BY ORDER OF THE SECRETARY OF THE AIR FORCE

AIR FORCE MANUAL 11-2C-130H VOLUME 3 ADDENDA B

30 JULY 2018

Flying Operations

C-130H MODULAR AIRBORNE FIRE FIGHTING SYSTEM (MAFFS) PROCEDURES

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statement. See AFI 33-360, *Publications and Forms Management*, **Table 1.1**, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the Publication OPR for non-tiered compliance items.

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Chapter 1

POLICY

1.1. Sound Judgment. These procedures provide guidance to plan and execute Modular Airborne Fire Fighting System (MAFFS) missions. Instructions in this AFMAN are mandatory and intended to provide the best possible operating procedures across a wide range of circumstances, but cannot account for every possible situation a crewmember may encounter during a MAFFS mission. Planners and aircrew must use sound judgment and operational risk management to manage unique mission demands.

1.2. General. MAFFS consists of a palletized pressurized tank system and dispensing nozzle loaded on C-130H aircraft modified by TCTO 1C-130-2058 and TCTO 1C-130-2059. When mobilized, MAFFS equipped aircraft are employed in support of the National Interagency Fire Center (NIFC) or a respective State agency responsible for firefighting (i.e. CalFIRE) to control forest/wildland fires.

1.2.1. The term "MAFFS" is used as a generic term which includes all operations relating to the deployment, employment and redeployment of the MAFFS system for the purposes of aerial delivery of liquid (retardant, water, or other approved liquid) from a suitably equipped C-130 aircraft in support of wildland fires.

1.2.2. Guidance for MAFFS missions includes but is not limited to: USFS MAFFS Operating Plan (FSI1 12-001), 18AF MAFFS Wildland Fire Fighting Plan, AFNORTH Standing OPORD, and this manual.

1.2.3. USNORTHCOM defines the US Fire Season as 1 May to 31 October annually. In Southern California (SoCal), the season extends to 30 November of each year.

1.3. Lead Command Oversight. Designated representative(s) from AMC will meet annually with at least one point of contact from each MAFFS Wing to conduct a review of MAFFS publications, training, tactics, techniques and procedures. **(T-2)**. HQ AMC designated C-130H/J Evaluators are authorized to fly on MAFFS training sorties on a non-interference basis to validate the MAFFS Certification Training program and ensure standardization across the MAFFS enterprise. **(T-2)**.

1.4. Deviations and Waivers. Do not deviate from policies in this AFMAN except when the situation demands immediate action to ensure safety. The Pilot in Command (PIC) is vested with ultimate mission authority and responsible for each course of action they choose to take.

1.4.1. Deviations. The PIC shall report deviations or exceptions taken without a waiver through command channels to their Chief, Major Command (MAJCOM) Stan/Eval. **(T-2)**.

1.4.2. Waivers. Unless otherwise directed, and IAW AFI 11-202V3, waiver authority for the content of this manual is MAJCOM/A3 with mission execution authority. For USTRANSCOM/AMC operational missions under Operational Control (OPCON) of 18 Air Force, 18 AF/CC is the waiver authority. For aircrews that Change Operational Control (CHOP) to a combatant command (CCMD), the COMAFFOR is the waiver authority.

1.4.2.1. Federal MAFFS missions in response to validated NIFC request for assistance (RFA) fall under USNORTHCOM and are executed through the 1st AETF (ACC) and the 1 AF/CC as the COMAFFOR is the commander/waiver authority.

1.4.2.2. Waivers for state missions are routed through the State JFHQ to NGB/A3.

1.5. Improvement Recommendations. Send comments and suggested improvements to this manual on an AF Form 847, *Recommendation for Change of Publication*, through channels to AMC/A3V, 402 Scott Drive Unit 3A1, Scott AFB IL, 62225-5302 or post to the Air Mobility Command Change of Publication sharepoint® site: **https://cs.eis.af.mil/aircrewpubs/AMC%20847%20Program/default.aspx**.

Chapter 2

COMMAND AND CONTROL

2.1. Air Expeditionary Group-Wildland Firefighting (AEG-WFF). CDRAFNORTH, in coordination with ACC, stands up the AEG-WFF and appropriate provisional EAS(P) under the 1 Air Expeditionary Task Force (AETF), to provide C2 for aviation units employed during WFF operations.

2.1.1. The designated AEG-WFF/CC coordinates all logistical issues on behalf of the remaining three units for deployment and employment using reachback to their home unit if required for logistics support.

2.2. Provisional Expeditionary Aerospace Squadron-Mission Commander.

2.2.1. An EAS-WFF (P)/MC is selected for all MAFFS activations and reports to the AEG-WFF/CC (Federal Activations) or to the appropriate OG/CC (State Activations). This Mission Commander is a MAFFS qualified rated officer no lower than the rank of Major/0-4.

2.2.2. The military unit responsible to provide the EAS (P)-WFF/MC is identified in the initial MAFFS activation message. The naming convention of each EAS should follow that of the MAFFS flying squadron responsible for providing the bulk of equipment and personnel to the deployed location, unless that name is already in use at another EAS location. **Example:** If the 731 AS has been tasked to stand up an EAS, the name would be 731 EAS. The AEG- WFF/CC has the final say on what name an EAS (P) will use.

2.2.3. The EAS(P)-WFF/MC is the primary point of contact between the military and the MAFFS Liaison Officer (MLO) and is the single point of contact for all military activities, equipment, and personnel (including air technicians assigned to MAFFS duties) at the deployed location. The MC maintains awareness of the national and regional fire situation and ensure MAFFS aircrew are informed of any changes that could adversely impact the mission, as soon as practical. Specifically, the MC should be aware of the status and location of local / regional incidents, weather systems, NOTAMS, TFRs, etc. at all times.

2.2.4. The AEG-WFF/CC (OG/CC for state activations) has final authority on all issues involving the military.

2.2.5. The MAFFS Liaison Officer (MLO) (federal or state) is single point of contact for all other (non-military) agencies.

2.2.6. The EAS(P)/MC should not act as a primary crew member on MAFFS airdrop missions. This does not preclude the EAS (P)-WFF/MC from accomplishing annual refresher training.

2.2.7. The EAS(P)/MC or AEG-WFF/CC will not be assigned to a MAFFS hard crew, but may be utilized during periods of reduced manning or to substitute crewmembers for short durations. **(T-2)**. An acting mission commander is declared any time the primary EAS(P)-WFF/MC is not available for duty (such as flying), and the MLO and AEG-WFF/CC is notified. Reference **paragraph 4.2** for EAS (P)/MC or AEG-WFF personnel crew rest requirements.

2.3. International Support.

2.3.1. Every effort is made to conduct International Support with a Leadplane pilot and Lead Aircraft. MAFFS deployment outside of NORTHCOM AOR remains under OPCON of 18 AF or as written in the DEPORD. The typical standing DSCA order does not apply outside of CONUS. Detailed planning with the host nation, MAFFS wings, AEG-WFF/CC, NIFC and other stakeholders is facilitated by 18 AF and appropriate orders issued prior to movement.

2.3.2. International assignments may be accepted after a risk assessment has been completed and made available for review by the Assistant Director of Operations, Fire and Aviation Manager. Ideally, personnel requested deploy with the aircraft tasked to support the International Assignment. The MLO, MAFFS Air Base Manager (MABM), MAFFS Leadplane Pilot (one per MAFFS aircraft), and EAS (P)-WFF/MC positions are filled for international MAFFS assignments. At least one Field Support Representative (FSR) is requested. A minimum of two FSR's is recommended. Requesting US Embassy provides a representative and interpreter, if necessary, to assist the MLO and EAS (P)-WFF/MC.

2.3.3. When unable to fly the lead plane aircraft to the international location, international MAFFS missions utilize a qualified MAFFS Leadplane pilot on board the MAFFS aircraft to assist the Aircraft Commander with firefighting analysis and requirements. Leadplane pilots are authorized MEP status during both training and employment missions.

2.3.4. Employment missions outside the NORTHCOM AOR require a MAFFS Instructor Pilot as the aircraft commander.

2.4. Flight Authorizations. Wings generate FAs for each crew they deploy in support of MAFFS. Intent is for deploying crews to operate as a contiguous crew utilizing the same FA.

2.5. Aircraft Maintenance. MAFFS aircraft generally return to beddown base (hub) each night to enhance aircraft maintenance. To facilitate safe and efficient operations, the MC may authorize MAFFS aircrew to RON away from hub for consecutive days with concurrence of the AEG/CC and MLO. The MLO may request approval from the AEG/CC for the MAFFS aircrew to RON away from hub for consecutive days.

Chapter 3

DEPLOYMENT/REDEPLOYMENT

3.1. Deployment. The USFS term for "deployment" is "mobilization". Deploy one MAFFS qualified crew per tasked MAFFS aircraft. If anticipated operational tempo dictates, additional crewmembers may be deployed at the direction of the AEG-WFF/CC with the concurrence of the MAFFS Liaison Officer (MLO). This additional crewmember must be added to the appropriate TPFDD with info e-mails sent to AFNORTH/A3X and AMC/A3O if not identified in the original employment message. Deploy USFS required support equipment using the most rapid means commensurate within the timeline specified by the requesting organization. Airlift Wings deploying in support of MAFFS should source airlift organically. Due to cost, when able limit support aircraft to one C-130 when deploying /redeploying one or two MAFFS aircraft. Support from one of the other MAFFS Airlift Wings may also be used. MAFFS ground compressors (if required) should be transported by airlift or suitably cushioned ground transportation to reduce potential damage. MLO support equipment, MAFFS unit maintenance equipment and MAFFS mechanics (as permitted by AFI 11-401, *Aviation Management*) may also be transported via airlift. Airlift requests are made through the AEG-WFF/CC to source appropriately (ANG, AFRC, 618th AOC (TACC)) if MAFFS wing organic airlift is unavailable.

3.1.1. System Functional Check.

3.1.1.1. For the first use of the season, MAFFS is functionally checked on the ground with a 2000 gallon water minimum discharge. This check should occur in three parts to test drop control pendants and emergency dump functionality.

3.1.1.1.1. First with the copilot pendant and a quantity at 1/6 tank volume and a coverage level setting at 4.

3.1.1.1.2. Second with the Loadmaster pendant and a quantity at 1/6 tank volume and a coverage level setting at 4.

3.1.1.1.3. While the drop is initiated from step B, execute an E-DUMP from the Loadmaster switch and allow the system to complete the E-DUMP command.

3.1.2. Succeeding installations should at a minimum be ops checked by cycling the Pintle without water and air charge. This check should occur at home station prior to departure. If installation and test at home station is not practical, unless specifically authorized by the AEG-WFF/CC, in coordination with the USFS, the outgoing MAFFS aircraft will remain in place until installation and test of the MAFFS system has been accomplished on the incoming aircraft. **(T-3)**.

3.1.3. If operations are anticipated to be conducted for more than two weeks, request deployment of one MAFFS trailer per employment location. MAFFS trailers are not equipped or approved for towing over civilian roads or highways. The MAFFS trailer may be transported by C-130 or via commercial flatbed semi-trailer. The EAS (P)/MC coordinates with the MLO for the desired transportation method.

3.1.4. MAFFS units and some equipment used in support of the MAFFS mission are owned and maintained by the USFS. Deployment of the MAFFS units also includes deployment of the associated ground support equipment required to execute firefighting operations.

3.1.5. MAFFS Tool Accountability and Positioning. MAFFS tool boxes use the Consolidated Tool Kit (CTK) program IAW AFI 21-101 AMC Sup, *Aircraft and Equipment Maintenance Management*, Ch. 10 Tools and Equipment Management.

3.1.5.1. MAFFS tool boxes accompany each MAFFS unit to MAFFS deployed locations. Each tool box is either attached to, or accompanies, the Pintle cart, and is downloaded and placed in a secured location at the deployed location.

3.1.5.2. MAFFS Tool Box POCs have all MAFFS tool box torque wrenches calibrated within the PMEL (Precision Measurement Equipment Laboratory) program. Recommend using War Readiness Material (WRM) account.

3.1.6. MAFFS iPAD®/ EFB Guidance. (Ref: AMC EFB CONEMP, AMC Configuration Baseline)

3.1.6.1. Authority To Operate (ATO). AFNORTH MAFFS iPads® have been approved for continued operation under the USAF EFB ATO. The approval provides the required legal certification to operate the devices IAW current guidance; however, it also comes with additional oversight and restriction. Specifically, the cellular (3G/4G) capability may not be used in flight. Instead, only a WPA2 encryption Wi-Fi ground access point or Stratus 2 ADS-B Wi-Fi feed may be used to access the data for presentation via the ForeFlight® Application installed on the devices.

3.1.6.2. AMC EFB devices. May also be used, in conjunction with Stratus 2 ADS-B and the ForeFlight® application, by certified MAFFS aircrews during MAFFS missions. The current EFB Configuration Baseline document requires devices be provisioned for Mobile Device Management (MDM) for use in conjunction with the ForeFlight® Application. Devices not provisioned for MDM may be used with the following limitations - WPA2 encryption Wi-Fi access on the ground may be extended, only as required to allow update of the flight information provided by the ForeFlight® application. The EFB device may also be operated with no time limits onboard the aircraft in conjunction with the Stratus 2 ADS-B Device in Airplane Mode with Wi-Fi enabled.

3.1.6.3. Information Access. Either the MAFFS iPad® or AMC EFB may be used to display Weather, Temporary Flight Restriction (TFR), Notices to Airmen (NOTAMS), ground station meteorological (METAR) and Terminal Area Forecast (TAF) information ISO operational and training MAFFS missions. Data may be accessed on the ground via WPA2 encryption Wi-Fi access point or inflight (anytime onboard the aircraft) via approved Stratus 2 ADS-B devices. Other Stratus 2 and ForeFlight® functions, including navigation and artificial horizon features, are not authorized. This system is intended to serve as an enhanced situational awareness tool for MAFFS aircrews.

3.1.6.4. Hardware Control. Unit MAFFS POCs develop procedures to closely control access to the devices.

3.1.6.5. System configuration. MAFFS POCs ensure a standardized system configuration is maintained. Recommend using AMC EFB Configuration Baseline update guidance for reference.

3.1.6.6. Content management. During annual standardization event, MAFFS POCs create a standardized set of applications, to be provided on all MAFFS iPad® or EFB devices. The list is reviewed at least annually and changes are made during the preseason prior to the annual MAFFS Certification Training events. POCs maintain iPad®/Stratus 2/ForeFlight® devices as aircraft equipment assigned to the MAFFS program. Wings are responsible for physical security of devices, physical maintenance and repair of iPads®/Stratus 2 devices. Training on MAFFS-specific iPad® configuration and operational employment is provided during annual certification training. Responsibility for Cellular Data Connectivity Plans rests with each Wing.

3.1.6.7. Other Limitations. Authorized for use in flight in accordance with the AMC EFB CONEMP. Use of aircraft power for operation and/or charging of Stratus 2 receivers is not authorized. MAFFS iPads® will not be connected to NIPRNet, AFNET or any other government network without express permission of AFNORTH / A6. **(T-2)**. MAFFS iPads® contain and communicate UNCLASSIFIED information only.

3.2. Redeployment. The USFS term for "redeployment" is "demobilization." MLO support equipment and MAFFS unit maintenance equipment should be kept together to facilitate rapid follow-on deployment. Most support equipment may be transported over land when more cost effective or efficient.

Chapter 4

PRE-FLIGHT PROCEDURES

4.1. Crew complement. Normal crew ratio for MAFFS Airlift Wings is 5.0 crews per MAFFS unit. Two loadmasters are required per crew. Crew complement per wing assumes a normal fire season and two MAFFS units per wing.

4.1.1. All crewmembers will be fully certified in MAFFS operations prior to performing operational MAFFS airdrops. **(T-2)**.

4.1.2. A certified MAFFS Aircraft Commander will occupy the left pilot seat for operational MAFFS airdrops. **(T-2)**.

4.1.3. Crewmembers non-current for MAFFS will regain currency in accordance with AFMAN 11-2C-130HV1, *C-130H Aircrew Training*. **(T-2)**.

4.1.4. Due to the hazardous nature of the mission, personnel other than assigned USAF aircrew members specifically required to accomplish the MAFFS mission, or receive/conduct required MAFFS training, will not fly on MAFFS employment aircraft. **(T-2)**. **Exception**: USAF Combat Camera staff and other Mission Essential Personnel (MEPs) may fly on missions when accompanied by an MEP approval letter signed by the AEG-WFF/CC. The EAS (P)/MC will advise the MLO when approved personnel other than assigned aircrews are on board. **(T-3)**.

4.1.4.1. Aircraft needing in-flight maintenance evaluation or live drops for system troubleshooting will not be flown over an actual fire. **(T-2)**.

4.1.4.2. Familiarization flights of U.S. Government employees (i.e., Lead plane pilots) on MAFFS aircraft during yearly certification training is approved providing the host wing conducts the requisite oversight and documentation IAW AFI 11-401.

4.1.4.3. DV flights are accomplished in accordance with IAW AFI 11-401, *Aviation Management*.

4.1.4.3.1. Federal mission (Training or Operation) approval authority resides with AEG/CC.

4.1.4.3.2. State mission (Training or Operational) approval request made through state JFHQ (IAW 11-401_ANG SUP 1).

4.1.4.3.3. OCONUS approval request are in accordance with IAW AFI 11-401, *Aviation Management*.

4.2. Crew Duty and Crew Rest Limitations. Maximum flight duty period (FDP) for MAFFS missions is 16 hours. MAFFS airdrop is a tactical event. Complete all MAFFS drops during the first 12 hours of the FDP. The AEG-WFF/CC may extend the 12 hour drop limit a maximum of 2 hours with concurrence of the Aircraft Commander.

4.2.1. MAFFS airdrops will not be planned to occur beyond 8 cumulative flight hours in any single day. **(T-2)**. Aircraft will not be launched if it is determined the airdrop portion would occur after the 8th cumulative flight hour. **(T-2)**. This does not apply to the return portion of flights after all airdrops have been completed. Due to the possibility of unplanned in-flight

delays, any sortie that is launched legally may complete the mission as long as daylight restrictions are met.

4.2.2. MAFFS duty includes flight time, ground duty of any kind, and standby or alert status at any location. Deployment/redeployment is not considered MAFFS duty and is not be included in consecutive day totals in **paragraph 4.2.3** below unless tasked for airdrops on the same day as arrival to or departure from the deployed location. In all cases, a crew's flight duty period begins upon earliest show time at home station.

4.2.3. Consecutive Duty Day Limitations. During any 14 consecutive days, crewmembers will be off duty for 2 full calendar days. **(T-2)**. Days off need not be consecutive. This limitation does not include AEG-WFF duties, but does include EAS (P)-WFF/MC duties. For example: A crewmember performs 7 days of MC duties then rolls in to a crew. That person requires 2 days off in 14 days inclusive of their MC duties. **(T-2)**.

4.2.4. Once the morning briefing is complete, EAS-WFF/MC's may release crews to hotel standby at any time during the day with the concurrence of the MLO. Hotel standby is considered part of the Flight Duty Period.

4.2.5. Safety is not to be compromised at any time. The Aircraft Commander may terminate flying activities whenever crew fatigue or any other factor such as heat or visibility (shadows, smoke, thunderstorms etc.) is deemed unsafe to continue.

4.3. Hours of Operations. MAFFS is dispatched to conduct operations over a fire not earlier than 30 minutes before official sunrise and not later than 30 minutes after official sunset. MAFFS airdrops will only be conducted during daylight hours. **(T-2)**. This does not apply to emergency jettison of retardant, which can be accomplished at any time. Take-offs and recoveries may be accomplished outside of daylight hours. All airtanker bases have official Sunrise/Sunset tables for their local areas.

4.4. Interfly Agreement. For federal activations, aircrew interfly between Wings with similar model aircraft is authorized. Additional approval required by AFMAN 11-2C-130HV3, *C-130 Operations Procedures*, and AFI 11-401, *Aviation Management*, is not required. State activations follow normal approval levels. All existing aircraft qualifications and MAFFS training and currency requirements apply. EAS (P)-WFF/MC will coordinate with the AEG-WFF and home units to verify individual Go/No-Go criteria is met. **(T-2)**. Flight authorizations shall accurately reflect each crew composition at all times. **(T-2)**. Any flight authorization write-in changes are coordinated with the AEG-WFF and EAS C2 personnel before any mission can depart. **(T-3)**.

4.5. Communications. USFS MAFFS FM radios are installed in MAFFS aircraft.

4.5.1. FM radio operating manuals are available from the MLO.

4.5.2. If the USFS MAFFS FM radio is inoperative, mission execution may continue, when authorized by the MLO, if a suitable alternate method of communications and flight following is employed.

4.6. Flight Planning.

4.6.1. The Aircraft Commander is responsible for all normal flight planning IAW AFMAN 11-2C-130HV3. When available the EAS (P)/MC provides additional support as coordinated with the deployed aircrew

4.6.2. For employment missions flown strictly under VFR, flights following procedures listed in **paragraph 6.3** satisfy AFI 11-202V3 flight plan filing and search and rescue procedures.

4.7. Aviation Operational Risk Management (ORM). ORM does not replace sound judgment nor replace "safety of flight" decisions by the aircraft commander or leadership. In situations where accomplishing the provisions of this Addenda B ORM guidance is impractical, final mission acceptance authority remains with the aircraft commander. In unique situations, process (not worksheet) variations are authorized as long as the intent of this manual is followed.

4.7.1. MAFFS ORM Worksheet. The MAFFS ORM Worksheet is the standardized MAFFS ORM tool for risk evaluation, identification, scoring, and acceptance. The office responsible for the current MAFFS ORM Worksheet is AMC/SEF. The most current version of the worksheet and fatigue scoring card can be found on the AMC/SE website link: **https://www.my.af.mil/gcss-af/USAF/ep/globalTab.do?channelPageId=s6925EC134B5F0FB5E044080020E329A9** under the AMC Aviation ORM tab at the Local Unit ORM Worksheets sub tab. MAFFS units may desire periodic adjustments to the worksheet and may submit requested changes to NGB/SEF, AFRC/SEF and AMC/SEF ORM for review, coordination, and posting.

4.7.2. Risk Assessment. Aircraft Commanders will accomplish and document Operational Risk Management (ORM) calculations for their mission prior to the first flight every day using the latest version of the MAFFS ORM Worksheet. **(T-2).** Due to the dynamic nature of MAFFS operations, it is not possible to always predict the location of fires, nor the location to which the aircraft are directed. For clarity, the Weather and Mission sections of the Worksheet refer to risks at the airport of departure and planned recovery. Use best judgment in assessing risk for enroute and airdrop portions of sortie(s). Prior to the start of each crew duty day every crew member uses the Health, Stress, and Fatigue scorecard on page 2 of the MAFFS ORM Worksheet to self-evaluate their current health/stress and fatigue risk level. The aircraft commander tallies the results, select the highest health/stress and fatigue score, and enter this value as the crew's "Human Factor" score.

4.7.2.1. The aircraft commander must sign and date the signature block of the Worksheet for each crew duty day. Any time the mission risk level is above LOW, enter the approval authority's last name (or initials), rank, office symbol and date of approval in the appropriate signature block at the bottom of the worksheet. All signatures and associated coordination must be accomplished before engine start. Document the ORM score in the appropriate block of the MAFFS Drop Log.

4.7.2.2. During mission execution, the MAFFS ORM Worksheet does not need to be re-accomplished for subsequent sorties during the FDP. However it is imperative aircraft commanders and the crew assess the mission complexity, environmental factors impacting aircraft and human performance, and aircraft systems limitations to determine if mission risk is elevated. If factors elevate the ORM score above the previously approval level, the aircraft commander will use any means possible to communicate with the appropriate authority for approval to continue prior to engine start. **(T-2)**. If unable to contact the AES or AEG leadership, the aircraft commander must carefully consider and evaluate the risks associated to the crew, aircraft, the current environment and other factors affecting the mission before continuing.

4.8. MAFFS Loading/Cargo Restrictions. The MAFFS unit are loaded, installed and unloaded under the supervision of a MAFFS qualified loadmaster IAW TO 1C-130A-9. The following restrictions apply:

4.8.1. At least two (recommend four) Emergency Landing Gear Restraint straps are carried on aircraft loaded with the MAFFS unit.

4.8.2. Maximum cargo weight on the ramp is limited to 1,500 pounds when the MAFFS unit is installed and loaded with any amount of liquid.

4.8.3. MEP's are permitted on MAFFS aircraft during deployment, positioning, and re-deployment legs only. Personnel are not permitted between Flight Station 245 and the forward edge of the MAFFS unit during takeoff and landing.

4.8.4. Due to limited availability of seating for the loadmaster, loadmasters can use a MAFFS seat, red troop seat or be seated up front on the flight deck for takeoff and landing. Instructor Loadmasters are required to be seated during takeoff and landing but can be standing during all other phases of flight. Loadmasters will not be in the paratroop door seat for takeoff and landing. **(T-2)**.

4.9. MAFFS Tanker Basing. MAFFS aircraft reload/service retardant and/or compressed air at air tanker reloading bases/facilities approved IAW the MAFFS Operating Plan.

4.9.1. At the request of the USFS, additional bases/facilities may be approved by the AEG-WFF/CC when surveyed and approved by a trained and qualified MAFFS Instructor Pilot or as directed by the AEG-WFF/CC.

4.9.2. MAFFS retardant reload bases and facilities are surveyed using an approved MAFFS Airfield Evaluation Checklist to ensure sufficient operational aerial firefighting support capabilities. The survey products are uploaded to the Supplemental Theater Information File (STIF) section of the AMC Airfield Suitability and Restrictions Report.

4.9.3. The AEG-WFF/CC ensures a MAFFS Site Survey has been conducted and the airfield is suitable for planned MAFFS operations before approval of any tanker base for MAFFS reload operations.

4.9.4. Waivers for weight bearing capacity or reduced crash fire rescue support will be processed through appropriate MAJCOM Airfield Operations and/or Stan/Eval office for decision by authority previously indicated under Deviations and Waivers. **(T-2)**.

4.9.5. Aircraft Rescue and Fire Fighting (ARFF) requirements. Operational MAFFS missions are authorized to reload at airfields having ARFF vehicles with at least a 1500 gallon capacity and at least 3 fire fighters. This capability represents the amount of agent needed to execute rapid intervention at one location of the aircraft that is involved in a small fire. At this level, rescue is not expected from inside the aircraft. This level of service represents increased risk/loss potential due to the lack of sufficient agent to maintain control of exterior or interior fire long enough to conduct interior rescue operations. The main MAFFS bed down base(s), to include training missions, are in accordance with AMCI 11-208, *Airlift Tanker Operations*, requirements.

4.9.5.1. For federal or state missions (in NORTHCOM AOR), ARFF waivers will be processed through AMC/A3A for approval by AMC/A3. **(T-2)**.

4.9.5.2. For OCONUS missions, ARFF waivers processed through COCOM.

4.9.6. MAFFS Tanker Bases are categorized as follows:

4.9.6.1. **R = Reload** – approved for loading retardant using existing pits. Verify personnel in place.

4.9.6.2. **H = Hub** – approved for loading using existing pits. May also be used for overnight and staging of maintenance. Most advantageous for activations.

4.9.6.3. **F = Full Activation** – approved for loading using existing or portable pits provided by the region. May also be used for overnight and staging of maintenance and support. Additionally, this location may be used to set up larger operating facilities.

4.9.7. AEG-WFF/CC conducts an annual MAFFS tanker base suitability review of airfields intended for use during the fire season. The review, as a minimum, verifies ARFF capabilities and weight bearing capacity. Results are published in the MAFFS Operating Plan.

Chapter 5

GROUND OPERATIONS

5.1. Servicing Pit Procedures. Servicing pit assignments, engine start, takeoff sequencing, marshalling and parking instructions are directed by the Air Tanker Base. Consideration should be given to shut down the outboard engines when ramp congestion is a factor.

5.1.1. If conditions permit, do not start outboard engines until reaching an uncongested area clear of the pit servicing area. If the outboard engines were not started before taxiing out of the pit servicing area, ensure "Starting Engines" and "Before Taxi" checklists are reviewed and fully accomplished before proceeding with the "Before Takeoff" checklist. The aircraft commander briefs taxi clearance and engine stop start duties in the crew brief. After the outboard engines are started, the flight engineer's "Taxi Checks - complete" call indicates the Starting Engines, Before Taxi, and Taxi checks have been completed for all engines.

5.1.2. To enhance the safety and efficiency of pit operations, the loadmaster monitors engine starts from the inside of the aircraft and maintain contact with the pilots on interphone. A USFS pit supervisor positions off the nose of the aircraft for engine start and maintain visual contact and radio contact with pilots on VHF Ramp frequency. The loadmaster takes a position on the inside of the aircraft and able to monitor engines. The loadmaster calls "Stop Start" as required for an abnormal start. At any time, the aircrew feels the Pit Supervisor is not effectively monitoring engine start per T.O. guidance and/or failing to comply with hand signals outside of AFI 11-218, *Aircraft Operations and Movement on the Ground*, guidance, the Aircraft Commander de-planes a Loadmaster to the front of the aircraft to monitor the engine start.

5.1.3. Pit Operations/Tanker Base operations are IAW the Standardized MAFFS Tanker Base Concept of Operations (**Attachment 3**). At USFS air tanker bases, pit operations are supervised by USFS personnel. Where US military maintenance is available, they coordinate with local USFS ramp personnel to ensure AFI11-218 standards for aircraft ground operations are maintained. At MAFFS Wings, pit operations are supervised by US military maintenance. USFS personnel may perform primary pit operations during annual training at MAFFS wings, under supervision of US Mil Mx.

5.1.4. A specific individual is designated as the servicing pit supervisor for each operating pit. The pit supervisor is easily identifiable by wearing high visibility vest. Duties include the following:

5.1.4.1. Marshall aircraft into the pit.

5.1.4.2. Stationed in front of the aircraft, act as a safety observer/refueling supervisor.

5.1.4.3. Communicate with aircrew via intercom cord plugged into an external intercom jack, hand signals, or radio on tanker base frequency.

5.1.5. Aircraft are chocked while being serviced in the pit. A set of aircraft chocks are available in each pit.

5.1.6. Fuel servicing is under the direction of the servicing supervisor. If authorized per the MAFFS Operating Plan, concurrent servicing is in accordance with T.O. 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*.

5.1.7. Aircraft fuel or retardant servicing with engines running is not authorized. **CAUTION:** Consult T.O. 1C-130(K)H-1, *Flight Manual C-130H*, Section 5 (OPERATING LIMITATIONS) for minimum fuel quantities, weight, maneuver load factor and airspeed limitations. Ensure maneuver load factors are not exceeded. Pit personnel do not approach the aircraft until the propellers have stopped turning.

5.1.8. Use of external power should be coordinated with the ramp manager due to congestion and other aircraft's use of the pits. External power should be used when extended pit operations are anticipated, such as during initial load, when directed to "return and hold", or when aircraft or MAFFS unit maintenance is required or when requested by the Aircraft Commander.

5.1.9. Whenever possible after each MAFFS sortie, retardant buildup is washed free from the empennage using high pressure water. The aircraft empennage is thoroughly washed after the last sortie of the day.

5.1.10. Nozzle Assembly Armed indicator. This safety feature is required for MAFFS certification by the USFS. Personnel do not travel aft of the nozzle when the armed light is on. The armed indicator light on the MAFFS nozzle provides a visual warning to personnel that are outside the aircraft.

5.1.11. Wet firing/flushing the system/emergency drops while on the ground/in the pits. Prior to accomplishing any wet fire/ground flushing, coordination takes place with the Tanker Base Manager, Ramp Supervisor, and Military Maintenance. **CAUTION:** MAFFS cabin controls are not to be manipulated until an area approximately 150 ft. behind the flushing aircraft is cleared of all personnel and loose objects. Another airtanker may be behind the aircraft in normal pit position but it cannot have any AGE near it, connected, or operating.

Chapter 6

FLIGHT OPERATIONS

6.1. MAFFS Aircraft Performance. MAFFS airdrops are frequently performed at high density altitudes, high temperatures and at heavy gross weights. If normal VFR or IFR climb requirements cannot be met with retardant/water on, all takeoff, climb out and departure data is computed using, as a minimum, maximum continuous power setting of 1010° C TIT. Maximum power may be required. **WARNING:** Aircraft climb performance is significantly reduced due to the high-drag configuration (nozzle drag and 100% flap airdrop configuration). Under certain density altitude conditions, three-engine climb capability may not be available.

6.1.1. Regardless of phase of flight, it is crucial to dump the retardant load either by normal or emergency drop methods anytime aircraft performance is in question. Should maximum climb performance be required, simultaneously jettison retardant, apply maximum power, and decrease drag by setting flaps to 50% or less as soon as possible.

6.1.2. Aircraft Drag Index. The external MAFFS nozzle assembly increases aircraft drag over all flight regimes. For the C-130H (Baseline), as defined in T.O. 1C-130H-1-1, MAFFS equipped aircraft add +20 for the additional drag from the nozzle.

6.1.3. VFR Departures and Engine-Out departure planning. All-engine minimum climb gradient capability ensures obstacle avoidance along the planned departure route. Engine-out climb gradient capability ensures that in the event of engine failure, the planned departure or emergency return route provides obstacle avoidance. Even when obstacles are not a factor, MAFFS equipped aircraft, loaded with retardant or water, must be capable of climbing at a rate of at least 200 feet-per-minute (fpm) on three engines at obstacle clearance speed. Crews use the "TAKE-OFF GROSS WEIGHT LIMITED BY THREE ENGINE CLIMB PERFORMANCE" chart from T.O. 1C-130H-1-1 to calculate the projected climb rate. This climb rate is in lieu of the required climb gradient of 152 feet-per-nautical mile. However, minimum VFR climb gradient following an emergency drop is 152 feet-per-nautical mile. The following restrictions will be met: **(T-2)**.

6.1.3.1. MAFFS equipment is configured for emergency dump during takeoff.

6.1.3.2. A fully operational MAFFS hydraulic system (accumulators charged to 2500 PSI minimum) is required prior to takeoff with liquid onboard.

6.1.3.2.1. A ferry flight is permitted with liquid on board for flight to MAFFS Maintenance Base with <2500 PSI MAFFS hydraulic pressure with normal climb gradient and WFF-AEG/CC concurrence. **(T-3)**.

6.1.3.3. Aircrew accomplish detailed engine-out departure planning to avoid high terrain and built-up areas to the maximum extent possible.

6.1.4. IFR Departures and Engine-Out departure planning. If an IFR departure is required, aircrew comply with normal IFR departure procedures.

6.1.5. Takeoffs and landings may be conducted in IMC.

6.2. MAFFS Limitations:

6.2.1. MAFFS airdrops are flown under the supervision of a MAFFS qualified Leadplane or Aerial Supervision Module (ASM).

6.2.2. Cabin pressurization is limited to 10 in Hg (5 psid) or less with the MAFFS door plug installed.

6.2.3. Until bonding measures are accomplished, the MAFFS nozzle assembly creates a risk of electrical transfer without dissipation into the aircraft as well as an increased risk of lightning strikes. Avoid thunderstorms by at least 25 nm when any portion of the MAFFS unit extends outside the aircraft.

6.2.4. Operation of galley equipment during MAFFS compressor operations may exceed maximum generator loads.

6.2.5. Operation of the MAFFS compressors in icing conditions may exceed maximum generator loads. If icing conditions are anticipated, ensure Compressor Enable switch is in the OFF position.

6.2.6. Weather Avoidance. ALCMC/WLN (SPO) approved MAFFS bonding procedures have been incorporated into TO 1C-130H-2-90JG-10-1 MX job guide and therefore, standard AFMAN 11-2C- 130HV3 thunderstorm avoidance criteria apply to aircraft; however, aircrew will confirm bonding has been accomplished prior to mission execution and avoid thunderstorms by 25nm when the system is found to be not in compliance. **(T-2).**

6.3. Flight Following.

6.3.1. The goal of flight following is to have contact with all fire-fighting aircraft at least once every 15 minutes by either Dispatch, Air Traffic Control, Lead Plane, or Air Tactical Group Supervisor (Air-Tac).

6.3.2. Automated Flight Following. 1 AF (AFNORTH)/A3O provide "Friendly Force Tracker" equipment for automated flight following (AFF) of all MAFFS configured aircraft. Trackers should remain on from departing until returning to home station. Batteries must be changed daily after use to ensure proper operation and signal reception.

6.3.3. Advise the departure tanker base of "rolling" (AFTO 781 takeoff time). After takeoff, contact dispatch and report location, destination fire or base, ETA, souls on board, and fuel in hours. If positive AFF, further calls are not required until departing the fire for return to base. If negative AFF, repeat with previous data every 15 minutes until in contact with Lead or Air-Tac. Terminate flight following upon return to base when in contact with tower or upon landing. Call "Stopped" (AFTO 781 land time) to the ATB radio operator. ATB personnel relay times to AEG-WFF for GDSS input.

6.3.4. All MAFFS aircraft enter transponder code of 1255 enroute to, within, and from the Fire Traffic Area (FTA) unless Air Traffic Control (ATC) assigns a different code.

6.3.5. Due to the fluid nature of WFF operations, MAFFS aircrew should be prepared to respond to short notice re-tasking requests through the dispatch system. Re-tasking requests may require operations at a new fire and/or air tanker base. Aircrew perform a thorough risk assessment prior to accepting any re-tasking.

6.3.5.1. If re-tasked within the same fire complex, the aircrew may proceed without further coordination, as long as ORM remains within aircraft commander line of authority.

6.3.5.2. If re-tasked to a new fire complex and/or ATB within assigned GACC; mission may continue with concurrence of Mission Commander. Dispatch coordinates.

6.3.5.3. If re-tasking is to fire complex and/or ATB outside of assigned GACC, AEG/CC concurrence is required. Dispatch coordinates.

6.4. Fire Traffic Area. Attachment 4 and the glossary defines the Fire Traffic Area (FTA). The FTA utilizes a 5 nm radius from the incident latitude and longitude for initial attack incidents but may grow as the fire grows. Good practice is to consider the FTA boundary being at least 5 nm from the perimeter of the fire.

6.4.1. The FTA can flex vertically depending on operational requirements of participating incident aircraft or by the requirements of the incident itself.

6.4.2. Radio communication for clearance to enter the FTA should be initiated at 12 NM from the incident latitude and longitude.

6.4.2.1. The maximum airspeed in the FTA is 150 KIAS. This does not preclude momentary speeds in excess of 150 for rejoin and formation maneuvering requirements.

6.4.3. Do not penetrate 7 NM from the coordinates or approximate perimeter of the fire, whichever is greater, unless permission is granted by controlling aircraft. If radio contact is not established prior to 7 NM, hold no closer than 7 NM from the fire (normally left turns) until contact is made and permission is granted to enter the FTA.

6.5. Lead plane procedures.

6.5.1. The Air Tactical Group Supervisor (ATGS) (commonly referred to as Air-Tac, see glossary) normally makes right hand orbits over the fire. Air-Tac (if on-scene) or the Lead Plane establishes air traffic control over the fire using the following criteria.

6.5.1.1. Air-Tac (if on scene) should be at an altitude above air tankers.

6.5.1.2. The Leadplane Pilot or Aerial Supervision Module (ASM) (see glossary) should remain at or below the air tanker orbit.

6.5.2. The Lead Plane or ASM duties:

6.5.2.1. Establish the orbit altitude and location.

6.5.2.2. The orbit point should allow air tankers to observe preceding drops.

6.5.2.3. Establish drop sequence and call for each tanker when ready.

6.5.2.4. Describe the target, drop objective, approach heading, altitude, and suggested escape route and advises on hazards, altimeter setting, desired coverage level, quantity, and other pertinent factors.

6.5.2.5. Inform air tankers of potential airdrop hazards to include: reduced visibility from smoke, shadows from reduced light, terrain, wind/turbulence, trees/snags, other air traffic, structures such as towers, antennas, power-lines etc.

6.5.2.6. Lead/supervise/direct MAFFS aircraft throughout the approach and airdrop and, if required, give the execution command over the release point. If Lead observes a situation in which the tanker needs to go around, they make a radio call: "Go Around. Consider your load."

6.5.2.7. Critique the airdrop (on target, short, right, etc.) if time and conditions permit.

6.5.3. Separation responsibilities. When entering the FTA and joining on the lead plane, use TCAS and visual scanning to acquire lead. Normally lead acquires the airtanker first. Lead maintains an altitude separation for de-confliction until they have the airtanker in sight. When the lead states they have the airtanker in sight, formation separation is lead's responsibility. Once the airtanker states they have lead in sight, separation responsibility is transferred to the airtanker. If the airtanker subsequently loses sight of lead, it is imperative to notify lead so they can either assume separation responsibilities or assign altitude separation if not in sight.

6.5.3.1. Once falling into position behind lead, select NORMAL mode on the IFF to prevent TA/RA calls but to allow lead and other aircraft to monitor the MAFFS mode 3 on their TCAS.

6.6. Airdrop Procedures.

6.6.1. The "SLOWDOWN" checklist must be completed prior to descending from entry altitude. Ensure both pilots and the navigator understand the target area and escape route prior to commencing the drop approach. For multiple passes in the same drop area start with the ONE MINUTE ADVISORY and verbalize the steps as indicated in the checklist. If the system is disarmed between drops, re-accomplish all checklists starting with the AFTER TAKEOFF (LM) and PRE-SLOWDOWN (Cockpit Crew) checklists.

6.6.1.1. The MAFFS system is designed to drop any sequence or number of drops from one full tank (3000 gallons) using one full charge of high pressure air (1200 psi), and normally does not require additional air compression between drops.

6.6.2. A "show-me" run may be required depending on target complexity, previous drops observed, and other factors. MAFFS aircraft loaded with retardant should remain at an altitude well above the Lead Plane performing a show-me run. This altitude should be at pattern altitude for the respective drop location, normally 1,000' AGL above drop altitude as directed by the lead plane pilot.

6.6.2.1. During a show me run configure and maneuver the aircraft so both the pilot and co-pilot can observe the target. This may require flying a different ground track than lead and banking the aircraft as lead approaches the intended target area so both pilots have visibility on the target.

6.6.3. Baseline pattern airspeeds and flap configurations for the actual drop are 140 KIAS/50% flaps on downwind, 130/70% flaps on base, and 120/100% (or 120/70% or less flaps for level drops) flaps on final. These speeds and configurations may, and are modified as required by the aircraft commander depending on spacing from lead, offset positioning from lead, energy management, turbulence, terrain, etc.

6.6.4. Baseline spacing from lead in the drop pattern should be approximately 1500 ft +/-500 ft (5 to 10 seconds behind lead plane at typical drop pattern airspeeds) but may vary based on

conditions and target acquisition. Spacing too close can lead to dangerous situations due to overruns. When able, fly above and offset from lead to maintain energy and allow the lead to keep the MAFFS aircraft in sight as much as possible.

6.6.4.1. It is important for the pilot to keep the target as well as the lead plane in their cross check to anticipate and avoid a situation leading to an overshooting final, and also to facilitate arriving at the start point in drop parameters.

6.6.5. Overrun procedures. Should the MAFFS overrun the lead plane, the MAFFS announces overrun on air to air frequency, the lead plane maneuvers down and left, and the MAFFS maneuvers up and right to allow the MAFFS pilot to keep the lead plane in sight, regain position, and advise lead. If in a turn (or terrain is a factor), the MAFFS announces overrun, lead maneuvers down and to the inside of the turn (or towards the terrain), and the MAFFS maneuvers up and to the outside of the turn (or away from the terrain).

6.6.6. Ascending drops or escapes and daisy chain drops are prohibited.

6.6.6.1. Drops into rising terrain are acceptable if maintaining level flight at an acceptable terrain clearance altitude throughout the drop (for example with a hard deck MSL altitude given).

6.6.7. Tandem drops are allowed providing the aircraft commander concurs, is in a position to observe the preceding drop, information listed in **paragraph 6.4** has been received from the lead plane, and the lead plane can maneuver to observe the drop.

6.6.8. Drop Altitude. 150 ft AGL Minimum.

6.6.8.1. When terrain and conditions permit, target an altitude approximately 150 ft above the fuel. Altitudes between 150 ft and 200 ft AGL are generally effective but in order to achieve coverage levels 6 and 8, altitudes near 150 ft AGL are required. Above 200 ft AGL the drop pattern begins scalloping and rapidly becomes ineffective.

6.6.9. Minimum drop airspeed is 120 KIAS. Higher speeds may be needed due to turbulence, terrain, turning drops, etc. Ultimately, the aircraft commander determines what airspeed and flap setting is appropriate for each drop.

6.6.10. Terminology on final to the drop:

6.6.10.1. Stating “I have the line” to lead means the MAFFS pilot has the target start/stop points in sight, knows the desired lateral placement of the drop, and has cleared the lead to pull off the line and maneuver to observe the drop.

6.6.10.2. Stating “Hold the line” to lead means the MAFFS pilot needs lead to continue on the drop line in order to assure acquisition of the correct start/stop points or lateral line location.

6.6.11. Leadplane pilots fly their aircraft over the desired ground track which corrects for wind drift and expect the air tanker to fly that same ground track. If desired otherwise, they specify, or they may direct last minute adjustments to the air tanker via air to air radio.

6.6.12. Exit/escape. Upon load clear, or completion of drop if a start/stop drop, simultaneously add power, retract flaps to 50% when able, and begin climb. Do not climb into the Air-Tac or other air tanker altitudes when exiting until clear of the FTA. To enhance traffic avoidance, select TA/RA as soon as possible once separating from lead after the drop.

6.6.13. Avoid application of retardant or foam within 300 ft of waterways (any body of water, lakes, rivers, streams, ponds, etc.).

6.6.14. MAFFS should not land fully loaded. However, it is permissible to do so when landing performance and conditions permit. The MAFFS load will be jettisoned prior to making approach and landing with an engine out. **(T-2).**

6.7. Jettison Procedures.

6.7.1. Jettison areas must be designated by the controlling agency. Ensure proper coordination with controlling authority prior to entry into a designated FTA.

6.7.2. A Leadplane is not required to jettison; however, the airtanker should drop at a minimum of 500 feet above ground level (AGL). (150 feet minimum if on an airfield).

6.7.3. If a dispatch is cancelled after loading of retardant, the MAFFS Liaison Officer (MLO) normally coordinates with the MC for the offload or jettison of the load within 72 hours.

6.7.4. All emergency and inadvertent retardant jettisons are reported to the MLO via the EAS-WFF/MC, dispatch, or nearest air tanker base. Include location of the drop and additional pertinent information

6.8. Post Flight. MAFFS crews document every sortie on the MAFFS Drop Log in **Attachment 5**. Use one log per local flying day. All takeoff and landing times are local to the actual takeoff and landing location, not the EAS or AEG-WFF locations. Takeoff and landing times and flight times should mirror the 781 times exactly (converted to local). Every block on the Drop Log is required for each sortie except Remarks. Write "UNK" or "N/A" for those blocks where data is not available or applicable.

6.8.1. Crews submit their totaled Drop Logs to AEG (EAS(P), if available) operations personnel at the end of each day, unless no flying occurred. If a crew is not able to return to the EAS location due to WX, MX, etc., crews should make every effort to FAX or email the completed and totaled Drop Log to the AEG or EAS(P) before entering crew rest.

6.8.2. Due to the nature of the mission, fuel tracker information is not required to be submitted to the AMC fuel efficiency office.

6.9. MAFFS System Maintenance.

6.9.1. MAFFS aircrew notify the EAS(P)/MC of MAFFS system discrepancies as soon as conditions permit. The Loadmaster enters MAFFS system discrepancies in the MAFFS maintenance log. Each discrepancy is reported to, and corrected by, the MAFFS contract maintenance Field Service Representative (FSR) assigned to the mission as soon as practical.

6.9.2. Upon demobilization, MAFFS retardant tanks are flushed two times with water after final retardant load. A ground flush is preferred. If this is not an option, an airborne flush may be performed. Coordinate desired jettison location with EAS(P)/MC and the MLO / ATBM.

MARK C. NOWLAND, Lt Gen, USAF
Deputy Chief of Staff, Operations

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

Interagency Agreement for the Provision of Temporary Support during Wildland Firefighting Operations

18AF AFTRANS Plans Library Tab M1, MAFFS Wildland Fire Fighting Plan

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AFMAN 11-2C-130HV3 Addenda A, *C-130 Operations Configurations/Mission Planning,* 13 August 2009

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Adopted Forms

AF Form 847, *Recommendation for Change of Publication* AFTO

AFTO Form 781, *ARMS Aircrew/Mission Flight Data Document*

Abbreviations and Acronyms

AEG—Air Expeditionary Group

AEG-WFF/CC—AEG Wildland Fire Fighting Commander

AFF—Automated Flight Following

AFI—Air Force Instruction

ASM—Aerial Supervision Module

ATGS—Air Tactical Group Supervisor (Air-Tac)

BLM—Bureau of Land Management

EAS—Expeditionary Airlift Squadron

EAS (P)-WFF/MC—EAS Wildland Fire Fighting Mission Commander

FSR—Field Support Representative (MAFFS Mechanic)

FTA—Fire Traffic Area

HLCO—Helicopter Coordinator

IC—Incident Commander

ICS—Incident Command System

MABM—MAFFS Airtanker Base Manager

MAFFS—Modular Airborne Fire Fighting System

MC—Mission Commander

MLO—MAFFS Liaison Officer

MAJCOM—Major Command (for the purposes of this AFMAN, includes ANG)

NIFC—National Interagency Fire Center

TCAS—Traffic Collision Avoidance System

TFR—Temporary Flight Restriction

USFS—United States Forest Service

WFF—Wildland Fire Fighting

Terms

Aerial Supervision Module—An ASM is a two person crew functioning as the Lead and ATGS from the same aircraft. The ASM crew is qualified in their respective positions and has received additional training and authorization. An ASM can be utilized as a Lead, ATGS, or both, depending on the needs of incident management personnel. An ASM consists of an Air Tactical Pilot and Air Tactical Supervisor.

Air Tactical Pilot (ATP)—The ATP is a qualified Leadplane Pilot who has received specialized training and authorization to function as an ASM crewmember. The ATP functions as the Leadplane pilot and utilizes Crew Resource Management (CRM) skills to evaluate and share the incident workload with the ATS.

Air Tactical Supervisor (ATS)—The ATS is a qualified ATGS who has received specialized training and authorization to function as an ASM crewmember. The ATS is an ATGS who also utilizes CRM to evaluate and share the incident workload with the ATP.

Air Tactical Group Supervisor—Commonly called “Air-Tac”. The ATGS manages incident airspace and controls incident air traffic. The ATGS is an airborne firefighter who coordinates,

assigns, and evaluates the use of aerial resources in support of incident objectives. The ATGS is the link between ground personnel and incident aircraft. The ATGS must collaborate with ground personnel to develop and implement tactical and logistical missions on an incident. The ATGS must also work with dispatch staff to coordinate the ordering, assignment, and release of incident aircraft in accordance with the needs of fire management and incident command personnel.

On initial attack incidents (type 4 and 5), the ATGS sizes-up, prioritizes, and coordinates the response of aerial and ground resources until a qualified Incident Commander (IC) arrives. On complex incidents (type 1, 2, or 3), the ATGS coordinates and prioritizes the use of aircraft between several divisions/groups while maintaining communications with operations personnel and aircraft bases (fixed/rotor).

In the Incident Command System (ICS), the ATGS works for the IC on initial attack and the Operations Section Chief (OSC), Air Operations Branch Director (AOBD), or operational designee on extended attack. The ATGS supervises the ATCO, Leadplane Pilot, and the HLCO positions when activated. The ATGS is qualified to function as an ATCO or HLCO.

Air Tanker Coordinator (ATCO)—The ATCO coordinates, directs, and evaluates airtanker operations. The ATCO works under the ATGS. This position is typically activated on complex incidents where several airtankers are assigned. An ATCO can reduce the span of control of the ATGS by managing all the airtankers over an incident. If no ATGS is present, the ATCO works for the IC. **The ATCO is not authorized for low level (below 500' AGL) operations.** (Historically, the ATCO position without the low level capability per this definition is not used. The ATGS normally fills this role. ASM or Leadplane Pilots are the standard for low level lead duties.)

Daisy Chain Drop—A retardant drop immediately behind another air tanker. Not allowed in MAFFS operations due to danger of flying into leading aircraft's retardant and inability of the lead aircraft to assess the first drop before the second aircraft drops.

Fire Traffic Area—A Fire Traffic Area (FTA) is defined as airspace created by a land management agency to encompass a location where aerial firefighting aircraft are operating. The FTA is not part of the National Airspace System although a FTA may be contained within a Temporary Flight Restriction (TFR). The FTA was developed by aerial firefighting personnel to provide a standardized initial attack airspace structure to enhance air traffic separation for all aircraft over wildland fire (or other) incidents. See **Attachment 4**.

Helicopter Coordinator (HLCO)—The HLCO coordinates, directs, and evaluates tactical/logistical helicopter operations. The HLCO works under the ATGS. This position is typically activated on complex incidents where several helicopters are assigned. A HLCO can reduce the span of control of the ATGS by managing all the helicopters over an incident. If no ATGS is present, the HLCO works for the IC, AOBD, or designee.

Leadplane Pilot (Lead) —The Leadplane position is identical to the ATCO except the pilot is qualified and authorized for low level operations. A Leadplane Pilot is not recognized in ICS and is classified as an ATCO by default. The low level capabilities of a Leadplane enhance the safety and effectiveness of airtanker operations in the often turbulent, smoky, and congested fire environment.

MAFFS Operating Plan—Overarching United States Forestry Service Operating Plan which varies year to year. For example, for 2012 the plan is named FSI 12-001.

Tandem Drop—Normally accomplished to extend the line from a previous drop. First air tanker drops behind the lead aircraft. The second air tanker is in position to observe the first drop but is far enough apart to eliminate any possibility of flying through the previous retardant and allow the lead aircraft to assess the first drop, but is also positioned close enough so the lead plane can still monitor the second drop after turning off the first drop line.

Attachment 2

MAFFS DROP CARD

Figure A2.1. MAFFS Drop Card.

OBST CLNC		FL AP	BANK AN	BANK ANG	
		0%			
OBST CLN					M
		50%			A
2 ENG					F
		100%			F
GROSS WEIGHT:					

Attachment 3

STANDARDIZED MAFFS TANKER BASE CONCEPT OF OPERATIONS

MAFFS Pilot Air Tanker Base Guide

Standardized MAFFS Tanker Base Concept of Operations

References: Interagency Air Tanker Base Operating Guide, MAFFS Operating Plan

The following is a chronological flow for operating the C-130H MAFFS aircraft on an approved USFS, CalFire or Joint Tanker Base Ramp. It is intended to align MAFFS air tanker operations with standard civilian tanker doctrine to ensure seamless integration at select air tanker bases.

Arrival

Airborne

- Contact Tanker Base 10 minutes prior to arrival on published VHF Tanker Base (TB) Operations Frequency with intentions and requirements (eg: Load and Return, 3000 gal retardant, 10K fuel)

Ground Operations

- Contact Ramp Manager for Pit Assignment on TB Freq prior to taxiing onto TB Ramp
- Park as directed

  Do not enter the ramp pits until outboard propeller rotation has stopped
  Exception: C-130 may enter pits with outboards rotating slowly in high wind conditions

  Ramp Manager (Green Vest) can communicate via VHF and may provide marshaling instructions
  Parking Tenders (Orange Vest) generally provide marshalling instructions into pits, during periods of heavy tanker traffic, using standard military signals (refer to **Figure A3.1**)

- Call "MAFFS 'X' Stopped" to TB Operations once parking brake is set (X= MAFFS unit)
  TB personnel relay On & Off times to AEG
  Retardant Loading Crew (Blue Vests or Red Shirts) do not approach the aircraft until directed by the Loadmaster, once all propeller rotation has stopped. The

loadmaster ensures the MAFFS system is disarmed prior to clearing the load attendant to approach.
During initial loading operations, A/C receives an orientation briefing from Air Tanker Base Manager (ATBM) or representative (refer to end of **Attachment 3**)

Departure

Ground Operations

1. Engine Start is in coordination with the Parking Tender via Hand Signals:

    1) PF holds up three fingers to indicate Start #3
    2) Parking Tender Points to #3 engine and signal when cleared to start

Dispatch relays any mission changes to the aircrew via TB Operations personnel using the Standard Interagency Dispatch Form

- Call for Taxi from ATC / CTAF a/r, and taxi as directed
  Taxi lights 'on' indicates "ready for taxi" to the Parking Tender

- Call 'MAFFS X Rolling' on TB Dispatch frequency

Airborne

- Contact En route Dispatch or National Flight Following a/r

Figure A3.1. Airtanker Base Ramp Operations Hand Signals.

EXHIBIT A-1: AIRTANKER BASE RAMP OPERATIONS HAND SIGNALS

Note: *Extracted from the Interagency Airtanker Operations Guide

(**With the exception of the Hot Brakes signal, all others are consistent with AFI 11-218)

Tanker Base Pilot Orientation Briefing Guide

The Tanker Base Pilot Orientation Briefing should be conducted between the MAFFS pilot and Air Tanker Base Manager (ATBM) or representative prior to conducting recurring operations at a particular air tanker base facility. This does not preclude servicing in pits on initial stop, if required.

Most ATBMs publish a local Pilot Orientation Package. As a minimum review the following with the appropriate tanker base representative:

Air Tanker Base Manager

Conduct a thorough review of local operating procedures, as required, to include the following:

- Base Operations
  - Local Fire Situation
  - Mission planning facilities / capabilities
  - Type Retardant in use
  - Loading / Pumping Equipment Capability / Limitations
  - Aircraft Parking Locations / Procedures
  - Local Hazards: ramps, runway, approach, departure
  - Airspace coordination plan
    - Class B, C, D airspace
    - Noise Abatement Procedures
    - MTRs
    - Ingress / Egress altitudes to / from fires)
    - Standard VFR departure / arrival procedures
    - Prominent Local Landmarks
    - Flight Hazards / TFRs
    - Jettison Areas
  - Pilot Duty Day and Flight Time limitations
  - Engine-run up location / procedures
  - Weather, time of day limitations, or collocated military activity
  - Flight Plans
  - ARFF requirements (minimum 3000 gallons retardant for continuous C-130 ops)
  - Air-Tac / Lead plane procedures and other operations
- Pit Operations (eg unidirectional pits, preferred pits, etc)

- Fuel / Ground Power requirements
- Aircraft Washing
- Marshaling requirements (eg 10’ obstruction clearance with wing walker)

- Dispatch Procedures
  - Standard Interagency Dispatch Form
  - GACC and Local Dispatch procedures
  - Flight Following (AFF, En route dispatch frequency, etc)
- C2 – ensure TB personnel pass On(Stopped) and Off(Rolling) times to AEG in Boise, ID
  - Phone - (208) 422-3422
  - Fax - (208) 422-3419
- RON requirements
  - Billeting
  - Transportation
  - Morning Brief

Time <u>Ramp Manager / Parking</u>

<u>Tender</u>

- Engine Start coordination (Hand Signals preferred during heavy tanker operations)
- Identify any obstruction hazards and coordinate wing walkers as required (10’ clearance)

<u>Load Attendant</u>

- Discharge Nozzle (Pintle) safety issues
- Retardant loading / metering procedures
- Emergency Shutoff procedures / signals

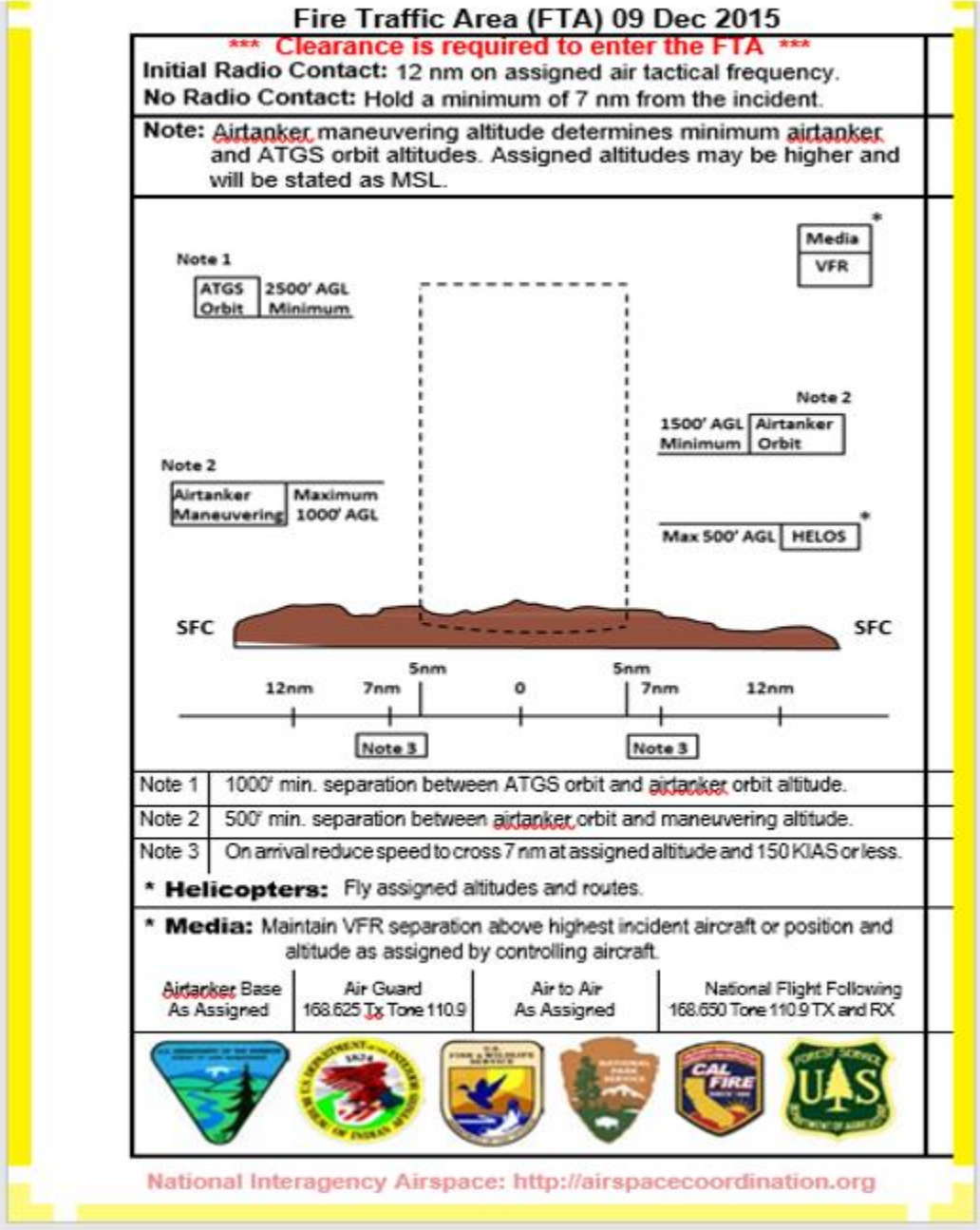
Figure A3.2. Standard Interagency Dispatch Form.

California Interagency Aircraft Dispatch-Tactical Air Operations CAL FIRE FC-106/U.S. Forest				
INCIDENT NAME			DATE	TIME
ORDER #			P #	
DESCRIPTIVE LOCATION				
RESPONSE AREA	SECTION	TOWNSHIP	RANGE	MERIDIAN
LATITUDE (Degrees, Decimal Minutes)			LONGITUDE (Degrees, Decimal	
BEARING	DISTANCE		FROM	
AIR CONTACT IDENTIFIER			AIR TACTICS FREQ. (FM) FIXED-	
			Freq Name	
HELICOPTER 'VICTOR' FREQ. (AM)			AIR to GROUND FREQ. (FM)	
			Freq. Name	
GROUND CONTACT IDENTIFIER			COMMAND/ECC FREQ. (FM)	
			ECC Name	
GROUND TACTICS FREQ. (FM)			RELOAD BASE	
OTHER A/C				
HAZARDS				
REQUEST NUMBERS		A3	A	
A1		A4	A	
A2		A5	A	

Attachment 4

FIRE TRAFFIC AREA

Figure A4.1. Fire Traffic Area 1.



Incident Airspace Reminders

Fire Traffic Area (FTA)

- The FTA is a communication protocol for firefighting agencies. It does not pertain to other aircraft that have legal access granted by the FAA within a specific TFR.
- The FTA should not be confused with a TFR, which is a legal restriction established by the Federal Aviation Administration to restrict aviation traffic while the FTA is a communication tool establishing protocol within firefighting agencies.
    - Participating aircraft must adhere to TFR policies as established by the FAA.
    - For example, if the TFR boundary of a polygon exceeds the 12-mile initial contact ring, clearance will still be required in order to enter the TFR.
    - If the TFR boundary is within the 12-mile ring, proceed with standard FTA communication procedures.

Temporary Flight Restriction (TFR) - All assigned/ordered aircraft must obtain clearance into or the incident TFR by the on scene aerial supervision or the official in charge of the on-scene emergency response activities.

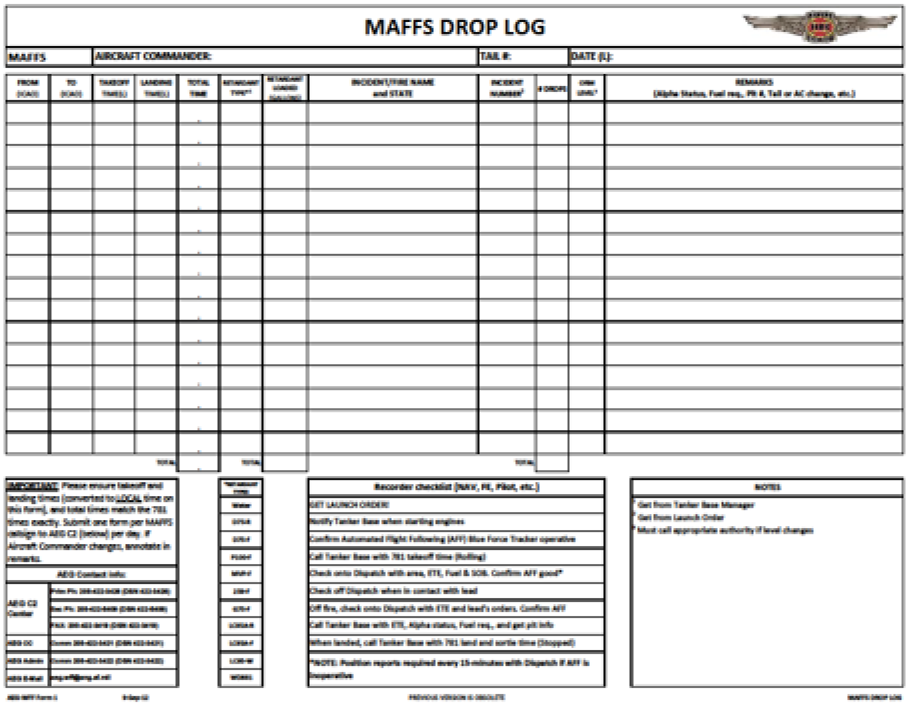
- **A ROSS order or Aircraft Dispatch Form is not a clearance into a TFR.**
- Aircraft not assigned to the incident must stay clear of the TFR unless communication is established with the controlling entity (ATGS, ASM, Leadplane, etc.) and authorization is given to enter/transit the TFR.
- The first responding aircraft, typically on extended attack incidents, must have reasonable assurance that there are no other aircraft in the TFR by making blind calls on the TFR frequency, other assigned air to air frequencies, and double checking with ground personnel (IC, OPS, or Helibase).
- There may be multiple aircraft operations areas within a TFR.
- Remember - Non-Incident aircraft may enter the TFR under the following conditions:
    - The aircraft is carrying **law enforcement** officials.
    - The aircraft is on a flight plan and carrying **properly accredited news representatives.**
    - The aircraft is operating under the **ATC approved IFR flight plan.**
    - The operation is conducted **directly to or from an airport** within the area, or is necessitated by the impracticability of VFR flight above or around the area due to weather, or terrain; notification is given to the Flight Service Station (FSS) or **ATC facility** specified in the NOTAM to receive advisories concerning disaster relief aircraft operations; and the operation does not hamper or endanger relief activities and is not conducted for observing the disaster.

Further Information: *Interagency Aerial Supervision Guide* (NFES 2544)

Attachment 5

MAFFS DROP LOG

Figure A5.1. MAFFS Drop Log.



MAFFS DROP LOG

MAFFS	AIRCRAFT COMMANDER:	TAIL #:	DATE (L):

FROM (ICAO)	TO (ICAO)	TAKEOFF TIME(L)	LANDING TIME(L)	TOTAL TIME	RETARDANT TYPE*	RETARDANT LOADED (GALLONS)	INCIDENT/FIRE NAME and STATE	INCIDENT NUMBER	# DROPS	DRM LEVEL	REMARKS (Alpha Status, Fuel req., PR #, Tail or AC change, etc.)
			TOTAL		TOTAL			TOTAL			

IMPORTANT: Please ensure takeoff and landing times (converted to LOCAL time on this form), and total times match the 781 times exactly. Submit one form per MAFFS callsign to AEG C2 (below) per day. If Aircraft Commander changes, annotate in remarks.

AEG Contact Info:	
AEG C2 Center	Prim Ph: [illegible]
	Sec Ph: [illegible]
	FAX: [illegible]
AEG CC	Comm [illegible]
AEG Admin	Comm [illegible]
AEG E-Mail	[illegible]

*RETARDANT TYPE
Water
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

Recorder checklist (NAV, FE, Pilot, etc.)
GET LAUNCH ORDER!
Notify Tanker Base when starting engines
Confirm Automated Flight Following (AFF) Blue Force Tracker operative
Call Tanker Base with 781 takeoff time (Rolling)
Check onto Dispatch with area, ETE, Fuel & SOB. Confirm AFF good*
Check off Dispatch when in contact with lead
Off fire, check onto Dispatch with ETE and lead's orders. Confirm AFF
Call Tanker Base with ETE, Alpha status, Fuel req., and get pit info
When landed, call Tanker Base with 781 land and sortie time (Stopped)
*NOTE: Position reports required every 15-minutes with Dispatch if AFF is inoperative

NOTES
[1] Get from Tanker Base Manager
[2] Get from Launch Order
[3] Must call appropriate authority if level changes

PREVIOUS VERSION IS OBSOLETE

MAFFS DROP LOG