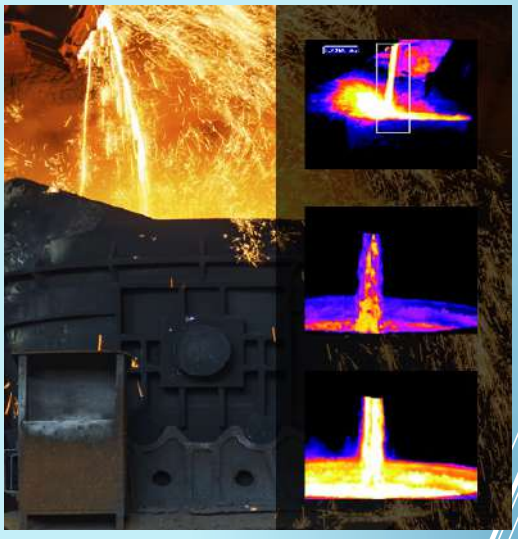
Miscellaneous Thermal Automation Solutions for Process Industry

Molten Metal Level Guage

Thermal Monitoring of Refractory Lining

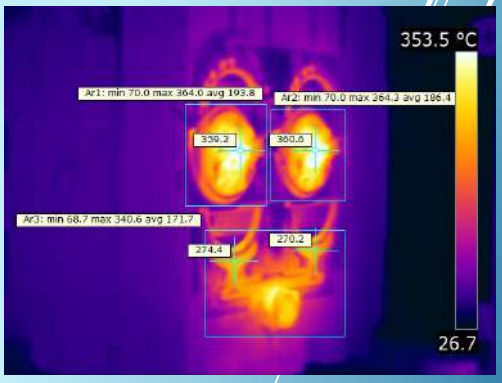


Torpedo Car Monitoring



Slag detection

Gas Flare Thermal Monitoring



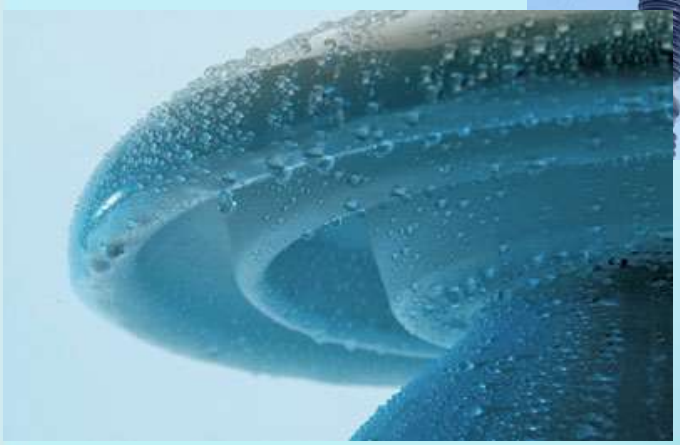
Die Casting Auto Thermal Monitoring

AGILE MICROSYS Pvt. Ltd.

RTV Silicone Coating

Principal Company – CSL Silicones Inc., Canada

- RTV coating is a special class of Silicon Coating
- Its required over high voltage insulators (Porcelain & Glass) in transmission lines and sub-stations
- RTV coating ensures No Flash Over incidences
- Flash Over in Insulators is common phenomena and happens due to increase in Corona. Reason for corona/arcing/tracking is:
  - ✓ Dust/pollution contamination sticks over insulators
  - ✓ Moisture in foggy weather
  - ✓ Salt contamination in costal region
- RTV coating increases the hydrophobicity of insulators to best possible extent.
- Hence, dust particles and moisture will not stick to insulators results in increasing electrical performance.
- Life of RTV coating once done is >25 years
- No cleaning of insulators is required after RTV coating
- We at Agile have already coated Insulators for PGCIL up to 800 KVDC
- CSL complies with all the Type Tests as per International Standards including most critical test i.e. 5000 Hrs ageing test as per IEC 61109



AGILE MICROSYS Pvt. Ltd.

PREDECTIVE MAINTENANCE SERVICES

- Thermography
- Energy Audit
- Power Factor Correction
- Cable Fault Location
- PID (Puncture Insulation Detection)
- Tower Foot Resistance Measurement
- Hot Line Washing

Clients & References

Ministry of Defence, GE T&D, Power Grid Corporation of India Limited (PGCIL), MahaTransco, MahaGenco, Tata Power , Hindustan Zinc Limited, Indian Institute of Technologies, National Thermal Power Corporation (NTPC), Maruti Suzuki India Limited, Indian Railways, Pragati Power Corporation Limited, RRVUNL, Adani Power Limited, And many more……..

CONTACTS

Corporate Office
703-B, 7th Floor
IRIS Tech Park, Sohna Road
Sector 48, Gurgaon (HR)
INDIA - 122018

Registered Office
837/5, Lane 5A,
Patel Nagar,
Gurgaon - 122001

Workshop
Unit no. 2, Beniwal Complex,
Opposite Vipul Business Park,
Near Subhash Chowk,
Sohna Road,
Gurgaon - 122018

Phone	**+91 124 4536823**
Cell	**+91 9899045247**
E-mail	**sales@agdp.co.in**
Web-site	**www.agdp.co.in**

Network Offices
Lucknow, Roorkee
Kota, Mumbai, Ajmer