

**CHANGE**

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

7400.2C CHG 2

7/13/87

**SUBJ:** PROCEDURES FOR HANDLING AIRSPACE MATTERS

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1. **PURPOSE:** This change transmits revised pages for Order 7400.2C, Procedures for Handling Airspace Matters.
2. **EFFECTIVE DATE:** This change is effective October 1, 1987.
3. **EXPLANATION OF CHANGES:** The significant changes are listed below. If further information is desired, contact ATO-240.
  - a. **7002. MINIMUM NUMBERS AND VOLUME.** Clarifies the policy.
  - b. **7007. REGIONAL ACTION.** Clarifies the procedure.
  - c. **7009. CONTROLLING AGENCY.** Clarifies the procedure.
  - d. **7011. CHARTING AND PUBLICATION.** Clarifies the procedure by adding temporary restricted areas.
  - e. **7133. ACTIVITIES.** Adds associated firing fans, footprints, buffers, etc.
  - f. **7134. SAFETY CONSIDERATIONS.** Clarifies the procedure.
  - g. **7135. COMMUNICATIONS AND RADAR.** Adds the proposed utilization.
  - h. **7152. TEAM REVIEW.** Clarifies the procedures and the policy.
  - i. **7154. DUTIES OF CHAIRMAN.** Clarifies the procedure.
  - j. **7155. TEAM REPORT.** Clarifies the procedure.
  - k. **7156. TEAM REPORT RESPONSES.** Adds a new paragraph, and clarifies the procedure and policy.
  - l. **7303. RESTRICTED AREA FLOOR.** Clarifies the policy.
  - m. **7305. JOINT USE.** Clarifies the procedure.
  - n. **7306. TEMPORARY RESTRICTED AREAS.** Clarifies the policy in subparagraph b.
  - o. **7230. SUBMISSION OF PROPOSALS.** Changes the policy, and amends the time table.

- p. 7333. REQUIRED INFORMATION. Clarifies the policy in subparagraphs a and e.
- q. 7334. DISCOURAGE LATE CHANGES IN REQUIREMENTS. Changes the policy.
- r. 7336. SUBMISSION OF PROPOSALS. Amends the time table.
- s. 7340. REQUIREMENT. Clarifies the policy.
- t. 7342. REPORT AMENDMENTS. Clarifies the policy.
- u. 7343. REVIEW SUMMARY. Clarifies the procedure, and changes the policy.
- v. 7420. SUBMISSION OF PROPOSALS. Changes the policy, and amends the time table.
- w. 7503. MOA FLOOR. Clarifies the procedure and the policy.
- x. 7520. SUBMISSION OF PROPOSALS. Changes the policy, and amends the time table.
- y. 7521. REGIONAL ACTION. Clarifies the procedure and the policy.
- z. 7530. GENERAL. Clarifies the procedure and the policy.
- aa. 7531. LOCATION AND DURATION. Changes the policy.
- bb. 7533. SUBMISSION OF PROPOSALS. Changes the policy, and amends the time table.
- cc. 7623. TIME OF SUBMISSION. Changes the policy, and adds a time table.
- dd. 7723. REGIONAL ACTION. Clarifies the policy.
- ee. Chapter 34. OUTDOOR LASER DEMONSTRATIONS. Moves the chapter from Part 7 to a new Part 8.
- ff. Part 8. MISCELLANEOUS PROCEDURES. Incorporates Chapter 34, "Outdoor Laser Demonstrations," which contains rewritten and updated guidance for processing outdoor laser demonstrations.
- gg. 8002. DEFINITIONS. Includes additional terms pertaining to laser demonstrations.
- hh. 8004. LASER CONSIDERATIONS. Adds a new paragraph which contains background material on laser effects.
- ii. 8005. EXPOSURE LIMITS. Specifically defines the limits used as the basis for the criteria in Chapter 34.

jj. 8022. STUDY. Includes consideration of helicopters operating below 1,000 feet in accordance with FAR 91.79(d).

kk. 8023. AFFECTED AIRSPACE. Deletes the maximum 12 watt limit for acceptable laser demonstrations. Revises and expands criteria presented based on output power and beam divergence.

ll. 8024. CALCULATING LASER EFFECTS. Adds a new paragraph, which explains how to calculate the laser effects using the revised charts.

mm. Figure 8-1. LASER PROJECTOR POWER/RANGE TABLE. Renumbers the old Figure 7-2, and changes the graph to a table.

nn. Figure 8-2. SINE VALUES. Adds a table to be used in calculating laser effects.

oo. Figure 8-3. SAMPLE NOTAM FORMATS. Adds three examples of laser NOTAM's.

pp. Figure 8-4. FOOD AND DRUG ADMINISTRATION ELECTRO-OPTICS SPECIALISTS' ADDRESSES. Renumbers the old Figure 7-3, and updates the information.

4. DISPOSITION OF TRANSMITTAL. Retain this transmittal until it is superseded by a new basic order.

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*John R. Ryan*

John R. Ryan  
Director, Air Traffic  
Operations Service

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# PART 7. SPECIAL USE AIRSPACE

## Chapter 27. GENERAL

### Section 1. POLICY

#### 7000. INTRODUCTION

In addition to the requirements of Part 1, this part contains the policy, procedures, and criteria for the assignment, review, modification, and revocation of special use airspace. Special use airspace is airspace of defined dimensions wherein activities must be confined because of their nature, and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities.

#### 7001. CATEGORIES

The handling of special use airspace matters falls into two categories. The first category consists of rulemaking actions which include restricted areas and prohibited areas. These relate to the assignment, review, modification, or revocation of airspace by a rule, regulation, or order as prescribed in Federal Aviation Regulations (See FAR Part 11). The second category consists of nonrulemaking actions and includes alert areas, controlled firing areas, and military operations areas (MOA's) where the FAA has the authority to make the final decision but does not express that decision by issuing a rule, regulation, or order. Also included in the nonrule category are offshore warning areas where the FAA has an interest, but the final approval is shared by other agencies.

#### 7002. MINIMUM NUMBERS AND VOLUME

a. Special use airspace programs are designed to accommodate national security and welfare and necessary military activity. They identify for other airspace users where the activity occurs and protect other users from hazardous operations. While establishment of special use airspace is essential to national security and the military mission, unnecessary proliferation of these areas degrades the special use airspace program and adversely affects the overall efficiency of the National Airspace System.

b. The volume of airspace to be included in any specific area of special use airspace and the time during which it is to be assigned shall be the minimum required to contain the proposed user activities, including safety zones required by military authority. When an aircraft activity conducted in special use airspace could measurably affect the

safety of persons or property on the surface, the proponent shall demonstrate that provisions have been made for their protection.

#### 7003. OPTIMUM UTILIZATION

To ensure optimum airspace utilization, using agencies shall be encouraged to make their airspace available for the activities of other agencies on a shared use basis. In this regard, all special use airspace proposals shall be specifically reviewed for a determination of whether the military requirement can be accommodated within, or by modifying, existing areas.

#### 7004. WAIVERS OF FAR's

The establishment/designation of special use airspace does not, in itself, waive any part of the Federal Aviation Regulations.

#### 7005. ENVIRONMENTAL ASSESSMENT

Special use airspace actions are subject to environmental assessments and procedures if the floor of the proposed area is below 3,000 feet AGL or if supersonic flight is anticipated at any altitude. Compliance with the National Environmental Policy Act (NEPA) is the responsibility of the proponent under the lead agency concept. (See Order 1050.1.)

#### 7006. COORDINATION OF PROPOSALS

Prior to submission for approval, military proponents of special use airspace will coordinate proposals with locally affected ATC facilities and military units, local FAA representatives/liaison officers where assigned, and the ARTCC having jurisdiction over the affected airspace. All coordination of nonmilitary proposals will be accomplished by the regional Air Traffic division.

#### 7007. REGIONAL ACTION

Special use airspace rulemaking actions shall be processed in accordance with the procedures prescribed in FAR Part 11 and in Parts 1 and 7 of this Handbook. Nonrulemaking actions shall be processed in accordance with the procedures prescribed in Part 1 and this part. Upon receipt of a special use airspace proposal, the region shall:

a. Review the proposal for completeness and sufficient justification.

b. Coordinate the proposal to identify conflicts with the requirements of other airspace users. Give special attention to compatible airspace use relative to existing and planned airports and their associated airspace requirements.

c. Circularize the proposal in accordance with the procedures specified in Part 1 and the chapter of this part applicable to the type special use airspace proposed. Additionally, if it would increase the burden on the public and/or coordination and informal discussions indicate it will be controversial, circularize the proposal to interested persons under the procedures of Chapter 2, Section 2. Proposed actions which clearly do not impact aviation need not be circularized nor issued as an NPRM.

d. When comments, review, and/or coordination indicate that the proposal will be controversial, an informal airspace meeting may be scheduled in accordance with Chapter 2, Section 3 of this Handbook.

e. When conclusions are reached, complete processing as specified in the appropriate chapter of this part. When required, forward the proposal to ATO-200 for action. The package shall include at the minimum the region's recommendations, justification, documentation of regional actions, copies of pertinent correspondence, original sectional charts showing proper coordinates, and all other related information contained in Section 3 of this chapter that could be useful to make a determination or complete the coordination.

#### **7008. JOINT USE**

Special use airspace should be available for use by nonparticipating aircraft when all or part of the airspace is not required for its prescribed pur-

pose provided there is no derogation to the using agency's mission. Because of their small size, geographic location, or high degree of utilization, some areas are impractical for joint use. Joint use procedures for specific types of airspace are contained in the appropriate chapter of this part.

#### **7009. CONTROLLING AGENCY**

Joint use of special use airspace requires the assignment of a controlling agency. The assigned facility is:

a. For joint use restricted areas, the ATC facility that may authorize transit through or flight within a restricted area in accordance with a joint use letter (reference FAR Part 73.17).

b. For other than joint use restricted areas, the FAA or the military ATC facility.

#### **7010. USING AGENCY**

Normally, the using agency is the agency, organization, or military command whose activity established the requirement for the special use airspace. An ATC facility may be the using agency for joint use areas when the facility is specified in a letter of procedure as having priority for use of the area.

#### **7011. CHARTING AND PUBLICATION**

With the exception of Controlled Firing Areas and an optional requirement for temporary MOA's and temporary restricted areas, special use airspace shall be reflected in aeronautical publications and depicted on aeronautical charts. New and revised areas normally become effective on the U.S. 56-day cycle publication dates (see Part 1).

#### **7012-7119. RESERVED**

## Section 2. DIMENSIONS

### 7120. GENERAL

Special use airspace is described in terms of horizontal (boundaries) and vertical (altitude) dimensions, effective for a specified period of time.

### 7121. HORIZONTAL LIMITS

The horizontal limits of special use airspace are defined by geographic coordinates or other appropriate references that clearly describe their boundaries. Where it is difficult to establish boundaries easily discernible from the air, the area may be changed to allow the boundary to be located along some charted prominent terrain feature; i.e., rivers, highways, railroad tracks, etc. Except for temporary areas, boundaries shall not be described as "along the boundary" of another airspace area.

### 7122. VERTICAL LIMITS

a. Vertical limits shall be established, as necessary, to contain the planned activities. Stratification to enhance joint use is permitted and encouraged.

b. Within areas solely containing aircraft operations, altitudes at or above 18,000 feet MSL shall be expressed as flight levels. Within areas containing other than aircraft operations, altitudes at or above 18,000 feet MSL shall be expressed as feet above mean sea level (MSL).

c. Below 18,000 feet MSL, altitudes shall be expressed to the nearest 100 feet. Above 18,000 feet MSL, altitudes/flight levels shall be expressed to the nearest 500 feet.

d. Procedures for determining the floor of special use airspace vary according to area type and are contained in the appropriate chapters of this part.

e. Ceilings are expressed as flight levels or feet above MSL. Unless otherwise specified, the word "to" an altitude or flight level means "to and including" that altitude or flight level. If the vertical limit does not include the altitude or flight level, the ceiling shall be expressed as "to but not including."

### 7123. TIMES OF USE

a. Close scrutiny of proposed times of use is essential to good management of special use airspace. Publication of unrealistic usage times unnecessarily discourages pilots of nonparticipating aircraft from requesting transit or activity information. In determining the times of use, the guiding factors are equally to:

(1) Assign the minimum period of time necessary to meet the requirements of the using agency.

(2) Enhance real time joint use of special use airspace by conveying to nonparticipants definite and/or probable periods of inactivity. For areas that permit transit without specific approval, this must also be weighed against the opposite effect of presumed inactivity luring nonparticipants into a lack of vigilance in the area.

(3) Keep to a minimum the amount of information necessary to publish and chart special use airspace areas.

b. Times of use shall be expressed using the terms or combinations of the terms indicated below and should reflect normal use for the majority of the time. When a using agency has knowledge of significant seasonal differences in usage requirements, different times of use may be established as appropriate; e.g., "Sep—Apr, Mon—Fri 0800—1700" and "May—Aug, Daily Sunrise—2300." Days of the week and/or months of the year should be indicated as appropriate.

(1) Sunrise and sunset.

(2) Specified time — Local time using the 24-hour clock.

(3) Intermittent — Requires an associated time or NOTAM provision. Not applicable to restricted areas without a "by NOTAM" provision.

(4) Continuous — Use only if justification exists for utilization 24 hours a day, 7 days a week. Not applicable to warning areas or combined use with (1) and (2) above.

(5) By NOTAM.

(a) May be used alone or in combination with (1), (2), and (3) above when anticipated usage cannot be determined, or when the nature of the using agency's mission requires infrequent and/or erratic utilization. Use of the "by NOTAM" provision is not intended to provide solely for the "possibility of unforeseen short range requirements" of the using agency.

(b) Shall be applicable to an entire area and not only to a portion thereof. When time of use varies significantly from one portion of an area to another, action should be initiated to have dissimilar portions identified by subdivision or reestablished as separate areas.

(c) Activation by NOTAM should normally be at least 24 hours in advance. This may be reduced if justified to gain an operational advantage.

### 7124-7129. RESERVED

### Section 3. CONTENT OF PROPOSALS

#### 7130. DESCRIPTION

a. Title — A short definitive description of what is proposed.

b. Boundaries — A definitive description of the proposed area's perimeter in accordance with paragraph 7121.

c. Altitudes — Minimum and maximum altitudes in accordance with paragraph 7122.

d. Times of use — Local time operations are normally expected to begin and end in accordance with paragraph 7123.

e. Controlling agency — Not applicable when the airspace will not be joint use.

f. Using agency.

#### 7131. COORDINATION

Furnish a resume of the coordination accomplished in accordance with paragraph 7006. For new areas, indicate that shared use and/or expansion of existing areas has been explored and determined unacceptable to satisfy the requirement for the proposed airspace. (See paragraph 7003.)

#### 7132. JUSTIFICATION

The need for the proposed airspace must be definitive and able to support any resultant imposition on nonparticipants or affordance of priority to the special use proponent. Requirements, such as "the containment of military activity," or "in support of national defense," or other similar statements, in and of themselves are inadequate.

#### 7133. ACTIVITIES

Activities include:

a. A detailed list of activities to be conducted by each organization proposing to use the area.

b. Local time daily operations normally are scheduled to begin and end. Include weather requirements if it is a condition of use. (See paragraph 7123.)

c. Number of hours (daily) the area will be used.

d. Days per week, weeks per month, or months per year, as appropriate, the area will be used.

e. If the area is to be used for aircraft operations, include:

(1) The number and type of aircraft normally involved in performing activities for which the area is established.

(2) A statement as to whether ground or airborne radar surveillance will be used during the operation. If radar surveillance will be used, indicate on the chart where the radar coverage is available.

(3) The altitudes to be used in daily aircraft operations (expressed in feet MSL or flight levels as appropriate). For each type of activity, include the altitudes (or blocks of altitudes) and the number of hours these altitudes will be used. (See paragraph 7122.)

(4) The intentions regarding flight at supersonic speeds.

f. If the area is to be used for surface firing (see paragraph 7122):

(1) Type weapon/s to be fired with their associated firing fans, footprints, buffers, etc.

(2) Maximum altitude of surface firing (expressed in feet MSL) used in accomplishing required operations.

(3) Number of hours highest altitude is to be used annually.

(4) Altitude normally used for daily firing operations (expressed in feet MSL).

(5) A detailed explanation of the peak hourly, daily, weekly, and monthly volume of firing.

g. Any special requirements.

#### 7134. SAFETY CONSIDERATIONS

Include an explanation as to how each of the following, if applicable, is to be accomplished.

a. How activity will be confined within the proposed area.

b. Procedures for handling malfunctions.

c. Ordnance trajectory envelope.

#### 7135. COMMUNICATIONS AND RADAR

Specify the availability and proposed utilization of ground and/or airborne communications coverage; e.g. range control, military radar unit (MRU), airborne radar unit (ARU), Fleet Area Control and Surveillance Facility (FACSFAC).

#### 7136. ENVIRONMENTAL AND LAND USE INFORMATION

a. Identify the lead agency or appropriate representative responsible for compliance with NEPA.

b. Certify NEPA compliance. If delayed, must be in hand by FAA prior to issuance of final rule

or publication cutoff date for nonrulemaking action.

c. Furnish the names, addresses, and telephone numbers of persons to whom comments on environmental and land use aspects may be submitted

d. Proposals requesting designation below 1,200 feet AGL which have underlying private or public use land must indicate agreement to provide reasonable and timely aerial access to such land. Prohibited and restricted area proposals requesting designation from the surface shall indicate that the proponent either owns, leases, or by agreement controls the underlying surface.

#### **7137. GRAPHIC DISPLAY**

Proposals shall include a graphic presentation of the proposed area on maps and aeronautical charts as appropriate. If applicable, the presentation should indicate those areas owned, leased, or controlled by the using agency. All proposals should, as a minimum, be depicted on an original Sectional Aeronautical Chart.

a. If the area is to contain aircraft operations, the following shall be depicted:

(1) The location and the representative pattern of firing and/or bombing runs. If appropriate, show where run begins, lock-on point, where firing, if any, commences and ends, and release point and pullup points.

(2) Impact areas.

b. If the area is to contain surface-to-surface or surface-to-air firings, the following shall be depicted:

(1) Firing points.

(2) Impact areas.

(3) Perimeter of firing fans for each type weapon used.

#### **7138. JOINT USE**

State whether the area will be joint use, and if not, include justification.

#### **7139. REMARKS**

Specify any pertinent data not indicated elsewhere.

#### **7140-7149. RESERVED**

## Section 4. REVIEW AND ANALYSIS

### 7150. ANNUAL REVIEW

ATO-200 and regional Air Traffic divisions shall systematically and periodically review special use airspace within their area of jurisdiction, and if required, initiate action to alter or revoke such airspace. As a minimum, the utilization of each area of special use airspace, except prohibited and warning areas, shall be reviewed on an annual basis.

### 7151. FORMAL/INFORMAL REVIEW

The review of special use airspace may be accomplished through formal or informal procedures. Formal reviews are conducted by special use airspace teams that are established when determined to be appropriate by ATO-200 or a regional Air Traffic division. Informal reviews are conducted on a continuous basis by all agency personnel engaged in handling special use airspace.

### 7152. TEAM REVIEW

Formal airspace reviews should be conducted by a special use airspace team that consists of three or more members. In matters involving Flight Standards, a representative from the Flight Standards division should be invited to participate as a member of the team. If required, representatives of more than one region can participate as members of the team. The team chairman should be an Air Traffic specialist of ATO-200 or the regional Air Traffic division. The selection and use of the special use airspace team should be on an "as required" basis, and a particular team shall be dissolved when its study is completed. Normally, team efforts should be directed toward problem areas evaluating the need for additional assignments of special use airspace and conducting reviews of selected special use areas for the purpose of developing recommendations for retention, alteration, or revocation based upon changing user requirements and/or actual utilization.

### 7153. TEAM RESPONSIBILITIES

The team shall act as a fact finding body for gathering complete information concerning the requirement for and use of special use airspace. It

should determine the actual hours of use, altitudes and geographical area used, types of activities conducted, and any other pertinent information. Teams should not accept statements from users based on conjecture regarding the present or future usage of an area. Instead, any stated requirement must be based on factual data.

### 7154. DUTIES OF CHAIRMAN

In addition to the above general responsibilities of a special use airspace review team, the team chairman shall accomplish the following:

a. Prior to the team's visit to the area, coordinate with appropriate military commands and/or civil users. Coordination should be initiated far enough in advance of the team's visit to provide local representatives with sufficient time to prepare required data. Initial coordination with the military shall be effected through the appropriate regional military representative.

b. If deemed necessary, schedule an informal airspace meeting near the location of the area under study. Such a meeting would allow the users and other interested persons an opportunity to present their position and offer recommendations.

### 7155. TEAM REPORT

On completion of the review, the team shall analyze the information obtained and develop its recommendations. The team findings shall be forwarded through the regional Air Traffic division to the regional military representative for appropriate action. A copy shall be sent to ATO-200 and to the affected ATC facility/s. The report should include:

a. A summary of the positions of all interested civil and military users to include operational requirements and recommendations.

b. The findings, conclusions, and recommendations of the team.

c. Positions submitted in writing at a formal special use airspace review shall be attached to the team report.

**7156 TEAM REPORT RESPONSES**

The appropriate regional military representative should provide a response to the team report within 60 days. If the military concurs with the team's findings, conclusions, and recommendations, the Air Traffic division should initiate any appropriate airspace action and advise ATO-200. If the Air Traffic division and the military are

unable to reach an agreement on the team's report, the Air Traffic division should forward the military position along with the Air Traffic division recommendation to ATO-200 for a determination. Also, provide a copy of the Air Traffic division recommendation to the appropriate military representative.

**7157-7199. RESERVED**

## Chapter 28. PROHIBITED AREAS

### Section 1. POLICY

#### 7200. DEFINITION

A prohibited area is airspace designated under FAR Part 73 within which no person may operate an aircraft without the permission of the using agency.

#### 7201. PURPOSE

Prohibited areas are designated when determined necessary to prohibit flight over a surface area in the interest of national security and welfare.

#### 7202. IDENTIFICATION

Prohibited areas are identified by the prefix letter "P," followed by a dash, a two-digit number

and a location (city/town/military reservation); e.g., "P-66 Rancho del Cielo, Goletta, CA." The identification number shall be assigned by ATO-200 and normally not until a proposal is published as an NPRM.

#### 7203. EXTENT

Prohibited areas are normally designated from the surface to the minimum altitude required, with a continuous time of designation.

#### 7204. PUBLICATION

Prohibited areas are designated and published in Part 73 of the Federal Aviation Regulations.

#### 7205-7219. RESERVED

## Section 2. PROCESSING

### 7220. SUBMISSION OF PROPOSAL

A proposal for the designation or amendment of a prohibited area should be submitted to the FAA regional Air Traffic division. If the proposal involves more than one region's airspace, Washington Headquarters (ATO-200) or a lead region may be designated as the focal point. The restrictions imposed by prohibited area designation are such that these actions are normally highly controversial and require indepth study. Although specifying a minimum processing time is impractical, at least 6 months is required for routine action.

### 7221. REGIONAL ACTIONS

After completion of the requirements of Chapter 27, prohibited area proposals shall be forwarded to ATO-200 for final determination. The proposal package shall include the region's recommendations, documentation of regional actions, copies of pertinent correspondence, and any other information that could be helpful in making a determination.

### 7222-7299. RESERVED

## Chapter 29. RESTRICTED AREAS

### Section 1. POLICY

#### 7300. DEFINITION

A restricted area is airspace designated under FAR Part 73 within which the flight of aircraft, while not wholly prohibited, is subject to restriction.

#### 7301. PURPOSE

Restricted areas shall be designated when determined necessary to confine or segregate activities considered to be hazardous to nonparticipating aircraft.

#### 7302. IDENTIFICATION

Restricted areas are identified by the prefix letter "R," followed by a dash, a four-digit number, and a location (city/town/area/military reservation and state); e.g., R-2904 Camp Blanding, FL. A letter suffix is assigned to denote subdivisions; e.g., R-3005A Townsend, GA. Identification numbers shall be obtained from ATO-200 and will not normally be assigned until the proposal is published as a proposed rule.

#### 7303. RESTRICTED AREA FLOOR

Restricted area floors will not normally be designated lower than 1,200 feet above the surface. If a valid requirement exists and there is minimal adverse aeronautical effect on the overall system, restricted areas can be established lower than 1,200 feet above the surface. However, the surface may be designated as the floor only when the using agency either owns, leases, or, by agreement otherwise, controls the underlying surface. At a minimum, provisions must be made for aerial access to private and public use land which underlies the restricted area and to accommodate instrument arrivals/departures with minimum delay. The restricted area shall exclude the airspace 1,500 feet AGL and below within a 3 NM radius of airports available for public use.

#### 7304. PUBLICATION

Restricted areas are designated and published in FAR Part 73 and in FAR Part 71 when joint use areas extend into the Continental Control Area.

#### 7305. JOINT USE

a. Restricted areas are designated as joint use areas by designating a using and a controlling agency and by executing a letter of procedure which provides for the operation of nonparticipating IFR and/or VFR flight within the area. Flight within these areas is controlled by the using agency except when released to the controlling agency during periods the airspace is not being used for its designated purpose. During such periods, the controlling agency may permit aircraft operations within the area.

b. When it is determined that a restricted area will be designated as joint use, the appropriate region will assign a controlling agency which shall, in conjunction with the using agency, execute a joint use letter of procedure. The preparation of the letter of procedure shall be in accordance with Handbook 7210.2. Also, see Figure 7-1. The format may be modified where local conditions warrant a departure from and/or the addition of other provisions, such as vertical and/or lateral subdivision of an area to facilitate joint use. For VFR operations it may be desirable to base lateral subdivisions on obvious, well defined landmarks. Charting of these subdivisions is optional.

c. The regional Air Traffic division shall be the approving authority of all joint use letters of procedure. This authority may be delegated to the facility designated as the controlling agency.

d. When there is a requirement to provide air traffic control services within a restricted area, the facility providing that service will be designated as the controlling agency.

**Note.** — Before ATC services can be provided in such airspace, it must be designated controlled airspace under FAR Part 71.

e. If both IFR and VFR requirements exist and if the controlling agency is an ATC facility remotely located from the restricted area, the area may be "flagged" on charts indicating to pilots that permission to transit the restricted area may be obtained by contacting an area or local FSS rather than the ATC facility.

f. Communications between the controlling and using agencies concerning the timely release of joint use restricted areas shall be outlined in the letter of procedure. Communications shall be accomplished by direct access telephone whenever possible. A record shall be made of all such communications. These records shall be retained for 15 days or longer if needed.

g. Procedures for clearing IFR flights with respect to joint use restricted areas are contained in Handbook 7110.65.

h. When joint use restricted areas will be designated at altitudes coincident with the Continental

Control Area, take concurrent action to have it incorporated in Subpart D of FAR Part 71.151.

#### **7306. TEMPORARY RESTRICTED AREAS**

a. Procedures to establish temporary restricted areas for military exercises are specified in Section 3 of this chapter. Temporary areas for other than military exercised may be designated to accommodate short term activities of various government or private agencies involved in research and development or other activity determined to be hazardous to nonparticipating aircraft.

b. Every attempt shall be made to process proposals in minimum time and provide the proponent assistance in submitting a proper proposal. Proponents shall be encouraged to seek permission from using agencies to conduct their activities within established restricted areas to preclude unnecessary designation of additional restricted airspace.

**7307-7319. RESERVED**

FEDERAL AVIATION ADMINISTRATION  
Washington, D.C. 20591

**JOINT USE RESTRICTED AREA LETTER OF PROCEDURE**

SUBJECT: Joint Use Letter of Procedure for Use of Restricted Area R-\_\_\_\_\_

EFFECTIVE: \_\_\_\_\_

In accordance with §73.13, §73.15, and §73.17 of the Federal Aviation Regulations, the following letter establishes procedures for the use of Restricted Area R-\_\_\_\_\_, by \_\_\_\_\_, the Controlling Agency, and by \_\_\_\_\_, the Using Agency.

1. The Using Agency shall release R-\_\_\_\_\_ to the Controlling Agency when not in use for the purpose designated.
2. During the time when the airspace is released to the Controlling Agency, FAA may clear IFR traffic and authorize VFR traffic into R-\_\_\_\_\_
3. The Controlling Agency shall return the use of R-\_\_\_\_\_ to the Using Agency upon request. Such request shall be made at least \_\_\_\_\_ (hours/minutes) prior to use by the Using Agency. (In determining this specific time, consideration should be given to such factors as: (1) IFR procedures which impinge upon the Restricted Area; (2) communications; and (3) time required to ascertain that all VFR aircraft shall be clear of the area.) \_\_\_\_\_ Tower, RAPCON, RATCF, FSS, etc., is designated as liaison station for the relaying of information concerning the release of the area between the Controlling Agency and the Using Agency. (This statement to be used only when required.)

**EXECUTED:**

For the Controlling Agency:

For the Using Agency:

Signed \_\_\_\_\_

Signed \_\_\_\_\_

Air Traffic Manager, \_\_\_\_\_

(Title) \_\_\_\_\_

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Date)

FIGURE 7-1 JOINT USE LETTER OF PROCEDURE

## Section 2. PROCESSING

### 7320. SUBMISSION OF PROPOSALS

Restricted area proposals are submitted to the FAA regional Air Traffic division at least 9 months in advance of the desired effective date. Military proposals shall be submitted through the appropriate regional military representative. The following schedule represents the minimum time to process proposals which require only routine coordination.

#### *Calendar Days*

|       |  |
|-------|--|
| D     | Proposal Received by FAA region.   |
| D+30  | Proposal reviewed by region and submitted to Washington Headquarters.  |
| D+95  | Proposal reviewed by Washington Headquarters. NOS coordination and chart preparation and Notice of Proposed Rulemaking (NPRM) is prepared and forwarded to Federal Register. |
| D+100 | NPRM published in Federal Register.  |
| D+145 | Comment period for NPRM ends. Comments are directed to appropriate region.   |

—CONTINUED

#### *Calendar Days*

|           |   |
|-----------|---|
| D+165     | Comments reviewed by appropriate region, and recommendations forwarded to Washington Headquarters within 20 days.     |
| D+220     | Proposal and comments receive final review. Rule is prepared and forwarded to Federal Register.                       |
| D+225     | Rule published in Federal Register at least 30 days prior to effective date.  |
| D+225-281 | NOS cutoff date/rule effective date within this time frame (NOS cutoff date is 8 weeks prior to rule effective date). |

### 7321. REGIONAL ACTION

After completion of the requirements of Chapter 27, restricted area proposals shall be forwarded to ATO-200 for final determination. The proposal package shall include the region's recommendations, documentation of regional actions, copies of pertinent correspondence, and any other information that could be helpful in making a determination.

### 7322-7329. RESERVED

## Section 3. TEMPORARY RESTRICTED AREAS FOR MILITARY EXERCISES

### 7330. HANDLING REQUIREMENTS

The handling of temporary restricted airspace requirements associated with military exercises differs significantly from the processing of other restricted airspace requirements. The following paragraphs provide definitive guidelines for handling the details associated with such exercises.

### 7331. INFORMAL COORDINATION

Before submitting a formal proposal requesting a temporary restricted area for a military exercise, the proponent should be encouraged to initiate informal coordination with the appropriate FAA region. This informal review can do much in eliminating future objections to the proposal. Where potential problem areas are noted, mutually agreeable adjustments to the proposed area should be made before formally submitting the proposal. During this coordination, primary consideration should be given, but not limited, to the selection of the ground maneuver area. This is because the requirement for restricted airspace will be directly dependent upon the location of the ground maneuver area. Attention should be given to the impact that a particular site location would have on IFR and VFR airway traffic, regularly used VFR routes, off airway air carrier routes, airports within and in proximity, instrument approach and missed approach areas, approach and departure procedures, and any special military operations.

### 7332. MILITARY EXERCISES

To assist FAA and military personnel in planning and preparing for military exercises requiring restricted airspace, the following time-phased listing of information items that are normally required in the processing of the request for special use airspace has been developed. It is unlikely that the list below includes all items of information that may be required for a specific military exercise and, conversely, certain items will not be applicable in all cases. Its primary purpose is to provide a common basis from which this agency and the DOD can proceed toward determining and meeting the peculiar airspace requirements associated with military exercises.

### 7333. REQUIRED INFORMATION

Information normally required for processing requests, developing procedures, and time periods required by the FAA are described as follows:

a. After all informal coordination has been completed and at least 8 months prior to the desired effective date of a temporary restricted area, a formal proposal should be submitted to the FAA. The proposal should include:

- (1) Name of exercise.
- (2) Location and description of area.
- (3) Time of designation.
- (4) Controlling and using agency.
- (5) Complete justification for the area to include:

- (a) Number of aircraft involved.
- (b) Types of aircraft and missions they will perform.
- (c) The exercise concept of operation (scenario).
- (6) A statement explaining if the entire area, as requested, is required for the complete exercise period, or does the scenario allow for releasing a portion of the area. If a portion can be released, what part, vertically or horizontally, and for what period of time.

(7) Requirements for refueling tracks, location, VFR or IFR, in or below positive controlled airspace.

(8) Commands that will take part in exercise.

(9) Requirements for FAA liaison personnel at exercise facilities and military liaison personnel at affected ATC facilities.

(10) Provision to be made for nonparticipating aircraft desiring to operate within area.

- (a) Local airport operations.
- (b) Ingress and egress routes.
- (c) Over flights.
- (d) Acceptance of reverse charge telephone requests from pilots.
- (e) Capability of the using agency to accept direct radio requests from pilots.

b. Four months prior to the proposed effective date of restricted area an NPRM is published provided the proponent furnishes the following data:

(1) Bases to be used as staging airfields and estimated volume of activity at each.

(2) Bare (inactive) bases to be activated and their locations.

(3) Military control facilities or navigation aids to be established where none now exist for use of participating aircraft outside of restricted area. Information provided should include locations and frequencies.

(4) Requirements for ingress and egress areas (vector areas).

(5) Requirements for routes from staging bases to include estimated volume of use.

(6) Location of military air traffic facilities.

(7) Requirements for refueling tracks, location, VFR or IFR, in or below area positive control.

(8) Requirements for military control of exercise traffic outside of restricted area.

(9) Requirements for FAA liaison personnel at exercise facilities.

**c. Three months prior to beginning of exercise:**

(1) Make provisions to assure that participating pilots are provided the capability of closing VFR flight plans.

(2) Provide information concerning other activities not mentioned which will require development of special operating procedures and/or FAA military agreements.

(3) NPRM comment period ends. Comments analyzed.

**d. Two months prior to beginning of exercise provide any additional information deemed necessary by the FAA. During this period, the rule is published designating the restricted area, or the proposal is rejected, and the NPRM is withdrawn.**

**e. Forty-five (45) days prior to beginning of exercise:**

(1) Provide any additional information deemed necessary by the FAA or exercise proponent.

(2) Provide copies of all established procedures and agreements for distribution to FAA and military personnel who require this information.

**7334. DISCOURAGE LATE CHANGES IN REQUIREMENTS**

The proponent of a temporary restricted area should be discouraged from making late changes in stated requirements which would generate different procedures from those previously developed. In any case, no change should be made within 45 days of the exercise unless (a) absolutely essential to the safe and successful conduct of the exercise, or (b) to reduce the amount of airspace to be restricted.

**7335. TIME REQUIREMENTS**

The agency requires a sufficient amount of time to designate airspace, develop procedures, and complete actions necessary to assist the proponent of an exercise to realize its objectives with a minimum of problems. To accomplish this mission, the planning and execution of that portion of the maneuver which deals with air traffic control must be a joint military/FAA effort from site selection to the final day of the exercise. In summary, close, early, and continuous coordination is essential.

**7336. SUBMISSION OF PROPOSALS**

*Calendar Days*

|           |  |
|-----------|--|
| D         | Proposal received by FAA region.   |
| D+30      | Proposal reviewed by region and submitted to Washington Headquarters.  |
| D+95      | Proposal reviewed by Washington Headquarters. NOS coordination and chart preparation. Notice of Proposed Rule-making (NPRM) is prepared and forwarded to Federal Register. |
| D+100     | NPRM published in Federal Register.  |
| D+145     | Comment period for NPRM ends. Comments are directed to appropriate region.   |
| D+165     | Comments reviewed by appropriate region, and recommendations forwarded to Washington Headquarters within 20 days.  |
| D+220     | Proposal and comments receive final review. Rule is prepared and forwarded to Federal Register.  |
| D+225     | Rule published in Federal Register at least 30 days prior to effective date.   |
| D+225-260 | Class II NOTAM cutoff date/Rule effective date within this time frame. (Class II NOTAM cutoff date is 5 weeks prior to Rule effective date.)                               |

**7337-7339. RESERVED**

## Section 4. ANNUAL UTILIZATION REPORT

### 7340. REQUIREMENT

Part 73.19 of the Federal Aviation Regulations requires using agencies to submit an annual utilization report detailing the use of each assigned restricted area. Supplemental reports may also be required upon request by the FAA.

### 7341. REVIEW

A detailed review of the annual utilization report shall be made by the appropriate regional Air Traffic division to:

- a. Determine if a particular area's utilization is consistent with its airspace designation or if an adjustment is in order.
- b. Provide data for and to supplement a team review of an area.
- c. Assist in resolution of questions concerning an area.

### 7342. REPORT AMENDMENTS

If, after reviewing a utilization report it is determined that additional information is needed to evaluate the use of a restricted area, the regional Air Traffic division shall request the using agency to submit a supplemental report in accordance with FAR 73.19. Requests for supplemental reports shall identify the specific additional information which is to be reported.

### 7343. REVIEW SUMMARY

Regional Air Traffic divisions shall conduct annual utilization reviews of all restricted areas within their jurisdiction and forward recommendations for corrective action, if required, to the regional military representative. An annual review summary including recommendations or actions taken, as appropriate, shall be submitted to ATO-200 ATTN: ATO-240 by June 15 of each year.

### 7344-7399. RESERVED

## Chapter 30. WARNING AREAS

### Section 1. POLICY

#### 7400. DEFINITION

A warning area is airspace of defined dimensions over international waters that contains activity which may be hazardous to nonparticipating aircraft. Because international agreements do not provide for prohibition of flight in international airspace, no restriction to flight is imposed. The term "warning area" is synonymous with the International Civil Aviation Organization (ICAO) term "danger area."

#### 7401. PURPOSE

Warning areas are established in international airspace to contain activity that may be hazardous and to alert pilots of nonparticipating aircraft to the potential danger.

#### 7402. IDENTIFICATION

Warning areas are identified by the prefix letter "W," followed by a dash, a two- or three-digit number, and a location (city/town/area/military reservation and state); e.g., W-72 VACAPES VA. A letter suffix is assigned to denote subdivisions; e.g.,

W-72A VACAPES, VA. Identification numbers shall be assigned by ATO-200.

#### 7403. PUBLICATION

When established, warning areas are published in the National Flight Data digest (NFDD). Additionally, information concerning warning areas not adjacent to or near the conterminous United States, Alaska, or Hawaii, will be disseminated by International NOTAM's issued by National Flight data center (NFDC) at least 28 days prior to effective date.

#### 7404. JOINT USE

When it is determined that a warning area will be established as joint use, a letter of agreement will be executed to assign a controlling agency and define the conditions under which nonparticipating aircraft may be authorized to operate within the area. Apply the procedures of paragraph 7305 as appropriate.

#### 7405-7419. RESERVED

## Section 2. PROCESSING

### 7420. SUBMISSION OF PROPOSALS

—CONTINUED

Warning area proposals are submitted to the FAA regional Air Traffic division through the appropriate military representative at least 7 months in advance of the desired effective date. The following schedule represents the minimum time to process proposals which require only routine coordination.

*Calendar Days*

D+160

Warning area published in NFDD on or before cutoff date for next available charting date.

D+160-216

NOS cutoff date/effective date within this time frame. (NOS cutoff date is 8 weeks prior to effective date.)

*Calendar Days*

|       |   |
|-------|---|
| D     | Proposal received by FAA region.  |
| D+30  | Proposal reviewed by region and coordinated as required. Nonrule circularization published. |
| D+75  | Comment period for non-rule circularization ends.   |
| D+95  | Comments reviewed, and proposal forwarded to ATO-200 with region's recommendations.         |
| D+140 | E.O. 10854 and NOS coordination completed by ATO-200.                                       |

### 7421. REGIONAL ACTION

After completion of the requirements of Chapter 27, warning area proposals shall be forwarded to ATO-200 for final coordination and publication.

### 7422. E.O. 10854 COORDINATION

In accordance with Executive Order 10854, warning area actions require coordination with Departments of State and Defense. This coordination will be accomplished by ATO-200 and normally requires a minimum of 45 days.

### 7423-7499. RESERVED

## Chapter 31. MILITARY OPERATIONS AREAS (MOA'S)

### Section 1. POLICY

#### 7500. DEFINITION

A military operations area (MOA) is airspace established outside positive control area to separate/segregate certain nonhazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted.

#### 7501. PURPOSE

The military has a continuing requirement to conduct nonhazardous training activities, such as air combat maneuvers, air intercepts, acrobatics, low altitude tactics, etc. MOA's are established to contain these activities in airspace as free as practicable from nonparticipating aircraft.

#### 7502. IDENTIFICATION

MOA's shall be identified by the use of a nickname from a geographical location or any other common name; e.g., "GATOR" or "FORT STEWART," and if desired, further identified in numerical sequence; e.g., "MOODY 1," "MOODY 2," etc. Cardinal points, letters, or "high" and "low" may be used to identify subsections; e.g., "GATOR LOW." Lengthy composites of the above are cumbersome for communications and charting and should be avoided.

#### 7503. MOA FLOOR

If a valid requirement exists and there is minimal adverse aeronautical effect on the overall system, MOA's can be established below 1,200 feet AGL. Determination of effect must include special consideration for aerial access to private and public use land and for terminal VFR and IFR flight operations. At a minimum, provisions must be made to accommodate instrument arrivals/departures with minimum delay, and the MOA shall exclude the airspace 1,500 feet AGL and below within a 3 nautical mile radius of airports available for public use.

#### 7504. LOCATION

While MOA's should be located to create minimum adverse impact on nonparticipating aircraft operations, full consideration shall be given to the military requirement. Where necessary, feasible, and a significant operational advantage will not be lost, airspace configurations may be changed and routes realigned or revoked to accommodate establishment of MOA's. Establishment of terminal or en route airspace to coincide with or supersede existing MOA's shall be avoided unless a significant operational advantage can be gained. MOA's shall not be established off-shore outside the U.S. 3 NM territorial limit. Additionally, and to the extent possible, locate MOA's:

- a. Within radar and communication coverage of an ATC facility or Military Radar Unit (MRU).
- b. Within 100 miles of the base of flight origin.
- c. Outside terminal airspace and away from Federal airways and regularly used VFR routes.

#### 7505. CONTROLLED AIRSPACE

Designate controlled airspace to coincide with MOA's only if IFR ATC service is to be provided in that airspace by an FAA or military ATC facility.

#### 7506. JOINT USE

MOA's, in effect, are always joint use in that VFR aircraft are not denied access and that IFR aircraft may be routed through the airspace when approved separation can be provided from MOA activity. Procedures for use of the airspace by nonparticipating IFR traffic shall be set forth in letters of agreement executed between the controlling and the using agencies. Such letters shall also include procedures for the appropriate flight service stations to be provided real-time active/inactive status of the MOA.

#### 7507-7519. RESERVED

## Section 2. PROCESSING

### 7520. SUBMISSION OF PROPOSALS

MOA proposals are submitted to the FAA regional Air Traffic division through the appropriate regional military representative at least 6 months in advance of the effective date. The following schedule represents the minimum time to process proposals which require only routine coordination.

—CONTINUED

#### *Calendar Days*

D+115-  
171

NOS cutoff date/effective date within this time frame. (NOS cutoff date is 8 weeks prior to effective date.)

#### *Calendar Days*

|       |   |
|-------|---|
| D     | Proposal received by FAA region.  |
| D+30  | Proposal reviewed by region and coordinated as required. Nonrule circularization published.   |
| D+75  | Comment period for non-rule circularization ends.   |
| D+95  | Comments reviewed and approval recommendation or disapproval determination made by region. MOA's recommended for approval sent to ATO-200 for final determination and processing. |
| D+115 | NOS coordination and MOA published in NFDD on or before cutoff date for next charting date.   |

### 7521. REGIONAL ACTION

a. ATO-200 is the final approval authority for MOA's. After completion of the requirements of Chapter 27, the regional Air Traffic division shall forward MOA proposals which are recommended for approval to ATO-200 for final determination. The proposal package shall include the region's recommendations, documentation of regional actions, copies of pertinent correspondence, and any other information that can be helpful in making a determination.

b. Authority to disapprove MOA proposals is delegated to the regional Air Traffic division. Disapproved proposals shall be fully documented in correspondence to the proponent with a copy to ATO-200. If the proponent resubmits the proposal, the regional office shall reevaluate and forward the package to ATO-200 for final determination.

### 7522-7529. RESERVED

### Section 3. TEMPORARY MOA'S

#### 7530. GENERAL

Regional Air Traffic divisions are the approval authority for temporary MOA's. Approved temporary MOA's shall be forwarded to ATO-200 for processing and publication. Disapproved proposals shall be fully documented in correspondence to the proponents with a copy to ATO-200. If the proponent resubmits the proposal, the regional office shall reevaluate and forward the package to ATO-200 for final determination.

The provision for temporary MOA's is in recognition of the military's need for additional airspace to periodically conduct readiness exercises that supplement routine training. When it is known that this need will occur on a regular and continuing basis, the necessary airspace should be considered for establishment as a permanent MOA with provisions for its activation by NOTAM/Special Notice disseminated well in advance of the scheduled activity.

#### 7531. LOCATION AND DURATION

When existing airspace is inadequate to accommodate short-term military training exercises, temporary MOA's may be established for a period not to exceed 30 days. Preference will be given to expansion of existing MOA's over establishment of new areas.

#### 7532. PUBLICATION

In all cases, approval of temporary MOA's shall include the provision that the military publicize the exercise within 100 miles of the affected airspace through such avenues as public media, pilot forums, and distribution of bulletins to known aviation interests. Determination of appropriate additional publication for temporary MOA's requires a case-by-case evaluation according to the scope of the exercise, anticipated impact on non-participants, time constraints, and other considerations. Normally, temporary MOA's will be published by NOTAM "L," at least 24 hours prior to activation, and Class II Graphic NOTAM's (available through ATO-200 on 8-9 weeks notice). Mail-

ing the Graphic NOTAM to all licensed pilots within the appropriate geographical area may be required to ensure adequate notification of the temporary airspace. Publication of temporary MOA's on aeronautical charts is normally not required; however, it may be a provision of approval if, because of anticipated impact on nonparticipants, such action is determined essential to aviation safety. Full consideration shall be given to the potential detrimental effect on the military of the additional processing time associated with aeronautical chart cyclic printing dates, and such a requirement shall not be imposed without ATO-200 concurrence.

#### 7533. SUBMISSION OF PROPOSALS

Temporary MOA proposals are submitted to the FAA regional Air Traffic division through the appropriate regional military representative at least 4 months prior to the desired effective date. The following schedule represents the minimum time to process proposals which require only routine coordination.

##### *Calendar Days*

|           |  |
|-----------|--|
| D         | Proposal received by FAA region.   |
| D+15      | Proposal reviewed by region and coordinated as required. Nonrule circularization published.  |
| D+60      | Comment period for non-rule circularization ends.  |
| D+80      | Comments reviewed by region and approval/disapproval determination made and forwarded to Washington Headquarters within 20 days.   |
| D+100-135 | Class II NOTAM cutoff date/effective date within this time frame. (Class II NOTAM cutoff date is 5 weeks prior to effective date.) |

#### 7534-7599. RESERVED

## Chapter 32. ALERT AREAS

### Section 1. GENERAL

#### 7600. PURPOSE

Alert areas are established to inform pilots of specific areas wherein a high volume of pilot training or an unusual type of aeronautical activity is conducted.

#### 7601. ACTIVITY

The activity within an alert area shall be conducted in accordance with Federal Aviation Regulations, without waiver, and pilots of participating aircraft, as well as pilots transiting the area, shall be equally responsible for collision avoidance. The establishment of alert areas does not impose any flight restrictions or communication requirements.

Flight service stations in the vicinity may broadcast information regarding the use being made of the area, as circumstances dictate. Operations which may be hazardous to other aircraft shall not be conducted within alert areas since such activity must be confined within restricted areas.

#### 7602. MINIMUM NUMBERS

Alert areas should only be established when a determination has been made that dissemination of the information concerning the activity would be of operational value to the flying public.

#### 7603-7619. RESERVED

## Section 2. ESTABLISHMENT

### 7620. PROPOSALS/REQUESTS

Regional Air Traffic divisions are responsible for initiating proposals or processing requests for alert areas and submitting recommendations to ATO-200.

### 7621. REVIEW BY ATO-200

ATO-200 is responsible for reviewing the regional recommendations and making the final determination regarding the establishment of alert areas.

### 7622. CHART DEPICTION

Alert areas shall be flagged on aeronautical charts with information regarding time of use, altitudes employed, and type of activity conducted. They will be identified by the prefix letter "A" followed by two or more digits. ATO-200 shall assign the identifying number.

### 7623. TIME OF SUBMISSION

Proposals for the establishment of alert areas shall be submitted to the appropriate regional office at least 6 months in advance of the desired effective date.

#### *Calendar Days*

|           |  |
|-----------|--|
| D         | Proposal received by FAA region.   |
| D+30      | Proposal reviewed by region and coordinated as required. Nonrule circularization published.                  |
| D+75      | Comment period for non-rule circularization ends.  |
| D+95      | Comments reviewed by region, and recommendations forwarded to Washington Headquarters within 20 days.        |
| D+115     | NOS coordination and Alert Area published in NFDD on or before cutoff date for next charting date.           |
| D+115-171 | NOS cutoff date/effective date within this time frame. (NOS cutoff date is 8 weeks prior to effective date.) |

### 7624. CONTENT OF PROPOSALS

These proposals shall include the following information:

a. Title — A definitive description of what is proposed.

b. Purpose — A comprehensive explanation as to why the action is proposed.

c. Location and Dimensions:

(1) A description of the airspace requested by geographic coordinates or other appropriate reference that clearly define the areas.

(2) Minimum and maximum altitudes (MSL/AGL) as appropriate

(3) A graphic presentation of the proposal to maps and aeronautical charts as appropriate.

d. Pertinent data on activities to be conducted:

(1) A detailed list of activities to be conducted in the area by all user organizations.

(2) Time, expressed in local time, daily operations normally are scheduled to begin and end.

(3) Number of hours (daily) the area will be used.

(4) Days per week, weeks per month, or months per year, as appropriate, the area will be used.

(5) Number and type of aircraft normally involved in performing activities for which the area is requested.

(6) Altitudes (MSL/AGL) to be used in daily aircraft operations.

### 7625. REGIONAL ACTIONS

Upon receipt of a proposal for an alert area, the appropriate region shall comply with the provisions of Part 1 and this part.

### 7626-7629. RESERVED

## Section 3. CRITERIA

### 7630. GENERAL

The criteria in this section shall be applied to determine whether or not alert areas should be established. The activity must be nonhazardous, and all flight activity shall be conducted in accordance with visual flight rules.

### 7631. HORIZONTAL BOUNDARIES

To the extent possible, these areas should be established so as to avoid Federal airways, major terminal areas, and high volume VFR routes. After an alert area is established, the designation of Federal airways through such areas should be kept to a minimum.

### 7632. VERTICAL DIMENSIONS

The ceiling and floor shall be established at levels necessary to contain the activity. In addition, the ceiling shall not extend into positive control airspace nor the floor established below 4,000 feet above ground level within a control zone.

### 7633. TIME ASSIGNMENT

A time period, expressed in local time, shall be specified to indicate hours of regularly scheduled use. When conditions warrant, provision may also be made for activation of the area by Notice to Airmen during other than regularly scheduled hours.

### 7634. TYPES OF OPERATIONS

Only the following types of operations should be considered.

a. Concentrated Student Training. A high volume of flight operations at one or more airports at a given location. Singly or jointly, the volume of activity should exceed 250,000 local operations annually and be generated primarily by student training in fixed-wing or rotary-type aircraft. A local operation is an aircraft arrival at or departure from an airport in which the aircraft:

(1) Operates in the local traffic pattern or within sight of the tower.

(2) Is known to be departing for, or arriving from, flight in local practice areas.

(3) Executes simulated instrument approaches or low passes at the airport.

b. Unusual Aerial Activity. This type of activity is harder to define and must be individually considered as to its operational significance to the flying public. As an example, an alert area may be established where regularly used VFR routes transit an area which regularly contains a specialized type of air traffic and where prior knowledge of such traffic would significantly enhance aviation safety.

### 7635-7699. RESERVED

## Chapter 33. CONTROLLED FIRING AREAS

### Section 1. GENERAL

#### 7700. PURPOSE

Controlled firing areas are established to contain activities which, if not conducted in a controlled environment, would be hazardous to nonparticipating aircraft. It is the user's responsibility to provide for the safety of persons and property on the surface, and the proponent's written request for a controlled firing area should indicate that such provisions have been made.

#### 7701. BASIS FOR APPROVAL

The approval of a controlled firing area shall only be considered for those activities which are either of short duration or of such a nature that

they could be immediately suspended on notice that such activity might endanger nonparticipating aircraft. Examples of such activities are as follows:

- a. The firing of missiles, rockets, anti-aircraft artillery, and field artillery. (Includes military and civil firings, and in the case of rockets, also pertains to those fired by amateurs.)
- b. Static testing of large rocket motors.
- c. Blasting.
- d. Ordnance disposal.
- e. Chemical disposal.

#### 7702-7719. RESERVED

## Section 2. ESTABLISHMENT

### 7720. RESPONSIBILITY FOR APPROVAL

The authority to approve or disapprove controlled firing area proposals rests with the regional Air Traffic divisions within whose jurisdiction the activity will take place.

### 7721. SUBMISSION REQUIREMENTS

The proposal for a controlled firing area should be submitted to the appropriate regional Air Traffic division at least 3 months in advance of the desired effective date.

### 7722. CONTENT OF PROPOSALS

Controlled firing area proposals should include the information listed in Chapter 27, Section 3.

### 7723. REGIONAL ACTION

Upon receipt of a proposal requesting a controlled firing area, the responsible regional Air Traffic division shall:

a. Review the proposal to determine if the proposed area's location would conflict with the requirements of other airspace users.

b. Accomplish the following:

(1) If practicable, encourage the proponent to explore the feasibility of conducting the activity in an existing restricted area.

(2) After reaching a decision to approve or disapprove a proposal, inform the proponent of such decision by formal letter. If approval is granted, issue a Certificate of Waiver to FAR Part 101 as required.

(3) If the decision is to approve a proposal, the letter of approval shall include, as a minimum, the following:

(a) Activity for which approval has been granted.

(b) Specific area for the activity.

(c) Altitudes.

(d) The name of the user.

(e) Time of use.

(f) Effective date.

(g) Safety precautions to be observed (see Section 3 of this chapter).

(h) Instructions, if applicable, for the user to notify the owner or manager of any airport that might be affected by the controlled firing area.

(i) Instructions for the user to file the following information with the nearest flight service station in sufficient time to permit a notice to airmen to be transmitted at least 12 hours prior to scheduled operations:

(i) Location of the area.

(ii) Time of use.

(iii) Activity to be conducted.

(iv) Altitudes.

(v) User.

c. Circularize potentially or known controversial proposals.

d. Forward to ATO-200, for information purposes, a copy of the request for a controlled firing area and subsequent regional action.

**7724-7729. RESERVED**

### Section 3. SAFETY PRECAUTIONS

#### 7730. PRECAUTIONARY MEASURES

Precautionary measures necessary to protect aircraft in flight, and where appropriate, persons and property on the surface are dependent on the type of activity, terrain, and other factors involved. The approving FAA office shall assure that adequate safety precautions are established for each controlled firing area. The following precautionary measures are considered to be the minimum required and shall be mandatory for all controlled firing areas:

a. The ceiling shall be at least 1,000 feet above the highest altitude of fire or other activity that could be hazardous to aircraft in the area.

b. Visibility shall be sufficient to maintain visual surveillance of the entire controlled firing area and for a distance of 5 miles therefrom in all directions.

#### 7731. RADAR SURVEILLANCE

If the approving FAA office determines that adequate radar surveillance is available, the criteria set forth in paragraph 7730a and b need not apply. The approving FAA office may establish ceiling and visibility requirements as it deems necessary; however, no projectile is to enter any cloud formation.

#### 7732. SAFETY OFFICER

The user of a controlled firing area shall appoint a safety officer. This person is responsible to see that surveillance of the area and for distance of 5 miles therefrom is maintained immediately prior to and during the time that activity hazardous to aircraft is in progress. Surveillance may be accomplished by ground observers, radar, patrol aircraft, and/or surface vessels. While the use of any one or a combination of the methods in considered satisfactory, the limited capabilities of a surveillance plan based solely on the use of ground observers must be recognized. Although it would not be reasonable to restrict the altitude of an area on this factor alone, its limitations must be considered.

#### 7733. USER RESPONSIBILITIES

The user must agree to cease any activity which creates a hazard upon notification that an aircraft is approaching the area. To accomplish this, each observer shall have continuous effective communications with the safety officer and shall be thoroughly briefed as to observer responsibilities.

#### 7734-7999. RESERVED

**MISCELLANEOUS PROCEDURES**

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# PART 8. MISCELLANEOUS PROCEDURES

## Chapter 34. OUTDOOR LASER DEMONSTRATIONS

### Section 1. GENERAL

#### 8000. INTRODUCTION

Outdoor laser demonstrations are light shows or tests that use a laser to amplify or generate light. The special lighting effects produced have made lasers increasingly popular for entertainment and promotional uses. When laser beams are projected or reflected into the navigable airspace, the potential exists for permanent eye damage and/or other injury to pilots and passengers of aircraft. Therefore, the FAA conducts an aeronautical study of all proposals for outdoor laser demonstrations to determine the effect upon the navigable airspace.

#### 8001. PURPOSE AND APPLICATION

a. This chapter provides guidance to air traffic personnel for determining or verifying the effects of an outdoor laser demonstration on the safe and efficient utilization of the navigable airspace.

b. This chapter applies primarily to commercial entertainment and promotional outdoor visible laser demonstrations which are subject to the Food and Drug Administration's (FDA) "Performance Standards for Light-Emitting Products," Code of Federal Regulations, 21 CFR 1040. Military and research laser applications may require other controls, safeguards, and airspace considerations which are beyond the scope of this chapter. While the criteria contained herein maybe useful for evaluating some military laser uses, it should be noted that such lasers are subject to military safety standards and are exempt from the requirements of 21 CFR 1040.

#### 8002. DEFINITIONS

As used in this chapter, the following terms are defined below:

a. CDRH — Center for Devices and Radiological Health. An office of the FDA concerned with the safe operation of laser devices.

b. Demonstration — An outdoor laser demonstration is considered to be an outdoor test, light show, or any other type of entertainment or promotional use of a laser.

c. Diffusion — The scattering or dispersing of a light beam by reflection off a surface or transmission through a translucent material.

d. Divergence — Measured in milliradians (mr). The increase in beam diameter with increase in distance from the source. The power of the light becomes spread over an increasingly wider area with distance from the source.

e. Eye-safe Distance — The maximum distance from the laser projector beyond which the laser beam irradiance does not exceed  $2.6\text{mW}/\text{cm}^2$ .

f. Irradiance — A measure of light energy spread across a given area, expressed in watts per square centimeter ( $\text{W}/\text{cm}^2$ ).

g. Laser — An acronym for Light Amplification by Stimulated Emission of Radiation.

h. Laser Manufacturer — A term that refers to persons who make laser products including those who are engaged in the business of design, assembly, or presentation of a laser projector and/or light show.

i. Laser Safety Officer — A knowledgeable person present during laser operation who is responsible for shutting down the laser should an unsafe condition occur or become imminent.

j. Milliradian (mr) — One thousandth of a radian. A measurement of laser beam divergence.

k. Navigable Airspace — Airspace at and above the minimum flight altitude prescribed in the Federal Aviation Regulations (FAR) including airspace needed for safe takeoff and landing (see FAR Part 91).

l. Nonvisible Laser — A laser-generated product that is not normally visible to the naked eye. Lasers of this kind are not used for outdoor laser demonstrations. They lack the principle safety factor—visibility.

m. Terminated Beam — An output from the laser projector which does not enter the navigable airspace but is terminated against a suitable object or surface.

n. Unterminated Beam — Projector outputs which are directed or reflected into the navigable airspace.

o. Variance — Permission from FDA for a laser manufacturer to deviate from one or more requirements of a standard when alternate steps are taken to assure safety; i.e., to be in the business of providing Class IIIb or IV laser demonstrations or projectors.

**p. Visible Laser** — A laser generated product visible to the naked eye.

**q. Watts** — A term used to measure the power output of a laser projector.

### 8003. LASER PRODUCT CLASSES

The FDA's laser performance standard divides laser products into five classes as follows:

**a. Class I laser projectors** produce levels of radiation that have not been found to cause biological damage. Class I visible radiation laser projectors emit less than 0.39 microwatts (0.39 millionths of a watt) continuous output.

**b. Class II laser projectors** produce visible radiation that could cause eye damage after direct, long term viewing. Class II laser projectors emit less than 1 milliwatt (1 thousandth of a watt) continuous output.

**c. Class IIIa laser projectors** produce visible radiation at levels capable of causing ocular injury in a short exposure. However, factors of atmospheric attenuation, beam, body movements, and limitations in eye focusing ability provide a measure of protection. Class IIIa laser projectors emit less than 5 milliwatts peak power.

**d. Class IIIb laser projectors** produce visible radiation powerful enough to injure human tissue with one short exposure to the direct beam or its direct reflections off a shiny surface. Class IIIb visible radiation laser projectors emit less than 500 milliwatts (one-half watt) continuous output.

**e. Class IV laser projectors** produce visible radiation so powerful that it can cause injury with a direct or reflected exposure, even when the beam is scattered or diffused by a rough surface or even by some smoke screens. Class IV visible radiation laser projectors emit more than one-half watt continuous output.

### 8004. LASER CONSIDERATIONS

**a.** The intensity of even a low power laser beam can be equal to or greater than that of the sun. When a laser beam enters the human eye, its power is concentrated on a very small area on the retina. This can produce harmful effects ranging from temporary flash blindness to permanent blind spots or other eye injury. In some cases, the eye's automatic aversion response to the light

(blink reflex) may be sufficient to avoid these effects. To guard against this hazard, an aircraft observer, with binoculars and direct communications with the laser operator, should be stationed at a location where visual surveillance of the entire area is possible. The observer shall notify the laser operator to cease projections if any aircraft or helicopters approach the area. This requirement should be placed in the FAA determination.

**b.** Laser beam divergence is very small even over long distances. For example, a beam with a 1mr divergence will be just over 1 inch in diameter at 100 feet from the source. Beam divergence and laser projector output power are considered in determining the airspace affected. A chart is provided for determining eye-safe distances for lasers having 0.5mr, 1.0mr, 1.5mr, and 2.0mr divergence (see Figure 8-1).

**c.** Diffusion effects have not been considered in Figure 8-1. Determination of these effects involves many variables and requires complex calculations. Evaluation of diffusion is beyond the scope of this chapter. Atmospheric scattering and absorption have also been ignored as an additional safety factor.

### 8005. EXPOSURE LIMITS

The eye-safe distances in this chapter are based on exposure limits for a maximum irradiance value of 2.6 milliwatts per square centimeter ( $2.6\text{mW}/\text{cm}^2$ ). This irradiance value is the maximum at which a person, unaided by viewing devices, such as binoculars or cameras, can typically react quickly enough to avoid an exposure that would exceed the limits of Class I. Staring into a laser beam, like staring into the sun, is dangerous. A momentary exposure however, can be compared to an accidental glance at the sun. In an accidental glance, the light does not remain focused on a single point on the retina, so the hazard potential is lessened. Considering aircraft movement and/or laser beam scanning, the probability of a prolonged exposure is statistically very low. This fact may actually permit use of slightly higher irradiance values. However, to maintain a reasonable margin of safety, the value of  $2.6\text{mW}/\text{cm}^2$  is chosen as the maximum permissible irradiance allowed at the aircraft.

**8006-8019. Reserved**

## Section 2. PROCESSING

### 8020. SUBMISSION OF PROPOSAL

a. The Center for Devices and Radiological Health (CDRH) requires that a laser manufacturer provide written notification to the FAA before conducting an outdoor laser demonstration.

b. CDRH informs manufacturers that:

(1) All notifications are to be directed to the Air Traffic division at the FAA regional office having jurisdiction over the area where the laser show will take place.

(2) FAA needs at least 21 days advance notice to process a request and conduct an aeronautical study. The FAA recognizes that industry conditions may not always permit the advance notice desired. While FAA endeavors to accommodate all requests, proper conduct of the aeronautical study to determine airspace effects is essential to air safety. This is particularly true when demonstrations occur in proximity to airports or when the nature of the demonstration would necessitate protection of large amounts of airspace. In these cases, it may be impossible for the FAA to respond to short-notice requests.

(3) Notifications are required for all demonstrations in which projections will be directed or reflected into the navigable airspace (including setup, alignment, and rehearsals). Notifications should contain a minimum of technical information. Of primary concern is the maximum distance from and altitude above the source to be affected by a proposed demonstration.

(4) A proponent wishing to provide supplementary information about measures which will result in a smaller actual danger area than that shown in the Laser Projector Power/Range Table should submit the data in advance to CDRH for review. CDRH will validate the information and issue a letter to the proponent to include with their notification to FAA.

c. Any FAA field office or facility receiving information on a proposed outdoor laser demonstration shall forward this information to the Air Traffic division in the appropriate FAA regional office as soon as practicable.

### 8021. CONTENT OF NOTIFICATIONS

a. Proponent notifications to the FAA regional office will include the following information on all proposed outdoor demonstrations:

- (1) Laser group/company.
- (2) Business address.
- (3) Telephone number.

- (4) Variance number and expiration date.
- (5) Date(s) and time(s) of shows(s).
- (6) Date(s) and time(s) of setup and alignment.
- (7) Location of the show.
  - (a) Showplace name and address.
  - (b) Latitude and longitude of showplace.
- (8) Maximum emitted peak power (watts) at the projector as certified to CDRH.
- (9) Azimuthal direction of projections.
- (10) Elevation of projections in degrees above the horizon.
- (11) Beam divergence (milliradians).
- (12) Maximum distance from source for irradiance of  $2.6\text{mW}/\text{cm}^2$  based on maximum emitted peak power.
- (13) Maximum altitude above source for irradiance of  $2.6\text{mW}/\text{cm}^2$  based on maximum emitted peak power and beam elevation.
- (14) A diagram depicting unterminated beam arrays if applicable.
- (15) Laser safety officer/operator.
  - (a) Local address and phone number.
  - (b) Additional safety procedures.
    - (i) Communications procedures during show.
    - (ii) Visual aircraft spotters.
    - (iii) Other.

b. Supplementary information if applicable. Include the CDRH letter validating the measures which result in a smaller affected area than that shown in the Laser Projector Power/Range Table.

### 8022. STUDY

a. The regional Air Traffic division shall conduct an aeronautical study on all notices received proposing an outdoor laser demonstration. The study should include the following, as appropriate:

- (1) Quantities of traffic affected.
- (2) Traffic flow.
- (3) Location(s) of aviation activity that may be affected, including areas where helicopter traffic operate below 1,000 feet in accordance with FAR 91.79(d).
- (4) Control jurisdiction; i.e., tower or center.
- (5) Coordination with local officials; i.e., airport managers, FAA Air Traffic managers, military representatives, etc.

(6) Possible flight restrictions that should be imposed (consider setup and alignment times as well as actual show times).

(7) Negotiations to resolve objectionable effects, such as limiting wattage, restricting direction and/or elevation of projections, weather requirements, etc.

b. Some demonstrations may require further segregation of non-participating aircraft from within a defined area. A temporary restricted area, established in accordance with the provisions of chapters 27 and 29, may be considered if warranted by airspace requirements and/or duration of proposed operations.

c. To enhance safety of flight, a Special Data NOTAM(L) should be prepared alerting pilots of laser demonstrations. Sample NOTAM's are shown in Figure 8-3.

### 8023. AFFECTED AIRSPACE

a. The amount of airspace affected by a laser demonstration varies with projector output power (watts) as follows:

(1) Less than or equal to one-half watt — Calculations show such a laser poses no hazard to the aviation public if aircraft are operating in compliance with FAR 91.79 restricting traffic to 1,000 feet over congested areas or over an open air assembly of persons. Restrictions on laser activity may be required to protect helicopter traffic operating below 1,000 feet in accordance with FAR 91.79(d).

(2) More than one-half watt — To determine laser effects, use the Laser Projector Power/Range Table (Figure 8-1). Determine whether or not the required airspace would impose undesirable restrictions on aircraft movements. CDRH personnel should be consulted concerning potential hazards or for technical advice as required (Figure 8-4).

b. Diffusion, diffraction, scanning, and other optical effects are often employed by laser manufacturers to modify the laser beam. These techniques could result in actual affected airspace being less than what is shown in the Laser Projector Power/Range Table. However, no reduction in chart figures will be allowed unless the data has been validated by CDRH.

c. Figure 8-1 depicts laser effects on airspace based on power output and beam divergence. The chart can be used to validate data submitted by the proponent or to examine alternatives for resolving objectionable effects. The distances in Figure 8-1 represent the minimum distance from the laser source required to ensure eye protection.

### 8024. CALCULATING LASER EFFECTS

a. Figure 8-1 specifies the minimum distance from the laser source which should be protected. Using a worst-case scenario, this distance would represent the minimum airspace to be protected both horizontally and vertically from the laser source. However, when the laser beam is projected or reflected above horizontal, but less than 90 degrees vertically, the minimum altitude requiring protection will actually be less than the distance shown in Figure 8-1. In this case, the minimum altitude may be found by multiplying the laser distance (from Figure 8-1) by the sine of the angle of elevation of the laser beam (from Figure 8-2) as follows:  $\text{Altitude} = \text{Laser Distance} \times \text{Sine of Elevation Angle}$ .

b. All distances should be rounded up to the next 100 foot increment. Example problems are shown in Figure 8-5.

### 8025. DETERMINATIONS

A determination on proposed laser demonstrations is either "objectionable" or "not objectionable" with respect to its effect on the navigable airspace. A statement of "objectionable" or "not objectionable" should be clearly made. A determination of "not objectionable," provided certain actions by the proponent are accomplished, is proper. Air safety shall be the primary concern. CDRH will consider the firm's history of cooperation with FAA when considering whether to renew or withdraw the firm's variance.

NOTE.—An "objectionable" determination may not motivate the proponent to cancel the proposed demonstration. In these cases, CDRH may withdraw the variance or seek an injunction to stop the demonstration.

### 8026. CONTENT OF DETERMINATIONS

Determinations should be in letter form and include, as a minimum, the following:

a. Listing of any provisions, conditions, or limitations, such as aircraft spotter requirements, as applicable.

b. Notification requirements including FAA contacts to be informed of show start/stop times, changes, or cancellation.

c. A statement advising the proponent that the determination satisfies FAA requirements only and that final approval must also be obtained from appropriate state/local agencies and the FDA.

d. Other information as deemed appropriate.

**8027. DISTRIBUTION OF DETERMINATION**

Respond to each notice with a written determination to the proponent. If necessary, determinations may be telephoned to the proponent and to the CDRH and confirmed by a written determination.

a. As required, ensure that a Special Data NOTAM(L) is issued advising pilots of the location of the outdoor laser demonstration and the dimensions of the airspace that should be avoided. Emphasize that possible eye injury could result if that airspace is penetrated.

b. A copy of all determinations shall be sent to ATO-200, affected air traffic control facilities, and the CDRH in Silver Spring, Maryland. CDRH's national, regional, and local offices' mailing addresses are included in Figure 8-4.

**FIGURE 8-1 LASER PROJECTOR POWER/RANGE TABLE**

| Laser Output Power (Watts) | Beam Divergence—Milliradians(mr) |       |       |       |
|----------------------------|----------------------------------|-------|-------|-------|
|                            | 0.5mr                            | 1.0mr | 1.5mr | 2.0mr |
| 1                          | 1452                             | 726   | 484   | 363   |
| 2                          | 2054                             | 1027  | 685   | 513   |
| 3                          | 2515                             | 1253  | 938   | 629   |
| 4                          | 2904                             | 1452  | 968   | 726   |
| 5                          | 3247                             | 1623  | 1082  | 812   |
| 6                          | 3557                             | 1778  | 1186  | 889   |
| 7                          | 3842                             | 1921  | 1281  | 960   |
| 8                          | 4107                             | 2054  | 1369  | 1027  |
| 9                          | 4356                             | 2178  | 1452  | 1089  |
| 10                         | 4592                             | 2296  | 1531  | 1148  |
| 11                         | 4816                             | 2408  | 1605  | 1204  |
| 12                         | 5030                             | 2515  | 1677  | 1258  |
| 13                         | 5235                             | 2618  | 1745  | 1309  |
| 14                         | 5433                             | 2717  | 1811  | 1358  |
| 15                         | 5624                             | 2814  | 1875  | 1406  |
| 16                         | 5808                             | 2904  | 1936  | 1452  |
| 17                         | 5987                             | 2993  | 1996  | 1497  |
| 18                         | 6161                             | 3080  | 2054  | 1540  |
| 19                         | 6329                             | 3165  | 2110  | 1582  |

**FIGURE 8-3 SAMPLE NOTAM FORMATS**

A LASER LIGHT DEMONSTRATION WILL BE CONDUCTED AT THE LIBERTY BOWL STADIUM, MEMPHIS, TENNESSEE (MEM VORTAC 355+ RADIAL, 5 NAUTICAL MILES, LATITUDE 35+ 07' 18"N, LONGITUDE 89+ 58' 40"W) ON DECEMBER 27, 1987, BETWEEN 1800 AND 2300 LOCAL. LASER LIGHT BEAM MAY BE INJURIOUS TO PILOTS'/PASSENGERS' EYES WITHIN 500 FEET VERTICALLY AND 1 NM LATERALLY OF THE LIGHT SOURCE.

**FIGURE 8-1 LASER PROJECTOR POWER/RANGE TABLE—CONTINUED**

| Laser Output Power (Watts) | Beam Divergence—Milliradians(mr) |       |       |       |
|----------------------------|----------------------------------|-------|-------|-------|
|                            | 0.5mr                            | 1.0mr | 1.5mr | 2.0mr |
| 20                         | 6494                             | 3247  | 2165  | 1623  |
| 25                         | 7260                             | 3630  | 2420  | 1815  |
| 30                         | 7953                             | 3977  | 2651  | 1988  |
| 35                         | 8590                             | 4295  | 2863  | 2148  |
| 40                         | 9184                             | 4592  | 3061  | 2296  |
| 45                         | 9741                             | 4870  | 3247  | 2435  |
| 50                         | 10268                            | 5134  | 3423  | 2567  |
| 55                         | 10769                            | 5384  | 3590  | 2692  |
| 60                         | 11248                            | 5624  | 3749  | 2812  |
| 65                         | 11707                            | 5853  | 3902  | 2927  |
| 70                         | 12149                            | 6074  | 4050  | 3037  |
| 75                         | 12575                            | 6288  | 4192  | 3144  |
| 80                         | 12988                            | 6494  | 4329  | 3247  |
| 85                         | 13387                            | 6694  | 4462  | 3347  |
| 90                         | 13775                            | 6888  | 4592  | 3444  |
| 95                         | 14153                            | 7076  | 4718  | 3538  |
| 100                        | 14521                            | 7260  | 4840  | 3630  |

**FIGURE 8-2 SINE VALUES**

| Elevation Angle | Sine   |
|-----------------|--------|
| 0               | .0000  |
| 5               | .0872  |
| 10              | .1737  |
| 15              | .2588  |
| 20              | .3420  |
| 25              | .4226  |
| 30              | .5000  |
| 35              | .5736  |
| 40              | .6428  |
| 45              | .7071  |
| 50              | .7660  |
| 55              | .8192  |
| 60              | .8660  |
| 65              | .9063  |
| 70              | .9397  |
| 75              | .9659  |
| 80              | .9848  |
| 85              | .9962  |
| 90              | 1.0000 |

A LASER LIGHT DEMONSTRATION WILL BE CONDUCTED AT 250 LOWER DUG CAP ROAD DALTON, GEORGIA (CHA VORTAC 156+ RADIAL, 15 NAUTICAL MILES, LATITUDE 34+ 44' 00"N, LONGITUDE 85+ 01' 00"W) ON MAY 18, 1987, BETWEEN 2130 AND 2330 LOCAL. LASER LIGHT BEAM MAY BE INJURIOUS TO PILOTS'/PASSENGERS' EYES WITHIN 2,000 FEET VERTICALLY AND 1 NM LATERALLY OF LIGHT SOURCE.

A LASER LIGHT DEMONSTRATION WILL BE CONDUCTED AT THE COTTON BOWL AT THE TEXAS STATE FAIRGROUNDS, DALLAS, TEXAS (LOVE VORTAC 123+ RADIAL, 6.5 NAUTICAL MILES, LATITUDE 32+ 47' 00"N,

LONGITUDE 96+ 45' 30"W) ON JULY 4, 1987, BETWEEN 2040 AND 2200 LOCAL. LASER LIGHT BEAM MAY BE INJURIOUS TO PILOTS'/PASSENGERS' EYES WITHIN 3,500 FEET OF LIGHT SOURCE.

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**FIGURE 8-4 FOOD AND DRUG ADMINISTRATION ELECTRO-OPTICS SPECIALISTS' ADDRESSES**

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| <i>Address</i>  | <i>Region</i>   |
|---|---|
| 585 Commercial Street<br>Boston, Massachusetts 02109<br>(617) 565-4718<br>FTS: 835-4718<br>ATTN: John J. Galli  | Regions I and II<br>(I—ME, NH, VT, MA, RI, & CT)<br>(II—NY, NJ, & PR)   |
| 60 Eighth Street, NE<br>Atlanta, Georgia 30309<br>(404) 347-3576<br>FTS: 257-3576<br>ATTN: Malcolm Frazier  | Regions III, IV, and VI<br>(III—PA, MD, DE, VA, WV, & DC)<br>(IV—KY, TN, NC, SC, MS, AL, GA, & FL)<br>(VI—NM, TX, OK, AR, & LA) |
| FDA District Office<br>1141 Central Parkway<br>Cincinnati, Ohio 45202<br>(513) 684-3505<br>FTS: 684-3505<br>ATTN: James E. Frye   | Regions V and VII<br>(V—MN, WI, MI, IL, IN, & OH)<br>(VII—NE, IA, KS, & MO)   |
| 1521 W. Pico Blvd.<br>Los Angeles, California 90015<br>(213) 252-7603<br>FTS: 983-7603<br>ATTN: James Roseboro  | Regions VIII and IX (So. Calif.)<br>(VIII—UT, CO, WY, MT, ND, & SD)<br>(IX—AZ & CA (LAX County and South))                      |
| U.S. Federal Building & U.S. Court House<br>Rm. 2062<br>280 1st Street<br>San Jose, California 95113<br>(408) 291-7893<br>FTS: 466-7893<br>ATTN: Robert C. Stohl  | Regions IX (No. Calif.) and X<br>(IX—HI, NV, & CA (North of LAX County))<br>(X—WA, OR, ID, & AK)                                |
| Consumer Safety Officer<br>National Office<br>Center for Devices<br>and Radiological Health<br>Consumer Industrial Products Branch, HFZ-312<br>8757 Georgia Avenue<br>Silver Spring, Maryland 20910<br>(301) 427-8228 |   |

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## FIGURE 8-5 LASER PROBLEM SOLUTIONS

### Example Problem 1:

Laser output power = 15 watts  
Laser beam divergence = 1.5mr

### Find: Laser distance:

1. Enter Figure 8-1 at 15 watts in the *Laser Output Power* column.
2. Proceed horizontally to the *1.5mr* column, and read the laser distance of 1875 feet.
3. Round up the distance to 1900 feet.

**Answer: Laser distance = 1900 feet.**

### Example Problem 2:

Laser output = 18 watts  
Laser beam divergence = 1.0mr  
Maximum elevation angle of laser beams = 60 degrees above horizontal.

### Find: Horizontal and vertical distances to be protected:

1. Laser distance (from Figure 8-1) = 3,080 feet.
2. Sine of 60 degree elevation angle (from Figure 8-2) = 0.8660.
3. Find altitude by multiplying 3,080 feet by 0.8660 = 2,667 feet.
4. Round up all figures to the next 100 foot increment.

**Answer: Minimum required protected airspace is 3,100 feet horizontally and 2,700 feet vertically from the laser source.**

Technical note: Solving the triangle in example problem 2 would indicate a 1,540 foot horizontal distance from the laser source. However, in determining the airspace effects, the greater distance from Figure 8-1 is selected as an added safety margin.