CL-415 Amphibious Water Scooping Aircraft
User Guide

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Introduction

This guide is intended to familiarize Fire Managers, Dispatchers, Firefighters, and Aerial Supervisors with the operations and logistics associated with the CL-415 Amphibious Water Scooping Aircraft (AWSA). The CL-415 is a multi-engine turboprop aircraft. While its design is similar to its predecessor the CL-215, the performance, capability, and efficiency of the CL-415 is greatly improved. When positioned and utilized properly, water scooping aircraft can be a very efficient and cost effective firefighting tool. The USFS has a Call When Needed contract for 4 CL-415s. It is also possible for Canadian Provincial owned and operated aircraft to be utilized in the US on specific County and State agreements.

Water Scooper Summary

Water scoopers are most effective when they are ordered early as a direct attack suppression tool for Initial Attack. The aircraft can be dispatched to a location with an adequate water source and normally operate on a 4 hour fuel cycle. The aircraft may be ground loaded at the airport, but it is more efficient to depart empty, then load at the local water source. All US operated CL-415s have a two pilot crew with an Initial Attack carded Captain. Canadian cooperators may operate with an assigned Bird Dog aircraft that operates similar to an Aerial Supervision Module (ASM). Flight crews can work independently and directly with a ground contact. Aircraft are equipped with two FM radios for Air to Ground communications. Aerial supervision may be required depending upon incident complexity and Aerial Supervision Guidelines. An aircraft manager will be assigned to each aircraft group and will generally be co-located with the aircraft. Although the CL-415 is foam and retardant capable, the current contract stipulates that only water will be used.

Planning Considerations:

Water Sources
Water sources should be pre-identified to verify they are suitable for water scooper use. Local units may contact the AWSA manager or vendor Chief Pilot to discuss potential water sources. Length of the water source should generally be 1 to 2.5 nautical miles and at least six feet deep. Length needed is dependent upon wind direction and strength, terrain, altitude, and temperature. The time on the water is typically 15 to 20 seconds, (actual fill time is 11 seconds). Lakes with surrounding terrain may only be usable in one direction and dependent upon wind shifts. Water scoopers are capable of utilizing salt or fresh water.

The flight crews are experienced seaplane pilots and are trained to avoid man made and natural hazards. The aircraft is maneuverable while scooping, which enables pilots to use bends in rivers and maneuver to avoid floating hazards. Flight crews are familiar and experienced operating amongst watercraft, and are certified by the FAA to operate seaplanes in busy harbors and waterways. In almost all cases, water scooping aircraft can operate on waterways occupied by recreational watercraft. On rare occasions, the water source, or a section thereof, may need to be closed to recreation. The decision to close a site will be at the discretion of the water site authority. Recommendations from the flight crew, AWSA manager, local law enforcement, or fire managers may be factors influencing the decision. Timely communication with lake patrols or law enforcement will help minimize impact on recreation. Notification should be made when operations cease, to avoid unnecessary restrictions. Flight crews are capable of communicating with Law Enforcement, Lake Patrols, and the USCG as needed via FM air to ground frequencies. Assistance from local units obtaining frequencies for Law Enforcement and Lake Patrols is appreciated.

Aquatic Invasive Species
The vendor has a detailed mitigation plan that is designed to avoid the spread of aquatic invasive species (AIS). Water sources must be researched to determine the AIS status. Local units may provide specific information, and flight crews and the AWSA manager are able to research the USGS AIS database as well as state specific guides. The vendor has an AIS Coordinator that receives daily email notifications of newly discovered affected water sources. Visual inspections and removal and disposal of plant material are required for water sources affected by AIS vegetation. Hot washing is required for water sources affected by AIS invertebrates. Aircraft will not move from one water source to another unless the AIS status of water sources is known.

Airport Requirements
An Airtanker Base is not required to operate the CL-415. Proximity to existing fires and areas with high fire potential should be considered when determining base options. CL-415s require a minimum runway length of 3,500 feet with a taxiway and ramp capable of supporting 36,000 pounds. Required runway length will vary with density altitude and surface conditions. Airports must have Jet A fuel available with single point fueling preferred. A standby facility either at an FBO or a rental trailer is appreciated by the crews and AWSA manager. Aircraft dimensions: wingspan 94', length 68', height 30'.

Aircraft Capabilities
Maximum water load is 1621 US gallons. Maximum speed is 187 knots. Normal economic cruise speed is 170 knots and high speed cruise is 180 knots. Normal fuel cycles are 4 hours; reduced fuel cycles may be 2.5-3 hours to allow for high altitude operations or ground loading in rare instances. The maximum altitude for water scooping is 8,000 feet pressure altitude. As altitude and temperature increase, so does the distance required to scoop a load. When using shorter alpine lakes, crews may download fuel in order to maximize water load. There is no speed restriction for loaded operations, and no altitude limit for water dropping. The maximum altitude for airport operations is 10,000 feet pressure altitude and service ceiling is 20,000 feet. USFS contracted CL-415s are Infra Red equipped. Flight crews utilize IR for target and prior drop situational awareness, but can also relay IR information to the ground or aerial supervision.

Crew Configuration (per aircraft)
2 Pilots
2 Mechanics
An agency manager overseas the AWSA operation and coordinates with local units, dispatch, and the vendor.

Dispatch Procedures
The use of a Tactical Aircraft Resource Order (TARO) is preferred but not required. In ROSS the scoopers are ordered as an *Airtanker Type 3 (multi-engine) special needs: CL-415*. The Aircraft Dispatcher would normally contact the aircraft manager to launch the scooper, as they are often times not located at an airtanker base. The contract required launch time is 15 minutes from time the crew receives the order. The aircraft manager will coordinate with Dispatch for water source notification as necessary.

Tactical Considerations
The CL-415 has two tanks and four doors. Loads may be dropped salvo, trail, or split into separate drops depending on targets and fuel type. Salvo drops are approximately 300' x 70' and trail drops are approximately 400' x 40'. Drop height range is 100' to 150'. Ground personnel should be at least 200' clear of the fire line. Typical turnaround times for the CL-415 are: 1 mile -3 minutes, 3 miles - 4 minutes, 6 miles – 6 minutes, 10 miles - 9 minutes, 15 miles - 12 minutes.

Initial Attack:
Scoopers are best utilized for initial attack incidents. They are most commonly used for direct attack on the fire edge. The aircraft are most effective when worked in tandem and with ground resources, although dispatching and drops should not be delayed while waiting for ground resources to arrive.

Large Fire Support:
Scoopers may also be used to support large fires. Water drops can support retardant, dozer, and hand lines that are pressured by strong fire behavior. The aircraft are well suited to support burn operations either by prepping the green side of containment lines, or tackling spot fires.

Ground Resources
Flight crews are experienced at working closely with ground forces. With air to ground communication established, flight crews must identify proximity of the ground crew to the drop area. Flight and ground crews must ensure the line is clear before water drops are made. A dry run may be advised to ensure adequate crew clearance and target confirmation. A minimum of 200 feet of clearance from the drop zone is recommended for ground crews.

Aerial Supervision

Water scooper crews conform to the Fire Traffic Area communication protocol and procedures. Awareness of other aerial resources, ground crews, and location of helicopter operations and dip sites is very important. Aerial supervisors may have water scoopers work directly with a ground contact and communicate directly with helicopters on the rotor frequency as appropriate. Flight crews are also experienced with lead plane operations. It may be beneficial to receive a "show me" or lead on specific targets, or when identifying ground crew locations. It is possible for helicopters and water scoopers to use the same water source and work the same areas of the fire when communication and separation protocol is well defined. In complex fire situations, it may be necessary to have water scoopers and helicopters work separate flanks, divisions, or targets. Complex incidents may dictate the use of initial points, checkpoints, blind calls ("off the drop", "up with a load", etc.) and vertical and/or horizontal fences to create adequate separation.

See ***Appendix A*** for a more detailed reference on Aerial Supervision with water scoopers.

Appendix A

Aerial Supervision Scooper Use Notes

Bring scoopers into orbit and provide fire orientation and tactical assignment as appropriate.

- Exception; on large fires consider clearing scoopers in at rotor ceiling, from a direction that does not conflict with rotor routes or airtankers maneuvering, and do not mix with ASM / Lead operations if not desirable.
- Scoopers can go direct to their dip site and hold for further direction or at an IP in-bound from their scoop site.
- Scooper pilots are familiar with and can use ASM / Lead when appropriate. They can also work direct with ground resources.

Identify dip (scoop) location, route, and pattern. Take time to do a show me and / or fly them through it. Scoopers will then identify what elevation they would like to run their route. They can adjust altitude on the route to and from their water source as appropriate to avoid helicopters. A vertical fence can be used for the route and have scoopers only descend to drop altitudes when cleared or self de-conflicted with rotors if previously established.

Identify what blind calls or communications you want them to use. They can use the terms "downwind-base-final, up with a load, or off the drop" on air tactics, air to air, and/or rotor victor frequencies as desired. If not instructed they will make the calls as necessary, but try to keep communications concise.

Have the scoopers stay grouped together when traveling their route. This reduces the number of communications (air and ground), makes it easier to sequence, and the pilots can adjust off the drop ahead of them. Give immediate feedback on drops so subsequent scoopers can adjust. If working directly with ground crews, encourage them to call adjustments on sequential drops as well.

Scoopers can communicate directly with ground resources if desired. They have 2 FM radios and can monitor and communicate effectively on A/G, air tactics, air guard (122.92 for CALFIRE ops).

Observe drop height or get feedback from ground and relay to CL-415 Pilots. Low drops can break branches and cause a hazard to the ground crews.

Identify airtanker and rotor tactical assignments and keep all resources apprised of changes to the plan.

Identify separation controls: vertical and horizontal (fences), checkpoints, etc.

- Two horizontal fences can designate a no fly zone to keep rotors and scoopers separate.
- Establish hard checkpoints prior to the scooper route for crossing rotor traffic. Same concept for the scoopers if they need to cross the rotor's pattern. It is sometimes best to clear rotors across the scooper route after the scoopers come off the drop. The scoopers are easier for the rotor pilots to see and it also gives them enough time to clear the scooper pattern. If vertical limits allow separation with Aerial Supervision and Tankers, rotors may go above scooper route if scoopers are designated a hard ceiling when rotors are going for fuel or returning to base. Again, this concept can be used in the reverse if terrain and fire complexity dictate.

When working multiple rotors in sequence with or adjacent to scooper operations, consider appointing a lead rotor to assist in ensuring control measures are being met.

Though scoopers like to stay low level once their route is set, they will return to and work from the tanker orbit if necessary.

Either the aerial supervisor or the lead scooper can coordinate the sequencing when working with other aerial resources.

- Sequencing by the AA or Lead can occur from the tanker orbit or into the tanker pattern from a nearby scooper IP. Sequencing will be more efficient when the scoopers stay low-level at a nearby IP vs. bringing them up to orbit altitude then back down. This also prevents the need to stack tankers up in the orbit or at 12 miles.
- When working with rotors only, consider allowing the lead scooper to sequence themselves in on rotor VHF. This method was effective with up to three rotors working the same drop area as the scoopers.
- It helps both rotors and scoopers to sequence if the rotor dip site is center to the scooper route. In this example the pilots of all aircraft can see where each other are in their respective patterns. Establish a rotor fence for when the scooper is on final, or vice versa as necessary. By having the rotor dip and route in sight, the scoopers are able to adjust their downwind and final legs for sequencing to keep a smooth flow and prevent rotors from holding.

If you are not ready to work scoopers, don't hesitate to ask them to hold outside the FTA until you can work them in. If you don't feel comfortable, adjust your resource order.

- After their transitional briefing, relief aerial supervisors still need to confirm their understanding of de-confliction controls with rotor, scooper, and fixed-wing operations. When Helco or AA are working a transition briefing, establish a plan and communication protocol so rotors and scoopers can self de-conflict if aerial supervisors are not available. The same concept should be used when AA or Helco need to go work another portion of the fire.

- Situations may arise when it is not appropriate to work scoopers with rotors. Consider reassigning scoopers to a different area of the fire, or schedule scoopers to relieve rotors as they rotate out on fuel cycles. Scoopers may also work till 30 minutes past sunset, and return to their base in the dark.