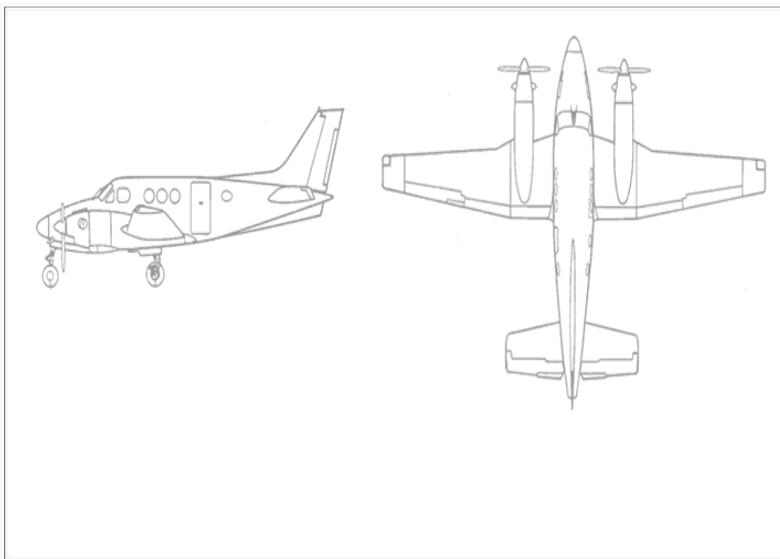
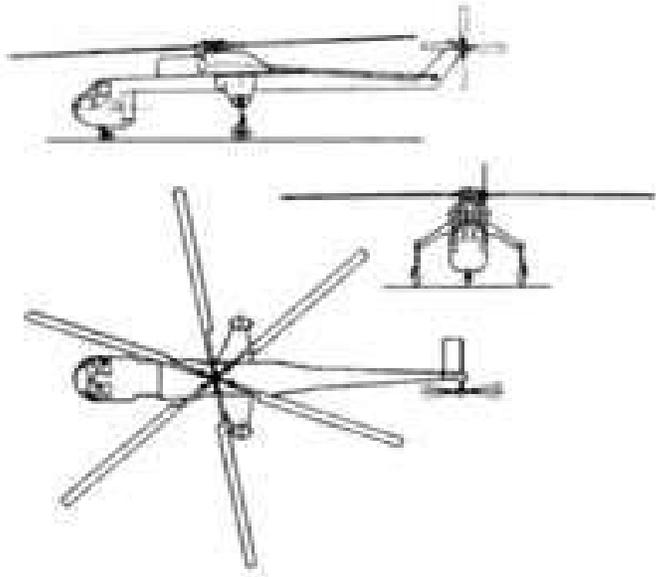


Facilitated Learning Analysis

Near Mid-Air Collision



Pacific
Southwestern
Region
September 2010



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Executive Summary

The fire in Southern California utilized several types of aviation resources. Towards the end of the operational day, two aircraft came within an estimated 200-300 feet of each other. The event involved two different aircraft types conducting two different missions. The pilot of one of the aircraft took immediate evasive action and once separation had been obtained, discussion about the event occurred over the radio. On the ground, appropriate follow up action occurred including discussion with the Regional Aviation Safety Manager (RASM) and filing a SAFECOM.

The RASM collected information about the event to determine what could be done to prevent issues such as this in the future. Near mid-air collision events are not frequent, but they do occur on a regular basis, largely between incident aircraft. With a goal towards preventing both near mid-air collisions and actual mid-air collisions, this event was determined to be a good candidate for the Facilitated Learning Analysis (FLA) process.

Aviation has been embracing the use of Safety Management System (SMS) to enhance aviation safety. Fire fighting operations within the Forest Service have been working to adopt a doctrinal approach that emphasizes performance based decision making rather than compliance based. Both of these are designed to bring the Agency into functioning as a High Reliability Organization (HRO) with safety as a core component throughout all aspects of the operation. The FLA is intended to provide information about the event without blame to allow for others to learn from the situation and prevent future occurrences. This near mid-air is the first aviation event to use the FLA process for accident prevention purposes. Those involved are commended for their voluntary participation in this process and for their efforts at enhancing aviation safety.

The FLA team membership was determined and a delegation of authority was signed. The FLA team reviewed the SAFECOM, dialogued with event participants and utilized technology such as Google Earth to determine the “whole picture” of the event. From understanding how the aircraft came to be in the situation, we hope to provide other pilots, Air Tactical Group Supervisors (ATGS) and Helicopter Coordinators (HLCO) with keys to preventing this type of situation in the future.

Background

The response to the fire was typical for the Southern California area. There were multiple helicopters delivering water and conducting a troop transport as well as airtankers dropping retardant. Aerial supervision was being accomplished through an ATGS and for the airtanker show through a Lead Plane. Aircraft and personnel from multiple agencies and departments were involved in responding to the fire.

By all FLA participants' accounts the airshow was going well and the Fire Traffic Area (FTA) was well established. The helicopters were working their way dropping water up the slope on the left flank of the fire. The airtankers were working on the right flank up on the ridge. There were no reported issues or concerns with how the operation was going.

“Everything was
working just fine”
- ATGS

The near-mid air event occurred at the end of the shift. The helicopters had called to the ATGS to let him know this would be their last drop before heading back to the airport. The airtanker was also on the last drop of the day. The evening shadows were “getting long” although none of the participants reported lack of daylight as an issue. The smoke column was beginning to “lay down” and light smoke prevented the ATGS from viewing the airtanker drop. Both the Lead Plane pilot and the helicopter pilot felt their visibility was good for the mission they were conducting.

The helicopters had been given a “hard ceiling” of which they needed to stay below. The fixed-wing aircraft had been given a “hard deck” of which they needed to stay above. The vertical separation between the fixed-wing and rotor-wing aircraft was about 400'. This was felt to be adequate based on the terrain, mission involved and lateral separation through working different areas of the fire.

In Southern California, local operating procedures tend to see one of the helicopters function as a lead helicopter; acting as a point of contact between the helicopters and the ATGS. They were calling themselves HLCO and being referred to as HLCO by others, which may have led to confusion. For this fire, there were two helicopters acting as HLCO for communications with the ATGS while still performing water dropping. They switched out as HLCO when needing to return for fuel. Based on the fire and aviation activity, this was not unusual nor did it create issue with the other aircraft.

Sequence of Events

Throughout the shift, the helicopters and airtankers had been working different flanks of the fire and by the end of shift the two resource types had encircled the fire and were working in about the same area.

View from the Lead Plane

The route of travel for the airtankers was aligned with a “go right to work” pattern with them coming on scene into a modified left base and dropping without ever getting into the classic pattern. The Lead Plane began the run about two miles from the drop with the airtanker following about a quarter mile behind. The Lead Plane pilot estimated his airspeed at 130 knots. The Lead Plane pilot noticed a “weird air current to the smoke” and slowly looked up while trying to process in his mind what exactly he was seeing. He noticed the helicopter and understood he was seeing water cascading directly in front of the airplane. He took immediate evasive action putting the airplane into a hard left climbing turn and called out for the airtanker to “go around, go around, helicopter over the drop”. The airtanker immediately banked right and went away from the drop area. The near mid-air event sequence all took place within an estimated five seconds. The Lead Plane pilot then called out to check the status of the airtanker who reported that they never saw the helicopter.

View from the helicopter

The helicopter was making the last drop of the day. The water dropping was progressing up the slope and the helicopter knew they were pushing up towards the ceiling. The helicopter pilots had the understanding that airtankers were in the other area of the fire and not where the helicopter was going to be dropping. The pilots completed their drop flying at an estimated 60 knots airspeed and headed to base when the ATGS contacted them and asked their location and did they see the airplanes. The co-pilot of the helicopter reported that he saw the Lead Plane and did not feel they were that close.

View from the Air Attack

Several helicopters had called in to let him know that this would be their last drop. The ATGS saw the Lead Plane and airtanker begin the run and then disappear under the smoke. He then heard the urgency and tone of the Lead Plane pilot’s voice and knew something had happened.

Follow up

The Lead Plane pilot and the ATGS discussed over the radio what had occurred. The ATGS contacted the helicopter and briefly discussed the situation. Once on the ground, the ATGS and Lead Plane pilot discussed the situation again. The Lead Plane pilot contacted the RASM to discuss the situation and followed the conversation with submitting a SAFECOM report.

Conditions

Environmental

The near mid-air collision occurred around 1900 hours towards the end of the shift. The sun was low on the horizon within an estimated 15 minutes of sunset. The smoke, which had been moving up into a defined column most of the day, was beginning to settle over the land mass and visibility was being affected in regards to the ATGS ability to view the other aviation resources. None of the participants discussed any concerns with the sun or smoke. The general consensus was that conditions were adequate for the missions being conducted and for the pace of the suppression action.

Communication

All participants stated that they received good briefings and felt they fully understood the mission assigned. Likewise, participants felt that communications were going well and recall no significant issues or concerns in regards to frequency congestion, clear direction or other aircraft communicating their whereabouts.

**Things were going well. A few commo issues, now and again but nothing really big.
–Helicopter Pilot**

Aviation Operation

There were five helicopters from three different agencies involved in water dropping and passenger transport missions. Throughout the day, five airtankers had been dropping retardant for the fire incident. The ATGS and Lead Plane had both recently transitioned into the aviation operation for their first time on scene. A switch between HLCO aircraft occurred shortly before the incident.

Lessons Learned from FLA participants

The helicopter hard ceiling was understood by the fixed-wing participants to be 3000' while the helicopter pilot understood it to be 3300'. This difference of understanding reduced the margin of safety through vertical separation from 400' to 100'.

- The lesson here is have the aircraft “read back” the information to ensure information is communicated accurately and that all parties have the same understanding.

The intended 400' vertical separation was adequate in the beginning of operations as the helicopters were on one area of the fire and the airtankers were on another. With the work progressing throughout the day, the fire was winding down and the area that aerial resources were working was diminishing. By the end of the day the helicopters had made their way to the top of the ridge where the airtankers were working. **With the lateral separation being reduced, the vertical separation was crucial to avoid airspace conflicts.**

- Keep assessing your mitigations as the operation progresses. What originally worked to reduce risk might not be effective as the operation changes.
- Based on this experience, the ATIS decided he will not use less than 500' vertical separation in future operations.

The ATIS observed during the FLA interview that the Bravo unit (who was working as a Lead Plane on this fire) had a better perspective to be tracking the helicopters. He cited unfamiliarity with the out of Region unit as one reason he did not “hand” the helicopter supervision over to the Bravo unit. Looking back, he states “**there were a better set of eyes and he was not using them**”.

- Be aware of human factors (unfamiliarity) that might affect how you operate. Work to overcome these.
- Utilize the best possible information in gathering situational awareness. If someone has a better perspective, tap into it.
- The Lead Plane could have suggested changing into a Bravo Unit profile as they had the best view of the helicopters in their vicinity.

The criticality of situational awareness was reinforced with this event. All of the participants reported they felt they were doing all that they were supposed to be doing. Everyone felt things were going well and that they understood where the other resources were operating. The Lead

Plane pilot and ATS had checked the TCAS and it did not register that another aircraft was in the vicinity.

- Do not assume anything. Trust but verify for yourself. Don't let complacency set in.

“This event has reset my focus and attitude”- Lead Plane Pilot

Positive Factors

The willingness of those involved to participate in the FLA process to promote an understanding of the event and enhance accident prevention.

The ATGS was able to work through what had happened after the fact and had some great lessons learned.

Recommendation by FLA team

Promotion and distribution of the FLA report to aviation refreshers and workshops to facilitate discussion on how the situation developed.

FLA Team

Bea Day – Team Lead
Cibola Forest Fire Management Officer

Yolanda Saldana
Pacific Southwest Regional Aviation Safety Manager

Dennis Brown
CALFIRE Aviation Safety Manager

Jami Anzalone
Southwestern Regional Aviation Safety Manager

Peter Tolosano
Pacific Southwest Operations Risk Management – (Mentor)

Definitions and Terms

ASM- the Aerial Supervision Module (ASM) is one airplane with a two person crew functioning as the Lead Plane and ATGS from the same aircraft. The crew includes a Lead Plane pilot qualified as a Air Tactical Pilot (ATP) as well as a ATGS who is qualified as an ATS.

ATGS – Air Tactical Group Supervisor. Manages incident airspace and controls incident air traffic. The ATGS is an airborne firefighter who coordinates, assigns, and evaluates the use of aerial resources in support of incident objectives.

ATS – Air Tactical Supervisor is a fully qualified ATGS who has received specialized training and authorization to function as an ASM crewmember.

Bravo Unit- The designation for an Aerial Supervision Module (ASM).

FTA -Fire Traffic Area is a standardized initial attack airspace structure with designated altitudes and patterns for the different aircraft types. (see Appendix B)

HLCO- Helicopter Coordinator coordinates, directs and evaluates tactical/logistical helicopter operations. The HLCO works under the ATGS.

Horizontal Separation – separation based on working different areas of the fire (e.g. Helicopters working the East side of the fire while airtankers work the West side)

Lateral Separation- separation based on different altitudes of aircraft. (e.g. Helicopters working at 5000' AGL while airtankers work at 7000' AGL)

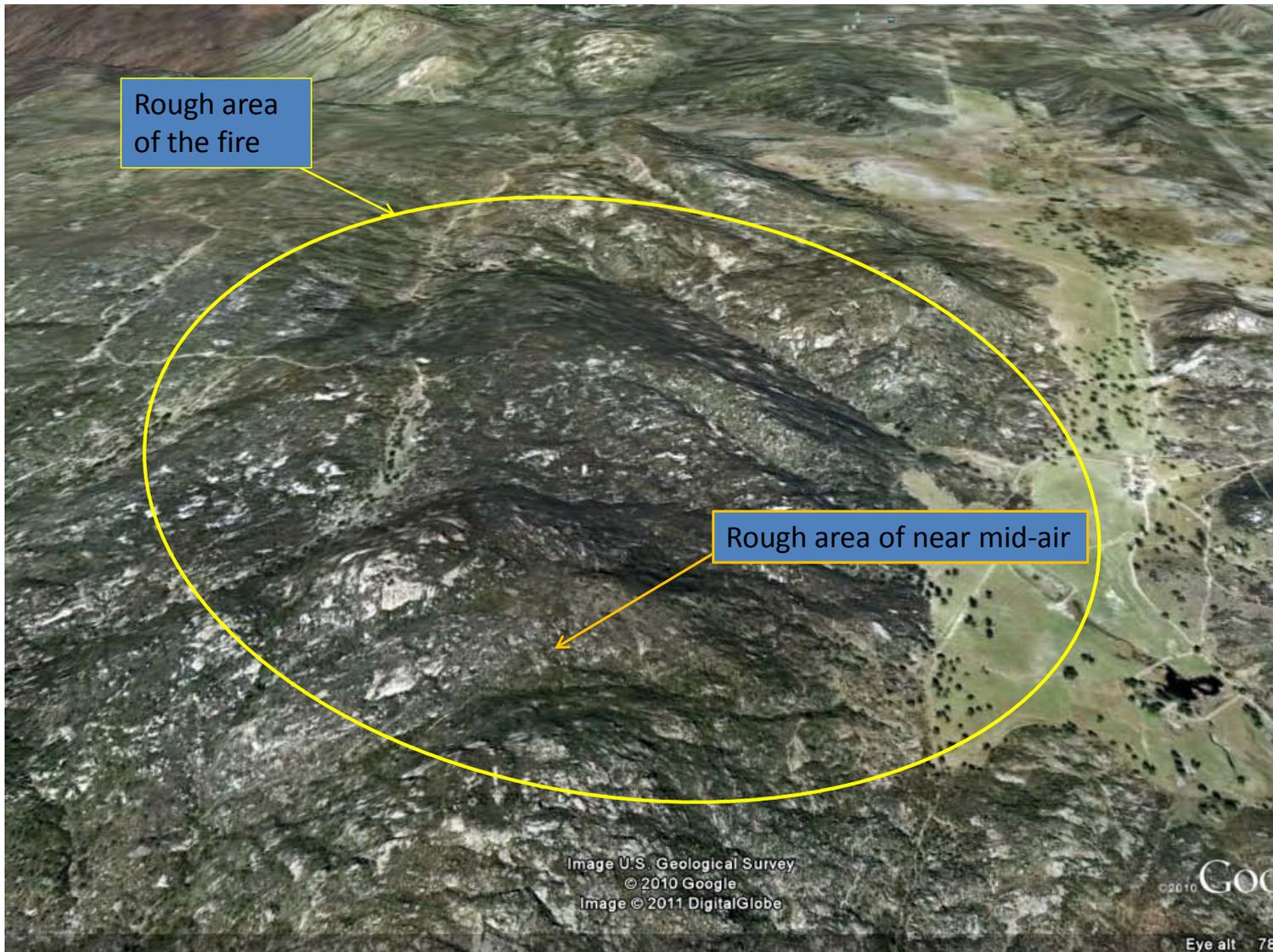
Lead Plane Pilot- Agency pilot, who coordinates, directs and evaluates airtanker operations, and is qualified for low level operations. The capabilities of a Lead Plane enhance the safety and effectiveness of airtanker operations.

Modified Left Base- instead of the classic 90° turns the airtankers were making turns into the base leg of the pattern at about 45° and continuing on the live drop run.

SAFECOM- Safety Communiqué is the hazard reporting system for Federal land Management Agencies for aviation operations. Reports are filed through the internet and can be anonymous.

TCAS- Traffic collision avoidance system monitors the airspace around an aircraft for other aircraft equipped with a corresponding active transponder, and provides a visual and aural warning to the pilot.

Appendix A- Aerial view



Appendix B- Fire Traffic Area (FTA)

FIRE TRAFFIC AREA (FTA) 31 MAR 06		FTA
<p>INITIAL RADIO CONTACT: 12nm on Assigned Air Tactical Frequency.</p> <p style="text-align: center; color: red;">CLEARANCE IS REQUIRED TO ENTER FTA</p> <p>NO RADIO CONTACT: Hold a minimum of 7nm from the incident.</p> <p>NOTE: Airtanker Maneuvering altitude determines minimum Airtanker and ATGS Orbit altitudes. Assigned altitudes may be higher and will be stated as MSL.</p>		
note 1	1000' min. separation between ATGS orbit and Airtanker orbit altitude.	
note 2	500' min. separation between Airtanker Orbit and Maneuvering altitude.	
note 3	On arrival reduce speed to cross 7nm at assigned altitude and 150 KIAS or less.	
* HELOS — Fly assigned altitudes and routes.		
* MEDIA — Maintain VFR separation above highest incident aircraft or position and altitude as assigned by controlling aircraft.		
AIR BASE 123.975	AIR GUARD 168.625n TxTone 110.9	AIR to AIR 122.925
NATIONAL FLIGHT FOLLOW 168.650n TxTone 110.9		