

CALIFORNIA STATE SENATE
BEFORE THE
SENATE COMMITTEE ON INSURANCE

Informational Hearing
WILDFIRE RESILIENCE: INNOVATION IN MITIGATION

Remarks of Jack McCall of Lindsey FireSense, LLC

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Madame Chair Rubio, members of the Committee, and Committee staff, thank you for inviting me here today to speak to you on the subject of Emerging Tools in Wildfire Mitigation. I am Jack McCall, Executive Vice President of Lindsey FireSense, a California-based company which has designed and produced the FIREBird wildfire detection system.

The FIREBird technology was designed by an incredible group of engineers and scientists with deep experience in the electric utility industry, the development and deployment of internet-of-things devices, and in wildfire detection. This interconnected skill set led us to design the FIREBird system to detect wildfires along electric utility power line.

California's Major Wildfires

Why did we develop this technology? When looking at the worst wildfires in California, we can turn to CALFIRE, which maintains lists of the largest, most destructive, and deadliest wildfires in the State. Examining these lists shows that almost 25% of these wildfires were caused by power lines¹.

This is consistent with research showing wildfires started by power lines tend to become ten times larger than wildfires started by other causes². This is largely because the wind events that initiate power line arcing or other equipment failure are extremely effective at spreading the fire. Defensive fire detection methods are necessary for the unique risks associated with wildfires near utility rights-of-way. Defensive fire detection necessitates fire sensing almost immediately after ignition no matter what time of day. Such rapid wildfire detection will reduce the response time ensuring that firefighting resources arrive to the smallest possible fire.

Wildfire Detection

There are several existing wildfire detection systems and programs in place in California and around the world. However, most of these systems and programs are primarily designed to look over expansive areas and spot wildfires from a distance, most commonly by identifying smoke plumes, which may limit the ability for rapid detection while the fires are small.

In comparison the FIREBird system was designed be placed along high-risk boundaries, and then to detect and report small wildfires which occur immediately adjacent to that boundary. As noted, utility power lines are a particularly important high-risk boundary as they are a proven source of often severe wildfires.

¹ <https://www.fire.ca.gov/stats-events/>, data accessed 9/19/2021. Additional fire cause material from <https://www.cnn.com/2020/10/30/us/southern-california-edison-responsible-woolsey-fire/index.html>

² Mitchell, Joseph W; "Power Lines and Catastrophic Wildland Fire in Southern California"; Fire & Materials 2009, San Francisco CA, Jan 26, 2009

The FIREBird System

The primary functions of the FIREBird system are simple; quickly detect and report on small wildfires.

1. Wildfire detection: The FIREBird device provides a localized, “in situ” approach to wildfire detection. Sensors within each FIREBird unit can detect wildfires across an almost 1000’ radius, resulting in a 60-acre detection zone. Wildfires as small as 5 x 5 feet can be detected within 200 feet, and even smaller fires can be detected when closer to the FIREBird unit.
2. Wildfire notification: Once detected, the FIREBird system is designed to notify interested parties by text or email, typically within 2 minutes.

When placed at regular intervals, FIREBird devices can provide continuous wildfire detection along utility rights-of-way, easements associated with roadways, or along wildland-urban interfaces where neighborhoods adjoin fuel-rich wildlands.

Each FIREBird device continuously monitors the surrounding area via 6 wildfire specific thermal detectors and 8 optical cameras. The use of multiple advanced neural-network algorithms minimizes false or missed fire detections.

The FIREBird system is intended to operate autonomously. No personnel are required to monitor the system. When a suspected wildfire is detected, the system automatically notifies designated personnel by text and email which include images of the suspect fire. Eliminating the need for a dedicated control center and personnel reduces the cost, and increases the speed, of implementation. FIREBird devices are solar-powered and contain built-in communications, further reducing the time and cost associated with deployment.

Documentation of wildfire events can be enhanced with the FIREBird system. Once a heat or fire event is detected, the FIREBird’s cameras capture six overlapping images, providing a 360-degree view of the surrounding area, potentially providing important documentation regarding the cause of the event.

Public Safety Power Shutoff Tools

An additional function of the system is intended to assist utilities in restoring power after a Public Safety Power Shutoff (i.e., PSPS) event. FIREBird devices document the conditions along a power line’s right-of-way under normal conditions. The system provides before and after image comparisons to help utilities decide when it is possible to re-energize a line after a PSPS event.

Example Wildfire

The benefit of deploying the FIREBird system along a power line is now discussed using the timeline of an actual power line related wildfire and exploring how the timeline could have been altered if the FIREBird system was deployed on that power line beforehand. Note that the FIREBird system was not available for purchase or installation at the time of the described wildfire.

The PowerPoint slides accompanying this testimony provide a better graphical representation of the timelines.

Actual Wildfire Timeline

1. A power outage is reported.
2. A utility worker arrives at the site of the reported outage 3 1/2 hours after the initial report. The worker identifies the actual cause of the fire as being some distance away.
3. Difficult road conditions and construction delays result in the worker not arriving to the site of the actual cause for 6 more hours. Upon arrival, the worker discovered, a) a tree leaning against the power line, b) one phase of the power line was still energized, and 3) a small fire was present near the base of the tree.
4. CALFIRE is notified of the fire 45 minutes later.

5. Airborne response from CALFIRE begins dropping water and fire retardant only 15 minutes later. This is 10 ½ hours after the power outage was initially reported.
6. A drone appears over the site for 30 – 45 minutes. Now dark, air support is grounded until the next day.
7. The fire grows overnight. By the end of the next day the fire was 2000 acres, and almost 100,000 acres by the end of the week.

Hypothetical Altered Timeline 1 – Early Felled Tree Detection

Recall the FIREBird system can provide images of the power line. If the system were in place, the utility could have requested a set of images of the power line either at the time the power outage was reported, or when the utility worker realized the cause of the outage was further away. If examination of images showed the tree leaning into the line, the power line could have been preemptively de-energized, and likely preventing the fire.

Hypothetical Altered Timeline 2 – Early Fire Notification

The actual fire's timeline makes it difficult to precisely determine when the fire was large enough to be detected by the FIREBird system. However, as CALFIRE was not notified until 10 ½ hours after the power outage was reported, this example assumes the system provided CALFIRE only one-hour prior notification.

Assuming all other events in the timeline remain in sequence, the key difference is now that the when the drone departs, there is still one hour of daylight remaining. A CALFIRE official was quoted, "We believe they [emergency responders] could have effectively controlled the fire to one to two acres with the additional time that they were robbed of" due to the drone not allowing resumption of air support before nightfall.

Deployment of the FIREBird system could have provided at least two opportunities to either prevent the fire from starting, or to control the fire by providing additional time through advance notification.

Benefits of the FIREBird Wildfire Detection System

The FIREBird wildfire detection system offers unique capabilities designed specifically to address the challenges of detecting wildfires occurring along power lines. Deployment of this system should:

- Reduce the likelihood of small wildfires going unnoticed
- Reduce the fire-fighting resources needed to control an event
- Reduce property damage
- Reduce the loss of life
- Increase public safety
- Increase time for evacuation, if required

Respectfully submitted,

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