OAS-35A
(4/18)

Interagency Aviation Lessons Learned

Subject: Firefighting Flight Operations

Area of Focus: "Formation flying, flying in close proximity, flights of two or more"

Distribution: All Aviation Operations

Discussion: Last year, two Single Engine Airtankers (SEATs) collided while conducting fire suppression operations. Both pilots were fatally injured and both aircraft were destroyed. The National Transportation Safety Board (NTSB) final report from the investigation has yet to be completed (WPR20LA246).

Both aircraft were on the third drop of the day, working as a flight of two, with one aircraft following the other while entering and operating within the fire traffic area. On the downwind and base leg, the two aircraft were separated by approximately 1500 feet. When they turned to the final approach course, the separation was reduced to less than 500 feet and the trailing aircraft was approximately 100 feet below the lead aircraft. The lead aircraft dropped the full retardant load and began a shallow climbing left turn. The trailing aircraft was observed to remain below the lead aircraft, flying through the lead's retardant. With retardant covering the windscreen, the pilot released the full retardant load and initiated a rapid, climbing left turn into the lead aircraft.

SEATs, and other aircraft in the firefighting community, often fly within close proximity to one another for a variety of reasons related to improving operational effectiveness. However, "how close" has essentially been left to each individual pilot's discretion. Some SEAT and lead aircraft pilots have stated that the heuristic (basic rule of thumb) is for the trailing aircraft to maintain a distance and speed that enables them to see the lead SEAT's retardant drop and coverage on the ground so they know where to start their retardant drop (tag and extend).

While some contractors possess policies and procedures to mitigate risks associated with this type of flying, others simply rely on the Federal Aviation Administration (FAA) or National Wildfire Coordinating Group (NWCG) standards. However, the FAA and NWCG guidance does not provide specific parameters for this this type of flying. The FAA's guidance on this issue is more closely related to their interpretation of "formation flying" whereas the NWCG refers to a standard related to "flights of aircraft". The following guidance is provided by the FAA and NWCG on this matter:

The FAA states that formation flight is "*More than one aircraft which, by prior arrangement between the pilots operate as a single aircraft with regard to navigation and position reporting. Separation between aircraft within the formation is the responsibility of the flight leader and the pilots of the other aircraft in the flight… A standard*

formation is one in which a proximity of no more than 1 mile laterally or longitudinally and within 100 feet vertically from the flight leader is maintained by each wingman (FAA AIM).

The *NWCG Standards for Aerial Supervision,* PMS 505 states that "*Flights of aircraft are comprised of two or more SEATs or Scoopers of the same make/model in close proximity to one another operating with a common objective. There must be enough distance between aircraft to allow Aerial Supervision to convey updated directions to the airtanker considering the preceding drop or a change in objectives. The trailing aircraft are responsible for separation between their aircraft and the aircraft they are following."*

If both aircraft are operating independently, then they are not acting as a "flight" and individual "see and avoid" separation criteria would apply. The term "See and Avoid" is included by the US Federal Aviation Administration (FAA) in Regulation 14 CFR Part 91.113 (b) as follows:

"When weather conditions permit, regardless of whether an operation is conducted under instrument flight rules or visual flight rules, vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft. When a rule of this section gives another aircraft the right-of-way, the pilot shall give way to that aircraft and may not pass over, under, or ahead of it unless well clear."

Formation, close proximity or "flight of two or more" training includes tactics and procedures for two or more aircraft operating in close proximity to one another, with all movements coordinated. For fire suppression operations, tactics include how to maintain different positions during flight, how to use radius of turn to increase or decrease the distance between other aircraft, and how airspeeds affect drop patterns and inflight rendezvous with another aircraft. Some of the procedures address emergencies, lost communications, over-run of another aircraft or lost sight of the other aircraft.

When two aircraft are flying in close proximity to one another, it's incumbent on the lead aircraft to provide a steady platform for the other aircraft to maintain safe separation. Variations in airspeed and altitude by the lead pilot can cause the "dash 2 or following" aircraft to focus excessively on the lead aircraft resulting in a loss of situational awareness. Training in both lead and "dash 2" positions provides a valuable perspective for each pilot that will improve their ability to anticipate movements and other critical components of aeronautical decision making. All that said, operators should train as they fly and fly as they train – in other words, they need to decide if they are going to operate as a "flight of two" (or more aircraft) using formation procedures and tactics or independently of one another.

When operating in close proximity to other aircraft, it's imperative that pilots make adequate separation a priority. Of equal importance is maintaining situational awareness with the surrounding terrain and climb out areas. Formation, proximity or flights of two or more operating in "loose trail" is demanding and must be practiced to ensure proficiency.

Training is one of the most effective, proactive measures available to reduce risk and improve efficiency. It's up to operators to ensure that pilots are able to capitalize on training opportunities. Above all, safety of flight always takes precedent over mission accomplishment.

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