



880 St-Fereol
Phone 450 452-4772
Les Cedres www.lamac.ca
Qc. J7T 1N3 Fax 450 452-2694

A Proposal to Transport Canada

**From the
Light Aircraft Manufacturers Association of Canada**

For

A New Canadian Aircraft Category

December 2006 (amended weight and seating capacity)

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SUMMARY

This is a proposal for the creation of a new category aircraft in Canada. LAMAC suggests that the new category be called a “Personal Aircraft”. This proposal fulfills the following objectives:

- A completion of the 1996 Recreational Aviation Review Project to create a new “Sport plane” category based on the current advanced ultra-light aeroplane standards. It was proposed that this new category be authorized for use in conventional flying schools through an industry-managed program.
- A response to the need for Canadian Light Aircraft Manufacturers to be able to produce fully manufactured aircraft without the financially onerous burden of the FAR Part 23 certification, or adherence to the 51% rule governing Amateur Built Aircraft.
- To provide flight training units and the aviation community with safe, well built aircraft at a competitive price, and create an alternative to the aging fleet of certified aircraft.
- A response to the creation of the Light Sport Aircraft in the USA, and to provide Canadian Manufacturers with the ability to penetrate that market.
- To solidify Canada’s position as a leader and innovator in the development of International Aviation.

LAMAC is adopting a Business Management approach to the creation of the Personal Aircraft. This proposal encompasses all aspects of the design, manufacture, testing and continuing airworthiness of the aircraft, including:

- The development of design and performance standards,
- The development of standards and practices for issuance of Certificates to Manufacture, including Quality Assurance program,
- The development of the standards and practices for issuance of a Personal Air Operator Certificate
- The creation of Flight Safety Management Program for air operations,
- The development of standards and practices for Continuing Airworthiness and Maintenance programs
- The creation of an Independent Audit Organization.

The key step in the development of this project will be the implementation of five core processes that will focus and drive the creation of the Personal Aircraft. This process will ensure a streamlined, efficient, and transparent method of achieving our goal.

1. An Evaluation of the current trends, needs, strengths and weakness of the industry that will drive a dynamic response for change.
2. Identification of the major areas of the industry that are targeted for change or improvement.
3. The Initiation of a Risk Management Process to assess the benefits and risks associated with the proposal. Stakeholder consultation will be an important part of this step
4. The Implementation of an action plan for the full development of the project
5. An effective Tracking mechanism to benchmark achievements against set goals, and serve as a data source for future evaluation.

The History of Recreational Aviation in Canada

The Early Days

Canadian recreational aviation began in 1908 with the formation of the Aerial Experiment Association leading to the first flight of the Silver Dart in Canada on February 23, 1909 under the control of J.D. McCurdy. Before a crowd of astonished onlookers, McCurdy took off and piloted the plane for about half a kilometre along the shoreline of Nova Scotia before making a smooth landing. From this beginning, recreational aviation was to spread across the country and into all walks of life.

As aviation grew and the complexity and performance of aircraft increased, regulations to protect public safety became essential. Increasing regulation of both aircraft and aircrew added progressively to the cost of manufacturing, selling, owning and operating aircraft. The international nature of aviation made close coordination and compatibility of regulations around the world a practical necessity, and this too added to the industry's overhead. By the 1980s, the cost and complexity of recreational aviation in certified aircraft had become so onerous that few people could justify the time and expense to engage in flying for purely recreational purposes, and recreational aviation went into decline in most parts of the world, including Canada. At the same time, ultra-light aircraft that flew below the radar of regulation and amateur-built aircraft were growing in number and the cost of recreational aviation returned to a more practical level.

A New Recreational Aviation Policy in Canada

From the early days, Canada has been a leader in recreational aviation. The Canadian Advanced Ultra-light Aeroplane category established the rules for a safe factory-built two-seat airplane subject only to the essential minimum of regulatory overhead. This came about through the combined efforts of Transport Canada and the recreational aviation community in the early 1990s. In 1996, Transport Canada and the recreational aviation community again worked together to develop a new Recreational Aviation Policy. One of the main aims of the Recreational Aviation Review Project was the establishment of "one voice" to guide future decisions about recreational aviation in Canada.

Recreational Aviation was defined as any aeronautical activity carried out primarily for enjoyment, on a "not for reward" basis. The decision was made that recreational aviation would be managed as a partnership between the recreational aviation community and Transport Canada, Civil Aviation, and this partnership would embody commitments to the:

- Sharing of safety responsibilities, including the ongoing monitoring of safety standards.
- Promotion of safety through training programs for recreational aviation pilots and flight instructors.
- Delivery of services required by the aviation community in the most effective manner.
- Consultation with stakeholders to discuss problems, share successes and suggest improvements for the future.

A number of recommendations came out of the Recreational Aviation Review Project:

- Create a new Pilot Permit – Given the nature of recreational flying, a new Recreational Pilot Permit (known as the "RPP") was created to make flying more affordable and accessible
- Allow IFR Flight for Amateur-Built Aeroplanes – Recognizing the evolution of amateur-built aircraft and their increased capability to fly higher and faster, Instrument Flight Rules (IFR) became available to pilots of suitably equipped amateur-built aircraft.
- Ease the requirements for aerobatics in amateur-built aeroplanes – A new policy requiring a "loop and roll" test by the owner replaced the costly engineering analysis previously required for amateur-built aeroplanes wishing to be used for aerobatics.
- Redefine ultra-lights – An increase in the maximum allowable take-off weight to 1200 lbs, and the registration of all ultra-light aircraft with "C-Ixxx" registration marks.

- Allow holders of an Ultra-light Pilot Permit to carry a passenger
- CREATE A NEW “SPORT PLANE” CATEGORY – The current advanced ultra-light aeroplane standards would form the basis for developing a new category of recreational aircraft. This proposed new category would be authorized for use in conventional flying schools through an industry-managed approval program, which would encompass design, production and maintenance standards.

With the exception of final item, all of the above recommendations have now been implemented.

Changes to the Advanced Ultra-light Aeroplane Design Standard

In 2001 TP 10141 Design Standards for Advanced Ultra-Light Aeroplanes prepared by the Light Aircraft Manufacturers Association in collaboration with Transport Canada was amended as follows:

- Maximum take off weight for a two place aircraft was increased to 560 kilograms (1232 pounds).
- The designator TP was not applicable to this document since it was not a Transport Canada Publication but a document developed and published by LAMAC. The Design Standard was re-designated DS-10141.

Subsequent amendments have clarified other sections of the design standard and allowed for the inclusion of powered parachutes and hang glider-based trikes. The latest version is DS-10141, Amendment 003, and dated November 4, 2004.

Recreational Aviation in USA

The Light Sport Aircraft

Recreational aviation in the USA has been undergoing an evolution similar to that in Canada. In the US, ultra-light vehicles operate in an un-regulated environment as defined in FAR 103. The FAA has recognized the need for a new category of aircraft into which the “fat” ultra-lights would fit, and has worked with the USA recreational aviation community to develop and put into place regulations that would allow for the operation of small aircraft exceeding the limits of ultra-light vehicles, with provision for carrying a passenger and using the aircraft for hire for flight training, rental and towing.

On September 1, 2004 the FAA introduced a new rule for the manufacture, certification, operation, and maintenance of light-sport aircraft. Light-sport aircraft weigh less than 1,320 pounds (1,430 pounds for aircraft intended for operation on water) and include airplanes, gliders, balloons, powered parachutes, weight-shift-control aircraft, and gyroplanes. This action was necessary to address advances in sport and recreational aviation technology, lack of appropriate regulations for existing aircraft, several petitions for rulemaking, and petitions for exemptions from existing regulations. The intended effect of this action is to provide for the manufacture of safe and economical certificated aircraft that exceed the limits currently allowed by ultralight regulation, and to allow operation of these aircraft by certificated pilots for sport and recreation, to carry a passenger, and to conduct flight training and towing in a safe manner. The rule also established requirements for maintenance, inspections, pilot training and certification.

The fact that there are many similarities between the USA rules and those in Canada is not surprising, as the Canadian rules were one of the models studied. The key difference between the rules now in place in the USA and those in Canada is that Light Sport Aircraft are issued with a Special Certificate of Airworthiness, while Canadian Advanced Ultra-light Aeroplanes operate with no flight authority document.

Overview of the USA Light Sport Aircraft Rule

- Maximum gross takeoff weight-1, 320 lbs (599 kg.), 1,430 lbs for seaplanes.
- Lighter-than-air light-sport aircraft maximum gross weight-660 lbs (300 kg.)
- Maximum stall speed-51 mph (45 knots)
- Maximum speed in level flight with maximum continuous power (Vh)-138 mph (120 knots)

- Single, non-turbine engine only, includes rotary or diesel engines
- Fixed or ground adjustable propeller
- Unpressurized cabin
- Fixed landing gear
- Repositionable landing gear for seaplanes allowing the wheels to be rotated for amphibious operation.
- Can be manufactured and sold ready-to-fly under a new Special Certificate of Airworthiness - Light-Sport Aircraft (SLSA) certification without FAR Part 23 compliance. Aircraft must meet the consensus standard. Aircraft under this certification may be used for sport and recreation, flight training, and aircraft rental.
- Can be kit or plans built and flown under a new Experimental Certificate of Airworthiness - Light-Sport Aircraft certification (ELSA). Aircraft under this certification may be used only for sport and recreation and flight instruction is restricted to the owner of the aircraft.
- Can be certificated as Experimental Light-Sport Aircraft (ELSA) if it was kit or plans-built and operated as ultra-light trainers. These aircraft must be transitioned to ELSA category no later than January 31, 2008.
- Will have FAA registration-N-number.
- Aircraft category and class includes Airplane (Land/Sea), Gyroplane, Airship, Balloon, Weight-Shift-Control (Trike Land/Sea), and Powered Parachute.
- U.S. or foreign manufacture of light-sport aircraft is authorized.
- Sport pilots may fly aircraft with a standard airworthiness certificate that meet above specifications. However, that airworthiness certification category will not be changed to a light-sport aircraft. Holders of a sport pilot certificate may fly an aircraft with a standard airworthiness certificate if it meets the definition of a light-sport aircraft.
- May be operated at night if the aircraft is equipped as per FAR 91.209 and the pilot holds at least a Private Pilot certificate and a minimum of a third-class medical.

The Sport Pilot certificate

Sport pilots are limited to operating aircraft that meet the definition of a light-sport aircraft, and must:

- Be a minimum of 16 years of age to become a student sport pilot (14 for glider)
- Be 17 years of age before testing for a sport pilot certificate (16 for gliders).
- Hold either a valid airman's medical or a valid U.S. driver's license as evidence of medical eligibility (provided you do not have an official denial or revocation of medical eligibility on file with FAA). However, a pilot who has had his or her last medical "denied" or "revoked" by the FAA would be required to obtain a special issuance medical (or alternative evidence of medical eligibility under a separate procedure being developed by FAA) before being allowed to base his or her medical fitness solely on driver's license requirements.

The Sport pilot certificate has the following restrictions:

- No flights into Class A airspace, which is at or over 18,000' MSL;
- No flights into Class B, C, or D airspace unless you receive training and a logbook endorsement;
- No flights outside the U.S. without advance permission from that country (ies)
- No sightseeing flights with passengers for charity fund raisers;
- No flights above 10,000' MSL;
- Daytime flight only; no night flights
- No flights when the flight or surface visibility is less than 3 statute miles;

- No flights unless you can see the surface of the earth for flight reference;
- No flights if the operating limitations issued with the aircraft do not permit that activity;
- No flights contrary to any limitation listed on the pilot's certificate, U.S. driver's license, FAA medical certificate, or logbook endorsement(s);
- No flights while carrying a passenger or property for compensation or hire (no commercial operations);
- No renting a light-sport aircraft unless it was issued a "special" airworthiness certificate; any qualified and current pilot (recreational pilot or higher) may fly a light-sport aircraft;
- A light-sport aircraft may be flown at night if it is equipped for night flight and flown by an individual with a private pilot (or higher) certificate who has a current and valid FAA airman's medical certificate.
- Sport Pilot Flight Instructors would be trained to give the training for the Sport Pilot Certificate.

Maintenance of Light Sport Aircraft

The sport pilot/light-sport aircraft rule creates two new Light-Sport Repairmen certificate-with either a maintenance or inspection rating. To earn an FAA repairman certificate of any type, you must be:

- At least 18 years old
- Speak, read, and understand English
- Demonstrate the requisite skill to determine whether an E-LSA or S-LSA is in a condition for safe operation
- U.S. citizen or legal permanent resident for a Inspection rating-complete a 16 hour course on the inspection requirements of the particular class of light-sport aircraft;
- For a Maintenance rating-complete a course - 120 hours (airplane category); 104 hours (weight shift or powered parachute); 80 hours (glider or lighter-than-air) -- on the maintenance requirements of the particular class of light-sport aircraft.

The annual condition inspection on special light-sport airworthiness certificated aircraft--can be completed by:

- An appropriately rated mechanic-that is, A&P
- An appropriately rated repair station; or
- A light-sport repairman with a maintenance rating.

A certificated pilot (Sport Pilot rating or higher) can perform preventive maintenance

The annual condition inspection on experimental light-sport airworthiness certificated aircraft can be completed by:

- An appropriately rated mechanic-that is, A&P
- An appropriately rated repair station; or
- A light-sport repairman with a maintenance rating; or
- A light-sport repairman with an inspection rating (only on your own aircraft).
- No rating is required to perform maintenance on experimental light-sport airworthiness certificated aircraft.

Consensus Standards

Instead of requiring manufacturers to build the new special and experimental light-sport aircraft to an existing type certification standard, FAA called for the industry to develop consensus standards. In the preamble to the "Certification of Aircraft and Airmen for the Operation of Light-Sport Aircraft" notice of proposed rulemaking (NPRM), FAA proposed that "the light-sport aircraft industry develop and reach a consensus on an airworthiness standard that would govern light-sport aircraft."

FAA's decision to propose that the light-sport aircraft industry develop consensus standards is rooted in dictates from Congress and the Office of Management and Budget (OMB). Congress, via Section 12 of the National Technology Transfer and Advancement Act of 1995, mandated that federal agencies "shall use technical standards that are developed or adopted by voluntary consensus standards bodies." In directing when and how federal agencies would meet that requirement, Congress stated, "Federal agencies and departments shall consult with voluntary, private sector consensus bodies and shall, when such participation is in the public interest and is compatible with agency and departmental missions, authorities, priorities, and budget resources, participate with such bodies in the development of technical standards."

In 1998 OMB, following on Congress' mandate, issued a document entitled Circular A-119 that further established policies related to consensus standards bodies, stating "this Circular directs (federal) agencies to use voluntary consensus standards in lieu of government-unique standards except where inconsistent with law or otherwise impractical."

Clearly, FAA's proposal to use consensus standards as opposed to type certification standards for light-sport aircraft comes from these mandates and documents.

OMB defines consensus as general agreement but not unanimity and adds that there must be a process for resolving objections.

Consensus standards were developed applicable to both special (ready-to-fly) and experimental light-sport kit aircraft, including standards for

- Design and performance criteria
- Quality assurance system requirements
- Completed aircraft production acceptance test specifications
- A system for continued operational safety monitoring.

For design and performance criteria, FAA dictated that the standard should define the minimum safety and performance requirements of an aircraft, which would be safe for the operator. The consensus group could choose to use existing standards or develop one or more new standards. FAA suggested that the following existing design and performance standards might be appropriate:

- JAR-VLA (European Joint Airworthiness Requirements-Very Light Aircraft), and/or
- DS-10141 (Design Standards for Advanced Ultra-light Aeroplanes), and/or
- BCAR-S (Britain's Civil Airworthiness Requirements Section S-Small Light Aeroplanes)

The quality assurance (QA) standard would provide control over all manufacturing phases of production of both the special and experimental light-sport kit aircraft, including supplier-furnished parts and services. As a minimum, FAA stated that the QA system would be capable of assuring that the aircraft produced would conform to the design criteria, identify the test and inspection procedures that would assure that conformity, and identify the inspection procedures for raw materials, incoming parts, and assemblies produced by suppliers.

The consensus standard for the QA system would describe the minimum general practices required. Each manufacturer will then be free to develop a specific QA system appropriate to its production facility.

In the production acceptance test standard, FAA required that the standard define test procedures that would assure the completed aircraft meet the flight manual performance as demonstrated in the prototype aircraft, including such applicable limits as empty weight and centre of gravity, performance specifications, controllability and maneuverability trim, stability, stall speed and handling characteristics, engine cooling and operating characteristics, propeller limits, systems functions, and folding or removable lifting surfaces.

For special ready-to-fly light-sport aircraft, the manufacturer will complete this test, while the assembler/builder will complete this check for experimental light-sport kits. Manufacturers will be required to supply a QA method for assemblers to complete that QA acceptance test.

For continuing airworthiness, the consensus standard would create a base line plan for continued operational airworthiness, including a method for monitoring and maintaining continued operational safety and for ensuring that changes to an aircraft

would not adversely affect compliance with the aircraft's airworthiness certificate. A process for identifying, reporting, and remedying safety-of-flight issues would also be outlined.

At the light-sport aircraft manufacturers' conference hosted by EAA, EAA recommended that the industry use the American Society of Testing and Materials International (ASTM) organization as the facilitating body for managing the consensus standards process. EAA recommended ASTM because of its impartiality, its more than 100 years of experience in the standards development field, and its ability to manage the process with little added expense to the manufacturing community

Obtaining a Special Certificate of Airworthiness – Light-Sport Aircraft

21.190 Issue of a special airworthiness certificate for a light-sport category aircraft.

- (a) Purpose. The FAA issues a special airworthiness certificate in the light-sport category to operate a light-sport aircraft, other than a gyroplane.
- (b) Eligibility. To be eligible for a special airworthiness certificate in the light-sport category
 - (i) The aircraft's operating instructions;
 - (ii) The aircraft's maintenance and inspection procedures;
 - (iii) The manufacturer's statement of compliance as described below; and
 - (iv) The aircraft's flight training supplement.

The aircraft must not have been previously issued a standard, primary, restricted, limited, or provisional airworthiness certificate, or an equivalent airworthiness certificate issued by a foreign civil aviation authority.

The aircraft must be inspected by the FAA and found to be in a condition for safe operation.

(c) The manufacturer's statement of compliance referred to above must:

- (1) Identify the aircraft by make and model, serial number, class, date of manufacture, and consensus standard used;
- (2) State that the aircraft meets the provisions of the identified consensus standard;
- (3) State that the aircraft conforms to the manufacturer's design data, using the manufacturer's quality assurance system that meets the identified consensus standard;
- (4) State that the manufacturer will make available to any interested person the following documents that meet the identified consensus standard:
 - (i) The aircraft's operating instructions
 - (ii) The aircraft's maintenance and inspection procedures
 - (iii) The aircraft's flight training supplement.
- (5) State that the manufacturer will monitor and correct safety-of-flight issues through the issuance of safety directives and a continued airworthiness system that meets the identified consensus standard;
- (6) State that at the request of the FAA, the manufacturer will provide unrestricted access to its facilities; and
- (7) State that the manufacturer, in accordance with a production acceptance test procedure that meets an applicable consensus standard has -
 - (i) Ground and flight tested the aircraft;
 - (ii) Found the aircraft performance acceptable; and
 - (iii) Determined that the aircraft is in a condition for safe operation.

Light-sport Aircraft Manufactured Outside the United States.

(d) For aircraft manufactured outside of the United States to be eligible for a special airworthiness certificate in the light-sport category, an applicant must meet the requirements of paragraph (b) of this section and provide to the FAA evidence that-

- (1) The aircraft was manufactured in a country with which the United States has a Bilateral Airworthiness Agreement concerning airplanes or Bilateral Aviation Safety Agreement with associated Implementation Procedures for Airworthiness concerning airplanes, or an equivalent airworthiness agreement; and
- (2) The aircraft is eligible for an airworthiness certificate, flight authorization, or other similar certification in its country of manufacture.

Impact of the USA Light-sport Aircraft Rules on Canadian Manufacturers

Access to the USA market is an essential requirement for a viable Canadian recreational aircraft manufacturing industry. If a Canadian manufacturer or owner wishes to export an aircraft that would be eligible for a USA Special Certificate of Airworthiness in the light-sport category, the aircraft must:

- Conform to consensus standards that are recognized by the FAA for the light-sport aircraft, and
- Be eligible for a Flight Authority in Canada.

Building the Advanced Ultra-light in compliance with the required consensus standards is possible; however, since ultra-lights fly in Canada under no flight authority or airworthiness certificate, it is uncertain whether they are eligible for a special certificate of airworthiness in the light sport category. Therefore, at the present time it would appear that a Canadian manufacturer may be unable to enter the Special Light Sport Aircraft Market in the USA, unless

- The Canadian manufacturer is prepared to open a manufacturing facility in the USA and effectively become an American manufacturer,
- Transport Canada harmonizes an existing category to the FAA requirements for the Light-Sport Aircraft, or
- Transport Canada introduces a new category aircraft that will satisfy the requirements of the FAA rule.

Some Canadian Manufacturers have already moved or opened manufacturing facilities in the USA. Among those who have not, some are seriously considering such a move, and are being offered attractive incentives to do so. Industry Canada and Transport Canada must ask the question – is a further exodus of aircraft manufacturing facilities in Canada desirable and would such moves be in the best interest of the recreational aviation community in Canada?

Canada traditionally has been a significant and innovative player in the development of international aviation. It had the vision to initiate a separate division within Transport Canada that would partner with aviation industry stakeholders within the recreational aviation sector. Canada also foresaw the emerging trend of the role that industry would play in this partnership, and was the first to introduce a fully manufactured non-certificated aircraft built and maintained to industry-managed standards. The USA has now expanded on that theme with the Light-Sport Aircraft and Canada must evaluate its options for future growth of Canadian recreational aviation.

Canada's appropriate response to the LSA was explored at a Recreational Aviation meeting on September 29, 2004. Options identified were to

- Proceed towards Harmonization with the USA
- Upgrade the AULA to the LSA standards
- Or leave the AULA within the ultra-light realm, and create a new Canadian Category.

A brief risk assessment exercise was conducted that identified the following risks:

1. Canadian Manufacturers may be producing products (AULA) not eligible as LSA

2. LSA program may not work
3. Student training requirements may become more expensive (aircraft costs)
4. Loss of dedicated UL training schools
5. US manufacturers may not be producing LSA compliant products
6. Additional costs of setting up a process for evaluation of manufacturing (QA requirements)
7. Loss of competitive position for Canadian production
8. Nobody bothers with the license or permits (killed by complication)
9. Student training requirements may become more onerous (additional training requirements)

Items 1 and 3 are two risk elements where probability, seriousness and exposure were all more than “low” but not “serious”.

Items 4 and 6 were considered “serious” risks to the present UL community. If the AULA ceased to exist, there would be no options open for the present manufacturers of existing AULAs but to downgrade their machines to basic ultra-lights. While the success of the LSA rule was listed as an unknown, it was nevertheless identified as a threat since, if unsuccessful, we would have aligned ourselves to a potentially extinct category, and jeopardized the thriving Canadian AULA. The loss of the passenger carrying privilege and regulatory simplicity of the AULA would be serious to the UL flying community. Risk mitigation strategies for these items were identified as follows:

- Develop the Canadian “Sport Aircraft” as an additional category, not a replacement for the existing advanced ultra-light aeroplane. This would protect those manufacturers who wish to continue producing Advanced Ultra-light aeroplanes, but have no interest in the more rigorous requirements of the Light Sport Airplane rules.
- “Grandfather in” current products that would comply with the new Aircraft category.
- Leave the Basic Ultra-light (BULA) and Advanced Ultra-light (AULA) categories where they are with no change to current status for pilot training.
- Permit the Canadian Sport Aircraft to be used for flight training towards the Recreational Pilot Permit and higher.

Pilot training issues were also explored as ways of mitigating the risks identified.

The Challenge of Harmonizing the AULA to the LSA

Recognizing that the introduction of a new aircraft category might be seen as a major step, LAMAC has considered it prudent to conduct further due diligence in exploring if the upgrading the AULA to meet the USA LSA standard was feasible or practical. The following table summarizes the similarities and differences between the two categories, and the effects of harmonizing the AULA to the USA LSA.

Item	AULA	LSA
Flight Authority	None	Special Certificate of Airworthiness for Light-Sport Aircraft.
Standards for design and performance	DS-10141	ASTM F 2245 – 04
Standards for Continued Airworthiness	Manufacturer’s Specified Maintenance Program, Issuance of Mandatory Actions	ASTM F 2295 – 03
Standards for Quality Assurance in the Manufacture	None except general description of Fabrication methods (DS-10141, 48 (a), (b), (c))	ASTM F 2279 – 03
Standards for Component Parts	None except general instructions DS-10141 Chapter E	ASTM F 2339 –04 and ongoing.

Item	AULA	LSA
Weight (MGTOW)	1232 land and water	1320 land, 1430 water
Propeller	No restrictions	Restricted to fixed pitch
Landing Gear	No restrictions	Restricted to fixed or re-positionable
Stall Speed	V _{so} 72 km/h (45 mph) V _{si} 96.5 km/h (60 mph) flaps retracted	45 kts (51.78 mph) flap configuration not given
Maximum continuous cruise speed	No restriction	120 kts
Load distribution limits and Minimum useful load computations	175 lbs standard occupant mass	190 lbs standard occupant mass
Climb	V _y <300 fpm	V _y <300 fpm
Balked Landing	At 1.3 V _{so} shall exceed 1/30	At 1.3 V _{so} shall exceed 1/30
Controllability and Maneuverability	Same except stick forces higher	Same except stick forces lower.
Longitudinal Control	Speed increase from 1.1 V _{si} to 1.5 V _{si} and from 1.1 V _{si} to V _F in less than 3 seconds. Power –off and full power.	“can be reached promptly”
Aerobatics	Limited to non-aerobatic operations	Unclear although reference to spin recovery mentioned.
Passenger carrying	1	1
Flight Training	UL Pilot Permit	Sport Pilot Permit
Minimum flight crew licence	UL Pilot Permit	Sport Pilot Permit
Medical requirement	Class 4 self declaration	Drivers License
Night	No	Yes
IFR	No	Yes

Definitions: V_{si} – stalling speed or minimum steady flight speed with the flaps in a specific configuration

The Standards

While DS-10141 is based on the CARs, JAR-VLA and FAR Part 23 government standards, the Light Sport-aircraft is based on the industry consensus standard developed by ASTM International. The CARs, JAR-VLA and FAR Part 23 are internationally recognized and follow a format familiar to aeronautical engineers and manufacturers of certificated aeronautical products. The ASTM standards, although much more detailed in their content, follow a somewhat different format that will require a period of familiarization on the part of those more used to working with traditional aviation standards.

The Canadian standard for Advanced Ultra-light Aircraft, DS-10141, amendment 003, is also an industry consensus standard, but follows a more traditional format. The latest edition has been edited and detailed definitions have been included resulting in a “user friendly” document

Since no standards currently exist for Quality Assurance in the Manufacture of AULAs, these would have to be established and complied with if harmonization was pursued. Based on the requirements of the ASTM standard FT2279 – 03 this imposition on existing manufacturers will be onerous. Some smaller AULA manufacturers will find it difficult to afford the human resources and facilities required to comply with these standards. Imposing these standards on manufacturers who have no wish to produce the resulting AULA/LSA for export to the USA could force them out of business.

The manufacturer of an AULA is responsible for the “after market support” relating to the safety of flight of their aeroplanes. However, since no standards currently exist for continued operational safety monitoring of an AULA beyond the requirements for the manufacturer to publish a specified maintenance program and issue mandatory actions for safety of flight issues, these specific standards would have to be developed and complied with.

The ASTM F 2295 – 03 is clear and all inclusive and if adopted should not prove to be too difficult a burden on AULAs manufacturers, and would be in the interest of safety. Once the forms and methodology are created, there should be very little additional cost to the manufacture. Some manufacturers who have websites could manage to integrate this standard with minimal cost.

The Type Definition

The design intent and flight loads are almost identical between the AULA and the LSA, but the MGTOW of the LSA is 88 lbs. heavier for land operation and 198 lbs. heavier for water operations.

The previous increase of the AULA from 1058 to 1232 is already causing a problem for some manufacturers. Some owners of AULA aeroplanes operating and registered on a Declaration of Compliance for a type definition of 1058 lbs. assume that they can automatically increase the weight to 1232, the now legal maximum take-off mass for an AULA. In some instances they advertise their aeroplanes for sale at the heavier weight leading to more frustration and disappointment when they learn that modifications will have to be done on the airframe to approve the increased weight. It is doubtful that all of these aircraft could be increased to 1320 lbs without structural modifications.

Should there exist any AULAs operating with in flight adjustable propellers, these would have to be modified for fixed or ground adjustable propellers only.

The definition of the landing gear for amphibious operations is ambiguous for the LSA. For water operations, a re-positionable landing gear is approved, but it is unclear whether retractable wheels would be approved. Any AULAs presently operating on amphibious floats would have to investigate this point further.

The AULA currently has no float allowance. An increase of 198 lbs for floats might be desirable, as the average AULA operating on floats is somewhat restricted in payload. However, this increase in weight for existing AULAs would have to be approved by the manufacturer to ensure that there would be no compromise to the structural integrity of existing models.

Maintenance

AULA owners enjoy the privilege of owner maintenance. To comply with the LSA requirements, an owner of an AULA would be required to take a 120-hour course if he/she wished to be able to perform maintenance on his/her aircraft. A certificated pilot holding a Sport Pilot rating or equivalent would only be allowed to perform preventive maintenance. There would be strong objections to this change as it would add significantly to the operating costs of these aeroplanes, and remove existing privileges that the AULA pilot/owner now enjoys. The impact on existing UL flight schools would be negative.

Audits

Currently there is no program for determining whether or not manufacturers of AULAs are complying with the standards. This has led to some problems. LAMAC has offered some initiatives that would facilitate the process of compliance. There has been discussion of the need for some type of internal or external audit to be put into place to ensure that when a manufacturer signs a Declaration of Compliance or a Statement of Conformity, it is valid. The requirements of internal audits of the Light Sport Aircraft might be considered whether or not the AULA were to be harmonized. The appropriate body to conduct these audits would have to be discussed. Following is a report from the LAMA site. Larry Burke is the President of the Light Aircraft Manufacturers Association in the USA.

AUDITING LSA MANUFACTURERS: Larry Burke and Phil Lockwood attended an FAA meeting in Oklahoma City that addressed, among other things, the role of the new LSA designated airworthiness representative (DAR). One role of the DARs will be to visit LSA manufacturers that submit affidavits of compliance with the consensus standards. Before issuing a compliance certificate, the DAR will review company-prepared documents that are required by the consensus standards, and LAMA is asking the FAA to slightly increase the scope of these DAR visits. The suggested addition would be the random selection in advance of the visit of three to five parts of the development, production and quality assurance standards. The manufacturer would be notified in advance which items were selected and would be asked to share the company documents on these topics with the DAR. The intention is not to scrutinize the documents for technical detail but to assure that complying documents have been prepared.

The estimate is an addition of less than half an hour to the DAR's review process and should preclude the reviewed company from not completing testing and documentation to the required documents. LAMA has considered offering member companies audits for a fee to assure compliance, but this recommended DAR procedure obviate the need for an initial audit of this type. However, LAMA staff does offer member companies, for fee, assistance in organization of QA and other activities, and preparing acceptable documents for complying with the ASTM LSA Standards.”¹

The Flight Authority

The most difficult challenge facing the AULA is the fact that it operates without any flight authority in Canada, and would have to be issued a Special Certificate of Airworthiness, Flight authorization or other similar certification for its particular category if it was to seek eligibility in the USA as a LSA. AULAs in Canada are listed as “Approved” for registration by Transport Canada. Transport Canada offers no airworthiness oversight on Advanced or Basic ultra-light aeroplanes, and therefore would not be able to fulfill one of the major requirements of the bilateral agreement between USA and Canada. A clearer definition of the FAA requirements of a “flight authorization or other similar certification” is currently being sought.

Note: As of August 10th 2005, it would appear that the Canadian AULA, by virtue of its ability to be registered and fly in Canada renders it eligible for LSA status, if all other requirements of the category are met. Nevertheless, there still remains the issue of a Canadian flight permit for production flight testing prior to the aircraft being delivered to the USA.

Kits and Partially Completed Kits.

The Experimental Light Sport Aircraft category can be delivered as anything from a 0% to a 99% complete kit, leaving the owner only 1% to complete! This means that the manufacturer of an E-LSA kit can complete more of the aircraft for the customer than is possible if the aircraft is to be registered as an amateur-built aircraft, while still avoiding the associated product liability that a fully manufactured aircraft may carry. Since the 51% rule applicable to amateur-built aircraft does not apply to AULAs that are built from a kit supplied by a manufacturer, no further study on this was conducted.

Conclusion

As of January 2004, there are 757 registered Advanced Ultra-light aeroplanes in Canada. In our view, the risks and obstacles are too great to warrant changing 757 aircraft that are currently enjoying their place in Canadian Recreational aviation in order to fit into a new, exciting, yet still unproven category in the USA. The obstacle that poses the greatest risk to embarking on the time and effort to harmonize the AULA to the LSA more than any other is the lack of flight authority and airworthiness oversight. LAMAC concludes that the AULA should be left in place, and at this point in time no further addition or change should be made to its current weight.

¹ As of this date, the ASTM Audit Group are still debating the scope and nature of the audits, whether the audits should be mandatory or voluntary, and whether they should be conducted internally or by an independent group.

A Proposed New Category Aircraft

The Proposal

LAMAC has concluded that the interests of the Canadian recreational aviation industry would be best served by the introduction of a new category of aircraft that would be issued with a Special Certificate of Airworthiness. LAMAC therefore proposes to Transport Canada:

1. That a new aircraft category be created in Canada which will respond to the pressing needs of Canadian manufacturers who wish to participate in the emerging markets that the USA Light Sport Aircraft can offer, while expanding the markets here domestically and in other countries for fully manufactured aircraft. LAMAC suggests that this new aircraft category *encompass* the USA Light Sport Aircraft as a minimum standard.
2. That this aircraft category be introduced as the conclusion of the Recreational Aviation mandate set out in 1996, and that the current advanced ultra-light aeroplane standards would form the basis for developing standards for the new category of aircraft. These aircraft would be subject to an industry-managed approval program for
 - The development of design standards,
 - The development of standards and practices for issuance of certificates to manufacture including quality assurance programs,
 - The creation of flight safety management procedures for air operations,
 - The standards and practices for continuing airworthiness and maintenance programs,
 - And the creation of an independent audit organization.
3. That aircraft conforming to the new category be granted a Special Certificate of Airworthiness.
4. That these aircraft be eligible for use in Certified Flight Training Units as a basic trainer for the Recreational Pilot Permit and higher providing the aircraft is suitably equipped.
5. That these aircraft be eligible for limited commercial use by holders of an appropriate Air Operators Certificate.
6. That the minimum pilot qualification for operation of the new category should be the Recreational Pilot permit.
7. That LAMAC be given responsibility for the management of the new category, and undertake the development and publishing of the required documents for:
 - (a) The design and performance standards, which will be based on the CARs, JARS and FAR part 23. The ASTM standards for the LSA would be appended or integrated to ensure seamless harmonization with the USA Light Sport Aircraft for those Personal Aircraft that meet the appropriate weight and speed requirements of the LSA.
 - (b) The Standards and Requirements for the issuance of “Approved for Manufacture” Certificates which will include Quality Assurance Program, Quality Audit Program for the manufacture and production of these aircraft. The ASTM, ISO and other established international standards would form the basis for this publication. LAMAC proposes that manufacturers who comply with these standards be “Approved for Manufacture”.
 - (c) The Standards for a Continuing Airworthiness Program for these aircraft. These will be based on the CARs and ASTM standards. LAMAC proposes that these aircraft be maintained by AMEs and AMOs

- when operating within a flight school, and maintained by their owners who have been suitably trained and approved if operated for personal use.
- (d) The Standards for Air Operator Certificates including Flight Safety Management, and Risk Management in Decision Making.
 - (e) The Standards for Prototypical and Production Test flights developed by a trained Professional Test Pilots under contract to LAMAC.
 - (f) A Fit for Flight Annual inspection program to determine continued fitness for flight
 - (g) Creation of generic documents that members can use in order to fulfill the requirements of the standards outlined above. These will be in the form of Compliance check lists, Service Difficulty Reporting, and Risk Assessment forms to name a few.
 - (h) Creation an independent audit group comprised of professional Individuals who will oversee the four main areas of compliance:
 - Design and Performance
 - Manufacturing and Production
 - Continuing Airworthiness
 - Qualifications and Training

Should this proposal be accepted, LAMAC would request the participation of Transport Canada in providing guidance and editorial input during the development of these documents to ensure their acceptability and compatibility within the Transport Canada system. We would strive for consultation with stakeholders and general consensus regarding the content of the documents, and to that end the documents would be posted on the LAMAC website so that members could review and comment on their development.

Further to the above, LAMAC's will provide technical assistance to manufacturers who request assistance in the testing and methodology of compliance with design standards.

LAMAC is currently also developing additional training documents and seminars relating to winter operations, ski flying, tail dragger training, and elementary preventative maintenance for owners.

The Name for the New Category of Aircraft

LAMAC is acutely aware of the potential for negative public perception relating to words such as "ultra-lights", "recreational vehicles", "sport", "amateur built", "experimental". None of these names do very much to raise the confidence level of the public towards aviation outside commercial air services. In addition, we should be mindful of the perception that an elite group of wealthy aviators enjoy their "sport" at the expense of the public's right to the quiet enjoyment of their pursuits.

LAMAC suggests that the new category be called a "Personal Aircraft" or PA, and that the initial Design and Performance standards be written for a **Light** version to be created within this new category. Subsequent categories might be Personal High Performance Aircraft, Personal Multi-Engine Aircraft.

LAMAC is committed to creating the PA to fulfill a role not currently filled by any other category. That of a fully "manufactured ready to fly" personal and training aircraft that would be:

- Designed to Standards
- Built to Standards
- Maintained to Standards
- Flight Tested to Standards

No existing types of aircraft will be compromised. No existing Pilot Privileges will be altered. The Personal Aircraft will not in any way negatively impact the BULA, AULA and Amateur Built aircraft.

Wherever it is practical to do so, already existing groups or organizations will be used or integrated into the operation of the Personal Aircraft – AMEs, AMOs, MD-RA, DARs, Flight Training Units, etc. This will have the effect of re-generating income for already qualified personnel and groups. No additional pilot training or licensing will be required. The already existing Recreational Pilot Permit would be the minimum qualification to fly a Personal Light Aircraft.

The Personal Light Aircraft.

- Would mean an aeroplane that has a type design that was in compliance with the standards specified in the manual entitled “Design Standards for Personal Light Aircraft”.
- A Personal Light Aircraft would have a maximum take off weight of 5000 lbs and a maximum seating capacity of four seats including the pilot.
- A Personal Light Aircraft would be fully factory manufactured, or professionally built by holders of an “Approved to Manufacture” certificate. An Approval to Manufacture certificate would be based on compliance with The Standards and Requirements for Manufacture of a Personal Light Aircraft and the associated Quality Assurance Program.
- A personal Light Aircraft would be eligible for commercial operations by holders of a Personal Air Operator Certificate.
- Personal Light Aircraft would be subjected to an Annual Airworthiness Inspection Process conducted by a suitably qualified individual.
- Personal Light Aircraft would be subjected to a Flight Test program prior to being granted a Special Certificate of Airworthiness.
- If a Personal Light Aircraft were sold as a kit, it would fall under the Amateur Built Rules.
- Holders of “Approved for Manufacture” certificates who are not the original manufacturer of the Personal Light Aircraft would be required to comply with the Manufacturers’ standards for assembly, and use only components and parts approved by the manufacturer. Fully manufactured or professionally built aircraft would be exempt from pre-cover inspections, but would be subject to a final fit for flight inspection by a person designated by Transport Canada.
- Personal Aircraft would be subject to audit by an Independent Audit Group

Impact on the Canadian Recreational Aircraft Industry

- The Personal Light Aircraft could achieve international status. Third world countries requiring medivac aircraft, small transport aircraft, and basic trainers would have an alternative to the amateur built or fully certified aircraft currently available.
- The Personal Light Aircraft could also address the needs of the Canadian North where fuel and supplies need to be transported to remote areas. Hunting and Fishing Camps would be able to operate the Personal Light Aircraft to transport their supplies and guests to the camps. Among other commercial privileges proposed for the Personal Light Aircraft would be sightseeing tours, banner towing and aerial photography.
- The Personal Light Aircraft would also provide flight-training units in Canada with an alternative to the high cost of maintenance of an aging fleet of certified aircraft.
- Because of the standards governing all phases of the design, manufacturer and continued airworthiness of the Personal Light Aircraft, it is expected that insurance premiums would be less cost prohibitive that they are for ultra-light aeroplanes and amateur built aircraft. Additionally, financing of the Personal Light Aircraft would be easier to obtain.
- The Personal Light Aircraft would be complying with recognized standards that are international, and which would be equal to or surpass the ASTM standards for the USA Light Sport Aircraft.

- Canadian manufacturers who chose to, can offer the Personal Light Aircraft in kit form for export under the 51% rule, thereby offering a product that conforms to a higher standard of manufacturing and production than that required for the experimental aircraft, hereby gaining some competitive advantage.
- There are currently several very highly qualified established companies that are “professionally” building amateur built aircraft for resale as a turnkey business. They must however still adhere to the 51% rule. This rule, which states that Amateur Built aircraft are assembled for educational or recreational purposes, and that 51% of the fabrication must be completed by the builder of record, is being stretched to its limit, to the point where it is in certain cases no longer applicable. The Personal Light Aircraft would legitimize this activity, and ensure standards of quality that are equal to those of a fully certified aircraft without the enormous cost of certification compliance.

Once again Canada will pioneer the next inevitable stage towards industry management and oversight of quality recreational aviation products that are built to the highest standards and consistent with established safety of flight criteria hitherto associated with fully certified products.

Appendix: The Draft Standards and Forms

The following LAMAC standards have been drafted and are currently undergoing review:

- DS 1101-04 Design Standards for the Personal Light Aircraft. (Chris Heintz)
- SP 1201-04 Standards and Requirements for Approved Manufacture and Production of Personal Light Aircraft (Frank Hofmann, Marlene Gill, Sean Gilmore)
- SP 1301 –04 Standards for Continued Airworthiness of Personal Light Aircraft (Frank Hofmann)
- SP 1401 –04 Standards for Prototypical and Production Flight Testing of Personal Light Aircraft. (Rainer Hau)
- Standards and Practice for the issuance of a Personal Air Operators Certificate. (Marlene Gill)
- Safety of Flight Management Program for holders of Personal Air Operators Certificates. (Marlene Gill)

LAMAC Administrative Forms are also being designed (Marlene Gill, Frank Hofmann, Ken Minchau, Rainer Hau et al)

- Compliance Check Lists
- Safety Risk Assessment Template
- Declaration of Compliance
- Certificate of Conformity
- Annual Airworthiness Inspection
- Operations Manual Template
- Manufacturer Audit Template
- Flight Testing Templates
- Approval for Manufacture Certificate

Drafts of these and other relevant documents will be available in due course.