



**Alberta Provincial Airtanker Program
Firebombing Procedures Manual
2026**

2026 Revisions

2.3 Preparing for Operations – Updated practice requirement from recommended to mandatory prior to commencing operations on an incident.

2.3 Preparing for Operations – Added in section to describe fire ready expectations at the start of contract.

3.2 Daily Briefings – Changed the word “encouraged” to “expected” for AAO attendance at the morning weather briefing in the Fire Centre.

3.2 Daily Briefings - Added in statement that AAOs are expected to use the reporting points when providing an update.

4.3 Overnighting – New section to describe airtanker group overnighting procedures.

6.1 Aircraft Maintenance – Updated procedure for reporting aircraft unserviceability.

8.1 Departure – Updated the procedure describing maintaining a sterile cockpit within the airport zone.

8.5 Cold Lake Air Weapon’s Range (CLAWR) – Added statement for the Air Attack Officer to contact the Lac La Biche Forest Area if aircraft have been granted additional clearances once inside the range.

9.3.1 Birddog Team Responsibilities – Updated to more clearly affirm the responsibilities of each birddog team member.

10 Airspace Management – Updated to more clearly affirm the responsibilities of each birddog team member with airspace management.

10 Airspace Management – Added in Helicopter Coordinator as an airspace manager.

10 Airspace Management – Added in a section explaining the requirement for functioning Mode C transponders and direction to remove non-compliant aircraft from the fire traffic area.

12.1 Verbal Identification – Updated to more clearly affirm the responsibilities of each birddog team member.

12.2 Demonstration Run – Updated to more clearly affirm the responsibilities of each birddog team member.

14 Skimmer Operations – Added in examples of tactics and descriptions.

18.4 Drop Assessment – Updated to more clearly affirm the responsibilities of each birddog team member.

23.4 Forward Looking Infrared (FLIR) – Updated to clearly affirm the responsibility of the Air Attack Officer and state policy for low level operations.

2025 Revisions

1.1 Provincial Wildfire Objectives and Priorities within the Forest Protection Area – Priorities removed and add a link to the most current priorities.

5.5 Time Free from Duty – Time free from duty requirements removed and replaced with a statement describing that Alberta Wildfire manages aerial firefighting within the parameters set by the Canadian Aviation Regulations.

7.1 Dispatch Information – Updated to describe the Airtanker Base Supervisor is responsible for sending electronic dispatch information and the Forest Area Dispatch is responsible for passing it verbally over the radio.

8.1 Departure – Added in statement describing maintaining a sterile cockpit within the airport zone during take offs.

10.3 General Airtanker Group Airspace Communication Procedures – Added section to state frequency when not monitoring the bombing frequency.

11.2 Stacking Procedures – Revised procedure for airtanker(s) that are between the 5-minute back call and entering the stack when an automatic stack decent occurs.

12.1 Verbal Identification – Updated list of information that may be provided to the airtanker.

14. Skimming Operations – Updated the ‘Skimmer Performance at Various Distances’ chart.

22.1 Airtanker Action is Complete – Removed the requirement to activate the all-clear (wail) siren.

22.4 Landings – Added in statement describing maintaining a sterile cockpit within the airport zone during landings.

23.7 – Daily Flight Report (A0-02) – title change to “Mobile Flight Report”. Removed the wording describing the form required to be signed.

24.1 Appendix 1 – Glossary of Firebombing Terms – Added definitions for ‘Base (of the fire) or Back’, ‘Bullseye’, ‘Diversion’, ‘Double-up’, ‘Early’, ‘Exit’, ‘Flank’, ‘Head (of the fire)’, and ‘Sterile Cockpit’. Updated ‘Stack’ definition. Removed ‘Wail Siren’.

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1. Introduction

Alberta Wildfire operates land-based and skimmer airtankers as components within a multi-faceted wildfire management strategy.

The province organizes its airtanker fleet into ten separate groups. Each airtanker group operates under the direction of an Air Attack Officer (AAO). However, each aircraft - birddog and airtanker - is considered to be its own entity, and may be temporarily assigned to other groups as required.

The airtanker fleet is provincial in nature. Aircraft and crews may be dispatched to specific fire requests or relocated to meet forecast fire occurrence anywhere in the province from any of the 13 permanent airtanker bases.

The purpose of this manual is to ensure that the airtanker operations are conducted in a safe, efficient and cost-effective manner.

Information for this manual was derived from the following sources:

- Air Attack Officer Training Manual
- Wildfire Management Policy and Standard Operating Procedures Manual;
- Alberta Wildfire Pilot Handbook;
- Canadian Aviation Regulations and Standards (CARs)

1.1. Provincial Wildfire Objectives and Priorities within the Forest Protection Area

To ensure the provincial objectives are met, safe but aggressive initial attack shall be taken on all unwanted wildfires within the Forest Protection Area (FPA), with a goal to contain wildfire spread by 10:00 the following day.

Please see <https://www.alberta.ca/how-we-fight-wildfires> for the priority of allocation and use of firefighting resources in the Forest Protection Area. Airtanker Program Objectives and Priorities

1.2. Airtanker Program Objectives and Priorities

As part of the province's policy to aggressively suppress unwanted wildfire, Alberta Wildfire's airtanker program objectives and priorities are:

Airtanker Objectives

- Quick containment
- Minimize size
- Minimize cost and damage

Airtanker Priorities

- Initial attack
- Support action within the first burning period
- Ongoing support action

Priority setting is the responsibility of the Forestry Manager, Wildfire Operations Officer, Forest Area Duty Officer and/or the Incident Commander, in conjunction with the Alberta Wildfire Coordination Center (AWCC) Duty Officer and the Provincial Aircraft Coordinator (PAC).

1.3. Line Authority for Airtanker use in Wildfire Suppression

Listed below is the line authority that Air Attack Officers will observe while working with airtanker groups within Alberta:

- Administration: Directly responsible to the Forest Area Duty Officer and/or the Provincial Aircraft Coordinator
- Initial attack: When assigned to an initial attack fire, the Air Attack Officer reports to the Incident Commander. The AAO will function as the Incident Commander until such time as ground personnel are on scene and have formally assumed command.
- Multiple fire action: Directly responsible to the Incident Commander on an individual fire, and Forest Area Duty Officer or designate (i.e. Wildfire Assessor) when working multiple fires.
- Support action: For assignments on support action for large incidents or complexes, the Air Attack Officer will report to a delegate of the Incident Commander on the Incident Command Team (Operations Section Chief, Air Operations Branch Director, Air Tactical Group Supervisor, Division Supervisor, etc.)

A safe and efficient airtanker program operation relies upon effective communication and situational awareness. Air Attack Officers will ensure that briefings are held as required.

2. Airtanker Operations Preparedness

With the arrival of airtanker groups at the start of the wildfire season, a period of orientation and briefing is required. Air Attack Officers are responsible for preparing themselves and their assigned airtanker group for operations.

2.1. Air Attack Officer Responsibilities

The Air Attack Officer that commences with an airtanker group starting contract takes on the responsibility for ensuring the group is in place at a specified time, facilitates the orientation of the group, ensures all briefings are performed, and readies the group for the start of their fire season.

2.1.1. Prior to Airtanker Group Arrival

Prior to the airtanker group arrival to the Airtanker Base, the AAO should:

- Be at the base to receive the airtanker group.
- Organize a Forest Area briefing, if required
- Check in and meet with the Airtanker Base Supervisor to determine Airtanker Base readiness (fuel, retardant, foam, parts storage, staffing, training required, etc.)

2.1.2. Upon Airtanker Group Arrival

- Meet and greet the airtanker crew. Start the process of building a team
- Facilitate introductions between airtanker base staff and crew
- Enable the offloading and storage of gear and spare parts
- Establish a schedule, and ensure initial Forest Area, base, and daily briefings are performed
- Ensure aircrew receive and sign-off on the *Airtanker Base Worksite Safety Orientation*
- Complete the airtanker group start of contract checklist with the airtanker crew

2.2. Airtanker Crew Responsibilities

Aircrew responsibilities when arriving at an assigned base include:

- Operation and maintenance of the aircraft
- Give aircraft-specific briefings to Air Attack Officers and airtanker base staff
 - Birddog pilots shall ensure each Air Attack Officer has received their training for “Personnel Assigned Duties Onboard an Aircraft”
- Orient themselves on:
 - Aircraft parking
 - Fueling procedures
 - Base equipment and facilities
- Orientation of base staff on the proper loading of the aircraft
- Operation of any equipment around the aircraft (i.e.: forklift, vehicles, etc.)
- Offloading and storage of any parts & equipment
- Arranging for required maintenance equipment over and above what the base provides

2.3. Preparing for Operations

When an airtanker group arrives at the beginning of the wildfire season, they will be provided with sufficient time to become “fire ready”. No pressure shall be placed upon the Air Attack Officer and/or aircrew to shortcut setup and briefing time to expedite dispatching the airtanker group.

The airtanker group must complete at least one practice prior to commencing operations on an incident. The expectation is that all group personnel are adequately trained and prepared to perform their duties; however, every opportunity must be given to the members to form an effective team.

The PAC will set the alert status for each airtanker group on the evening prior to the start of the contract period. The alert status will specify the time at which the group is required to be fire ready. Fire ready status indicates that the airtanker group has completed all arrival and setup activities, conducted a practice, completed a debrief, and is prepared to accept an assigned fire mission. The airtanker group and the assigned AAO are responsible for planning their arrival at the base with sufficient time to complete all required tasks prior to the fire ready time. In some cases, this may require the group and the AAO to arrive at the base on the evening before the contract start date.

The PAC and Forest Area Duty Officer will be apprised of the group status and notified when the group is fire ready.

2.4. Import Airtanker Groups

During times of high wildfire load, additional airtanker & birddog aircraft may be hired or imported from external jurisdictions under CIFFC Mutual Aid Resource Sharing (MARS) agreements.

Upon arrival of these resources, an Alberta Air Attack Officer may be assigned to ensure:

- Appropriate orientation and briefings are conducted
- Communication systems are in place to use Alberta’s Firenet FM radio network, and all frequencies are programmed correctly
- Logistical needs of the group personnel are met.

If a birddog aircraft accompanies an imported airtanker group, one of the following may occur:

- Birddog arrives with an Air Attack Officer and a pilot from the supplying agency. In this case, a nationally certified Alberta AAO will be assigned to the airtanker group to check ride or mentor the birddog team. This may not be required if the visiting AAO is nationally certified and is familiar with long-term retardant and skimmer operations. The Alberta AAO will remain with the birddog until such time as they are satisfied with the performance of the imported birddog team.
- Birddog arrives with only the pilot. In this case, the Alberta AAO assigned to the resource will function as the Air Attack Officer in charge. If the birddog pilot has not worked in Alberta within the last year, a proficiency practice will be conducted prior to dispatching the group.

The PAC and Forest Area Duty Officer will be kept informed on the status of the group and notified when the group is fire ready.

2.5. Airtanker Group or Air Attack Officer Export

In the event an airtanker group and/or Air Attack Officer are exported to another jurisdiction, upon arrival, the Air Attack Officer or Group Captain (if the airtanker is exported without the birddog) must ensure the following before fire operations:

- Appropriate orientation and briefings are conducted, including planned integration with jurisdictional resources
- Communication systems are in place, and all frequencies are programmed correctly
- Logistical needs of the group personnel are met.

3. Briefings

3.1. Initial Basing and/or Re-positioning Briefings

When an airtanker group is assigned to an airtanker base, be it the initial season deployment, or a base change during the season, the crew members will receive detailed briefings as follows:

- Forest Area Briefing
An Alberta Wildfire staff representative from the Forest Area will provide an orientation (policies, local wildfiresituation, contacts, maps, local information, special operation areas, etc.) and answer any group questions. This briefing is to take place as soon as practical following the group's arrival.
- Airtanker Base Worksite Safety Orientation
The Airtanker Base Supervisor will ensure any individual entering the premises receives a base safety orientation before performing any duties on the base. Each individual must sign the completed *Airtanker Base Worksite Safety Orientation* form, and the Airtanker Base Supervisor will retain this information for the remainder of the season. Once signed off, this safety orientation is valid for that specific base for the remainder of the season.

3.2. Daily Briefings

Air Attack Officers on shift are expected to participate in daily briefings and communicate any relevant information to their group:

- Daily Weather Briefing
The Provincial Weather section conducts two daily weather briefings at 10:30 am and 15:30 pm. AAOs are expected to attend the morning briefing in the Fire Centre and encouraged to attend the afternoon briefing when possible.
- Forest Area Conference Calls
Each Fire Centre holds a daily conference call with the wildfire resources. This allows all resources assigned to the area to receive information from the Forest Area Duty Officer, and an opportunity to discuss issues and concerns pertaining to the current situation. AAOs are encouraged to participate in these calls.

- Daily Air Attack Officer Meeting

All Air Attack Officers on shift will participate in the daily online meeting held at 9:30 am. This is a mandatory meeting unless the airtanker group is involved in operations at the time of the call. AAOs are encouraged to participate in the meeting on the day prior to their shift to familiarize themselves with the current and expected wildfire situation. When providing updates on previous day operations, Air Attack Officers are expected to follow the reporting points outlined in the meeting PowerPoint to ensure consistency and clarity.

During extended periods of low wildfire hazard, the PAC may reduce the frequency of the Air Attack Officer meeting. The PAC will communicate any deviations from the daily schedule in the comments section of the *Alberta Airtanker Alerts*.

Live Meeting sign in information is provided at the start of the wildfire season.

3.3. After Action Reviews

An informal post-mission after action review (AAR) is required after each mission/dispatch. Depending on the complexity or issues arising from the mission, a formal AAR may be held.

AARs are centered around four questions:

- What was expected to happen?
- What actually occurred?
- What went well and why?
- What can be improved and how?

An AAR features:

- An open, honest and professional discussion.
- Participation by everyone on the team, including engineers, ATB Supervisor and loaders, etc.
- A focus on results of the mission.
- Identification of ways to sustain what was done well.
- Development of recommendations on ways to overcome obstacles.

Suggested list of topics, include:

- Alerts
- Dispatch Information
- Loading/Retardant Quality
- Radios/Tracking/Satellite Phone
- Safety/Hazards
- Air Attack Plan/Objectives
- Decisions and Communications
- Run/Target Description

- Drop Assessments
- Aircraft and Tank System
- Ground Crews/Fire Centre
- Other Aircraft

Copies of all formal After Action Reviews are required to be emailed to the Lessons Learned site at: wf.lessonslearned@gov.ab.ca. Please cc the Forest Area, the PAC and the Airtanker Program Supervisor.

4. Airtanker Positioning and Alerts

4.1. Airtanker Group positioning

Airtanker group positioning within the Province of Alberta is a strategy to increase initial attack capacity and reduce containment times of wildfires.

The province has twelve primary and one secondary airtanker bases. The Provincial Aircraft Coordinator (PAC) is responsible to position airtanker groups to maximize initial attack effectiveness and coverage. The PAC will consult with the Forest Area Duty Officers to form a deployment plan best suited for the existing and forecast wildfire hazard. The Provincial Duty Officer will approve the plan.

4.2. Day-basing

Day-basing is a single-day strategic relocation of an airtanker resource within the province, to increase initial attack capacity and reduce the containment times of wildfires. Unlike a longer-term base change, the airtanker group is moved to the specified location for that day's alert period only and will return to its home base for the night. Maintenance engineers or spare parts are not required to day-base. Airtanker groups should be fueled and fire-ready at the day base location by 13:00 or the scheduled red/yellow alert status, whichever is earlier.

While in transit to or from a day base, land-based airtankers will be loaded with water.

4.3. Overnighting

Overnighting is a short duration relocation of an airtanker group to a location other than its assigned home base, where the group remains overnight and returns to its home base following the completion of the assignment. Overnighting may last for up to three days. It is typically used to expedite next day operations on wildfires that have escaped initial attack, reduce transit time for early morning operations, and respond to forecasted weather or other operational necessity.

Prior to approving overnighting, the PAC will confirm that the airtanker group is able to overnight and that no scheduled maintenance, inspections, crew changes, or other operational constraints will prevent the group from remaining available for operational tasking. The Forest Area logistics staff may assist the airtanker group with arranging accommodations, meals, and vehicles as required. Aircraft maintenance engineers and spare parts are not normally required unless specifically directed.

While in transit to or from an overnight location, land-based airtankers will be loaded with water unless otherwise directed.

4.4. Base Change

This is a full relocation of the airtanker group to a different airtanker base. The airtanker group is expected to check out of the hotels and load all spares and cargo within two (2) hours. Every effort will be made to give advance notice of upcoming base changes. Upon arriving at the new location, the group can unload and arrange for practices, vehicles, accommodation, and meals depending on wildfire hazard and group status.

When departing for a base change, airtanker group pilots shall notify the Airtanker Base Supervisor of their ETA. The Airtanker Base Supervisor shall then notify the Fire Centre of the departure time, so the ATR can be updated.

4.5. Daily Alberta Airtanker Alerts

In consultation with the Forest Area Duty Officers and the Provincial Duty Officer, the Provincial Aircraft Coordinator will build the daily Alberta Airtanker Alerts. The airtanker alerts will contain the alert status and times, airtanker positioning, sunrise & sunset times, the name of the AAO assigned to each airtanker group, and any other relevant notes as required. The form will be distributed to the Fire Centres, airtanker bases, AAOs, and program partners, typically by 17:00 on the previous day.

4.6. Alberta Airtanker Alert Statuses

Red	Initial Attack: Birddog wheels roll within 10 minutes after dispatch. Sustained Action and Mutual Aid: Birddog wheels roll immediately after mission planning completed. Personnel must be on base for the specified standby period and are to be prepared for immediate departure.
Yellow	Birddog wheels roll within 30 minutes from dispatch.
Blue	Birddog wheels roll within 1.1 hours from dispatch.
Green	The airtanker group is off duty (released from standby obligations) and can be away from base for a specified period. A green day must be scheduled 12 hours in advance.

5. Airtanker Group Duty Day and Flight Limitations

5.1. Pilot Duty Day

A pilot's duty day is restricted by the Canadian Aviation Regulations. This duty period is (14) fourteen hours in any 24 consecutive hours.

A pilot's duty day starts when a pilot:

- Reports for a flight,
- Commences standby that has a reporting time of one hour or less,
- Performs any duty required by the company, or
- Performs any duty designated by the Minister of Transport

A pilot's duty day ends when:

- The engine is turned off at the end of the final flight,
- Any required paperwork is completed,
- Any pilot performed fueling or maintenance is completed,
- At the end of a predetermined standby period, whichever is later.

5.2. Mandatory Rest Periods

A Mandatory Rest Period is a period of time in which the pilot is free from all duty, is not interrupted by the company, and is provided an opportunity to obtain not less than eight (8) consecutive hours sleep, time for meals and personal hygiene, and time to travel to and from the rest facility.

5.3. Daily Maximum Flight Hours – Initial Attack Fires

All airtankers and birddogs are permitted to fly a maximum of ten (10) hours, per day (wheels roll to wheels stop) on initial attack fires, based on the pilot's duty day.

If a flight crew has been actively flying on initial attack for an extended period, the Air Attack Officer and airtanker group pilots shall be consulted to determine if the maximum flight hours are required to be adjusted to reduce cumulative fatigue.

5.4. Daily Maximum Flight Hours – Support Action Fires

All airtankers and birddogs are permitted to fly a maximum of ten (10) hours (wheels roll to wheels stop), for the first day of support action and then a maximum of eight (8) hours, per day (wheels roll to wheels stop), for any subsequent days on support action, based on the pilot's duty day.

If a flight crew has been actively flying on initial attack immediately prior to being assigned to support action, the Air Attack Officer and group pilots shall be consulted to determine if the maximum flight hours are required to be adjusted to reduce cumulative fatigue.

5.5. Time Free from Duty

Alberta Wildfire manages fixed-wing aerial firefighting within the parameters set by the Canadian Aviation Regulations. Aircrews will not be asked or expected to exceed the Canadian Aviation Regulations. The aircraft companies will track "Days Free from Duty" for airtanker groups.

5.6. Grounding Times

Firebombing operations are restricted to daytime Visual Flight Rules (VFR) conditions within the period commencing one half hour before sunrise and ending one half-hour after sunset. An exception to this regulation applies to Instrument Flight Rules (IFR) rated pilots within suitably equipped aircraft; they may fly within night VFR or IFR conditions. This exception does not apply to actual firebombing on a target and is authorized for flights to and from a fire or another airstrip only. All contract birddogs and airtankers are certified and equipped for IFR flight, with the exception of AT-802F and FireBoss aircraft. AT-802F and FireBoss aircraft are permitted to fly in nighttime VFR conditions. Birddogs equipped with FLIR cameras are not permitted to fly in known icing conditions; the FLIR camera must be removed prior to any flights that may encounter icing conditions. The CL-215T aircraft are not permitted to fly in temperatures at or below seven degrees Celsius, nor in conditions of visible moisture.

5.7. Weather and Notice to Airmen – NOTAM

Pilots are required to be informed on current and forecast weather conditions, and any notices to airmen (NOTAMs) that may affect flight operations. Air Attack Officers are expected to remain informed, and to understand the implications that may affect air attack operations.

6. Aircraft and Crew Readiness/Preparedness

6.1. Aircraft Maintenance

Aircraft maintenance engineers (AMEs) and pilots shall plan their maintenance duties to avoid conflict with the airtanker group's ability to meet the alert response times. All Alberta airtanker bases have maintenance facilities which provide for aircraft spares storage and workspace for AMEs to utilize.

Should an aircraft become unserviceable during an alert period, the aircraft unserviceability must be immediately reported to the Forest Area Duty Officer. The Air Attack Officer/Airtanker Base Supervisor will ensure the aircraft unserviceability is reported to the PAC, including the estimated time to return to service, if known. The pilot in command is required to record unserviceability items on the *Mobile Flight Report*.

6.2. Aircraft Pre-flight

Daily inspections are to be conducted according to the coloured alert status, to avoid any conflicts with expected response times. Air Attack officers are strongly encouraged to become familiar with and involved in the daily inspection routines of the assigned birddog aircraft. Communication and collaboration with the birddog pilot is key to ensuring safety. AAOs must be familiar with the aircraft's basic systems, instruments, and operation, including a rudimentary knowledge of emergency procedures, and will work with the birddog pilot to ensure this becomes second nature.

6.3. Air Attack Officer Preparedness

To prepare for duty, the Air Attack Officer shall:

- Be on base and ready to take over their assigned group by 10:00 on the first day of their scheduled shift or one hour prior to the start of the airtanker group's alert, whichever is earlier.
- Have a flight bag (AAO kit & personal effects for an overnight stay) packed and carried aboard all flights.
- Daily Inspect (DI) the equipment within the birddog aircraft for which the AAO is responsible. This includes FLIR equipment and recording devices, FM radios, siren, iPad, map books and group AAO kit.
- Review, understand, and communicate the fire weather forecast, fire weather indices, fire behaviour prediction system, fire occurrence-lightning location maps, human-caused probabilities and location, resource preparedness sheets, and provincial airtanker alerts.
- Review current provincial fire load as well as locations.
- Determine the Fire Centre organization and contacts.
- Initial attack and support resource deployments.
- Anticipate work for the day (i.e. support, lightning storms, etc.), and safety concerns.
- Meet with the Airtanker Base Supervisor and review the readiness of the airtanker base, including:
 - Condition of mixing/ loading equipment and storage facilities.
 - Quality control of fire retardant i.e. salt content, viscosity.
 - Verify the liquid concentrate retardant stock on hand can meet the anticipated demand.
 - Fuel and oil stocking levels, condition of fueling equipment and the fuel being supplied.
 - Aircraft parking and dispatch procedures (i.e. with multiple groups on base).
 - Inspect the base or operation from a safety standpoint and take corrective action against hazards.
- Complete the FP 249 - *Passenger and Cargo Manifest* form. Submit a copy to the Fire Centre.
- Monitor crew fatigue, morale, and safety.
- Keep the Forest Area Duty Officer apprised as to the status of the airtanker group.

6.4. Airtanker Group and Airtanker Base Proficiency Practices

A correlation between periods of low airtanker activity and an increase in accidents and incidents has been observed. Airtanker practices are carried out during periods of inactivity to help ensure aircrews, support staff, equipment and air attack procedures are current and functional. A sense of complacency may build during periods of inactivity. Proficiency practice frequency shall be:

- Airtanker groups will carry out two proficiency practices during the first seven days of the start of contract.
- Airtanker groups are required to practice every six days absent fire action within the previous five days.
- When an airtanker group is positioned to an eastern-slopes base (Springbank, Pincher Creek, Rocky Mountain House, Edson or Grande Prairie), the group will undertake at minimum one proficiency practice in mountainous terrain as soon as practical.

The decision to practice will be at the discretion of the Air Attack Officer in consultation with the Forest Area Duty Officer. Practices shall not be postponed due to anticipated fire activity; such times have proven to account for an inordinate number of incidents and accidents. Practices should only be postponed for safety reasons, usually weather-related. Other considerations for proficiency practices:

- Before initiating a practice, enquire with the Forest Area Duty Officer if it is feasible to incorporate the airtanker practice with any ground crew training, or to support local projects.
- Fire retardant may be used in practices with the approval of the Provincial Aircraft Coordinator.
- All fire retardant jettisoned on a practice must be dropped in an approved abort zone or in a location approved by the Forest Area Duty Officer. Retardant volume shall be entered into the FIRES database.
- Practices with land-based airtankers should allow for an initial load and one reload for each airtanker.
- Practices with skimmer aircraft should allow for 4 loads per airtanker.
- Multi-group practices are encouraged to promote cross training between different airtanker types.
- AAOs are encouraged to learn aircraft systems and procedures, and to assist the pilot during emergencies.
- Instrument-rated groups may opt to practice IFR approaches and landing on a practice day if the weather will not permit a regular practice.

Airtanker base staff are required to practice every six days if they have had no fire action or airtanker group proficiency practices in the previous five. Practices must be documented.

6.5. Birddog Familiarization Flights

Familiarization flights are conducted by birddog pilots and Air Attack Officers to ensure each are clear about their functions within the cockpit. This will avoid in-flight confusion between the birddog team members and help maintain a safe, well-coordinated operation. Familiarization flights are normally made at the beginning of each season, whenever there is a new pairing of individuals who do not routinely work together, or when utilizing an unfamiliar aircraft type. The following are procedures to be covered; they may be adjusted according to the experience levels of both individuals.

- Pre-flight: Following an initial base briefing, an aircraft inspection will include a thorough safety briefing, review of the use of avionics and cockpit instruments, discuss dispatch procedures and individual responsibilities throughout the mission, and review any emergency procedures. Pilots unfamiliar with a particular airtanker base will benefit from a review of local topographical features and visual checkpoints near the airport.
- In-flight: Points to cover during a familiarization exercise include: AAO preferences while orbiting during the initial fire reconnaissance, aerial suppression strategies, demonstration runs and run descriptions, birddog aircraft positioning overhead the fire, airspace management, task distribution, hazard identification, communication procedures, etc.

Simulated targets should be flown in areas featuring varying topography and fuel types. Upon completion, a short debriefing should resolve any discrepancies found during the flight. The Air Attack Officer and birddog pilot should be aware of each other's functions in all phases of aerial attack.

7. Dispatching Procedures

The dispatching of airtanker resources is the responsibility of the Forest Area Duty Officer, who administers wildfire operations for the area in which the airtanker resource is currently located. Forest Areas may dispatch an airtanker group positioned in their Forest Area, to a fire within their boundaries or designated reload zone, without AWCC intervention. The PAC is responsible for filling ATRs and has the authority to override any airtanker dispatch.

The Forest Area Duty Officer or designate is responsible to create an Airtanker Request (ATR) in the Alberta Dispatch system. Information entered into the system is instantly disseminated to all individuals involved in executing an airtanker dispatch.

The following is a guide designed to summarize the order of events from the time the Airtanker Base Supervisor receives a group dispatch request from the Fire Centre until the airtankers become airborne.

7.1. Dispatch Information

The Fire Centre that is responsible for the base at which the group is located will initiate the dispatch of an airtanker group.

The Airtanker Base Supervisor is responsible for alerting the airtanker group of a dispatch. If the airtanker group is not on base (e.g. yellow or blue alerts), the ATBS will notify the AAO. The AAO will notify the rest of the group. If the airtanker group is on base, the Airtanker Base Supervisor will activate the dispatch siren (klaxon) and follow up with verbal announcement over the base PA system as to which group or specific aircraft are being dispatched.

The Air Attack Officer, upon hearing the dispatch siren, will proceed to the operations room of the Airtanker Base, and request the following basic dispatch information from the Airtanker Base Supervisor:

- Detection/Fire Number
- Location – Latitude/Longitude coordinates given in Degrees, Minutes, Decimals.
- Bearing (in degrees) and Distance (in nautical miles)

Upon hearing the dispatch siren, pilots will proceed directly to their aircraft and prepare their aircraft for departure. They may receive their basic dispatch information (lat/long, bearing, distance and detection/fire number) from the Airtanker Base Supervisor via a printout of the ATR or via the VHF-AM radio (base frequency of 122.050).

Note: All aircraft shall monitor 122.050 VHF-AM when operating within the airtanker base apron, loading pits and taxiway areas.

The Airtanker Base Supervisor is responsible for sending electronic Dispatch Information to the airtanker group email. The Forest Area Dispatch is responsible for passing it verbally over the radio. Electronic

Dispatch Information will typically be sent when the entire airtanker group is dispatched, not to individual airtankers. The Dispatch Information should include the following, if available:

1. Detection/Fire Number
2. Location – Latitude/Longitude coordinates given in Degrees, Minutes, Decimals. Including geographic reference (if available)
3. Resources and their ETAs
4. Frequencies
5. Incident Commander/Contact
6. Any additional information. i.e. other fires in close proximity.

The Air Attack Officer shall request any updates to the Dispatch Information after departure or request the Dispatch Information to be passed verbally over the radio if the group did not receive it electronically via email.

In the event of an airtanker-only dispatch to meet another birddog, airtanker pilots require the following information:

1. Detection/Fire Number
2. Location – Latitude/Longitude coordinates given in Degrees, Minutes, Decimals. Including geographic reference (if available)
3. Group bombing frequency of the working birddog or air advisory if ATGS is established
4. Working birddog or ATGS call sign

Airtankers must not depart without this information. The ATBS or the Air Attack Officer are responsible for following up with the Forest Area Dispatch to gather this information.

Note: The lead airtanker pilot shall advise the ATBS of the ETA to the incident, who will then pass this information to the Fire Centre to be entered into the active ATR.

7.2. Sustained Action Airtanker Dispatches

Prior to requesting airtankers for support on sustained action, the Incident Commander or designate must ensure that the target area of the fire has been assessed to ensure the visibility requirements (minimum 3 statute miles) are met, and that achievable objectives exist.

Once the airtanker request is submitted, responding Air Attack Officers must obtain all required Dispatch Information and incident maps prior to launching. If the visibility or mission objectives are unclear, AAOs may request to assess the target area in the birddog prior to launching airtankers.

Air Attack Officers are responsible for conducting a quick group briefing prior to launching to ensure mission objectives are clear, incident maps are distributed, and flight routes are planned. All efforts should be made to plan for sustained action missions before airtanker requests are submitted (e.g. loading incident maps of potential support missions on iPad, reviewing IAPs and comms plans in the morning).

7.3. Mutual Aid Dispatches (outside the Forest Protection Area)

Occasionally, airtankers are requested to action mutual aid fires outside the Forest Protection Area. Due to the complexity, potential hazards and potential for conflict with civilian personnel on the ground, an Alberta Wildfire representative must be on site prior to any airtanker drops.

Once the airtanker request (ATR) is submitted, the responding Air Attack Officer must obtain all required Dispatch Information prior to launching. If the visibility or mission objectives are unclear, the AAO may request to assess the target area in the birddog prior to launching airtankers.

7.4. Loading

The airtanker base loader is responsible for loading the airtanker(s). Aircraft company maintenance staff may be present in the loading pits to marshal the aircraft; check the mechanical condition of the aircraft and ensure aircraft loading procedures are being conducted safely. A set of red and green 'traffic' lights is located next to all loading pits. These lights visually indicate which pit is actively loading airtankers. The colors indicate: green (loading), and red (not loading). A red light may also indicate a dispatch has been cancelled.

A designated safety area will be marked (painted and/or flagged) adjacent to every loading pit at all airtanker bases. After the loader has completed loading the airtanker, they will safely exit to this designated safety area and give a thumbs-up signal to the airtanker pilot. Prior to the airtanker departing the loading pit:

- The airtanker pilot must call on the radio: "Confirm all clear, Roll Time for (tanker number)"
- The Airtanker Base Supervisor will visually confirm that the loader is clear and call on the radio "*Loader clear, (tanker number) Roll Time xx:xx*"
- The airtanker shall not move forward until all ground personnel confirmed to be clear.

When two or more airtanker groups are located at the same base, Airtanker Base Supervisors will coordinate the order of airtanker loading and departure with Air Attack Officers. For example:

- Two or more land-based groups on a single-pit base, the airtanker in the loading pit will load first.
- Two or more land-based groups on a dual-pit base: one airtanker from each group should be in a loading pit. If the groups are on differing alerts (i.e.: one Red, one Yellow) the airtankers from the group on the highest alert shall be positioned in the loading pits.
- Land-based and skimmer groups on base, the ATBS should activate the dispatch siren and make a PA announcement confirming the specific group(s) being dispatched.

7.5. Recording Roll Times

The ATBS will record airtanker(s) roll and stop times and ensure that they are recorded into the FIRES program. The ATBS will pass these times to pilots over the radio on the airtanker base frequency.

An airtanker's roll time commences when it first moves from the loading pit after loading. Time does not start when an airtanker leaves its parking space for the loading pit. The time is recorded when the airtanker returns from the flight and comes to its initial stop at the airtanker base, whether at its assigned parking space, the fuel pumps, loading pad or at the end of the line for a reload. Time spent in a reloading or refueling queue will not be recorded as revenue time.

If an airtanker or birddog is refueled away from the airtanker base apron itself, record the stop time at the fueling location. 0.1 hours will be added for the reposition back to the airtanker base.

Aircraft movements to adjust heading into wind or away from obstacles will not be considered revenue time (no wheels-roll or stop times recorded).

Air Attack Officers will record the birddog wheels roll and stop times as they occur. AAOs are responsible for providing these times to the pilot for completion of daily flight reports.

7.6. Walkaround/Altimeter Setting/FLIR

Prior to departing, AAOs shall:

- Ensure a pre-flight walkaround (inspection) of the birddog is complete.
- Ensure the current airport altimeter setting is recorded.
- Ensure that the FLIR camera is powered up when the birddog aircraft avionics are turned on.
- Ensure a memory drive is in the recording device.

8. Enroute

8.1. Departure

The birddog team shall maintain a sterile cockpit while operating within the airport zone. Communications and actions shall be limited to those that are mission critical or directly related to flight safety during takeoff and departure.

Once the birddog aircraft is airborne, the Air Attack Officer shall establish communications with the Fire Centre on the assigned Firenet frequency after clearing the airport zone. Communications may be established within the airport zone with pilot approval when required due to a dispatch location close to or within the airport zone.

When establishing communications, Air Attack Officers shall relay the following information:

- Destination of the mission (confirm incident number if applicable)
- Forestry payload manifest & weight
- Estimated Time of Arrival, using 24hr time (e.g. "ETA 14:20". Do not use estimated time *duration* of flight)
- Request the most current dispatch information if not already provided

Upon clearing the airport control zone and when practical to do so, the birddog team will tune the VHF-AM radios to the group bombing and air advisory frequencies. Similarly, each airtanker will switch to the group bombing frequency and report into the birddog aircraft. Aircraft are expected to be vigilant for unexpected wildfires while enroute. Airtanker pilots will report any observed smoke to the Air Attack Officer.

8.2. Airtanker Communication

Once all airtankers have advised that they are monitoring the bombing frequency, the birddog team will confirm the following:

- Altimeter Setting
- Incident number and location
- Closest reload source for the land-based and closest lake for skimmer airtankers
- Other aircraft and any known hazards
- The airtankers will pass their ETA to the fire to the birddog

In the event of a tanker-only dispatch to another birddog, each airtanker will have their satellite phone selected to receive calls for diversions, cancellation or updates to their dispatch. Within multi-plane airtanker groups, one airtanker typically will be contacted and is expected to relay the information to the rest of the group. Airtanker pilots may also use the satellite phone to contact the local Forest Area or PAC if required. Phone numbers are listed on the *Air Attack VHF-AM Radio Frequencies and Phone Numbers* sheet.

8.3. Flight Following

Flight following will be provided by a combination of direct radio contact between the aircraft and the radio room and the use of the Dispatch program. Aircraft will report all takeoffs, landings and deviations to the Fire Centre over the radio. Air Attack Officers will adhere to established flight following rules as defined in the Alberta Wildfire Standard Operating Procedures. If connectivity issues do not permit flight following to be completed through the Dispatch system, verbal 30-minute check-ins are required.

When the birddog crosses a Forest Area boundary, Air Attack Officers will:

- Advise the Fire Centre of the area they are leaving that they will be switching frequencies to the Fire Centre they are entering.
- Establish communication with the new Fire Centre using the applicable Firenet frequency, confirming ETA to the destination.
- Request updated Dispatch Information

8.4. Standard Airmanship - Cruising Altitudes

All aircraft operating within the Fire Traffic Area will be assigned corridors and altitudes by the airspace manager. Outside the FTA, aircraft above 3000' AGL are expected to adhere to VFR cruising orders as defined in the Transport Canada Aeronautical Information Manual (TC AIM):

Heading

West Track (180- 359 degrees)

East Track (000- 179degrees)

Altitude

Even Altitude + 500ft.

Odd Altitude +500ft.

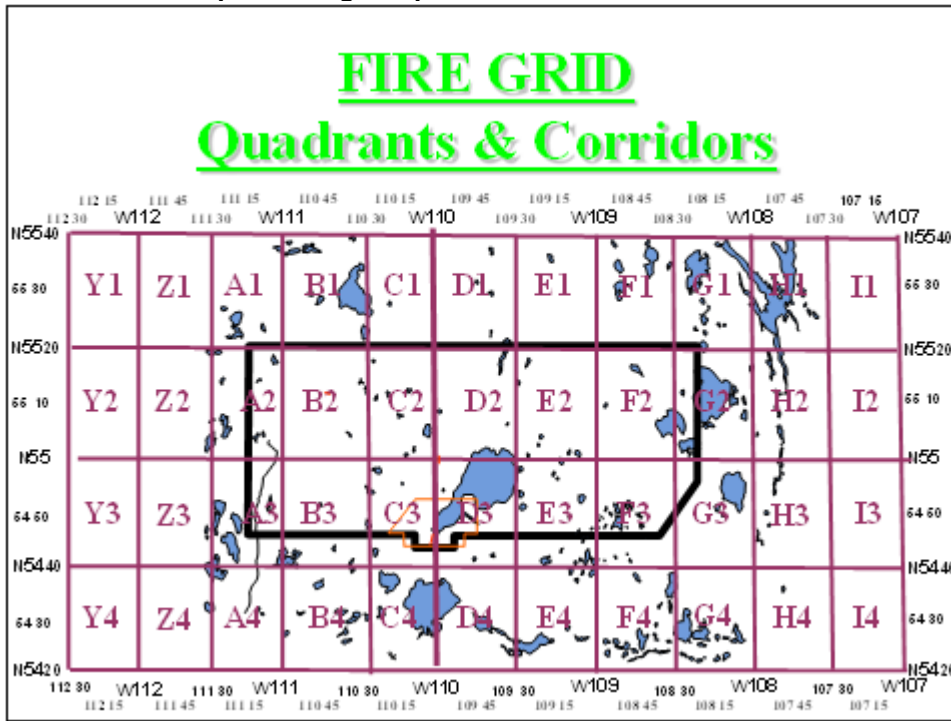
To increase horizontal separation, aircraft will offset 1.0-mile right of track.

8.5. Cold Lake Air Weapons Range (CLAWR)

The province retains responsibility for fire suppression within the Cold Lake Air Weapons Range. The Lac La Biche Forest Area is responsible for all fire operations involving the Range and will advise the Range entry point and any restrictions to be observed. Clearance must be received from the Lac La Biche Fire Centre before entering the CLAWR.

Upon clearance by the Fire Centre, the pilot will contact the tower at CFB Cold Lake (the Fire Centre will confirm the frequency). Reception may be difficult at the north end of the Range, requiring a higher altitude to establish contact. If pilots are unable to contact the tower, AAOs will contact the Lac La Biche Fire Centre who will notify the tower by phone. Aircraft may not proceed into the CLAWR until confirming that Cold Lake Tower has been notified and clearance instructions are received.

FIGURE 1. Cold Lake Air Weapons Range Map



8.6. Class F Airspace Clearance Procedures

The following procedures apply to birdog aircraft and helicopters. Airspace clearance procedures for airtankers are described in [Section 10.3](#). While transiting to and from wildfires outside Class F airspaces, aircraft are expected to monitor the enroute frequency 126.700 MHz and the assigned air advisory frequency if possible.

- For initial attack, the primary air advisory frequency is 129.800 MHz unless advised of an alternate.
- For sustained action, the primary air advisory frequency is 130.175 MHz North of 53° latitude and 122.650 MHz South of 53° latitude unless advised of an alternate.
- Ensure your transponder is on squawk code 1200 or as assigned by ATC.

8.6.1. Approaching Class F Airspace with No Known Aircraft at the Wildfire

If no known aircraft are at the wildfire, make an advisory call 5 minutes back on the assigned air advisory frequency, communicating your registration/call sign, fire number, altitude, direction of approach, intentions and frequencies monitoring.

8.6.2. Approaching Class F Airspace with No Airspace Manager

If there is no airspace manager (ATGS, birddog or HLCO), all inbound aircraft will contact any known aircraft 5 minutes back from the wildfire on the assigned air advisory frequency. If no response, remain outside the restricted Fire Traffic Area (5 nautical miles) and advise the Forest Area Dispatch. Confirm the assigned air advisory frequency and aircraft registrations with the Fire Centre. Do not proceed inbound until positive communications have been established.

All aircraft operating within an unmanaged Fire Traffic Area will broadcast their movements and maintain their own separation using the assigned air advisory frequency.

8.6.3. Approaching Class F Airspace with an Airspace Manager

If an airspace manager (ATGS, birddog or HLCO) is activated, all aircraft must call the airspace manager a minimum of 5 minutes back from the wildfire on the assigned air advisory frequency. If no response, remain outside the Fire Traffic Area (5 nautical miles) and advise the Forest Area Dispatch. Confirm the assigned air advisory frequency and aircraft registrations with the Fire Centre. Do not proceed inbound until communications are established.

The Airspace Manager will require:

- Your aircraft registration/callsign
- Your location (distance in NM), direction of approach, altitude
- Your intentions over the fire

Example: "Birddog 132, helicopter ABC on Air Advisory...5 minutes back, west of HWF-123, 3500 feet...I would like to drop off my crew off at the base of the fire"

The Airspace Manager will provide:

- An altimeter setting
- Entry clearance and/or holding instructions
- Information on other aircraft on scene

When operating within the Fire Traffic Area with an airspace manager (ATGS, birddog, or HLCO), all aircraft shall contact the airspace manager on the assigned air advisory for clearance instructions into or out of the FTA before they lift off or deviate from an approved task.

9. Air Attack Planning

9.1. Birddog Arrival over the Fire

Depending upon the topography relative to the physical location of the fire, the birddog aircraft will fly overhead the fire in a right-hand orbit at 1000 ft. to 2000 ft. above ground. The birddog pilot will endeavour to ensure Air Attack Officers have unobstructed views of the fire and its surroundings.

Prior to commencing firebombing, the birddog team will:

- Continue managing the airspace.
- Notify other aircraft in the area that you are over the fire and pass the ETA for dispatched airtanker(s) if known.
- Remain in a high-level orbit until positive airspace control of all aircraft has been established.
- Capture digital photos of the fire upon initial arrival. Email photos to the Fire Centre Wildfire Ops and AWCC email accounts.
- Confirm whether an *Initial Fire Assessment* has been completed; coordinate assessments with any ground crews present.
- Confirm the fire location with the GPS. Relay updated coordinates as required to the Fire Centre.
- Make a sketch* of the fire, noting:
 - Perimeter
 - Spread Direction
 - North Arrow
 - Hazards
 - Terrain
 - Exits
 - Geographic Points
 - Direction of Possible Runs and/or Circuits

*The sketch may be hand-drawn, drawn using an app-based tool, or by a Markup tool on tablet photos.

- Confirm the cardinal directions with the birddog pilot, other aircraft and ground crews.
 - Use simple references like seismic lines, lakes, wind direction, etc.
 - Use standard terminology: head; tail; right flank; and left flank; spot fire; finger; etc.
- Check with the incident commander (if present) for the ground crew's current attack plan.
- Formulate an air attack plan based upon assessment and available/anticipated resources.
- Keep the ground crew apprised of the birddog intentions.
- Air Attack Officers may assign priorities in multiple fire situations if a Wildfire Assessor is not present.
- Once the incident is assessed, Air Attack Officers **MUST** pass the following information to the Incident Commander and/or Fire Centre:
 - Fire size
 - Head Fire Intensity
 - Fuel type including any changes in fuel type

- Values (location, distance and level of threat)
- Action plan and objectives
- Number of rounds required (for retardant airtankers) and estimated bombing time (for skimmer airtankers) until completion of the air attack operation.
- Any anticipated birddog replacement.

Example: “ The fire is 30 hectares, HFI 4 ~~at the head and 2 on the flanks~~, burning in C2, there is oil and gas activity 10 km south of the fire but not currently threatened, we are planning to put retardant across the head and then will box in the fire, anticipating 8 rounds of retardant and will require a birddog replacement at 13:30.”

Request additional resources as required. When requesting additional airtankers, the request must include the following information:

- Type of airtanker group required (long term retardant or skimmer)
- Number of airtankers required
- Airtanker(s) only or entire group including the birddog
- The working birddog on the fire to report to
- The group bombing frequency.

Example: “I would like to request one long term retardant airtanker group, tanker only, birddog not required, the airtanker is to report to Birddog 56 on Group 3’s bombing frequency”

9.2. Airtanker Operations without Birddog Supervision

Conducting low-level drops without birddog team supervision (often termed ‘lone wolfing’) is prohibited within the province of Alberta.

The exception is dropping retardant in an approved abort zone. If no birddog team is available, the airtanker pilot must conduct a high-level pass to confirm the intended drop area is clear of hazards, and the drop height shall be a minimum of 500 feet AGL.

9.3. Air Attack Plans

With the information gathered from the assessment, and the number and types of airtanker(s) available, Air Attack Officers will begin to formulate a possible attack plan.

If an Incident Commander is on scene, AAOs will establish initial communications with the IC to formulate an agreeable aerial suppression plan. Based upon the Incident Commander’s requirements and the Air Attack Officer’s knowledge of aircraft capabilities, a final air attack plan with definite objectives is formed. If the Air Attack Officer is unable to achieve the IC’s objectives, the AAO will recommend alternative options to the Incident Commander.

Air attack plans will include where to action the fire first, the sequence and type of drops. A fire sketch will assist in orientation and describing the attack plan to the pilot. The use of proper terminology is

important to this description. Once the plan has been formed, prepare for the arrival of the airtankers. Be ready to commence suppression activities as soon as possible.

9.3.1. Birddog Team Responsibilities

When directing and coordinating an airtanker operation, the birddog team must be aware of what each other is doing while still acting independently. They need to keep each other informed of what is happening with their workload. Each is responsible for the following:

The Air Attack Officer:

- Coordinates the planned attack
- Directs the airtanker through the birddog pilot
- Manages the airspace for non-airtanker aircraft in the Fire Traffic Area*
- Communicates to ground crews and the Fire Centre

The birddog pilot:

- Ensures safe flight of the birddog aircraft
- Manages the airtanker group's movements*
- Communicates the bombing run description to the airtanker pilot(s)*

*Although these tasks may be performed by either the Air Attack Officer or the birddog pilot based on cockpit workload and crew experience when operationally necessary, the separation of duties outlined above is the expected standard. ~~Risk Management / Decision Making~~

Decisions are made with safety as the primary consideration. Birddog teams must maintain situational awareness during all aspects of the firebombing operation. Planning the intended airtanker runs begins when the birddog is orbiting the fire at a high altitude and is followed up by descending to lower altitudes to check the runs.

Safety Decisions at "High Altitude"

Always take advantage of the 'big picture' from a high-altitude perspective. Focus should not be limited to the immediate fire area; it is necessary to assess any fuel type changes, natural guard potential or values at risk ahead of the fire. The following factors may limit aerial fire suppression tactics:

- Prevailing winds: strength and direction, mountain effects
- Turbulence: mechanical, atmospheric and fire-generated
- Downdrafts: lee side of hills, thunderstorm and fire-generated
- Visibility: smoke, cloud, rain, remaining daylight, valley shadowing and sun glare
- Precipitation: visibility, potential for hail associated with thunderstorm activity
- Lightning: may be an indication of worsening weather/wind/visibility
- Terrain: will dictate orientation, run direction and retardant placement possibilities
- Obstructions: powerlines, cables, tall trees, snags, towers and proximity to built-up areas may restrict low level work
- Aircraft over the incident: firefighting, commercial and transient aircraft.

NOTE: The recommended minimum altitude to fly above powerlines is 100' above the top of the poles/towers. Avoid dropping directly on poles/towers to prevent damage to insulators & transformers, or creating an inadvertent arcing electrical short.

Prior to Descent

- The birddog team will determine cardinal directions based upon prominent topographic, geographic or artificial features. Example: "The valley runs north to south".
- The birddog team will determine mission objectives and the aerial suppression plan. Example: "We have a spot fire on a steep slope. The airtanker will blanket the fire, stepping up the hill from left to right, on down-valley runs"
- Air Attack Officers should ensure that all items and procedures that could cause distraction at low altitudes are dealt with prior to descent (i.e. radio work)

Safety Decisions at "Low Altitude"

All group members must maintain situational awareness at all times, and determine:

- What has happened?
- What is happening now?
- What might happen next and later?

If visibility is restricted or the wind conditions are difficult to read, the birddog pilot may fly the initial low-level passes at a higher altitude than required in order to assess conditions. The birddog team will identify hazards, escape routes and flight paths. If hazards pose too great a risk, Air Attack Officers will terminate the mission and advise the ground crew and the Fire Centre.

If the hazards and risk appear to be acceptable to the birddog team, they will determine the circuit pattern. When determining bombing run directions, the team will ensure that all exits are level or descending, remaining clear of any hazards.

9.4. Assessing the Runs

Prior to identifying the target to the airtanker pilot and in full consideration of the risk management/decision making aspects, the birddog team will check out the initial bombing runs for:

9.4.1. Feasibility of Approaches

Left-hand circuits are preferred by two-crew airtanker types, so the flying captain may better keep the target in sight throughout the circuit. Terrain and visibility restrictions may limit the circuit to right-hand only. The birddog team will broadcast any hazards, geographical features and ridge crossing altitudes to assist airtankers in setting up their flight profile through the circuit.

The birddog team will ensure that steep turns in a bombing circuit do not exceed limitations specified in company operation manuals. Any angle of bank exceeding 30 degrees must be identified to the airtanker pilot to a maximum permitted angle of bank of 45 degrees.

Up-valley bombing runs must always allow room for a 180-degree turn to exit down-valley. The birddog team will note any prominent landmarks or features that may be described to assist in identifying the line and trigger point to the airtanker pilots.

9.4.2. Feasibility of Exits

Bombing runs into rising terrain are prohibited. Runs must allow a loaded airtanker to exit safely in the event of a loss in power or inability to jettison the retardant load. Airtankers must always be in position to depart the area without the need to climb and stay at an altitude below the base of the stack; exits will always be flown level or downhill.

9.4.3. Target Altitude

Target altitude is the actual altitude as read from the altimeter as the birddog passes overhead the target at the correct bombing height above obstructions. Calling the target altitude allows airtankers to fly appropriate flight profiles to the target when in the bombing circuit. The specified bombing height above ground may be adjusted due to weather, visibility, wind, and/or terrain conditions.

When flying multiple runs perpendicular to the slope in steep terrain, the birddog team must check the feasibility of every run and exit and provide accurate target altitudes to the airtanker pilot.

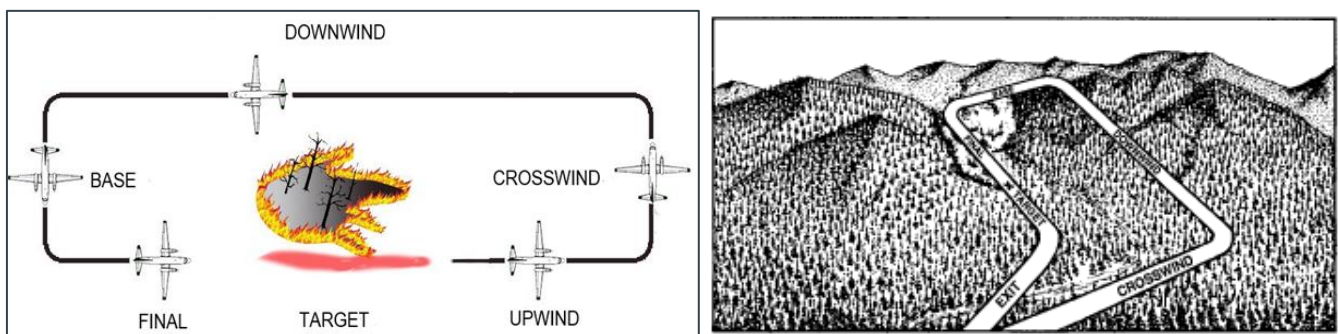
9.4.4. Hazards

Any previously identified (during the “high altitude” assessment) hazards will be reaffirmed when checking the runs. In addition, any hazards identified during the low-level assessment (i.e. descending air, turbulence, smoke, sun glare, shadows, etc.) must be communicated to airtanker pilots.

9.5. Firebombing Circuit

The circuit or traffic pattern over a fire is the same to that used over an aerodrome (airports). Typically, aircraft will land into wind at an airport; the basic firebombing circuit may be flown independent of wind direction. The terms (crosswind, downwind, base, final, and exit) quickly identify an aircraft’s position in relation to the target. Left-hand circuits are preferable so pilot(s) may better keep the target in sight.

FIGURE 2. The Firebombing Circuit



10. Airspace Management

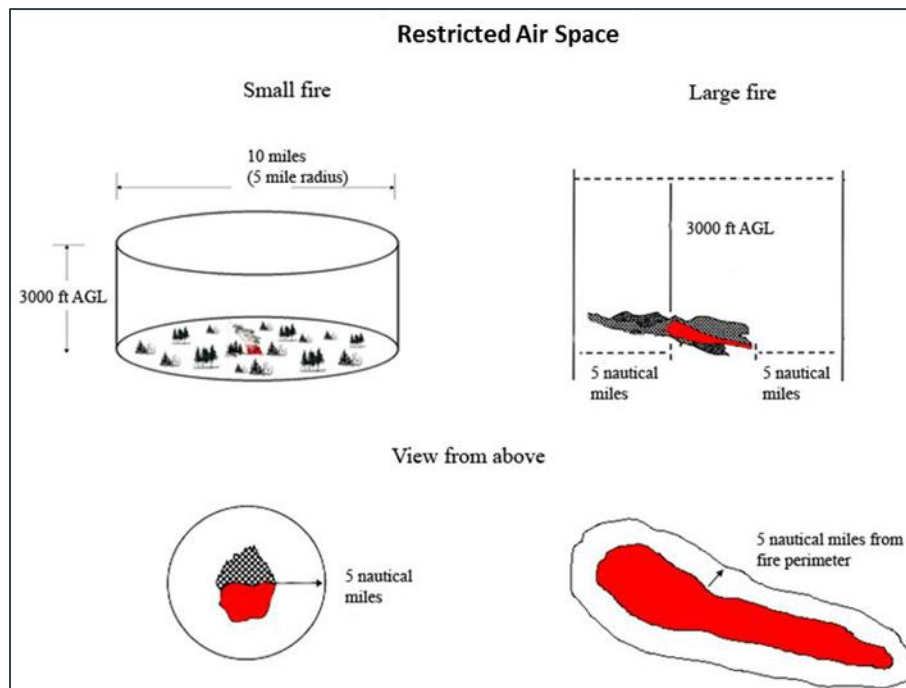
The birddog team (birddog pilot and Air Attack Officer) or Helicopter Coordinator manages the airspace over an incident. During airtanker operations, Air Attack Officers manage helicopter traffic on the established air advisory frequency, while birddog pilots manage airtanker operations on the assigned bombing frequency. The birddog team shall keep each other informed of airspace management actions to ensure shared situational awareness. Helicopter Coordinators do not manage airtankers and will only provide airspace instructions to helicopters and the birddog aircraft.

All aircraft assigned to wildfire operations must have a functioning Mode C transponder turned on while operating. Aircraft with an inoperative or disabled transponder shall be considered unserviceable and removed from service until the transponder is repaired and verified as serviceable. The Airspace Manager will direct any aircraft with an unserviceable Mode C transponder to depart the Fire Traffic Area or land as soon as practicable until the deficiency is rectified.

10.1. Incident Airspace Management

As per the Canadian Aviation Regulations, an automatic flight restriction exists over forest fires. The regulation reads; “no person may operate an aircraft over a forest fire area, or area that is located five (5) nautical miles around the fire perimeter and at an altitude of less than 3,000 feet AGL” (CARs 601.15). If additional altitude (greater than 3,000 ft. AGL) or radius (greater than 5 nautical miles) is required, a request may be made through the Provincial Aircraft Coordinator via the local Forest Area, to request a Notice to Airmen (NOTAM) issued by Nav Canada, for an amended Fire Traffic Area.

FIGURE 3. Fire Traffic Area



Aircraft assigned to the specific fire incident are exempt from the NOTAM restrictions as per CAR 601.17. This does not eliminate the requirement to request clearance into a FTA from an established airspace manager. Any aircraft working for Alberta Wildfire that operate near a wildfire to which that aircraft is not assigned, must abide by CAR 601.15/16 listed above.

10.2. Air Advisory Frequencies – VHF-AM

Alberta Wildfire has been assigned several VHF-AM frequencies by Innovation, Science and Economic Development Canada (ISED). The air attack program has been given exclusive use of a number of these frequencies, which have been assigned to airtanker groups (bombing frequencies). Five additional frequencies have been allocated to be used for air advisory channels.

The following radio frequencies are to be used for air advisory:

- 129.800 MHz Primary Initial Attack
- 128.950 MHz Secondary Initial Attack
- 130.750 MHz Alternate Initial Attack (North of 53°, below 3500' AGL only)
- 130.175 MHz North Primary Sustained Action (North of 53°, below 3,500 AGL only)
- 122.650 MHz South Primary Sustained Action (South of 53°)

Consult the *FP183 Radio Guide* for a full list of available radio frequencies

10.3. General Airtanker Group Airspace Communication Procedures

Birddog aircraft proceeding to an incident will monitor the assigned VHF-AM air advisory radio frequency and the designated Firenet FM frequency. As described in [Section 8.6](#), no aircraft will enter the Fire Traffic Area until communication with the aircraft over the incident has been established and, if an airspace manager is present, has received clearance, assigned altitude, and altimeter setting.

Airtankers should check in with their assigned birddog when able and monitor the bomb frequency. The airtanker should wait for a break in the radio communications when checking in with their birddog, if the radio communications are too busy, they should only call inbound at 5 minutes. No clearance or instructions shall be given until the 5 minute call from the airtanker.

All inbound airtanker(s) will call their assigned birddog on their bombing frequency when 5 minutes back from their dispatch coordinates to request clearance and instructions (altimeter setting, altitude, position in stack). Inbound airtanker(s) must include the following when they have established communications with their assigned birddog:

- Tail number
- Frequency (if not on the assigned bomb frequency)
- ETE
- Direction of Approach
- Fire Number
- Altitude

Example: "Birddog 126, Tanker 485, 5 minutes back, north of LWF-110 at 8500 feet"

If airtanker(s) are unable to establish communications with their assigned birddog, they must remain outside the restricted Fire Traffic Area (5 nautical miles) and call the PAC on the satellite phone. The PAC will confirm the assigned bomb frequency and working birddog with the airtanker(s). Airtanker(s) must not proceed inbound until positive communications have been established.

10.4. Single Airtanker Group Airspace Communication Procedures

Airtankers will remain on their assigned firebombing frequency; their only contact will be their birddog. The airtanker(s) will be directed to a rendezvous point (usually directly overhead the target) and maintain a holding pattern until instructed otherwise by the birddog aircraft. Airtanker pilots are encouraged to monitor the air advisory frequency, as an increased awareness measure. See [Section 11](#) for more details on stacking procedures.

10.5. Multiple Airtanker Group Airspace Management Procedures

If multiple airtanker groups are working on an incident, they may either work together or independently of each other. If they work independently, the groups will typically operate over separate parts of the fire, using defined geographical boundaries.

If the airtanker groups are working together on an incident, the earliest arriving birddog generally assumes the position of the working birddog and the later-arriving birddog assumes the supporting role. If additional birddog aircraft are not required on the incident, they will be instructed to return to the closest airtanker base to await further assignment. All inbound airtanker(s) will call the working birddog 5 minutes back on their bombing frequency for clearance and instructions (altimeter setting, altitude, and position in stack). See [Section 11](#) for more details on stacking procedures and [Section 15](#) for more details on multiple airtanker group operations.

The support birddog may be requested to assume the role of Air Tactical Group Supervisor (ATGS). The working birddog team makes the decision to establish an ATGS platform. The call sign of the supporting birddog changes to "Air Attack" and wildfire number. For example: the ATGS call sign for LWF-110 would be "Air Attack 110". The air advisory frequency for the incident will be used as the initial contact channel for all incoming aircraft. Each airtanker will call the ATGS 5 minutes back and state the cardinal direction they are approaching from and will not enter the Fire Traffic Area until instructions have been received from the ATGS. Immediately after receiving instructions from the ATGS, the incoming airtanker will switch to the working birddog bombing frequency to monitor the airtanker bombing action and will continue monitoring (if able) the air advisory frequency. See [Section 11](#) for more details on stacking procedures and [Section 15.2](#) for working with ATGS.

10.6. Establishment of an Altimeter Setting

To ensure vertical separation, it is critical that all aircraft use the same altimeter setting when operating within a Fire Traffic Area. Vertical separation between aircraft within the FTA is usually 500 feet.

- All aircraft are responsible for ensuring a current altimeter setting is used (per CARs 602.35).
- Altimeter settings are considered current up to 90 minutes.
- Pilots will set their altimeters on the ground where the specific elevation is known (airport, tower site, base camp, etc.), but may update the altimeter enroute to obtain a more accurate setting
- If an altimeter setting is changed enroute or while working on a wildfire, it is imperative that all aircraft over the fire receive and acknowledge the new setting.
- When arriving at a sustained action incident with an Incident Management Team (IMT), the birddog team will request the altimeter for that incident and recommend updating when required. If the birddog team updates the altimeter, they must pass the new altimeter setting to the incident dispatch so that all aircraft on the incident can be notified.
- The Standard Pressure Region altimeter setting may not be used as the default on a wildfire incident.

10.7. Flight Priorities

Airspace flight priorities over a wildfire are determined during the planning stage. Flight priorities over a wildfire are:

1. Human emergencies
2. Airtanker action
3. Helicopters (bucketing / aerial ignition)
4. Service / Logistics
5. Reconnaissance

10.8. Assigned Altitudes within the Fire Traffic Area

The altitude assignments listed below are used as a guideline by airspace managers. As wildfire situations can vary based on topography, location, class of airspace, etc., the airspace manager may be required to assign different altitudes and corridors other than these standards:

Designated Altitudes in the Fire Traffic Area

<u>Aircraft Type</u>	<u>Height (Feet) Above Ground Level (AGL)</u>
Helicopters	Surface – 500 AGL
Birddog	100 - 1,000 AGL
Airtankers in Stack	1,500 AGL and above in 500' increments
Air Attack Platform	Next available altitude above highest airtanker in stack
Others (assessment, media aircraft, etc.)	Highest

Convert these elevations to above sea level (ASL) from above ground level (AGL) as all altitude assignments are given in feet ASL.

10.9. Integrated Helicopter Coordinator (HLCO) Operations

During HLCO operations, the HLCO manages the airspace. When a fixed wing birddog arrives, the birddog team will take over airspace management after a turnover briefing with the HLCO. If it is deemed suitable, HLCOs will be cleared to continue helicopter operations within specific airspace assigned by the birddog. If any helicopter needs to transit anywhere outside its specifically-assigned airspace, clearance must be obtained from the birddog team.

After discussion with the HLCO, the birddog team may give tactical direction to specific helicopters and integrate them with fixed wing airtanker operations.

10.10. Managing Helicopters within the Fire Traffic Area

The birddog team is responsible for managing aircraft within the Fire Traffic Area. They can use the following tactics to manage helicopters:

- Assign the helicopter an operational portion of the fire to work (e.g. bucketing)
- Assign the helicopter a safe altitude to orbit and observe
- Request the helicopter to land
- Request the helicopter to remain at a safe distance away until cleared into the fire

Helicopters should be accommodated whenever possible; however, the birddog team must not exceed their span of control. Managing more than four helicopters while managing airtankers within the same airspace can be hazardous. The birddog team must maintain complete situational awareness of all aircraft within their airspace and ensure that vertical and horizontal separation is maintained.

If at any time, either member of the birddog team feels that they are losing situational awareness, they must reduce the number of resources that they are managing within the airspace (e.g. hold airtankers outside the Fire Traffic Area or at an airtanker base, request helicopters land or hold outside the Fire Traffic Area).

Note: Helicopters with external loads shall not be stacked above any aircraft.

10.11. Loss of Communications

If an airtanker experiences total or partial loss of air-to-air communications during operations, the following procedures shall be used:

Note: At no time shall these procedures take precedence over safe operation of the flight, especially with regards to traffic and terrain collision avoidance.

10.11.1. Before Entering the Fire Traffic Area

Airtankers must not enter the Fire Traffic Area and shall attempt to contact the birddog by text or satellite phone and advise. If unable to establish communications with the birddog, airtanker pilots shall contact the PAC by either text or satellite phone and advise, and then return to the airtanker base of origin or to another suitable airport while using normal loss-of-communication procedures.

10.11.2. After Receiving Clearance into the Fire Traffic Area, Prior to Entering the Stack

Maintain assigned altitude and reverse course and leave the Fire Traffic Area. Do not change altitude unless safety demands, until clear of the Fire Traffic Area. Attempt to contact birddog by text or satellite phone and advise. If unable to establish communications with the birddog, contact the PAC by either text or satellite phone and advise. Return to the airtanker base of origin or to another suitable airport using normal loss-of-communication procedures.

10.11.3. After the Overhead Call and/or Established in the Stack Before Becoming Working Tanker (not number 1 tanker)

Maintain assigned altitude. Attempt to contact birddog by text or satellite phone and advise. If unable to establish communications with the birddog, contact the PAC by either text or satellite phone and advise. Maintain the assigned altitude and leave the stack in the direction of the origin. Do not change altitude unless safety demands, until clear of the restricted area. Return to the airtanker base of origin or to another suitable airport using normal loss-of-communication procedures.

10.11.4. Once the Working Tanker (number 1) and at Any Time During the Run

Maintain assigned altitude. If descending for the run, stop the descent but continue with the run as flown by the birddog. Do not drop the load unless flight safety requires it. Return to the base of the stack. Attempt to contact birddog by text or satellite phone and advise. If unable to establish communications with the birddog, contact the PAC by either text or satellite phone and advise. Fly a single orbit then depart the stack in the direction from which they came. Climb when appropriate as per a normal post-drop departure. Once clear of the Fire Traffic Area, return to the airtanker base of origin or to another suitable airport using normal loss-of-communication procedures.

10.11.5. After Receiving Exit Instructions

Fly the exit as per normal. Attempt to contact the birddog by text or satellite phone and advise. If unable to establish communications with the birddog, contact the PAC by either text or satellite phone and advise. Climb when appropriate as per a normal exit. Once clear of the Fire Traffic Area, return to the airtanker base of origin or to another suitable airport using normal loss-of-communication procedures.

10.11.6. Skimmer Aircraft

Maintain the position within the group until over the scooping area. Then depart the group in a manner consistent with good airmanship and safety. Attempt to contact the birddog by text or satellite phone and advise. If unable to establish communications with the birddog, contact the PAC by either text or satellite phone and advise. Climb when appropriate as per a normal exit. Return to the airtanker base of origin or to another suitable airport using normal loss-of-communication procedures.

11. Stacking Procedures for Retardant Airtankers

As discussed in [Section 10.7](#), a system of assigned altitudes has been developed for various aircraft arriving to an incident. Within this system, a series of altitude assignments is reserved for orbiting airtankers. Procedures have been developed to safely and efficiently manage land-based (retardant carrying) airtankers over the fire.

Skimmer Airtanker procedures will be covered in [Section 14](#), as they typically do not orbit overhead the fire location.

11.1. Aircraft Separation – Birddog and the Working Airtanker

The working airtanker shall not occupy the birddog's airspace (up to 1000 feet above target elevation) until positively cleared into that airspace. A phrase including the working airtanker's three-digit tail number and the words "cleared the run" will signify that the birddog team is permitting that airtanker to share the common airspace and that all ground crews or personnel are in safe locations relative to the intended drop zone. Once the "cleared the run" command has been issued, and with positive visual contact with the birddog aircraft, the airtanker may descend into the circuit.

Generally, the birddog maintains right-hand orbits to allow the AAO the best view of the fire but may switch to a left-hand circuit while demonstrating the run if a following airtanker intends to fly a left-hand circuit. Airtankers observe from the stack in a left-hand orbit and generally prefer a left-hand circuit (terrain permitting) bombing run. Following the drop, airtankers will exit the run as briefed by the birddog team. After the airtanker has completed the bombing run, the airtanker will either:

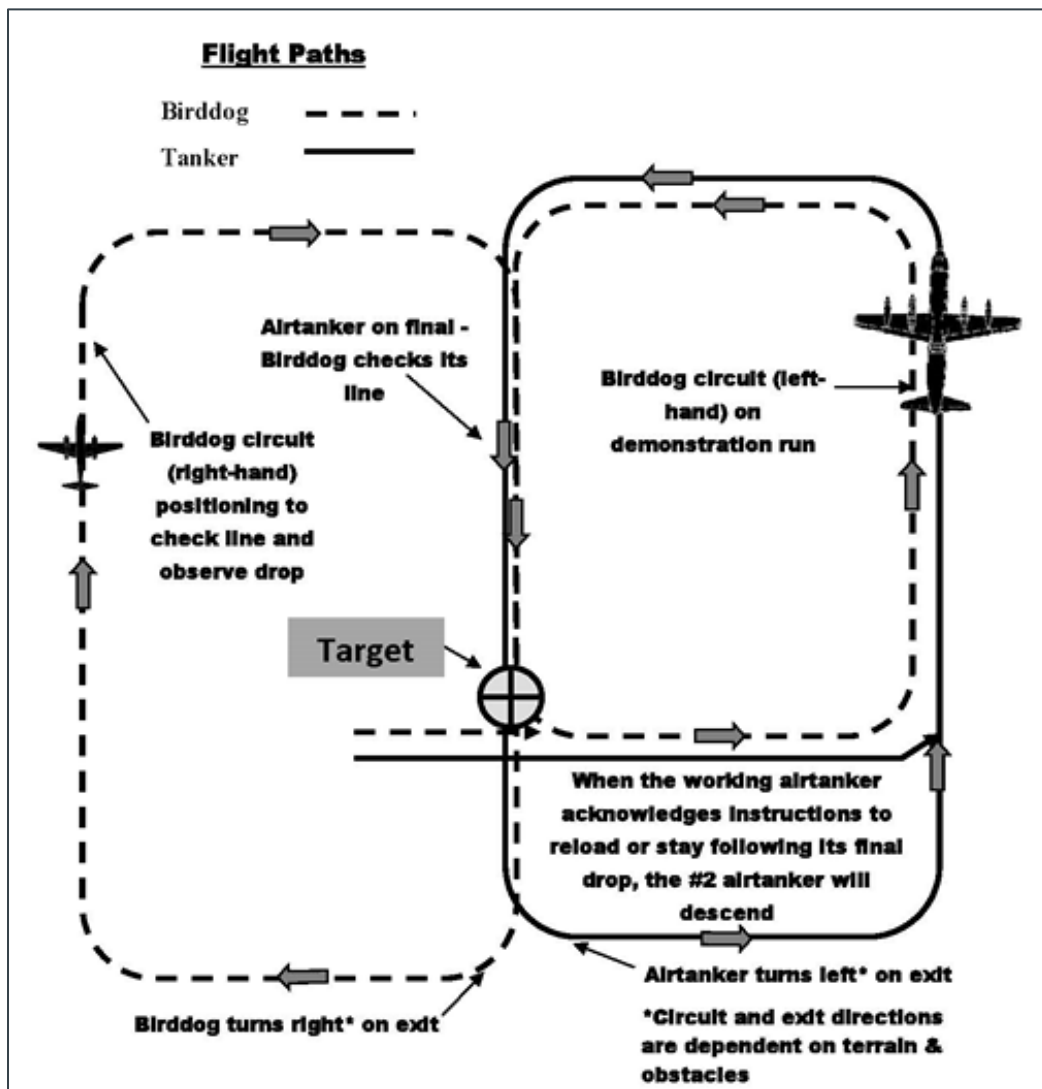
- Climb to the base of the stack, if the airtanker has retardant remaining, and wait for instructions for the next run, or
- Exit the Fire Traffic Area as instructed by the birddog team.

The aircraft occupying the airspace within 1000' above the ground must maintain visual separation. In the event visual contact is lost, each aircraft must fly standard predetermined flight paths until visual contact is regained.

Should terrain or aircrew preference require use of a non-standard circuit, procedures to provide lateral separation must be briefed and updated as necessary.

Keeping the bombing frequency free of superfluous discussions and using clear, concise transmissions is essential when two aircraft are operating in the same airspace. Silence on the frequency serves as a valuable buffer available for all aircraft to avoid confusion and to reduce the possibility of conflict.

FIGURE 4. Aircraft Separation – Birddog and Working Airtanker



11.2. Stacking Procedures

The base of the stack is established by the working birddog. In general, the base of the stack will be set at 1500 feet above ground level (rounded up to the nearest 500-foot interval). Only the working birddog controls the base of the stack.

All inbound airtankers must contact the working birddog aircraft once 5 minutes back from the Fire Traffic Area. At this time the birddog team will pass the following information:

Mandatory Points:

1. Altimeter setting
2. Entry altitude into the stack
3. Position in the stack
4. Identity and/or type of the preceding airtanker

Time Permitting:

5. Target Altitude
6. Brief fire summary and objective
7. Orientation and direction of run
8. Any applicable flight safety hazards or traffic conflicts

After the information is received, airtanker pilots will read back the first four pieces of information confirming to the birddog team it was received correctly.

Example: "29.78, 5,000 feet, number 2, following 487"

Upon entering the stack, airtanker pilots shall:

- Announce arrival and altitude and position in the stack e.g. "Tanker 485 is overhead at 5,000 feet, number 2";
- Fly a left-hand orbit
- Observe the operation and listen to instructions given by the working birddog team.

Inbound to the stack, airtankers must be aware of all inbound and outbound aircraft and plan their approach to their altitude in the stack to maintain separation. Vertical separation must be maintained visually and by reference to cockpit instruments. Each pilot will keep the airtanker immediately below them in sight and shall fly consistent speeds and angles of bank to enable the following aircraft to observe them. Inbound airtankers must monitor the working birddog frequency and keep track of stack position changes occurring before their arrival. See below for procedures to enter the stack if an automatic stack descent occurs before arriving in the stack. Pilots should broadcast if they lose visual contact with the preceding aircraft below.

After the birddog team has issued instructions to the working airtanker (#1) to exit the airspace, airtanker #2 will automatically descend to the base-of-stack altitude and assume the working position. Airtanker #2 will simultaneously broadcast the maneuver with a statement that includes that airtanker's tail number and a confirmation of the altitude to which it is descending and that it is number 1 in the stack. Example: "Tanker 487, 4,500 feet, number 1". If the #2 airtanker has not yet entered the stack, they will transmit

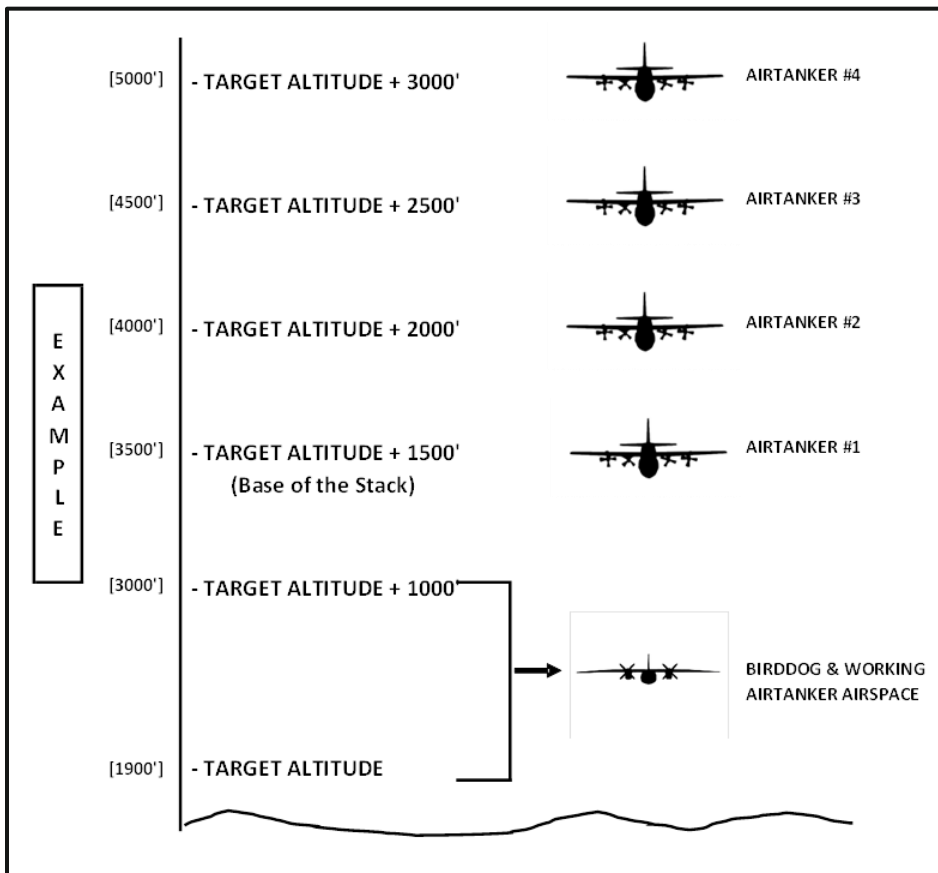
the same information and indicate how far back they are in minutes. Upon arrival over the target, they will announce their arrival and altitude. The birddog team will acknowledge this statement. Upon hearing this acknowledgement, all other airtankers in the stack will simultaneously descend 500 feet (see note below regarding exception for line astern) to their new, lower stack position while maintaining visual reference to and separation from the aircraft below them. Pilots must broadcast if they lose visual contact with the preceding aircraft below.

Airtankers that have been assigned an altitude but have not entered the stack will apply airmanship techniques to maintain separation until they have entered the stack and will plan to enter the stack at their new altitude based on the automatic descent of the tanker they are following.

Note: If a line astern procedure has just been completed, the pilots in the stack will need to calculate how much to descend based on the number of airtankers involved in the line astern. For each aircraft in the line astern formation, they will need to descend 500 ft. per aircraft. Example: three aircraft in line astern formation would require a 1500 ft. descent.

All aircraft must maintain visual reference with lower aircraft in the stack. If visual reference is lost, or confusion exists, any pilot may request a "Stack Check" will be before descending within the stack. When a stack-check is requested, each aircraft, starting at the base of the stack, will identify their tail number and current altitude. This will continue upwards to the top of the stack, including inbound aircraft with an assigned altitude.

FIGURE 5. Stack Configuration



11.3. Stack Deconstruction – Dispersal of Aircraft from the Fire Traffic Area

The following procedure will be used for the deconstruction of the stack and dispersal of all aircraft inside the Fire Traffic Area when a decision to cease fire action has been made:

- The working birddog team will communicate to all airtankers established within the incident's stack that no further airtanker action will occur on the incident.
- The working birddog team will state, "All aircraft hold your position and await further instructions".
- The birddog team will then give exit instructions to all aircraft in a safe and organized manner.
- If an ATGS platform has been established, the ATGS team will assist the working birddog team as required.

Incident geographical, environmental and observed flight conditions may require, at the discretion of the working birddog team, deconstruction of the stack from the top of the stack downward or from the base of the stack upward.

11.4. Horizontal Separation (Racetrack Circuit)

It is rare in Alberta to horizontally separate airtankers, but there may be cases where doing so may benefit the operation. Horizontal separation is used by other agencies, mainly in the United States.

All inbound airtankers must contact the operational birddog aircraft when 5 minutes back from the fire. At this time, the birddog will assign/confirm the altimeter, entry altitude into the airspace (usually 1500 ft. AGL rounded to the next highest 500 foot altitude), inform pilots they will be horizontally-spaced and provide the aircraft type and tail numbers of any other aircraft at the same altitude in the airspace.

Note – It is extremely important that pilots maintain visual separation with each other upon entering the airspace and over the target area until cleared for a run. It is imperative that visibility be good, that the flight patterns be adequate unhindered by terrain and that no-fly zones be communicated from the birddog team. Only aircraft of similar weight should be horizontally-spaced at one time. In the event of mixed-sized airtankers (e.g. an AT-802 following an L-188), it would fall to pilots' discretion and a "caution wake turbulence" advisory should be issued. If any pilot expresses discomfort, establish a hold area for them until the horizontally-spaced aircraft are cleared from the racetrack pattern.

When established at the assigned altitude, and considering the need to maintain visual reference/separation with other airtankers, the airtanker pilot will:

- announce arrival and altitude ("Tanker 681 is overhead at ____ feet, following Tanker 682")
- assume a left hand orbit unless directed otherwise
- report the loss of visual contact of the airtanker immediately ahead of them and widen their circuit until visual reference is regained
- observe the action and listen to the instructions given by the working birddog.

11.5. Split Stack

A method of separating airtankers into two stacks. This may be required due to operating differences between aircraft, or due to insufficient vertical space to accommodate all aircraft in a single stack (low cloud ceilings or overlying controlled airspace). A second vertical 'holding' stack may be established over a point other than directly overhead the incident. If possible, the two stacks should maintain separation referencing geographic features. The two stacks should be established so that conflict-free transition corridors exist between the fire and the reload base/skimming lake.

As airtankers are processed and given instructions after dropping, they are replaced by aircraft moving from the bottom of the 'holding/reserve stack' to the top of the 'operating stack', as directed by the birddog or ATGS.

12. Target Identification Techniques

12.1. Verbal Identification

Upon arrival at the incident, airtanker pilots will advise the birddog team when overhead with the birddog in sight. At this time, the birddog pilot will provide airtanker pilots with a more detailed description of the proposed target and run. Information provided may include:

- Orientation (use of geographic feature to define cardinal direction)
- Objective (e.g. box in, blanket, line building, etc. plus description if required)
- Target identification/run direction
- Circuit direction (only stated if right hand circuit)
- Helicopter traffic, if applicable
- Drop type

Following confirmation that the airtanker is in position to observe the run, the birddog team will use one of the following techniques to pinpoint the target:

12.2. The Demonstration Run

The demonstration run (also referred to as the "dummy run" or "show me") is a simulated bombing run made by the birddog to demonstrate the run and identify the target to airtanker pilots. Loaded airtankers have limited maneuvering and climbing capabilities. These low-level passes must simulate the flight of the airtanker, in a manner that will allow the airtanker to hold the load over the fire and still exit safely.

The birddog team will confirm that the airtanker is in position to observe, and the birddog pilot will describe the following:

- The circuit
 - announcing each new leg
 - hazards as they are encountered
 - giving clear references, if available and
 - headings.
- Ridge crossing altitudes
- Reference point(s) to assist airtanker pilots in determining the proper line
- Correction for wind drift as required
- Target altitude
- Exit

Birddog pilots will announce visual contact with the target and when the birddog is overhead, will identify the target by announcing “Start Now”, or “Start Here, Stop Here”. It is imperative that the birddog flies beyond the anticipated load length on the ground before initiating the exit route to ensure that the airtanker could hold the load and still exit safely.

When approaching the target, AAOs will activate the electronic siren in ‘yelp’ mode as a warning of an imminent drop to ground crews. This is an AAO function; the birddog pilot focuses upon flying the aircraft while at this low altitude. The siren will be used on every incident and Air Attack Officers will not commence action until ground crews have confirmed they are clear of the drop areas.

A demonstration run is normally used for the first airtanker on a specific run or when an incoming airtanker has not had an opportunity to observe a previous drop. Subsequent run descriptions may be given verbally rather than demonstrated, but only if the birddog team has previously flown and validated the run for feasibility.

Once the target has been identified, birddog pilots will place the aircraft in a position to allow Air Attack Officers an unobstructed view of the run and of the drop and to facilitate line corrections and drop assessments as required.

When airtanker pilots announce “final and armed”, birddog pilots will acknowledge this transmission, maintaining radio silence unless the line being flown requires correction, or an obvious safety concern exists.

12.2.1. Demonstration Run Example

The following example (Figure 6) is meant to help put the above-noted procedures in better perspective. The numbers listed for each transmission correspond to the position of the aircraft in Figure 6.

1. Tanker 485 "Birddog 56, Tanker 485 is overhead at 3500 ft. with you in sight. Go ahead your run"

2. Birddog 56 "Tanker 485, Roger. We're over the fire, crosswind left-hand for the run. Arm 1/2 @ coverage level four"

3. Birddog 56 "Downwind left"

4. Birddog 56 "This is left base over the ridge...ridge crossing 2300 feet"

5. Birddog 56 "Final over the swamp, line up with the left side of the fire and a tall grey snag....short final ... tag on to the snag ... start here, target altitude 1800 feet"

6. Birddog 56 "Exit slight left and follow the valley...caution rising ground, right wing and that snag really pokes out above the canopy. Note, we ran into some descending air turning base to final."

7. Tanker 485 "Tanker 485 has the run, crosswind left"

- Birddog 56 "Tanker 485, cleared the run. Anticipate the same run direction tagging onto the drop you're about to make"

8. Tanker 485 "Roger, 485 cleared the run, downwind left-hand armed 1/2 at coverage level four"

- Birddog 56 "Roger"

9. Tanker 485 "Final, armed"

- Birddog 56 "Roger"

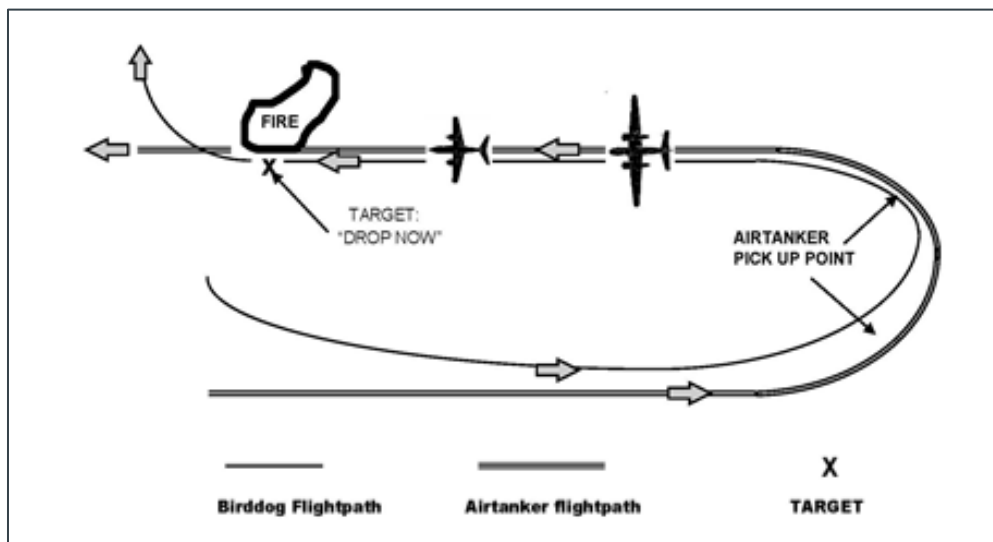
10. Birddog 56 "Tanker 485, bullseye. Tag on to the head of the last drop and extend, turn the line 10 degrees left. Arm remainder at coverage level three. Exit left, down the valley and caution the tall snag you just tagged on to."
8. Tanker 485 "Roger. Downwind left armed remainder at coverage level three"
- Birddog 56 "Roger"
9. Tanker 485 "Final, armed"
- Birddog 56 "Roger"
10. Birddog 56 "Tanker 485, one quarter short...Loon, Reload"
11. Tanker 485 "Roger, Loon, Reload"

12.3. The Lead In

The lead in is normally used when the line and trigger point are difficult to see or describe due to visibility or lack of references. It is commonly used with skimmers. The following is the sequence used for the lead in:

- The birddog pilot maneuvers in front of the airtanker on the downwind or base leg of the circuit.
- At this time the birddog pilot will give a run description that includes any hazards plus the exit.
- The airtanker will follow the birddog at a safe distance. Airspeed adjustments required for spacing are accomplished by instructions from the airtanker pilot to the birddog pilot. On final, the birddog pilot will either count down “3, 2, 1, Now” to announce the start point or identify the target by announcing “Start Now”, or “Start Here, Stop Here”.
- As part of the planning for the lead-in, it should be agreed upon between the birddog and the airtanker which direction the birddog will fly after the target.
- The airtanker will state they are “final and armed” for the type of drop requested.
- Following that statement, if safe to do so, the birddog may pull up and fly a 180° turn away from the inbound heading, to parallel the final run, while maintaining a safe distance from the following airtanker. This maneuver puts the birddog in position for the Air Attack Officer and/or birddog pilot to observe and assess the drop.
- After the birddog has acknowledged the airtanker is on final, maintain radio silence unless:
 - There is a safety concern or
 - The load needs to be held.

FIGURE 7. The Lead In

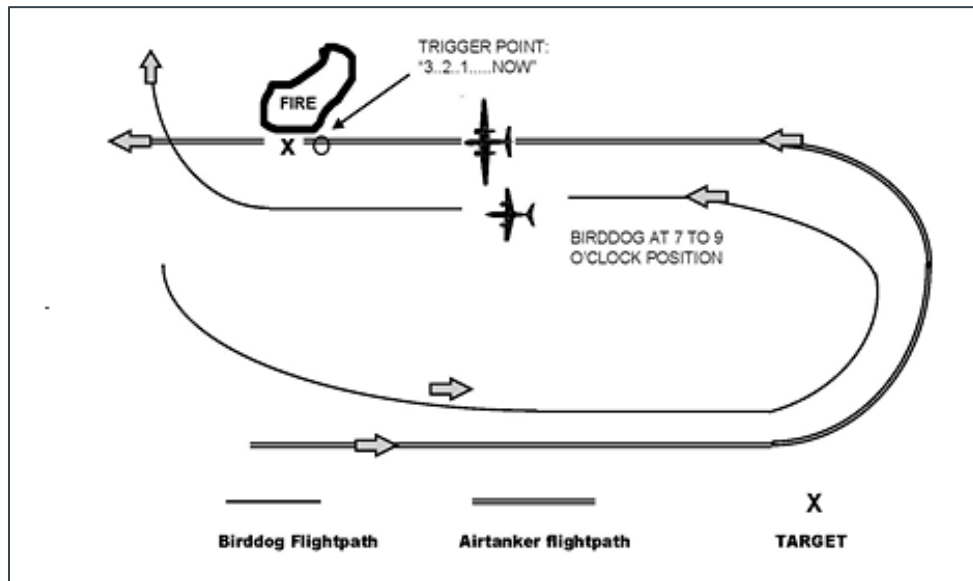


12.4. The Called Shot

This method is used when the airtanker pilot understands the required line, but the actual target or trigger point is indistinct. The birddog team will provide instructions prior to the airtanker approaching the target. During a called shot, the birddog flies abeam the airtanker on the final leg. The birddog pilot must consider wake turbulence and the climb capabilities of the airtanker.

Approaching the target, either the Air Attack Officer or birddog pilot will begin the called shot countdown: “3, 2, 1, Now”. The airtanker pilot triggers the load upon hearing “Now”. The assessment is always a “bullseye” for the airtanker pilot unless there is a delay between the “Now” command and release of the retardant load. Differences in altitude or lateral position between the birddog and airtanker may create a distorted perspective for the Air Attack Officer. This parallax may cause an inaccurate drop command.

FIGURE 8. The Called Shot



12.5. Line Astern Formation

Line astern formation is defined as more than one airtanker sharing the working airspace below the bottom of the stack with the birddog aircraft, following each other through the circuit to the drop and exit. Line astern may be used to expedite line-building, to rapidly clear several aircraft from the stack, or if low cloud/smoke ceilings limit the stack altitude. Each airtanker retains the option to accept or decline a line astern request. The birddog may fly a demonstration run with each airtanker pilot observing from above or may initiate a lead-in with multiple aircraft following. The birddog team shall highlight that multiple airtankers will share the working airspace by including the term “line astern” within the run clearance: “Tankers 678, 679, cleared the run, line astern”).

Given wake turbulence considerations, line astern formations should be conducted with similar-weight aircraft only. A lighter aircraft shall not follow behind a heavier aircraft in line astern. The birddog team shall issue a “caution wake turbulence” advisory to the trailing aircraft. Line astern runs must all be flown in the same direction (tag-on, roll-up and parallel instructions only) with no more than a 10-degree change

in lines between aircraft. Aircraft spacing shall be sufficient to allow the birdog team to assess the preceding drop and adjust instructions for the next-to-drop aircraft. The next-to-drop aircraft will acknowledge instructions with their tail number. Only the last aircraft in line may return to the bottom of the stack with a partial load of retardant aboard; all preceding aircraft will attempt to empty their tanks and depart the Fire Traffic Area following their drops. All aircraft in the formation shall be issued a common exit path, and the group will not set course directly for the destination airport until clear of the bombing circuit. In the event of a go-around (retardant load is held), the airtanker will fly the exit in line astern formation as instructed and request clearance to remain in the working airspace or rejoin the top of the stack.

Line astern formations are commonly used with skimmer aircraft and multiple-aircraft groups such as the AT-802s but are not commonly used with heavier airtanker types.

12.6. Aircraft Overrun Procedures

In the event of an imminent overrun of an aircraft by another aircraft, the aircraft in danger of overrunning the other aircraft will communicate the overrun and their deconfliction plan.

13. Retardant Airtankers - Direct and Indirect Attack

Retardant control lines should be coordinated with the ground suppression activities. If timely ground suppression does not follow retardant application, the fire can eventually burn through.

13.1. Direct Attack

Fire retardant is dropped directly on burning fuels to completely blanket smaller fires and to cool any hot spots hampering control efforts:

Spot Fires - Small fires are normally covered with retardant. Use caution to ensure that the edges of the fire are well-covered with no spots outside of the line (dropping a load directly on a fire can displace burning fuels outside the fire perimeter). When dropping on a spot fire, consider:

- Flying the drop into wind and place the forward portion of the drop on the fire, to provide the concentration of retardant on the flames.
- Blanketing the fire from different angles to ensure adequate wrap-around fuel coating.
- Prioritizing the uphill or downwind side of the fire.

Cooling Hot Spots - Hot spots on larger fires must sometimes be cooled with direct applications of fire retardant. When suppressing hot spots close to the fire's edge, take care to avoid dropping long or short and spreading the fire outside its existing perimeter.

13.2. Indirect Attack

Fire retardant is used to build a line that will either stop fire spread or be used as a control line from which to burn. The standard procedure is to lay retardant across the head of the fire, then down each flank, and finally across the base. If visibility at the head is reduced in smoke, forward spread may be cut off with a pincher-type attack plan. The flanks are gradually squeezed until the head is pinched off.

Natural and Artificial Guards - Line construction may be hastened and retardant application reduced by utilizing natural fuel breaks such as lakes, streams, rockslides, etc. Take advantage of areas with light fuel loading. Fire retardant may be applied at lower coverage levels in such locations.

Fireproofing - When fire is threatening to overrun equipment or structures, fireproofing may be considered. Retardant is dropped adjacent to but not directly on buildings, equipment, or other values (i.e. outbuildings and equipment / logging machinery). Coating fuels outside the fire control line may be used where it appears the control line is insufficient to hold the fire.

13.3. Line-building Techniques

Wildland fire control principals that apply to conventional methods of ground-based attack (handline, heavy equipment, etc.) also apply to fire retardant line construction. Watch for and avoid:

- Locating line through heavy fuel accumulations
- Creating sharp corners along the line
- Leaving excessive amounts of unburned fuel within the control line
- Dropping long-term fire retardant inside the fire perimeter

The following should be considered when line building:

- **Coordination** - The establishment of any fire retardant control line with the ground crew(s) requires coordination. Clear communication of the air attack plan will help avoid airtankers being held up waiting for crews to clear the drop zone. Keep approach and departures from the drop zone clear of ground crew(s). If possible, avoid low overflight of helicopters on the ground.
- **Fire Spread** - Anticipate fire spread so the line is not outflanked while waiting between drops. Grass and slash type fuels move quickly, necessitating backing off from the fire's edge to allow the time lag between loads.
- **Direction of Run** - Set up direction of line construction so that pilots are tagging onto an existing line rather than rolling up to it. Tag-ons are easier to accurately judge.
- **First Load (Marker Load)** - Where possible, begin the line at a conspicuous location so that the initial airtanker pilot will have little problem identifying the target. If difficult to pinpoint the starting location, a partial load may be used as a visual marker and reference. Follow-up drops may then be applied in relation to this marker load.

- **Overlapping Loads** – Single-door drops from conventional tanks should be overlapped by approximately 25% to ensure effective coverage. Drops from constant-flow tanks require a 30-40 foot (9-12m) overlap to ensure effective coverage.
- **Heavy Fuels** - In heavy fuel accumulations, retardant drops may be ‘doubled up’ so that retardant can penetrate elevated fuels and reach the surface, even when using higher coverage levels. It may be necessary to apply retardant drops in two directions to cover as much of the fuel as possible (avoiding a “shadowing effect” of large-diameter fuel in the direction of a drop).
- **Turning Corners** - Avoid creating sharp corners, as fire retardant line width may be narrow and the area will be subject to fire breaches. Round out corners by using additional retardant.
- **Mountain Fires** - Fires on slopes tend to burn uphill during the daytime and reverse direction downhill due to subsiding air and/or slope cooling during evenings and at night. Burning fuels may also roll downhill. Normally, an initial run is flown cross-slope to cut off fire spread and the flanks are then guarded with downhill or side-stepping runs. It is advisable to remind ground crews of rolling or falling debris from above their location.
- **Steep Runs** - Consider the following procedures when dropping on steep slopes:
 - Cooling off the head and then the up-valley flanks will result in a flow of air into the fire at these points, potentially negating the effects of the natural upslope and up-valley winds.
 - Fly along contours rather than perpendicular to the fire edge to ensure sufficient retardant reaches the surface. This parallel or “side-stepping” technique requires additional retardant, but are necessary if downhill runs are infeasible or ineffective.
 - Fly runs from the fire edge towards the interior to avoid blowing burning fuels outside of the perimeter.
- **Half On - Half Off** - In theory, this tactic simultaneously cools and guards an active fire edge. This drop requires increased accuracy from airtanker pilots and miscalculations may result in wasted retardant landing within the fire. Use caution when attempting the half on-half off drop.
- **Flanking Action** - Fast spread rates and high intensity fires:
 - Guard flanks to prevent lateral expansion until the fire’s forward spread slows or runs into a natural barrier.
 - Tie into an anchor point on the base or a portion of the flank and create the line towards the head.Slower spread rates and moderate to high intensity:
 - Angle loads (pinching) across the head to reduce it to a manageable size, followed by progressing across the head.
- **Outflanking** - Outflanking may occur when hot-spotting along an extended fire perimeter. Consider creating a continuous line with overlapping loads. A multi-group operation may be required to meet the fire retardant demand. If a suitable water source for skimmer airtankers is nearby, a long term / short-term combination can be considered.

14. Skimmer Operations

Many of the land based airtanker procedures and principles apply to the water skimmer / scooper airtanker operations. There are notable differences in attack principles and mission operations. Skimmers operate on a litres-per-hour concept; delivering large volumes of short term suppressants in a given time. Water drops can normally be expected to reduce fire intensity and rates of spread for a limited time (foams or other additives may increase the length of effective suppression), depending upon forest fuels and burning conditions. Water sources should be located relatively close to the fire with minimal differences in elevation, and ground resources should be on site during or shortly after skimmer action.

The Air Tractor 802 Amphibious and CL215T aircraft may operate as a retardant airtanker and water-scooping airtanker. AAOs may decide whether to have retardant loaded into the aircraft upon dispatch or have them fly empty directly to the closest suitable lake to commence skimmer operations. When arriving at a fire with a load of retardant, the aircraft will operate as a land-based retardant airtanker for the initial load. AAOs then have the option to request the airtanker for additional retardant loads as required. Following any retardant drop(s), if a suitable lake lies within an effective turnaround distance, the aircraft should commence skimmer operations.

Note: While the CL215T is capable of carrying long-term retardant, its poor drop footprint, reduced load capacity, and decreased efficiency, require that this practice should only be considered when:

- Water sources are frozen or inoperable,
- There is a shortage of land-based retardant airtankers, or
- The turnaround time to a water source is inefficient to meet the needs at the fire.

Airtanker drop tactics are selected based upon fire behavior, fuel type, objectives, aircraft capability, and the distance of the water source from the fire. Effective delivery is influenced by turnaround time and the fire conditions. Air Attack Officers determine appropriate drop techniques to achieve a desired tactical effect. Direct attack forms the majority of skimmer drop activity; other tactics are used as conditions and objectives require. The following tactics may be employed individually or in combination:

- **Direct Attack** - Direct attack involves placing water directly on the active flaming edge of a fire to immediately reduce intensity and slow spread. This tactic is most effective when fire behavior allows safe engagement of the head, and a rapid knockdown is required.
- **Flank Reinforcement** - Flank reinforcement involves placing water along an active flank or within an established containment feature to prevent 'slop over' or flare-ups. Drops are aligned parallel to the fire perimeter to maintain line integrity and maximize the controlling effect.
- **Spot Fire Suppression** - Spot fire suppression involves targeted drops on new ignitions outside the main fire perimeter to prevent growth and to limit expansion of the fire area.
- **Indirect Head Drops** - Indirect head drops, also referred to as the "Rizzoli," are placed directly behind the advancing head of a fire. Convection from the head fire draws the water into the active edge, reducing fire intensity and creating an opportunity for suppression actions on the head of the fire.

Topography must be considered in mountainous areas as the turnaround times can be lengthened by density altitude and skimming route diversions over or around hills. It is essential that the water sources are located relatively close to the fire, with a minimal difference in elevation.

The “Litres per Hour” concept requires that delaying skimmer aircraft drops must be kept to a minimum to preserve the cost effectiveness of the operation. Fires of moderate intensity may be controlled from 15 nm distances between water source and fire. Fire intensities in the range of 1,500 to 2,500 KW/m require 5-10 nm distances to be effective. To meet fire control objectives when skimmer turnaround times are excessive, additional skimmer aircraft and/or land-based airtankers must be requested. Consider staggering aircraft refueling cycles when working with skimmer groups, to maintain a constant airtanker presence overhead the fire.

The following table illustrates the number of drops per hour, drops per fuel cycle, and volume per hour that one CL-215T and one AT802 amphibious aircraft can deliver at various distances from the water source. This table was calculated assuming ideal skimming conditions with a direct route to the fire.

FIGURE 9. Skimmer Performance at Various Distances
(2023 Reference Guide to the Drop Effectiveness of Skimmer and Rotary Wing Airtankers)

CL-215T				
Skim Distance (NM)	5	10	15	20
Delivery (l/hr)	53,000	38,000	30,000	24,000
Drops/hr	12	9	7	6
AT802-AF				
Skim Distance (NM)	5	10	15	20
Delivery (l/hr)	27,000	19,000	15,000	12,000
Drops/hr	11	8	6	5

14.1. Skimmer Airtanker Operations

The birddog team in consultation with the airtanker pilots, will determine the nearest potential water source for skimming. Consideration must be given to the following points:

- Distance/ time between the water source and the fire.
- Differences in elevation within the skimming circuit.
- Depth of water body.
- Water conditions (i.e. brackish water) and obstructions on the water surface.
- Available and useable length of water surface for skimming. Aircraft require approximately one statute mile in length and six feet (2m) of depth for safe skimming.
- Suitability of approach and departure paths at the water source. Consider winds and obstacles.
- The airtanker crew owns the final decision as to the suitability of a water body for skimming.

Note: If skimmer airtanker pilots plan to change water sources for any reason, they must request clearance before deviating from the established water source.

The skimmer crew will establish a bombing circuit similar to that illustrated in *Figure 10*. Aircraft separation is normally horizontal rather than vertical. Skimmer crews will establish themselves in the circuit and maintain their own separation. Skimmer airtankers do not normally orbit over the fire; as a rule, skimmer airtankers will fly a straight-in approach and are dependent upon pre-flown validation runs made by the birddog.

For initial drops within a fire, the “lead-in” technique is the preferred method of target identification. The birddog may then orbit & direct any subsequent runs by assessing drops and referring to previous drops/assessments to describe load placement. The next-to-drop airtanker will acknowledge instructions by responding with its tail number. Every new run or change in run direction must have been flown and validated by the birddog aircraft prior to establishing orbit & direct tactics.

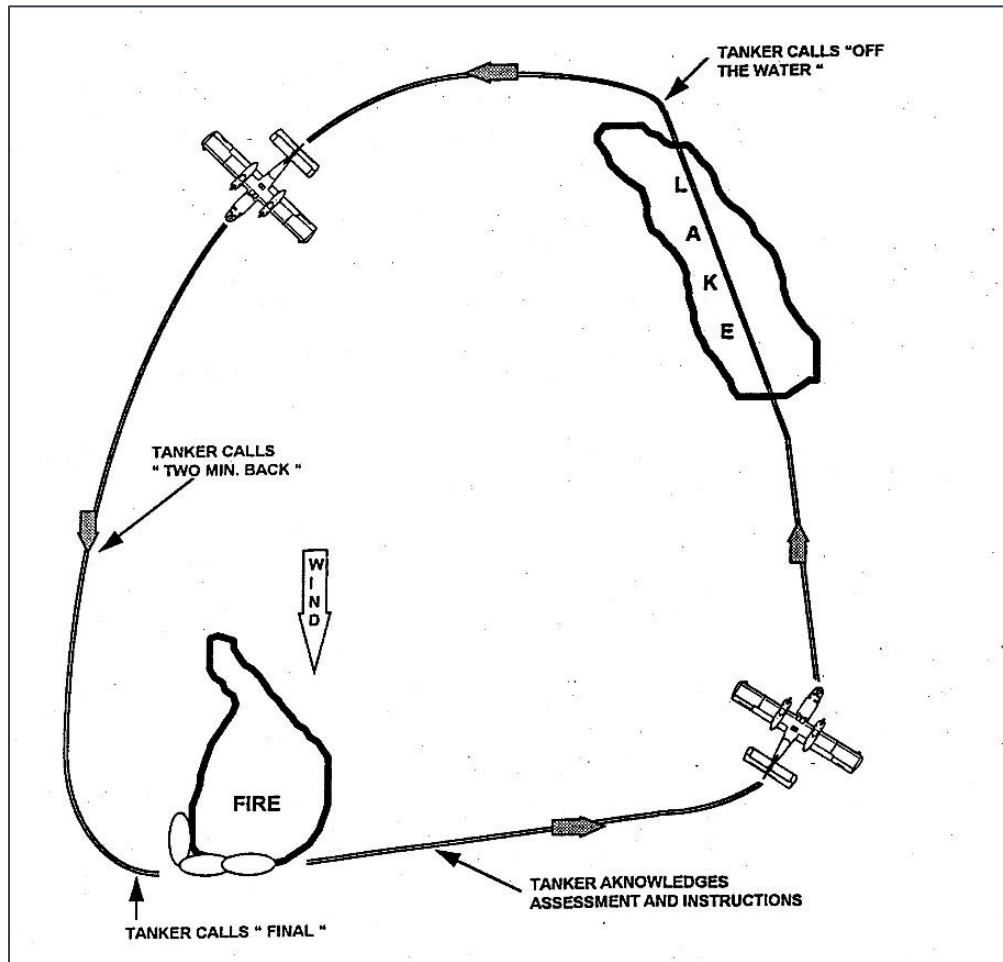
During skimming operations, the skimmer crew will advise the birddog team “off the water with a load”. This signals to the birddog team that skimming was safely completed and skimmers are ready to be incorporated into the attack plan. If the skimmers are required to hold (i.e. for other traffic) they may be instructed to orbit over their pick-up water source or at a holding area designated by the birddog team. Due to heavy cockpit workload during water pickups, do not attempt to contact skimmer aircraft while they are on the water, unless for emergency purposes.

Land-based and amphibious airtankers may work the same fire simultaneously. Given the fire size and other logistics (i.e. location of water source from the fire), it may be possible for two birddog teams to work multiple groups independently if the operations can be geographically separated. A single working birddog may direct both land-based and skimmer airtankers. Any additional birddog aircraft may be assigned to an ATGS role or released from the incident to return to the closest airtanker base. Fire burning conditions, distance between the water source and/or airtanker base and the fire, plus fire objectives are all used to determine the need between long-term and suppressant drops.

Skimmer airtankers are required to rinse their internal tanks after injecting foam. It is common practice for these airtankers to flush their tanks and drop these rinse loads on the fire prior to returning to base. Avoid dropping straight water on top of foamed loads that have been applied on the surface.

Due to nose gear limitations on the CL-215 airtanker, these aircraft do not utilize gravel airstrips nor land with a load of water or retardant as the increased weight can damage the landing gear.

FIGURE 10. Skimmer Circuit



14.2. Integration of Land-Based and Skimmer Aircraft

Simultaneous use of land-based and skimmer aircraft may be extremely effective suppression tactic. When integrating both airtanker types, the birddog team should estimate the turnaround time for the skimmer aircraft, and while the skimmers are transiting to & from their water source, utilize land-based airtankers with retardant as per normal operations.

Upon leaving the water source, a skimmer group will call the birddog with an ETA to the fire zone in order to allow sufficient time for the birddog team to complete any retardant runs and permit the safe departure of the airtanker. Skimmers may then enter the Fire Traffic Area, drop their loads and return to the water source. During short skimmer turnaround times, the birddog may fly demonstration runs for an orbiting airtanker holding at the base of the stack. The skimmers may be cleared to drop, followed by run clearance to the retardant airtanker as the skimmers depart. In cases of retardant priority, AAOs may instruct a skimmer group to delay their entry into the Fire Traffic Area while the prioritized retardant load is applied.

The concept of "see and be seen" is critical during integrated operations during which retardant airtankers are typically descending from a vertical stack while skimmers are approaching horizontally at 500-1000 feet AGL. Confirming visual contact between skimmers and retardant airtankers is critical to maintaining effective aircraft separation throughout the operation.

The primary advantage of utilizing both suppression concepts is employing the inherent strengths of each. Containing a fire with retardant while simultaneously cooling its interior provides a highly effective aerial suppression technique.

15. Multiple Group Airtanker Operations

It is common practice for multiple groups to be dispatched to a single incident, or for an airtanker group to be dispatched in support of another group's mission. The following points outline the information and communication flows and procedures:

15.1. Enroute

The earliest arriving birddog generally assumes the position of the working birddog and the later arriving birddog assuming the supporting role. This may differ if prior arrangements have been made between responding Air Attack Officers (for example, for training or check ride purposes).

For the supporting airtanker group, when all airtankers have reported they are on the group bombing frequency, in addition to the standard update information, the AAO will confirm the working birddog call sign, bombing frequency and altimeter setting in use over the target (if available at this time).

Prior to the '5 minutes back' call, the support Air Attack Officer should be in contact with the working birddog and will provide the incoming airtanker group with the following information:

- Fire Number
- Altimeter Setting in Use
- Target Altitude
- Confirmation of reload airtanker base
- Status of the support birddog (e.g., assuming the role of 'Air Attack', providing other support, or flying to an assignment elsewhere)
- Working birddog call sign and/or the initial contact frequency for any Air Attack platform already established at this incident.
- Other pertinent information (hazards, other air traffic etc.).

The support Air Attack Officer will instruct the airtanker group to switch and report on the new bombing frequency. The airtankers shall not cease monitoring their original bombing frequency unless specifically approved by their birddog team in case of an enroute diversion to a higher priority target. Superfluous radio transmissions may interfere with firebombing traffic between the working birddog and an airtanker in the bombing circuit or aircraft entering or maneuvering in the stack over the incident. When the hand-off to the working birddog is complete, the incoming airtankers shall report to the working birddog.

15.2. Support Birddog (Air Tactical Group Supervisor) Role Overhead the Incident

Prior to the support birddog arriving over the incident, the working birddog will assign an altitude above the airtanker stack. The support birddog will orbit at a high level and may serve as a communications link between the ground crews, working birddog, and Fire Centre. This system allows the working birddog to concentrate on the firefighting tactics and low-level airspace coordination. The support birddog must also

be prepared to manage airspace and descend into the working birddog role should the working team need to rest or refuel.

The support birddog may be requested to assume the role of Air Tactical Group Supervisor (ATGS). The decision to establish an ATGS platform lies with the working birddog team. The callsign of the supporting birddog changes to "Air Attack + (wildfire number)". For example: the ATGS call sign for LWF-110 would be "Air Attack 110". The air advisory frequency for the incident will be assigned as the initial contact channel for all incoming aircraft.

When an ATGS platform has been activated, the ATGS shall broadcast on the air advisory channel that Air Attack (fire number) has been established. This information shall be passed to the Fire Centre for inclusion into the ATR and communicated to all aviation resources assigned to the incident. Inbound and outbound aircraft will now contact "Air Attack (fire number)" on the assigned air advisory frequency for entry clearance and exit instructions. The working birddog and the ATGS will monitor the incident air advisory frequency and the working bomb frequency.

15.3. Incoming Aircraft

All aircraft will call the birddog when 5 minutes back from the incident on that incident's air advisory frequency and shall not enter the Fire Traffic Area until instructions have been received from the ATGS.

Non-airtanker aircraft will either be assigned to the working birddog if they will be operating within their managed airspace or assigned to another area of the incident.

Each airtanker will enter the stack at their assigned altitude. No incoming airtankers will enter or descend within the stack until the airtanker they are following has been identified visually as per the stacking procedures in [Section 11](#).

Immediately after receiving instructions from the ATGS, incoming airtankers will switch to the working birddog frequency to monitor the airtanker bombing action and if able, continue monitoring the air advisory frequency.

After an airtanker has completed its final drop and has exited the immediate fire zone (at an altitude below the base of the stack), the outgoing airtanker pilot will contact the ATGS to confirm departure intentions. This assists in traffic separation. After leaving the Fire Traffic Area, the airtanker may once again monitor enroute frequencies and ensure they are on the appropriate altimeter setting.

A sample flow of the conversation between the incoming airtanker and ATGS (assuming the incoming airtanker is unaware ATGS has been established):

Tanker 485 (123.22 MHz)	“Birddog 54, this is Tanker 485 on bomb, 5 minutes back, North of LWF-110 at 8500 feet”
Birddog 54 (123.22 MHz)	“Tanker 485, contact Air Attack 110 on 129.8”
Tanker 485 (129.800 MHz)	“Air Attack 110, Tanker 485 on 129.8, 5 minutes back, North of LWF-110 at 8500 feet”
Air Attack 110 (129.800 MHz)	“Tanker 485, this is Air Attack 110, altimeter 29.83, cleared overhead at 4000 feet, number 1, there’s a helicopter above you at 6,000 feet, Air Attack at 7000 feet. Contact Birddog 54 overhead on 123.22.”
Tanker 485 (129.800 MHz)	“29.83, 4000, number 1, contact Birddog 54 on 123.22”

NOTE: Airtankers should monitor both frequencies until overhead and report (on the working birddog frequency) in the stack at the assigned altitude or their new stack altitude if they have stepped down because they are aware of the working airtanker departing the fire.

Tanker 485 (123.22 MHz)	“Birddog 54, Tanker 485 on bomb, overhead at 4000 feet, number 1”
Birddog 54 (123.22 MHz)	“485, Roger”

Note: After the airtanker has dropped, received their assessment and instructions to reload or stay, the working birddog will instruct the departing airtanker to contact the ATGS for instructions on exiting the Fire Traffic Area.

Birddog 54 (123.22 MHz)	“Tanker 485, bullseye, Slave Lake, Reload. Contact Air Attack 110 on 129.8 for exit instructions”
Tanker 485 (129.800 MHz)	“Air Attack 110, Tanker 485 on 129.8, with instruction Slave Lake, Reload.”
Air Attack 110 (129.800 MHz)	“Tanker 485, you are cleared to the south, maintain 4000 feet or below for 5 miles, then altitude your discretion, caution Tanker 681 may be inbound from Slave Lake”

16. Procedures for Working with Mutual Aid Agricultural Aircraft (Prairie Dogs)

Alberta Wildfire may be requested to assist mutual aid partners on wildfires outside of the Forest Protection Area. Our mutual aid partners may also use contracted agricultural aircraft on these fires. If airtanker resources are dispatched, the birddog will manage the airspace over the Fire Traffic Area.

An Alberta Wildfire representative must be on scene prior to using airtanker resources. The birddog will make initial contact with the Prairie Dog aircraft on VHF-AM 126.70 and assign a bombing frequency (either the group bombing frequency (VHF-AM) or the Prairie Dog frequency (Kinniburgh FM 166.32). The Prairie Dogs will then monitor this assigned frequency.

All incoming aircraft will contact the birddog 5 minutes back before entering the FTA., and will provide their position, altitude and direction relative to the fire. The birddog will provide a current altimeter setting and entrance instructions.

Due to aircraft performance capabilities, Prairie Dogs will NOT be stacked above the fire in 500' intervals. The Prairie Dogs will be put into a separate racetrack orbit 1500' AGL above the target. The Prairie Dogs will not be put into the same stack with other airtanker types; a split stack will be required. The birddog will provide a demonstration run including target description, target altitude, hazards and exit instructions. The birddog will NOT lead in the Prairie Dogs.

17. Factors Influencing Drop Placement and Patterns

For retardant to accurately reach the intended target, the birddog team and airtanker pilots must consider a variety of factors. Variables that should be considered include:

- Drop height
- Aircraft speed
- Aircraft attitude
- Drop selection
- Canopy & fuel type
- Wind speed & direction
- Topography
- Tank & venting systems
- Retardant characteristics
- Atmospheric conditions
- Pilot release [trigger] point
- Volume & speed (flow) of retardant released
- Physical characteristic of the retardant

18. Assessing the Drop

There are two procedures used for observing drops:

- The birddog views the drop from an overhead orbit
- The birddog flies in formation with the airtanker

18.1. Overhead Orbit

In this procedure the birddog pilot will position the aircraft directly above the target (approximately 1000 feet AGL) as the airtanker drops, providing Air Attack Officers with an unobstructed view. Right-hand orbits are preferred. This method is commonly used with skimmer airtankers working a target after having received previous demonstration runs or lead-ins.

18.2. Flying in Formation

The birddog pilot will typically position the aircraft behind and to the left (7 o'clock position relative to) of the airtanker. The birddog pilot must consider possible wake turbulence produced by the airtanker when maneuvering into position. A proper formation is important such that it will allow AAOs the opportunity to check the airtanker for the correct line, airspeed and height above treetop or ground, and allow for observation of the drop itself. The birddog may turn right after the drop, to keep the retardant in sight until it has settled. Alternate positioning may be used due to terrain, smoke, or AAO request.

18.3. After the Drop

The AAO will observe the airtanker after the drop to ensure that it clears the area. The AAO will immediately advise the airtanker pilot if something out of the ordinary is noticed: the load not being released, doors not closing, an incorrect drop type or retardant streaming from the tank. The FLIR camera allows Air Attack Officers to see the exact placement of the drop in obscured visibility. If the birddog is unable to observe where the drop settled, the footprint can be observed on a subsequent pass over the target area using the FLIR camera.

18.4. Drop Assessment

As soon as possible after the drop, Air Attack Officers will provide the airtanker pilot with an assessment of the accuracy of the drop. If the drop landed exactly as intended, the assessment is a "Bullseye". If the drop was off target, give airtanker pilots an accurate description of where the drop settled in relative to where it was intended to be dropped. Examples of items to assess and provide feedback on:

- Advise if it was long or short, relative to the load length, measured in $\frac{1}{4}$ load length increments (e.g. $\frac{1}{2}$ Long)
- Left or right, relative to load width, measured in $\frac{1}{2}$ load width increments (e.g. $\frac{1}{2}$ Load Right, 1 left)
- Too high, low, fast, slow, or the run was flown offset from the intended line.
- Incorrect volume or coverage level selection
- Foam concentration appears weak or heavy

After each assessment, instruct airtanker pilots to proceed with the next drop or to a designated base to reload or stay. If additional drops are required and the last drop was inaccurate, the birddog team will provide instructions to help adjust the trigger point or line. For example, if the instructions were to tag onto the existing retardant line and the assessment for the drop was “1/4 long and one load right”, the birddog’s next instructions would be: “Same run, parallel left starting ¼ earlier”.

Air Attack Officers should document drop times, load placements & accuracy on the *Air Drop Form*. This information should be used for debriefings, future reference and data entry into the FIRES Program.

The birddog pilot will typically relay an Air Attack Officer’s drop assessment to the airtanker pilot over the assigned bombing frequency. However, when providing assessments and subsequent drop instructions to the preceding airtanker during skimming operations, the Air Attack Officer should communicate directly unless unable to witness the drop.

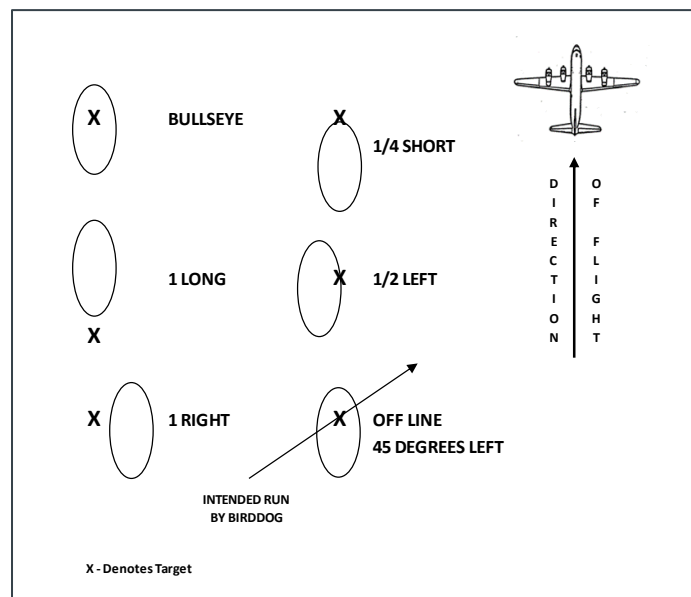
18.4.1. Drop Height

AAOs shall assess the airtanker for drop height. The drop height above the canopy or bare ground must allow the retardant to lose forward movement prior to entering the canopy or hitting the ground. This height may vary from approximately 100 to 150 feet above the canopy or bare ground. When retardant loses forward movement and rains vertically on the fuel, it provides more effective fuel coverage. Low drop heights expose both the airtanker pilot and ground crews to unnecessary risk and ultimately result in a less-effective drop pattern and fuel coverage.

18.4.2. Drop Speed

AAOs will assess the airtanker for drop airspeed. The airtanker must maintain consistent drop speeds according to aircraft and company operations manuals. Drop speeds will vary according to aircraft type, tank configuration and company operations manual specifications. Low drop speeds may affect safety and maneuverability and result in excessive concentrations on the ground and less effective line length. Excessive airspeeds produce a longer, less concentrated pattern and may result in inadequate fuel coverage.

Figure 11. Drop Assessments



19. Reloading Airtankers

Air Attack Officers must continually assess whether additional resources are required and shall:

- Request the departing airtanker(s) to reload and/or
- Request additional airtanker(s).

As outlined in [Section 9.1](#), any request for additional airtankers must include the following information:

- Type of airtanker group required (long term retardant or skimmer)
- Number of airtanker groups required
- Airtanker(s) only or entire group including the birddog
- The callsign of the working birddog on the fire
- The working birddog's bombing frequency

As each airtanker receives exit instructions, the birddog will instruct the airtanker to:

- (Airtanker base) and Stay – there are no more anticipated requests.
- (Airtanker base) and Reload – return to the incident to deliver another load.

20. Stop Action

Air Attack Officers, Incident Commanders, or Forest Area Duty Officers may terminate airtanker action. Air Attack Officers shall consult the Incident Commander and/or the Forest Area Duty Officer prior to stopping action on any fire. Missions may be terminated due to one of the following reasons:

- **Objectives Achieved** - Once mission objectives have been achieved, airtanker action is terminated. Confirm with the Incident Commander that they have sufficient resources on site or enroute prior to departing the incident.
- **Safety** - Where hazards such as poor visibility, turbulence, terrain, obstacles pose a threat to aircraft safety, airtanker action must be stopped. Any member of the airtanker group may express safety concerns and halt the mission.
- **Beyond Resources** - Airtanker action should cease whenever excessive fire behaviour, size or lack of ground resources challenge the ability of the available airtanker resources to attain achievable objectives.
- **Higher Priority** - The Fire Centre or Provincial Aircraft Coordinator may cancel an airtanker request due to a higher-priority incident elsewhere.

Any ceased action due to safety or beyond resources must be followed up with the Incident Commander and/or the Forest Area Duty Officer by the Air Attack Officer when they return to the airtanker base.

21. Cancelled Dispatch

Airtanker groups may be dispatched to detection messages or wildfires prior to confirming that airtanker action is required.

If an airtanker request is cancelled prior to the group becoming airborne, the Fire Centre will notify the Airtanker Base Supervisor, who will in turn inform the group via the airtanker base radio frequency 122.05. If an airtanker group is cancelled while airborne, the Forest Area Dispatcher will inform the Air Attack Officer via the local Firenet channel. The group will then be instructed to return to base or divert to another incident.

In the event of an airtanker-only dispatch, the airtanker cannot be contacted by the airtanker base or birddog, the Forest Area will contact the airtanker via the satellite phone.

22. Returning to Base

22.1. Airtanker Action is Complete

After all airtankers have completed action, the birddog will normally remain over the target to complete tasks such as:

- Update the Incident Commander and ground crew,
- Communicating fire updates,
- Observing or photographing the fire behavior, etc.,
- Provide an update to the Fire Centre,
- Turn over airspace control responsibilities to remaining aircraft assigned to the incident.

Once an airtanker group has completed their objective, the Air Attack Officer may advise the Airtanker Base Supervisor and/or Forest Area Duty Officer on the status of the group (i.e. fuel remaining for the birddog and airtanker; retardant on board; remaining duty day; etc.). This will aid in decision making for possible diversions and refueling requirements.

Before releasing any airtankers that are not part of their group, Air Attack Officers will contact the Fire Centre via the local Firenet channel to confirm if there are any requirements for the airtanker within the Forest Area. The birddog team will communicate instructions for reassignment to the airtanker over the bombing frequency. If there are no requirements, the birddog team will release the airtanker(s) and instruct them to call the PAC. One airtanker from each group will call the PAC cell phone (if no response, the AWCC main line is the secondary phone number) via the satellite phone and inform them that they have been released, before returning to their base. The information will be given as in the following example: "Tanker 487 released." At that time, the PAC will either request more information regarding their fuel / retardant status and fill outstanding airtanker requests or instruct them to return to base.

22.2. Inbound the Airtanker Base

Navigate to the base and provide an ETA to the Fire Centre. The airtanker group will remain vigilant for new fires whenever airborne. Airtanker(s) transiting without a birddog are required to have their satellite phone switched on to receive calls for dispatches or diversions. All aircraft should call and/or monitor the airtanker base radio frequency 122.050 when approaching the destination base. Each aircraft, when approaching an airtanker base, shall advise the Airtanker Base Supervisor:

- Intentions (stay vs hold vs reload)
- Request fuel as required
- Request any additional supplies/services required

22.3. Aborting Loads

If an airtanker request has been cancelled, airtankers may have to jettison a portion of the retardant load at a designated abort area to avoid an overweight landing.

If a birddog team is available to directly supervise an abort, allow them to arrive prior to releasing any retardant. The birddog shall assess the drop zone and fly the intended run prior to the airtanker releasing any retardant. If no birddog is available, the airtanker may proceed with the abort, but shall:

- Overfly the drop zone, ensuring no people, or infrastructure is within the intended drop area.
- Maintain a minimum drop height of 500 feet AGL.
- The jettisoned volume of retardant must be documented on the Drop Report and entered into the FIRES program.

Abort area locations are marked on digital maps carried in the birddog or may be obtained by contacting the Fire Centre or Airtanker Base Supervisor.

22.4. Landing

Air Attack Officers are responsible for the following when the birddog is on final approach for landing:

- Ensure cords & equipment do not interfere with the control column, and are stowed for landing
- Act as an active crew member: scan the runway ahead to ensure no aircraft, wildlife or other obstacles are present.
- Inform the local Fire Centre that the birddog aircraft is on final to land at (name of airport)

The birddog team will maintain a sterile cockpit while inside the airport zone, limiting communications and actions to those that are mission-critical or directly related to flight safety during landing.

Air Attack Officers serve as an added layer of protection against landing with gear retracted or in an unsafe condition, and helping avoid conflicts with other air traffic.

In the TC690 Turbo Commander:

- Look out the right window, and confirm the right main landing gear is extended, and appears to be in the locked position.
- Look at the spinner of the right-hand engine, to see the reflection of the nose gear.
- Confirm the three green landing gear indicator lights are illuminated.

In the C208 Grand Caravan:

- Assess the condition of the right landing gear & tire (the gear is non-retractable).

22.5. Parking Loaded Airtankers

Ensure loaded airtankers are parked on the apron's concrete pads whenever possible. Loaded airtankers parked on asphalt may create ruts or divots on the surface.

22.6. Group back at the Airtanker Base

Once an airtanker group has returned to an airtanker base, the group shall prepare for the next dispatch: Advise the ATB Supervisor or the Fire Centre duty officer when the group is expected to be available for the next dispatch.

Refuel and prepare each aircraft for its next mission. Birddogs are normally refueled before airtankers. Ensure all paperwork and documentation is completed.

Conduct an after-action review as soon as feasible. A post-mission after action review is required after each mission. Schedule this review as soon as possible following the mission, and depending upon complexity or number of identified issues, a formal or informal session may be held. Refer [Section 3.3](#) to for additional information on AARs.

23. Administration

23.1. Drop Reports

AAOs must enter drop reports into FIRES by the end of each shift.

23.2. Cancelled Dispatch Report

All cancelled airtanker dispatches must be recorded within the FIRES database. The information must include time and date of dispatch, group dispatched, AAO name, fire/detection number, cancelled/diverted time, aircraft roll times, and volume of retardant aborted if applicable.

23.3. Wildfire Photos and Video

All photos and videos taken while engaged in wildfire operations are property of the Government of Alberta. Photos/videos will not be distributed to any individual, company, news affiliate, or posted onto social media platforms unless permission is obtained from the Director of Wildfire Operations.

Air Attack Officers shall take digital photos of all wildfires actioned. These photos must include:

- Views of the incident upon arrival
- Significant changes in fire behavior and/or operational events
- Views of the incident before departure

Photos must be time & date stamped and labelled and include the incident number and the AAO's name.

If possible, photos should be emailed in "real time" to the Forest Area WFOPs and the AWCC email accounts. All photos must be forwarded prior to the end of each day to the AWCC and the applicable Forest Area WFOPS email accounts.

23.4. Forward-Looking Infrared (FLIR)

All Air Attack Officers shall be proficient in the operation of the FLIR camera in their specific birddog. Training manuals for each type are available on the FireDrive.

FLIR operation is the responsibility of the Air Attack Officer. During low level operations, the birddog pilot is not to monitor the FLIR display and is to maintain full attention outside the aircraft and on flying the aircraft.

All suspected human caused fire missions must be recorded on the FLIR data card. Emphasis should be placed on recording infrared footage of the suspected point of origin and any people or vehicles near the fire. The recorder hard drive will store the video files for the entire season. If specific fire videos are required for investigation purposes, the AAO will be required to download the video from the hard drive on to a thumb drive (provided in the kits).

When requested by the Investigation Unit, thumb drives must be mailed as soon as possible (by government courier) in the provided envelopes to investigation staff at Wildfire Management Branch in Edmonton.

The FLIR Kit contains:

- External hard drive c/w USB cable
- Multiple compact thumb drives
- Pelican-type storage case for the above items. Each case has the Group # labelled on the exterior

The AAO shall operate the birddog's FLIR camera during every practice to ensure that all systems operate correctly, and the AAO remains proficient in its use.

All personal opinions and analysis must be avoided in the FLIR dialogue and when labelling images/FLIR files.

23.5. Quick Strike / Border Zone / Mutual Aid Fire Procedures

Airtanker groups may be dispatched into neighboring jurisdictions to assist in wildfire suppression missions. The following information from these missions must be sent to the Provincial Aircraft Coordinator on the day of the mission:

- All drop reports (using requesting agency forms if possible).
- After Action Reviews
- Aircraft flight times
- Volume of retardant loaded from Alberta airtanker bases used on that mission.
- Fuel tickets from refueling during/after the mission, whether in Alberta or elsewhere.

23.6. Initial Fire Assessments (FP 41)

If an Air Attack Officer is the first agency resource arriving to an incident, the AAO must relay an *Initial Fire Assessment* (FP 41) report. The Air Attack Officer must then follow up the written or emailed electronic copy of the complete FP 41 assessment to the Area Office by the end of their shift.

23.7. Mobile Flight Report

To ensure accurate flight information for administration purposes, daily flight activity, fuel usage and aircrew expenses will be recorded for each aircraft under contract, using the *Mobile Flight Report*. If no revenue flights have been performed during the day, a *Mobile Flight Report* will still be completed which will have information on aircrew expenses (accommodation, rental vehicles, meals not supplied by Alberta Wildfire).

23.8. Flight Crew Meals

When the alert status of an airtanker group indicates the group will be 'on base' during a meal period, the airtanker group is responsible to supply their own food while on base.

When airtanker groups fly through the meal period, end up at another base due to fire action, or are called to base without time to acquire a meal (this may include an early 'stand to' before grocery stores are open or getting 'off base' at night after grocery stores are closed), the following will apply:

- A hot 'sit down' meal at the Airtanker Base can be provided at the discretion of the Forest Area in conjunction with the Air Attack Officer. Meals may come from the camp kitchen or ordered from a restaurant. If a flight crew member partakes in this meal, (breakfast, lunch or dinner), they are expected to sign for the meal and must record it on the *Mobile Flight Report*.

Whenever the Wildfire Management Branch provides a light lunch 'on-the-fly' meal to keep the aircraft airborne, that meal may be claimed by the flight crew on their expense account. Refreshments such as juice and bottled water will be provided for the flight crews during fire operations. Coffee, tea and water will be made available to flight crews while on base.

The AAO and ATBS shall consult with their group aircrews to determine the times that meals should be ordered to keep airtanker groups engaged in operations.

24. Appendices

24.1. Appendix 1 – Glossary of Firebombing Terms

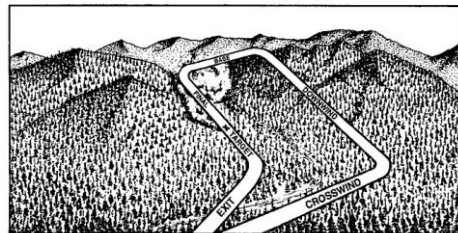
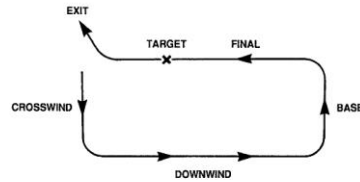
<i>Abort</i>	A planned release of retardant in order to achieve an aircraft's maximum landing weight. It is recommended, but not mandatory, that a birddog accompany the airtanker to the designated abort zone to facilitate the drop.
<i>Armed</i>	A confirmation by the airtanker pilot that the drop system is correctly configured to trigger the release of the load as requested by the birddog team.
<i>Base (of the fire) or Back</i>	A portion of the fire perimeter that is opposite to the head. Typically exhibiting the slowest rate of spread.
<i>Base Leg</i>	The leg of the bombing circuit immediately preceding the final leg .
<i>Bullseye</i>	An assessment that the drop was placed exactly where requested.
<i>Called Shot</i>	A drop technique whereby the birddog cues an airtanker's drop release point by verbal command, saying "3, 2, 1, Now".
<i>Cleared the Run</i>	A command from the birddog confirming that the airtanker may descend from the stack and share the same airspace as the birddog. Visual contact must be acquired by one or both aircraft inside the working airspace below the stack. "Cleared the Run" also confirms that ground personnel or other aircraft are clear of the drop zone and it's safe to release the load as described.
<i>Compartmented Tank</i>	A tank design containing several separate compartments, each with its own non-fluctuating door. The doors may be opened individually, simultaneously or in sequence to achieve a desired retardant pattern on the ground. Note that once a door is opened, the entire contents of its compartment are released.
<i>Coverage Level</i>	The concentration of retardant dropped from a variable constant-flow tank. A Coverage Level 1 equates to 3.78 litres per 9m ² of ground (or 1 US gallon per 100 ft ²).

<i>Crosswind</i>	The leg of the circuit over an airport or bombing target that precedes the downwind leg .
<i>Demonstration Run</i>	A simulated bombing run made on a target flown by the birddog to assess hazards, identify and describe the target, target altitude, run heading and a safe exit path to the observing airtanker. May also be called a “dummy run” or “show me”.
<i>Diversion</i>	Change in birddog and/or airtanker assignment from one incident to another higher priority incident.
<i>Drift</i>	Advice or indication that wind of sufficient velocity may significantly affect drop placement and that a correction factor must be applied by the airtanker pilot.
<i>Double-up</i>	An instruction to place a drop directly on top of the preceding drop.
<i>Downwind Leg</i>	The leg of the bombing circuit immediately preceding and perpendicular to the base leg .
<i>Drop Assessment</i>	Air Attack Officers will assess each airtanker’s drop for accuracy and effectiveness. Drops will be rated as a bullseye, short, long, left, right or offline. Short and long drops are rated as a fraction of the entire load in ¼ length increments. Left and right drops are assessed using the width of the load as a reference. Other assessed variables include drop height, drop speed, retardant coverage, foam effectiveness and load drift.
<i>Drop Height</i>	Height of the airtanker at load release, usually given in feet above the tree canopy or the bare ground.
<i>Dummy Run</i>	A simulated bombing route flown to a target by the birddog to indicate the target and route to the airtanker. May also be called a “show me” or “demonstration run”.
<i>Early</i>	Assessment that the drop shall be or was triggered short of a designated point.
<i>Exit</i>	The safe, level or descending route flown after a drop to avoid hazards.
<i>Extend</i>	An instruction to tag onto and lengthen a retardant line in the required direction.

Final

A live bombing run where the airtanker intends to make the drop.

Firebombing Circuit



Flank

The portion of the fire perimeter linking the head and the base of the fire, roughly parallel to the main direction of spread. Right and left flanks are distinguished by looking from base towards the head.

FLIR

Forward Looking Infra-Red. A camera that captures and enhances thermal infrared signals, combined with visible light, enabling the user to see objects and differences in heat signatures through an obstructing medium such as smoke.

Fire Traffic Area (FTA)

The portion of airspace within 5 nautical miles of a wildfire perimeter, extending to 3000 feet above ground. The FTA dimensions may be amended by NOTAM. As per CAR 601.15, no unauthorized person may operate an aircraft over a forest fire area, or over any area that is located within five (5) NM of one, at an altitude of less than 3000 feet above ground level. If additional space is required, ask the Area office to request a Notice to Airmen (NOTAM) be issued by Nav Canada describing the amended restricted area (CAR 601.16).

Gap

An area within a retardant line on the ground with absent, weak or ineffective retardant coverage.

Half on / Half off

A drop made overlapping a linear reference on the ground (the fire edge, previous retardant drop, etc.). This technique may be used to simultaneously cool burning fuels and guard adjacent unburned fuels.

<i>Head (of the fire)</i>	The leading fire perimeter with the greatest rate of spread. Usually aligned with the direction of wind and/or upslope terrain.
<i>Head (of the drop)</i>	The most forward end of the retardant drop on the ground.
<i>Hold the Load</i>	A command issued by the birddog team to cancel the clearance to drop its load. This command is generally issued when an airtanker is flying an incorrect path, or it is no longer safe to drop on the target. The airtanker will fly the exit as described and await instructions from the birddog.
<i>Inspection Run</i>	A pass overhead the target by the birddog or airtanker to assess the run.
<i>Late</i>	Assessment that the drop shall be or was triggered beyond a designated point.
<i>Lead-in</i>	A technique whereby the airtanker follows directly behind the birddog through the circuit to the target.
<i>Line Astern</i>	Directing two or more airtankers or water skimmers to drop on a given target while occupying the same airspace simultaneously. The second and each subsequent aircraft follows the flight path flown by the lead aircraft.
<i>Load</i>	The capacity of a single airtanker's tank when full.
<i>Load Width</i>	The width covered by a given retardant/water drop on the ground.
<i>Lone Wolfing</i>	Lone wolfing refers to an airtanker conducting low-level drops without supervision of a birddog. Lone wolfing is prohibited in Alberta.
<i>Long</i>	Assessment that the drop landed beyond a designated point.
<i>Marker Load</i>	A drop strategically placed as a visual reference point used to aid placement of subsequent drops.

<i>Orbit and Direct</i>	A technique whereby the birddog orbits overhead the incident after flying an initial low-level demonstration run and verbally identifies targets to airtankers or water skimmers.
<i>Provincial Aircraft Coordinator (PAC)</i>	An individual based in the operations room at AWCC responsible for the coordination of safe and efficient use of provincial aviation assets.
<i>Quick-Strike</i>	A mission in which an airtanker group is dispatched to an incident in a neighboring jurisdiction and returns to their assigned base upon completion. Airtankers may reload or refuel in the other jurisdiction prior to returning home.
<i>Reload</i>	An instruction to an airtanker to proceed to a designated airtanker base for another load of retardant and return to the same incident.
<i>Rising Terrain (or ground)</i>	Indicates that the ground ahead or abeam the target is higher than the target altitude itself.
<i>Roll-up</i>	Connecting the head end of a dropped load to a given reference point on the ground.
<i>Round</i>	The capacity carried by an entire airtanker group, whether one or more aircraft.
<i>Salvo</i>	A technique whereby a specified number of doors in a compartmented tank are opened simultaneously to give a heavier, more concentrated drop pattern on the ground.
<i>Short</i>	An assessment that the effective portion of the drop landed before a designated point.
<i>Show Me</i>	A simulated bombing run flown to a target by the birddog to indicate the target and route to the airtanker. May also be called a “dummy run” or “demonstration run”.
<i>Span</i>	Refers to a distance equal to the wingspan if the airtanker being used.

<i>Split Stack</i>	A method of separating airtankers into two stacks. This may be required due to operating differences between aircraft, or due to insufficient vertical space to accommodate all aircraft in a single stack.
<i>Stack</i>	An established holding pattern over a fire or defined point for airtankers awaiting drop instructions in which aircraft are vertically separated at 500-foot intervals. The working birdog controls the stack movements. If the ATGS role has been activated, the ATGS team will assign stack entry altitudes for incoming aircraft.
<i>Stack Check</i>	A radio request which initiates a sequential report by all aircraft within an operational stack to report their tail number and current altitude. The lowest or 'working' airtanker will report first, followed by each aircraft in ascending vertical order, including any aircraft within five minutes of the fire who has been assigned a stack entry altitude. Any aircraft may request a stack check to eliminate confusion or to reacquire situational awareness.
<i>Start-Stop</i>	An instruction to an airtanker equipped with a constant flow tank to drop a line of retardant connecting two identified points on the ground at a given coverage level, without specifying the desired portion of the tank's capacity. (i.e.: "Start-Stop, Coverage Level 4").
<i>Stay</i>	An instruction issued to an airtanker to proceed to a designated location and await a new dispatch.
<i>Step Left/Right</i>	An instruction for a following airtanker in a line-astern formation to overlap their drop on the indicated (left or right) side of the previous drop.
<i>Sterile Cockpit</i>	Limiting communications and actions to those that are mission critical or those pertaining to flight safety during critical phases of that flight. Examples include but are not limited to all flight at or below 1000' AGL, during demonstration runs, airtankers are on base & final legs, moments of significant pilot workload or whenever airspace complexities dictate.
<i>String Drop</i>	A drop in a compartmented tank whereby single doors open in succession at a defined interval.
<i>Tag On</i>	Connecting the tail end of a retardant drop to a given point on the ground.
<i>Tail (of the drop)</i>	The aft end of the retardant drop on the ground.

<i>Target Altitude</i>	The indicated altitude in feet above sea level of the release point of the retardant over the target. Allows the airtanker pilot to fly a flight profile within the bombing circuit towards the desired release altitude. Target altitudes are generally 150'-200' above the height of the tree canopy.
<i>Variable Constant Flow</i>	A type of retardant tank design using an onboard computer to control a set of two longitudinally hinged doors which meter the flow of retardant to achieve a specified coverage level on the ground. The tank generally contains a single compartment. 'Variable' refers to the ability of the doors to fluctuate their aperture during the drop to account for varying head pressures in the tank. "Constant Flow" refers to that fluctuation producing a consistent coverage level on the ground.
<i>Working Birddog</i>	The operational or low-level birddog, sometimes referred to as the tactical birddog. The working birddog manages the airtanker stack above the fire.
<i>Yelp Siren</i>	A pulsing siren signaling to ground crews of an intended and/or imminent drop from an airtanker. All ground personnel must move clear of the drop zone, and AAOs must receive verbal or visual confirmation of personnel safety prior to clearing an airtanker for the run.

24.2. Aquatic Invasive Species (AIS) Prevention and Decontamination Procedures

Aquatic invasive plants and animals (i.e.: zebra mussels, fish infected with whirling disease) pose a risk to Alberta's natural ecosystem. Preventing exposure to AIS through best-management practices is the easiest and most effective manner of controlling their spread.

24.2.1. Imported Aircraft Decontamination Procedures

Whenever helitankers, helicopters with buckets, or skimmer airtankers enter Alberta, they must be thoroughly decontaminated and dried prior to being utilized in Albertan waterbodies. Decontamination of these aircraft is not required for quick strikes into neighboring jurisdictions unless directed by the Provincial Aircraft Coordinator. The Fire Centre Duty Officer, with guidance from the Provincial Aircraft Coordinator, will arrange for a steam truck to be on-site to meet skimmer aircraft arrival.

24.2.2. Preventing Whirling Disease Spread from Infected Areas

Whenever possible, avoid operating from known or high-risk whirling disease watercourses. If operating in the infected areas is unavoidable:

- Avoid dipping or scooping water from multiple water sources within the same operational period to minimize cross-contamination of water sources.
- If possible, do not transport water between drainages.
- Use deeper (blue) water whenever possible. Avoid shallow areas that are likely to disturb mud or plants.

If contamination of equipment by water or organic material is unavoidable, follow published aviation decontamination procedures.

24.2.3. Aviation Decontamination Procedures

- Chemicals such as bleach and quaternary ammonium compounds do not meet corrosion requirements for aluminum and shall not be used on aircraft fuselages or water delivery components such as helicopter buckets and foot valves
- Visually inspect aircraft surfaces (floats, tanks, intakes, water buckets, snorkels) daily, during maintenance, and after each water delivery mission
- Remove all visible plants and mud from external surfaces
- Decontaminate all exposed surfaces by power washing with hot water ($\geq 90^{\circ}\text{C}$) for 5-10 sec (up to 5 minutes is preferred) before moving to new water sources
- Allow all surfaces to thoroughly dry