

# APPLICATION STORY



## FLIR HELPS ROOFING PROFESSIONALS FIND MOISTURE WITH AIRBORNE INSPECTIONS

**FLIR Tau2 camera core integrated into Workswell's WIRIS drone system**

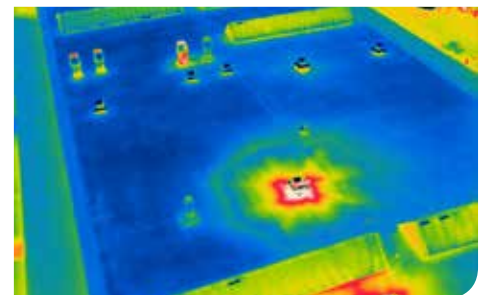
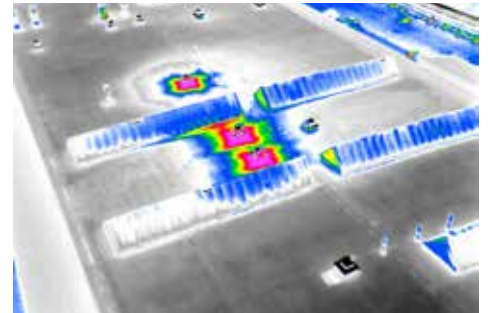
*If a leak occurs on a flat roof, damage often goes unnoticed for considerable time as water penetrates and soaks the decking and underlying insulation. This can lead to expensive damage from the rot which often develops and if left can weaken the roof structure. Roofing professionals have been using thermal imaging cameras for years to pinpoint water intrusion, find moisture beneath the surface, and document dryness with accuracy and confidence. However, for roofs of industrial buildings, thermal inspections can be a very time-consuming and physical job, when done with a handheld thermal camera. That's where the Workswell WIRIS comes in. Thanks to this advanced drone equipped with a FLIR Tau2 thermal imaging camera core, thermal inspections of industrial roofs are a walk in the park.*

Although flat roofs have many advantages construction-wise, their installation is often complex, due to the composition of the many roof layers. Many places on flat roofs can be the source of defects. Water leaks might be the result of unprofessional installation, neglected maintenance or degradation of the surface due to insufficient protection of the surface layers against climatic influences. Additionally, water collected on the damaged roof construction can have a negative effect on the durability of the roof clad. Mostly, water leaking under the surface of the roof over a long period will destroy the foundation layers.

Finding water leaks with the naked eye is not as straightforward as it might seem. In most cases, water trails do not directly lead to the leak source and thus the entire flat roof needs to be examined in detail. Regular maintenance roof inspections however can lead to timely discovery of leaks and as a result prevent damage to escalate into more serious, permanent damage. Unfortunately, in industrial applications, a detailed survey of an entire roof is very difficult due to the sheer size of the task. For an inspection professional, it can be a time-consuming and physically demanding task and, therefore, in most cases, the inspector only



*The Workswell WIRIS unit is light (only 400 g) and compact (139x84x69 mm). The futuristic design of the cover is not an end in itself, but necessary for proper attachment to a drone gimbal (with a mounting thread on the top and bottom).*



*Thermal imaging cameras are well-established as valuable inspection tools that help reveal missing insulation, HVAC air flow and equipment issues, radiant heating malfunctions, compromised roofing, and much more.*

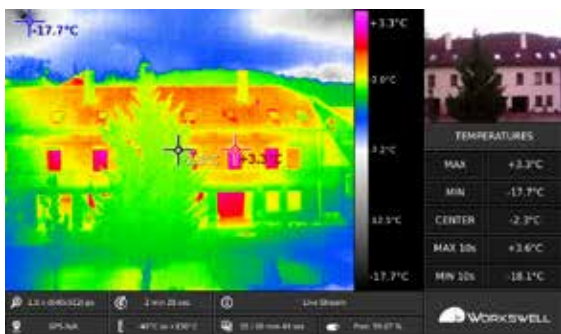


The Workswell WIRIS system can be fully controlled from the ground.

focuses on risky areas and defects that can be overseen.

## Thermal imaging for timely moisture detection

Thermal imaging cameras have proven to be a very effective and reliable way to find water leaks and hidden moisture areas. Due to temperature differences between dry places and moist areas, thermal cameras can fully see where moisture has penetrated the roof. Depending on the construction of the roof, it is possible to see how large an area is affected by moisture and assess the gravity of the problem. Thermal imaging inspections are very effective during or after sunset, because the roof - which has been heated for a certain time - will reveal temperature differences between the dry areas, which cool down slowly, and the moist areas, which will cool down much faster. In warmer seasons, a thermal camera can identify areas that are poorly insulated (thermal bridges). These areas will reveal warmer temperatures than the surrounding roof parts.



The unique system allows operators to remotely switch between cameras, to record radiometric videos or to make static images in both the visible and infra-red spectrum.

## Airborne inspections with Workswell WIRIS

Although a handheld thermal imaging camera is an excellent diagnostic tool, manual roof inspections can still be time-consuming, especially with larger industrial buildings. The way around this problem is to use a pilotless aircraft with a thermal camera attached to it. Such an aircraft can fly above roofs and is not restricted by the number of ladders, elevations or unstable surfaces. The operator is in full control of the drone from a safe place, has an immediate overview of the condition of the roof and if moisture is detected, the operator can zoom in on the details and then personally check the area.

In answer to this need, Workswell s.r.o., a Czech technology development and trading company operating on the Central-European market, based in Prague, developed the Workswell WIRIS system. The WIRIS is an advanced drone system that combines a visible light camera and a thermal camera and has been especially developed for the detection of moisture problems on flat roofs. The unique system allows operators to remotely switch between cameras, to record radiometric videos or to make static images in both the visible and infra-red spectrum. The operator sees the objects followed by the drone in real time or can analyze records and identify damaged areas. Unlike similar systems, the Workswell WIRIS enables to manually set the range of temperatures, e.g. in the interval of 15 °C to 25 °C, even during a flight.

"Thanks to the Workswell WIRIS system, roof inspectors can now inspect industrial building remotely, in all safety and with unmatched productivity," says Jan Sova, managing director at Workswell s.r.o. "They now have a full overview of the entire roof at their fingertips."

Pictures taken by the onboard visual camera complete the thermal imaging footage and make it possible to precisely locate the moisture defect. The WIRIS system can also be fitted with a GPS sensor for

storing information about the position of the drone when creating a record. The system can measure temperature at the central point, as well as in the local minimum and maximum. This function can also be used to navigate drones, as it automatically shows where the largest potential problem is located. Produced records are fully radiometric, and include video.

## Tau 2 LWIR thermal imaging camera core

Workswell relied on the FLIR Tau2 longwave infrared camera core for the thermal imaging part of the Workswell WIRIS system. Jan Sova: "We have used the FLIR Tau2 in previous systems before, and always achieved excellent imaging results. The Tau2 is very light and compact, which helped us to build a drone of half the weight compared to previous drone systems. The biggest improvement provided by the WIRIS system, is that it can be fully controlled from the ground and settings can easily be adapted while the drone is in the air. The WIRIS with the FLIR Tau2 is an ideal solution for thermal inspections of industrial building roofs."

FLIR® Tau® 2 thermal imaging cameras offer an unmatched set of features, making them well-suited for demanding applications like Unmanned Airborne Vehicles (UAVs), thermal weapon sights, and handheld imagers. Improved electronics now give Tau 2 even more capabilities, including radiometry, increased sensitivity (<30mK), 640/9Hz frame rates, and powerful image processing modes that dramatically improve detail and contrast. Since the electrical function are common between the Tau 2 640, 336 and 324, integrators have direct compatibility between the different camera formats, and Tau camera versions share many of the same lens options.

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

[www.flir.com/oem](http://www.flir.com/oem)

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