

9321.1-PR

Remote Sensing

In Federal Disaster Operations

Standard Operating Procedures

Federal Emergency Management Agency

June 1999

FEMA has developed four levels of operational guidance for use by emergency teams and other personnel involved in conducting or supporting disaster operations. This document corresponds to the level highlighted in bold italics.

Level 1	Overview	A brief concept summary of a disaster-related function, team, or capability.
Level 2	<i>SOP or Operations Manual</i>	<i>A complete reference document, detailing the procedures for performing a single function (Standard Operating Procedure), or a number of interdependent functions (Ops Manual).</i>
Level 3	Field Operations Guide (FOG) or Handbook	A durable pocket or desk guide, containing essential nuts-and-bolts information needed to perform specific assignments or functions.
Level 4	Job Aid	A checklist or other aid for job performance or job training.

This document is consistent with and supports the Federal Response Plan (FRP) for implementation of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, 42 U.S.C. § 5121, et seq.

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FOREWORD

This Remote Sensing Standard Operating Procedures identifies and outlines the policies, procedures, and responsibilities associated with the use of remote sensing and ancillary data to support and facilitate disaster and emergency response operations. It directly supports -- and is applicable to all Federal departments and agencies operating under -- the Federal Response Plan (FRP). Within FEMA, the responsibility for disaster-related remote sensing coordination is assigned to the Response and Recovery Directorate (at Headquarters) or Division (at Regions). Within a FRP environment, the field-level responsibility for remote sensing coordination is vested in the Information and Planning Section of the applicable Federal response element (i.e., Emergency Response Team or Regional Operations Center Staff).

Questions, comments, and suggested improvements related to this document are encouraged. Inquiries, information, and requests for additional copies should be directed in writing to FEMA, Response and Recovery Directorate, Operations and Planning Division, Assessment and Analysis Branch, 500 C Street SW - Room 606, Washington, DC 20472.

[Signed June 1999]

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I. OVERVIEW

The most critical and coveted, yet situationally difficult category of information to capture immediately following a disaster is accurate and timely intelligence about the scope, extent, and impact of the event. The reason such information is important should be evident: intelligent and effective response decisions are dependent on a credible characterization of the situation and identification of potential and verifiable jurisdictional needs. Unfortunately, the environmental and infrastructural trauma resulting from the disaster may hinder or prevent the timely acquisition of such information through conventional collection methods, such as ground surveys or telephonic reports. Instead, it is possible (and in some cases probable) that scattered or sustained outages to communications systems and transportation corridors will adversely impact the ability of initial response elements to assess and report on damages and critical needs. It is during these periods of diminished information collection capability that remote sensing systems can provide a highly effective alternative means of gathering intelligence. The purpose of this Remote Sensing Standard Operating Procedures (SOP) document is to provide specific guidance on the use of these assets to support effective decision-making during response operations.

A. INTRODUCTION AND BACKGROUND

1. Remote sensing is the acquisition of information via aerial or satellite sensors. Such information, particularly imagery obtained from satellite platforms, may be of limited value in and of itself. However, when evaluated by expert analysts, such imagery can reveal or yield important intelligence. That intelligence -- in the form of analysis -- may then be integrated into geographic information systems (GIS) to produce map-based or tabular products that are operationally exploitable by emergency managers and decision-makers at all levels of the response structure.

a. **Aerial-Derived Information.** This type of information (typically electro-optical photography, but also including radar, infrared, and multispectral imagery) is obtained from sensors aboard manned and/or unmanned aircraft. Either commercial or federal sources may be used to provide manned aerial support, as determined by the needs of the particular situation. Unmanned aerial support is available through military and commercial sources.

b. **Satellite-Derived Information.** This type of information (typically electro-optical photography, but also including radar, infrared, and multispectral imagery) is obtained from sensors aboard geostationary or orbiting satellites. Generally, commercial or unclassified federal satellites are used to provide imagery support, although support may be requested from classified National Technical Means (NTM) satellites under certain conditions.

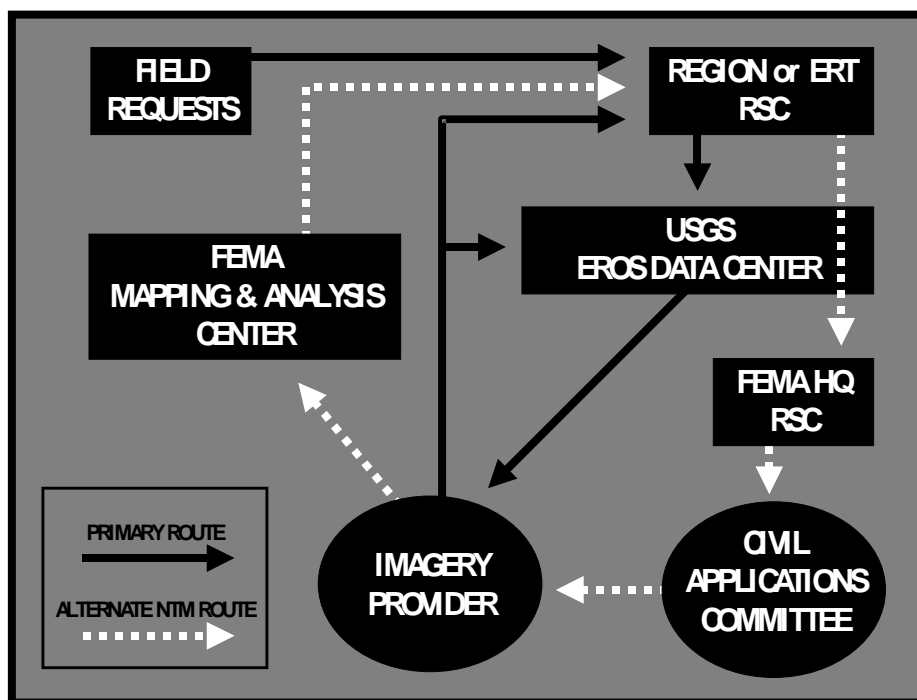
2. The capabilities available through remote sensing systems are integral to the situation assessment process and, as such, directly support information and planning activities. Remotely sensed information can prove valuable to emergency managers throughout the life cycle of the event, from emerging threat through the post-

disaster recovery phase. This SOP describes the methods to be used for requesting or coordinating remote sensing support of Federal Response Plan (FRP) operations and activities. The procedures in this SOP are not applicable to activities or requirements occurring outside the authority of the FRP.

B. SUMMARY OF OPERATIONS

The disaster-related remote sensing tasking and acquisition process begins with the identification of an information requirement that can only be satisfied through the application of remote sensing. This requirement is forwarded to the Regional or ERT Remote Sensing Coordinator (RSC), who will then (see Fig. I-1) contact the U.S. Geological Survey's (USGS) Earth Resources Observation Systems (EROS) Data Center (EDC). The EDC Remote Sensing Support Coordinator (RSSC) will determine if the requested support is available, identify costs, and manage tasking, acquisition, and delivery actions. However, if support is unavailable, the Regional/ERT RSC will be

Figure I-1
Remote Sensing Request and Support Flow



referred to the FEMA Headquarters RSC, who will immediately determine through the Civil Applications Committee (CAC) if the request can be fulfilled through National Technical Means (NTM). If NTM sources are appropriate, the FEMA Headquarters RSC will initiate and manage subsequent tasking, acquisition, and delivery actions, as well as coordinate necessary GIS support with the FEMA Mapping and Analysis Center (MAC). However, if NTM systems are unavailable or inappropriate, the request will be returned to the Regional or ERT RSC for re-coordination with the RSSC at the EDC. Points of contact and telephone numbers for each organization or agency can be found in Appendix C.

C. CAPABILITY DESCRIPTION

Remote sensing capabilities vary according to a wide range of factors, including (but not limited to) availability, sophistication of collection and measurement systems, type of platform, and data processing requirements. Specific capabilities are outlined below.

1. Electro-Optical Imagery. Electro-optical (EO) images are, essentially, photographs. EO imagery can be obtained from satellites, aircraft, or unmanned aerial vehicles (UAVs). In general, satellite EO imagery is of much lower spatial resolution than can be obtained from aerial or UAV imagery, but covers a much larger area. This imagery, although readily subject to lay interpretation, generally yields better information when exploited by experienced imagery analysts. Projected uses include:

- a. Assessing levels and patterns of damage within disaster areas.
- b. Assessing scope and extent of debris fields within disaster areas.
- c. Monitoring and assessing the extent of flooding.

2. Radar Imagery. Radar (an acronym for “Radio Detection and Ranging”) provides the capability to remotely observe surface areas regardless of weather or availability of sunlight. Depending on the situation and conditions, radar waves can or may be able to penetrate clouds, haze, vegetation, ice, and extremely dry sand. The terms “imaging radar” and “synthetic aperture radar (SAR)” are commonly and synonymously used to describe this capability. Because radar imagery provides less resolution than electro-optical imagery, interpretation by experienced imagery analysts is highly recommended. Projected uses include:

- a. Assessment of damage to weather-obscured disaster areas.
- b. Monitoring and assessing the extent of flooding.

3. Infrared Imagery. Infrared is electromagnetic radiation. Infrared remote sensing instruments function by sensing infrared radiation (IR) that is naturally emitted or reflected by the Earth’s surface or from the atmosphere, or by sensing signals transmitted from, and reflected back to a satellite or aircraft. Since thermal IR data are based on temperatures rather than visible radiation, the data may be obtained day or night. Infrared imagery is, compared to other forms of imagery, very low resolution; therefore, interpretation by experienced imagery analysts is highly recommended. Projected uses include:

- a. Determining forest fire or wildfire boundaries, or spot fire flare-ups.
- b. Determining power availability based on thermal signatures.
- c. Assisting in non-urban search and rescue activities.

4. **Multispectral Imagery.** Multispectral remote sensing is the process of simultaneously measuring reflected or emitted energy across a variety of relatively narrow spectral bands, ranging from ultraviolet to the thermal-infrared portion of the electromagnetic spectrum. Multispectral imagery may be collected by both satellite and airborne sensors, however, when comparing their capabilities, satellite sensors generally sacrifice spatial resolution for wider area coverage. As with other forms of imagery, interpretation by experienced imagery analysts is highly recommended to achieve maximum exploitation. Projected uses include:

- a. Detecting pollution in or toxic contamination of water and soil.
- b. Assessing the impact of drought on agriculture.
- c. Providing a broad indication of flood inundation.

D. RESPONSIBILITIES

1. Emergency Response Team (ERT) Responsibilities

The Technical Services Branch of the Information and Planning Section is assigned the responsibility of coordinating remote sensing activities and requirements for the Emergency Response Team (ERT). In the absence of a Technical Services Branch, the Information and Planning Section Chief will assume (or redelegate) this responsibility. Within the Technical Services Branch, this responsibility is assigned to the position of RSC (if staffed; otherwise it reverts to the branch chief), whose responsibilities include:

- a. Identifying ERT remote sensing requirements, opportunities, and activities by other ERT elements or Federal agencies.
- b. Coordinating required aerial or non-NTM satellite remote sensing support directly with the USGS/EDC.
- c. Preparing and forwarding remote sensing requests to the FEMA Headquarters RSC when NTM collection and processing systems are or may be required. This responsibility includes validating that the request cannot be fulfilled by non-NTM systems or capabilities.
- d. Functioning as the ERT single point of contact for remote sensing issues.

2. State and Local Responsibilities

a. States are responsible for coordinating and obtaining remote sensing to support their own disaster response operations. To effectively exercise that responsibility, States are highly encouraged to identify potential state (e.g., National Guard), local, and commercial remote sensing providers in their region, determine their capabilities and availability, and develop/establish appropriate contingency support agreements.

b. Federal assistance may be requested when the requirements of a State cannot be met by or through their own resources or resource agreements. In such cases, States should communicate their remote sensing needs (through their emergency management authorities) to the Information and Planning Section of the ERT or ROC Staff. Such requests must include a statement why the State cannot perform or contract for the performance of the requested work. Mission assignments resulting from a State-originated request may be subject to the applicable cost-share. For additional information concerning mission assignment procedures and protocols, refer to Job Aid 9344.1-VW, Mission Assignments Overview.

c. Under certain conditions, States must agree to special dissemination and access restrictions before NTM-derived imagery will be provided.

3. FEMA Regional Office Responsibilities

Each FEMA Regional Director will designate a primary and alternate Regional RSC. The Regional RSC will coordinate and resolve day-to-day remote sensing issues within the Region, as well as (prior to the establishment of an ERT RSC) receive, process, and manage disaster-related remote sensing requests. It is recommended that the two Regional RSC positions be filled by personnel representing the Response and Recovery Division and Mitigation Division, since both functional areas have a significant and continuing interest in remote sensing capabilities. However, the remote sensing coordination mission is the overall responsibility of the Region's Response and Recovery Division. Regional Response and Recovery Division Directors will forward the names and telephone numbers of Regional RSC designees to the FEMA Headquarters RSC. Designated Regional RSCs are responsible for:

a. Coordinating (until the capability is available on the ERT) aerial or non-NTM satellite remote sensing support directly with the USGS EROS Data Center.

b. Preparing and forwarding remote sensing requests to the FEMA Headquarters RSC, when NTM collection and processing systems are or may be required. This responsibility includes validating that the request cannot be fulfilled by non-NTM systems or capabilities.

c. Being the Regional single points of contact for remote sensing issues.

d. Supplementing this manual with Region-unique procedures or information, as appropriate. Please forward supplements to the FEMA Headquarters RSC.

NOTE: The Regional RSC should not be confused with the RSC position on the ROC Staff. However, the Regional RSC should be the primary candidate (if available) to staff the ROC Staff RSC position.

4. FEMA Headquarters Responsibilities

FEMA Headquarters responsibilities are exercised by the RSC, under the Assessment and Analysis Branch, Operations and Planning Division, Response and Recovery Directorate. Those responsibilities include:

- a. Developing policy and procedures for the acquisition, use, and management of remote sensing information for disaster operations. This SOP is the primary vehicle for articulating disaster-related remote sensing policy and procedures.
- b. Coordinating remote sensing involving or requiring support from National Technical Means (NTM).
- c. Developing and coordinating a support agreement with the EDC to provide non-NTM aerial and satellite support directly to Regions and ERTs.
- d. Forwarding pertinent remote sensing information to Regional RSCs.

5. Federal Agency Responsibilities

Federal agencies which support the FRP may either be (1) recipients of remote sensing information; (2) providers (or processors) of remote sensing information, or (3) both. In all cases, federal agencies are required to coordinate planned remote sensing activities (self-provided or laterally/commercially tasked), with the Information and Planning Section, Technical Services Branch of the responding ERT. If an ERT has not been deployed, coordinate with the FEMA Headquarters RSC. This requirement serves two primary functions: it eliminates potential duplication of effort, and it ensures that anticipated/generated remote sensing products and information are made available to the maximum number of potential federal and State users. *(Note: this coordination requirement applies only to those agencies operating within or supporting a FRP activity or operation.)* The following federal agencies/organizations have specific remote sensing responsibilities or authorities under Executive Order, the FRP, and/or supporting or associated agreements:

a. **United States Department of the Interior (DOI)**. DOI will, through the United States Geological Survey (USGS) EROS Data Center (EDC):

(1) Function as FEMA's executive agent for the acquisition and coordination of non-NTM and non-DoD aerial and satellite remote sensing during disaster response operations. Specifically, as executive agent, the EDC will:

(a) Upon receipt of a mission assignment from a designated FEMA authority, coordinate and manage the timely tasking, acquisition, processing, and delivery of satellite imagery from commercial or (non-NTM) federal sources. Designated FEMA authorities are the Headquarters RSC, a Regional RSC, or ERT Information and Planning Section Chief, Technical Services Branch Chief or RSC. For more information on mission assignments, refer to Job Aid 9344,1-VW, Mission Assignments Overview.

(b) Upon receipt of a mission assignment from a designated FEMA authority, coordinate through the USGS/Mid Continent Mapping Center (MCMC) for the timely tasking, acquisition, processing, and delivery of aerial photogrammetric and photographic products, from both commercial and federal sources. Designated FEMA authorities are listed in the preceding paragraph.

(2) Archive and store, in a readily accessible system, all imagery obtained by or through the USGS in support of FEMA disaster operations.

(3) Be prepared to provide other remote sensing exploitation, products, and data services, if requested and within the capabilities of the USGS.

(4) Identify new remote sensing products and technologies which may improve or enhance federal disaster response operations and capabilities, or which may be candidates for additional research.

b. **Civil Applications Committee (CAC)**. The CAC is the federal interagency organization charged with validating and approving civil agency requests to use NTM satellite sensor systems in support of non-intelligence activities or operations. In accordance with this authority, the CAC will:

(1) Expeditiously process Domestic Imagery Requirements (DIRs) submitted by the FEMA Headquarters RSC in support of federal disaster operations.

(2) Immediately notify appropriate federal activities of approval/disapproval.

c. **National Imagery and Mapping Agency (NIMA)**. NIMA will, through their Disaster Response Team (DRT):

(1) Upon request from the FEMA Headquarters RSC, and following DIR approval by the CAC and NIMA Policy office, coordinate and manage the timely tasking, acquisition, analysis, and delivery of satellite imagery or imagery-derived products from NTM sources. These activities and sources may involve non-NIMA facilities or resources.

(2) Provide expert analysis of imagery to determine damage levels and other elements of essential information (EEI).

(3) Provide technical expertise (in the form of briefings or analytical reporting) to FEMA Headquarters.

(4) Provide technical experts (specifically, imagery analysts) to support deployed ERTs that require on-site imagery exploitation.

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II. OPERATIONS AND PROCEDURES

Every process is governed by certain operating principles and procedures, the adherence to which is usually a necessity if the desired capability is to be fully and responsively exploited. Remote sensing is no exception. The misunderstanding of remote sensing procedures and operating principles can delay acquisition and exploitation of desired imagery, adversely affecting the disaster response by denying potentially crucial information and analysis to decision-makers. This chapter details the procedures that govern disaster-related remote sensing operations, first by identifying some basic assumptions upon which these supporting procedures are based, and then by outlining those procedures.

A. ASSUMPTIONS

1. Remote sensing capabilities within both federal and commercial sectors will be available, but may be limited by environmental, technical, or competitive factors.
2. Delivery of remote sensing information, from the initial time of request, will take a minimum of 12 hours (aircraft) or 24 hours (satellite).
3. Remote sensing support will not be appropriate for all disasters or events.

B. ESTABLISHING A REQUIREMENT

Any and every disaster, emergency, and threat should be immediately and continually evaluated for supportability by remote sensing coordinators at Regions and Headquarters. This evaluation should be guided by one key consideration: Is the event "*remote sensible?*" Simply put, does it make sense to seek remote sensing support? This is a key consideration because, in practice, less than ten percent of all declared disasters present legitimate remote sensing opportunities. To determine situational remote "sensitivity," answer the following questions (see checklist at Figure D-1).

1. ***Is the information necessary or nice-to-display?*** In other words, is remote sensing required to support explicit planning or decision-making objectives? Will the absence of the requested information possibly have an adverse effect on operations? Under no circumstances should remote sensing support be sought merely to provide displays. Verifying an operational need for the requested information is the single most important validating role of RSCs.

2. ***Is the requested information discernible from analysis of imagery?*** RSCs must validate that the information needed by a requester is actually derivable from analysis of the remotely sensed imagery. For example, a requester may want to know the height and extent of storm surge across a particular area. The RSC must recognize that while common indicators of surge *height* cannot be observed from overhead imagery, the *extent* of storm surge may be deducible from associated debris residue.

3. ***Is the targeted area very large or geographically remote?*** If the targeted area is small, the needed information (i.e., what the requester wants to determine *from* the remote sensing) can often be obtained more quickly from a ground or aerial survey. As an example, a fixed or rotary-wing aerial survey might be more appropriate to determine the degree of damage to structures on a sparsely populated, small island in the Chesapeake Bay. Conversely, for damage assessment purposes, remote sensing should be actively considered if the area to be targeted (regardless of size) is also geographically remote. A good example would be a small, sparsely inhabited Pacific atoll hundreds of miles from the nearest airport-capable island. If the area to be targeted is geographically large with many centers of population (e.g., Puerto Rico or Long Island), the time required to perform visual surveys might make remote sensing a viable damage assessment alternative. Keep in mind that for purposes other than damage or impact assessment, size and remoteness are not necessarily valid considerations. In no case, however, should remote sensing systems be used when conventional collection techniques (e.g., ground assessments) are both available and capable of satisfying the information requirements or needs of the requester.

4. ***Will the request support disaster response activities?*** Remote sensing requests should either directly or indirectly support the operational objectives of the federal response effort. Operational objectives are established by an ERT, ROC Staff, or Emergency Support Team (EST) to prioritize, focus, reconcile, and unite the response activities of all organizational functions. Remote sensing efforts should, therefore, be geared towards helping achieve those objectives. Requests which do not appear to support articulated objectives must be carefully evaluated and cautiously validated by remote sensing coordinators. For further information on operational objectives (as well as the entire planning process), refer to the Information and Planning Section SOP or, when published, Operations Manual.

5. ***How quickly will the information's utility diminish?*** Identifying the perishability of requested information is an important responsibility of RSCs, since it would be both pointless and negligent to request information that cannot possibly be provided until after it is no longer needed. Equally important is to know when the need for the information diminishes or will diminish, so that potentially expensive collection efforts can be aborted. For all requests, RSCs should have the requesting official identify periods of utility, if known.

6. ***Are other methods of information acquisition available?*** Use alternative collection methods whenever possible and wherever appropriate. Do not request NTM support until or unless it has been determined that the necessary information is unavailable from other commercial or federal sources. For example, FEMA has agreements with both the U.S. Customs Service and Civil Air Patrol (CAP) to provide aerial support (transportation, overflight, video) during and in support of disaster response operations. These resources may be able to obtain the needed information faster and at less expense.

C. ASSIGNING THE REQUIREMENT

1. Once the need for remote sensing is established (in accordance with the guidance in preceding paragraphs), the responsible RSC must determine what method(s) will be used to provide the necessary support. NTM sources will not be used if the requirement can be fulfilled by commercial or other federal systems or sources (RSCs may be asked to certify non-availability of these systems). However, a determination of fulfillment depends on more than technical capability. A commercial aerial system may possess the technical capability to provide the requested products, but not within the timeframe established by the requester. In such cases, where the urgency of the requirement precludes unnecessary or avoidable delay, NTM support may be authorized. Before contacting either the FEMA Headquarters RSC, EDC Remote Sensing Support Coordinator (EDC-RSSC), or Defense Coordinating Officer (DCO), the Regional or ERT RSC must determine the following:

a. Urgency. How fast is the imagery/derived information needed? If the purpose is for assessing damages or impacts for the purpose of identifying response priorities, the urgency will likely preclude non-NTM support.

b. Frequency: How often is the imagery/derived information needed? If the information is needed continually throughout an operational period, non-NTM sources will be required.

c. Target Area. Is the area relatively small, such as a point target (e.g., dam, small town, or residential area), or a large geographic area (e.g., one or more counties)? If possible, identify target areas by both place name and latitude and longitude (lat/long); this will speed up the process as well as help eliminate targeting errors. Lat/long can be represented one of three ways:

(1) Point Target. Typically, point targets are identified by listing a single lat/long and surrounding area of interest. Example:

A five-mile radius of 32.46.51N/108.16.32W, Silver City, New Mexico.

(2) Point-to-Point Target. A point-to-point target can be identified by using two lat/long pairs and the intervening area of interest. Example:

The Red River between points 47.21.6N/96.52.43W and 48.3.25N/97.4.33W.

(3) Area Target. An area target requires a minimum of three lat/long pairs, but four pairs is normal. Example:

The area east of the Salt Lake bounded by:
41.19.18N/111.44.24W
41.16.30N/112.16.6W
40.24.48N/112.5.30W
40.3030N/111.37.42W

d. Resolution. What level of resolution is required (imagery only)? Resolution is defined as a measure of the ability to separate observable elements. In the case of imagery, it describes the area represented by each pixel. The smaller the area represented, the more accurate and detailed the image. A resolution of 4 km means that each pixel represents a square that is 4 km on each side.

e. Analytical Requirements. What kind of analysis is requested or needed (e.g., damage assessment or flood boundary determination) and in what form does that analysis need to be provided (e.g., MapInfo polygons or verbal report)?

2. RSCs should follow the RSC Checklist at Figure D-1 prior to submitting a formal request for remote sensing support.

3. Regardless of the urgency of the request, the Regional or ERT RSC should first -- and immediately -- contact the EDC-RSSC to request support. Be prepared to outline precise requirements, to include latitude and longitude of targeted areas, and frequency and duration of requested support (refer to the Remote Sensing Request Preparation Checklist at Figure D-2). The EDC-RSSC will determine if the necessary support can be provided from commercial or non-NTM federal resources. If support can be coordinated, the EDC-RSSC will provide an estimated cost, but will not take any action until in receipt of a valid Mission Assignment. If such support is unavailable, the requesting RSC will be referred to the FEMA Headquarters RSC to determine if NTM support is available.

4. If the EDC-RSSC is unable to coordinate the requested support, the Region or ERT RSC should contact the FEMA Headquarters RSC to determine if NTM support may be available. If the request is NTM-appropriate, FEMA Headquarters will assume responsibility for all further coordination. If it is determined that the request is not supportable, the FEMA Headquarters RSC will notify the Regional or ERT RSC, who will then re-assume responsibility for coordinating needed support through the EDC-RSSC. In cases where extremely high-resolution imagery is required quickly, Department of Defense (DOD) aerial reconnaissance aircraft may be available to provide support. To determine availability, the RSC should immediately contact either the DCO (if available), or the Military Support Liaison Officer (MSLO) at FEMA Headquarters.

5. If the request includes a requirement for imagery analysis, exploitation by experienced imagery analysts will be required. When NTM support is authorized, expert imagery analysis will automatically be provided, since, in most cases, the imagery itself will not. However, when the request is for non-NTM support, the Regional or ERT RSC should determine, in consultation with the EDC-RSSC, if needed analysis is available from the provider. If not, the RSC will need to coordinate on-site technical expertise. The RSC will (through the Technical Services Branch Chief) advise the Information and Planning Section Chief that an on-site requirement exists (or will exist) for one or more imagery analysts. If in agreement, the Information and Planning Section Chief should request, through the DCO, that the NIMA Disaster Response

Team provide imagery analysts. Ensure the request identifies the type(s) of analyses needed (e.g. damage assessment, agricultural impact assessment, etc.), and the projected length of time on-site support will be required.

a. If a DCO is not activated or not yet available, requests should be forwarded (through the ROC Staff, EST, or FEMA Headquarters RSC) to the MSLO at FEMA Headquarters. The MSLO will forward the request to the appropriate military office, normally the Director of Military Support (DOMS).

b. Imagery analysts will be staffed as the "Technical Specialist" position on the Technical Services Branch.

c. Whenever contemplating or planning to request the deployment of a NIMA imagery exploitation team, immediately notify the FEMA Headquarters RSC.

d. The USGS is an alternate source of imagery analysis expertise. Refer requests to the EDC-RSSC.

6. The type of collection system or systems (aerial or satellite; electro-optical or radar, etc.) chosen to support a remote sensing request will be left to the discretion of the EDC-RSSC. That decision will be based on the information requirements provided by the requesting RSC. For NTM-requests, the collection methodology will be determined by the NTM provider.

7. Other agencies supporting response efforts may also be initiating or coordinating remote sensing through their own resources or commercial agreements. To prevent the unnecessary duplication of effort and assure the maximum utilization of products, the Information and Planning Section must continually check with other functional areas to identify planned or ongoing remote sensing activities.

8. For non-NTM sources, requests may initially be coordinated over the phone, but a formal tasking or obligating document is required to initiate an actual response. Refer to Appendix D for samples of accepted tasking/obligating documents.

D. DELIVERY

1. Remote sensing imagery or information will be delivered to the requester and/or RSC in the manner and format they prescribe, whenever and wherever possible. However, circumstances may not always accommodate preferences. For example, large, paper copies of aerial imagery may be requested by an ERT, but commercial delivery may be unavailable due to disaster-caused transportation system limitations. Another potential problem is the tremendous size of many digital images, which may inhibit or prevent transmission over standard e-mail systems. In such cases, imagery may be electronically obtainable via an alternate system, such as FTP (File Transfer Protocol). Contact your Local Area Network (LAN) Administrator to establish an FTP site. The following types of products are generally available:

a. Paper Products. Imagery and imagery-derived information (in the form of GIS products) are available in paper form, generally in one of the following five sizes (advise the FEMA MAC or ERT GIS Coordinator of your requirements):

- (1) "A" size: 8 ½" x 11"
- (2) "B" size: 11" x 17"
- (3) "C" size: 17" x 22" or 18" x 24"
- (4) "D" size: 22" x 34" or 24" x 36"
- (5) "E" size: 34" x 44" or 36" x 48"

b. Electronic Products. Many commercial providers can digitize imagery and provide it electronically, either via e-mail, internet or, more commonly (due to the size of the files) via FTP. The FEMA MAC can also provide finished GIS products electronically, either as MapInfo files or in other forms (*.PDF, *.GIF, *.JPEG, etc.).

c. Verbal or Written Products. Verbal reports may be provided when the criticality of the information is such that the requester cannot wait for hard products, or analytical clarification is required. A written report may be requested (or unilaterally provided) if the analysis is complex or potentially confusing.

2. Certain release restrictions may apply to received products.

a. NTM *imagery* is usually not releasable outside federal channels, nor may it -- without approval -- be reproduced or photographed. However, the GIS *imagery-derived products* which the FEMA MAC generates from NTM remote sensing may be disseminated without restriction.

b. If FEMA pays for (or shares in the cost of) commercial imagery, that imagery must be freely distributable without restriction. RSCs and the EDC-RSSC should not enter into agreements with a provider that will not authorize free release of delivered products to all federal and state response agencies.

E. STAND DOWN

1. The ERT Information and Planning Section should frequently poll other response elements to determine their remote sensing needs, if any. In the absence of any need or projected need, the Information and Planning Section Chief should deactivate the remote sensing coordinator position and any associated technical experts; i.e., imagery analysts. In addition, the EDC-RSSC should be notified immediately following a determination that remote sensing support is no longer required. The FEMA Headquarters RSC will authorize the termination of NTM remote sensing collection once the requested information has been provided or the need for such information has abated.

2. The Information and Planning Section is responsible for ensuring that all non-NTM imagery obtained in support of the disaster is ultimately forwarded to the EDC-RSSC for final disposition (storage, cataloging, etc.). NTM imagery will be returned to the FEMA Headquarters RSC. For mailing addresses, refer to Appendix C. All other remote sensing records will be disposed of in accordance with Information and Planning Section SOP or (when published) Operations Manual guidance.

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III. SUPPORT REQUIREMENTS AND PROCEDURES

A. LOGISTICS

Remote sensing activities and operations at a DFO require no standard, independent logistical support. However, if technical experts brought in to augment the remote sensing mission of the Technical Service Branch identify unique support requirements, these will be addressed on a case-by-case basis.

B. COMMUNICATIONS

At the Regional and ERT levels, standard commercial phone capability and internet access are the minimum requirements. At FEMA Headquarters, the RSC additionally requires a classified communications capability (secure phone -- fixed and mobile -- and secure fax) to coordinate NTM activities with the provider and necessary coordination organizations, such as the CAC.

C. INFORMATION SYSTEMS

The following information or information-support/production systems are required to support remote sensing activities:

1. Color Poster Printer/Plotter.
 - a. Regions and FEMA Headquarters require permanent, readily available access to printers capable of printing high resolution imagery and imagery-derived products. These products will be used for planning, briefings, and can be produced and shipped to deployed response elements.
 - b. If an ERT requires this capability, the necessary equipment can be ordered from the Disaster Information Systems Clearinghouse (DISC) through the MAC. Refer to the document Federal Coordinating Officer Procedures for Obtaining Geographic Information System (GIS) Support at a Disaster Field Office (DFO).
2. Color Laser Printer, 600 DPI or better. This printer will be used to print imagery derived products for briefings, planning meetings, decision-support activities, and distribution to responders and emergency management officials. Regions and FEMA Headquarters require a permanent capability; ERTs can obtain this capability in accordance with the procedures in the preceding paragraph.
3. Pentium II MMX (or better) PC. This PC must have a minimum 256MB RAM, 10 GB hard drive, 32x CD -ROM drive, and state-of-the-art video card. All capabilities must be upgradeable.

D. PERSONNEL MANAGEMENT

For catastrophic and major disasters, do not delay the decision to activate a Technical Services Branch Chief and RSC as part of an ERT Information and Planning Section.

1. An EDC-RSSC must be available 24 hours a day to coordinate FEMA remote sensing requests. The USGS/EDC will establish procedures to ensure an EDC-RSSC can be contacted at or (if on call) through a designated telephone number. Refer to Appendix C.

2. A FEMA Headquarters RSC will be available 24 hours a day to coordinate remote sensing issues, and can be contacted through the FEMA Operations Center (FOC).

3. NIMA/DRT will develop and implement procedures to ensure that a team member is available 24 hours a day to coordinate remote sensing issues with the FEMA Headquarters RSC.

E. FINANCIAL MANAGEMENT

Remote sensing imagery and support will normally be obtained through issuance of a mission assignment to the USGS. However, in some instances, an RSC may elect to coordinate support through other avenues, such as the DoD, other federal agency, or directly with a commercial provider. A mission assignment (executed using the Request for Federal Assistance form) is the vehicle for tasking other federal entities, while the FEMA Form 40-1, Requisition and Commitment for Services and Supplies is used for commercial providers. For additional guidance, refer to one or more of the publications listed below. (Note: Remote sensing requests fulfilled through NTM sources do not fall under the purview of these publications and are provided at no cost. However, NTM providers will not, as a rule, provide actual imagery.)

1. 9344.1-VW, Mission Assignments Overview
2. 9344.1-JA, Job Aid: How to Process Mission Assignments
3. 9050.1-JA, Job Aid: How to Process a Procurement Request in the Operations Section

IV. PLANS, REPORTS, AND RECORDS

Remote sensing is functionally aligned under the Information and Planning Section, which is responsible for ensuring that it supports, and is supported by, effective objective planning, accurate and timely situation reporting, and a responsive and accessible records management system.

A. ESSENTIAL ELEMENTS OF INFORMATION

The following list reflects those generic, pre-identified elements of information deemed potentially essential to support an effective federal response to an exigency. However, not all Essential Elements of Information (EEIs) are legitimate collection targets for remote sensing, either situationally, or as a rule. Below, the EEIs preceded by a © are considered appropriate targets under all supported exigencies; those preceded by a ☒ are considered appropriate only under certain circumstances.

- © **Boundaries of the disaster area**
- © **Social/economic/political impacts**
- © **Jurisdictional boundaries**
- ☒ **Status of transportation systems and critical transportation facilities**
- ☒ **Status of communications systems**
- ☒ **Access points to the disaster area**
- ☒ **Status of operating facilities**
- ☒ **Hazard-specific information**
- ☒ **Weather data affecting operations**
- ☒ **Seismic or other geophysical information**
- ☒ **Status of critical facilities and distribution systems**
 - Status of remote sensing and reconnaissance activities
 - Status of key personnel
 - Status of Emergency Support Function (ESF) activation
 - Status of disaster or emergency declaration
 - Major issues/activities of ESFs
 - Resource shortfalls/Status of critical resources
 - Overall priorities for response
 - Status of upcoming activities
 - Donations
 - Historical and demographic information
- ☒ **Status of energy systems**
- ☒ **Predictively modeled estimates of potential impacts**
 - Status (statistics) of recovery programs (human services, infrastructure, SBA)
- ☒ **Status and analysis of needs and preliminary damage assessments**
 - Status of efforts under other Federal emergency operations plans

The source of these EEIs is the Information and Planning Section Standard Operating Procedures or (when published) Operations Manual.

B. GEOGRAPHIC INFORMATION SYSTEMS

Remote sensing information is most useful when it supports timely and effective decision-making. Experience has consistently proven that raw, unanalyzed *imagery* is far less effective as a decision-making tool than is *analysis*, derived from that imagery, and fused into GIS products.

C. PLANNING

Action should be taken to assess the need for and request remote sensing as soon as possible. Once remote sensing support activities are underway, the RSC should either (1) attend all subsequent planning meetings, or (2) meet daily with the Planning Support Branch; the purpose: to identify future requirements and plan accordingly.

D. REPORTING

Due to any number of factors, visual or spatial remote sensing products may not be immediately or quickly available to requesters. Those factors include, but are not limited to classification of the imagery, time required to develop derived GIS products, and technical shortcomings. Remote sensing clients may, therefore, request an immediate verbal or written report of findings by imagery analysts. These reports will generally be provided directly to the requester by the analyst(s). It is anticipated that, under certain conditions, classification concerns may prevent verbal reporting. These verbal reports follow no specific format; instead, the report will be narratively tailored to meet the specific request.

E. RECORDS MANAGEMENT

At the Disaster Field Office, all files and records will be provided to the Documentation Branch of the Information and Planning Section for maintenance and disposition. At the Region, the Regional RSC will ensure records are properly administered. The FEMA Headquarters RSC will execute this function at FEMA Headquarters. All imagery will be stored and archived at the USGS EDC. All imagery-derived products will be stored and archived by the FEMA Headquarters MAC.

F. AFTER-ACTION REPORTING

Problems, innovations or circumstances that significantly impacted, either positively or negatively, the timely or effective acquisition of remote sensing support, should be considered for recommendation as an After-Action Report (AAR) item. While the Information and Planning Section Chief is responsible for making the AAR recommendation to the FCO; it is the Technical Services Branch Chief (if activated) who is responsible for detailing the issue and outlining recommended corrective or implementation actions. For AAR formatting and preparation guidance, refer to the Information and Planning Section SOP or, upon publication, Operations Manual.

V. OPERATING FACILITIES

1. Disaster Field Office (DFO). It is from the DFO that the ERT, including the Technical Services Branch of the Information and Planning Section, conducts operations. The ERT RSC will operate from this facility.
2. Regional Operations Center (ROC). It is from this facility, or from the Region proper, that the Regional RSC coordinates remote sensing activities.
3. FEMA Headquarters. The RSC operates from the Assessment and Analysis Branch of the Operations and Planning Division, Response and Recovery Directorate. Remote sensing coordination is normally accomplished from the RSC program offices, but may be relocated to the National Interagency Emergency Operations Center (NIEOC) during EST operations. FEMA Headquarters is located in Washington, D.C.
4. EROS Data Center (EDC). The EDC-RSSC is located at this facility, near Sioux Falls, SD. The EDC maintains the National Satellite Land Remote Sensing Data Archive (NSLRSDA) which includes over 4 million satellite images from Landsat, National Oceanic and Atmospheric Administration (NOAA) polar orbiting weather satellites, and declassified intelligence satellites, as well as over 8 million aerial photographs.

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VI. TRAINING AND EXERCISES

A. TRAINING REQUIREMENTS

All designated RSCs will:

1. Review and become familiar with the procedures outlined in this SOP.
2. Review and become familiar with the referential and supporting documents identified in Appendix A of this SOP.
3. Attend and satisfactorily complete the Information and Planning Section Training Course (course number E228) in residence at the Emergency Management Institute (EMI).
4. Attend and satisfactorily complete the Technical Services Branch Training Course (course number E298) in residence at EMI.

B. EXERCISES

Remote sensing procedures (identification of requirements, coordination of products) will be periodically tested during FEMA and other agency-sponsored exercises, if appropriate to the scenario. Determinations of participation will be made on an exercise-by-exercise basis.

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APPENDIX A REFERENCES

TITLE OF REFERENCE	REFERENCE OR DOCUMENT NO.	PUBLICATION DATE
Federal Response Plan		April 1992
Information and Planning Section Standard Operating Procedures (SOP)		July 1996
Information and Planning Section Operations Manual	9330.1-PR	DRAFT
Emergency Response Team (ERT) Operations Manual	9354.1-PR	June 1998
Emergency Support Team (EST) Operations Guide	9360.1-FG	April 1998
Federal Coordinating Officer Procedures for Obtaining Geographic Information System (GIS) Support at a Disaster Field Office (DFO)		October 3, 1997
FEMA/USGS MOU		1982 (under revision)
Civil Air Patrol Support in Disasters	9347.1-PR	September 1997
About the EROS Data Center USGS Background Paper		June 30, 1998
Mission Assignments Overview	9344.1-VW	November 1998
Job Aid: How to Process Mission Assignments	9344.1-JA	DRAFT
Job Aid: How to Process a Procurement Request in the Operations Section	9050.1-JA	DRAFT

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APPENDIX B ACRONYMS AND ABBREVIATIONS

The following is a list of the acronyms and abbreviations used in this publication. For a more comprehensive terminology listing, refer to *The Disaster Dictionary: Common Terms and Definitions Used in Disaster Operations*, dated May 1997 (draft), a FEMA document currently under development and review.

AAR	After-Action Report
CAC	Civil Applications Committee
CAP	Civil Air Patrol
CD-ROM	Compact Disc - Read Only Memory
COB	Close of Business
DC	District of Columbia
DCO	Defense Coordinating Officer
DFO	Disaster Field Office
DIR	Domestic Imagery Requirement
DISC	Disaster Information Systems Clearinghouse
DOD	Department of Defense
DOI	Department of the Interior
DOMS	Director of Military Support
DRT	Disaster Response Team
EDC	EROS Data Center
EDC-RSSC	EROS Data Center - Remote Sensing Support Coordinator
EEI	Essential Element(s) of Information
EMI	Emergency Management Institute
EO	Electro-Optical
EROS	Earth Resources Observation Systems
ERT	Emergency Response Team
ESF	Emergency Support Function
EST	Emergency Support Team
FAX	Facsimile
FCO	Federal Coordinating Officer
FEMA	Federal Emergency Management Agency
FOC	FEMA Operations Center
FOG	Field Operations Guide
FRP	Federal Response Plan
FTP	File Transfer Protocol
GB	Gigabyte
GIS	Geographic Information System(s)
IDP	Imagery-Derived Product
IR	Infrared Radiation
Km	Kilometer
LAN	Local Area Network
Lat/Long	Latitude and Longitude
MA	Mission Assignment
MAC	Mapping and Analysis Center
MB	Megabyte
MCMC	Mid Continent Mapping Center

MSLO	Military Support Liaison Officer
NIEOC	National Interagency Emergency Operations Center
NIMA	National Imagery and Mapping Agency
No.	Number
NTM	National Technical Means
NSLRSDA	National Satellite Land Remote Sensing Data Archive
Ops	Operations
PC	Personal Computer
RADAR	Radio Detection and Ranging
RAM	Random Access Memory
RFA	Request for Federal Assistance
ROC	Regional Operations Center
RRSC	Regional Remote Sensing Coordinator
RSC	Remote Sensing Coordinator
RSSC	Remote Sensing Support Coordinator
SAR	Synthetic Aperture RADAR
SBA	Small Business Administration
SOP	Standard Operating Procedure(s)
SW	Southwest
TBD	To Be Determined
UAV	Unmanned Aerial Vehicle
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey

APPENDIX C POINTS OF CONTACT

POSITION	NAME	TELEPHONE NO.	FAX NO.
		SECURE PHONE NO.	SECURE FAX NO.
REMOTE SENSING COORDINATOR FEMA HQ PRIMARY	DAVID GARRATT	(202) 646-4546	(202) 646-4336
		(202) 646-3050	(202) 646-3050
REMOTE SENSING COORDINATOR FEMA HQ ALTERNATE	BRUCE PRICE	(202) 646-3331	(202) 646-4336
		(202) 646-3331	(202) 646-3050
NATIONAL IMAGERY AND MAPPING AGENCY DISASTER RESPONSE TEAM	TED DONALDSON (TEAM CHIEF)	(202) 863-3256	(202) 863-3186
		(202) 685-6165	(202) 685-6166
EROS DATA CENTER REMOTE SENSING SUPPORT COORDINATOR	MICHAEL CRANE	(605) 594-6041	(605) 594-6150
REMOTE SENSING COORDINATOR FEMA HQ MITIGATION	PAUL BRYANT	(202) 646-3607	(202) 646-2577
		N/A	N/A
MAPPING AND ANALYSIS CENTER FEMA HQ	ED CORVI PRIMARY DENNIS GREEN ALTERNATE	(202) 646-2813	(202) 646-4652
		(202) 646-3470	(202) 646-3402
FEMA OPERATIONS CENTER	24-HOUR ON-DUTY CONTROLLERS	(202) 898-6100	(202) 898-6177
		(202) 898-6103	(202) 898-6103
FEMA MISSION ASSIGNMENT POLICY OFFICER	CARRON SHOFFNER	(816) 283-7953	(816) 283-7042
CIVIL APPLICATIONS COMMITTEE CHAIRMAN	DR. ERIC ANDERSON	(703) 648-7822	(703) 648-7873
		(703) 648-7822	(703) 648-7870

FEMA MILITARY SUPPORT LIAISON OFFICER	----	(202) 646-3091	
REGIONAL REMOTE SENSING COORDINATOR	MARK GALLAGHER	(617) 223-9552	(617) 223-9519
FEMA REGION 1		N/A	N/A
REGIONAL REMOTE SENSING COORDINATOR	CHARLES RIDGWAY	(212) 225-7233	(212) 225-7005
FEMA REGION 2		N/A	N/A
REGIONAL REMOTE SENSING COORDINATOR	CHARLES LORD	(215) 931-5652	(215) 931-5590
FEMA REGION 3		N/A	N/A
REGIONAL REMOTE SENSING COORDINATOR	DAVID LAWSON	(770) 220-5504	(770) 220-xxxx
FEMA REGION 4		N/A	N/A
REGIONAL REMOTE SENSING COORDINATOR	LARRY BAILEY	(312) 408-5582	(312) 408-5599
FEMA REGION 5		N/A	N/A
REGIONAL REMOTE SENSING COORDINATOR	JOHN C. ROBERTS	(940) 898-5220	(940) 898-5163
FEMA REGION 6		N/A	N/A
REGIONAL REMOTE SENSING COORDINATOR	RON McCABE	(816) 283-7007	(816) 283-7042
FEMA REGION 7		N/A	N/A
REGIONAL REMOTE SENSING COORDINATOR	DAN GRIFFITHS	(303) 235-4990	(303) 235-4939
FEMA REGION 8		N/A	N/A
REGIONAL REMOTE SENSING COORDINATOR	KEN CHIN	(415) 923-7250	(415) 923-7270
FEMA REGION 9		N/A	N/A
REGIONAL REMOTE SENSING COORDINATOR	NETTIE LEWIS	(425) 487-4751	(425) 487-4741
FEMA REGION 10		N/A	N/A

APPENDIX D JOB AIDS AND OTHER SUPPORT INFORMATION

The RSC Checklist at Figure D-1 guides the RSC through the general actions and activities necessary to obtain remote sensing support.

FIGURE D-1 – RSC CHECKLIST

1.	_____	Validate the request or requirement for remote sensing, i.e., determine:
a.	_____	Is the information necessary (as opposed to “nice-to-have”?)
b.	_____	Can the requested information be discerned from imagery analysis?
c.	_____	Does the size or location of the target area preclude conventional information collection methods (e.g., ground assessment)?
d.	_____	Will the requested information support one or more ERT objectives or EEI?
e.	_____	Can the information be acquired quickly enough to be useful?
f.	_____	Are other forms of information collection unavailable or inadequate?
2.	_____	Complete the <i>Remote Sensing Request Preparation Checklist</i> .
3.	_____	Contact the EDC Remote Sensing Support Coordinator and determine if the EDC can support the request.
a.	_____	If the request <i>is</i> supportable, proceed to step 6.
b.	_____	If the request is NOT supportable, proceed to step 4.
4.	_____	Contact the FEMA Headquarters RSC and request support.
a.	_____	If NTM support is available, the FEMA Headquarters RSC will coordinate product delivery.
b.	_____	If NTM support is NOT available, proceed to step 5.
5.	_____	Contact the Defense Coordinating Officer (DCO) or (through FEMA Headquarters RSC) the Military Support Liaison Officer (MSLO) and determine if aerial reconnaissance support is available.
a.	_____	If the request <i>is</i> supportable, proceed to step 6.
b.	_____	If the request is NOT supportable, notify the FEMA Headquarters RSC that support is not available either through the EDC or DOD, and determine if any other options are available.
6.	_____	Determine the projected cost of the support, and prepare/coordinate the necessary mission assignment (using the Request for Federal Assistance form).
7.	_____	If imagery analysts will be required to exploit the imagery, notify the Technical Branch Chief that technical specialists will be required. Recommended source is the National Imagery and Mapping Agency (NIMA) Disaster Response Team.
8.	_____	Monitor the provision of assistance. Notify the Region and/or FEMA Headquarters RSCs of any problems.
9.	_____	Ensure all imagery (film) is returned to the EDC for storage.

The Remote Sensing Request Preparation Checklist at Figure D-2 should be accomplished by a Remote Sensing Coordinator prior to soliciting support from the USGS/EROS Data Center, FEMA Headquarters RSC, or other source. It should be completed at Step 2 of the RSC Checklist depicted at Figure D-1. RSCs should be prepared to discuss checklist items 2 through 5 below in greater detail.

FIGURE D-2 – REMOTE SENSING REQUEST PREPARATION CHECKLIST

1. _____	What are the coordinates of each point (or boundary coordinates of each area) you require to be remotely sensed?		
	PLACE NAME	LATITUDE	LONGITUDE
		N	W
		N	W
		N	W
2. _____	What information is sought from the remote sensing?		
	a.	Damage Assessment	
	b.	Extent of Flooding and/or Storm Surge	
	c.	Extent and Degree of Debris	
	d.	Boundaries of Disaster Area	
e.	Other: (describe) _____ _____ _____		
3. _____	What final product do you require?		
	a.	Raw imagery (e.g., photograph or non-photographic image)	
	b.	Exploited imagery (e.g., analyzed by imagery analyst)	
	c.	Imagery-derived product (e.g., flood extent maps, etc.)	
4. _____	What size product do you require?		
	a.	Poster size	How many?
	b.	Paper size	How many?
5. _____	What timeframe are the products needed?		
	No Later Than:	_____	
	Continue until:	_____ or product(s) delivered	
6. _____	Who are the primary and alternate POCs for this request?		
	PRIMARY	Name: _____	
		Phone: _____	Pager: _____
	ALTERNATE	Name: _____	
Phone: _____		Pager: _____	
7. _____	What is the shipping address for any products?		

8. _____	Has funding been approved for this request ?		
	MA Number:	_____	
	Fund Cite Number:	_____	

When operating under or within the authority of the FRP, the primary tool for requesting non-NTM remote sensing support is the Request for Federal Assistance (RFA) form. Once approved, an RFA becomes a Mission Assignment, which is the formal tasking vehicle for interagency support. A Mission Assignment may be originated by the EST, ROC Staff, or ERT, and should always be originated at the lowest level possible.

The following matrix outlines what response echelons should be expected to originate Mission Assignments during what conditions/situations:

Mission Assignment Originator	Situation(s)
Emergency Support Team (EST)	Multi-Regional event (i.e., states from more than one region are affected by the event).
Regional Operations Center (ROC) Staff	1. Multi-state event within Regional confines. 2. At the request of the Emergency Response Team, Advance Element (ERT-A).
Emergency Response Team (ERT)	When deployed and operating from an operational Disaster Field Office (DFO).

Remote sensing Mission Assignments may be issued to the USGS, to the DoD, or to other Federal agencies. Sample Request for Federal Assistance (RFA) forms are provided on the following pages.

FIGURE D-3 -- SAMPLE RFA FORM (For EDC Support)

Tracking Information (FEMA Use Only)

State: <i>Texas</i> Disaster #: <i>FEMA-DR-9999-TX</i>	Action Tracking # <i>413-5-99-TX</i> Date/Time Received: <i>1415E / October 24, 1999</i>
---	---

I. Assistance Requested

Internal Reference #	Assistance Requested	Qty	Date/Time Needed	Deliver to: Name/Address/Phone
	<i>Aerial Remote Sensing Support</i>		<i>25 - 30 October</i>	<i>Jane Smith FEMA DFO /ESF #5 Kermit, Texas (999) 888-7777</i>

Requestor/Phone #: *John Doe, FEMA Region VI ROC, (666) 555-4444*
 State Approving Official (if applicable): *Sam Jones, State Coordinating Officer, (555) 444-3333*

II. Description

Assigned Agency: *United States Geological Survey* New MA Amendment to MA#

Mission Statement: *Provide electro-optical aerial reconnaissance over select areas of Southern Texas. Provide same-day delivery of non-video digitized imagery to remote sensing coordinator or imagery exploitation team at DFO. Imagery should be highest resolution obtainable. Provide sustained overflight capability for five days beginning October 25, 1999. Imagery will become the sole and exclusive property of FEMA and must be releasable without restriction. Target areas will be identified daily by the Information and Planning Section of the DFO.*

Cost Share: Yes No See attached

Total Cost Estimate: *\$75,000.00* Projected completion date: *October 30, 1999*

Agency POC and Phone #: *EROS Data Center Remote Sensing Support Coordinator, (333) 222-1111*

III. Coordination (FEMA Use Only)

Type of Assistance	State Cost Share	Fund Citation
Direct Federal Assistance	0, 10, 25 %	1999 06 _____ 9 ___ 4 250 __ D
Technical Assistance	0%	
Federal Operations Support	0 %	Cost Share (%/\$):
Mission Assignment Coordinator (preparer) _____		
FEMA Project Officer/Branch Chief (program approval) _____		
Funds Control (funds review) _____		

IV. Approval

State Approving Official _____
Federal Approving Official _____

V. Obligation (FEMA Use Only)

Mission Assignment No.:	Amount This Action: \$	Date Obligated
Amendment Number:	Cumulative Amount: \$	Initials

FIGURE D-4 -- SAMPLE RFA FORM (For DoD Support)

Tracking Information (FEMA Use Only)

State: <i>Florida</i> Disaster #: <i>FEMA-DR-8888-FL</i>	Action Tracking # <i>413-5-88-FL</i> Date/Time Received: <i>0930E / August 16, 1999</i>
---	--

I. Assistance Requested

Internal Reference #	Assistance Requested	Qty	Date/Time Needed	Deliver to: Name/Address/Phone
	<i>Aerial Remote Sensing Support</i>		<i>17 Aug to TBD, but NLT 21 Aug</i>	<i>Jessica Yarmchuk FEMA DFO /ESF #5 Ft Walton Beach, FL (999) 888-7777</i>
Requestor/Phone #: <i>Jessica Yarmchuk, Technical Services Branch Chief, (999) 888-7777</i> State Approving Official (if applicable):				

II. Description

Assigned Agency: <i>Department of Defense</i>	New MA	Amendment to MA#
Mission Statement: <i>Provide aerial reconnaissance over select areas of the Florida panhandle. Provide same-day delivery of non-video digitized imagery to imagery exploitation team at DFO. Imagery should be highest resolution obtainable (12-inch or better). Provide sustained overflight capability for five days beginning August 17, 1999 or ASAP. Imagery will become the sole and exclusive property of FEMA and must be releasable without restriction. Target areas will be identified daily by the Information and Planning Section of the DFO.</i>		
Cost Share:	Yes No	See attached
Total Cost Estimate: <i>\$150,000.00</i>	Projected completion date: <i>August 21, 1999</i>	
Agency POC and Phone #: <i>Colonel Clark Savage, FEMA MSLO, (222) 111-9999</i>		

III. Coordination (FEMA Use Only)

Type of Assistance	State Cost Share	Fund Citation
Direct Federal Assistance	0, 10, 25 %	1996 06 _____ 9 ___ 4 250 __ D
Technical Assistance	0%	
Federal Operations Support	0 %	Cost Share (%/\$):
Mission Assignment Coordinator (preparer) _____ FEMA Project Officer/Branch Chief (program approval) _____ Funds Control (funds review) _____		

IV. Approval

State Approving Official _____ Federal Approving Official _____
--

V. Obligation (FEMA Use Only)

Mission Assignment No.:	Amount This Action: \$	Date Obligated
Amendment Number:	Cumulative Amount: \$	Initials

FIGURE D-5 -- SAMPLE 40-1 FORM

FEDERAL EMERGENCY MANAGEMENT AGENCY REQUISITION AND COMMITMENT FOR SERVICES AND SUPPLIES		DOCUMENT CONTROL NO. 288951
See Instructions on Reverse (FAILURE TO COMPLETE OR COORDINATE ALL ITEMS ON THIS FORM MAY RESULT IN PROCESSING DELAYS)		
1. PROGRAM OFFICE (Office Symbol, Building, Room No.) <i>DFO 9999DR Room 14B</i>	2. PROJECT OFFICER (Name and Telephone No.) <i>Susan Smith (333) 444-5555</i>	3. DATE OF REQUEST <i>November 21, 1999</i>
4. ESTIMATED PERIOD OF PERFORMANCE/DATE REQUIRED <i>Nov 23 through Nov 30, 1999</i>		5. TOTAL ESTIMATED COST
6. DELIVER TO: NAME (Include Office Symbol, Building, Room No. – If different than Item 1) <i>Same as Items 1 and 2</i>		7. SUGGESTED SOURCE(S): (Name, Address, Contact, Telephone No.) <i>FarFlung Aerial Enterprises, Inc. 9876 Reconnaissance Road - Suite 212 Wickenburg, AZ 87654</i>
<input type="checkbox"/> Ship to Headquarters Services Division		
<input type="checkbox"/> Attached		
8. PROJECT TITLE/DESCRIPTION OF SUPPLIES, EQUIPMENT AND/OR SERVICES (For supplies indicate item/mode block number, item name, quantity, unit price and amount – Attach an additional sheet, if necessary) <i>Provide 9" resolution (or better) aerial photographs of Rio Grande River and environs (1/2 mile inland both sides of river) from Santa Gonzalez to Sierra Nogales. Photographs will be provided digitally within 24 hours and hard copy within 48 hours.</i>		
9. LIST OF ATTACHMENTS		
<input type="checkbox"/> SCOPE/STATEMENT OF WORK <input type="checkbox"/> SECURITY CLASSIFICATION <input type="checkbox"/> GOVERNMENT PROPERTY <input type="checkbox"/> PROPOSAL EVALUATION CRITERIA <input type="checkbox"/> SPECIFICATIONS (DD Form 254) <input type="checkbox"/> REPORTS AND DATA <input type="checkbox"/> INDEPENDENT GOVERNMENT ESTIMATE <input type="checkbox"/> RECOMMENDATION FOR OTHER THAN FULL AND OPEN COMPETITION <input type="checkbox"/> OTHER (Specify)		
10. REFERENCES		
<input type="checkbox"/> AMENDMENT/MODIFICATION TO _____ <input type="checkbox"/> PROCUREMENT & ASSIST PLANNING DOCUMENT <input type="checkbox"/> CLASSIFIED DOCUMENTS <input type="checkbox"/> (FEMA Form 40-1) CONTROL NO. PD _____ <input type="checkbox"/> _____ <input type="checkbox"/> OTHER (Specify)		
11. JUSTIFICATION/DOCUMENTS (Attach additional sheet, if necessary) <i>Supports information requirements of ESF's 5, 8, and 10.</i>		
12. APPROVALS – PROGRAM ADMINISTRATIVE AREA		13. APPROVALS – ADMINISTRATIVE (Supplies and Equipment)
<i>Susan Smith</i> _____ Date _____ Project Officer		Headquarters Services Division _____ Date _____
<i>John Jones</i> _____ Date _____ Intermediate Approval		
<i>Alice Johnson</i> _____ Date _____ Program Head		Contact: _____
_____ Date _____ Other Coordination		14. FUNDING: <i>1999-06-9999-DR-4400-2507-D \$45,000.</i> Funds in the amount of \$ _____ are hereby certified available and reserved. _____ Date _____ Certifying Officer
_____ Date _____ Other Coordination		
_____ Date _____ Other Coordination		
_____ Date _____ Other Coordination		
_____ Date _____ Other Coordination		
15. ASSIGNMENT		
CONTRACTING/ASSISTANCE OFFICER NAME TELEPHONE NO. DATE PR RECEIVED		

CONTRACT SPECIALIST _____		

