Rapid Lesson Sharing

Event Type: Success Story of Night Aviation Operations – Working in the Wildland-Urban Interface.

Date: Aug. 21, 2016

Location: Cedar Fire; Kernville, California

Successful Night Aerial Operations on the Sequoia National Forest's Cedar Fire

"We were the first resources into the subdivision. We were having a difficult time figuring out where to go (fire front). Night ATGS located us with infrared and directed us to the right location."

Engine Captain

"The Helicopter saved our bacon and let us keep working on digging line."

Crew Member

Cedar Fire

On Sunday, August 21, at approximately 2100 hours, the Cedar Fire was making a push south toward Wofford Heights, a mix of permanent and summer residential homes located one mile south of Kernville, Calif. and one mile north of Lake Isabella. Wofford Heights is located in Division S/P on the fire's operations map.

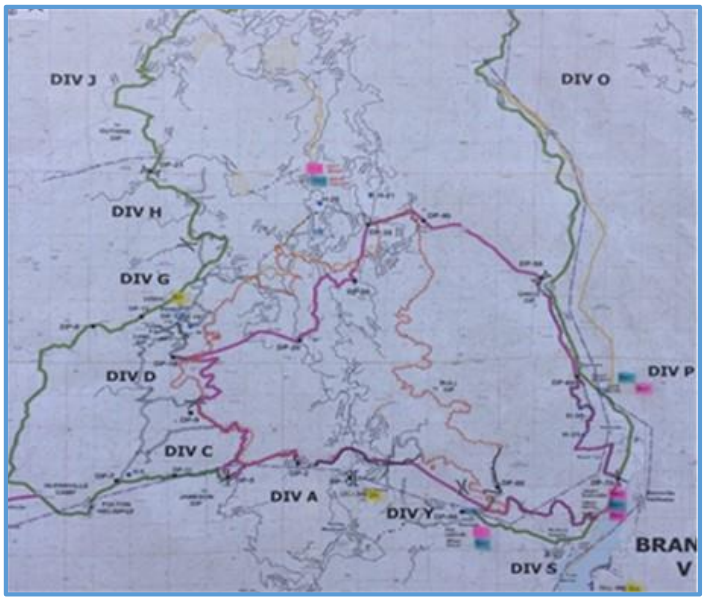
Approximately 250 homes are scattered throughout this area located on steep slopes, on top of ridges, as well as on more level terrain. Most of these residences have winding driveways with thick vegetation (brush and trees) adjacent to their homes.

The Incident Management Team ordered the night-flying helicopter resource to be re-positioned from the Angeles National Forest to the Cedar Fire based on activity the IMT had experienced the night before, along with the fact that the fire had spread into areas of significant tree mortality.

Night Operational Briefing

Supervisors of resources (personnel and equipment) scheduled for the night operational period attended a briefing at 1800 hours at the Incident Command Post.

2000 hour briefing for night operations at the Helibase in which Division S/P and the night-flying helicopter, H-531, are discussed.



At the 2000 hour briefing, resources were briefed using this daily operations map. (Wofford Heights is located directly above the "S" in "DIV S".)

They then took that information and conducted more specific briefings with all of their resources at designated locations near their work site.

The night Helitack Captain had briefed the ATGS over the phone (he and the Platform were at the airport) and then conducted a 2000 hour briefing for the Helitack Module, Water Tender Driver(s), Mechanics, and Pilots.

Division Supervisor briefing night resources on strategy and tactics before going out on the line.

Night Resources are Getting into Place

At approximately 2100, the night resources were getting into place. The temperature was 75 degrees, RH 23%, and northwesterly ridge winds had gusts to 15 mph. Temperatures were cooling into the 50s to mid-60s, with moderate relative humidity recovery. The temperature during the day had been 94 degrees with an RH of 15%. The predominant fuels consist of grass, brush, and scattered oak and pine trees. The terrain is steep and rocky with ravines and drainages running from the north to the south into the houses and outbuildings of Wofford Heights.

The fuels were critically dry in all classes. Due to the poor humidity recovery, the burning period extended from the day into the night. The fire came off the ridge toward the structures with 40+ foot flames at approximately 40 chains per hour.

Drainage and fuels between the fire to the north and houses to the south.

Fire is Threatening Wofford Heights

Resources assigned on Division S/P that night: one Strike Team (5) of Type 3 Engines; four Type 6 Engines; two Type 2 Dozers; one Safety Officer; Division Supervisor; Strike Team Leader for the engines; and two Type 2 20-Person Hand Crews. The assignment for the night was to assess the communities of Kernville and River Kern for structure protection. However, the downslope winds and the fire's proximity to Wofford Heights changed the mission. They were now focused on structure defense and resident evacuations. All of the resources went into Wofford Heights and found their way through the myriad of roads until they were south of the fire and north of the houses.

Fire behavior north of Wofford Heights.

Looking north from Wofford Heights where the Cedar Fire was stopped August 21-23. Wofford Heights is located to the right and below this photograph.

Two Helicopters and Air Attack Ordered for Division S/P

They looked at the fire coming at them and determined that they would lose at least two houses before they found ground suitable enough to make a stand to try and stop the fire. At first, they didn't know that there were night dropping water helicopters assigned to the fire. In fact, H-408 was assigned as the dedicated medevac ship and H-531 had just become certified that day to fly the area at night. To fly at night, the night pilots have to have an orientation flight during the day.

"We were digging line next to the fire. I looked up and there were 25-foot flames. H-531 came in, cooled it down, and we continued digging line."

Crew Member

View from night flying optics.

A Structure Assessment Specialist arrived and told them about the night flying helicopters and night flying Air Attack. The Division ordered the three resources for Division S/P: two Helicopters H-408, H-531; and Air Attack 51.

The Strike Team Engine Supervisor became the point of contact for the helicopters on the fire's edge. They started dropping water to cool the fire's edge while the rest of the resources began cutting hand line adjacent to the fire with the dozers building contingency or secondary control lines.

"By air attack flying in the dark at 0530, they set us up for successful day operations."

Operations Section Chief

"Without the two Helicopters (H-531 and Kern County H-408) dropping water on the fire, we would have lost at least the first two houses. They gave us time to bring in more personnel and build control lines."

Division Supervisor

"Night Air Attack can see our trouble spots and help direct resources (night Helicopter, Engines and Crews) into the area AND prevent us from getting cut off when visibility (smoke) takes away our situational awareness."

Branch Director

Air Attack (AA-51) and Helicopters H-408 and H-531 worked the fire until approximately 0100 in the morning. They came back at 0500 and 0600 to assist the crews with hot-spotting and holding the line. H-531 stayed on the fire until the day aviation resources came out to the Division to continue the fire's containment. The Air Attack assisted operations by ordering air tankers and helicopters early enough to help set the strategy and tactics for the day shift.

Without Night Water Dropping Capability, Structures Would Have Been Lost

Without the water dropping capability at night on the Cedar Fire, there would have been structures lost at Wofford Heights (too much time to set-up hose lays for structure defense) and personnel safety compromised by the increased exposure to extreme fire behavior.

This was the first of three nights on the Cedar Fire that night aviation operations were used to protect values at risk (VAR-structures) and to limit fire spread (spotting). The second night, on August 25, was at Panorama Heights to protect structures. The third night, on August 26, was to suppress a spot that came out of Division Y.

The Cedar Fire burning near Panorama Heights on the night of August 24.

The next night, night aviation operations were used to help protect Panorama Heights' structures.

"The Helicopters took the heat and intensity out of the fire so we could go direct (line on the fire's edge)." **Safety Officer**

A Brief History of U.S. Forest Service Aerial Night Operations

In 1973, Congress approved special funding for the U.S. Forest Service to investigate new techniques which would reduce the severe wildland threat that existed nationwide. A project called "Helicopter Night Operation" was initiated and assigned to San Dimas Equipment Development Center. Assistance in this exploration was provided by the U.S. Army, Los Angeles County Fire Department and (then) the California Department of Forestry. In June 1974, the Los Angeles County Fire Department made the first night water drops on a wildland fire on the Angeles National Forest. In 1976, the Forest Service contracted its first Night Vision Goggle (NVG) Bell 212 helicopter. This helicopter was based at the Rose Valley Helibase, Los Padres National Forest. In 1977, the second contracted NVG helicopter was based at the Tanbark Helibase on the Angeles National Forest. In the early 1980s, the program was studied, reviewed, and discontinued for budgetary reasons.

In 2010, the Forest Service recognized the value of reengaging in night flying operations because the greatest opportunity to engage fire is when wind speeds are low, temperature is low, and relative humidity is high. These conditions most often occur at night. Under these conditions, there are niche opportunities when tactical night operations could make the difference in the desired outcome—representing a multimillion dollar or a lifesaving difference.

Therefore, in 2010 a committee was formed and a Night Helicopter Operations Study was developed, which included a risk assessment of 67 hazards with a 109 risk mitigation measures for those identified hazards. In 2012, a night helicopter program was approved by the Chief of the U.S. Forest Service, for one helicopter limited to water delivery only when specific criteria for operations are met. The oversight and quality assurance of the night helicopter program is overseen by the National Night Helicopter Steering Committee. (For specific operational details, see the "National Night Air Operations Plan" hyperlink on next page.)

The Night Flying Helicopter is hosted on the Angeles National Forest and supports wildland fire suppression on Forest Service-protected lands, including Wildland-Urban Interface areas within and adjacent to the Angeles, Cleveland, San Bernardino national forests and the southern half of the Los Padres National Forest. The use of the aircraft is coordinated through the Angeles National Forest following normal dispatch protocols.

From the time of the first night helicopter program, the technology has improved dramatically. The military and other agencies have gained significant experience that was leveraged when the Forest Service re-engaged in the program.

One of the hazards identified was the need for aerial supervision at night, due to the high volume of cooperating aircraft that engage in night aerial suppression efforts in Southern California. This triggered a highly successful side benefit, a Night Air Attack Program. Both the Night Helicopter and the Night Air Attack programs utilize highly capable crews and aircraft. Furthermore, both programs have added new technology and additional training.

Both the Forest Service's Night Helicopter and Night Air Attack programs are staffed over the nighttime period (1900-0700). The helicopter program is staffed 24 hours per day with a day and night crew. This staffing—which requires detailed planning for transitions—includes Pilots, Mechanics, Fuel Truck Drivers, and agency personnel.

Field Observations on the Night Aviation Operations Program

"The night helicopter has helped us control numerous initial attack fires at night over the past two years."
Battalion Chief

"We get a smoke report at night; the Duty Officer can order the Helicopter and ATGS, get a real time situational update, and make decisions on suppression."
Chief 1

"Night flying resources help set us up for success, helping us prioritize resource locations and problem areas."
Division Chief

Lessons Shared

Benefits of Night Aviation Operations

In addition to water delivery for direct attack and structure protection at night, these night programs have additional benefits, including:

- Guide ground resources to correct locations.
- Buy time for leadership to make overnight decisions and plans.
- Monitor fire spread and containment boundaries.
- Determine appropriate response for values at risk.
- Help set up day tactics during the night, based on real-time evaluation.
- Provide situational awareness to ground resources.
- Provide early warning of changing conditions.
- Coordinate emergency situations

Knowledge of Program is Not Wide-Spread

As with any new program, this one faces challenges. Outside of Southern California, much of the fire community is unaware of the program. Fire personnel need to be familiar with the benefit of using night assets. Discuss the risk and exposure of being under aircraft at night. Using night helicopters is different than day. Ask the pilot how he wants you to signal him/her for water drops. Ensure ground resources "know" how night helicopters work and keep them a safe distance away.

"When we get assigned, some fires don't know how to use us."

Night Helitack Captain

Below are two governing documents for night flying and the fours rules of engagement.

These Engagement Criteria Need to be Assessed Continually
(A minimum of one of these four criteria must be met to engage in water dropping.)

- Lives are or will be threatened.
- Structures are or will be threatened.
- Resources of significant economic values are or will be threatened.
- Excessively high suppression cost will be prevented.

Governing Documents

There are strict conditions for the use of assets in night aviation operations which can be found in the "National Night Air Operations Plan". This Operations Plan was developed based on the risk assessment to ensure that identified hazard mitigations were engineered into the system.

USFS National Night Air Operations Plan

The FIRESCOPE Night Flying Guidelines is the standard for Interagency Night Helicopter programs in California.

FIRESCOPE Night Flying Guidelines

"One of the biggest unplanned benefits of the night helicopter program is the night Air Attack program."

Type 1 Incident Commander

Limitations

There are limitations of use regarding Night Aviation Operations that need to be understood. The Incident Commander or Incident Management Team needs to be aware of duty and hourly flight limitations, including:

- The only night helicopter mission approved is water/retardant dropping and flights supporting this mission, i.e. transporting essential Helitack Crewmembers to the helispot to fill the helicopter tank and training flights.
- Flights will be conducted under VFR conditions.
- For aircraft equipped with an operational searchlight there is no minimum illumination value that will restrict the helicopter from flying at night.
- Pilot and Co-Pilot shall be well rested and have 10 hours off-duty preceding the start of their shift.
- Helicopter Pilot flight time (including day, night, and NVG) will not exceed a total of six hours per night.
- Helibase and helispot location requirements are more stringent than in daylight.
- Pilot night flying currency must be maintained.
- Only ground-based water-fill operations from pre-designated or approved helispots will be permitted (no hover-filling).
- Approved helispots are to be flown by the Pilot in the daytime prior to use at night. This can be accomplished preseason as well as during the season. The only exemption to this requirement is if the helispot is a lighted public airport.
- The Forests will be responsible for periodic checks and notification of any changes to the helispots.
- The Night ATGS aircraft has no additional limitations for missions at night and shall adhere to agency policy and Federal Aviation Regulations.
- During Night Flying Operations there will be an appropriately staffed dispatch center to ensure emergency response and flight following is occurring.

More Field Observations on the Night Aviation Operations Program

"I listen to the night Air Attack Supervisor (ATGS) and he gives me a real-time picture of how things are going out there. He also anticipates daytime needs based on Values at Risk (VAR), fire location/behavior, and orders aerial assets (Helicopters and Air Tankers) for early day operations."

Air Operations Branch Director on the Cedar Fire

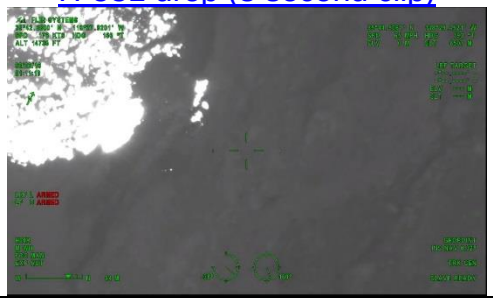
"Ground personnel can help us locate them by standing in the green, twirling a light stick, or flashing their headlamp on and off. Lights shining in the cockpit doesn't bother us with night vision goggles, although a laser might."

Helicopter Pilot

"When I made contact by radio (A-G) they told me to identify our position by shaking my head up and down from an unburned area to mark my location. We, the Helicopter and me, used this method for hours directing water drops."

Engine Strike Team Leader

Check out these five videos provided by "Pacific Southwest NightWatch AA-51 platform" of Helicopter 531 operating at night.
Four are from the Cedar Fire and one is from the Blue Cut Fire.

Helicopters 531 & 408 on DIVS Y, Cedar Fire	H-531 on DIVS Y (shorter clip)
	
H-531 on the Blue Cut Fire, Lytle Creek	Concise H-531 on DIVS Y
	
H-531 drop (8 second clip)	
	

The night Helicopter can operate without a night Air Attack if it is the only aviation asset.

The night Air Attack can operate with or without night Helicopters.

The fire community can benefit from a better understanding of operational capabilities of the night aviation program.

This RLS
was submitted by:

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