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Evaluation of the Effects of
Ultralight Activity San Diego
Region's Aviation Sys.

EVALUATION OF THE EFFECTS OF ULTRALIGHT ACTIVITY ON THE SAN DIEGO REGION'S AVIATION SYSTEM

San Diego
ASSOCIATION OF
GOVERNMENTS

EVALUATION OF THE EFFECTS OF ULTRALIGHT ACTIVITY ON THE SAN DIEGO REGION'S AVIATION SYSTEM

JUNE 1984

San Diego

ASSOCIATION OF GOVERNMENTS

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The contents of this report reflect the views of the San Diego Association of Governments which is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policy of the Federal Aviation Administration This report does not constitute a standard, specification or regulation.

D

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Abstract

TITLE:	Evaluation of the Effects of Ultralight Activity on the San Diego Region's Aviation System
AUTHOR:	San Diego Association of Governments
SUBJECT:	Issues Relating to the Growing Sport of Ultralight Flying Activity
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ABSTRACT:	This study documents the current level of ultralight activity in the region, as well as established federal, state, and local regulations. Demand for facilities is estimated and a model ordinance to allow local agencies to plan for this sport's safe and coordinated growth is presented.

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RESOLUTION

No. 84-117

ADOPTION OF THE "EVALUATION OF THE EFFECTS OF ULTRALIGHT ACTIVITY ON THE SAN DIEGO REGION'S AVIATION SYSTEM" REPORT

WHEREAS, the San Diego Association of Governments, a joint powers agency, hereinafter referred to as SANDAG, is the designated Metropolitan Planning Organization for the San Diego Region, and as such is responsible for the preparation and adoption of the Regional Transportation Plan which includes an aviation element; and

WHEREAS, the Federal Aviation Administration expressed interest in studying the growth and possible effects of ultralights on the existing aviation community; and

WHEREAS, the completed study has been reviewed by San Diego's regional aviation community, local airport operators, local jurisdictions and citizens; NOW THEREFORE

BE IT RESOLVED that the SANDAG Board of Directors hereby adopts the actions with recommended changes in the Ultralight Activity Report and incorporates this report into the Aviation Element of the Regional Transportation Plan.

PASSED AND ADOPTED this 22nd day of June, 1984.

Harriet M. Stockwell
CHAIRWOMAN

ATTEST: _____
SECRETARY

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EXECUTIVE SUMMARY

Executive Summary

Purpose of Study

The San Diego Association of Governments has been actively involved in comprehensive planning for air transportation since 1971. To date, the agency has produced evaluations of commercial and general aviation demand, needed facility expansion, and coordination required among all forms of aviation from helicopters to large commercial jets.

The purpose of this study is to relate the needs of the relatively new sport "ultralight flying" with those of the existing aviation community and general public. This study attempts to define issues relative to the growth of ultralight use, review the status of present federal, state, and local regulations, define existing facility utilization and possible future demand, and make recommendations relative to the development of safe and coordinated ultralight usage in the region.

Ultralights Defined

A powered ultralight vehicle is defined in Federal Aviation Regulations (FAR), Part 103, as a machine that is operated by a single occupant, is used for recreational or sport purposes only, weighs only 254 pounds empty weight, has a fuel capacity not exceeding 5 U.S. gallons, and is not capable of more than 55 knots at full power or in excess of 24 knots power-off stall speed. Unpowered ultralights are commonly referred to as hang gliders.

Under certain conditions the powered ultralight is considered an aircraft. These conditions exist when a registration certificate is obtained from the Federal Aviation Administration (FAA). Under these circumstances the vehicle is no longer governed by FAR 103 and must be flown under Federal Aviation Regulations governing experimental aircraft which also requires that the pilot be licensed.

Present Regulations

Unlike all other types of flying machines, the ultralight is only partially regulated by the federal government, is excluded from regulation by the State of California, and is presently dealt with on a case-by-case basis at local levels of government. For all practical purposes at this stage in its growth, the ultralight industry is "self-regulating" in the sense that the vehicle does not require federal airworthiness certification nor does the operator of the vehicle require a license.

Federal Regulations. Because an ultralight vehicle in most cases is not a registered aircraft, it may be operated only according to the rules specified in FAR 103. These rules may be summarized by saying that the vehicle may be operated only in daylight hours, in clear weather,

and away from any congested area of a city, town, settlement, or open air assembly of persons. It may not be operated within any airport control zone or other air traffic control area. The intent of this regulation is that an ultralight vehicle is fundamentally a recreational device to be used outside of congested urban areas.

The provisions of FAR Part 157 require that any ultralight landing area be reported to the FAA on its Form 7480-1. Failure to file the form may subject the property owner to a fine not to exceed $1,000 for each violation.

State Regulations. The provisions of present State Law exclude ultralight vehicles from the definition of an aircraft and, therefore, no State permit is required for a facility from which ultralights may operate. Because of this exclusionary language in California statutes, the State of California has relegated the ultralight industry to self-regulation, thus leaving land uses, facility design, and site location completely in the hands of local government.

Local Regulations. Although there have been some use of ultralights at general aviation airports since 1980, the cities in the region and the County now prohibit ultralight vehicles from operating at their airports unless they are FAA registered (thus becoming experimental aircraft flown by licensed pilots). The one exception to this rule is the County's designation of space at Ocotillo Dry Lake for ultralights. Both the cities and the County have the ability to control development of ultralight facilities through land use regulations, such as zoning or through the requirement of conditional use permits.

Concept of Self-Regulation (Pilot Certification, Vehicle Registration, Airworthiness Standards and Insurance)

As discussed earlier, the level of federal, state, and local regulations has revolved around the concept of "self-regulation". Essentially, this means that state and local jurisdictions are left to enforce the regulations promulgated under FAR 103. Any infraction of the Federal Air Regulation comes within the purview of local law enforcement in the absence of federal regulation to the contrary. Of concern to the San Diego region is the fact that the State of California has adopted fundamentally the same attitude as the federal government in that the State does not require approval of landing sites for that vehicle.

To strengthen the concept of "self-regulation", the Aircraft Owners and Pilots Association (AOPA), through its Air Safety Foundation (ASF), is encouraging pilot certification and aircraft registration. It is the Association's belief that their "Powered Ultralight Pilot Competency and Registration Program", along with the adoption of airworthiness standards for the vehicle, will eliminate the need for federal regulation but will make aviation insurance more accessible to the ultralight industry.

Because both the pilot competency and the registration programs are totally voluntary, their success will be the measure of the industry's ability to preserve its self-regulation status and, therefore, ASF is working diligently at implementing its programs. Registration of vehicles would allow reasonable compilation of

statistics relative to ultralights in terms of both total numbers in use and accident-related data. Since many ultralights come to the purchaser in kit form, it is this interest in construction in the owner's home or garage that leads some manufacturers of ultralights to believe that airworthiness standards should be broadened to include all types of ultralight vehicles. Currently, two groups have established or are in the process of establishing airworthiness standards. They are the Powered Ultralight Manufacturers Association (PUMA) and the National Association of Sport Airplane Designers (NASAD). Although undocumented, it is also possible that the FAA will ultimately publish federal airworthiness standards.

Due to the lack of federal participation in the regulation of ultralights, the aviation insurance community has been reluctant to provide coverage for ultralight vehicles. AVEMCO, which is a major aviation insurance company affiliated with the AOPA, is presently supplying aviation insurance for ultralights; however, AVEMCO will not insure an ultralight unless its operator has completed the ASF Pilot Competency Program. Therefore, the incentive to the ultralight owner, if he or she wishes to obtain insurance, is to also become certified by ASF. Ultralight insurance is available from Lightwing Insurance Company which also requires that the operator be certified by the ASF. Global Insurance and Reed Stenhouse offer only vehicle insurance at this writing since Reed Stenhouse discontinued product liability coverage for manufacturers. Other companies are investigating the industry to determine their entry into the various markets, such as product liability and landing facilities premises liability, in addition to insuring the ultralight vehicle itself.

Existing Ultralight Facilities

Currently, ultralight activity occurs at six sites in the San Diego region and one site in Riverside County.

The sites that are available to all ultralights, including those that are registered as aircraft, are:

1. Nichols Field, formerly San Diego Air Sports Center, near Otay Lakes (leased from the City of San Diego).

2. Barona Indian Reservation, east of Ramona (leased from the Barona Indians).

3. Ocotillo Dry Lake in East San Diego County (operated by the County Airports Division).

4. Lake Elsinore, located in Riverside County.

Only if an ultralight is registered with the FAA as an experimental aircraft may it be used at the following general aviation airports:

1. Brown Field, operated by the City of San Diego.

2. Oceanside Municipal Airport, operated by the City of Oceanside.

3. Palomar Airport, operated by the County of San Diego.

The number of ultralights registered as "experimental aircraft" operating at these facilities is under ten and most ultralights are not registered with the FAA.

Several ultralight owners are operating from private property within the San Diego region, but the locations are deemed to be "secret" and, therefore, the number and extent of activities at these facilities were not determined.

It should once again be noted that there is a very subtle distinction which exists in the operation of ultralights on public airports. Although the machinery might be identical, its operation falls under FAR 103, unless it is registered. If it is registered, it then becomes an aircraft and its operator must be a licensed pilot with a valid medical certificate, it must have an airworthiness certificate issued by the FAA as an experimental aircraft, and its registration number must be displayed on the machine. Once the vehicle is defined as an aircraft, it then becomes subject to all of the federal air regulations concerning aircraft and is no longer within the purview of FAR 103. This subtle difference makes absolutely no change in the operating characteristics of the vehicle, except that public airport proprietors who have received financial assistance from the FAA must now treat the machine in a totally non-discriminatory fashion. It is this subtlety that concerns airport proprietors, because in their mind, the only real difference in the machine is its operator, who if licensed has displayed some aeronautical knowledge and has been tested by the FAA to insure that knowledge. The operating characteristics of the machine are no different, however, and it is felt by many that mixing ultralights with conventional aircraft may be unsafe under certain circumstances.

Proposed Ultralight Facilities

There are presently two sites being considered by property owners for the establishment of ultralight vehicle facilities:

1. Robert Custer property, south of Rainbow on Rice Canyon Road, proposed by the property owner.

2. McCrink property, east of Rancho Santa Fe on Artesian Road, being proposed by members of Chapter 27 of the Experimental Aircraft Association (EAA).

Future Ultralight Facility Demand

Based on a survey of local ultralight dealers and using an estimated regional number of vehicles sold nationally, it was assumed that in 1984 there are approximately 300 "owned" ultralights in the San Diego region, 100 of which are in actual use.

Since the future growth of ultralights in the region is strongly tied to the availability of facilities, it is important to understand that the following estimation for demand assumes available operating facilities are somehow provided. Given that assumption, the constraints to ultralight sales and use are similar to other recreational products. That is, the only limitations are cost and consumer interest. Market studies completed by various manufacturers vary, but a fair consensus seems to develop around a figure of 10% sales growth per year.

Based on this, two estimates of future ultralight vehicle growth were made, both using 10% growth figure. The first was 10 percent growth not compounded, en-

titled the moderate forecast, the second was 10% compounded, entitled accelerated forecast.

There is a range given in the moderate and accelerated forecasts of between 930 and 2,221 ultralights in the region by the year 2005. Of that figure, somewhere between 465 and 1,111 would be in actual use at any given time. The range for added facilities between now and the year 2005 would be somewhere between 12 and 28. (See Chapter 3.)

Recommendations

Based on the review of present and forecast ultralight activity, the following actions are recommended.

o Relating to General Aviation Airports and Special Ultralight Facilities:

1. Prohibit the use of any public airport facility by an ultralight unless the ultralight is registered with the Federal Aviation Administration (FAA), the operator is licensed by the FAA and the ultralight has an airworthiness certificate issued by the FAA, and that when an ultralight is registered with the FAA, it shall be deemed to be an aircraft subject to all of the rules and regulations applicable to aircraft at any airport in the region.

   (This acknowledges the fact that existing general aviation airports are reaching capacity and that the mixing of ultralights with other forms of aircraft requires a high degree of user knowledge and aviation system coordination.)

2. Prohibit the take-off or landing of ultralight vehicles, as that term is defined and described in Federal Aviation Regulations Part 103, in the region unless all of the following conditions are met:

   (a) the consent of the property owner is obtained;

   (b) the ultralight vehicle operator has a pilot's license issued by the Federal Aviation Administration (FAA) or is registered with the AOPA Air Safety Foundation (ASF) as an "Ultralight Pilot" or equivalent;

   (c) the ultralight vehicle is registered with the AOPA Air Safety Foundation (ASF) and the ultralight vehicle owner has marked the ultralight vehicle in accordance with that program, or the ultralight vehicle is registered with the FAA and marked as an aircraft;

   (d) the ultralight vehicle owner provides evidence that the ultralight vehicle has an airworthiness certificate issued by the FAA; or that the ultralight vehicle meets the airworthiness requirements of the Powered Ultralight Manufacturers Association (PUMA) or the National Association of Sport Aircraft Designers (NASAD); or written certification by the manufacturer of the ultralight vehicle or the kit from which it is built, or written certification by the builder of the ultralight vehicle that it is airworthy; and

(e) the ultralight vehicle owner provides a certificate of insurance evidencing that the ultralight vehicle is properly insured, whether for pleasure or commercial use (in the case of 2-place ultralight vehicles) for third party, bodily injury and property damage liability coverage in a minimum amount of $250,000.00 single limit.

(This in essence would enforce a high degree of self-regulation among ultralight users, requiring at a minimum: pilot competency training, vehicle registration, airworthiness standards, and insurance to fly an ultralight in the region.)

o Local Control

3. Urge the County to amend its Zoning Ordinance definition of "aircraft" (added by Ord. No. 5508 (N.S.) adopted 5-16-79) to read as follows: "Any contrivance, now known or hereafter invented, used or designated for navigation of or flight in the air, except ultralight vehicles as that term is defined and described in Federal Aviation Regulations, Part 103." (Underlined portion is added by amendment.)

(This, in effect, would permit the County to allow development of an ultralight facility through the use of a Conditional Use Permit rather than through the regulations promulgated by the State of California for operating an airport.)

4. Each city in the region and the County should require that the use of any land within their respective jurisdictions by ultralight vehicles, as that term is defined and described in Federal Aviation Regulations, Part 103, will be allowed only if the property owner, from which ultralight vehicles intend to take-off or land, obtains a Conditional Use Permit from the respective jurisdiction in which the landing site is located.

(This establishes land use control through zoning and the use of a Conditional Use Permit as the method of local control of ultralight facilities.)

5. Each city in the region and the County should adopt an ultralight ordinance, similar to the model ordinance found in Appendix F, in order that ultralight vehicle operators can anticipate uniformity in the regulation of ultralight vehicle operations and landing facilities within the region and in order that the region's residents can be assured that their health, safety and welfare are being protected.

(This sets a standard of land use control on new facilities by offering a model ordinance.)

o New Facilities

6. Urge the Federal Aviation Administration to provide standards and guidelines for the physical construction of landing facilities to accommodate ultralight vehicles and provide "matching funds" to local government for constructing them.

(This would allow federal aviation monies to be used to fund start-up costs of ultralight facilities as well as to provide minimum standards for their design.)

7. Urge the cities in the region and the County, with the cooperation of SANDAG, to take the necessary steps to implement a self-supporting system of ultralight vehicle landing facilities to accommodate the future demand for ultralight vehicles as described in this report.

   (This would encourage the implementation of new facilities through user paid, non-tax supported funds.)

o Ultralight Industry

8. Urge the ultralight industry to adopt a program of uniform airworthiness certification which will apply to all ultralight vehicles operating within the United States.

   (This would provide increased safety to the construction and operation of ultralights.)

9. Urge the ultralight manufacturers to make the ASF registration program mandatory, by marking each vehicle constructed by them with an ASF number and by obtaining and assigning an ASF number to each kit sold by the manufacturer.

10. Urge the members of EAA to register their self-designed and self-built ultralight vehicles under the ASF program.

    (These two actions would virtually assure registration of the majority of ultralight vehicles.)

CHAPTER 1
INTRODUCTION

Introduction

According to an article in National Geographic magazine (August 1983), John Moody of Wisconsin is credited with the first flight of a powered ultralight vehicle. In March 1975 Mr. Moody rigged a 10-horsepower engine and a propeller on a biplane glider he had purchased two years earlier. Shortly after a successful flight, Mr. Moody contacted the Federal Aviation Administration (FAA), informed them he had flown a "powered hang glider" and requested to know whether or not he was operating an unlicensed airplane. The late date of this event emphasizes the newness of the sport of ultralight flying.

It was not until October, 1982 that the FAA issued Federal Aviation Regulation (FAR), Part 103, relating to ultralight vehicles. In that rule the FAA describes an ultralight as a vehicle weighing less than 254 pounds, having a fuel capacity not exceeding five gallons, a top speed of 55 knots, a power-off stall speed not to exceed 24 knots, and which is intended for recreational or sport uses only.

Today it is estimated that there may be as many as 20,000 ultralight vehicles nationally. Since ultralights do not have to be registered, an actual number cannot be determined. With the cost of an average ultralight (in 1984 dollars) ranging from $4,500 to $6,500, its marketability as a sport activity is competitive with other forms of recreation (i.e., off-road vehicles, sailing, etc.).

With the addition of power to hang gliders, it seems to have produced a greater market, because with power and wheels, the ultralight becomes much more versatile. Improvements in ultralight designs have contributed to the growth of the industry, but that proliferation has created some concern in the aviation community about mixing ultralight vehicles with conventional aircraft.

The characteristics of powered ultralights are similar to aircraft in that they require an area from which to take-off and land, but at that point the similarity ends. As previously mentioned, by definition, an ultralight may not exceed a speed of 55 knots (61 miles per hour) calibrated airspeed at full power in level flight, whereas many conventional aircraft have stalling speeds in the same range. Essentially, what this means is that an ultralight at its maximum airspeed in the traffic pattern at an airport could not be followed by many conventional airplanes, because it is impossible for many conventional airplanes to fly as slowly as the ultralight. It thus becomes extremely difficult to mix the two machines at a common landing site, which causes airport proprietors to have doubts about the safety of mixing the machinery at their airports. Also, by definition an ultralight vehicle does not require any type of certification as to its airworthiness, nor is the operator of the vehicle required to have any type of license or medical examination, as in the case of other types of aircraft. This creates an additional concern in the minds of airport proprietors, because ultralight operators are not required to have any aeronautical knowledge whatsoever, in order to legally operate their vehicles.

An ultralight owner may make the decision to register his machine with the FAA in which case the machine is no longer governed by FAR 103, but will become an experimental aircraft requiring a pilot's license, medical certification, and airworthiness certification. If the airport owner is a public entity, and if the airport has received federal money, either in its acquisition or in its improvements, that airport owner must accommodate an ultralight aircraft. Therefore a dichotomy exists, in that the flight characteristics of an ultralight remain the same whether it is governed by FAR 103 as an ultralight vehicle or whether it is registered with FAA, thus becoming an aircraft subject to the non-discriminatory language of the airports' grant agreements with the FAA.

With the increased use of ultralights and with the anticipated growth of the general aviation industry in the region, the present situation concerning ultralights should be planned in a coordinated fashion in order to provide proper direction to its future compatibility with other forms of aviation, especially in those areas where air traffic is presently congested.

The purpose of this study is to review the various issues involving this new sport, the implications of increased ultralight activity in the San Diego region, and to recommend some possible guidelines for use by federal, state and local agencies, and by the ultralight industry.

CHAPTER 2
INVENTORY

Inventory

Present Regulations

Regulation of the navigable airspace is preempted by the federal government. With publication of FAR 103, the federal government has specifically defined the rules and regulations concerning ultralight vehicles. The full text of FAR 103 will be found in Appendix A of this report, and its present application by the federal government provides for "self-regulation" of the ultralight industry. Essentially, this means that state and local jurisdictions must enforce the regulations promulgated under FAR 103. Any infraction of the Federal Air Regulation comes within the purview of local law enforcement in the absence of federal regulation to the contrary. Of concern to the San Diego region is the fact that the State of California has adopted fundamentally the same attitude as the federal government in that the State does not consider an ultralight vehicle to be an aircraft, and thus does not require approval of landing sites for that vehicle. This places enforcement of the regulation of ultralight vehicles squarely upon the shoulders of local jurisdictions. Some ultralight operations throughout the country have been prohibited by local jurisdictions under their police powers where the ultralight operator has been cited for disturbing the peace, and effectively prohibited from operating within that jurisdiction. When the ultralight owner registers his aircraft with the FAA, however, his vehicle becomes subject to the Federal Air Regulations concerning its design and construction and he becomes subject to the regulations concerning licensing and operating aircraft. The present situation, therefore, imposes a burden on local jurisdictions to determine first of all whether the ultralight is registered or whether it falls within conditions of FAR 103; that determination will dictate the course of action which the local jurisdiction may take in its control of the owner and/or operator of an ultralight.

Under the provisions of Federal Aviation Regulations (FAR) Part 157, ultralight landing facilities now fall within the "notice" requirements for landing areas, similar to airports and heliports, thus requiring completion of FAA Form 7480-1 by the facility proponent. The instructions for completing the form and a copy of the form are found in Appendix G. The reasons for filing this form with the FAA are to ensure notification of any change to the aviation system and to permit the FAA to evaluate the effects of any change on the operational capability of the system. The information on the form, however, will be helpful in notifying local jurisdictions of the proposed construction of ultralight landing facilities. Heretofore, local governments have only "discovered" ultralight operating areas from complaints of neighbors, as the result of accidents or on a happenstance basis.

Local jurisdictions have, under their police powers, the right to control land uses within their jurisdictions. Therefore, at the present state of regulation, local jurisdictions can control the use of the machine by determining whether or not to

grant a conditional use permit for ultralight landing sites. At this point, the ultralight industry is quite literally subject to the control of local jurisdictions which has not heretofore been the case in other types of aviation activities.

Manufacturers and Associations

The manufacturers of ultralights present the full gambit of business characteristics. They range from very small "home built" operations to rather large manufacturing facilities. Their financial stability is equally broad, and because of the "self-regulation" aspects of the industry, considerable diversity in workmanship and quality control exists.

The growth of the powered ultralight industry, however, although in existence for some years prior to 1980, is thought to have started in that general time frame. During the approximately three years of this burgeoning industry, there have been as many as sixty companies purporting to manufacture ultralight machines. In this study effort, questionnaires (Appendix B) were sent to a number of manufacturers. Interestingly, the answers to the questions asked for the study were quite consistent among the eight replies, with the exception of estimated future sales of vehicles, where there were wide differences in the opinions of these manufacturers. In addition, most of those who responded to the questionnaire were, and still are, manufacturing hang gliders, and their current powered ultralights are the outgrowth of that experience coupled with the improvements resulting from increased use of the vehicles.

Airworthiness Standards

Consistent with the self-regulation concept, the Powered Ultralight Manufacturers Association (PUMA) has adopted airworthiness standards which must be met by manufacturers who are members of the association. The standards will be found in Appendix C. It has been argued by non-PUMA members that these airworthiness standards discriminate against some manufacturers and they, therefore, neither endorse nor comply with these standards and are thus non-members of PUMA. The Experimental Aircraft Association (EAA) has long dominated the "home-built" aspects of the aviation industry, and many of its members, quite naturally, are enthusiastic about the development of ultralight vehicles. Since many ultralights come to the purchaser in kit form, the industry provides for the construction of an ultralight on a do-it-yourself basis. It is this interest in construction in the owner's home or garage that leads some manufacturers of ultralights to believe that airworthiness standards should be broadened to include all types of ultralight vehicles.

Because ultralights may be constructed and delivered as a unit, as a kit ready for assembly or as a kit requiring some construction, the National Association of Sport Airplane Designers (NASAD) is also developing a set of airworthiness standards which they believe goes beyond the capability of the PUMA standards. This joint effort between NASAD and PUMA, although providing two sets of standards, can assist local jurisdictions with their regulation of the ultralight industry. This, again, is another step in the ultralight industry's efforts to provide safe vehicles to the general public.

Under normal circumstances, the airworthiness standards for construction of many other types of aircraft are dictated by the FAA, and although the information is

hearsay, there is a belief within the industry that FAA will ultimately publish airworthiness standards for the construction of all ultralight vehicles.

Pilot Certification and Ultralight Vehicle Registration

The Aircraft Owners and Pilots Association (AOPA), through its Air Safety Foundation (ASF), is currently providing the most widespread pilot certification and aircraft registration criteria. Their "Powered Ultralight Vehicle Pilot Competency and Registration Program" is found in Appendix D. The ASF program, like the airworthiness standards proposed by PUMA and NASAD, is aimed at eliminating the need for federal regulation of the ultralight industry.

Because both the pilot competency and the registration programs are totally voluntary, their success will be the measure of the industry's ability to preserve its self-regulation status and, therefore, ASF is working diligently at implementing its programs. Here again, should the FAA become involved in issuing pilot's licenses and registering ultralights, much of the basic work to set the tone of those regulations has been accomplished by ASF.

In answer to SANDAG's questionnaire and during the course of interviewing local operators, the ASF programs were thought by those responding to be reasonable and, without question, better than regulation by the federal government.

Almost unanimously the dealers that were contacted during the study supported the concept behind the ASF Pilot Competency and Registration Program, and depending upon which manufacturer they represent, airworthiness standards published by PUMA or NASAD. The dealers contacted, therefore, present what appears to be a very responsible image concerning the regulation and growth of the ultralight industry.

Insurance

Because of the lack of federal participation in the regulation of ultralights, the aviation insurance community has been reluctant to provide coverage for ultralight vehicles. AVEMCO, which is a major aviation insurance company affiliated with the AOPA, is presently supplying aviation insurance for ultralights; however, AVEMCO will not insure an ultralight unless its operator has completed the ASF Pilot Competency Program. Therefore, the incentive to the ultralight owner, if he or she wishes to obtain insurance, is to also become certified by ASF. Ultralight insurance is also available from Lightwing Insurance Company which requires that the operator be certified by the ASF. Presently, Global Insurance and Reed Stenhouse also insure the vehicle, but Reed Stenhouse has discontinued product liability coverage, leaving manufacturers without an insurance program for their products. Other insurance companies are investigating the industry to determine their entry into the various markets, such as product liability and landing facility premises liability, in addition to insuring the ultralight vehicle itself.

Dealers in the Region

A list of the ultralight dealers in the San Diego region will be found in Appendix E. Interviews with several of the dealers indicate that their sales are directly proportional to the number of available facilities within the region from which they can operate, and they unanimously believe that not only will the number of

machines increase, but the number of sales outlets will also proliferate if facilities are made available from which they can operate ultralight vehicles. In essence, they believe that their sales potential is directly proportionate to the availability of convenient operating sites. They further believe, however, that many ultralight owners are operating their vehicles in the region on an "underground" basis, because they feel their activities would be curtailed if their visibility increased.

Some of the dealers have progressed into powered ultralights from their previous activities with hang gliders. In most cases, hang glider dealers and powered ultralight dealers do not desire to operate from the same facility because their customers are different.

Regional Facilities and Activities

In addition to other aviation facilities, the present known ultralight activity centers are depicted in Figure 1, including hang gliding sites. Although the thrust of this study deals with powered ultralights, it was necessary to determine where hang gliding activity takes place so that the location analysis found in Chapter 5 will take that facet of the ultralight industry into consideration.

The major concentration of ultralight activities occurs at six ultralight vehicle sites in the region and one site in Riverside County. Ultralights registered with the FAA are permitted at three of the region's airports.

1. Nichols Field (formerly San Diego Air Sports Center). This site is operated by Don Mumma. Also operating on the facility are Larry Faast, the Eipper dealer for the southern portion of the San Diego region, and Andrew Gold, a Flightstar dealer. In order to fly an ultralight at the Nichols Field site, an owner must pay an annual $100.00 fee, which makes the site accessible to them. Since this facility is used jointly by ultralights and by aircraft carrying skydivers, the ultralight activity is relegated to the short, small runway. Because of the location of the facility on Otay Mesa, and because of its proximity to a majority of the population of the region, this site is perhaps the most active of any in the region.

2. Barona Indian Reservation. This site is used exclusively by Bill Jenner, who represents the Eipper dealership in the North County area. Because the site is located on an Indian reservation, which is a federal enclave, the activities there do not fall within the jurisdiction of the County of San Diego. As is the case with most ultralight sites in the region, this site is totally controlled by the operator and is conducted under his rules and regulations. This site is considered limited in its use because of surrounding rough terrain and an obstruction to the landing approach.

3. Ocotillo Dry Lake. The County of San Diego owns this site and it is part of the general aviation airport system. Negotiations with ultralight operators resulted in the designation of an area east of the runway system of approximately eight acres for use by ultralight vehicles. According to the County's Airport Division, approximately 15 ultralights use the facility on any given weekend when the weather is suitable. There is no charge for use of the facility, however its distance from the center of population of the region tends to reduce its level of activity.

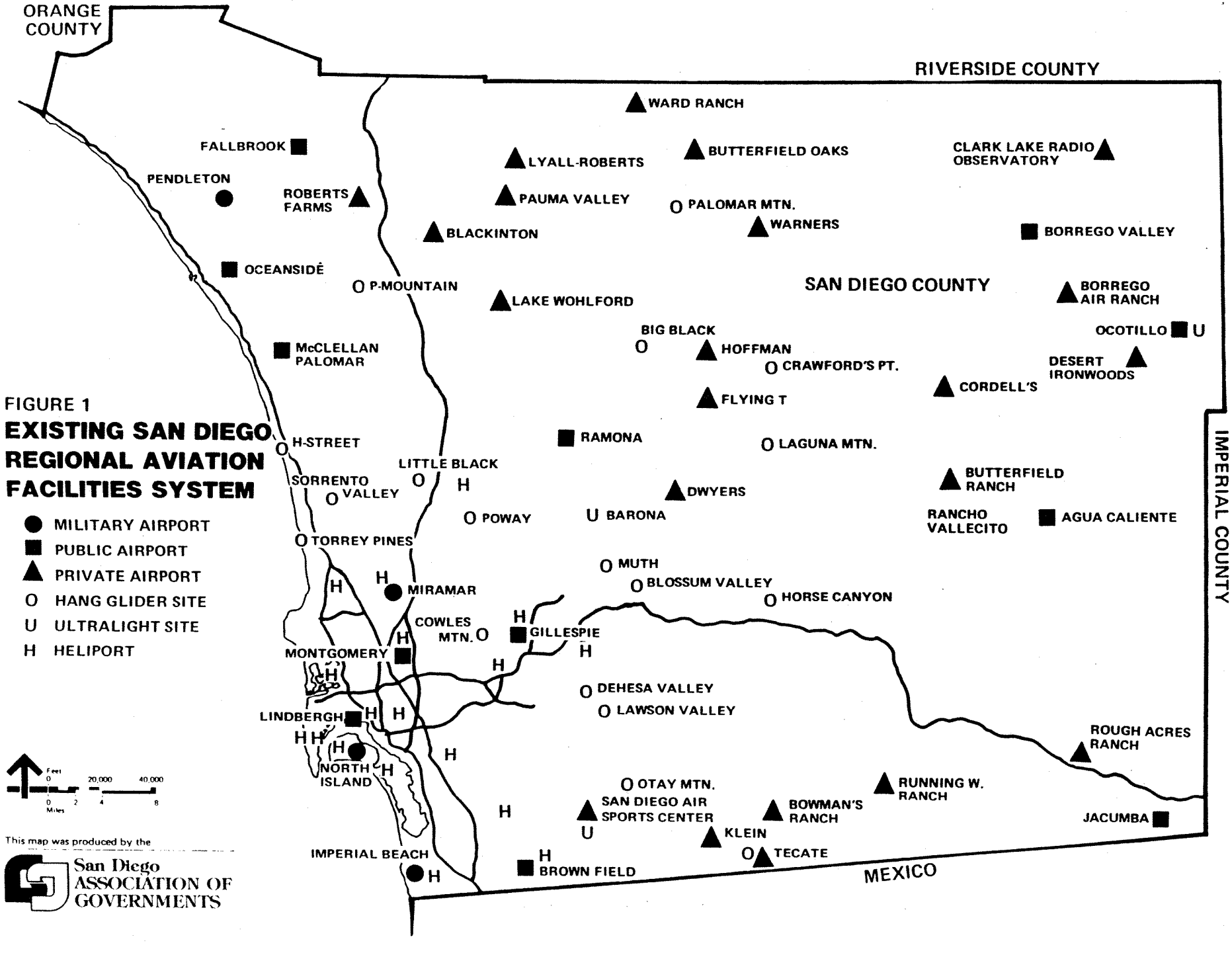


FIGURE 1

EXISTING SAN DIEGO REGIONAL AVIATION FACILITIES SYSTEM

- ● MILITARY AIRPORT
- ■ PUBLIC AIRPORT
- ▲ PRIVATE AIRPORT
- O HANG GLIDER SITE
- U ULTRALIGHT SITE
- H HELIPORT

This map was produced by the

San Diego ASSOCIATION OF GOVERNMENTS

4. Brown Field. The airport is owned by the City of San Diego and is not available to ultralight vehicles unless they are registered (which makes them an aircraft). It has been used in the past but presently there are no ultralights operating there.

5. Oceanside Municipal Airport. The airport department of the City of Oceanside published "Ultralight Operating Procedures Effective May 1981", in an effort to accommodate powered ultralights in the Oceanside area. At the time these procedures were established, they were the first attempt in the region to accommodate ultralights at an airport. While these procedures were in effect, and when ultralights were using the airport, the Eipper factory was then located in San Marcos, and residents of the City of Oceanside were impacted by the noise created by ultralights emanating from the Eipper factory. Although the airport management could not control the Eipper activities, the Oceanside residents blamed the airport for those activities and the procedures and operations were short lived. Continuing complaints from Oceanside residents forced the abandonment of the procedure, and the airport now limits ultralight activities to those registered with the FAA (thus converting them to aircraft). There are some registered ultralights based on the airport, but their activities are limited.

6. Palomar Airport. This airport has one ultralight registered with the FAA based on the facility making it an aircraft. The ultralight operates under the same rules and regulations as any aircraft using the airport, including two-way radio.

7. Lake Elsinore and Perris. These facilities are located in Riverside County and are perhaps the Southern California headquarters for ultralight operation. These sites are included in this inventory of facilities because many of San Diego's residents use them due to the lack of facilities in the San Diego region.

Several ultralight owners are operating from private property within the San Diego region, but these locations were not available to the study team. The number and extent of activities at these facilities were not, therefore, determined. It also should be noted that San Diego residents also avail themselves of some sites in Mexico. The extent of this use is also not known.

During the course of this study effort two proponents of ultralight facilities identified sites which they hope to develop.

- Robert Custer owns property in the vicinity of the community of Rainbow which is used for agricultural purposes and upon which he proposes to provide basic facilities to accommodate his friends who are owners of ultralight vehicles. Mr. Custer is a retired Navy pilot and is an ultralight vehicle operator. The site is located approximately 5 miles south of Rainbow on Rice Canyon Road.

- Ed McCrink owns approximately 780 acres of land east of Rancho Santa Fe on Artesian Road. He has been approached by Tim Warren of EAA Chapter 27 and other ultralight enthusiasts to use the property as a landing facility. Due to the problem created by the County's definition of an airport it has not been

possible thus far to delineate the criteria for the permitted use of the land for ultralight vehicle landings. The County's Airports Division, however, is attempting to resolve the problems connected with development of the facility.

Local Government Programs

The most active governmental agency is the County of San Diego because its jurisdiction covers land which is less urbanized than other local jurisdictions and is therefore conducive to ultralight activity. Because an ultralight is a "contrivance now known or hereafter invented, used or designed for navigation of or flight in the air", it fits the aircraft definition under San Diego County's zoning ordinance definitions and, therefore, any site to be used for ultralight operations falls within the County's definition of an airport. Since the State of California requires all airport sites to obtain approval through their site permit process, any ultralight facility in San Diego County would, theoretically, require State approval, along with the approval of the FAA, review by the Airport Land Use Commission (ALUC), and a conditional use permit from the County, approved by the Board of Supervisors. However, the State of California and the FAA do not recognize the ultralight as an aircraft, nor their landing facilities as an airport, and thus the means of control available to the County is through the conditional use permit process.

At the present time, the County has adopted the attitude that its airports should not be used by ultralight vehicles because its insurance coverage does not include ultralights. This was determined as a result of the suggested use of Ramona Airport by ultralight operators which, in the opinion of the County Airports Division, did not justify self-insurance on the part of the County. The subject of liability insurance for ultralight operations on airports varies widely throughout the nation and is beyond the scope of this study.

CHAPTER 3
FORECASTING

Forecasting

The manufacturing, purchase and use of powered ultralights, for all practical purposes, commenced so recently that forecasting its future activity is extremely difficult. The growth of the industry nationwide since 1980 has been phenomenal. Based on one manufacturer's estimate, their production of powered ultralights increased 600% in 1982 alone. That same manufacturer, however, suggests that starting in 1984, the industry will grow only at a rate of about 10% per year, because they estimate that the growth in the past three years was due to the fact that enthusiastic customers were being satisfied. In other words, the manufacturer felt that although an ultralight provides a relatively inexpensive means of flying, it is limited to use as a recreational vehicle, and, as such, presents a more limited market than if the device could be used for transportation purposes. Therefore, the customers for a purely recreational device have, to a great extent, been satisfied and thus future sales will be more difficult.

Another factor which makes forecasting extremely difficult is that many dealers are predicting very high sales volumes in an effort to attract investors for their activities. Hence, the forecasting in this study provides a wide range of activity which should be verified to as great a degree as possible in the coming years.

Many people in the industry believe that the availability of landing facilities determines the number of ultralights to be sold, because if the facilities are remote or crowded the owner will become disenchanted with the sport. Observers predict that, with the advent of two-place training ultralights, sales will increase because the training process is more reliable, resulting in more growth potential.

The verification process will only be possible if the machines can be identified through some registration device which could provide some reasonably accurate statistics concerning the number of ultralights in the region.

National Outlook

Three separate sources of information agree that the national number of ultralights in operation at the end of 1983 was estimated to be 20,000. This number is based on a report by the Federal Aviation Administration (FAA) issued in September 1983, which showed by the end of 1983 there would be 15,000 to 20,000 vehicles nationwide. An article which appeared in the August 1983 issue of National Geographic estimated 20,000 vehicles in operation by the end of 1983. The Powered Ultralight Manufacturers Association (PUMA), in answer to a questionnaire sent to them by SANDAG, estimated deliveries by their members at approximately 8,500 units in 1982 and the same number in 1983. Because not all manufacturers of ultralights belong to PUMA, it is possible that the additional 3,000 machines could have been delivered by non-PUMA members. The estimate is further supported by the replies to a SANDAG questionnaire received from

eight manufacturers of ultralights showing their total deliveries to date (November 1983) to be approximately 17,000 machines. Here again, the variance is approximately 3,000 ultralights between those reported delivered and the estimate reflected above.

Because accurate forecasting of such an infant industry is probably not possible, this study uses the figure of an estimated 20,000 machines in operation nationally at the end of 1983 as the basis for the forecasting of future activity.

There is an extremely wide series of estimates for future growth, ranging from the conservative 10% annual growth estimate described above, to as high as a 50% growth estimate by some observers of the industry. Thus, the range of growth is from 2,000 to 10,000 new machines added nationally to the fleet each year.

The horizon year for this study is 2005. Based on a present fleet of 20,000 ultralights, the most conservative estimate of growth would show a total of 64,000 machines nationally by 2005, and the most liberal estimate would suggest a national fleet of 240,000 by the horizon year.

Regional Demand

There exists no validated inventory of ultralight vehicles owned and in use in the San Diego region. Based on this fact, estimates of the number of vehicles for this study are the result of manufacturers' inquiries and the best judgment possible on the San Diego proportion of those vehicles sold nationally.

For the purpose of forecasting demand, a differentiation should be made between those ultralight vehicles owned in the region and those vehicles in use. In discussions with the ultralight community locally, it became apparent that for a number of reasons many ultralight vehicles are not in use. Some vehicles are retired because of age, some are stored because the enthusiast has become disinterested in the sport, and some have become second vehicles because a better model has been purchased.

Manufacturers Estimate. Although actual documentation of the numbers of vehicles owned in the region is unavailable, a telephone canvass of the 13 manufacturers who have sold vehicles here leads to the following estimates. There may be between two hundred and three hundred ultralights owned in the region. Of those 200-300, it is estimated that there are probably around 100 in active use.

Proportion of National Number. Another method of estimating the regional number of ultralights would be to consider San Diego as part of the national market. As stated earlier, several sources have used the number of 20,000 ultralights nationally. Currently, the region represents 0.85% of the U.S. population. If the region had 0.85% of the national number, that would yield 170 ultralights in the region. However, in previous aviation studies it has been found that because of the region's good weather, higher per capita income, and life style characteristics, there tends to be a higher level of aviation activity. Recent studies for helicopters and general aviation indicate that the region's aircraft are about 1.5% of the national totals in these respective areas. If this ratio is applied to ultralights, the result would be about 300 ultralights locally. This figure tends to coincide with local manufacturers' estimates.

For the purpose of estimating the existing capacity and future demand for ultralights, this study uses 300 as the number of ultralights in the region and approximately 100 as the number that are actively used at the present time.

Capacity Estimates

The study entitled "Evaluation of Additional General Aviation Airport Sites", published by SANDAG (1984), suggests that the existing airport system in the region (west of the mountains) will reach capacity by the year 2005 if no new airports are constructed. Since the forecast of growth in general aviation aircraft may be conservative, based on past performance in the San Diego region, the existing airport system cannot provide any future capacity for ultralight operations. Therefore, from a pure capacity standpoint, the region's airport system cannot be expected to accommodate ultralight activity to any meaningful extent beyond the next 10 years.

The methodologies for prescribing airport capacity have been developed over many years, and they are based on the characteristics of the airplanes using the facilities. The major difference between the operating characteristics of an airplane and an ultralight vehicle are such that airport capacity analysis cannot be applied to ultralight operations. Therefore, although there may be some correlation between the number of ultralights based on an acre of ground and the number of airplanes based on an acre, the flying characteristics of the vehicles are totally different, and their use of the landing area cannot be correlated. In addition, the ultralight vehicle does not lend itself to outside storage, because of the damaging effects of wind and sun on what is considered to be a fragile vehicle. Therefore, the storage of ultralights should generally be accomplished indoors, thus requiring much more hangar space than is normally ascribed to airplanes, but the majority of ultralight owners prefer to store their vehicle either in their garage, or in a trailer designed for storage, and thus do not require extensive storage facilities on an airport. Thus, the number of based ultralights is not a good capacity indicator.

Another factor affecting capacity estimates for ultralights is weather, because it is illegal to operate an ultralight vehicle in other than Visual Flight Rules (VFR) conditions. As a general rule, when the visibility (distance measured horizontally) is less than three miles in controlled airspace and one mile outside controlled airspace or when the ceiling (vertical distance to clouds) is less than 1,200 feet, ultralight vehicles may not be operated. In addition, responsible pilots of ultralights are of the opinion that it is unsafe to operate an ultralight when wind velocities are in excess of 15 knots in smooth air, or in excess of 10 knots in turbulent or cross wind conditions. The result of these weather restrictions suggests that, unlike airplanes, ultralights may be operated only during certain hours of the day because of the weather, and may not be operated at night under any circumstances. These limitations will, therefore, restrict the capacity of any landing area used by ultralights and will drastically reduce the ability of any particular site to accommodate a large amount of ultralight activity.

Another constraint to capacity of an ultralight facility is the nature of the flying activity. It has been suggested by those who operate ultralights that the average duration of an ultralight flight is approximately 20 minutes, and that the ultralight pilot will stay within a relatively short distance from the the landing area because there are limited facilities for cross country flights. When his 20 minute flight is

completed, he will then land and share his experience with others at the landing site. Thus, the ultralights landing site provides a meeting place for ultralight flyers to watch one another fly and to visit about their experiences.

It has also been suggested that congestion at an ultralight landing area occurs when there are an average of 15 to 20 vehicles in the air at one time at any one location, which is quite a different situation than exists at airports with airplanes. Generally, about 50% of the total operations at an airport are itinerant in nature, that is to say that an airplane will depart the airport and be gone for several hours to another destination and return at some other time. These differences in characteristics of the two types of flying machines makes capacity estimates for ultralights a case of first impression in this study.

Some observers feel that because of the "comradeship" of ultralight flyers, they will generally spend an entire day at an ultralight facility flying their vehicle only about 40% of the time and spending the rest of the time in conversation with their friends. Based on these characteristics of ultralight activity, it has been suggested by many in the industry that a reasonably well-controlled ultralight facility can accommodate an average of 20 machines on any given day.

Demand/Capacity Analysis

The fundamental purpose of a demand/capacity analysis is to measure forecast demand and ascribe capacity values to existing facilities in order to determine the system's capability to meet future demand. At the present time, the range of values for demand in the region is very wide. This range may very well be narrowed if facilities for ultralight operation are not developed because prospective customers will be unwilling to purchase an ultralight unless they have some assurance of being able to operate it. Demand may, therefore, be constrained by lack of facilities resulting in only the most avid ultralight enthusiasts continuing to be involved in the sport.

Since the FAA has elected to permit the industry to be "self-regulated", ultralight facilities may very well spring up in a variety of locations unless local jurisdictions prevent the activity under their "police powers".

It is the purpose of this analysis, therefore, to provide some planning guidelines for the San Diego region to deal with future demands.

Assuming that there are presently 300 ultralights owned by residents of which 100 are used with some regularity, and further assuming that there are three non-airport ultralight facilities within the region; simple arithmetic provides an existing demand/capacity relationship. The ratio of machines to facilities suggests that each facility now accommodates approximately 33 of the active ultralights in the region. This, of course, assumes that all active ultralights are being used all of the time. Interviews indicate this is not the case, but rather that the ultralights are being used about half of the time. Thus, each of the existing facilities in the region is accommodating an average of about 17 ultralights.

Since it has previously been suggested in this study that an ultralight facility will accommodate approximately 20 machines on any given day, the system capacity at the present time theoretically exceeds demand by 3 ultralights per facility. However, demand may be constrained due to the location and capability of the

existing facilities. It has been argued by owners in the region that the existing facilities are actually only capable of providing capacity for 10 to 15 ultralights because of weather, location and methods of operation.

Since the future growth of ultralights in the region is strongly tied to the availability of facilities, it is important to understand that the following estimation for demand assumes available operating facilities are somehow provided. Given that assumption, the constraints to ultralight sales and use are similar to other recreational products; that is, the only limitations are cost and consumer interest. Market studies completed by various manufacturers vary, but a fair consensus seems to develop around a figure of 10% sales growth per year. Based on this, two estimates of future ultralight vehicle growth were made, both using a 10% growth figure. The first was 10 percent growth not compounded, entitled the moderate forecast and presented in Table 1. The second was 10% compounded, entitled accelerated forecast and presented in Table 2.

TABLE 1
MODERATE FORECAST
ULTRALIGHT VEHICLE GROWTH - SAN DIEGO REGION

	1984	1990	1995	2005
Ultralights Owned	300	480	630	930
Ultralights in Use	100	240*	315*	465*

TABLE 2
ACCELERATED FORECAST
ULTRALIGHT VEHICLE GROWTH - SAN DIEGO REGION

	1984	1990	1995	2005
Ultralights Owned	300	531	855	2,221
Ultralights in Use	100	265*	428*	1,111*

*Assumes one out of every two vehicles will be used, although currently, only one out of three are in use, it is estimated that future users will be more active if facilities are available in proper locations.

Thus a range is shown in these two tables of between 930 and 2,221 ultralights in the region by the year 2005. Of that figure, somewhere between 465 and 1,111 would be in active use at any given time.

If it is assumed that an ultralight facility can handle about 20 vehicles per day, and further assuming the average enthusiast would spend about one half of his or her available weekends actually involved in the sport, estimating the number of needed facilities is possible.

This simple formula was used to estimate facility needs:

Number of ultralight vehicles in use $\div 2^1 \div 20^2$ = number of facilities needed.

[1]Based on the fact that on the average an ultralight will be used one-half of the year.

[2]Based on the ultralight industry's estimate that the average ultralight facility can accommodate 20 vehicles at a time. (This is primarily because ultralights, unlike airplanes, are not used to travel, but as a sport activity which entails maintaining close proximity to the landing area.)

Based on this formula, Table 3 below estimates an unconstrained demand for additional ultralight facilities under the moderate and accelerated estimates.

TABLE 3
ULTRALIGHT FACILITY NEED - SAN DIEGO REGION

	Existing[3]	1990	1995	2005
Moderate	3	6	8	12
Accelerated	3	7	11	28

[3]Only three facilities are considered to be currently available in the San Diego region to Part 103, ultralight vehicles (Nichols, Barona, and Ocotillo Dry Lake). Because an ultralight has to be registered as an aircraft to use general aviation facilites and the pilot licensed, and because some general aviation airports are assumed to reach capacity in the near term, it is unlikely these airport facilities could fulfill ultralight demand.

It is important to re-emphasize that this facility estimation is highly reciprocal. In other words, without the provision of ultralight facilities, the number of actual ultralights will be limited. Also built into the facility need forecast is the assumption that it is inadvisable for general aviation airports to provide access to "unregistered" ultralights operating under Part 103.

Since this study is perhaps the first of its kind to be conducted, some "license" has been taken and values have been arbitrarily assigned for planning purposes in an effort to provide some rationale for future growth. This approach is by no means capricious, and should be considered a reasonable attempt to satisfy the growth of the ultralight industry in an orderly fashion within the region.

CHAPTER 4
REGULATORY ANALYSIS

Regulatory Analysis

Historically, machines which use air as the medium for transportation have been regulated by the Federal Aviation Administration (FAA). In essence, the federal government preempts the regulation of the navigable airspace. However, states and local governments are generally the regulators of land use and facilities on the ground. Therefore, the complete regulation of flying vehicles is multi-jurisdictional, requiring coordination and cooperation between the many governmental agencies involved.

Unlike all other types of flying machines, the ultralight is only partially regulated by the federal government, is excluded from regulation by the State of California, and is presently dealt with on a case-by-case basis at local levels of government. For all practical purposes, at this stage in its growth, the ultralight industry is "self-regulating" in the sense that the vehicle does not require federal airworthiness certification nor does the operator of the vehicle require an airman license. This analysis, therefore, is an attempt to provide the current status of governmental dealings with ultralights in the San Diego region and, in addition, an effort to forecast the trends in regulatory control of ultralights by governmental agencies.

Federal Actions

All flying machines, including fixed-wing aircraft, helicopters, autogyros, gyrocopters, gliders, balloons and dirigibles are required to be registered with the FAA. In addition, the pilot or operator of all of these vehicles requires a license issued by the FAA which license is predicated upon the successful completion of a written examination, a demonstration of ability to operate the vehicle and compliance with the appropriate medical examination for the type of pilot's license being issued. None of the above requirements apply to the flying machine known as an ultralight vehicle. In this sense, the ultralight industry is self-regulating.

The term "ultralight vehicle" is defined in Federal Air Regulations (FAR) Part 103 as a vehicle that:

1. Is used or intended to be used for manned operation in the air by a single occupant;
2. Is used or intended to be used for recreation or sport purposes only;
3. Does not have any U.S. or foreign airworthiness certificate; and
4. If unpowered, weighs less than 155 pounds; or
5. If powered:
   a. Weighs less than 254 pounds empty weight, excluding floats and safety devices which are intended for deployment in a potentially catastrophic situation;
   b. Has a fuel capacity not exceeding 5 U.S. gallons;

c. Is not capable of more than 55 knots calibrated airspeed at full power in level flight; and
d. Has a power-off stall speed which does not exceed 24 knots calibrated airspeed.

Because an ultralight vehicle is not a registered aircraft, it may be operated only according to the rules specified in FAR 103. These operating rules may be summarized by saying that the vehicle may be operated only in daylight hours, in clear weather, and away from any congested area of a city, town or settlement, or over any open air assembly of persons, and not within any control zone or other air traffic control area. The intent of this regulation indicates that an ultralight vehicle is fundamentally a recreational device to be used outside of congested urban areas.

In addition to the very explicit requirements which define the vehicle and its operating characteristics, it - like all other flying machines - must be operated in a manner that does not create a hazard to other persons or property. Since the ultralight vehicle may not create a hazard to persons and property, it must, therefore, give way to all other flying vehicles.

In the event the owner of an ultralight vehicle wishes to operate his machine as an aircraft, he may do so by obtaining a registration certificate from the FAA for the ultralight, and must also obtain, at a minimum, a student pilot's license to operate the ultralight. Once the ultralight and the pilot are registered with the FAA, the machine is no longer governed by FAR 103, but must be flown under the Federal Air Regulations governing experimental aircraft.

Because there is some difference between the operating characteristics of all flying machines, mixing all or some of them in the same airspace can provide an extremely difficult situation in congested urban areas. At the present time, there are no federal criteria for the compatibility of ultralights with other aircraft and, hence, many airport operators prohibit the use of ultralight vehicles at their airport facilities. However, the airport operator must accommodate ultralights if the airport is public, has received federal assistance and the ultralight is a registered aircraft.

The provision of FAR Part 157 require that any ultralight landing area be reported to the FAA on its Form 7480-1. Failure to file the form may subject the property owner to a fine not to exceed $1,000 for each violation.

State of California Viewpoint

The provisions of present State Law (Assembly Bill No. 1342, amending Sections 21012 and 21661 of the Public Utilities Code) exclude ultralight vehicles from the definition of an aircraft and, therefore, no State permit is required for a facility from which ultralights may operate. Because of this exclusionary language in California statutes, the State of California has relegated the ultralight industry to pure self-regulation, thus leaving land uses, facility design, and site location completely in the hands of local government. Under its basic charter, however, the State of California, through its Division of Aeronautics, is required to foster and promote aviation within the State and may, therefore, be consulted concerning the operation of ultralight vehicles within the State of California.

STATE ULTRALIGHT REGULATIONS

By J. Jefferson Miller
and Erin L. Harman
Reprinted from Ultralight Pilot Magazine, November/December 1983

State	Ultralight vehicle registration	Ultralight pilot registration	Ultralight landing site/ airport restrictions	Defined as aircraft	Aircraft/ pilot registration	Actions under consideration/other regulations
Alaska	No	No	N/A	Yes	No	State intends to segregate heavy aircraft from light aircraft"
California	No	No	Airport access dealt with on case-by-case basis, landing sites exempt from permit requirements	Yes, if vehicle is certificated by FAA	No	N/A
Connecticut	No	No	Landing sites must meet minimum standards and be licensed by state	No	No	N/A
Florida	No	No	State has proposed minimum standards for commercially operated flightparks	Yes	No	N/A
Georgia	No	No	State minimum airport standards apply to landing sites	Yes	No	N/A
Hawaii	No	No	State minimum airport standards apply to landing sites	Yes	No	Vehicle registration may be proposed if level of activity increases.
Idaho	No	Yes —$2 fee	Landing sites require owner's consent	Yes	Yes	N/A
Illinois	Yes, but not enforced	No	Must operate out of airport unless special permit is obtained	Yes	Yes	State intends to set criteria for flightparks
Indiana	Yes	No	Flightparks must comply with minimum standards that are slightly different from airport standards	Yes	Aircraft only	Proposed legislation would exempt vehicles from excise tax and aircraft registration
Louisiana	Yes	Yes	Flying sites must be registered by state	No	No	Altimeter must be mounted on ultralight or wrist-altimeter must be worn by pilot
Maryland	No	No	Publice-use landing areas must be licensed; private-use areas must be registered	Yes	No	Mandatory insurance requirement
Massachusetts	No	No	State prohibits operation of aircraft weighing less than 400 pounds out of airport or landing site without written permission from field operator	No	Yes	N/A
Michigan	No	No	N/A	No	Aircraft only	Proposed legislation would require licensing of ultralight pilots
Minnesota	No	No	N/A	Yes	Aircraft only	Consideration has been given to requiring ultralight vehicle registration

State	Ultralight vehicle registration	Ultralight pilot registration	Ultralight landing site/ airport restrictions	Defined as aircraft	Aircraft/ pilot registration	Actions under consideration/other regulations
Montana	Yes	Yes	N/A	No	Yes	N/A
Nevada	No	No	N/A	Yes	No	N/A
New Hampshire	No	No	Ultralight operations at state-owned airports prohibited unless vehicle is registered by FAA and pilot is certificated	No	Yes	N/A
New Mexico	Yes, but not enforced	No	Decided by individual airport operator	Yes	Aircraft only	N/A
New York	No	No	Landing sites must meet local govt. approval, have permit from state Department of transportation and meet certain airport standards	Yes	No	N/A
North Carolina	No	No	Landing sites must have permit from state Department of Transportation	Yes	No	N/A
North Dakota	Yes	No	N/A	No	Yes	Licensing of dealers required.
Ohio	Yes, but not enforced	No	N/A	Yes	Aircraft only	N/A
Oregon	Yes	Not enforced	Must receive site approval	Yes	Yes	N/A
South Dakota	Yes	Yes	N/A	Yes	Yes	N/A
Tennessee	No	No	Decided by airport operator	No	No	N/A
Texas	No	No	N/A	Yes	No	Proposed legislation would require pilot and vehicle registration
Virginia	Yes	Yes	Landing sites must be registered and licensed	Yes	Yes	Mandatory insurance requirement
Washington	No	Yes	N/A	No	Yes	N/A
Wisconsin	Yes	No	Must receive site approval from state	Yes	Aircraft only	N/A

*This information was revised in accordance with "Erratum" published in Ultralight Pilot, January/February, 1984 at page 7.

With the editor's permission, Table 4, "State Ultralight Regulations", has been presented in an effort to show the variety of actions being taken by various state governments concerning ultralights. This table appeared in the November/ December, 1983 issue of Ultralight Pilot and is reproduced with the editors' permissions.

As the industry develops, it can be assumed that the State of California may well adopt some laws which tend to parallel the actions taken by other states. In summary, however, the present status of California's concern with the ultralight may best be expressed by a "hands off" attitude on the part of the legislature.

Regional and Local Attitudes

Because of the nature of the vehicle, ultralights are relegated to relatively uncongested areas. Hence, the unincorporated portion of the County of San Diego is experiencing most of the ultralight activity. Since 1981, the Airports Division of the County has attempted to work with the industry in an effort to provide facilities for ultralight operation. They have, at the same time, prohibited ultralight vehicles from operating on County airports, with the exception of the airport property adjacent to Ocotillo Dry Lake where a separate landing area for ultralights has been provided. In addition, at the Ocotillo site, there are constraints placed on ultralight operators concerning traffic patterns and altitudes. The County permits FAA registered ultralights to use their airports because they are considered airplanes and governed accordingly.

San Diego County presently defines an ultralight vehicle as an aircrft and therefore any landing site is presently considered by County planners as an airport.

Synthesis of Future Actions

Even though the ultralight industry believes that regulation should be fundamentally left to the private sector, its efforts without governmental guidance and enforcement appear to be creating problems.

In essence, the ASF programs for pilot competency and registration are sporadic in their success because they are completely voluntary. Those ultralight operators who create the most severe problems to the industry are not willing to be "controlled" by anyone and thus will not voluntarily participate in any form of regulation. Therefore, the sincere efforts of the responsible ultralight operators are being depreciated by the minority interests within the industry.

The ultralight enthusiasts within the Experimental Aircraft Association (EAA) are participating not only in the preparation of airworthiness standards but are also working in the area of pilot competency. Like the ASF, however, the work of those dedicated persons within EAA is available only to those ultralight operators who desire to be educated.

The provisions of FAR 103 appear to protect the public rather than the operator because under the regulation ultralight operation must be conducted away from concentrations of people. The regulations do not really protect the operator because they permit the operator to fly anything he wants to, whether the machine is properly designed and built or not. In this sense the provisions of FAR 103 do not appear to be completely satisfactory.

With respect to the registration aspects of self-regulation, the inability to identify the machines which violate the law creates a concern among the responsible operators to such an extent that most industry people support some form of registration. Registration is primarily for identification purposes but it is also essential to provide records of activity and accident investigation.

It has been argued that self-regulation of the industry is essential to maintain not only the freedom sought by those who fly ultralights, but the low overall cost of the sport. The basic difficulty with government regulation is thought to be the cost of bureaucracy and not necessarily the burden of control.

On the other hand, without government participation it is extremely difficult to enforce any regulation because the private sector has no authority to deal with the renegades within the industry. For this reason the State of Louisiana requires that an ultralight be registered and that the pilot pass a written test and a flight test. Apparently, Louisiana feels that licensing and registration are necessary because the legislators do not feel that pure self-regulation is either in the best interest of the responsible ultralight owner or the public.

The manager of FAA's General Aviation and Commercial Division in the Office of Flight Operations in Washington was recently interviewed concerning the status of ultralight operations since the passage of FAR Part 103. Although he indicated all was apparently working well from a self-regulation perspective, there was an undertone in the interview to indicate that more regulation might ultimately be expected as a result of public pressure to make the sport safer.

It should be expected that the level of regulation will increase in the years to come, but in the meantime local jurisdictions will be required to deal with the industry somewhere between complete prohibition and total self-regulated conditions. One way to do this would be for the local jurisdictions to require that there be approval of a conditional use permit for any ultralight landing site only if the vehicles using the site are certified by either PUMA or NASAD, are registerd by the ASF, and their pilots have passed, at a minimum, the requirements of the ASF Pilot Certification program or equivalent. In this way the ultralight industry would be able to grow in a responsible and planned fashion until the FAA and perhaps the State of California actively pursue more formal regulation of the industry.

If all of the ultralight manufacturers applied for an ASF Registration number for each ultralight they built and placed the number on the machine, it would certainly complement the program. Hypothetically, no ultralight vehicle nor ultralight kit would be delivered in the United States without an ASF number displayed on it. If the EAA members who own their own home-built and designed ultralights also participated in the ASF Registration program, almost complete registration of the ultralights in the U.S. could be accomplished.

CHAPTER 5
LOCATION ANALYSIS

Location Analysis

The region's aviation facilities are shown in Figure 1, including the three known ultralight landing areas within the region. A fourth site located at Lake Elsinore is not shown, but is considered as a site used by San Diego ultralight owners as described in Chapter 3. The purpose for depicting all of the airports in the region is to locate and identify existing facilities which may be adaptable to ultralight use. The graphic description of these airports also serves to identify facilities which probably cannot be used for ultralight activity, as will be described later in this chapter.

Airspace Concerns

The federal government has preempted regulation of the navigable airspace and all activity within that airspace must be conducted in accordance with Federal Aviation Regulations (FAR). The operation of ultralight vehicles are regulated by FAR 103 unless they are registered with the FAA as experimental aircraft. Although the operator of an ultralight vehicle is not required to register his machine, nor is he required to have a pilot's license to operate the machine, he must strictly adhere to the operating requirements of FAR 103. In this sense, although the FAA considers the ultralight industry to be self-regulated, the operator of an ultralight must nevertheless conform to certain specific operating requirements. The major concern in the aviation community with the self-regulation aspect of ultralight operation is the fact that aircraft and ultralights share the same airspace in many instances, and yet the operator of an ultralight vehicle is "not required to meet any aeronautical knowledge, age, or experience requirements to operate those vehicles or to have airman or medical certificates". Although the ultralight operator is required to maintain vigilance so as to see and avoid aircraft, and shall yield the right-of-way to all aircraft, and may not operate his vehicle in a manner that creates a collision hazard with respect to any aircraft, the potential for mid-air collision does increase in congested airspace. For this reason, the general feeling in the aviation community is that ultralights should be relegated to locations where minimum aircraft activity occurs.

In the San Diego region, because of the Terminal Control Area (TCA), the overlapping airport control zones of the airports in the metropolitan area and the high density activity connected with the operations of NAS North Island, OLF Imperial Beach and Brown Field, ultralight activities should be highly restricted in those areas. The Seawolf departure from NAS Miramar and the high density north/south traffic along the coastline between the Mission Bay VOR and the Oceanside VOR suggests a restriction of activity in these areas as well. The combination of restricted airspace at Camp Pendleton, the activities of Oceanside Municipal Airport on Pendleton's south boundary and Fallbrook Airport on its east boundary, combined with approaches and departures to Palomar, suggests that the airspace in the vicinity of these facilities should also be constrained as to ultralight use.

It must be remembered that any restriction of aeronautical activity in the navigable airspace (the airspace above 500 feet in uncongested areas, and above 1,000 feet in congested areas and on the approaches and departures to airports) is strictly within the purview of the FAA and, therefore, the only means available to local jurisdictions is through the exercise of their police powers within their jurisdiction, to control the land uses for landing and take-off of ultralight vehicles. Presently, the location of ultralight facilities falls totally within the purview of the local jurisdiction in which the site is proposed.

Airport Conflicts

One of the basic reasons for this study was to provide airport operators in the region with guidelines for the use of their airports by ultralight vehicles, because there is a feeling by many that airplanes and ultralights are not compatible at some of the region's airports. The FAA has not made any regulations concerning the operation of ultralights from airports, nor have they prepared guidelines for them similar to aircraft. They suggest only that ultralight activity should be conducted from a landing area separate from the runway system on the airport.

The regulation of ultralight activity on private airports is solely within the discretion of the airport owner. On the other hand, publicly owned airports in which the federal government has participated financially must accommodate all aircraft in a non-discriminatory fashion, unless in the airport proprietor's discretion, he deems the operation to be unsafe. The airport manager must nevertheless prove to the FAA that in fact the operation of any particular type aircraft on his airport is unsafe.

There is a very subtle distinction which exists in the operation of ultralights. Although the piece of machinery might be identical, its operation falls under FAR 103, unless it is registered. If it is registered, it then becomes an aircraft and its operator must be a licensed pilot with a valid medical certificate, it must have an airworthiness certificate issued by the FAA as an experimental aircraft, and its registration number must be displayed on the machine. Once the vehicle is defined as an aircraft, it then becomes subject to all of the federal air regulations concerning aircraft and is no longer defined as an ultralight vehicle, within the purview of FAR 103. This difference in definition makes absolutely no change in the operating characteristics of the vehicle, except that public airport proprietors who have received financial assistance from the FAA must accommodate ultralights which are defined as aircraft in a totally non-discriminatory fashion. It is this subtlety that concerns airport proprietors, because in their mind, the only real difference in the machine is its operator, who if licensed has displayed some aeronautical knowledge and has been tested by the FAA to insure that knowledge. The operating characteristics of the machine are no different, however, and it is felt by many that mixing ultralights with conventional aircraft may be unsafe under certain circumstances. There is more concern with this conflict at high density airports in the region, not only because they are reaching capacity, but because the operation of the much slower ultralight vehicles could in fact further reduce the airport's overall capacity as well as increase the airport's noise.

As mentioned in Chapter 3, Forecasting, it is expected that the region's existing airports will reach capacity by the year 2005 without adding any ultralight activity whatsoever, thus the proliferation of ultralight aircraft should be accommodated at other than the region's public airports.

At airports with an airport traffic control tower (usually busier airports), the ultralight must be capable of two-way radio communication with the traffic controller which is an added expense to the ultralight operator. Since ultralights usually operate on weekends, the requirement that they mix with other aircraft at a busy airport indicates that operation on controlled airports is normally inefficient.

Although airport improvement funds are not presently available from the FAA for the construction of "pure" ultralight facilities, those funds are, nevertheless, available for improvement to an airport to provide for ultralight vehicle operation. It may, therefore, be desirable for the jurisdiction in which private airports presently are located to determine if those airports, or any of them, could be acquired in public ownership and properly planned as joint aircraft/ultralight facilities.

The operation of ultralights at airports is not, in any sense, a black and white situation. It appears that at airports where the annual operations are less than 100,000 per year, and where land suitable for construction of separate ultralight landing facilities is available, the two activities, properly regulated, could be compatible. It is necessary, however, for the FAA to establish certain standards for the location and construction of such facilities because of their continuing concern for safety in all aeronautical activities and because the application of purely local criteria could result in non-standard facilities design and operation. It therefore seems to be incumbent on the FAA to prescribe standards for the safe operation of ultralights at airports.

Present Facilities Capability

As was discussed in Chapter 3, the existing facilities within the region being used by ultralights appear to fall short of providing the necessary capacity to meet present demand, let alone expected future activity.

Examples of the use of a public airport by a registered ultralight (making it an aircraft) include the recent experience of the Flightstar dealer at Brown Field and a private operation at Palomar. Although Brown Field's overall traffic has not yet reached capacity, and thus does presently have some capability to accommodate ultralights, the ultralight operator himself found it extremely difficult to mix with other general aviation traffic at the airport. He therefore moved to Nichols Field. There is no separate traffic pattern for ultralights at Brown Field and, thus, the accommodation of this aircraft did not seem to provide the solution for proper facilities for ultralight vehicles. There is an owner at Palomar who flies in the regular aircraft traffic pattern and must give way to all other aircraft as well as maintain radio contact with the tower.

Another example of ultralight operation occurred at Oceanside Municipal where the airport management provided a separate landing area and a special traffic pattern for ultralights. The difficulty resulted from the increased noise from the ultralight vehicles, and community pressure forced the airport to discontinue ultralight operation, except on a highly limited basis. It is believed that the Oceanside example is an indication of what would occur at the other busy public airports in the region's urbanized areas if ultralights are permitted to operate at those facilities.

It may be appropriate for ultralight aircraft as opposed to ultralight vehicles to operate at Ramona Airport and Brown Field for the next few years until those airports commence to reach their overall general aviation capacity at which time ultralights would provide a deleterious effect on capacity needed by aircraft that require the length and size of the runway system. At that time it may be necessary for ultralights to be relocated to more suitable facilities. This situation suggests, therefore, that the existing public airport system does not provide a long-term solution to ultralight activity in the San Diego region. On the other hand, some of the region's private airports may very well be converted to ultralight flight parks, and if held in public ownership, could provide the land use protection necessary for their continued existence. In addition, if these private airports are properly planned to permit mixing aircraft and ultralight activity, those airports in public ownership may very well not only provide ultralight capability, but add needed capacity to the general aviation airports system.

The County of San Diego as a result of its experience with ultralight facilities at Ocotillo Airport, could work with FAA to determine compatible standards for ultralight/ aircraft operation at some of the region's private airports. This is not to suggest, however, that the use of the County's airports at Palomar, Ramona or Gillespie be considered as a solution to the need for ultralight facilities, because those facilities are required for the existing and future general aviation activity, which they are designed to accommodate.

The facilities at Nichols Field (Air Sports Center) at Otay Mesa, and the Barona Indian Reservation site, now being used by ultralights, are virtually "private clubs" in the sense that they are controlled by the operator using the site. With the exception of Ocotillo, the existing facilities are virtually unavailable to the general public.

In the absence of public facilities new dealers who come to the region may seek to establish their own landing sites so that they can assure their customers of a place to accommodate their needs.

Facility Needs

The results of a questionnaire submitted to ultralight manufacturers, coupled with personal interviews with the several ultralight dealers and operators in the region, as well as a special meeting held in February 1984 with the ultralight community, and a review of the standards prepared by the Aircraft Owners and Pilots Association (AOPA) Air Safety Foundation (ASF) indicate a wide variety of opinions concerning the size of an ultralight facility. The minimum size recommended is an area either 150 feet in diameter or 300 feet on each side of a square, and a maximum size landing area is 1,000 feet in diameter, or 1,500 feet on each side of a square. Opinions were expressed that the landing area should be at least 2,000 feet long in a prevailing wind direction in order to accommodate two-place ultralights in their training activities. It was suggested that the square with 1,500 foot sides, if properly located into the wind, would be adequate to meet these needs. In all instances, it was suggested that the approach and departure from the landing area should be relatively clear, and that trees and other obstructions which might cause turbulence should not be permitted in close proximity to the landing area.

It was recommended that fuel be available, and that other amenities such as water and toilets, in addition to storage areas, be provided.

In an effort to synthesize these requirements, a typical ultralight landing facility is graphically displayed in Figure 2, showing the maximum facility size and the approach areas free of obstruction, in order to provide some guidance as to an appropriate site. The square is located so that the prevailing wind is diagonal from the corner of the square, thus providing a landing/take-off area of approximately 2,000 feet under prevailing wind conditions. This typical facility would meet the criteria recommended by the various sources with whom the matter was discussed.

In addition to the facility itself, for the landing and take-off of ultralights, most operators suggest that the site be located away from congested areas, in pleasant countryside, so that the ultralight operator can enjoy the scenery. At first blush, this may sound facetious, however, the character of the ultralight operator, at this point, is for him to enjoy the use of his vehicle for purely recreational purposes and, therefore, a flight which provides interesting countryside is far more rewarding than nondescript or hostile terrain. In addition, every operator should be concerned with his safety and should be vigilant for suitable emergency landing sites in the event of a vehicle malfunction.

Because of the comradeship in the ultralight industry, and the desire of most ultralight owners to enjoy the company of others who fly ultralights, everyone surveyed during the course of this study, recommended that maximum use of a site could be obtained if recreational activities were associated with it. It was, therefore, suggested that properly located amenities such as camping and picnic areas, playground and sport facilities should be incorporated into the design of the ultralight facility. This attitude seems to coincide with the findings of the County's 1981 Public Works Advisory Board meetings wherein the ultralight was viewed more as a recreational vehicle than a transportation device. It has been suggested that its development should be encouraged by the park and recreation departments of the local jurisdictions with assistance from the aviation departments as to the technical flying aspects of the vehicle.

Since it is illegal to operate ultralights "over any congested area of a city, town, or settlement, or over any open air assembly of persons" (FAR 103.15), the location of landing facilities should not only be in a rural environment, but access to the site should be over routes which comply with the requirements of FAR 103. This location criteria is perhaps more important in the region west of the mountains because the growth of urbanization is more intense in this area.

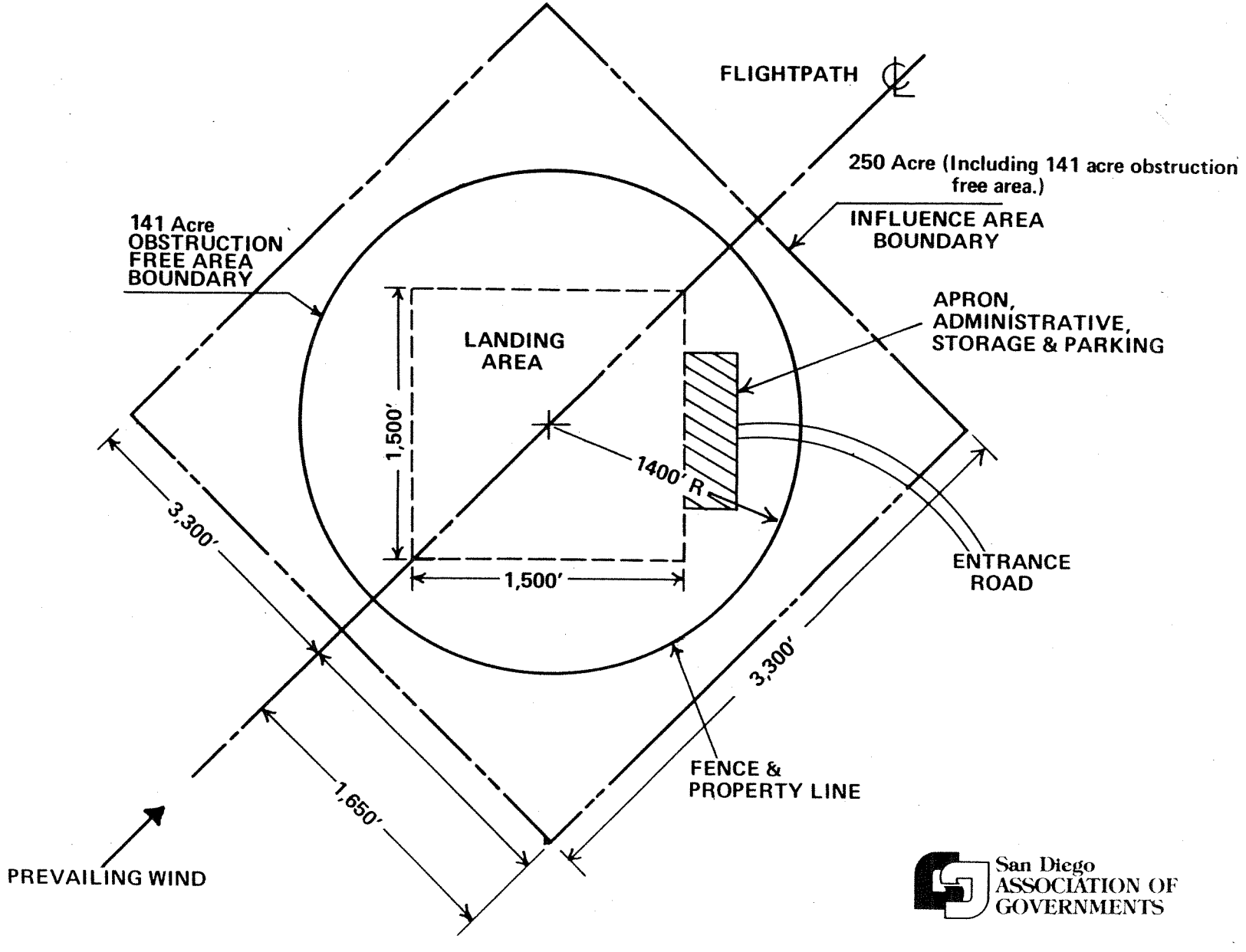
Weather conditions must also be considered in determining facility needs; ideally sites should be located where turbulence, high winds, fog and low clouds do not predominate.

The facilities common to all aviation activities should also be considered such as fencing not only to prevent theft, vandalism and general security for the users, but also to protect the public, particularly children, from inadvertent harm from the activity.

Environmental concerns are thought to be at a minimum with respect to noise because the facility by its very nature should be located in a rural setting. This does not obviate the need to be concerned with noise, however, because even in a rural setting, high frequency overflights can affect underlying land occupiers.

FIGURE 2

TYPICAL ULTRALIGHT VEHICLE LANDING FACILITY



San Diego ASSOCIATION OF GOVERNMENTS

The calculation of the land needed for a typical facility suggests two types of land control. The area to be used for the landing, take-off, approach protection, vehicle storage, parking and general amenities is based on the size of the facility found in Figure 2. This area should be owned or controlled by the proprietor in fee and is estimated to be 141 acres. The influence area which consists of the land necessary for the operation of ultralights to provide noise protection and safety is estimated at 109 acres in addition to the landing facility. This influence area should be controlled by land use and height limit zoning if publicly owned, and by avigation easement if zoning cannot be accomplished. The total area for the site is estimated to be 250 acres of directly influenced area.

Criteria Guidelines

In an effort to provide local jurisdictions with guidelines for the analysis of ultralight vehicle landing sites within the region, a "laundry list" of items which were determined to be important in the course of this study is shown in Table 5. The list is by no means exhaustive, however, it can be used as a guideline to measure the suitability of any site being considered as an ultralight facility.

TABLE 5
CONSIDERATIONS FOR ULTRALIGHT FACILITIES

1. Take-off and Landing Area Size (Is it adequate?)
2. Peripheral Area Size (Is it free of obstructions?)
3. Obstruction Clearance (Are the approach and departure clear?)
4. Fencing (Is it tall enough to be effective?)
5. Wind Indicators (Are they planned correctly?)
6. Markings (Are they readable?)
7. Proximity to Other Aviation Facilities (Is there any conflict?)
8. Approach/Departure Access (Are the paths over open land?)
9. Ground Access (Is it sufficient?)
10. Aesthetics (Is the facility attractive looking?)
11. Utilities (Are they planned?)
12. Land Use Compatibility (Is the facility properly located?)
13. Noise (Are there apt to be complaints?)
14. Overall Environmental Assessment (Does the area warrant the facility?)
15. Local Ordinances Compliance (Does the site meet jurisdictional rules?)

CHAPTER 6
ALTERNATIVES

Alternatives

Possible System Configuration

At the present time, the nature of ultralight use is not similar to other activities in the aviation community. Ultralights have a tendency to operate in a relatively small geographic area because their fuel quantity and their speed are limited by FAR 103. Assuming a theoretical ground speed of 50 miles an hour and a rate of fuel consumption at 2.5 gallons per hour, the effective range of an ultralight is something less than 100 miles (with a reserve fuel supply for safety). In addition, ultralight operators tend to congregate at a given flying site, rather than to use their ultralight for cross-country travel. This tendency for local activity may stem from the present lack of ultralight destinations and may very well change as new facilities are made available.

Several factors have been considered in suggesting a system of ultralight facilities for the San Diego region. These factors, although not unique to the region, are nevertheless applicable to the particular conditions that exist.

Because under federal rules ultralights must give way to all other types of aircraft, and because powered ultralights must give way to hang gliders, the system has been configured to avoid these conflicting areas of aeronautical activity. As depicted in Figure 3, each aviation facility west of the mountains has been assigned an area. In addition, airways and flyways used by aircraft and helicopters have also been designated so as to provide a graphic depiction of possible conflict.

The flight of ultralights is prohibited over congested areas and assemblies of people; thus, each of these areas in the region has been designated.

Areas of rugged terrain have also been determined because there is a question of safety involved in operating in these areas.

Camp Pendleton has been delineated because ultralights are prohibited from operating within its boundaries, as are other aircraft, without the express permission of the U.S. Marine Corps.

The greatest amount of land available for ultralight facilities is east of the mountains, but this area is also remote from the population centers of the region and is, therefore, less desirable from the ultralight operator's viewpoint. (This area is not shown in Figure 3.)

The remaining areas left on Figure 3 represent possible areas in which additional ultralight facilities could be located. Any new site in one of the these areas should, however, be subject to review by the local government through its planning process.

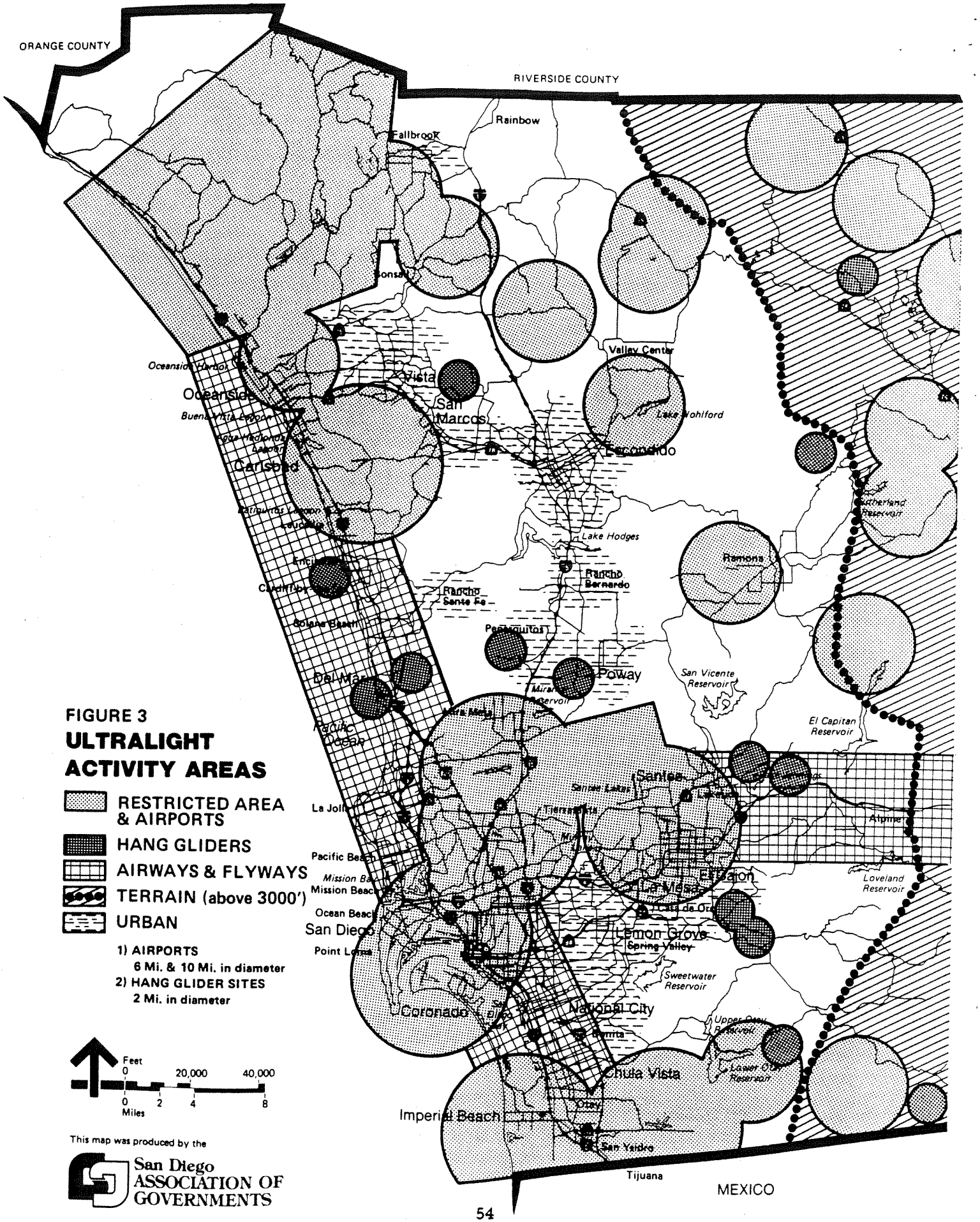


FIGURE 3

ULTRALIGHT ACTIVITY AREAS

- RESTRICTED AREA & AIRPORTS
- HANG GLIDERS
- AIRWAYS & FLYWAYS
- TERRAIN (above 3000')
- URBAN

1) AIRPORTS
6 Mi. & 10 Mi. in diameter
2) HANG GLIDER SITES
2 Mi. in diameter

Feet 0 20,000 40,000

0 2 4 8 Miles

This map was produced by the

San Diego ASSOCIATION OF GOVERNMENTS

Compatibility Evaluation

Future sites need to be chosen with the following factors in mind:

1. Sites should be located that can be economically self-supporting (i.e., in a good market area with reasonable ground access time).

2. Sites should be located in areas no less than five miles from any existing or proposed residential area, because the times for flying ultralights are during those portions of the day when the wind is calm, and that usually occurs in early morning or late evening when the ambient noise is generally at a lower level, thus the sites should not be located in close proximity to the region's residents.

3. Sites should all be located in relatively flat terrain so that ultralight operators do not require maximum horsepower for the operation of their vehicle, thus reducing the overall noise impact of ultralights using the site and also providing safer operating areas.

4. Each of the sites should be located within a reasonable distance of the others, which tends to dissipate the amount of activity at any given site, because it permits the ultralight operator to fly cross-country and utilize those sites that are less noise sensitive.

5. Sites should be located in proximity to other outdoor recreational uses where noise is generated, such as off-road vehicles and other motor powered devices.

As previously indicated, no future site should be on an existing public airport since it would tend to increase the airport's overall noise generation, thus making the airport incompatible with the land uses surrounding it. It is possible that some existing private airports may be compatible for future ultralight activity.

It is interesting to note that although the ultralight vehicle may be able to operate from facilities the size of a heliport, most heliports are located in areas of population concentration, and the ultralight would be in violation of FAR 103 by operating from such a facility, because they would overfly congested areas, which is prohibited by the regulations. No heliports were considered as ultralight vehicle landing facilities in this study.

CHAPTER 7
CONCLUSIONS AND RECOMMENDATIONS

Conclusions and Recommendations

Even the most conservative forecast of ultralight activity in the San Diego region indicates the need to accommodate the operation of these vehicles in an organized manner. Because neither the federal government nor the State of California presently wish to become involved in regulating the construction, operation and design of facilities to accommodate the landing and take-off of the vehicle, it may be necessary for local government to assume the role of regulator. Local government's only means of regulation is through enforcement of the law where an ultralight operator endangers lives and property, and through the permit process wherein the local jurisdiction permits the use of land on a conditional basis.

The most important aspect of local regulation is to provide maximum protection for the public with minimum liability on the part of the local jurisdiction. Since the federal government does not prescribe standards for the construction and operation of ultralight landing facilities, it is advisable for local government to do so with due consideration for its liability. Standards and requirements appear to be available from the Powered Ultralight Manufacturer's Association (PUMA), the National Association of Sport Airplane Designers (NASAD), the Aircraft Owners and Pilots Association through its Air Safety Foundation (ASF), and the Experimental Aircraft Association (EAA), and these guidelines are available to local government for use by them in exercising their police powers through law enforcement and through the conditional use permit process.

The number of ultralights forecast to be based in the San Diego region ranges from 930 to 2,221 by the year 2005, and the number of facilities needed to accommodate these machines ranges from 12 to 28. Because the general aviation public airport capacity is reached at some point between the year 2000 and 2005, these existing facilities should not be expected to accommodate ultralight operations at that time. However, some airports in the public system may be able to accommodate ultralight activity in the interim, until the airport's capacity is reached, provided the vehicle is registered with the FAA. There appear to be only two public use airports in the area west of the mountains that are adaptable to meaningful ultralight activity at the present time; they are Ramona Airport and Brown Field.

There appear to be certain areas of the region which are not conducive to ultralight activity, and these areas are fundamentally in the highly urbanized portions of the region and areas where aeronautical activity is congested.

Summarizing this study indicates that because the use of ultralights will continue to grow, because this growth is likely to result in illegal operations on private property, and because there will be continued pressure to use congested general aviation facilities, it is advisable for local, state and federal agencies, and ultralight manufacturers to take the following actions:

o Relating to General Aviation Airports and Special Ultralight Facilities:

1. Prohibit the use of any public airport facility by an ultralight unless the ultralight is registered with the Federal Aviation Administration (FAA), the operator is licensed by the FAA; and the ultralight has an airworthiness certificate issued by the FAA, and that when an ultralight is registered with the FAA, it shall be deemed to be an aircraft subject to all of the rules and regulations applicable to aircraft at any airport in the region.

   (This acknowledges the fact that existing general aviation airports are reaching capacity and that the mixing of ultralights with other forms of aircraft requires a high degree of user knowledge and aviation system coordination.)

2. Prohibit the take-off or landing of ultralight vehicles, as that term is defined and described in Federal Aviation Regulations Part 103, in the region unless all of the following conditions are met:

   (a) the consent of the property owner is obtained;

   (b) the ultralight vehicle operator has a pilot's license issued by the Federal Aviation Administration (FAA) or is registered with the AOPA Air Safety Foundation (ASF) as an "Ultralight Pilot" or equivalent;

   (c) the ultralight vehicle is registered with the AOPA Air Safety Foundation (ASF) and the ultralight vehicle owner has marked the ultralight vehicle in accordance with that program, or the ultralight vehicle is registered with the FAA and marked as an aircraft;

   (d) the ultralight vehicle owner provides evidence that the ultralight vehicle has an airworthiness certificate issued by the FAA; or that the ultralight vehicle meets the airworthiness requirements of the Powered Ultralight Manufacturers Association (PUMA) or the National Association of Sport Aircraft Designers (NASAD); or written certification by the manufacturer of the ultralight vehicle or the kit from which it is built, or written certification by the builder of the ultralight vehicle that it is airworthy; and

   (e) the ultralight vehicle owner provides a certificate of insurance evidencing that the ultralight vehicle is properly insured, whether for pleasure or commercial use (in the case of 2-place ultralight vehicles) for third party, bodily injury and property damage liability coverage in a minimum amount of $250,000.00 single limit.

   (This in essence would enforce a high degree of self-regulation among ultralight users, requiring at a minimum: pilot competency training, vehicle registration, airworthiness standards, and insurance to fly an ultralight in the region.)

o Local Control

3. Urge the County to amend its Zoning Ordinance definition of "aircraft" (added by Ord. No. 5508 (N.S.) adopted 5-16-79) to read as follows: "Any contrivance, now known or hereafter invented, used or designated for navigation of or flight in the air, except ultralight vehicles as that term is defined and described in Federal Aviation Regulation, Part 103." (Underlined portion is added by amendment.)

   (This, in effect, would permit the County to allow development of an ultralight facility through the use of a Conditional Use Permit rather than through the regulations promulgated by the State of Calfiornia for operating an airport.)

4. Each city in the region and the County should require that the use of any land within their respective jurisdictions by ultralight vehicles, as that term is defined and described in Federal Aviation Regulations Part 103, will be allowed only if the property owner, from which ultralight vehicles intend to take-off or land, obtains a Conditional Use Permit from the respective jurisdiction in which the landing site is located.

   (This establishes land use control through zoning and the use of a Conditional Use Permit as the method of local control of ultralight facilities.)

5. Each city in the region and the County should adopt an ultralight ordinance, similar to the model ordinance found in Appendix F, in order that ultralight vehicle operators can anticipate uniformity in the regulation of ultralight vehicle operations and landing facilities within the region and in order that the region's residents can be assured that their health, safety and welfare are being protected.

   (This sets a standard of land use control on new facilities by offering a model ordinance.)

o New Facilities

6. Urge the Federal Aviation Administration to provide standards and guidelines for the physical construction of landing facilities to accommodate ultralight vehicles and provide "matching funds" to local government for constructing them.

   (This would allow federal aviation monies to be used to fund start-up costs of ultralight facilities as well as to provide minimum standards for their design.)

7. Urge the cities in the region and the County, with the cooperation of SANDAG, to take the necessary steps to implement a self-supporting system of ultralight vehicle landing facilities to accommodate the future demand for ultralight vehicles as described in this report.

   (This would encourage the implementation of new facilities through user paid, non-tax supported funds.)

o Ultralight Industry

8. Urge the ultralight industry to adopt a program of uniform airworthiness certification which will apply to all ultralight vehicles operating within the United States.

   (This would provide increased safety to the construction and operation of ultralights.)

9. Urge the ultralight manufacturers to make the ASF registration program mandatory by marking each vehicle constructed by them with an ASF number and by obtaining and assigning an ASF number to each kit sold by the manufacturer.

10. Urge the members of EAA to register their self-designed and built ultralight vehicles under the ASF program.

    (These two actions would virtually assure registration of the majority of ultralight vehicles.)

APPENDICES

APPENDIX A

Part 103—Ultralight Vehicles

Subpart A—General

§ 103.1 Applicability.

This Part prescribes rules governing the operation of ultralight vehicles in the United States. For the purposes of this Part, an ultralight vehicle is a vehicle that:

(a) Is used or intended to be used for manned operation in the air by a single occupant;

(b) Is used or intended to be used for recreation or sport purposes only;

(c) Does not have any U.S. or foreign airworthiness certificate; and,

(d) If unpowered, weighs less than 155 pounds; or

(e) If powered:

(1) Weighs less than 254 pounds empty weight, excluding floats and safety devices which are intended for deployment in a potentially catastrophic situation;

(2) Has a fuel capacity not exceeding 5 U.S. gallons;

(3) Is not capable of more than 55 knots calibrated airspeed at full power in level flight; and

(4) Has a power-off stall speed which does not exceed 24 knots calibrated airspeed.

§ 103.3 Inspection requirements.

(a) Any person operating an ultralight vehicle under this Part shall, upon request, allow the Administrator, or his designee, to inspect the vehicle to determine the applicability of this Part.

(b) The pilot or operator of an ultralight vehicle must, upon request of the Administrator, furnish satisfactory evidence that the vehicle is subject only to the provisions of this Part.

§ 103.5 Waivers.

No person may conduct operations that require a deviation from this Part except under a written waiver issued by the Administrator.

§ 103.7 Certification and registration.

(a) Notwithstanding any other section pertaining to certification of aircraft or their parts or equipment, ultralight vehicles and their component parts and equipment are not required to meet the airworthiness certification standards specified for aircraft or to have certificates of airworthiness.

(b) Notwithstanding any other section pertaining to airman certification, operators of ultralight vehicles are not required to meet any aeronautical knowledge, age, or experience requirements to operate those vehicles or to have airman or medical certificates.

(c) Notwithstanding any other section pertaining to registration and marking of aircraft, ultralight vehicles are not required to be registered or to bear markings of any type.

Subpart B—Operating Rules

§ 103.9 Hazardous operations.

(a) No person may operate any ultralight vehicle in a manner that creates a hazard to other persons or property.

(b) No person may allow an object to be dropped from an ultralight vehicle if such action creates a hazard to other persons or property.

§ 103.11 Daylight operations.

(a) No person may operate an ultralight vehicle except between the hours of sunrise and sunset.

(b) Notwithstanding paragraph (a) of this section, ultralight vehicles may be operated during the twilight periods 30 minutes before official

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sunrise and 30 minutes after official sunset or, in Alaska, during the period of civil twilight as defined in the Air Almanac, if:

(1) The vehicle is equipped with an operating anticollision light visible for at least 3 statute miles; and

(2) All operations are conducted in uncontrolled airspace.

§ 103.13 Operation near aircraft; Right-of-way rules.

(a) Each person operating an ultralight vehicle shall maintain vigilance so as to see and avoid aircraft and shall yield the right-of-way to all aircraft.

(b) No person may operate an ultralight vehicle in a manner that creates a collision hazard with respect to any aircraft.

(c) Powered ultralights shall yield the right-of-way to unpowered ultralights.

§ 103.15 Operations over congested areas.

No person may operate an ultralight vehicle over any congested area of a city, town, or settlement, or over any open air assembly of persons.

§ 103.17 Operations in certain airspace.

No person may operate an ultralight vehicle within an airport traffic area, control zone, terminal control area, or positive control area unless that person has prior authorization from the air traffic control facility having jurisdiction over that airspace.

§ 103.19 Operations in prohibited or restricted areas.

No person may operate an ultralight vehicle in prohibited or restricted areas unless that person has permission from the using or controlling agency, as appropriate.

§ 103.21 Visual reference with the surface.

No person may operate an ultralight vehicle except by visual reference with the surface.

§ 103.23 Flight visibility and cloud clearance requirements.

No person may operate an ultralight vehicle when the flight visibility or distance from clouds is less than that in the following table, as appropriate:

Flight Altitudes	*Minimum Flight Visibility*	*Minimum Distance from Clouds*
1,200 feet or less above the surface regardless of MSL altitude:		
(1) Within controlled airspace—	3 statute miles	500 feet above 1,000 feet above 2,000 feet horizontal.
(2) Outside controlled airspace:	1 statute mile	Clear of clouds.
More than 1,200 feet above the surface but less than 10,000 feet MSL:		
(1) Within controlled airspace—	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal.
(2) Outside controlled airspace—	1 statute mile	500 feet below 1,000 feet above 2,000 feet horizontal.
More than 1,200 feet above the surface and at or above 10,000 feet MSL:	5 statute miles	1,000 feet below 1,000 feet above 1 statute mile horizontal.

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Appendix B

San Diego
ASSOCIATION OF
GOVERNMENTS

Suite 524 Security Pacific Plaza
1200 Third Avenue
San Diego, California 92101
(619) 236-5300

ULTRALIGHT MANUFACTURERS' QUESTIONNAIRE

1. Manufacturer's name: _____

2. Address: _____

3. How long have you been manufacturing ultralights? _____
   Date of first flight of prototype: _____

4. Contact Person Responding: _____

5. Name or model number of vehicles manufactured: _____

6. Number of units delivered by you to date: _____

7. Member of PUMA: _____ Yes _____ No

8. If not, why have you declined to join or why have you resigned: _____
   _____

9. Does your machine comply with PUMA recommended airworthiness standards:
   _____ Yes _____ No

10. Will you send us a copy of your airworthiness documentation? (We will return it if you so request.) _____ Yes _____ No

11. What is the name of your chief engineer: _____
    Does he have a degree in aeronautical engineering? _____ Yes _____ No

12. How many units of each model do you expect to sell in:
    1983 _____
    1984-85 _____
    1986-90 _____
    1991-95 _____
    1996-2000 _____

13. Do you have an estimate of the total number of vehicles you expect to sell in San Diego County in:
    1983 _____
    1984-85 _____
    1986-90 _____
    1991-95 _____
    1996-2000 _____

14. Do you have a dealer or distributor assigned to theSan Diego area?
    _____ Yes _____ No
    If so, may we have his or her name and address? _____
    _____

MBER AGENCIES: Cities of Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, , San Diego, San Marcos, Santee and Vista ADVISORY/LIAISON MEMBERS: Calif. Dept. of Transportation/U.S. Dept. of Defense and Tijuana/Baja Calif. Norte

15. Is your vehicle only available in kit form? _____ Yes _____ No

16. Do you require your dealer to assemble your vehicle and fly it before delivery to the customer? _____ Yes _____ No

17. May we have the name and address of each purchaser of an ultralight vehicle sold in San Diego County and the date the vehicle was delivered:

_____

_____

_____

18. Do you believe the AOPA Pilot Certification program to be good:
_____ Yes _____ No
Comment: _____

_____

19. Do you belive the AOPA Vehicle Registration program to be good:
_____ Yes _____ No
Comment: _____

_____

20. Do you believe ultralight vehicles should be permitted to operate on airports?
_____ Yes _____ No

21. If the answer to Question 20 is yes, under what constraints or at what size airports (example, those with less than 100,000 annual operations)?

_____

22. Do you believe special facilities such as ultralight "ports" should be available?
_____ Yes _____ No

23. If the answer to Question 22 is yes, how large should the landing area be (example, 1,000 feet square, 2,000' x 400', etc.)?

_____

24. What facilities hould be available?
Fuel _____
Water _____
Electric _____
Food _____
Hangers _____
Tie Downs _____
Other _____

25. From your first-hand knowledge, what are the names and addresses of casualty insurance companies that will insure ultralight vehicles?

_____

_____

_____

26. What have we failed to ask?

_____

_____

_____

_____

POWERED ULTRALIGHT MANUFACTURERS ASSOCIATION

PUMA

AIRWORTHINESS STANDARDS

FOR

POWERED ULTRALIGHT VEHICLES

March 3, 1983

FOREWORD

1. PURPOSE

These airworthiness requirements comprise the minimum requirements consistent with safe flying characteristics and structural soundness of powered ultralights. They are not intended to restrict or limit the design characteristics of the ultralight aircraft. They are intended only for those aircraft that are designed and constructed for release to the general public. PUMA is a non-profit organization, organized by the manufacturers of ultralight vehicles. The airworthiness certification program is available to PUMA members. Also the certification program is available to non-members who want their ultralight certified by PUMA. A minimum certification fee will be charged to cover the costs of certifying their ultralight vehicle. Certification of any entity's vehicle to meet PUMA certification standards does not indicate that they are a member of PUMA only that their vehicle meets the PUMA airworthiness standards.

PUMA is involved with safety related programs involved with ultralight vehicles. A certification seal will be issued to the vehicle which is certified indicating only that it has met the PUMA airworthiness standards. An additional PUMA membership seal is issued to those who are official members of PUMA. Member requirements are available to the general public.

2. SCOPE

These standards are to apply to all aircraft that meet the FAA definition of an ultralight as defined by FAR 103.

3. INTERPRETATION

These airworthiness requirements should not be regarded as constituting a textbook of current aeronautical knowledge; interpretation of the requirements against a background of such knowledge is essential.

4. ARRANGEMENTS

These standards are arranged in the same order as FAR Part 23 "Airworthiness Standards Normal and Acrobatic Category Airplanes."

The subparts and paragraphs are arranged and numbered with the same numbers as the FAR's except where a deletion or addition was necessary due to the peculiarities of powered ultralights.

5. UNITS

Throughout this document the British units of measurement are used.

6. AMENDMENTS

These requirements will be amended when necessary.

POWERED ULTRALIGHT MANUFACTURERS ASSOCIATION

PUMA

CERTIFICATE OF COMPLIANCE #

Date_____

The _____

manufactured by _____

has, by declaration of the manufacturer, been found to comply with PUMA Airworthiness Standards for Powered Ultralight Vehicles, Part 4--Normal Category Ultralight Vehicles, Part 5--Engines and Drive Systems, and Part 6--Propellers. A Record of Compliance has been received by the PUMA Certification Committee and found to be complete and in accordance with the recommendations specified in PUMA Airworthiness Standards for Powered Ultralight Vehicles, Parts 4, 5 and 6.

_____ _____

PRESIDENT VICE PRESIDENT

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AIRWORTHINESS STANDARDS FOR POWERED ULTRALIGHT VEHICLES

PART 3

PUMA CERTIFICATION PROCEDURES

3.5 General

Unless otherwise specified, each requirement of this standard must be met at a gross loading within the recommended load range for which certification is requested. This must be shown by documented tests upon a vehicle of the type for which certification is requested or, where prescribed, by calculations based on and equal in accuracy to the results of testing.

3.7 Application for a Certificate of Compliance

After all testing has been completed, the manufacturer will submit a Record of Compliance in the form of a report to PUMA. The record should contain:

a) All documentation required to satisfy PUMA Parts 4, 5 and 6.

b) A written document, dated and signed by the officers of the company stating: "The information contained herein is to the best of our knowledge complete, accurate and in accordance with the requirements of PUMA Parts 4, 5 and 6."

c) Any major changes in design must be accompanied by appropriate documentation and be submitted as an addendum.

3.9 Certification Committee

The Certification Committee shall be appointed annually by the Board of Directors.

3.11 Review and Verification of Record of Compliance

a) Upon receipt of the Record of Compliance, the Certification Committee and/or its appointees will review its general content and verify that the Record is complete and in accordance with the recommendations and suggestions of PUMA Parts 4, 5 and 6. The Record of Compliance must be in the form of a document, written and organized in such a manner so as to be easily read and verified.

b) If so verified, a Certificate of Compliance will be issued and published in the ultralight media. The Certificate is to read:

"The (model and size) manufactured by _____ has, by declaration of the manufacturer, been found to comply with PUMA Airworthiness Standards for Powered Ultralight Vehicles, Part 4--Normal Category Ultralight Vehicles. A Record of Compliance has been received by the PUMA Certification Committee and found to be complete and in accordance with the recommendations specified in PUMA Airworthiness Standards for Powered Ultralight Vehicles, Part 4--Normal Category Ultralight Vehicles, Part 5-- Engines and Drive Systems, and Part 6--Propellers.

AIRWORTHINESS STANDARDS FOR POWERED ULTRALIGHT VEHICLES

PART 4

NORMAL CATEGORY ULTRALIGHT VEHICLES

GENERAL

4.1 Applicability

a) This part prescribes airworthiness standards for the issue of airworthiness certificates, and changes to those certificates, for vehicles in the ultralight category.

b) Each person who applies under Part 4 for such a certificate must show compliance with the applicable requirements of this part.

c) The burden of adequate documentation rests with the manufacturer. If the Certification Committee finds inadequate documentation, the Application and Record will be returned for more complete or appropriate documentation.

4.3 Ultralight Categories

a) As determined by FAR Part 103-Ultralight Vehicles, and intended for non-aerobatic operation. Non-aerobatic operation includes:

1) Any maneuver incident to normal flying;

2) Stalls (except whip stalls); and

3) Lazy eights, chandelles, and steep turns in which angle of bank is not more than 60 degrees.

b) Ultralight vehicles intended for use without restrictions other than those shown to be necessary as a result of required flight tests shall be designated as aerobatic. Ultralight vehicles, in this category, may be certificated if the requirements in this part are met and the applicant demonstrates all maneuvers to be approved for the vehicle.

FLIGHT

General

4.21 Proof of Compliance

Each requirement of this subpart must be met at each appropriate combination of weight and center of gravity within the range of loading conditions for which certification is requested. In addition, 50 hours of logged flight must be completed and a record submitted with the test data required in 3.7.

4.23 Load Distribution Limits

Ranges of weight and centers of gravity within which the vehicle may be safely operated must be established by the applicant.

4.25 Weight Limits

The maximum and minimum weights shall be established by the applicant.

4.29 Empty Weight and Corresponding Center of Gravity

a) The empty weight and corresponding center of gravity must be determined by weighting the vehicle.

b) The condition of the vehicle at the time of determining empty weight must be one that is well defined and can be easily repeated.

c) The empty weight determined in (a) above must be in accordance with FAR Part 103.

4.31 Removable Ballast

Removable ballast may be used in showing compliance with the flight requirements of this subpart, if--

a) The place for carrying ballast is properly designed and installed, and is marked, and

b) Instructions are included in the vehicle flight manual, for the proper placement of the removable ballast under each loading condition for which removable ballast is necessary.

4.33 Propeller Speed and Pitch Limits

The propeller speed and pitch must be limited to values that will assure safe operation under normal operation conditions.

PERFORMANCE

4.45 General

Compliance with the performance requirements of this subpart must be shown for still air corrected to standard atmosphere.

4.49 Stalling Speed

Must meet the requirements of FAR Part 103.

4.50 Maximum Speed

The maximum CAS speed (V_H) in level flight with full power must be determined by flight test measurements and must not exceed the requirements of FAR Part 103.

4.51 Takeoff

The distance required to take off and climb over a 50 foot obstacle must be determined:

a) With the engines operating within approved operating limitations; and

b) No takeoff made to determine the data required by this section may require exceptional piloting skills or exceptionally favorable conditions.

4.65 Climb: All Engines Operating

The vehicle must have a steady rate of climb at sea level of at least 250 feet per minute.

FLIGHT CHARACTERISTICS

4.141 General

The vehicle must meet the requirements of Section 4.143 through Section 4.251 at the normally expected operating altitudes without exceptional piloting skill, alertness, or strength.

CONTROLLABILITY AND MANEUVERABILITY

4.143 General

a) The vehicle must be safely controllable and maneuverable during --

1) Takeoff;
2) Climb;
3) Level flight;

4) Dive; and
5) Landing (power on and power off) with the wing flaps extended and retracted.

b) It must be possible to make a smooth transition from one flight condition to another (including turns and slips) without danger of exceeding the limit load factor, under any probable operating condition.

4.145 Longitudinal Control

It must be possible to pitch the nose downward so the rate of increase in airspeed allows an acceleration from 1.1 V_{S1} to 1.5 times V_{S1} in not more than 3 seconds.

4.151 Aerobatic Maneuvers

Each aerobatic category vehicle must be able to perform safely the aerobatic maneuvers for which certification is requested. Safe entry speeds for these maneuvers must be determined by the applicant.

4.155 Elevator Control Force in Maneuvers

There must be a steadily increasing control force needed to achieve the positive limit maneuvering load factor.

4.157 Rate of Roll

It must be possible, using a favorable combination of controls, to roll the vehicle from a steady 30 degree banked turn through 60 degrees so as to reverse the direction of the turn within 4 seconds while maintaining 1.3 V_{S1}.

STABILITY

4.171 General

The vehicle must be longitudinally, directionally and laterally stable over the normal operating speed range as defined herein.

4.173 Static Longitudinal Stability

With the vehicle in a trimmed condition the control forces must be as follows:

a) A pull (or equivalent) must be required to obtain and maintain speeds below the trim speed and a push (or equivalent) required to obtain and maintain speeds above the trim speed. This must be shown at any speed between 1.2 V_S and the maximum allowable speed V_{NE} or the maximum attainable speed V_H, whichever comes first.

b) The airspeed must return to within plus or minus 10 percent of the original trim speed when the control force is slowly released at any speed within the specified range.

c) The stick force must vary with speed so that any substantial speed change results in a stick force clearly perceptible to the pilot.

4.177 Directional and Lateral Stability

a) The static directional stability, as shown by the tendency to recover from a skid with the rudder free, must be positive. At larger angles of skid up to that at which full rudder is used, the rudder pedal force must not reverse.

b) The static lateral stability, as shown by the tendency to raise the low wing in a slip, must be positive. At larger slip angles up to the angle at which the full rudder or aileron control is used the rudder pedal force may not reverse. Enough bank must accompany slipping to hold a constant heading. Rapid entry into, or recovery from, a maximum slip may not result in uncontrollable flight characteristics.

4.181 Dynamic Longitudinal Stability

Any short period longitudinal oscillation between the stalling speed and the maximum allowable speed must be damped with the primary controls (a) free and (b) fixed.

STALLS

4.201 Wing Level Stall

a) For a vehicle with independently controlled roll and directional controls, it must be possible to produce and to correct yaw by unreversed use of the directional control up to the time the vehicle pitches.

b) For a vehicle with interconnected lateral and directional controls (2 controls) and for a vehicle with only one of these controls, it must be possible to produce and correct roll by unreversed use of the rolling control without producing excessive yaw, up to the time the vehicle pitches.

c) The wing level stall characteristics of the vehicle must be demonstrated in flight as follows

The vehicle speed must be reduced with the elevator control until the speed is slightly abov the stalling speed, then the elevator control mus be pulled back so that the rate of speed reductic will not exceed one knot per second until a stall is produced, as shown by an uncontrollable downward pitching motion of the vehicle, or until the control reaches the stop. Normal use of the elevator control for recovery is allowed after th pitching motion has unmistakably developed.

d) Except where made inapplicable by the special features of a particular type of vehicle the following apply to the measurement of loss of altitude during a stall:

1) The loss of altitude encountered in the stall (power on or power off) is the change in altitude (as observed on the sensitive altimeter testing installation) between the altitude at which the vehicle pitches and the altitude at which horizontal flight is regained.

2) If power or thrust is required during stall recovery the power or thrust used must be that which would be used under th normal operating procedures selected by the applicant for this maneuver; however, the power used to regain level flight may not be applied until flying control is regained.

e) During the recovery part of the maneuver, it must be possible to prevent more than 15 degrees of roll or yaw by the normal use of control.

4.203 Turning Flight and Accelerated Stalls

Turning flight and accelerated stalls must be demonstrated in tests as follows:

a) Establish and maintain a coordinated turn in a 30 degree bank. Reduce speed by steadily and progressively tightening the turn with the elevator until the vehicle is stalled or until the elevator has reached its stops. The rate of speed reduction must be constant, and:

   1) For a turning flight stall, may not exceed one knot per second; and

   2) For an accelerated stall, be 3 to 5 knots per second with steadily increasing normal acceleration.

b) When the stall has fully developed or the elevator has reached its stop, it must be possible to regain level flight without:

   1) Excessive loss of altitude;
   2) Undue pitchup;
   3) Uncontrollable tendency to spin;
   4) Exceeding 60 degrees of roll in either direction from the established 30 degree bank; and
   5) For accelerated entry stalls, without exceeding the maximum permissible speed or the allowable limit load factor.

c) Compliance with the requirements of this section must be shown with:

   1) Wing flaps: Retracted and fully extended for turning flight and accelerated entry stalls, and intermediate if appropriate, for accelerated entry stalls;

   2) Landing gear: Retracted and extended;

   3) Cowl flap: Appropriate to configuration;

   4) Power: 75 percent maximum continuous power.

SPINNING

4.221 Spinning

a) Normal category: A single-engine, normal category vehicle must be able to recover from a one-turn spin or a three-second spin, whichever takes longer, in not more than one additional turn, with the controls used in the manner normally used for recovery, power on and off.

   1) For both the flaps-retracted and flaps-extended (if applicable) conditions, the applicable airspeed limit and positive limit maneuvering load factor may not be exceeded.

   2) There may be no excessive back pressure during the spin or recovery; and

   3) It must be impossible to obtain uncontrollable spins with any use of the controls.

b) If it is desired to designate a vehicle as "characteristically incapable of spinning," this characteristic must be shown by demonstration with:

   1) A weight five percent more than the highest weight for which approval is requested; and

   2) A center of gravity at least three percent of the c.g. range aft of the rearmost position for which approval is requested.

GROUND AND WATER HANDLING CHARACTERISTICS

4.231 Longitudinal Stability and Control

a) A vehicle may have no uncontrollable tendency to nose over in any reasonably expected operating condition, including rebound during landing or takeoff. Wheel brakes must operate smoothly and may not induce any undue tendency to nose over.

b) A seaplane or amphibian may not have dangerous or uncontrollable porpoising characteristics at any normal operating speed on the water.

4.233 Directional Stability and Control

a) There may be no uncontrollable ground or water looping tendency in 90 degree cross winds, up to a wind velocity of 0.2 V_{SO} at any speed at which the airplane may be expected to be operated on the ground or water.

4.335 Design Airspeeds

a) Design cruising speed, $V_C = .9\ V_H$ where V_H is the maximum speed obtained in level flight with rated r.p.m. and power, V_H must not exceed the requirement of FAR 103.

b) Design dive speed, $V_D \geq$ 1.3 [illegible] V_C is [illegible] [illegible] use [illegible] V_D.

c) [illegible]

b) The vehicle must be satisfactorily controllable without exceptional piloting skill or alertness, in power-off landings at normal landing speed without using brakes or engine power to maintain a straight path.

c) The vehicle must have adequate directional control during taxiing.

4.235 Taxiing Condition

The shock-absorbing mechanism may not damage the structure of the vehicle when the vehicle is taxied on the roughest ground that may reasonably be expected in normal operation.

4.239 Spray Characteristics

Spray may not dangerously obscure the vision of the pilot.

MISCELLANEOUS FLIGHT REQUIREMENTS

4.251 Vibration and Buffeting

Each part of the vehicle must be free from dangerous vibration under any appropriate speed and power conditions up to at least the minimum value of V_D allowed in Section 4.335. In addition, there may be no buffeting, in any normal flight condition, severe enough to interfere with the satisfactory control of the vehicle, cause excessive fatigue to the pilot, or result in structural damage. Stall warning buffeting within these limits is allowable.

4.253 Noise

The dBA level of an aircraft flying overhead at 100 ft. altitude at V_H shall not exceed 95 dBA.

STRUCTURE

4.301 Loads

a) Strength requirements are specified in terms of limit loads (the maximum loads to be expected in service) and ultimate loads (limit loads multiplied by prescribed factors of safety). Unless otherwise provided, prescribed loads are limit loads.

b) Unless otherwise provided, the air, ground and water loads must be placed in equilibriun with inertia forces, considering each item of mass in the vehicle. These loads must be distributed to conservatively approximate or closely represent actual conditions.

c) If deflections under load would significantly change the distribution of external and internal loads, this redistribution must be taken into account.

4.303 Factor of Safety

Unless otherwise provided, a factor of safety of 1.5 must be used.

4.305 Strength and Deformation

a) The structure must be able to support limit loads without detrimental, permanent deformation. At any load up to limit loads, the deformation may not interfere with safe operation.

b) The structure must be able to support ultimate loads without failure for at least three seconds. However, when proof of strength is shown by dynamic tests simulating actual load conditions, the three-second limit does not apply.

4.307 Proof of Structure

Compliance with the strength and deformation requirements of Section 4.305 must be shown for each critical load condition. Structural analysis may be used only if the structure conforms to those for which experience has shown this method to be reliable. In other cases, substantiating load tests must be made. Dynamic tests, including structural flight tests, are acceptable if the design load conditions have been simulated.

FLIGHT LOADS

4.321 General

Flight load factor represents the ratio of the aerodynamic force component (acting normal to the assumed longitudinal axis of the vehicle) to the weight of the vehicle. A positive flight load factor is one in which the aerodynamic force acts upward, with respect to the vehicle.

4.331 Symmetrical Flight Conditions

a) The appropriate balancing horizontal tail load must be accounted for in a rational or conservative manner when determining the wing loads and linear inertia loads corresponding to any of the symmetrical flight conditions specified herein.

b) The incremental horizontal tail loads due to maneuvering and gusts must be reacted by the angular inertia of the vehicle in a rational or conservative manner.

4.333 Flight Envelope

a) General Compliance with the strength requirements of this subpart must be shown at the combinations of airspeeds and load factors as determined herein.

b) Maneuver Envelope Except where limited by maximum (static) lift coefficients, the vehicle is assumed to be subjected to symmetrical maneuvers resulting in the following limit load factors:

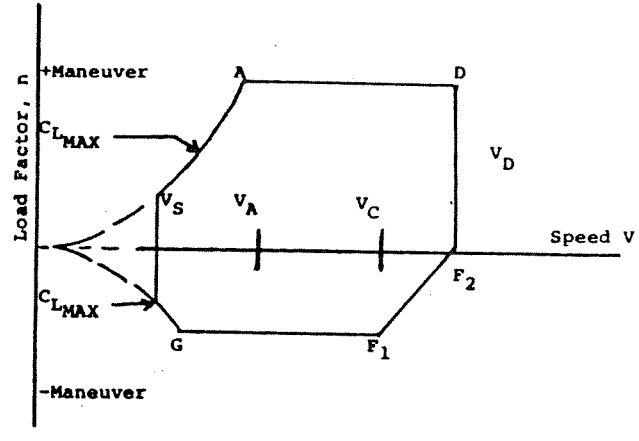
1) The positive maneuvering load factors specified in Section 4.337 at speeds up to V_D;

2) The negative maneuvering load factor specified in Section 4.337 at speeds up to V_C; and

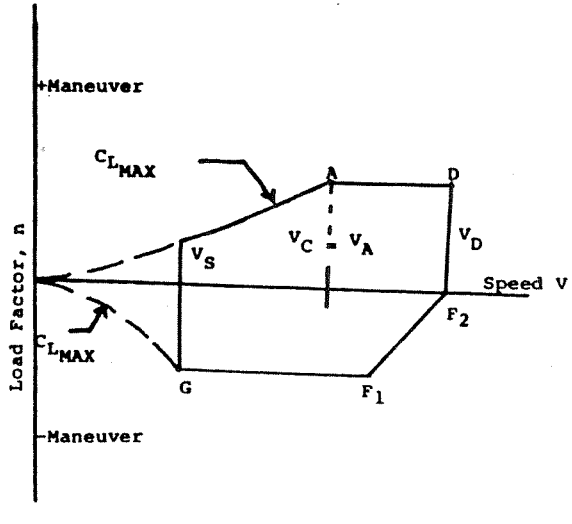
3) Factors varying linearly with speed from the specified value at V_C to 0.0 at V_D Line F_1 F_2.

c) Flight Envelopes

1.



2.



4.335 Design Airspeeds

a) Design cruising speed, $V_C = .9\ V_H$ where V_H is the maximum speed obtained in level flight with rated r.p.m. and power, V_H must not exceed the requirement of FAR 103.

b) Design dive speed, $V_D \geq 1.3\ V_C$. If $V_D = 1.3\ V_C$ is unattainable then the maximum speed attainable in a dive shall be used as V_D.

c) Design maneuvering speed, $V_A = V_{S1}(n)^{1/2}$ where--

1) V_{S1} is a measured or computed stalling speed with flaps retracted at the design maximum gross weight; and

2) n is the limit maneuvering load factor used in design.

3) The computed stall speed V_{S1} shall be determined as follows:

$$V_{S1} = \left[\frac{391\ W}{S\ C_{L_{MAX}}}\right]^{1/2}$$

where--

V_{S1} = Stall speed (m.p.h.)

W = Maximum gross weight (lb)

S = Wing area (ft^2)

$C_{L_{MAX}}$ = maximum vehicle normal force coefficient

$C_{L_{MAX}}$ shall be determined by

$C_{L_{MAX}} = C_{L_\alpha}\ \alpha$

where--

$\alpha = 25^\circ$ and C_{L_α} is computed from the following formula

$$C_{L_\alpha} = \frac{2\pi \mid 57.3}{p + \frac{2}{A}} \quad \text{(per degree)}$$

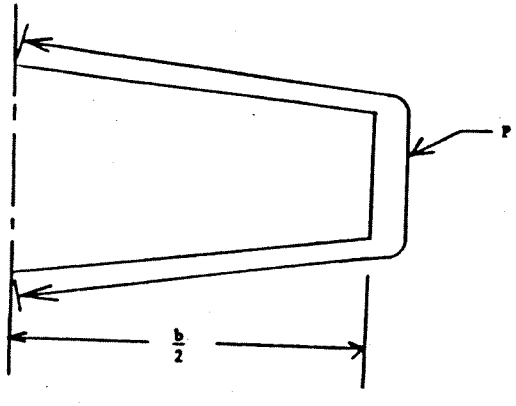
A = wing aspect ratio

p = semi-perimeter factor $= \frac{P}{b}$

b = wing span (ft)

α = angle of attack of wing root section (degrees)

P = Distance measured around the outside perimeter of one half of the wing. (Feet)



4) The stall speed, V_S, may be obtained from flight testing with calibrated instruments, if the design is such that it can be demonstrated that the vehicle has a definitive, clean stall break.

5) The minimum stall speed, V_S, used in design shall not be less than that calculated by the formula in Section 4.335 (c)(3).

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4.337 Limit Maneuvering Load Factors

a) The positive limit maneuvering load factor may not be less than 2.0 and need not be greater than 4.0. Between the values of n=2.0 and 4.0, the positive limit maneuvering load factor shall be determined from the intersection of the $C_{L_{MAX}}$ line and V_C. The $C_{L_{MAX}}$ line can be determined from the equation $V=V_S(n)^{1/2}$.

b) The negative limit maneuvering load factor used for design may not be less than .3 times the positive load factor.

4.345 High Lift Devices

a) If flaps or similar high lift devices to be used for takeoff, approach, or landing are installed, the vehicle with the flaps fully deflected at V_F, is assumed to be subjected to a symmetrical positive limit load factor of 2.0.

b) V_F must be assumed to be no less than 1.4 V_{S1}, where V_S is the stalling speed defined in Section 4.335 (c).

The attitude of the vehicle for proof test purpose at this load factor may be determined using the equation and parameters defined in Section 4.335.

$$\alpha = \frac{391\ n\ W}{V_F^2 S\ C_{L\alpha}}$$

4.349 Rolling Conditions

For vehicles incorporating ailerons, the wing and wing bracing must be designed for the loads resulting from the following aileron deflections and speeds in combination with a vehicle load factor of at least two-thirds of the positive maneuver load factor used for design.

1) Maximum aileron deflection at V_A; and

2) One-third of the maximum aileron deflection at V_D.

4.361 Engine Torque

a) Each engine mount and its supporting structure must be designed for the effects of--

1) The limit torque corresponding to takeoff power and propeller speed acting simultaneously with 75 percent of the limit loads from flight condition A of Section 4.333 (c); and

2) The limit torque corresponding to the maximum continuous power and propeller speed, acting simultaneously with the limit loads from flight condition A of Section 4.333 (c).

b) The limit torque is obtained by multiplying the mean torque by a factor of 4.0.

c) Engine torque effects need not be investigated for any other conditions.

4.363 Side Load on Engine Mount

a) Each engine mount and its supporting structure must be designed for a limit load factor in a lateral direction for the side load on the engine mount of not less than--

1) 1.33; or

2) One-third of the limit load factor for flight condition A.

b) The side load prescribed in paragraph (a) of this section may be assumed to be independent of other flight conditions.

4.371 Gyroscopic Loads

The engine mount and its supporting structure must be designed for gyroscopic loads resulting from maximum continuous r.p.m. for the following conditions:

All possible combinations of the following:

1) A yaw velocity of 2.5 radians per second
2) A pitch velocity of 1 radian per second
3) A normal factor of 2.5

Note: One radian equals 57.3 degrees.

3 Speed Control Devices

If speed control devices (such as spoilers and drag flaps) are incorporated for use in enroute conditions, the vehicle must be designed for the symmetrical maneuvers prescribed in Section 4.333 with the device extended at speeds up to the placard speed for this device.

CONTROL SURFACE AND SYSTEM LOADS

5 Control System Loads

Each flight control system and its supporting structure must be designed for loads corresponding to the limit pilot forces specified in Section 4.397. Pilot forces used for design are assumed to act at the appropriate control grips or pads as they would in flight, and to react at the attachment of the control system to the control surface horns.

7 Limit Pilot Forces

a) In the control surface flight loading condition, the airloads on movable surfaces and the corresponding deflections need not exceed those that would result in flight from the application of any pilot force within the ranges specified in paragraph (b) of this section. The forces defined in 4.397 need not be more than 2 times the demonstrated air load force.

b) The limit pilot forces and torques are as follows:

Control	Minimum forces or torques
Roll:	
Stick	20 lbs
Wheel	20 lbs
Pitch:	
Stick	50 lbs
Wheel	50 lbs
Yaw:	65 lbs

5 Secondary Control Systems

Secondary controls, such as wheel brakes and spoilers, must be designed for the maximum forces that a pilot is likely to apply to these controls.

CONTROL SURFACE LOADS

4.431 Control Surfaces

Must be designed for loads imposed by the following conditions:

a) At V_A, full deflection of the control surface; and

b) At V_D, one-third of full deflection of the control surface.

4.457 Wing Flaps

The wing flaps, their operating mechanisms, and their supporting structures must be designed for critical loads occurring in the flaps-extended flight conditions with the flaps in any position.

GROUND LOADS

4.471 General

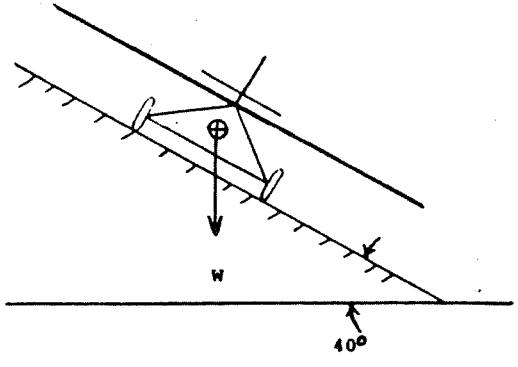
Ground loads subetantiation shall be complied with by conducting the following specified ground load tests.

4.473 Ground Load Assumptions

The ground loads requirements of this subpart must be complied with at the design maximum gross weight.

4.485 Side Load Conditions

For the side load condition, the vehicle is assumed to be in a normal flight level attitude with respect to an inclined lateral surface as shown. Only the main wheels shall be contacting the ground, and blocked to allow an even distribution of the ground reaction load. The large concentrated weight items shall be ballasted to represent the critical c.g. ultimate load condition.



Ballast to maximum gross weight.

EMERGENCY LANDING CONDITIONS

4.561 General

a) The vehicle, although it may be damaged in emergency landing conditions, must be designed as prescribed in this section to protect each occupant under those conditions.

b) The structure must be designed to give each occupant every reasonable chance of escaping serious injury in a minor crash landing when--

1) Proper use is made of belts or harnesses provided for in the design; and

2) The occupant experiences the ultimate inertia forces shown in the following table:

Ultimate Inertia Forces

	Normal	Aerobatic
Upward	3.0g	4.5g
Forward	9.0g	9.0g
Sideward	1.5g	1.5g

DESIGN AND CONSTRUCTION

4.601 General

The suitability of each questionable design detail and part having an important bearing on safety in operations must be established by tests.

4.603 Materials and Workmanship

a) The suitability and durability of materials used for parts, the failure of which could adversely affect safety, must--

1) Be established by experience or tests;

2) Meet approved specifications that ensure their having the strength and other properties assumed in the design data; and

b) Workmanship must be of a high standard.

4.605 Fabrication Methods

The methods of fabrication used must produce consistently sound structures. If a fabrication process (such as gluing, spot welding, or heat treating) requires close control to reach this objective, the process must be performed under an approved process specification.

4.607 Self-locking Nuts

No self-locking nut may be used on any bolt subject to rotation in operation unless a nonfriction locking device is used in addition to the self-locking device.

4.611 Accessibility

Means must be provided to allow inspection (including inspection of principal structural elements and control system), close examination, repair and replacement of each part requiring maintenance, adjustment for proper alignment and function, lubrication or servicing.

Material Strength Properties and Design Values

a) Material strength properties must be based on enough tests of material meeting specifications to establish design values on a statistical basis.

b) The design values must be chosen so that the probability of any structure being understrength because of material variations is extremely remote.

Fatigue Strength

The structure must be designed, as far as practicable, to avoid points of stress concentration where variable stresses above the fatigue limit are likely to occur in normal service.

Flutter

The wings, tail, and control surfaces must be free from dangerous flutter, airfoil divergence and control reversal from lack of rigidity, for any condition of operation within the limit V-N envelope, including all speeds up to the lesser of 1.4 V_C and 1.2 V_D, but not less than V_D.

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WINGS

Proof of Strength

The strength of wings must be proved by load tests or by combined structural analysis and load tests.

CONTROL SURFACES

1 Proof of Strength

a) Limit load tests of control surfaces are required. These tests must include the horn or fitting to which the control system is attached.

b) In structural analyses, rigging loads due to wire bracing must be accounted for in a rational or conservative manner.

CONTROL SYSTEMS

4.671 General

Each control must operate easily, smoothly and positively enough to allow proper performance of its functions.

4.681 Limit Load Static Tests

a) Compliance with the limit load requirements of this part must be shown by tests in which--

1) The direction of the test loads produces the most severe loading in the control system; and

2) Each fitting, pulley, and bracket used in attaching the system to the main structure is included.

b) Compliance must be shown (by analyses or individual load tests) with the special factor requirements for control system joints subject to angular motion.

4.683 Operation Tests

a) It must be shown by operation tests that, when the controls are operated from the pilot compartment with the system loaded to limit loads as prescribed in paragraph (b) of this section, the system is free to perform its intended function.

b) The prescribed test loads are--

1) For the entire system, loads corresponding to the limit airloads on the appropriate surface, or the limit pilot forces in 4.397 (b) whichever are less; and

2) For secondary controls, loads not less than those corresponding to the maximum pilot effort established under 4.405.

4.726 Ground Load Dynamic Tests

To substantiate the ground load landing conditions, the following drop test shall be conducted. At maximum design gross weight, free drop the entire vehicle from a height of 20.7 inches. The landing gear may yield but not fail during this testing.

PERSONNEL AND CARGO ACCOMMODATIONS

4.777 Cockpit Controls

a) Each cockpit control must be located (except where its function is obvious) to provide convenient operation and to prevent confusion and inadvertent operation.

b) The controls must be located and arranged so that the pilot, when seated, has full and unrestricted movement of each control without restriction from either his clothing or the cockpit structure.

4.779 Motion and Effect of Cockpit Controls

Cockpit controls must be designed so that they operate as follows:

Controls	Motion and Effect
a) Aerodynamic:	
Roll	Right for right wing down
Pitch	Rearward for nose up
Yaw	Right for nose right
b) Powerplant:	
Lever Throttle	Forward to open
Other Throttle	As specified in owner's manual
c) Other Controls:	
All other controls shall operate as specified in owner's manual.	

4.785 Seats, Safety Belts and Harnesses

a) Each seat and its supporting structure must be designed for occupants weighing at least 190 pounds with parachute and for the maximum load factors corresponding to the specified flight and ground load conditions including the emergency landing conditions prescribed in 4.561.

b) Each pilot seat must be designed for the reactions resulting from the application of pilot forces to the primary flight controls, as prescribed in 4.395.

c) Proof of compliance with the strength and deformation requirements of this section for seats may be shown by--

1) A combination of structural analysis and static load tests to limit loads; and

2) Static load tests to ultimate loads.

POWERPLANT

General

4.901 Installation

a) This part, regarding the vehicle powerplant, includes each component that--

1) Is necessary for propulsion; and

2) Affects the safety of the major propulsion units.

b) Each powerplant must be constructed, arranged and installed to--

1) Insure safe operation, within the normal flight envelope; and

2) Be accessible for necessary inspections and maintenance.

c) Engine cowls and nacelles must be easily removable or openable by the pilot to provide adequate access to an exposure of the engine compartment for preflight checks.

4.903 Engines

Each engine must be certificated under PUMA Part 5.

4.905 Propellers

a) Each propeller must be certificated under Part 6.

b) Engine power and propeller shaft rotational speed may not exceed the limits for which the propeller is certificated.

4.925 Propeller Clearance

a) Unless smaller clearances are substantiated, there must be--

1) At least one inch radial clearance between the blade tips and the vehicle structure, plus any additional radial clearance necessary to prevent harmful vibration;

2) At least one-half inch longitudinal clearance between the propeller blades or cuffs and stationary parts of the vehicle; and

3) Positive clearance between other rotating parts of the propeller or spinner and stationary parts of the vehicle.

FUEL SYSTEM

4.951 General

Each fuel system must be constructed and arranged to insure a flow of fuel at a rate and pressure established for proper engine functioning under each likely operating condition, including any maneuver for which certification is requested.

4.963 Fuel Tanks: General

a) Each fuel tank must be able to withstand, without failure, the vibration, inertia, fluid and structural loads that it may be subjected to in normal operation.

b) The fuel tank capacity should not exceed current FAR Part 103 requirements for ultralight vehicles.

4.975 Fuel Tank Vents

a) Each fuel tank must be vented from the top part of the expansion space. In addition--

1) Each vent outlet must be located and constructed in a manner that minimizes the possibility of its being obstructed.

2) Each vent must be constructed to prevent siphoning of fuel during normal operation.

3) The venting capacity must allow the rapid relief of excessive differences of pressure between the interior and exterior of the tank.

4.997 Fuel Strainer or Filter

There must be a fuel strainer or filter between the fuel source and the inlet of the fuel metering device. This fuel strainer or filter must be accessible for draining and cleaning or replacement.

OPERATING LIMITATIONS AND INFORMATION

4.1501 General

a) Each operating limitation specified in 4.1505 through 4.1525 and other limitations and information necessary for safe operation must be established.

b) The operating limitations and other information necessary for safe operation must be made available to the pilot as prescribed herein.

4.1505 Airspeed Limitations

The never-exceed speed V_{NE} must be established so that it is--

a) Not less than 0.9 times the minimum value of V_D allowed under 4.335; and

b) Not more than the lesser of--

1) 0.9 V_D established under 4.335; or

2) 0.9 times the maximum speed shown under 4.251.

4.1507 Maneuvering Speed

The maneuvering speed V_A determined under 4.335 must be established as an operating limitation.

4.1511 Flap Extended Speed

The flap extended speed V_{FE} must be established so that it is equal to the value of V_F as defined in 4.345.

4.1519 Weight and Center of Gravity

The weight and center of gravity limitations determined under 4.23 must be established as operating limitations.

4.1521 Powerplant Limitations

The powerplant limitations prescribed in this section must be established so that they do not exceed the corresponding limits for which the engines or propellers are certificated.

4.1525 Kinds of Operation

The kinds of operation to which the vehicle is limited are established by the category in which it is eligible for certification and by the installed equipment.

4.1529 Maintenance Manual

A maintenance manual containing the information that the applicant considers essential for proper maintenance must be made available to the owner at the time of delivery of the vehicle. The applicant must consider at least the following in developing the essential information.

a) Description of systems such as electrical, hydraulic, fuel, controls, etc.

b) Lubrication instructions setting forth the frequency and the lubricants and fluids which are to be used in the various systems.

c) Pressures and electrical loads applicable to the various systems.

d) Tolerances and adjustments necessary for proper functioning of the vehicle.

e) Methods of leveling, raising and towing.

f) Methods of balancing control surfaces.

g) Frequency and extent of inspections necessary for proper maintenance of the vehicle.

h) Special repair methods applicable to the vehicle.

i) List of special tools.

MARKINGS AND PLACARDS

4.1543 Instrument Markings: General

Each instrument must be clearly visible to the pilot and display the applicable limitations.

4.1545 Airspeed Indicator

The never-exceed speed (V_{NE}) shall be marked on each airspeed indicator.

4.1559 Operating Limitations Placard

There must be a placard in clear view of the pilot stating--

"The markings and placards installed in this vehicle contain operating limitations which must be complied with when operating this vehicle. Other operating limitations which must be complied with when operating this vehicle are contained in the Vehicle Flight Manual."

4.1563 Airspeed Placards

There must be an airspeed placard in clear view of the pilot and as close as practicable to the airspeed indicator. This placard must list the design maneuvering speed V_A and never-exceed speed V_{NE}.

4.1567 Flight Maneuver Placard

For normal category vehicles there must be a placard in clear view of the pilot prohibiting aerobatic maneuvers.

VEHICLE FLIGHT MANUAL AND APPROVED MANUAL MATERIAL

4.1581 General

Furnishing information A Vehicle Flight Manual must be furnished with each vehicle, and it must contain the following:

a) Information required by 4.1583 through 4.1587.

b) Other information that is determined by the manufacturer to be necessary for safe operation because of design, operating, or handling characteristics.

4.1583 Operating Limitations

a) Airspeed limitations The following information must be furnished:

1) Information necessary for the marking of the airspeed limits on the indicator and the significance of each of those limits.

2) The speeds V_A and V_{NE} and their significance.

b) Powerplant limitations The following information must be furnished:

1) Limitations required by 4.1521.

2) Explanation of the limitations when appropriate.

c) Weight The Vehicle Flight Manual must include the maximum weight.

d) Center of gravity The empty weight, empty center of gravity and the established center of gravity limits must be furnished.

e) Maneuvers A list of authorized maneuvers, appropriate airspeed limitations, and unauthorized maneuvers must be furnished.

f) Flight load factor The positive and negative limit load factors in g's must be furnished.

4.1585 Operating Procedures

For each vehicle, information concerning normal and emergency procedures and other pertinent information necessary to safe operation must be furnished.

4.1587 Performance and Handling Quality Information

General For each vehicle, the following information must be furnished:

a) The stall speed and determining factors.

b) The takeoff distance and determining factors.

c) Spinning characteristics including loss of altitude, any tendency for the spin to turn into a spiral dive, and recommended recovery procedures, if applicable.

d) Other pertinent handling quality characteristics determined by the manufacturer.

PART 5

ENGINES AND DRIVE SYSTEMS

Subpart A
General

5.1 Applicability

This part prescribes airworthiness requirements for ultralight vehicle engines and drive systems.

5.4 Drive Systems

The drive system, including propeller, must be subjected to an endurance test equivalent to Section 5.49.

5.5 Instruction Manual

An instruction manual containing the information that the applicant considers essential for installing, operating, servicing and maintaining the engine must be provided.

5.7 Engine Operating Limitations

Engine operating limitations shall be established based on the engine and drive system operating conditions demonstrated during tests required by this part and include those relating to power, speeds, temperature, pressures, fuels, and oils which the applicant finds necessary for safe operation of the engine.

5.8 Selection of Engine Power Ratings

Each selected rating must be for the lowest power that all engines of the same type may be expected to produce under the conditions to determine that rating.

5.15 Materials

The suitability and durability of materials used in the engine must--

a) Be established on the basis of experience or tests; and

b) Conform to approved specifications that ensure their having the strength and other properties assumed in the design data.

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:9 Durability

Engine design and construction must minimize the probability of occurrence of an unsafe condition of the engine between overhauls.

Subpart B
Design and Construction

1 Engine Cooling

Engine design and construction must provide the necessary cooling under conditions in which the vehicle is expected to operate.

1 Engine Mounting Attachments and Structure

a) The maximum allowable loads for engine mounting attachments and related engine structure must be specified by the applicant.

b) The engine mounting attachments and related engine structure must be able to withstand the specified loads without failure, malfunction or permanent deformation.

Accessory Attachments

Each accessory drive and mounting attachment must be designed and constructed so that the engine will operate properly with the accessories attached. The design of the engine must allow for the examination, adjustment or removal of each essential engine accessory.

Subpart C
Design and Construction
Reciprocating Aircraft Engines

Ignition System

Each engine must be capable of being equipped with an engine shut off switch in reach of the pilot.

Subpart D
Block Tests: Reciprocating Aircraft Engines

Calibration Tests

Each engine must be subjected to the calibration tests necessary to establish its power characteristics and the conditions for the endurance test specified in 5.49 (a) to (c). The results of the power characteristics calibration tests form the basis for establishing the characteristics of the engine over its entire operating range of crankshaft rotational speeds, manifold pressures, and fuel/air mixture settings. Power ratings are based on standard atmospheric conditions at sea level.

5.49 Endurance Test

a) The engine must be subjected to an endurance test with a representative propeller load that includes a total of 50 hours of operation and consists of the cycles specified herein. Each cycle must be conducted as follows:

Sequence	Duration (Minutes)	Operating Conditions
1	5	Starting - Idle
2	5	Take-off power
3	5	Cooling run (Idle)
4	5	Take-off power
5	5	Cooling run (Idle)
6	5	Take-off power
7	5	Cooling run (Idle)
8	15	75% of maximum continuous power
9	5	Cooling run (Idle)
10	60	Maximum continuous power
11	5	Cooling run and stop
Total:	120	

b) During or following the endurance test the fuel and oil consumption must be determined.

c) Alternatively, engines may be certified for a specific model of ultralight vehicle if the endurance test consists of 100 hours of logged flight in that specific model ultralight vehicle.

5.55 Teardown Inspection

After the endurance test has been completed the engine must be completely dis-assembled. No essential component may show rupture, cracks or excessive wear.

5.57 Engine Adjustment and Parts Replacement

The applicant may service and make minor repairs to the engine during the endurance tests.

AIRWORTHINESS STANDARDS
FOR POWERED ULTRALIGHT VEHICLES

PART 6

PROPELLERS

General

Propeller operating limitations shall be established by the manufacturer.

DEFINITIONS

Aerodynamic Coefficients - Nondimensional coefficients for aerodynamic forces and moments C_L, C_M, C_D, etc.

Aircraft - A device that is used or intended to be used for flight in air (FAR 1.1).

Aircraft Engine - An engine that is used or intended to be used propelling aircraft. It includes engine appurtenances and accessories necessary for its functioning, but does not include propellers.

Air Density - ρ the mass density of the air through which the glider is moving, in terms of the weight of a unit volume of air divided by the acceleration due to gravity. ρ_0 is the mass density of air at sea level under standard atmospheric conditions and has a value of .002377 $\frac{lb \quad sec.^2}{ft^4}$.

Airframe - The fuselage, booms, nacelles, cowlings, fairings, airfoil surfaces (including rotors, but excluding propellers and rotating airfoils of engines), and landing gear of an aircraft and their accessories and controls.

Airplane - An engine-driven fixed wing (as opposed to rotary wing) aircraft heavier than air, that is supported in flight by the dynamic reaction of the air against its lifting surfaces (FAR 1.1).

Airship - An engine-driven lighter-than-air aircraft that can be steered.

Balloon - A lighter-than-air aircraft that is not engine driven.

Brake Horsepower - The power delivered at the propeller shaft (main drive or main output) of an aircraft engine.

Calibrated Airspeed - CAS. Indicated airspeed of an aircraft, corrected for position and instrument error. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level. Calibrated airspeed is equal to equivalent airspeed at very low speeds.

Category - (1) As used with respect to the certification, ratings, privileges, and limitations of airmen, means a broad classification of aircraft. Examples include: airplane; rotorcraft; glider; and lighter-than-air; and

(2) As used with respect to the certification of aircraft, means a grouping of aircraft based upon intended use or operating limitations. Examples include: transport; normal; utility; acrobatic; limited; restricted; provisional; and ultralight.

Class - (1) As used with respect to the certifications, ratings, privileges and limitations of airmen means a classification of aircraft within a category having similar operating characteristics. Examples include: single engine; multi-engine; land; water; gyro plane; helicopter; airship and free balloon; and

(2) As used with respect to the certification of aircraft, means a grouping of aircraft having similar characteristics of propulsion, flight, or landing. Examples include: airplane; rotorcraft; glider; balloon; landplane; seaplane; and ultralight.

Drag - The aerodynamic force acting on an aircraft parallel to the flight path.

Dynamic Pressure - q. The kinetic energy of a unit volume of air.
$q = 1/2 \rho V^2$ where V is TAS in feet per sec.
$q = 1/2 \rho_0 V^2$ where V is EAS in feet per sec.

Equivalent Airspeed - EAS. Calibrated airspeed of an aircraft corrected for adiabatic compressible flow for the particular altitude. Equivalent airspeed is equal to calibrated airspeed in standard atmosphere at sea level and at very low speeds at altitude. EAS = TAS $(\rho/\rho_0)^{1/2}$.

External Load - A load that is carried, or extends, outside of the aircraft fuselage.

External Load Attaching Means - The structural components used to attach an external load to an aircraft, including external-load containers, the backup structure at the attachment points, and any quick-release device used to jettison the external load.

Glider - A heavier-than-air aircraft, that is supported in flight by the dynamic reaction of the air against its lifting surfaces and whose free flight does not depend principally on an engine (FAR 1.1).

Gross Weight - W. The combined weight of the glider, pilot, equipment combination.

Hang Glider - (for purposes of these Airworthiness Standards) A heavier-than-air aircraft that is supported in flight by the dynamic reaction of the air against its lifting surfaces and whose free flight does not depend principally on an engine and is specifically designed to be foot launched, landed, and carryable by the pilot.

Indicated Airspeed - IAS. The speed of an aircraft as shown on its pilot static (or equivalent) airspeed indicator calibrated to reflect standard atmosphere adiabatic compressible flow at sea level uncorrected for system errors and corrected for instrument error.

Kite - A framework covered with paper, cloth, metal or other materials, intended to be flown (while tethered) at the end of a rope or cable, and having as its only support the force of the wind moving past its surface (FAR 1.1).

Large Aircraft - Aircraft of more than 12,500 pounds, maximum certificated takeoff weight.

Lighter Than Air Aircraft - Aircraft that can rise and remain suspended by using contained gas weighing less than the air that is displaced by the gas.

Lift - The aerodynamic force acting on an aircraft perpendicular to the flight path.

Load Factor - n. The ratio of a prescribed load to the gross weight of an aircraft; the prescribed load may be expressed in terms of aerodynamic forces, inertia forces, or ground reactions.

Manifold Pressure - Absolute pressure as measured at the appropriate point in the induction system and usually expressed in inches of mercury.

Maximum Continuous Power - With respect to reciprocating engines, means the brake horsepower that is developed--

(1) in the standard atmosphere at a specified altitude; and
(2) under the maximum conditions of crankshaft rotational speed and engine manifold pressure that are approved for use of unrestricted duration.

Maximum Recommended Wing Loading - (W/S)MAX. The maximum allowable gross weight divided by the wing area of an aircraft.

Mean Aerodynamic Chord - $\bar{C}$. The chord of an imaginary airfoil which would have force vectors throughout the flight range identical with those of the actual wing or wings.

Minimum Recommended Wing Loading - (W/S)MIN. The minimum allowable gross weight divided by the wing area of an aircraft.

Parachute - A device used or intended to be used to retard the fall of a body or object through the air.

Pitching Moment - The aerodynamic moment acting on an aircraft at some given reference point.

Pitch Setting - The propeller blade setting, as determined by the blade angle measured in a manner, and at a radius, specified by the instruction manual for the propeller.

Preventive Maintenance - Simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations.

Propeller - A device for propelling an aircraft that has blades on an engine-driven shaft and that, when rotated, produces by its action on the air a thrust approximately perpendicular to its plane of rotation. It includes control components normally supplied by its manufacturer, but does not include main and auxiliary rotors or rotating airfoils of engines.

Standard Atmosphere - Means atmosphere in which --

(1) The air is a dry perfect gas;
(2) The temperature at sea level is 59 degrees Fahrenheit;
(3) The pressure at sea level is 29.92 inches Hg.';
(4) The temperature gradient from sea level to the altitude at which the temperature is -69.7 degrees Fahrenheit, is -0.003566 Fahrenheit per foot and zero above that altitude;
(5) The density P_0 at sea level under the conditions described in Subparagraphs (1) through (4) is 0.002377 lb. sec 2/ft. 4.

True Airspeed - TAS. The airspeed of an aircraft relative to undisturbed air. True airspeed is equal to equivalent airspeed multiplied by $(\rho_0/\rho)^{1/2}$ TAS = EAS $(\rho_0/\rho)^{1/2}$.

Ultralight Vehicle - A type of flying vehicle defined by FAR Part 103.

Wing Area - S. The area enclosed by the projection of the wing outline on a surface containing the wing chords.

Wing Loading - (W/S) The gross weight divided by the wing area of an aircraft.

ABBREVIATIONS AND SYMBOLS

C	Mean Aerodynamic Chord
C_D	Drag Coefficient = D/qs
C_L	Lift Coefficient = L/qs
C_M	Pitching Moment Coefficient = $M/qs\bar{c}$
C_{MO}	Zero Lift Pitching Moment Coefficient
CAS	Calibrated Airspeed
D	Drag
EAS	Equivalent Airspeed
IAS	Indicated Airspeed
L	Lift
L/D	Lift to Drag Ratio
M	Pitching Moment
n	Load Factor
q	Dynamic Pressure
S	Wing Area
TAS	True Airspeed
V	Velocity
V_A	Design Maneuvering Speed
V_B	Design Speed for Maximum Gust Intensity
V_C	Design Cruising Speed
V_D	Design Diving Speed
V_F	Design Flap Speed
V_{FE}	Maximum Flap Extended Speed
V_H	Maximum Speed in Level Flight with Rate r.p.m. and Power
V_{LO}	Maximum Landing Gear Operating Speed
V_{NE}	Never-Exceed Speed
V_{NO}	Maximum Structural Cruising Speed
V_S	Stalling Speed or the Minimum Steady Flight Speed at which the Airplane is Controllable
V_{SO}	The Stalling Speed or the Minimum Steady Flight Speed in the Landing Configuration
V_{S1}	The Stalling Speed or the Minimum Steady Flight Speed Obtained in a Specific Configuration
V_X	Speed for Best Angle of Climb
V_Y	Speed for Best Rate of Climb
W	Gross Weight
(W/S)	Wing Loading
$(W/S)_{MAX}$	Maximum Wing Loading
$(W/S)_{MIN}$	Minimum Wing Loading
ρ	Air Density
ρ_0	Sea Level Air Density with Standard Atmosphere

ASF POWERED ULTRALIGHT VEHICLE PILOT COMPETENCY AND REGISTRATION PROGRAM

Interest of the AOPA Air Safety Foundation

The AOPA Air Safety Foundation (ASF) is a nonprofit foundation dedicated to general aviation safety through pilot education and training, accident prevention and aeronautical research. The ASF has gained an international reputation for enhancing safety through the development of outstanding aviation training courses and for the high caliber of instruction provided by ASF programs.

ASF currently conducts more than 1000 airman training programs annually throughout the nation. In cooperation with FAA, it provides revalidation clinics for more than 18,000 certificated flight instructors and it publishes two safety periodicals plus numerous safety notices, bulletins and alerts each year. Since 1950 all of these safety services have been available to the entire airman public without regard to membership in any organization. One ASF bi-monthly publication, the Air Safety Journal is mailed, free of charge, to all active airman with no other qualification necessary. A second publication, the quarterly Flight Instructor Safety Report, is mailed free of charge to all CFIs.

The ASF has now embarked on new safety programs designed for the rapidly evolving ultralight industry. The primary objective of the ASF is to create and administer a national program for collecting, analyzing and rapidly communicating ultralight safety information. ASF is uniquely qualified to meet that objective through established and long standing national programs for certificated flight instructors, pilot safety seminars, safety research and communications through periodicals dedicated to safety issues.

To facilitate that primary objective, ASF will establish and maintain a national list of ultralight vehicle pilots and vehicle owners, a national accident/incident reporting and feedback system and programs to assist ultralight vehicle pilots in acquiring and documenting the knowledge and skills necessary for safe ultralight operations as specified in FAR 103 and FAA Advisory Circular 103-1.

POWERED ULTRALIGHT VEHICLE PILOT COMPETENCY

AND REGISTRATION PROGRAM

The ASF powered ultralight vehicle pilot competency and registration program is that part of the AOPA Air Safety Foundation's (ASF) overall ultralight safety activities which is designed to fulfill the request of the Federal Aviation Administration (FAA) as stated in the preamble to FAR Part 103: "The ultralight community is expected to take positive action to develop these (pilot competency and registration) programs in a timely manner and gain FAA approval for their implementation." In this document "ultralight vehicle" and "ultralight" will mean powered ultralight vehicle.

The ASF powered ultralight pilot competency and registration program consists of:

1) A national network of ASF Registered Examiners. ASF Registered Examiners will test and observe the knowledge and competency of ultralight pilot applicants. Upon successful completion of examinations by an applicant, the ASF Registered Examiner will be privileged to recommend that the ultralight pilot be registered with the AOPA Air Safety Foundation.
2) A common national registration list of powered ultralight pilots. Each ultralight pilot who requests a competency evaluation from an ASF Registered Examiner and successfully completes all portions of that evaluation to the satisfaction of the ASF Registered Examiner may then request to be registered with the AOPA Air Safety Foundation as an Ultralight Pilot. The Ultralight Pilot registration list, and the ASF Registered Examiner list, will be used for timely communication of safety information pertinent to the ultralight pilot and vehicle he or she flies.

Appendix D

I. ASF Powered Ultralight Pilot Examiner.

This part prescribes the requirements for the registration of ASF Registered Examiners. In order to be registered by ASF as an ASF Registered Examiner the applicant will:

(a) before October 1, 1983, certify that he/she is an active ultralight vehicle flight instructor. Further, the applicant will:

1. Certify that he/she:
   a. Has flown powered ultralights for not less than 20 hours over a period of not less than six months,
   b. Has flown powered ultralights from at least three different sites,
   c. Has flown at least five hours in each make and model of powered ultralight in which he/she is instructing,
   d. Has given instruction to at least five powered ultralight students while they were in flight; and,
   e. Is at least 18 years of age.
2. Successfully complete an ASF Registered Examiner seminar conducted by ASF which includes a written test on all subject areas defined in FAR Part 103 and Advisory Circular 103-1, paragraph 17, items a through w, plus the following:
   a. Student evaluation and testing,
   b. Accident/incident reporting procedures; and,
   c. ASF Registered Examiner responsibilities.

(b) after October 1, 1983, he/she will be required to:

1. Present to ASF a written recommendation from an ASF Registered Examiner stating that the applicant is a competent ultralight flight instructor,
2. Be registered as an ultralight pilot; and,
3. Complete all of the items listed in sections 1 and 2 above.

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The ASF Registered Examiner program will be administered by the AOPA Air Safety Foundation on a national basis. Seminars will be available to all qualified ultralight flight instructors who wish to be designated as ASF Registered Examiners. Seminars will be held in various geographic locations intended to correspond to the powered ultralight activity levels throughout the fifty United States. The seminars will be conducted on a continuing basis, determined by need, and are planned to number more than fifty during the first year this plan is in effect.

In the case of an ASF Registered Examiner applicant who does not meet the requirements as prescribed in 1 a through d, but does meet requirement 1e, he/she may attend an ASF seminar and upon successful completion of that seminar be privileged to administer the written test only. He/she may subsequently certify to the AOPA Air Safety Foundation that requirements in 1 a through d have been satisfied and then be privileged to administer the entire powered ultralight pilot competency examination during the remaining duration of his/her registration period.

An ASF Registered Examiner shall maintain compliance with 1c before commencing flight instruction in each particular make and model ultralight vehicle.

An ASF Registered Examiner shall complete, to the best of his/her abilities, an ASF accident/incident reporting form whenever he/she becomes aware of, or has additional relevant information about, an accident or incident in his/her area which in any way involves an ultralight vehicle. The completed form shall be mailed to the AOPA Air Safety Foundation in an expeditious manner.

Each ASF Registered Examiner shall do his/her utmost to insure safe ultralight operating practices at all times and places and shall exercise, and cause to be exercised, peer pressures on all ultralight pilots observed committing unsafe acts or flying in an unsafe or reckless manner.

The AOPA Air Safety Foundation expects that in practice an ASF Registered Examiner will have given flight instruction to the pilot applicant and will, therefore, be confident of his/her student's abilities before administering competency examinations.

The ASF Registered Examiner may charge a reasonable fee for administering a competency evaluation, but must charge the same rate for each pilot applicant. Standardization will be achieved by using evaluation sheets supplied to the ASF Registered Examiner by the AOPA Air Safety Foundation. The basis for evaluation is stated in Advisory Circular 103-1, paragraph 17 a through w; paragraph 18b 2 and 3; paragraph 19 a through f; paragraph 20 a through e.

The designation of an ASF Registered Examiner will expire two calendar years from the date of registration. This designation may be renewed by attending an ASF Registered Examiner seminar. An ASF Registered Examiner designation may be terminated prior to the expiration date when:

1. It is determined by a federal, state or local authority that any person authorized to conduct examinations under this plan has been found in violation of FAR Part 103 or any other law or regulation related to ultralight flying,
2. Any person authorized to conduct examinations under this plan has conducted an examination or demonstration which does not conform to the requirements and guidelines in the FAR Part 103 and Advisory Circular 103-1; and,
3. He/she fails to submit accident/incident reports as required in this plan.

An ASF Registered Examiner shall document the recommendation of not less than ten ultralight pilot registrations during the previous year before qualifying for re-registration. In the case of an ASF Registered Examiner who cannot document the recommendation of not less than ten ultralight pilot registrations during the previous year, the ASF Registered Examiner may not be re-registered for a period of six months from the expiration date of his/her last registration.

An ASF Registered Examiner shall maintain a written record of each competency examination he/she administers. This record shall be kept for not less than two years and will be available upon request to the AOPA Air Safety Foundation or to federal, state or local authorities. The contents of this record shall include:

1. Name of pilot applicant,
2. Address of pilot applicant,
3. Date of examination,
4. Location of examination; and,
5. Examination results.

II. ASF Registered Ultralight Pilot.

This part prescribes requirements for the registration of an Ultralight Pilot. In order to be registered as an Ultralight Pilot an applicant must request an examination from an ASF Registered Examiner. This examination will include:

1. Written test.

The written test is to be supplied by the AOPA Air Safety Foundation to each ASF Registered Examiner. The test subjects, as defined in AC 103-1, include:

a. Determination of Part 103 applicability,
b. Inspection requirements (103.3),
c. Hazardous operations (103.9),
d. Daylight operations (103.11),
e. Right of way (103.13),
f. Congested areas (103.15),
g. Operations in certain airspace (103.17),
m. Visual reference to the surface (103.21),
n. Conventional aircraft operations (AC 103-1, Paragraph 17n)
o. Operations in prohibited or restricted areas (103.19),
p. Flight visibility and cloud clearance requirements (103.23),
q. General characteristics of weather (AC 103-1, Paragraph 17q)
r. Elements of micrometerology and applications to ultralight flight (AC 103-1, Paragraph 17r),
s. Common weather hazards and avoidance (AC 103-1, Paragraph 17s),
t. General elements of ultralight aerodynamics and performance (AC 103-1, Paragraph 17t),
u. General procedures for operating in the vicinity of conventional aircraft and the problems of wake turbulence (AC 103-1, Paragraph 17u),
v. Preflight inspection of the vehicle, with emphasis on critical elements of the inspection such as proof loadings of the controls (AC 103-1,

Paragraph 17v); and,

w. Limitations and restrictions applicable to the specific vehicle being flown (AC 103-1, Paragraph 17w).

The objective of the written test is to determine if the pilot applicant meets the knowledge standards as stated in AC 103-1. At least two questions on the written test will pertain to each item in AC 103-1, paragraph 17 a through w. These written tests will be reviewed and updated as required by the FAA with one revised copy being forwarded to the FAA for approval before implementation. (See Appendix 1 for the written test.)

2. Oral test.

The oral test will pertain to airspace and conventional aircraft operations, particularly those related to the applicant's primary operational area, and will include a review of any incorrectly answered written test questions.

3. Flight competency test and demonstration.

a. The objective of the flight competency test, which is required by AC 103-1 as amended from time to time, is to enable the ASF Registered Examiner to observe the applicant in the following:

1. Execution of procedures and maneuvers within the performance capabilities and limitations of the ultralight vehicle, including use of all vehicle systems (AC 103-1, Paragraph 20a),
2. Properly executing the appropriate procedures and maneuvers (AC 103-1, Paragraph 20b),
3. Handling the vehicle with smoothness and accuracy (AC 103-1, Paragraph 20c),
4. Exercising good judgement (AC 103-1, Paragraph 20d); and,
5. Applying aeronautical knowledge (AC 103-1, Paragraph 20e).

b. The content of each demonstration of flight competency, as required by AC 103-1 and the amendments which can be expected from time to time, is:

1. Preflight check (AC 103-1, Paragraph 19a),
2. Ground handling (AC 103-1, Paragraph 19b),
3. Takeoffs and landings (AC 103-1, Paragraph 19c),
4. Traffic patterns (AC 103-1, Paragraph 19d),
5. Flight at minimum controllable airspeed (AC 103-1, Paragraph 19e); and,
6. Emergency procedures (AC 103-1, Paragraph 19f).

The basis for issuance of an Ultralight Pilot registration document is:

1. A written test score not less than 70% correct on all questions related to the objective stated in AC 103-1, paragraph 17.
2. Successful completion of the oral examination. Success is attained when the ASF Registered Examiner is satisfied that the applicant understands the knowledge areas of incorrectly answered questions on the written test, as well as airspace and conventional aircraft operations related to the primary operational area of the applicant.
3. Standards for completion of the flight competency evaluation are stated in AC 103-1, item 20. Each ASF Registered Examiner will use those standards when he/she is conducting a flight competency evaluation. Each ASF Registered Examiner will be supplied with a flight evaluation form, from the AOPA Air Safety Foundation, to be used when evaluating flight competency. This form will include the standards for reference.

An Ultralight Pilot registration will expire two calendar years from the date of issuance, unless the Ultralight Pilot successfully completes a re-evaluation by an ASF Registered Examiner. The re-evaluation may include any portion of the original ASF Ultralight Pilot competency evaluation, but normally would be comprised of an oral evaluation only. The purpose is to determine that the pilot has maintained his/her knowledge level and is aware of changes that may have occurred in FAR 103, any associated Advisory Circulars and any changes which may have occurred in the airspace and in conventional aircraft operations related to the primary operational area of the pilot.

III. Documentation and registration numbers.

A series of registration numbers will be assigned by ASF beginning with one and continuing indefinitely for ASF Registered Examiners; and another series of registration numbers, beginning with one and continuing indefinitely for Ultralight Pilots. Documentation and registration numbers will be issued to each applicant by the AOPA Air Safety Foundation upon receipt of notification that he/she has successfully completed the appropriate examination. (See Appendix 2 for copies of the documents that will be issued to both ASF Registered Examiners and Ultralight Pilots.)

Record keeping. Current ASF Registered Examiner and Ultralight Pilot registrations will be maintained in an ASF computer program for a minimum of 36 months. Expired and renewed records will be maintained on microfiche for a minimum of five years. Records will be released to the FAA as needed, to individual state governments (but only records or residents of that state) and to law enforcement agencies on a per case basis. Lists and/or mailing labels of registration records will not be sold for commercial purposes.

Any other FAA approved organizations engaging in Ultralight Pilot registration must not sell or indiscriminately release information received from the AOPA Air Safety Foundation for the purpose of administrative continuity.

This program will be administered on a national basis and will be available to the general public in a fair and equitable manner without regard to membership in any organization.

This program may be amended from time to time based on service input, or to reflect changes in FAR Part 103, Advisory Circular 103-1 or subsequent documents produced by the FAA. A copy of any proposed changes will be forwarded to the FAA, AFO-800, for approval before implementation.

ASF POWERED ULTRALIGHT VEHICLE REGISTRATION PROGRAM

The AOPA Air Safety Foundation (ASF) Powered Ultralight Vehicle Registration Program will provide powered ultralight vehicle owners with a method of theft protection and proof of ownership, as well as provide ASF and the industry with a means to communicate safety information concerning specific aircraft. (In this document "ultralight vehicle" and "ultralight" will mean powered ultralight vehicle.) Registration numbers will be assigned by the ASF to all ultralights that comply with the prerequisites. The owner will receive a set of tamper-resistant labels containing the registration numbers to mark critical parts of the ultralight, a wallet-size registration certificate and instructions on how the visible wing markings are to be positioned. The registration will be valid until the ultralight is sold or destroyed, the owner dies, or two years elapse, whichever comes first. Provisions are made for renewal and transfer.

A central computer data base of all registration transactions will be maintained at ASF headquarters and will be available to government agencies and other legitimate organizations on a need-to-know, noncommercial basis. All transactions will be accomplished by mail.

The data compiled in the registration and renewal process will serve as a statistical base for growth rates and accident/incident experience. It will also facilitate timely communication of safety information to specific ultralight owners and pilots. Each owner of a registered ultralight will receive a quarterly safety newsletter at no charge, in addition to notices, bulletins and alerts as appropriate.

REGISTRATION PROGRAM

A. This program will be conducted by the AOPA Air Safety Foundation, currently at 7315 Wisconsin Avenue, Bethesda, Maryland 20814.

B. The person responsible for this program will be John Ballantyne, Director of Ultralight Programs, Telephone: 301-951-3973.

C. Administration and conduct of the program:

1. This program will be made available on a national basis via announcements in a variety of trade publications and direct mail programs. This registration system will be made available to all owners of ultralight vehicles without regard to organizational affiliation. A registration fee will be charged.
2. All registration transactions will be accomplished via mail, with processing being done at AOPA Air Safety Foundation headquarters.
3. Registration prerequisites. All applicants must conform to the following prerequisites before registering an ultralight with the AOPA Air Safety Foundation:
   a. Compliance with FAR Part 103. An applicant must possess an ultralight vehicle that meets the criteria stated in FAR Part 103.
   b. Proof of ownership. The applicant for registration of an ultralight must submit proof of ownership with this application. A copy of the bill of sale for the ultralight or kit is usually sufficient proof. If the applicant did not purchase the ultralight from the last registered owner, the applicant must submit conveyances completing the chain of ownership from the last registered owner to the applicant. If the ultralight is amateur-built, a notarized affidavit describing the vehicle and stating that it was amateur-built should be submitted as proof of ownership instead of a bill of sale.
4. Registration numbers. The registration numbers will consist of two numbers followed by three letters. The first number will be 1, the second number will be 0 through 9. The letters I and O are not to be used. Certain combinations of letters and numbers used for distress purposes will not be used in a registration number. These combinations are: Any three letter combinations beginning with the letter Q, any number with the three letter DDD, TTT, XXX, YYY and PAN. (See Appendix 1 for complete list of possible combinations.) Registration numbers will be randomly assigned unless a special number is requested. An additional fee is charged for requested numbers.
5. Visible marking requirements. A registration number must be displayed on each registered aircraft as follows:

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   a. Characters shall be in Arabic numerals and upper case (capital) letters in a Roman style typeface.
   b. Characters must be six inches high and four inches wide, except the number "1" which must be one inch wide and the letters, "M" and "W" which may be six inches wide. Characters must be formed by solid lines one inch thick.
   c. The registration number shall be permanently affixed to the underside of the lowest left wing. The number shall be oriented spanwise with the top of the characters pointing forward. The center of the number shall be at least three feet, but not more than five feet, from the left wing tip.
   d. Letters shall be spaced a minimum of 1½ inches apart.
   e. In the case of an ultralight that has a configuration which prohibits the practical implementation of the preceeding visible marking requirements (5a through d), a variation may be requested by the ultralight owner to the ASF.
6. Duration of registration. The ultralight registration is valid for two years or until one of the following occurs:
   a. Sale of the ultralight. Sale of the ultralight voids the registration of the ultralight. The new owner may apply for registration in his/her name. If the new owner does not register the vehicle, all registration markings and numbers must be removed.
   b. Destruction or withdrawal from service. In the case of destruction of the ultralight or withdrawal from service, the registration is no longer valid and must be returned to the AOPA Air Safety Foundation and all registration markings removed from the ultralight.
   c. Death of the registered owner. Death of the registered owner of the ultralight voids the registration. Refer to item 6a or 6b.
7. Registration Certificate content, see Appendix 2.
8. Administrative processing. Registration applications and associated documents proving ownership will be verified and entered into a central computer data base at Foundation headquarters. A registration card will be computer produced and

mailed to the registrant.

9. Record keeping. Current registration records will be maintained in an in-house computer for a minimum of 36 months. Expired records will be maintained on microfiche for a minimum of five years. Records will be released to the FAA as needed, to individual state governments (but only records of residents of that state) and to law enforcement agencies on a per case basis. Lists and/or mailing labels of registration records will not be sold for commercial purposes.

   Any other FAA approved organization engaging in ultralight registration must not sell or indiscriminately release information received from ASF for the purpose of administrative continuity.

10. Additional features. A nationally organized method of registering and marking ultralight vehicles is important in a self-regulating atmosphere because it provides the basis for:

    a. Ultralight vehicle ownership identity for the purpose of:
       1. Theft recovery,
       2. Identity of an offender,
       3. A communication base from which accident/incident/maintenance information can be disseminated to owners and operators; and,
       4. Maintaining a current data base of ultralight vehicles and ultralight vehicle exposure.

    b. The use of ultralight registration and exposure data in combinations with accident, incident and maintenance problem data. The comparisons of these information sources will result in:
       1. Accurate accident statistics,
       2. Identification of geographic areas of concentrated ultralight activity,
       3. Identification of areas of flight safety problems,
       4. Identification of generalized maintenance problems; and,
       5. Identification of recurring mechanical defects pertinent to a specific make/model of vehicle.

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11. Safety information dissemination. The culmination of this information gathering and subsequent analysis will be published by the AOPA Air Safety Foundation in a periodical safety newsletter. The purpose of this safety newsletter will be to relate meaningful statistics and information pertinent to the safe operation of ultralight vehicles. This safety newsletter will be published on a quarterly basis, or more frequently, and will be sent free of charge to every ASF registered Ultralight Pilot and ultralight vehicle owner. In addition, ASF will disseminate pertinent safety information on a need-to-know basis to specific owners and pilots through notices, bulletins and alerts.

AOPA AIR SAFETY FOUNDATION
ULTRALIGHT AIRCRAFT
REGISTRATION APPLICATION

See instructions on reverse side. Please print or type all entries.

NAME OF APPLICANT(S) (Last, First, Middle Initial)

Last First I.

ADDRESS (of first applicant)

Street

City State Zip

TYPE OF ACTION: ☐ Initial ☐ Renewal ☐ Transfer

Registration Number (if any)

AIRCRAFT MAKE & MODEL:

AIRCRAFT SERIAL NUMBER:

ENGINE TYPE: ENGINE SERIAL:

DATE OF PURCHASE: MO DY YR

TYPE OF REGISTRATION:

☐ Individual ☐ Partnership ☐ Corporation ☐ Co-Owner

SPECIAL MARKING REQUESTED (Additional fee charged)

(see reverse side for special marking regulations)

I hereby certify that all of the entries made on this page are true statements and that the attached proof of ownership is true copy of the original. Registration is for accident reporting and statistical information purposes. It does not constitute proof of ownership or title, nor does it constitute certification of airworthiness.

Signature Date

Signature Date

Signature Date

Do Not Write Below This Line

Registration Date

Fee Control Number

AOPA AIR SAFETY FOUNDATION 421 Aviation Way, P.O. Box 865, Frederick, Maryland 21701

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REGISTRATION APPLICATION INSTRUCTIONS

PREPARATION: Except for signatures, all data should be typewritten or printed legibly. Signatures must be in ink.

ELIGIBLE AIRCRAFT: Only those aircraft described as powered ultralight vehicles in Federal Aviation Regulations Part 103 are eligible for registration by the Air Safety Foundation.

PROOF OF OWNERSHIP: The applicant for registration of an aircraft must submit proof of ownership with this application. A copy of the bill of sale for the aircraft or kit is usually sufficient proof. If the applicant did not purchase the aircraft from the last registered owner, the applicant must submit conveyances completing the chain of ownership from the last registered owner to the applicant. If the aircraft was built from parts (amateur-built), a notarized affidavit describing the aircraft and stating that it was built from parts should be submitted as proof of ownership instead of a bill of sale.

REGISTRATION NUMBERS: The registration numbers will consist of two numbers followed by three letters. The first number will be 1, the second number will be 0 through 9. The letters I and O are not to be used. Certain combinations of letters and numbers used for distress purposes will not be used in a registration number. These combinations are: Any three letter combinations beginning with the letter Q, any number with the three letters DDD, TTT, XXX, YYY and PAN. Registration numbers will be randomly assigned unless a special number is requested. An additional fee is charged for requested numbers.

FEES: The registration fee is $15. Requests for special numbers require an additional $10 fee. These fees include a registration card, identification labels, national registry and mailings of safety information. Six inch characters required for aircraft marking are not supplied.

DURATION OF REGISTRATION: The aircraft registration certificate is valid for two years or until one of the following occurs:

1. Sale of aircraft;
2. Destruction of the aircraft;
3. Death of registered owner.

If any of these events occurs, the registration may be transfered to the new owner, or will be no longer valid and must be returned to the Air Safety Foundation within thirty days and all registration markings removed from the aircraft.

Complete all applicable items on the form, attach proof of ownership and the proper fee, and mail. Please allow four weeks for processing.

Unless otherwise noted all questions pertaining to ultralight flying only over the previous two years:

Pilot time hours Cross-Country hours

Pilot time previous 6 months hours

Aircraft normally used 1)

2)

Do you own an ultralight? ☐ yes ☐ no

Type

How many flying sites or airports have you flown from?

Where do you normally fly from?
☐ Airport ☐ Flightpark ☐ Farm ☐ Other

Where do you store your aircraft?
☐ Hanger ☐ Garage ☐ Barn ☐ Other

AOPA AIR SAFETY FOUNDATION
421 Aviation Way
P. O. Box 865
Frederick, Maryland 21701

Appendix E

REGION DEALERS - ULTRALIGHTS

	Dealer Name	Company Represented
1.	Chuck Adams	Cobra, Advanced Aviation
2.	Mike Eaton	Cascade Ultralight California
3.	Larry Faast	Eipper Aircraft
4.	Bill Jenner	Eipper Aircraft
5.	Tim Warren	Mitchell
6.	Andy Gold	Pioneer International Corporation
7.	Jerry Branson	Pteradactyl
8.	Dave Martin	Ultraflight Sales
9.	Duke Prichard	Weedhopper West
10.	Lauren Ellsworth	Ultimate Hi Bennett Prike
11.	————	Challenger Ultralight
12.	————	Victor Ultralight
13.	Ben Curatola	Phantom Ultralight

Appendix F

It is the intention of this document to provide standardized criteria for the development of ultralight vehicle facilities within the boundaries of each political subdivision in the region. The document has been prepared recognizing that ultralight vehicle operations are presently considered by the Federal Aviation Administration (FAA) to be self-regulated, that ultralight vehicles are not defined as aircraft by the FAA, nor by the State of California, and that the compatible land use of ultralight vehicle facilities will not be reviewed by the San Diego Association of Governments (SANDAG) acting as the region's Airport Land Use Commission (ALUC). This document is also prepared as a guide to local law enforcement agencies to regulate ultralight vehicle operations within their jurisdictions.

The model ordinance may be used as a guide for developing ultralight vehicle facilities ordinances within the region in anticipation of the growth of the ultralight vehicle industry. The blank spaces should be filled in with appropriate data as noted at the end of this document.

MODEL ULTRALIGHT VEHICLE ORDINANCE
Ordinance Number ___

AN ORDINANCE OF THE ___(1)___, CALIFORNIA, PROVIDING FOR THE ISSUANCE OF CONDITIONAL USE PERMITS FOR ULTRALIGHT VEHICLE LANDING FACILITIES AND PROVIDING FOR THE REGULATION OF ULTRALIGHT VEHICLES.

The ___(2)___ of the ___(3)___ does ordain as follows:

Section 1. Citation of Ordinance

This ordinance may be cited as the ___(1)___ Ultralight Vehicle Ordinance.

Section 2. Rules of Construction

This Ordinance shall be construed liberally in order to effectuate its purposes. Unless otherwise specifically prescribed in this Ordinance, the following provisions shall govern its interpretation and construction:

(a) As used in this Ordinance, the masculine, feminine, or neuter gender, the singular or plural number, and the present or future tense, shall each be deemed to include the others whenever the context so indicates;

(b) Time is of the essence in this Ordinance. No person shall be relieved of his obligation to comply promptly with any provision of this Ordinance by any failure of ___(3)___ to enforce prompt compliance with any of its provisions;

(c) Any right or power conferred, or duty imposed upon any officer, employee, department or board of ___(3)___ is subject to transfer by operation of law to any other officer, employee, department, or board of ___(3)___;

(d) No person shall have any recourse whatsoever against ___(3)___ for any loss, costs, expense or damage arising out of any provision or requirement of this Ordinance or the enforcement thereof; and

(e) This Ordinance does not relieve any person of any requirement of the (3) Charter, or any ordinance, rule, regulation or specification of (3).

Section 3. Definitions

Whenever used in this Ordinance, the following words or phrases shall mean:

(a) "___(3)___" shall mean ___(1)___ a municipal corporation in the State of California;

(b) "___(4)___" shall mean the ___(2)___ of ___(3)___;

(c) "___(5)___" shall mean the ___(5)___ of ___(3)___ as that office is defined in the ___(3)___ Charter and any officer or employee of ___(3)___ appointed by the ___(5)___ to act for him;

(d) "Airports Director" shall mean the director of the airports department of (3) and any officer, agent or employee of ___(3)___ appointed to act for him;

(e) "Ultralight Vehicle" shall mean a vehicle that is defined and described in Federal Aviation Regulation (FAR), Part 103, promulgated by the United States Government, Department of Transportation (DOT), Federal Aviation Administration (FAA), as that regulation is presently written or as it may be amended;

(f) "Airport" shall mean any area of land or water which is used, or intended for use, for the landing and take-off of aircraft, and any appurtenant areas which are used, or intended for use for airport buildings or other facilities or rights-of-way, and all airport buildings and facilities located thereon. Ultralight Vehicle Landing Facilities shall not be considered Airports for purposes of this Ordinance;

(g) "Approach-Departure Path" shall mean the flight track of an ultralight vehicle as it approaches or departs from the ultralight vehicle facility's designated take-off and landing area;

(h) "Helicopter" shall mean a heavier-than-air flying vehicle that can take-off and land vertically or near vertically;

(i) "Ultralight Vehicle Landing Facility" shall mean an area of land or water used or intended to be used for the take-off and landing of ultralight vehicles, which specifically includes the facilities and markings necessary for the area to be used by the public in the event such use is permitted, including its buildings and facilities, if any;

(j) "Public Airport" shall mean any airport which offers the use of its facilities by the public in general without prior notice and without specific invitation or clearance, or any airport owned by a public entity, including federal, state and local government, or any agency of them, and districts and joint powers agencies. An airport owner may discriminate against use by a size or type of aircraft or helicopter for which the facilities are not adequate, without altering the status of the airport as public;

(k) "Private Airport" shall mean any airport not owned by a public entity, which allows use of its facilities only by the owner and his invitees;

(l) "Take-off and Landing Area" shall mean that area of the ultralight vehicle facility where the ultralight vehicle actually lands and takes-off, and includes the runway area; and

(m) "Taxiway" shall mean a surface pathway used to taxi an aircraft, an ultralight vehicle or used to hover taxi or ground taxi helicopters to and from the take-off and landing area.

Section 4. Site Selection Criteria

An ultralight vehicle landing facility site shall meet the following site location criteria:

(a) The proposed facilities shall be located on a site which ensures that such use will not adversely affect the adjoining land uses and the growth and development of the area in which it is proposed to be located.

(b) The sites shall be so located to ensure that as much as possible, the approach and departure paths leading to and from the ultralight vehicle landing facility are over terrain which affords emergency landing areas such as open parks, golf courses, highways, freeways and open land. Approach and departure paths over residential development, schools, open assembly of people, playgrounds or highly populated areas are prohibited;

(c) The size and shape of the site proposed for use should be adequate to allow full development of the proposed use in a manner not detrimental to the particular area nor to its peace, health, safety and general welfare; and

(d) The site shall be served by streets and highways adequate in width and pavement type to carry the quantity and kind of traffic generated by this use.

(e) No ultralight vehicle may land or depart in any area within 2,000', measured by air line, of the boundary of any public or private school maintaining kindergarten classes or any classes in grades 1 through 12.

Section 5. Ultralight Vehicle Landing Facilities Development Standards

An ultralight vehicle landing facility shall meet the following site development standards.

(a) The take-off and landing area shall be a rectangle at least 1,000' by 250' or a circle the diameter of which is 1,000'.

(b) The peripheral area is intended as a safety area surrounding the take-off and landing area; it shall be a circle at least 2,800' in diameter with its center located in the geometric center of the take-off and landing area, and free of obstructions to the approach and departure paths to the take-off and landing area.

(c) Approach and departure paths to the site shall be governed in accordance with Federal Aviation Regulations (FAR) Part 77, particularly where applicable to Visual Runways.

(d) A wind indicating device shall be provided and maintained at all times in a workable condition.

(e) The ultralight vehicle landing facilities shall be marked with the letter "U", the height of which will be a minimum of 10' and the width of which shall be a minimum of 5'6". The stroke width of the letter shall be 15". The letter shall be placed on the facility with the top of the letter pointing to magnetic north and shall be of a contrasting color from the background on which it is placed.

(f) Surfacing of the ultralight vehicle landing facility shall be so as to minimize the blowing of any dust, dirt or other objectional material onto neighboring property.

(g) The edge of a take-off and landing area shall be no closer than 400' from any property line; any administrative, operations or maintenance buildings erected on an ultralight vehicle landing facility shall be located not closer than 25' from any property line; location and setbacks for buildings storing combustibles shall be approved by the ___(3)___ fire marshal;

(h) The exterior edge of the obstruction free area shall be fenced or otherwise protected to keep unauthorized persons out of this area; fences shall be a minimum of 6' in height;

(i) Facilities located on the water shall be marked in accordance with U.S. Coast Guard approved standards;

(j) Adequate portable fire extinguishers shall be provided as determined by the ___(3)___ fire marshal;

(k) The ultralight vehicle landing facility property owner shall provide to (1) a certificate of insurance evidencing third party, premises liability insurance covering use of the property by ultralight vehicles, in a minimum amount of $500,000.00 single limit for bodily injury and property damage;

(l) The property owner of the property on which an ultralight vehicle landing facility is located must assure (1), in writing, that he shall require all owners and operators of ultralight vehicles to meet, as a minimum, all of the following requirements:

(1) The operator of an ultralight vehicle in command of the flight of the ultralight vehicle shall be registered with the AOPA Air Safety Foundation (ASF) as an "Ultralight Pilot" or equivalent, or have a pilot's license issued by the Federal Aviation Administration (FAA).

(2) The ultralight vehicle shall be registered with the AOPA Air Safety Foundation (ASF) and its owner shall mark the ultralight vehicle in accordance with the program;

(3) The ultralight vehicle owner shall provide evidence that the ultralight vehicle is airworthy by a showing that the ultralight vehicle meets the airworthiness requirements of the Powered Ultralight Manufacturer's Association (PUMA), the National Association of Sport Aircraft Designers (NASAD), or a written certification that the ultralight vehicle is airworthy, issued by the manufacturer or builder of the ultralight vehicle;

(4) The ultralight vehicle owner shall provide a certificate evidencing that the ultralight vehicle is insured for third party bodily injury and property damage liability coverage in a minimum amount of $250,000.00 single limit;

(m) The planning commission may impose such additional conditions, as it deems necessary and desirable, to protect the public health, safety and welfare in the issuance of a conditional use permit.

Section 6. Site Operation Standards

All ultralight vehicle landing facilities established in the (3) shall obtain a Conditional Use Permit from (1) and shall meet the following site operations standards:

(a) The hours of operation shall be limited to the periods between sunrise and sunset daily, except as provided for in Federal Aviation Regulation, Part 103.11(b).

(b) Emergency fire fighting equipment shall be provided as deemed necessary and adequate by the (3) fire marshal.

(c) Emergency communications shall be available between the ultralight vehicle landing facility and the fire department communications center. These facilities may consist of a standard fire alarm or a direct line to a telephone manned 24 hours a day;

(d) Fueling and maintenance facilities shall be subject to ___(3)___ fire marshal approval;

(e) All trash receptacle areas in the vicinity of ultralight vehicle landing facilities shall be enclosed by masonry walls 6' in height and a solid wooden gate of equal height. Trash bins and receptacles shall have lids to prevent blowing of litter and debris;

(f) A wind indicating device shall be provided and maintained on the site at all times in workable condition;

(g) Any ultralight vehicle take-offs or landings within 3 miles of any airport manned by an FAA control tower shall maintain two-way radio contact with the airport's traffic control tower;

(h) The requirements of this Ordinance shall not apply to the operation of ultralight vehicles in emergency situations when a take-off or landing is necessary to protect life or property. Such operations shall be carried out in a prudent manner with due regard for safety; however, the ultralight vehicle owner or operator may be liable for damage to persons or property resulting from the emergency operation.

Section 7. Automatic Suspension and Revocation of Conditional Use Permit

When, in the opinion of the ___(5)___, the continued operation of an ultralight vehicle landing facility is a serious danger to the public health, safety or welfare, the ___(5)___ may suspend the Conditional Use Permit to operate such facility without complying with the hearing procedure provided by this Ordinance. The permit holder is, however, entitled to the appeal procedure provided by this Ordinance.

Section 8. Grounds for Suspension or Revocation

The ___(5)___ may suspend or revoke a Conditional Use Permit to operate an ultralight vehicle landing facility whenever:

(a) There is a violation of these sections or subsections and/or of any State or federal law or regulation pertaining thereto;

(b) There has been a material change of circumstances, since the granting of the Conditional Use Permit, which would have precluded issuance if such changed circumstances had been in existence at the time of application; or

(c) Conditions of the Conditional Use Permit have been violated.

Section 9. Hearing Procedures

Before denying, suspending or revoking a Conditional Use Permit issued pursuant to this Ordinance, the ___(5)___ shall call a hearing as provided in this Ordinance, except as provided in Section 7. of this Ordinance.

Section 10. Notice of Hearing

Upon the calling of a hearing pursuant to Section 9., the ___(5)___ shall cause a written notice of hearing specifying the time and place of hearing and the reason for such suspension or revocation to be served personally or by mail upon the permit holder. Such service shall be made at least ten (10) days before the hearing. The day of mailing shall be deemed the first of the ten days for determining the ten day period.

Section 11. Hearing

At the time and place which is appointed for the hearing, the ___(5)___ shall hear the parties and take evidence.

Section 12. Rules of Evidence

The hearing need not be conducted according to the statutory or common law rules of evidence. Any relevant evidence may be admitted and considered by the ___(5)___ if it is the sort of evidence on which responsible persons are accustomed to rely in the conduct of serious affairs. Objections to evidence shall be noted and the ruling given by the ___(5)___.

Section 13. Decision

At the conclusion of the hearing, the ___(5)___ shall make an order. Such order can:

(a) Dismiss the charges;

(b) Suspend or revoke the Conditional Use Permit; or

(c) Affix such other conditional and probationary orders as may be proper for the enforcement of this Ordinance.

A copy of the decision shall be furnished to the permit holder who shall be informed of his right to appeal pursuant to this Ordinance.

Section 14. Stay of Suspension or Revocation

The effect of a decision of the ___(5)___ shall be stayed while an appeal to ___(4)___ is pending or until the time for filing such appeal has expired, except as provided in Section 7. of this Ordinance.

Section 15. Commencement of Appellate Procedure

Any person affected by an action taken or purported to be taken under authority of this Ordinance, or by a failure to act in conformity with this Ordinance, may appeal such action or failure to act by filing within ten (10) days of such act or failure, an appellate petition with the ___(3)___ Clerk on a form furnished by him.

Section 16. Appellate Hearing

The ___(3)___ Clerk shall set the appeal for public hearing. Notice thereof shall be published in a newspaper of general circulation at least once, ten (10) days prior to the date of the hearing, which shall be within thirty (30) days after appellant files his appellate petition. At the conclusion of the hearing, ___(4)___ shall, by resolution, grant or deny the appeal. When the appellate petition is filed with the ___(3)___ Clerk, any action which is the subject of appeal shall be stayed until ___(4)___ decides the appeal, except as provided in Section 7. of this Ordinance. If ___(4)___ grants the appeal, ___(4)___ shall direct the appropriate action of ___(5)___. If ___(4)___ denies the appeal, the action of the ___(5)___ becomes effective immediately upon denial.

Section 17. Constitutionality

If any section, subsection, sentence, clause or phrase of this Ordinance is for any reason held to be invalid, such decision shall not affect the validity of the remaining portions of this Ordinance. The ___(4)___ hereby declares that it would have adopted the Ordinance and each section, subsection, sentence, clause or phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases may be declared invalid.

Notes:

(1) The name of the political subdivision enacting the ordinance (e.g. City of San Marcos)

(2) The designated group controlling the affairs of the political subdivision (e.g. City Council)

(3) The designation of the political entity (e.g. City)

(4) The short description of the designated group controlling the affairs of the political subdivision (e.g. Council)

(5) The designated administrative head of the political subdivision (e.g. City Manager)

INSTRUCTIONS

Appendix G

NOTICE OF LANDING AREA PROPOSAL

(Use Back of This Sheet as Worksheet)

As Used Herein, The Term "Airport" Means
Any Landing Area such as Airport, Heliport, Seaplane Base, Ultralight Flightpark, or Balloonport.

Federal Aviation Regulations Part 157 requires that each person who intends to do any of the following shall notify the Administrator:

1. Construct or otherwise establish a new airport or activate an airport.
2. Construct, realign, alter or activate any runway, landing strip or associated taxiway.
3. Deactivate, discontinue using or abandon an airport, runway, landing strip or associated taxiway for a period of one year or more.
4. Change the status of an airport from personal use (exclusive use by the owner), or private use (use by the owner or other persons authorized by the owner) to an airport open to the public.

The notice required shall be made by submitting this form in triplicate to the nearest Federal Aviation Administration's Airports District Office or Regional Office.

Section 901 of the Federal Aviation Act of 1958, as amended, provides that any person who violates a rule, regulation or order issued under Title III of this Act shall be subject to a civil penalty not to exceed $1,000 for each violation.

General Instructions

1. For any project falling in categories 1, 2 or 4 above, complete all appropriate sections. If the project is, or will be, associated with a personal or private-use airport located more than 5 nautical miles from any airport open to the public and more than 20NM from an IFR airport (an airport for which an instrument approach procedure has been authorized) only sections A, B, D, F and I need be filled out.
2. For deactivation or abandonment (category 3 above), complete sections A and I only.
3. Express all bearings as magnetic and mileages as nautical.
4. **Please Print or Type All Items and Be Sure All Copies are Legible.**

Section A—Self-explanatory.

Section B—If the type of use is to be by the owner only, check "personal." If also used by persons authorized by the owner, check "private." If the airport is open to the public, check "public." If the airport is owned by a state or state agency; a municipality or other political subdivision; or a tax supported organization, check "public" ownership. Otherwise indicate that the type of ownership is "private." If necessary, use a separate sheet of paper to describe changes or alterations.

Section C—Airport or seaplane base: List VFR airports and heliports within 5NM, and IFR airports within 20NM. Heliports: List VFR airports and heliports within 3NM and IFR airports within 10NM.

Section D—Attach U.S. Geological Survey quadrangle map or equivalent. Plot locations of facility to the nearest second, runway alignments, associated taxiways or sealane alignments. When appropriate, use city map for heliports.

Section E—List and plot on quadrangle map or equivalent any obstructions. Airport or seaplane base: Within 3NM radius for VFR airports and with 5NM for IFR airports. Heliports: Within 5,000 feet of the perimeter of the heliport landing and takeoff area.

Section F—Self-explanatory.

Section G—List schools, churches and residential communities within a 2NM radius for airports and within a 1NM for heliports.

Section H—Self-explanatory.

NOTE: Additional copies of FAA Form 7480-1 may be obtained from the nearest FAA Airports District Office or Regional Office.

Notification to the FAA does not waive the requirements of any other government agency.

ADDRESSES OF THE REGIONAL OFFICES

Alaskan Region
AK

Alaskan Regional Office
Airports Division AAL-600
701 "C" Street
Anchorage, AK 99513
Mail Address
701 "C" Street, Box 14
Anchorage, AK 99513
Tele 907-271-5438

Central Region
NE, IA, MO, KS

Central Regional Office
Airports Division ACE-600
601 East 12th Street
Kansas City, MO 64106
Tel. 816-374-5278

Western-Pacific Region
HI, CA, NV, AZ, GU

Western-Pacific Regional Office
Airports Division AWP-600
15000 Aviation Boulevard
Hawthorne, CA 90260
Mail Address
AWP-600
P.O. Box 92007
Worldway Postal Center
Los Angeles, CA 90009
Tel. 213-536-6182

Southern Region
KY, TN, NC, SC, GA, AL, MS, FL, VI, PR

Southern Regional Office
Airports Division ASO-600
3400 Norman Berry Drive
East Point, GA 30344
Mail Address
P.O. Box 20636
Atlanta, GA 30320
Tel. 404-763-7288

Northwest Mountain Region
WA, OR, MT, ID, WY, UT, CO

Northwest Mountain Regional Office
Airports Division ANM-600
17900 Pacific Hwy. South
C-68966
Seattle, WA 98168
Tel. 206-431-2600

Eastern Region
NY, PA, WV, VA, DC, MD, DE, NJ

Eastern Regional Office
Airports Division AEA-600
JFK International Airport
Federal Building
Jamaica, NY 11430
Tel. 212-917-1239

Southwest Region
NM, TX, OK, AR, LA

Southwest Regional Office
Airports Division ASW-600
4400 Blue Mound Road
Fort Worth, TX 76101
Mail Address
P.O. Box 1689
Fort Worth, TX 76101
Tel. 817-877-2600

Great Lakes Region
ND, WI, MI, SD, IL, OH, MN, IN

Great Lakes Regional Office
Airports Division AGL-600
2300 East Devon Avenue
Des Plaines, IL 60018
Tel 312-694-7458

New England Region
MA, NH, VT, RI, CT, ME

New England Regional Office
Airports Division ANE-600
12 New England Executive Park
Burlington, MA 01803
Tel. 617-273-1235

(THIS IS YOUR WORKSHEET - RETAIN AS YOUR COPY)

Form Approved OMB No. 2120-0(

US Department of Transportation
Federal Aviation Administration

NOTICE OF LANDING AREA PROPOSAL

NAME OF PROPONENT, INDIVIDUAL OR ORGANIZATION

ADDRESS *(No., Street, City, State, Zip Code)*

☐ Establishment or Activation
☐ Alteration
☐ Deactivation or Abandonment
☐ Change of Status

OF ☐ Airport ☐ Ultralight Flightpar ☐ Heliport ☐ Seaplane Base ☐ Other *(Specify)*

A. Location of Landing Area

1. NEAREST CITY OR TOWN	2. COUNTY	3. STATE	4. DISTANCE AND DIRECTION TO NEAREST CITY OR TOWN	
			Miles	Direction
5. NAME OF LANDING AREA	6. LATITUDE ° ' "	7. LONGITUDE ° ' "	8. ELEVATION	

B. Purpose

Type Use	Type Ownership	If Change of Status or Alteration, Describe Change.	Construction Dates	
			To Begin/Began	Est. Completion
☐ Public	☐ Public			
☐ Private	☐ Private			
☐ Personal				

C. Other Landing Areas

Ref. A5 Above

	Direction from Landing Area	Distance from Landing Area

D. Landing Area Data

		Existing *(If any)*			Proposed		
		Rwy #1	Rwy #2	Rwy #3	Rwy	Rwy	Rwy
1. Airport, Seaplane base, or Flightpark	Magnetic Bearing of Runway(s) or Sealane(s)						
	Length of Runway(s) or Sealane(s) in Feet						
	Width of Runway(s) or Sealane(s) in Feet						
	Type of Runway Surface *(Concrete, Asphalt, Turf, Etc.)*						
2. Heliport	Dimensions of Landing and Takeoff Area in Feet						
	Dimensions of Touchdown Area in Feet						
	Magnetic Direction of Ingress/Egress Routes						
	Type of Surface *(Turf, rooftop, etc.)*						
3. All	Description of Lighting *(If any)*				Direction of Prevailing Wind		

E. Obstructions

Type	Height Above Landing Area	Direction from Landing Area	Distance from Landing Area

F. Operational Data

1. Estimated or Actual Number Based Aircraft

Airport, Flightpark, Seaplane base	Present *(If est. indicate by letter "E")*	Anticipated 5 Yrs. Hence	Heliport	Present *(If est. indicate by letter "E")*	Anticipated 5 Yrs. Hence
Multi-Engine			Under 3500 lbs. MGW		
Single-Engine			Over 3500 lbs. MGW		
Glider					

G. Noise Considerations

Identification	Direction from Landing Area	Distance from Landing Area

2. Average Number Monthly Landings

	Present *(If est. indicate by letter "E")*	Anticipated 5 Yrs. Hence		Present *(If est. indicate by letter "E")*	Anticipated 5 Yrs. Hence
Jet			Helicopter		
Turboprop			Ultralight		
Prop			Glider		

3. Are IFR Operations Anticipated
☐ No ☐ Yes Within _____ Years Type Navaid:

H. Application for Airport Licensing

☐ Has Been Made ☐ Not Required ☐ County
☐ Will Be Made ☐ State ☐ Municipal Authority

I. CERTIFICATION: *I hereby certify that all of the above statements made by me are true and complete to the best of my knowledge.*

Name, title, *(and address if different than above)* of person filing this notice—type or print.

Signature *(In ink)*

Date of Signature

Telephone No. *(Precede with area code)*

FAA Form 7480-1 (4-83) SUPERSEDES PREVIOUS EDITION

San Diego Association of Governments

Appendix H

BOARD OF DIRECTORS

June 22, 1984

AGENDA REPORT No.: R-47

EVALUATION OF THE EFFECTS OF ULTRALIGHT ACTIVITY
ON THE SAN DIEGO REGION'S AVIATION SYSTEM

Introduction

This study relating to ultralight aircraft was funded by the Federal Aviation Administration (FAA) in an attempt to document the issues relating to ultralight aircraft including the current level of ultralight activity in the region, as well as state and local regulations. Demand for additional sport ultralight flight facilities has also been estimated and a model ordinance prepared to allow local agencies to plan for this sport's safe and coordinated growth.

At the April Board meeting aviation consultant George Coté presented the various elements of the draft study. Since that time staff has received and responded to various comments on the plan. These comments and recommended changes are reflected in the attachment.

Discussion

A powered ultralight vehicle is defined in Federal Aviation Regulations (FAR), Part 103, as a machine that is operated by a single occupant, is used for recreational or sport purposes only, weighs 254 pounds or less empty weight, has a fuel capacity not exceeding 5 U.S. gallons, and is not capable of more than 55 knots at full power or in excess of 24 knots power-off stall speed. Unpowered ultralights are commonly referred to as hang gliders.

The actions recommended in the ultralight plan would discourage the use of ultralights at general aviation airports, encourage registration and/or licensing of pilots, and require the development of airworthiness standards for the vehicles. An estimate of the future demand for separate flightparks is made and a model ordinance is offered which encourages jurisdictions to use the conditional use permit as a method to regulate the location of ultralight flightparks.

The draft ultralight report was widely circulated and underwent extensive review by members of San Diego's ultralight community, local airport operators, local jurisdictions and citizens. Based on that review, it is my

RECOMMENDATION

that the Board approve Resolution 84-117 adopting the actions in the ultralight study with modifications recommended in the attachment.

RICHARD J. HUFF
Executive Director

San Diego
ASSOCIATION OF
GOVERNMENTS

Suite 524, Security Pacific Plaza
1200 Third Avenue
San Diego, California 92101
714/236-5300

RESOLUTION

No. 84-117

ADOPTION OF THE "EVALUATION OF THE EFFECTS OF ULTRALIGHT ACTIVITY ON THE SAN DIEGO REGION'S AVIATION SYSTEM" REPORT

WHEREAS, the San Diego Association of Governments, a joint powers agency, hereinafter referred to as SANDAG, is the designated Metropolitan Planning Organization for the San Diego Region, and as such is responsible for the preparation and adoption of the Regional Transportation Plan which includes an aviation element; and

WHEREAS, the Federal Aviation Administration expressed interest in studying the growth and possible effects of ultralights on the existing aviation community; and

WHEREAS, the completed study has been reviewed by San Diego's regional aviation community, local airport operators, local jurisdictions and citizens; NOW THEREFORE

BE IT RESOLVED that the SANDAG Board of Directors hereby adopts the actions with recommended changes in the Ultralight Activity Report and incorporates this report into the Aviation Element of the Regional Transportation Plan.

PASSED AND ADOPTED this 22nd day of June, 1984.

_____
CHAIRWOMAN

ATTEST: _____
SECRETARY

MEMBER AGENCIES: Cities of Carlsbad, Chula Vista, Coronado, Del Mar, El Cajon, Escondido, Imperial Beach, La Mesa, Lemon Grove, National City, Oceanside, Poway, San Diego, San Marcos, Santee and Vista ADVISORY MEMBERS: California Department of Transportation and Tijuana/Baja California Norte

ATTACHMENT

DRAFT ULTRALIGHT STUDY COMMENTS

Comment: City of San Diego **Subject: Noise**

Neither the operating rules established in FAR Part 103 nor the proposed Model Ordinance appear likely to control adequately the potential noise impacts from ultralights, except in limited circumstances (e.g. over congested areas or at an ultralight facility). Other areas potentially subject to sustained overflights are afforded no protection from this inherently noisy activity. Insofar as this could result in a significant regulatory problem for local agencies, we would appreciate any guidance you could offer. Specifically, do FAA regulations preempt local agency regulation of the noise effects of in-flight ultralights? If not, what regulatory mechanism is recommended: application of a general municipal noise ordinance, specific condition in the CUP granted for an ultralight facility, designation of prohibited or restricted operating areas pursuant to FAR 103.19, or some other means?

Recommendation:

Expand discussion on noise-related ultralight patterns and encourage local jurisdictions to concentrate on the use of conditional use permits to control noise problems.

Discussion:

The FAA preempts the operation of all flying vehicles in the navigable airspace, including ultralights. However, FAR Part 103, the FAA's guidelines on ultralights, do not address potential noise problems. Furthermore, since the State of California does not define an ultralight as an aircraft, these vehicles are not covered by California aircraft noise law.

This leaves the issue of how to deal with ultralight noise problems predominantly with local jurisdictions. Attempts by local jurisdictions in other parts of the country to use "nuisance" or "disturbing the peace" types of ordinances have met with limited success. In fact, one such noise ordinance relating to helicopters in Texas was struck down because it created an inequity by singling out one problem area (i.e., helicopters) among many other problem areas relating to noise issues.

Therefore, staff feels the strongest and maybe the only effective tool available to local jurisdictions in this issue is the use of conditional use permits. The local jurisdiction can prohibit ultralight operations within certain land uses (i.e., high density residential) and, on that basis, control noise. The jurisdiction may also revoke a conditional use permit if the ultralight facility is proven to be a nuisance.

Comment: City of San Diego **Subject: Land Use Compatibility**

The general site selection criteria presented in Section 4 of the Model Ordinance seem appropriate. However, we strongly urge deletion of the attempted (but

inadequate) land use compatibility classification presented in subsection (a) on page 103. Since there does not appear to be a definitive or even generally accepted classification based on objective criteria, we believe this should be left to the determination of the local land use agency.

Subsection (a) is as follows:

> "An ultralight vehicle land facility site shall meet the following site location criteria:
>
> (a) The proposed facilities shall be located on a site which ensure that such use will not adversely affect the adjoining land uses and the growth and development of the area in which it is proposed to be located; space used for natural resources, agriculture, and certain recreational land uses appear closely compatible; residential, low density with one dwelling unit per two acres and open space for tourist recreation and commercial use may be compatible land uses; residential low density and areas of people assembly such as churches, open air auditoriums, and picnic areas are normally incompatible land uses; residential high density and mobile home uses are clearly incompatible."

Recommendation:

Drop discussion of compatible land uses which begins after the semi-colon in the third line (i.e., everything that is underlined).

Discussion:

Since the discussion on compatible versus incompatible land uses is to a large degree somewhat subjective, each jurisdiction should decide for itself what is to be included in this section. The purpose of a model ordinance is simply to suggest a degree of format and structure to be used in resolving a problem.

Comment: City of San Diego **Subject: ALUC**

Reference is made on pages 23 and 101 to the "approval" of airports and ultralight facilities by the Airport Land Use Commission. Insofar as the ALUC Rules and Regulations only allow for the ALUC to review and make recommendations regarding such facilities (Section 5.1), we suggest the report be revised accordingly.

Reference to page 23: "Since the State of California requires all airport sites to obtain approval through their site permit process, any ultralight facility in San Diego County would, theoretically, require State approval, along with the approval of the FAA, the Airport Land Use Commission (ALUC), and a conditional use permit from the County, approved by the Board of Supervisors. However, the State of California and the FAA do not recognize the ultralight as an aircraft, nor their landing facilities as an airport, and thus the means of control available to the County is through the conditional use permit process."

Reference to page 101: "The document has been prepared recognizing that ultralight vehicle operations are presently considered by the Federal Aviation Adminis-

tration (FAA) to be self-regulated, that ultralight vehicles are not defined as aircraft by the FAA, nor by the State of California, and that the compatible land use of ultralight vehicle facilities will not be reviewed and approved by the San Diego Association of Governments (SANDAG) acting as the region's Airport Land Use Commission (ALUC).

Recommendation:

Change reference to ALUC's power of approval in both paragraphs to ALUC's power of review.

Discussion:

The City is correct in stating the ALUC's role is that of review and making recommendations.

Comment: City of San Diego **Subject: Definitions**

For purposes of consistency, we suggest that the definitions presented in Section 3 of the Model Ordinance (pages 102-103) follow those contained in the ALUC Rules and Regulations.

Recommendation:

Include in the ALUC rules and regulations the definition of an ultralight and ultralight vehicle land facility as well as making consistent other definitions.

Discussion:

Definitions in the ALUC rules and regulations and the model ordinance should be consistent.

Comment: AOPA **Subject: Ultralights at GA Airports**

Please reconsider the prohibition of ultralights from existing general aviation facilities. Airports such as Ramona, Palomar, Oceanside and Brown are seemingly ideal for the joint use of ultralight and general aviation aircrft. Hundreds of existing airports across the country, some that are more active than those just mentioned, have been successfully operating on an integrated basis for years now. The secret to the successful operation is an understanding between all parties concerning the integrated operation and a line of communication kept open between the several parties to make the system work. Please reconsider this feature using brochures we have developed concerning the operation of ultralights at existing airports.

Recommendation:

No change recommended.

Discussion:

The report does not recommend prohibition of ultralights from general aviation facilities. Action #1, page 7, simply would require that an ultralight be registered, the operator be licensed, and the vehicle be certified airworthy if it is to operate on a general aviation facility. These are the same standards set for other general aviation aircraft.

It is staff's belief that there are strong safety and operational reasons for requiring this. All other ultralights (i.e., certified but not licensed by the FAA) should be operated out of separate flightpark facilities.

Comment: AOPA **Subject: Airworthiness Standards**

It may be difficult to impose the restriction that vehicles meet either the PUMA or NASAD standards for at least a year or eighteen months. The PUMA standards were just approved by the FAA one month ago. It will be some time before substantial members of manufacturers can comply with these standards. Also note that the NASAD standards have not received recognition from the FAA and therefore may not be appropriate to include in your study.

Recommendation:

Modify language in report to note that there will need to be one year to 18 months time between approval of airworthiness standards and actual use by the industry. Also note that NASAD standards have not yet received FAA recognition.

Discussion:

It is staff's belief that airworthiness standards used and adopted by the ultralight industry are imperative for the growth and safety of the sport. They should be implemented as expediently as possible.

Comment: AOPA **Subject: Zoning**

Section 3 - Definitions. We used the term "flightpark" instead of "ultralight vehicle land facility". Since we developed this term several years ago, it has gained common usage and is unique in defining a location where ultralight activity only occurs.

Recommendation: Change all references of ultralight vehicle landing facilities to "flightparks".

Discussion: Agree; traditional use of the term "flightpark" will make for better communication.

Comment: AOPA **Subject: Site Selection Criteria**

The site location criteria appears to be a bit over-restrictive. The low density area defined as one dwelling per two acres will make it very difficult to find an ideal site for ultralights. Perhaps this particular area could be made less definite, leaving the final decision up to the local zoning board. Additionally, the require-

ment that no ultralight may take off or land within 5000 feet from the boundary of a public school seems overly-restrictive, also. Flight patterns and other consideration should be looked at prior to making such a ban.

Recommendation: Drop definition of "low density" and number of feet from a school from this ordinance.

Discussion: As a model ordinance, decision on what is considered "low density" and what is considered a safe distance from a school will have to be made at the local jurisdictional level.

Comment: AOPA **Subject: Landing Facilities**

The 2800 foot diameter clear circle will make it very difficult to find suitable land meeting these requirements. Also, Part 77 standards would be excessively restrictive if applied to ultralight operations. Some of their unique and operational capabilities preclude the necessity for using Part 77. The letter "U" to mark the facility appears to be nonstandard in view of the fact that several years ago a unique segmented circle symbol was developed to denote ultralight facilities. This unique symbol is included in our "Guidelines for the Operations of Ultralight Vehicles at Existing Airports". Finally, the requirement for a six-foot fence is excessive in that there is a great ecohomic burden associated with this.

Recommendation:

Use segmented circle symbol for ultralights as developed in "Guidelines for Operations of Ultralight Vehicles at Existing Airports." Do not modify other standards indicated.

Discussion:

The discussion of the typical ultralight vehicle land facility or "flightpark" is meant to depict the "optimal" or best case standard for such a facility. Not all facilities can be built to this standard for financial or other reasons, but nevertheless the description of the optimal facility should remain.

Comment: AOPA **Subject: Site Operation**

The section that states "Emergency firefighting equipment shall be provided as deemed necessary and adequate" by the fire marshal leaves too much to the imagination of the local fire marshal. We would prefer to either have more specific recommendations or to dilute that statement. Also the requirement to have two-way radio contct between ultralight vehicle and the tower of an airport located within three miles is excessive. The FAA has been quite content, in the past, to allow operations of this sort under a letter of agreement.

Recommendation:

Drop language on the requirement of an ultralight vehicle to have a two-way radio within three miles of an airport, and insert the requirement for a letter of agreement as recommended by FAA. Also, modify language on emergency firefighting equipment to read: "Emergency firefighting equipment shall be provided."

Discussion:

Since the FAA has concluded that a letter of agreement is adequate under the above stated conditions, this report should so reflect that. The level of emergency fire fighting equipment should be negotiated between flightpark operator and the local jurisdiction.

Comment: AOPA **Subject: Revocation of Use Permit**

Section 8 - Grounds for Suspension or Revocation. While I am not a land use planner or a lawyer, it seems to be that subparagraph (b) has a "catch-22" involved in it. It appears that this would cover the circumstance where a housing development is started adjacent to the ultralight facility, necessitating a review of the conditional land use permit. This just seems a bit unfair.

Recommendation:

No change recommended.

Discussion:

A conditional use permit is just that — conditional. The discretion should be left up to the local jurisdiction to revoke a special use permit for flightparks as the nature of the surrounding area changes (i.e., urbanizes).

Comment: AOPA **Subject: Facility Provision and Maintenance**

Finally, it seems that adequate provisions have been made to protect the citizenry from the ultralights but there has been little placed in these recommendations that will do the reverse. It is easy for the majority of the citizenry surrounding an ultralight site to exert undue influence upon that site if everything at the site is being conducted in a safe and responsible manner. Therefore, it seems to me there should be some language built into this ordinance that would protect the minority from the majority.

Recommendation:

No changes recommended.

Discussion

Disagree, the report in its recommendations section on pages 7 through 9 has listed various actions to encourage the safe and proper growth of the sport of ultralight flying. In particular, it recommends the FAA provide matching funds to local governments to construct flightparks (action #6).

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