

INDRO ROBOTICS CASE STUDY: CITY OF VICTORIA FIRE DEPARTMENT

DRONES “INVALUABLE” FOR FIREFIGHTING

SUMMARY

- A case example of the application of the capability of InDro Robotics industrial drones, built to serve the variety and challenges of First Responder scenarios.
- In May 2019, the City of Victoria Fire Fighter Department was faced with a rapidly growing fire in a downtown location.
- Minimal visibility due to smoke instantly impeded tactical decision making, complicating the ways to bring the fire under control.
- Working with the City’s Emergency Program team, an InDro Robotics drone was called in to be the eyes above the billowing smoke.
- Providing invaluable information instantly, securely, the drone facilitated infrared imaging via the FLIR, situation analysis via the camera, and security of data and information transferred between the drone, the pilot and the Deputy Chief in charge.
- The InDro Robotics drone played a vital role to problem solving and developing strategies the Victoria Fire Fighter Department undertook to successfully bring the fire under control.



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Deputy Chief Daniel Atkinson, Victoria Fire Department

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CASE STUDY

Vancouver, BC - It was early in the morning on May 6, 2019; the start of a dangerous and demanding event that would test the skills and endurance of many of Victoria's firefighters and emergency program staff – and also prove the real-time value of airborne technology in suppressing one of the biggest fires in the city's history.

For Deputy Chief Daniel Atkinson, the day began with a routine early drive into work. It was interrupted at about 05:30 by an urgent radio call reporting a growing fire in a downtown location. Atkinson was soon the first Chief Officer on the scene. "It was determined pretty early on that we had a significant fire, and the way the smoke was presenting it was obvious we were going to be there a significant period of time," he recalls.

Three ladder trucks were soon at what would become known as the Pandora Street Fire. But with the roiling brown smoke, Atkinson knew immediately this fire would present multiple challenges – starting with visibility. Where was the fire the hottest beneath all of that smoke and steam? In what direction was it growing, and what threat might that pose? Where should the ladders be positioned, the water directed? Was the fire in danger of destroying adjacent buildings?

Those were just a few of the many questions with which Atkinson was trying to quickly grapple. But one decision was instantaneous: He called Tanya Patterson, the City's Emergency Program Coordinator.

"Given the rapid fire spread, I reached out to Tanya at about six in the morning: 'Can you get down here and bring the RPAS?'" he asked.

Patterson was on her way, along with Deputy Emergency Program Coordinator Olympia Koziatek – who would soon be piloting an InDro Robotics drone above the heavy smoke.



While pilot inputs on a remote typically control drones via RF – Radio Frequency – the InDro models have the additional ability to be controlled over a cellular network. That method is more immune to jamming and also helps InDro fly missions known as Beyond Visual Line of Sight, meaning to areas well beyond what the pilot can see with their bare eyes. In fact, InDro is one of very few companies granted Transport Canada approval for BVLOS flights – an obvious advantage for Search and Rescue missions, post-disaster assessment and more. (It's also a strong vote of confidence that these aircraft are very unlikely to fail during flight.)

Many of these improvements, particularly the Ingress Protection and lens treatments, were of immediate benefit in the choking air above Pandora Street. But three features were truly invaluable:

- Extensive InDro training and follow-up
- The situational awareness provided by an "Eye in the Sky"
- The data provided by a FLIR thermal camera

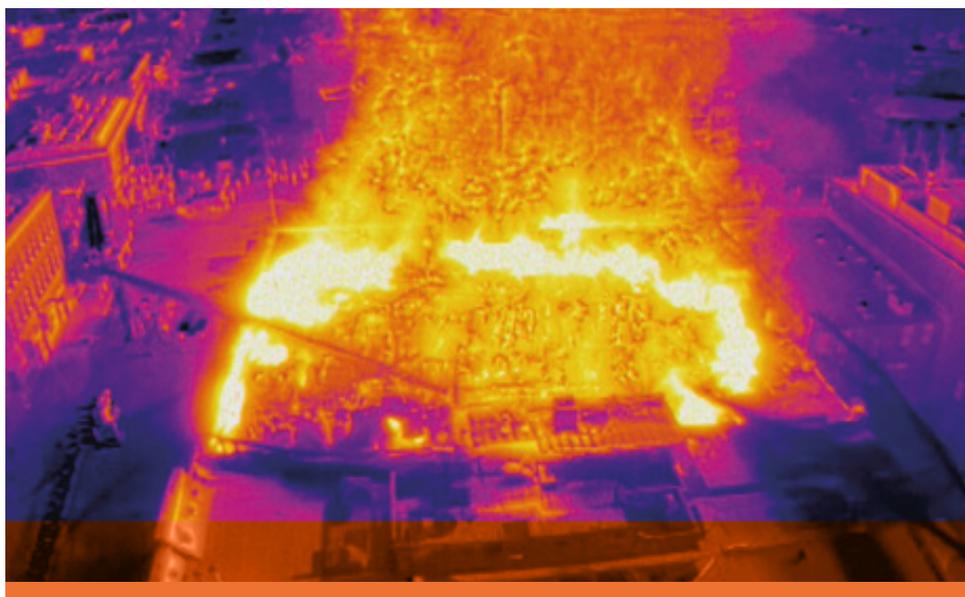
THE FLIR

Remember how Atkinson knew he and his team would struggle with seeing the hot spots through the dense smoke? The FLIR camera renders the smoke invisible, instead providing images where the picture is shown as bands of colour representing different temperatures. Pilot Olympia Koziatek was able to “see” the hotspots on an iPad attached to her controller. Patterson was watching from a second iPad. Both she and Koziatek could touch any spot on their screens for an instant temperature readout; data available to key decision-makers in real-time.

“If you’ve ever been to one of these big fires, the smoke is thick and completely impenetrable,” explains InDro Robotics CEO Philip Reece. “You’re pointing the hose at where you think the fire is. Now you switch to thermal and it basically cuts the smoke – the smoke disappears. Now you see the heat coming up off the fire. You can actually follow it down through the different radiometric temperature colours to where the real core of the fire is.”

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InDro Robotics
CEO, Philip Reece



Seeing the Heat: The brighter the colour, the hotter the temperature. This data enabled the best decision-making. Here, two hoses are positioned to prevent the fire from consuming the adjoining building. FLIR image courtesy City of Victoria,

Fire Department

At the other end of the spectrum, the stream of cold water is shown in bright contrast – allowing the scene commander to most effectively combat the fire.

“The RPAS allowed us to see through the smoke, and it allowed us to see not only the heat signature on the building of origin, but the heat signature on the adjacent structures as well,” says Atkinson.

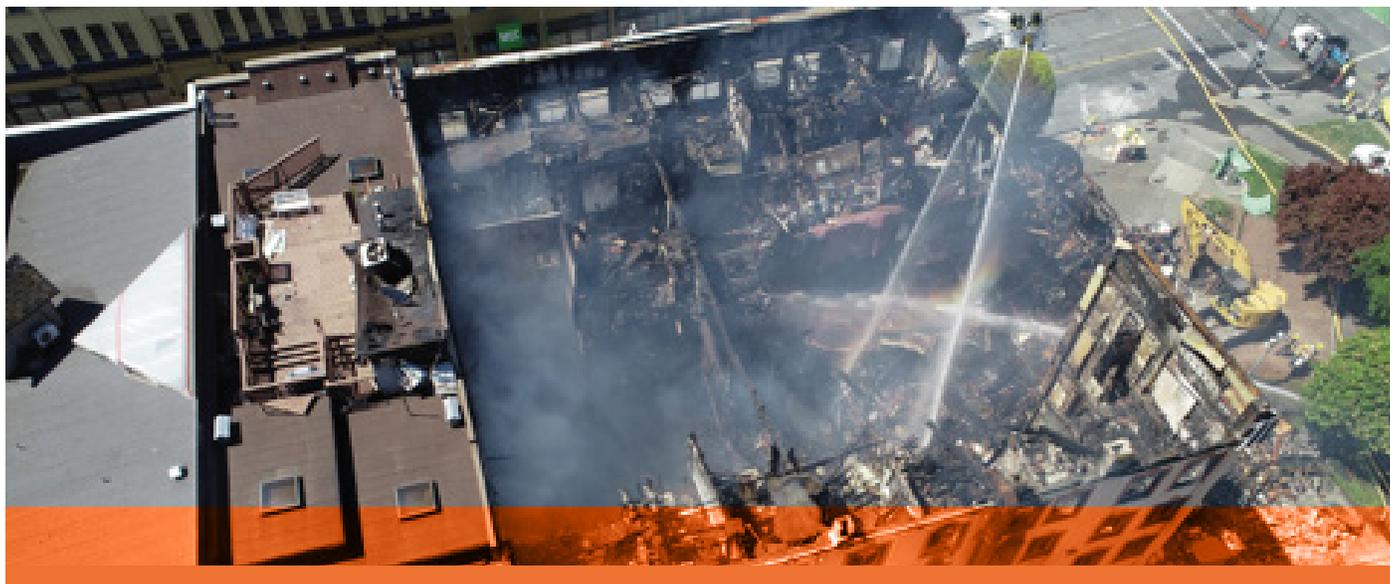
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Situational Awareness

The InDro M200 was up much of the day, with extra battery sets being charged nearby. Whether it was the fixed camera providing a bird’s-eye view of the overall scene, or the ever-important FLIR imagery, the data it provided that day was an absolute game-changer.

"I had a lot of things going through my brain, but it was a sense of clarity is the best way I could put it," says Atkinson. "Anytime (at a fire) you're making the best decision you're able to with the limited information you have. So this allowed us to have a higher level of confidence in the decisions we were making. There was a sense of clarity there, because we knew whether or not our tactics were being effective."

Though that first day was the most critical, the famed Pandora Street Fire lasted seven days before it was deemed completely over and done with. The M200 continued to play a role, not only combing for hotspots, but by providing clear aerial images to help responders identify where there might be potential for a "pancake-type collapse."



"It was the first real time that we could deploy it to help drive and direct our strategies," says Atkinson. "It was absolutely invaluable at this incident."

Training

The product itself can take a partial bow for that. But any piece of technology with a human interface is only as good as the person operating it. All of the Victoria Fire Department Pilots (there are now 14) have had extensive training — starting with an intensive course at InDro headquarters on Salt Spring Island and continuing at the department and in the field. Emergency Program Coordinator Tanya Patterson and Deputy Chief Atkinson were among the first four, back in 2016, to cover the material required by Transport Canada.

Any illusions it would be a snap were quickly vanquished.

"It was a lot more difficult than anticipated," says Patterson. "We started with toy drones, but then it was Transport Canada regulations, weather, flight theory, all the topics you need to know. And that was just level one."

In fact, the Fire Department later worked with InDro, Global Medic, and University of Calgary PhD student Maja Kucharczyk to create centimetre-accurate 3D maps of the downtown core in the City of Victoria — a Canadian first. These can be used for situational awareness and damage assessments after an emergency such as an earthquake or flooding.

(Transport Canada requirements for advanced operations are even more rigorous now, following regulations that went into effect June 1.)

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As an Emergency Program Coordinator, Patterson was more than just an early adopter: She sees use-case scenarios far beyond fires. She's prepared for everything from creating 3D maps following disasters like seismic events or building collapses through to search and rescue — even civil unrest. Atkinson, too, sees multiple opportunities: Locating and rescuing kite-surfers, rapid shoreline search, perhaps even dropping portable flotation devices to people struggling to stay above water.

"That's where my head goes," he says.

Soon, there will be even more potential. InDro Robotics has a product in the works that allows one person to control up to five drones...and two people to fly 25. Think searches, mapping, urgent medical deliveries.

And — if you think like Patterson or Atkinson or Reece — the possibilities are endless.