



APPLICATION STORY

Rosenbauer includes FLIR thermal imaging cameras in cutting edge fire engine

'Thermal imaging cameras make a fire brigade much more efficient'

Firefighters from over the world have realized the potential of thermal imaging cameras for fire brigades. Whether to see in the dark or through smoke, thermal imaging cameras can be an invaluable tool for firefighters. As the world's leading fire engine manufacturer Rosenbauer has chosen to include thermal imaging cameras from FLIR in their new line of cutting edge fire trucks.

Thermal imaging cameras do not need any light whatsoever to create a crisp image. And maybe even more important for firefighters: they can also see through smoke. With a thermal imaging camera firefighters can see from a distance whether ongoing firefighting activities are effective and direct the extinguishing activities where smoke renders normal vision useless. But not only can thermal imaging cameras see through smoke, thermal imaging cameras will also give you useful information about parts of a fire that are still hot. That's why Rosenbauer incorporates FLIR PathFindIR thermal imaging cameras in their designs.

The Rosenbauer Group is one of the world's largest manufacturers of fire fighting vehicles. With its wide range of municipal firefighting vehicles and aerials, its extensive series of Aircraft Rescue and Fire Fighting (ARFF) vehicles and industrial fire fighting vehicles, advanced fire fighting components and fire & safety equipment, Rosenbauer provides a full range of firefighting equipment.

Innovative design

The latest innovation Rosenbauer has brought on the market is the Stinger, a high reach extendable turret that is especially useful for fighting airplane fires. The Stinger

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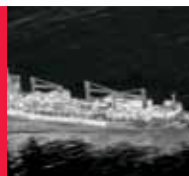
The thermal images from the FLIR PathFindIR are shown on the multifunctional screen in the cabin of the vehicle.

The Rosenbauer headquarters in Leonding, Austria, as seen from the air.







The Stinger's hydraulic arm has a reach of 16.5 meters high.

consists of a water turret and a piercing tool with built in nozzle that can puncture an airplane's hull and immediately extinguish the fires inside by spraying water inside the plane at a rate of 1000 liters per minute. To use this tool more effectively, Rosenbauer has chosen to include an optional FLIR PathFindIR thermal imaging camera in the design.

'Thermal imaging: very effective tool for firefighters'

The FLIR Systems PathFindIR thermal imaging camera is a compact and rugged thermal imaging camera that is designed for the automobile industry. It can be used to visualize thermal energy emitted from an object, which makes it an extremely effective tool for nighttime Driver Vision Enhancement (DVE). It enables drivers to detect and monitor potential hazards on or near the road, allowing more time to react, but it is also a very effective tool for firefighters, according to Roland Jungmair, and not just because a thermal imaging camera can see through smoke.

Finding the hot spot

"Using the FLIR PathFindIR thermal imaging camera the firefighters can see where the airplane is the hottest on the outside and that indicates where the fire is burning on the inside. With that information they're able to decide where they can apply the Stinger piercing tool to reach the maximum effect. For when the hottest fires have been extinguished, the firefighters can safely enter the plane and put out the last of the fires. So if speed is what you're after the FLIR PathFindIR thermal imaging camera really is a great tool."

And speed is very important for airport firefighters, according to Jungmair. "For airport firefighting services, time is really of the essence. Not only might there be human lives at stake or expensive cargo at risk of being destroyed, there's also the issue of delay. When a burning airplane occupies the landing strip, no other planes can land there, which causes delays and these in turn cause financial losses for the airport. So it is very important that the airplane is removed from the air strip as quickly as possible. With the FLIR PathFindIR thermal imaging camera the firefighters can be more effective in extinguishing fires inside the airplane, which leads to shorter delays and keeps the financial losses at a minimum."

'The Stinger has a unique piercing tool'

The Stinger is a hydraulic piercing tool that can be used to puncture the hull of an airplane. The piercing tool extends the piercing lance within a time frame of 0.1 seconds at a pressure of 210 bar (3000 psi). Not even the most advanced composite materials currently used for aircrafts can withstand this swift and powerful motion. Once the hull is pierced in this manner, the built-in nozzle can spray water or other extinguishing agents into the aircraft at an astounding rate of 1000 liters per minute.

With its hydraulic arm fully extended, the Stinger can reach up to 16.5 meters high and 11.4 meters far. The Stinger piercing tool is mounted – together with the FLIR PathFindIR thermal imaging camera – on a tilt platform at the end of the hydraulic arm that allows it to penetrate the aircraft's hull from every possible position. The Stinger is currently the only extendable turret on the market with this kind of functionality. "The fact that it can puncture an aircraft's hull from every possible direction makes the Stinger really unique", explains Jungmair.

Also for industrial use

"But using the Stinger turret in combination with a FLIR PathFindIR thermal imaging camera isn't just useful for airports", continues Jungmair. "We also produce industrial firefighting vehicles with the Stinger turret. Fire fighting efficiency can be greatly improved by the Stinger's elevated position of 16.5 meters and an additional advantage for such industrial applications is the fact that the Stinger can be operated from a safe distance through a radio control unit or – in an area with high radio interference – through a secure cable connection. This minimizes both the manpower needs and the health hazards for the firefighters. And the increased effectiveness the FLIR PathFindIR thermal imaging camera delivers is just as useful in industrial estates as on airports."

The FLIR PathFindIR is very compact and the rugged design keeps the vital core well protected against humidity and water, an important reason for Rosenbauer to choose this thermal imaging camera.

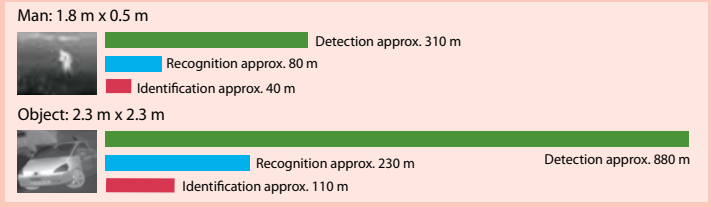
Jungmair is based in the company's headquarters in Leonding, Austria, where the Panther with the Stinger extendable turret has been designed. "This is where most of the assembly is done. In this large facility, covering over 85000 square meters, the

PathFindIR

The FLIR Systems PathFindIR is a compact thermal imaging camera that significantly reduces the hazards of night time driving. It enables drivers to see much further, with improved clarity, than with standard headlights. Drivers can detect and monitor pedestrians, animals, or objects on or near the road, allowing more time to react to any potential danger. PathFindIR helps to detect and recognize potential hazards in total darkness, smoke, rain and snow.

Imaging Performance	
Detector type	Focal Plane Array (FPA), uncooled microbolometer 324 x 256 pixels
Spectral range	8 to 14µm
Field of view	36° (H) x 27° (V) with 19 mm lens
Thermal sensitivity	100 mK at +25°C
Image processing	Digital Detail Enhancement (DDE)

Range performance 19 mm lens



From left to right: Peter Dekkers, FLIR Transportation Business Development Manager Europe, Roland Jungmair, Rosenbauer International AG Product Manager Mobile Systems and René Breitenberger, Distribution Manager Measuring Equipment at FLIR products distributor NBN Electronics.

entire production process comes together." In 2009 a grand total of 876 firefighting vehicles were produced in Austria and 2119 worldwide.

According to Jungmair the Rosenbauer's fire engine of choice for airports is the Panther. "It combines the world's leading design and state of the art equipment for airport firefighting services. Due to its lightweight build and powerful engine it is the perfect fire engine for when time is of the essence. With the added functionality of the Stinger with a built-in FLIR PathFindIR thermal imaging camera it really is the best the market has to offer."

FLIR PathFindIR: rugged, compact and very effective

With a resolution of 320 x 240 pixels and a 19 mm wide angle lens the FLIR PathFindIR thermal imaging camera has very wide field of view (36°), which is extremely useful for situational awareness. This maintenance free system delivers crisp video images which can be displayed on virtually any display. The FLIR PathFindIR thermal imaging camera is also very compact: it measures 5.8 by 5.7 by 7.2 cm and weighs only 360 grams. That makes it very easy to install in any vehicle. And the rugged design keeps the vital core well protected against humidity and water, which was also an important reason for Rosenbauer to choose this thermal imaging camera, according to Jungmair.

Rosenbauer is supplied with the FLIR PathFindIR thermal imaging cameras by the FLIR products distributor NBN Electronics. According to Jungmair his company chose to do business with the Austria-based electronics distributor because of their extensive knowledge of and experience with thermal imaging cameras. "We have good relations with the specialists at NBN Electronics and when we decided that our new models would have to include thermal imaging cameras they were the first we turned to."

Driver Vision Enhancement

The Panther is not necessarily equipped with just one thermal imaging camera from FLIR. For Driver Vision Enhancement (DVE), Rosenbauer also offers a second FLIR thermal imaging camera that's mounted on a pan and tilt platform, placed at the front of the vehicle. The thermal images are shown on the multifunctional screen in the cabin of the vehicle. "That setup really is perfect for DVE. It allows the driver to see at night and through smoke. We tested it by putting blinds on all of the windows of a fire engine and then navigating with the FLIR thermal imaging camera alone. It worked flawlessly!"

In Australia some airport firefighters have ordered a Panther ARFF vehicle with a FLIR PathFindIR thermal imaging camera installed because of the kangaroos. "Kangaroos are so abundant in certain parts of Australia that the firefighters need the FLIR PathFindIR thermal imaging camera to avoid hitting these animals", explains Jungmair. "Before they had the FLIR PathFindIR thermal imaging cameras they had to drive

This Panther fire engine has two FLIR thermal imaging cameras, one installed on the Stinger's piercing tool and another mounted on a pan and tilt platform in the front of the vehicle.

This new fire engine from the Rosenbauer's AT-Series has a FLIR PathFindIR thermal imaging camera installed in the bumper to help the firefighters see through smoke, which is especially useful in case of tunnel-fires.

slowly if they wanted to avoid hitting the large marsupials, but with the help of the FLIR PathFindIR thermal imaging camera they can now safely drive through the areas where kangaroo are abundant at full speed, which allows them to get to the fire a lot quicker."

Avoiding accidents in airports

Using a thermal imaging camera for DVE in airport situations has several advantages, explains Jungmair. "When a passenger plane is being evacuated, people might panic and run away in a direction the firefighters didn't expect. With the FLIR PathFindIR thermal imaging camera the firefighters can quite easily spot such pedestrians through fog and smoke and even in total darkness. Using a thermal imaging camera really is a very good way to avoid tragic accidents."

"And there's also another advantage", adds René Breitenberger, Distribution Manager Measuring Equipment at NBN Electronics. "When the sun is low in the sky, during the morning or evening, the firefighters driving the truck might be blinded by the sunlight, or if a plane is coming in for a landing on the airstrip, its lights might also render the driver's normal eyesight useless. In such situations they can look at the images from the FLIR PathFindIR thermal imaging camera and safely continue their approach of the fire without slowing down."

Seeing through smoke in a tunnel

According to Jungmair the success of the FLIR PathFindIR thermal imaging camera on the Panther ARFF vehicles has also lead to other applications. "When we saw how effective the FLIR PathFindIR thermal imaging camera is as a driver vision enhancement aid and combined that with the fact that it can see through smoke, we immediately realized that it would be an incredibly useful tool for a firefighter that has to cope with a smoke-filled tunnel."

Jungmair stresses the importance of specialized tunnel firefighters. "A lot of our highways pass through tunnels and car crashes in a tunnel are therefore not unheard of. In some cases such a car crash results in a fire. In a tunnel the smoke cannot escape as easily as above ground. Not only does that mean that it is very important to evacuate a tunnel as quickly as possible to prevent people from developing respiratory problems due to the smoke, it also makes the firefighters' job difficult due to very low visibility. After conferring with firefighters specialized in tunnels we drew the conclusion that the best way to adapt our trucks for tunnel firefighters to meet the special challenges of tunnel firefighting was by using thermal imaging cameras."

FLIR PathFindIR: a tested and tried product

After deliberation Jungmair and his colleagues opted for the PathFindIR thermal imaging camera from FLIR. "We decided to provide our customers with the option to have the FLIR PathFindIR thermal imaging camera installed in the bumper because it is a tested and tried product. It has been effectively used in numerous other automobile applications and its small size made it very easy to incorporate and integrate the FLIR PathFindIR thermal imaging camera in our design. It provides a very clear image even in total darkness and with the FLIR PathFindIR thermal imaging camera the firefighters can see pedestrians or objects, even when smoke makes it completely impossible to see anything with the naked eye. It allows the tunnel fire brigade to safely navigate smoke-filled tunnels, avoiding accidents, and it helps to swiftly find the location of the fire, so it really is a great tool to make tunnel-firefighting more effective."

The flexible FLIR PathFindIR thermal imaging cameras – and thermal imaging cameras in general – are a great tool for firefighters, concludes Jungmair. "In a lot of situations thermal imaging cameras can really help make firefighters more effective."

This test shows that the Stinger's piercing tool can puncture an aircraft's hull from every possible direction. Jungmair: "That makes the Stinger really unique."

For more information about thermal imaging cameras or about this application, please contact:

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