

CHAPTER 4

Airspace Hazards and Conditions

I. Introduction

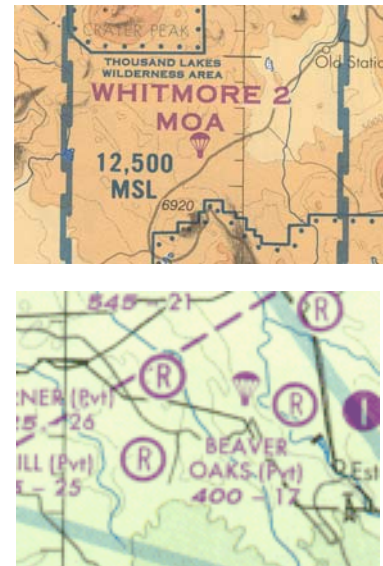
The purpose of this chapter is to provide an overview of a number of airspace areas that require caution, some of which may not be initially apparent. All of the possible hazards cannot be listed but many circumstances have been included. With knowledge of these situations the construction of hazard maps for aviation agency purposes should be easier.

II. Airspace Hazards

A. Parachute Jump Operations

There are published locations where parachute operations take place. These areas may be found on sectionals, in the Airport/Facility Directory and in FLIP AP/1A. The charted Parachute Jumping Area symbol is a magenta (brown on Helicopter Route Charts) parachute. The published parachute jump descriptions are typically limited to a defined point and may not include a radius or may list a very small landing area. The actual operating area of jump aircraft will normally extend beyond this area. Winds may also take jumpers beyond these areas.

FIGURE 4-1 Two examples of Parachute Jump Operations on sectionals



Prior to flights near or in these areas agency personnel should search for the ATC coordination frequency. Many jump operators also broadcast jump alerts on the common traffic advisory frequency (CTAF) for airports where parachute landings are located. Be aware when operating in proximity to this area for stray jumpers and aircraft.

B. Bird and Animal Strikes

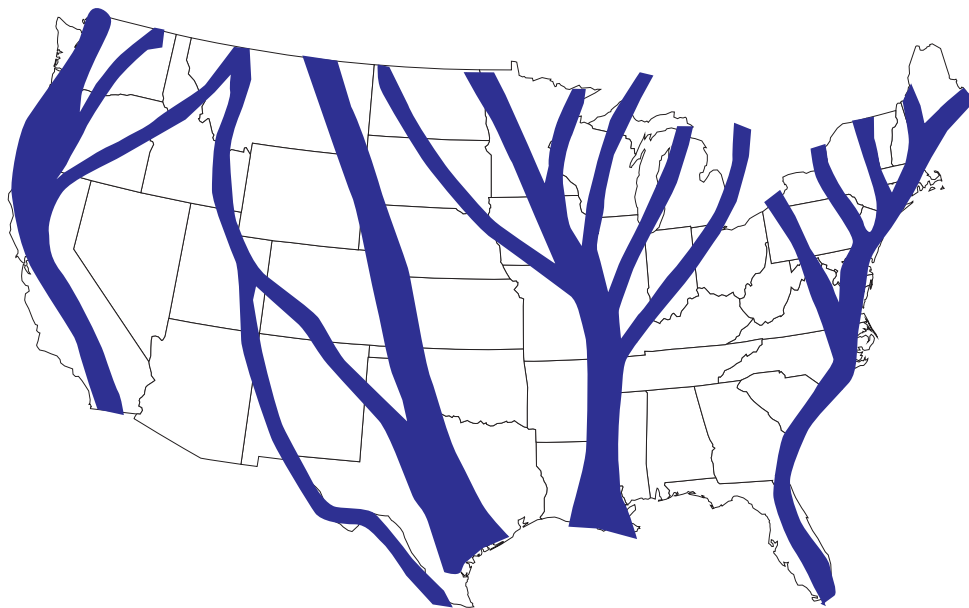
The Wildlife Services (WS) program of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) works closely with the FAA, DoD and the aviation industry to research wildlife areas at airports and to reduce the economic impacts and hazards to aviation caused by wildlife. According to WS, collisions between aircraft and wildlife at airports have risen dramatically in recent years as a result of large population increases in many wildlife species, faster airplanes and the increase in air traffic.

Wildlife Services (WS) researchers and the FAA believe that about 80 percent of wildlife aircraft strikes go unreported. These unreported strikes make detection and management of wildlife hazards much more challenging.

The potential for bird strikes increases during bird migrations in the months of March through April, and August through November. The altitudes of migrating birds vary with winds aloft, weather fronts, terrain elevation, cloud conditions and other environmental variables. About 90 percent of migratory flights occur below 5,000 feet MSL; however, migratory waterfowl have been reported as high as 20,000 feet MSL.

There are four major migratory flyways in North America—Atlantic, Mississippi, Central, and Pacific. A recent Fall Flight Forecast Index expected 105 million migratory waterfowl to use the national airspace from altitudes of less than 100 feet AGL to over 20,000 feet AGL.

FIGURE 4-2 Four Major Migratory Flyways



Pilots are requested to report any bird or other wildlife strike to the FAA using FAA form 5200-7 (Figure 4-3). The data derived from these reports are used to develop standards to mitigate this potential hazard to aircraft and for documentation of necessary habitat control on airports.

Pilots are encouraged by the FAA to use caution and to minimize enroute flying at lower altitudes during migration. Owls, waterfowl, vultures, hawks, egrets, blackbirds and starlings cause the greatest impact to flight operations due to their size, abundance or habit of flying in dense flocks.

Further information and on-line strike reporting may be found at the Airport Wildlife Hazard Mitigation website of the William J. Hughes FAA Technical Center at <http://wildlife.pr.erau.edu>.

Military records and information may be found at the Bird/Wildlife Aircraft Strike Hazard (BASH) website at <http://afsafety.af.mil/AFSC/bash/home.html>.

C. Unmanned Air Vehicles (UAV) and Remotely Operated Aircraft (ROA)

FAA Handbook 7610.4 identifies an ROA as an un-piloted aircraft (e.g. drone) which is remotely controlled by an external source that is either airborne or on the ground. Until recently, these aircraft were also referred to as UAVs or Remotely Piloted Vehicles (RPVs). UAV is still commonly used, but technically the FAA has officially changed the designation to ROA.

ROAs are no longer strictly military or defense contractor operations. Universities, commercial companies, utility companies, and even law enforcement agencies are looking at or experimenting with uses for ROA.

ROAs are generally operated within the parameters of two types of areas. Those designed to be

FIGURE 4-4 Solar Powered UAV Example



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controlled solely from ground-based launch sites are usually limited to a defined local area, such as an airport which supports line-of-sight control. Power and equipment capabilities influence the size of this area, unless supplemented by additional control sites. Other ROAs utilize satellite communications and can maneuver over much greater distances and altitudes. These operations may or may not have a piloted chase aircraft.

ROA operations outside Restricted Areas or Warning Areas are required to get FAA approval via a Certificate of Authorization (COA). The application for a COA must address the aircraft's ability to "See and Avoid" via radar, on-board cameras, chase plane control, etc. Agency personnel should contact the FAA Regional Office for further information, and to provide feedback regarding airspace conflicts that may occur.

D. Patrol Aircraft

There could be several types of non-military, low altitude patrol operations conducted by fixed wing or rotary aircraft in your area. Some of these operations may include law enforcement, border patrol flights, utility company surveys of transmission lines and stations, aerial spraying on private or public lands, other agencies' administrative and support flights (e.g. NASA, DOE, etc.), air rescue and medivac flights. In addition, the Civil Air Patrol may fly MTRs at the request of DoD to check for low level aviation hazards.

Agency personnel should establish contacts with these agencies or companies to deconflict when feasible. At a minimum, knowledge of the type and schedule of the activity is recommended.

E. Ultralights/Gliders/Manned Balloons

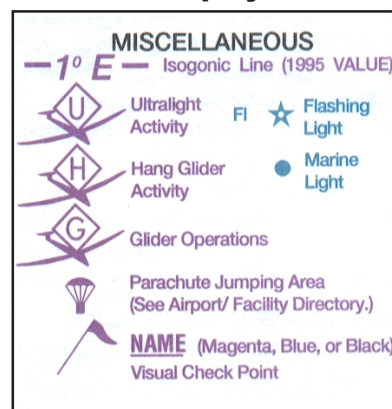
14CFR Part 103 defines ultralights as "vehicles" (not aircraft) that are used or intended to be used for manned operation in the air by a single occupant. In addition to ultralights, and gliders there are three "winged categories"; fixed-wing, flexible wing (powered parachutes and powered paragliders) and weight-shift (a three wheeled airframe called a trike). The main differences in these classifications, besides configuration, are the control systems.

Regardless of the type of control system, all such craft must meet the same 14CFR 103 requirements for weight and operating capabilities to be classified as an ultralight. When these requirements are met, the following 14CFR 103 restrictions apply:

- Use is only for sport and recreation
- Use allowed for daylight operations only
- No operations over congested areas
- Used by single occupant
- Maximum five gallons of fuel
- Yield right-of-way to all aircraft
- Prior permission required for operation in controlled airspace
- Operation prohibited in restricted areas

14CFR Part 103 (ultralight vehicles) currently does not require pilot certification, nor does it require aircraft registration. Many user and industry groups [e.g. United States Ultralight Association (www.USUA.org), Aero Sports Connection, Experimental Aircraft Association Ultralights, United States Hang Gliding Association(www.ushga.org)] may operate alternative registration and training programs that are designed to enhance the FAA's regulations. Concentrated ultralight vehicle activity is depicted on sectionals (see Figure 4-5).

FIGURE 4-5 Ultralights/ Gliders/Manned Balloons Sectional Map Symbols



Agency personnel planning flights or activities in an one of these areas should be aware of the location and frequency of ultralight and similar activity. Care should be taken to enhance the “see and avoid” capability, as ultralights and manned balloons are not normally equipped with radios. Frequently, ultralight and glider tow operations are in close proximity to small airports, and specific airport operating instructions or preferred operating areas may exist. Additionally, be alert to non-powered glider activity near higher terrain, where wind or “wave” conditions help keep these vehicles aloft. For activity information, contact the FAA, local airports or the organizations listed above.

F. Banners and Unplanned Releases

Depending on the type and complexity of activity over federally managed lands, the possibility of planned or unplanned drops from aircraft or airborne vehicles exists. Banners are towed both for commercial use and for military operations. Normally an area for banner release is pre-designated and deconflicted, but a sudden change in weather conditions, or aircraft control problems, may force a pilot to make an unplanned release. Other types of unplanned releases or drops include tanks or pods, weapons, fuel or external load dumps, and other (towed) items. Any aircraft may experience the problem of a part or piece falling off, which occasionally leads to an emergency situation.

G. Chaff

Chaff are small metallic strips used by the military to interfere with the enemy's radar capacity to lock on or identify an aircraft with radar. Chaff may be released at various altitudes and float slowly down, creating a reflective screen and "hiding" the aircraft's position. Chaff is commonly used for military training but can have a significant effect on FAA radar systems. Approval to use chaff must be coordinated with the FAA.

H. Flares

Flares are devices launched airborne to divert approaching weapons from the target aircraft. Depending on wind and altitude launched, flares can appear to "hang" in the sky or have a slow descent rate. Flares used today by the military are normally self-destructive, meaning they are launched at sufficient altitudes to complete its burn before reaching the ground, leaving no trace except a small metallic tab. Flares are normally restricted to use over military ranges or other approved sites.

Agency personnel should develop a list of points of contact (POC) for coordination of incidents of this nature. Although most of the above discussion relates to military aircraft flights, civilian operators may be involved as well. Contact the FAA, MILREPS, or other personnel for assistance in identifying the type and frequency of these activities.

I. Open Skies Treaty

The Treaty on Open Skies was ratified by the United States Senate in 1994. Signatories to this Treaty include NATO allies and former Warsaw Pact nations. The Treaty is dependent upon complete territorial openness, and permits the use of unarmed observation aircraft equipped with imaging sensors. Under the Terms of this treaty, signatory countries are authorized to operate aircraft over all territories of the visited/observed country (e.g. the United States) under the conditions outlined in the treaty. These conditions permit full access to all United States airspace. Under the terms of the treaty, the Defense Threat Reduction Agency (DTRA) conducts training and operational flights to support the Treaty. Additionally, the State Department has authorized foreign nation overflights that may be conducted in U.S. airspace in preparation for treaty implementation. In all of these preparatory overflights, like official Treaty overflights, all conditions of the Treaty, related to access to airspace and notification procedures are fully exercised.

Treaty provisions state that Open Skies flights take precedence over regular air traffic and allow flights through all Special Use Airspace. Open Sky Treaty aircraft flights will be coordinated through the FAA.

III. Ground-Based Operations

Ground-based operations include moored balloons, kites, unmanned rockets and unmanned free balloons. 14CFR 101 (moored balloons, kites, unmanned rockets and unmanned free balloons) addresses the operating requirements and restrictions for these activities. These operations are usually contained within a specific area, although unmanned rockets and balloons may reach considerable altitudes or trajectories before falling to earth. In both cases, there are specific weight and size limitations imposed to qualify under this regulation. 14CFR 101 operations are admonished to not operate in a manner that creates a hazard to other persons or their property and to not allow an object to be dropped from their platform, if such action creates a hazard to other persons or their property.

A. Moored Balloon and Kites

A moored balloon is defined as any balloon that is moored to the surface of the earth, or an object thereon that has a diameter of more than six feet or a gas capacity of more than 15 cubic feet. An 14CFR 101 regulated kite is any kite that weighs more than five pounds and is intended to be flown at the end of a rope or cable. Operation of a moored balloon or kite between sunrise and sunset requires marking of mooring lines with colored

pennants or streamers. The FAA requires obstruction lighting to serve as a visual warning for operations conducted between sunset and sunrise. Moored balloon or kite operations more than 150 feet above the surface of the earth require at least 24 hours notice for coordination with the FAA ATC facility nearest to the place of intended operation.

Figure 4-6 Example of a Tethered Aerostat Radar System



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The Tethered Aerostat Radar System is a balloon-borne radar system which provides low level radar surveillance data in support of federal agencies involved in the nation's drug interdiction program. The aerostat is a large fabric envelope filled with helium. It can rise to 15,000 feet while tethered by a single cable, which has a maximum breaking strength of 26,000 pounds. Normal operating height is 12,000 feet MSL. The average aerostat is about two times the size of the Goodyear blimp. For security and safety reasons, the airspace around USAF aerostat sites are restricted for a radius of at least two or three statute miles and an altitude up to 15,000 feet.

B. Unmanned Rockets

An unmanned rocket falls within specific weight and material criteria and normally does not include aerial fireworks displays or model rockets (addressed below). Operation of unmanned rockets requires advance coordination with the FAA ATC facility nearest to the place of intended operation.

C. Unmanned Free Balloons

Unmanned free balloons that meet specific payload and load separation criteria are required to comply with 14CFR 101 and will coordinate with the FAA ATC facility nearest to the place of intended operation within six to 24 hours prior to the beginning of the operation. A launch notice to the FAA or military ATC facility nearest to the place of intended operation is also required immediately after balloon launch. Unmanned free balloons may be equipped with trailing antennas or other suspension devices that may require appropriate obstruction markings.

Agency personnel should be aware of these occasional activities. Some weather balloons do not meet 14CFR 101 criteria and thus may not be coordinated with ATC. Identify the responsible operators and establish POCs for shared notifications when appropriate.

D. Model Rockets/Model Aircraft

Local individuals and organizations may be involved in recreational model rocket and model aircraft clubs or events. These operations are sometimes found in proximity to airports (some small airports identify areas for these activities) or other common public areas (e.g. schools or parks). Dry lakebeds and other flattened areas are other ideal sites. Normally though, these areas are too remote for public utilization. Altitudes used can be relatively low (below 1,500 feet AGL) for model aircraft, but some model rocket clubs operate to altitudes in excess of 18,000 feet MSL and may incorporate larger areas.

These activities may not be a problem for agency personnel but it's important to identify sites for potential safety conflicts.

E. Lasers

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 or other injury to pilots and passengers of aircraft.

Outdoor laser demonstrations are subject to Food and Drug Administration (FDA) regulation. Military and research laser applications may require other controls, safeguards and airspace considerations.

The FDA's laser performance standards divide laser products into five classes. 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 can be concentrated on a very small area of the retina. This can

produce harmful effects ranging from temporary flash blindness to permanent blind spots or other eye injury.

Laser manufacturers must provide written notification to the FAA before conducting an outdoor laser demonstration. To enhance safety of flight, laser performances are listed in the US NOTAM system as FDC NOTAMS.

Check NOTAMS before scheduling flights and caution pilots and passengers to approach known laser performance areas with extreme caution.

F. Obstacles, Antenna Farms and Power Lines (www.fcc.gov)

14CFR Part 77 and FAA AC 70/7460-2K provide criteria and guidance for FAA evaluation of construction and other man-made obstacles that may affect navigable airspace. This process is used to:

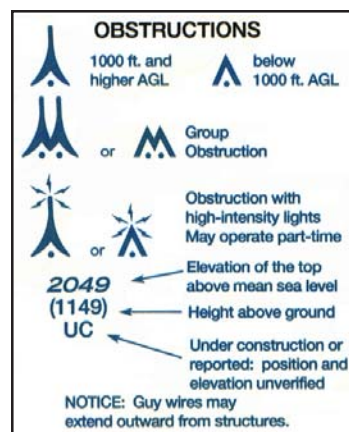
- Recognize potential aeronautical hazards in order to minimize adverse effects
- Revise published data or issue NOTAM to alert pilots to airspace change(s)
- Recommend appropriate marking and lighting to make such objects visible to pilots
- Depict obstacles on aeronautical charts for pilotage and safety

The FAA requires notification and an evaluation of certain obstacles prior to construction. These obstacles will generally meet one or more of the following criteria:

- Greater than 200 feet AGL
- On or near an airport, heliport or sea base
- Obstacle may cause electromagnetic interference

The kinds of objects which fall under this criteria include proposed construction or alteration of:

FIGURE 4-7 Symbols From Sectional



- Buildings
- Towers
- Roadways
- Overhead communications and transmission lines (including supporting structures)
- Water towers and supporting structures

These obstruction criteria can also include construction equipment or other temporary structures such as:

- Cranes
- Derricks
- Stockpiles of equipment
- Earth moving equipment

Agency personnel should be aware of proposed obstructions within their units and, when needed, provide comment to the FAA facility performing the evaluation. FAA findings from evaluations of proposals are classified as either a “Determination of Hazard to Air Navigation” or a “Determination of No Hazard to Air Navigation”. When the finding indicates a hazard does exist, the FAA may recommend appropriate lighting and/or marking to make the obstacle more visible to pilots.

Agency personnel may contact their FAA Regional headquarters and request being placed on the mailing list to receive “FAA Determinations of Hazards (or No Hazards) to Air Navigation” notifications.

Advisory Circular 70/7460-2K states: *“An FAA determination is a conclusion on the study of a structure’s projected impact on the safe and efficient use of navigable airspace. It should not be construed as an approval or disapproval of the project.”* This means the FAA determination and recommendations are not legally binding on the proponent. This FAA process does not relieve the project proponent of the compliance requirements of other laws, ordinances or regulations. Local government and land use planning authorities may be helpful in focusing on steps that can be taken to minimize adverse affects of proposed actions.

Many structures exist that could significantly affect the safety of flights operating below 2,000 feet AGL. Numerous skeletal structures, such as

radio and television antenna towers, exceed 1,000 feet AGL with some extend higher than 2,000 feet AGL. Most skeletal structures are supported by guy wires, which are hard to see in good weather and are virtually impossible to see in poor weather. These wires can extend up to 1,500 feet horizontally from the structure they support.

Overhead transmission and utility lines often span approaches to runways, natural flyways such as lakes, rivers gorges and canyons. They may also cross other landforms that pilots often follow, such as highways and rail-road tracks.

14CFR 77 processes encourage grouping of radio antennas and like structures in “antenna farms”. The intent is to group together similar sized obstructions, making them easier to locate and avoid.

In the planning process, agency personnel can encourage companies to bury transmission and utility lines to remove the risk to aviation activities. Where this is not possible, reflective and other visual markers may be recommended to provide increased visibility of the wires.

Pilots operating in these areas should be thoroughly briefed as to potential hazards. Missions should be planned so as to avoid low-level flight in these areas whenever feasible.

Dispatchers and Aviation Managers should maintain current hazard maps and relay this information to affected pilots.

G. Blasting

There are two issues that present a hazard in blasting: flyrock debris and premature detonation. The Department of Defense is concerned that electronic warfare equipment on certain DoD aircraft could initiate a premature explosion of blasting equipment. Blasting operations using non-electric blasting caps (NONEL) are not at risk (e.g. fireline explosives). Operations using electric blasting caps (EBC) are at risk of premature detonation under a variety of circumstances, as described by the Electronic Warfare Committee at the Pentagon.

Permanent blasting are listed in the DoD AP 1/B Publication. However, most agency blasting sites vary, depending on where the mission or project is conducted. Blasting materials can be used for rock blasting, road or fireline construction, hazard trees or snags, burning logging landings, beaver dam removal, wildlife waterholes, trail construction and maintenance, avalanche control, ditches, stumps, fish ladders, general demolition (bridges, foundations, etc.), tree topping, fisheries improvement, backfiring, mine closures, animal removal, seismic work and breaching irrigation dams.

Blasters are encouraged to work with agency dispatchers in order to notify DoD schedulers of blasting sites within Military Training Routes or Special Use Airspace.

Advance notice (24 hours minimum) of planned blasting activity should be forwarded to the appropriate DoD Scheduling Activity for SUA's and MTR's. Information needed includes:

- Latitude/longitude of site or VOR/DME
- Dates and times of blasting activity
- Affected military airspace (MTR segments, etc)
- Agency contact names and phone numbers

III. National Security

After the attacks of September 11th, the United States has enforced many changes in the nations airspace, both temporary and permanent. A new department (Department of Homeland Security) has been formed to cope with the current threats of terrorism and war. The following steps are recommended for coping with the current state of affairs involving our nations airspace.

Know and understand the following:

- National Security and Interception procedures. (AIM Section 6, 5-6-2)
- Be aware of all national security TFR's - Monitor the US NOTAM Website
- Monitor Guard frequency (121.5 MHz) and understanding of intercept procedures
- Be aware of TFR's over major professional or collegiate sporting events or other major open air assemblies
- Be aware of Special TFRs concerning flights over some cities, especially the Washington DC area
- Avoid TFRs or Restricted airspace in the vicinity of the President or Vice President

- Be aware of rules and regulations for operating in and out of Mexico and Canada
- Be aware of rules against circling or loitering over nuclear sites
- Know and understand current NOTAMS
- Graphical and textual depictions of TFRs are available.

Websites to monitor

Homeland Security: <http://www.dhs.gov/dhspublic/index.jsp>

AOPA: <http://www.aopa.org>

Aero-news: <http://www.aero-news.net>

Airspace links to TFRs and Graphical depictions: <http://www.fs.fed.us/r6/fire/aviation/airspace>, <http://airspace.blm.gov>

FAA: <http://www.faa.gov>

TSA: <http://www.tsa.gov/public/>

US NOTAM Website: <https://www.notams.jcs.mil/> or <https://www.notams.faa.gov/>

HAI: <http://www.rotor.com/>

Customs and Border Protection (CBP): <http://www.cbp.gov/>

A. SCATANA/ESCAT

In the event of a terrorism activity or war, the Federal Government may be involved in invoking a “cold war era” agreement between the FAA, DoD and the Federal Communications Commission (FCC). SCATANA (Security Control of Air Traffic and Navigation Aids) or ESCAT (Emergency Security Control of Air Traffic). Once SCATANA is activated a wartime priority list (WATPL) is established allowing essential personnel and aircraft to use the airspace. SCATANA was originally intended to clear the skies following confirmed warning of attack. It was partially invoked after the tragedies of September 11th (Navigational aids were not disabled.) Under SCATANA, the appropriate authority (FAA or DoD) may authorize flight by granting a Security Control Authorization to the involved ARTCC or agency requesting the clearance. The following missions may be granted authority to fly:

- Organized civil defense missions
- Disaster relief flights
- Agricultural and forest fire flights
- Border Patrol Flights
- Search and Rescue Disaster Assistance (SARDA)

As of May 2003, the FAA and involved agencies are involved in a rewrite of SCATANA. The new agreement will be called “ESCAT”.

B. Transportation Security Administration (www.tsa.gov)

The September 11th attacks led Congress to enact the Aviation and Transportation Security Act (ATSA). Under ATSA, the responsibility for inspecting persons and property was transferred to the Under Secretary of Transportation for Security, who heads a new agency created by that statute known as the Transportation Security Administration (TSA).

On Feb. 17th 2002 TSA assumed responsibility for inspecting persons and property previously held by aircraft operators. The Under Secretary of Transportation for Security issued rulemaking transferring the FAA rules to title 49 of the Code of Federal Regulations creating the Transportation Security Regulations (TSR).

C. Department of Homeland Security (www.dhs.gov)

In the event of a terrorist attack, natural disaster or other large-scale emergency, the Department of Homeland Security will assume primary responsibility for ensuring that emergency response professionals is prepared for any situation. This will entail providing a coordinated, comprehensive federal response to any large-scale crisis and mounting a swift and effective recovery effort. On November 25th, 2002 the President signed the bill creating the new Department of Homeland Security and on January 24th, 2003, the new Department came into existence. The new agency is the result of combining all or part of 22 agencies.

The world has changed since September 11, 2001. Our nation remains at risk to terrorist attacks and will remain at risk for the foreseeable future. The following Threat Conditions each represent an increasing risk of terrorist attacks. Beneath each Threat Condition are some suggested Protective Measures, recognizing that the heads of Federal departments and agencies are responsible for developing and implementing appropriate agency-specific Protective Measures. At this time there are no pre-identified airspace plans related to the threat level. Agency employees should be familiar with their agency security plans and monitor information websites such as www.faa.gov.

1. Understanding the Homeland Security Advisory System

Additional information available at http://www.dhs.gov/dhspublic/theme_home7.jsp

- **Low Condition (Green).** This condition is declared when there is a low risk of terrorist attacks.
- **Guarded Condition (Blue).** This condition is declared when there is a general risk of terrorist attacks.
- **Elevated Condition (Yellow).** An Elevated Condition is declared when there is a significant risk of terrorist attacks.
- **High Condition (Orange).** A High Condition is declared when there is a high risk of terrorist attacks.
- **Severe Condition (Red).** A Severe Condition reflects a severe risk of terrorist attacks.

FIGURE 4-8 Homeland Security Threat Levels

