(No. 127 December 2015)

EXHIBIT C

CMD RECIPROCAL COOPERATIVE FIRE PROTECTION AGREEMENT INCIDENT AWARENESS AND ASSESSMENT (IAA) EXHIBIT

27 MARCH 2015

DOCUMENT AMENDMENT RECORD

Amendment Number	Date Issued	Section Amended	Document Amended By (Name)	Date Amended
		DRAFT EXHIBIT C	CAPT STROMBERG	5 JAN 2015
		DRAFT EXHIBIT C	CAPT STROMBERG	26 MAR 2015
		DRAFT EXHIBIT C	CAPT STROMBERG	27 MAR 2015
		FINAL EXHIBIT C	CHIEF GUERRERO	20 MAY 2015

Table of Contents

1. INTRODUCTION..... 4

2. EXHIBIT PURPOSE..... 4

3. ASSUMPTIONS, RESTRICTIONS AND LIMITATIONS..... 5

4. IAA OPERATIONS.....5

5. IAA CALFIRE AND CMD RESPONSIBILITIES…….6

5.5 IAA AND REMOTE SENSING PLANNING COMMITTEE….....6

5.6 REIMBURSMENT……6

5.7 ORDERING PROCEDURE……...6

5.8 MEDIA RELEASES……..6

6. IAA SENSOR/PLATFORM GENERAL UTILIZATION AND CHARACTERISTICS.…6

7. FULL MOTION VIDEO (FMV) UTILIZATION AND CHARACTERISTICS ……8

8. ELECTRO-OPTICAL (EO) UTILIZATION AND CHARACTERISTICS ……...12

9. INFRA-RED (IR) UTILIZATION AND CHARACTERISTICS ……14

10. MULTI-SPECTRAL IMAGERY (MSI) UTILIZATION AND CHARACTERISTICS....16

APPENDIX 1 - GLOSSARY OF ACRONYMS AND ABBREVIATIONS

APPENDIX 2 – COLLECTION DECK, TEMPLATE, AND DEFINITIONS

1. Introduction

This Operating Plan implements the agreements documented in the "Cooperative Agreement" among: the California Office of Emergency Services (CAL OES); the California Department of Forestry and Fire Protection (CAL FIRE); US Department of Agriculture Forest Service (USFS); US Department of Interior, Bureau of Land Management (BLM); US Department of Interior, National Parks Service (NPS); and the California Military Department (CMD).

This exhibit is designed as an operational reference for the state activation and employment of CMD Incident Awareness and Assessment (IAA) capabilities.

About this document: This document is constructed as an Exhibit to the Cooperative Agreement (CAL FIRE # 7CA02773) but has been constructed so that material can be amended separately from the base agreement as determined to be necessary by the cooperating agencies.

Explanation of Terms:

1. CMD shall refer to the California Military Department, to include all assigned soldiers and airmen, as commanded by The Adjutant General (TAG).

2. CAL OES shall refer to the California Office of Emergency Services under the authority of the Governor of the State of California.

3. CAL FIRE shall refer to the California Department of Forestry and Fire Protection.

Sustainment: CAL FIRE will coordinate an annual review and update of this document to ensure the most current information and procedures are accurately represented. A revision record is included to record changes at the time the document is updated.

For additional information regarding information contained within this handbook, please contact the California National Guard J32 at 916.854.3440 or NGCAJOC-OPS@ng.army.mil

2. Purpose:

This exhibit's purpose is to define and describe Incident Awareness and Assessment (IAA) support for CAL FIRE in wildfire planning and operations. It identifies CNG IAA assets, requirements and process to access these resources for CAL FIRE. Finally, this exhibit introduces integration opportunities and cooperative protocol between CAL FIRE and the CMD which will make the IAA cycle effective and efficient in supporting wildfires.

3. Assumptions, Restrictions and Limitations

3.1 National Guard Bureau, AFNORTH / 1st Air Force, and the FEMA GIS Coordination Cell will be available to assist filling unmet collection requirements

3.2 The SECDEF is required to grant the use of Remote Piloted Aircraft for any DSCA operations. The SECDEF process currently takes up to three days.

4. IAA Operations: Definition, Process and Requirements

4.a. Incident Awareness and Assessment (IAA) Defined: The IAA process synchronizes and integrates the planning and execution of various information capabilities which provide situational awareness and assessment to civil authorities and Joint Task Force Commander in support of domestic operations. It includes the tasking, acquisition, processing, assessment and dissemination that provide critical information to the appropriate local, state and federal authorities within an affected area. Incident awareness information assists authorities in responding to disasters to save lives, mitigate suffering, minimize serious property damage, and protect vital infrastructure. All IAA capabilities are legally employed in accordance with Federal policies on Intelligence Oversight and handling of US persons' information. IAA is very similar to remote sensing used commonly in the civilian sector.

4.b. IAA Process Description (see the glossary for a more detailed definition of terms): The IAA process is triggered by a significant disaster or the anticipation of one. Office of Emergency Services, another state entity, or a military entity will send a request for IAA through the Joint Operations Center most likely in a form of an MRT or RFA with a collection request (reference CAL FIRE remote sensing ordering procedures 8100 procedure 390). If the collection request is not attached, the California Military Department's J2 Collection Manager (CM) will contact the POC listed on the MRT/RFA to gather information in the form of above discussed collection deck. Depending on the size of the event and/or if there are any unmet requirements, the JFHQ State-J2 might reach out through the National Guard Bureau to the FEMA GIS Coordination Cell and the interagency remote sensing partners. Once the IAA platform(s) are in the collection phase or have completed the collection phase, CMD Processing, Assessment, and Dissemination (as required from the customer) will be performed. The products and the assessments will be reviewed with the customer to ensure their requirement was met. Finally, any additional and emerging requirements will follow the above stated collection process unless the priority of the request is high enough to be considered an Ad Hoc requirement.

c. National Guard PUM Requirement. A Proper Use Memorandum (PUM) must be on file before National Guard airborne platforms can be tasked to collect domestic imagery. Normally, there is a fire season PUM on file in support of CAL FIRE and expediting the IAA process. In the case of a potential life and limb emergency, a PUM can be filed with the Secretary of Defense post IAA Flight unless a RPA is request in which a PUM is contingent on Secretary of Defense approval of the system. However, a PUM for a RPA cannot be filed until

an event occurs and must be approved by the SECDEF for all DSCA events. A PUM is a memorandum that defines a request by an organization for a domestic imagery requirement and its intended use. A PUM acknowledges awareness of the legal and policy restrictions regarding domestic imagery collection, retention, dissemination, and use. The PUM provides an auditable trail of authority and responsibility up to the appropriate levels, while ensuring the rights of U.S. citizens and organizations are being protected IAW the law. Failure to file a PUM before the conduct of a domestic imagery collection mission is Questionable Intelligence Activity (QIA), reportable to the Assistant to the Secretary of Defense Intelligence Oversight ATSD (IO). PUMs will be filed IAW Enclosure E of Chief National Guard Bureau Manual (CNGBM) 2000.01. The CMD's PUMs are filed through the CA JFHQ/J2.

5. Authorities / Responsibilities

5.1. CAL FIRE SHALL: Determine IAA requirements and follow process in para 4.b above.

5.3. CAL FIRE SHALL: Support IAA education within the IMTs.

5.2. CMD SHALL: Be prepared to support CAL FIRE's IAA requirements.

5.4.. CMD SHALL: Be prepared to brief and/or train Incident Management Teams on IAA capabilities relevant to fire support and how to acquire them.

5.5. CAL FIRE AND CMD SHALL: Meet at least annually to discuss potential fire collection planning, determine potential collection opportunities, and discuss development of further IAA or remote sensing cooperative SOPs and share information about IAA or remote sensing capabilities for more efficient and effective collection management.

5.6 REIMBURSMENT SHALL: Be in accordance with the conditions and rates listed within the CMD Agreement, Exhibit A – California Interagency Finance Plan.

5.7 ORDERING PROCEDURES SHALL: Be in accordance with the CAL FIRE 8100 Handbook, Procedure # 390 Agency Remote Sensing Infrared and CAL FIRE 7700 Handbook Exhibit – Remote Sensing / Infrared Resources.

5.8 MEDIA RELEASES SHALL: Be in accordance with the Incident Command System Operating Guidelines. Any release of incident information including photos / video / tours and incident related interviews shall be coordinated through the Incident's Lead Public Information Officer or their designee. Redistribution or linkage to any of the Incident's official information sources do not need prior authorization.

6. IAA SENSOR AND PLATFORM CHARACTERISTICS AND USES:

a. Each contingency has its unique Priority Intelligence Requirements and subsequent Essential Elements of Interest (EEIs) which drive variations in the IAA collection plan and deck. There are specific sensors and platforms best suited to support fires and individual requirements. The type of sensor that may be required per type of asset/agency is illustrated in Table 1.1 below. The following section addresses each of the California Guard sensors and the platforms/assets that provide civilian and military authorities with situational awareness during a disaster. The intent of discussing asset by capability is that when requests are made to the California National Guard Collection Manager, they should come in the form of a capability rather than a platform because if the request is specific to the type of imagery/product, the IAA process will be more efficient and the products will be more effective throughout the operational area.

Table 1.1: Fire Relevant IAA Capabilities and Supporting Assets

	Application/Example Uses	**National Guard (T-32) Assets**
FMV (EO/IR)	-Near real time SA -Damage Assessment -Wildfire perimeters -Search and Rescue	RC-26
		UH-72 Lakota
EO Still Frame	-Situational Awareness -Damage Assessment	Eagle Vision
		FMV-capable assets above
IR Still Frame	-Damage Assessment -Wildfire perimeters -Search and Rescue	Eagle Vision
		FMV-capable assets above
MSI	-Wildfire damage (Unique Signature detection, change detection)	Eagle Vision

7. National Guard IAA Sensors: Full Motion Video (FMV) Utilization and Characteristics

A. FMV Description and Uses:
FMV is a sensor that provides near real time (NRT) streaming video or archived clips provided to the customer for situational awareness. FMV is available in both EO and IR. FMV can be used for Search and Rescue (SAR), Line of Communication (LOC) Analysis, Initial Damage Assessment (DA), Fire Perimeter Identification, and Situational Awareness (SA).

B. FMV Advantages and Disadvantages:
FMV is limited during cloud coverage, when there is a cloud ceiling and given certain visibility levels. FMV's downlink range is Line of Sight (LOS) on some platforms. In order to process, assess, and disseminate the FMV feed, an RC-26, P-3, and Non-Traditional IAA (NTIAA) require systems to receive and transmit.

C. FMV Product Dissemination and Requirements for Access: FMV can be disseminated by a Remotely Operated Video Enhanced Receiver (ROVER) which sees in real time what the aircraft's sensors are acquiring in the air. The ROVER systems can be disseminated to a wide audience of interagency users through DCO Adobe Connect or the Geospatial Information Interoperability Exploitation Portable (GIIEP) Server (see paragraph 5d). Most FMV platforms require username and password as the feeds are controlled information.

D. FMV Platform Capabilities, estimated associated costs, average sortie length:
See table below

EXHIBIT C

FMV Platform (Owner/User)	***Type***	***Products***	***Estimated Cost for Platform***	***Avg Sortie Length/ Task to Sortie***	***Advantages***	***Disadvantages***	***State FMV Dissemination Methods***
UH-72 Lakota (CANG/T-32)	Twin engine, multi-role helicopter w/FLIR EO/IR MX15i sensor	Fire detection, Fire perimeter mapping, FMV feed, still/snaps, potential imagery/FMV analysis	$2,555.22/hr (emergency), IC4U/ground feed equip if desired is $778.65/day additional cost	2 hrs (Max 3hrs)	Multi-role, Rover compatible	No ortho/georectified data, mapping data convertible but not delivered in GIS shapefile format	NORTHCOM's FMV Portal, GIIEP Server
RC-26B (CANG/T-32)	Twin engine turbo prop ISR aircraft w/3-5 micron thermal imager	Fire detection, Fire perimeter mapping, GIS compatible and geo-rectified data, FMV feed, still/snaps, and potential imagery/FMV analysis	$562.00/hr (emergency), IC4U/ground feed equip if desired is $778.65/day additional cost	4-6hrs/12 hrs but earlier if available	Color EO/IR sensor, NIIRS 6 (ID individuals and building materials)	Limited number of aircraft	NORTHCOM's FMV Portal, GIIEP Server

8. National Guard IAA Sensors: Electro-Optical (EO) Utilization and Characteristics

A. EO Description and Uses: Electro-optical sensors produce visible images that display reflected light. If light is available, features like mountains, rivers, lakes, silt run-off from rivers into the sea, and coastlines are clearly visible. Clouds appear white because they reflect light. EO sensors can be used to show Damage Assessment (DA), infrastructure, and provide Situational Awareness (SA).

B. EO Advantages and Disadvantages: This is a day time only capability. EO sensors are also limited in cloud cover because it reflects light. The visibility level depends on availability of light.

C. EO Product Dissemination and Requirements for Access: Dissemination method is dependent on the platform (see table below). However, the majority of dissemination occurs through Hazards Data Distribution System (HDDS) on the following website: http://hdds.usgs.gov/EO/. Dissemination meets most request types. Photos can be disseminated via hardcopy, jpeg, or geotiff/ntif format. EO will also be hosted on GIIEP server (see paragraph 5d).

D. EO Platform Capabilities, estimated associated costs, average sortie length: See table below

EXHIBIT C

EO Platform (Owner/user)	Type	Products	Estimated Cost	Avg Sortie Length/ Task to Sortie	Advantages	Disadvantages	State Dissemination Methods
Eagle Vision (CANG Program)	Commercial Satellite Imagery	EO/IR/MSI Still imagery (1-10 Meter resolution), potential imagery analysis	Free	Coverage varies	International Charter supports multi-satellite planning and rapid data turn-around (EV ground station streams imagery to GIIEP w/in 5 min of downlink	Potential gaps in coverage	HDDS and GIIEP capable
FMV Assets (CANG/T-32)	See above table	See above table	See above table	See above table	See above table	See above table	See above table

9. National Guard IAA Sensors: Infra-red (IR) Utilization and Characteristics

A. IR Description and Uses: Infrared images display temperature differences. Infrared sensors pick up data both day and night. They show the pattern of heat (infrared radiation) released from the Earth. Heat-producing areas, such as warm water currents or cities (with heat absorbing concrete and asphalt and heat-producing cars, people, and factories) are clearly indicated on infrared images. Clouds appear in varying shades of gray, depending on their temperature, as determined by their height above Earth. IR sensors can be used to show Damage Assessment (DA), infrastructure, and provide Situational Awareness (SA) and fire location identification.

B. IR Advantages and Disadvantages: This is a day and night time capability but IR is adversely affected by cloud cover.

C. IR Product Dissemination and Requirements for Access: Dissemination method is dependent on the platform (see table below). Dissemination meets most request types. Black and white photos can be disseminated via hardcopy, jpeg, or geotiff/ntif format. Photos can be posted to the GIIEP server.

D. IR Platform Capabilities, estimated associated costs, average sortie length: See table below

IR Platform (Owner/User)	Type	Products	Estimated Cost	Avg Sortie Length	Advantages	Disadvantages	State Dissemination Methods
Eagle Vision (CANG Program)	Commercial Satellite Imagery	EO/IR/MSI Still imagery (1-10 Meter resolution, potential imagery analysis	Free	Coverage varies	International Charter supports multi-satellite planning and rapid data turn-around	Potential gaps in coverage	HDDS and GIIEP capable
FMV Assets (CANG/T-32)	See above table	See above table	See above table	See above table	See above table	See above table	See above table

10. National Guard IAA Sensors: Multi-Spectral Imagery (MSI) Utilization and Characteristics

A. MSI Description and Uses: Daytime sensor which analyzes images taken in three and four infrared band wavelengths and then combines them to make composite images. In MSI, images of a scene or object illuminated by the sun or other source are created using reflected or emitted energy from different parts of the spectrum. If the proper wavelengths are selected for collection and assessment, multi-spectral images can be used to detect specific signatures. MSI sensors can be used to show change detection, identifying and mapping wildfire threats, vegetation classes, soil types, and identify extent of fire damage, limited Signature identification, and presence of HAZMAT in the affected area

B. MSI Advantages and Disadvantages: MSI is weather dependent and MSI Subject Matter Expertise (SME) is likely required for analysis because raw data is very detailed and difficult to interpolate.

C. MSI Product Dissemination and Requirements for Access: Dissemination method is dependent on the platform (see table below). Reporting/dissemination meets most requests types. Photos can be disseminated via hardcopy, jpeg, or geotiff/ntif format.

D. MSI Platform Capabilities, estimated associated costs, average sortie length: See table below.

MSI Platform (Owner)	Type	Estimated Cost	Avg Sortie Length	Advantages	Disadvantages	State Dissemination Methods
Eagle Vision (CANG Program)	Commercial Satellite Imagery, potential imagery analysis	Free	Coverage varies	International Charter supports multi-satellite planning and rapid data turn-around	Potential gaps in coverage	HDDS and GIIEP capable

APPENDIX 1: GLOSSARY OF ACRONYMS AND ABBREVIATIONS

CM: Collection Manager (California Military Department J2)

CMD: California Military Department

***Collection Deck:** CPCL that is broken out by desired collection capability for each requirement (i.e. EO, IR, FMV, HSI, MSI)

EO: Electro-Optical

FMV: Full Motion Video

Geospatial Information Interoperability Exploitation Portable (GIIEP): A system and server which receive and disseminate Electro-Optical and Infra-Red Imagery and/or FMV from airborne and ground asset and provides FMV and still photography to Incident Commanders, first responders, state and local leadership, federal partners and national-level leadership. Both the server and system are hosted by the NGB. All FMV and still photography will be associated with organic Geographic Information Systems (GIS) and be accessible to most users through web-based access. GIS will be capable of overlaying the latest space-based and other imagery (military/civilian) through the United States Geological Survey (USGS), which serves as a repository of unclassified domestic imagery. Host GIIEP software on NGB approved DoD and non-DoD systems. The GIIEP system operates at the unclassified level and is not designed to operate at a classified level.

HSI: Hyper Spectral Imagery

IC4U (Incident Commander's Command, Control, and Communications Unit (IC4U): The IC4U is designed to provide real-time information reach back capabilities. It provides ROVER (see below), computers, phones, scanner, E-Mail, and WIFI availability to a range of customers where no infrastructure is available or additional communications capability is needed.

IR: Infra-red

MSI: Multi Spectral Imagery

PIRs: Priority Intelligence Requirements

PUM: Proper Use Memorandum

ROVER: A system which allows ground forces such as Forward Air Controllers (FAC) to see what an FMV capable asset is seeing in real time by receiving data acquired by the aircraft's sensors on a laptop on the ground. In an IAA environment ROVER systems can be used for JTF Situational Awareness or as in inject point to a wider dissemination architecture such as DCO Adobe Connect or the GIIEP Server.