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Expanded LSA - MOSAIC

AERO Friedrichshafen 2023

Rian Johnson, Chair of F37 on Light Sport Aircraft

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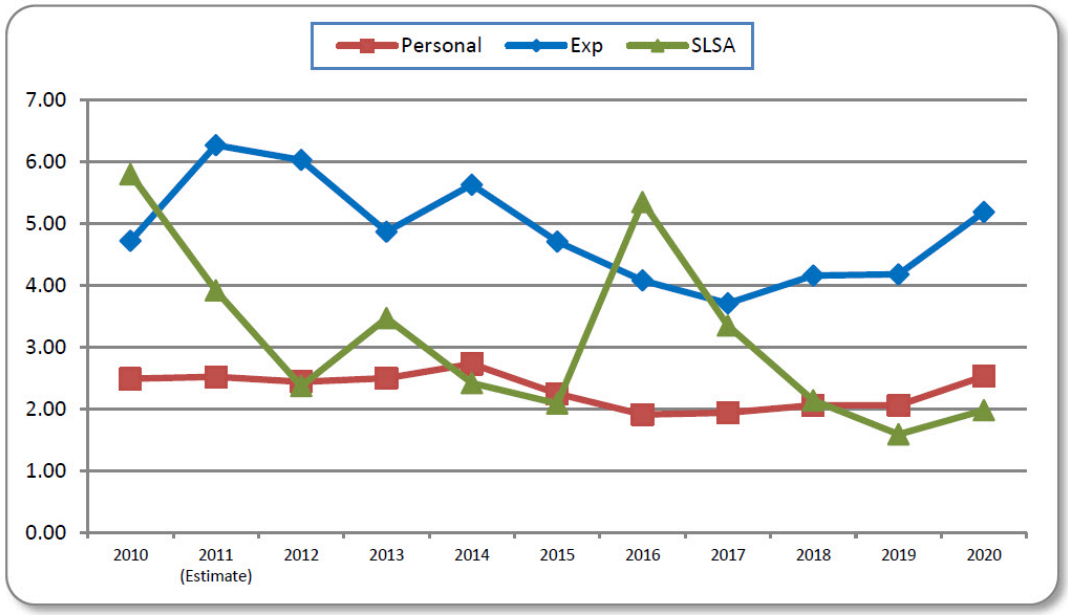
F37 Quick Facts

- Established 2002
- Number of Members: ~226 (+13% since Jan 2022)
- Number of Standards: 34 active
- Global Participation: 19 Countries represented
- F37 Standards available in Volume 15.09 in the ASTM Annual Book
- Meetings twice per year

Why Expand LSA?

- Overall safety record continues to improve
- LSA accident rate now trending better than Personal (TC'd aircraft not for furtherance of business)

Comparison Chart Showing Fatal Accidents per 100K Hours of Operation



Why Expand LSA?

- More robust aircraft needed for training
- More useful load for passengers and fuel
- More weight needed for … electric, safety items
- Kit built assist programs

Current LSA Example

Gross Weight Limits 600 kg

Typical Empty Weight 370 kg

Typical Fuel 55 kg

Only 175 kg left for fuel and passengers

Many modern occupants are 90 kg or more. This does not leave room for two occupants let alone room for baggage.

Why Expand LSA?

– From the FAA lower the cost of training aircraft.

Why Expand LSA?

- In the United States new classes of aircraft will be included Rotorcraft, Gyro, eVTOL

- 14 CFR part 1 defines different aircraft classes:
  - Airplane means an engine-driven fixed-wing aircraft heavier than air, that is supported in flight by the dynamic reaction of the air against its wings
  - Powered Lift means a heavier-than-air aircraft capable of vertical takeoff, vertical landing, and low speed flight that depends principally on engine-driven lift devices or engine thrust for lift during these flight regimes and on nonrotating airfoil(s) for lift during horizontal flight
  - Rotorcraft means a heavier-than-air aircraft that depends principally for its support in flight on the lift generated by one or more rotors

Why Expand LSA?

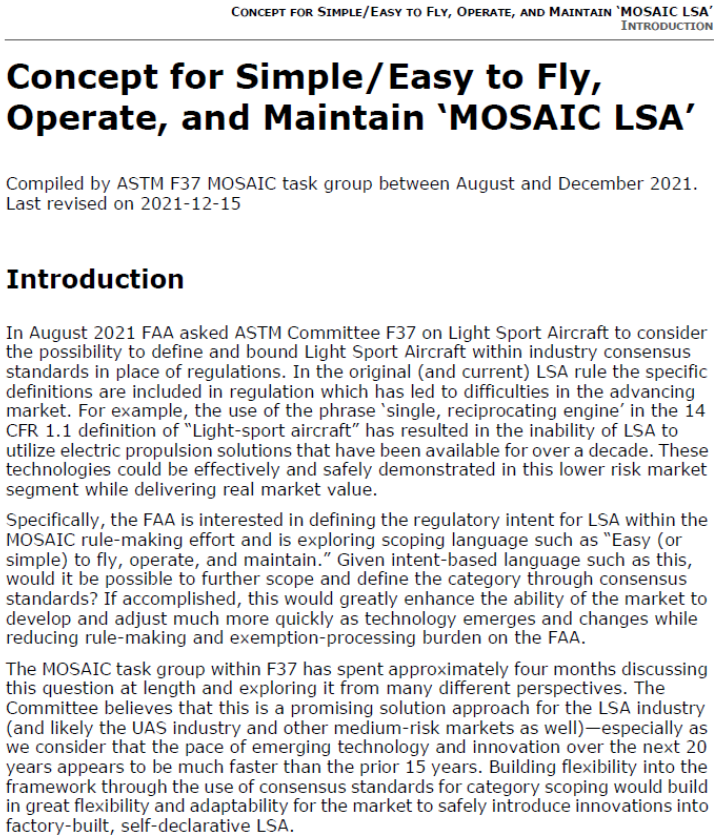
- Self-declarative compliance creates immense flexibility for manufacturers to innovate with means of compliance and affordably bring safe aircraft to the market.

- 208 new aircraft designs brought to market in 18 years—one new make/model every month for 18 years straight!

- Certification burden should match how the aircraft will be used. Personal aircraft, flight training, aerial work but not common carriage

Supporting MOSAIC LSA in F37

- F37 committee was asked what would make an airplane Simple/Easy to Fly, Operate, and Maintain
- Proposed rule would *very* substantially expand the category and types of LSA aircraft
  - Heavier
  - Faster
  - More seats
  - Greater utility
  - Powered lift or eVTOL configurations
  - and more…
- Simple/Easy to Fly, Operate, and Maintain
  - What if it were possible to put the definition/bounds of LSA in consensus standards instead of the rule?
  - F37 developed and delivered a 20-page concept paper to FAA
  - Proposed overall concept, standards implementation strategy, and regulatory implementation strategy
  - Proposed standards-based training and endorsements framework for pilots, ways to simplify maintenance of complex systems, and margin-based performance concepts



CONCEPT FOR SIMPLE/EASY TO FLY, OPERATE, AND MAINTAIN 'MOSAIC LSA'
INTRODUCTION

Concept for Simple/Easy to Fly, Operate, and Maintain 'MOSAIC LSA'

Compiled by ASTM F37 MOSAIC task group between August and December 2021.
Last revised on 2021-12-15

Introduction

In August 2021 FAA asked ASTM Committee F37 on Light Sport Aircraft to consider the possibility to define and bound Light Sport Aircraft within industry consensus standards in place of regulations. In the original (and current) LSA rule the specific definitions are included in regulation which has led to difficulties in the advancing market. For example, the use of the phrase 'single, reciprocating engine' in the 14 CFR 1.1 definition of "Light-sport aircraft" has resulted in the inability of LSA to utilize electric propulsion solutions that have been available for over a decade. These technologies could be effectively and safely demonstrated in this lower risk market segment while delivering real market value.

Specifically, the FAA is interested in defining the regulatory intent for LSA within the MOSAIC rule-making effort and is exploring scoping language such as "Easy (or simple) to fly, operate, and maintain." Given intent-based language such as this, would it be possible to further scope and define the category through consensus standards? If accomplished, this would greatly enhance the ability of the market to develop and adjust much more quickly as technology emerges and changes while reducing rule-making and exemption-processing burden on the FAA.

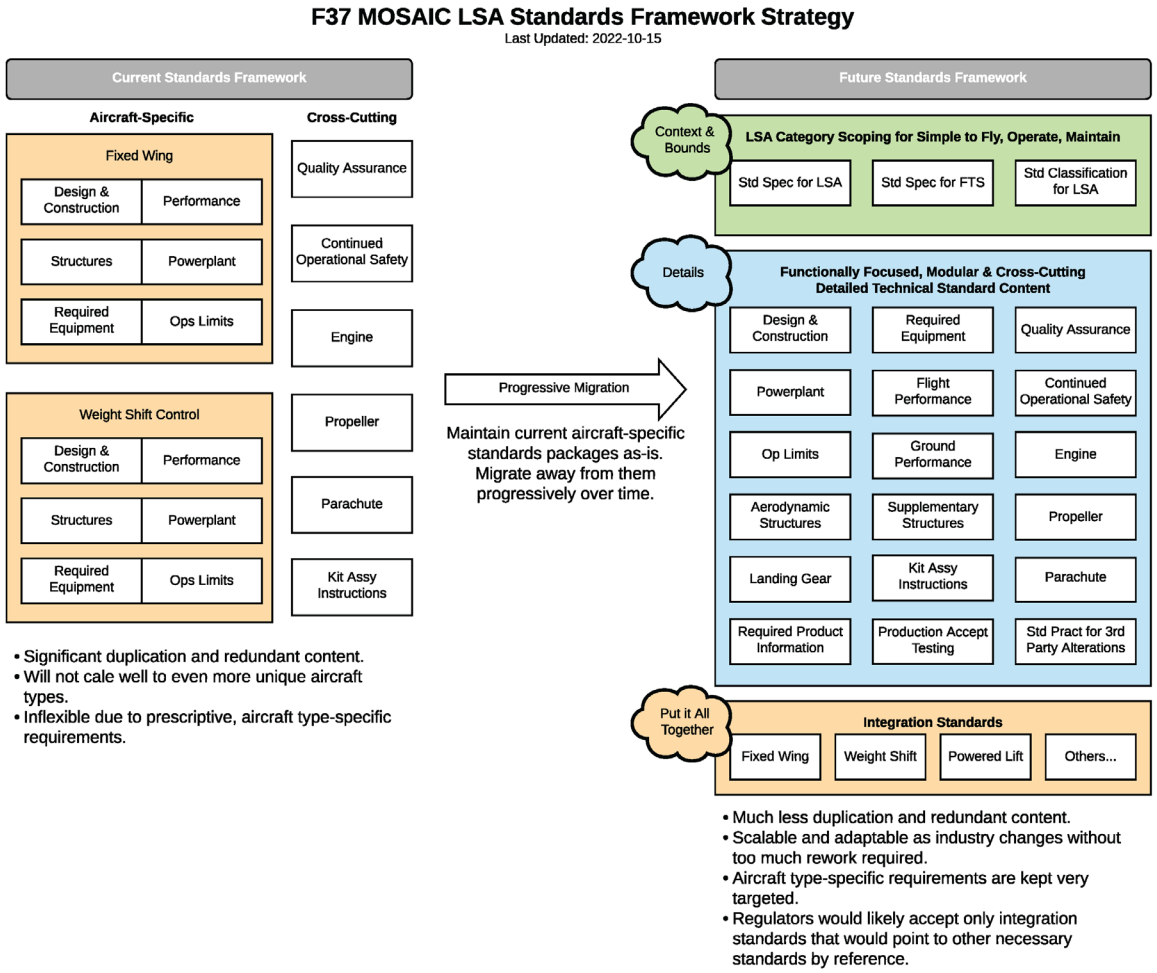
The MOSAIC task group within F37 has spent approximately four months discussing this question at length and exploring it from many different perspectives. The Committee believes that this is a promising solution approach for the LSA industry (and likely the UAS industry and other medium-risk markets as well)—especially as we consider that the pace of emerging technology and innovation over the next 20 years appears to be much faster than the prior 15 years. Building flexibility into the framework through the use of consensus standards for category scoping would build in great flexibility and adaptability for the market to safely introduce innovations into factory-built, self-declarative LSA.

FAA Update

- FAA MOSAIC Rulemaking
  - **M**odernization **O**f **S**pecial **AI**rworthiness **C**ertification
  - Expanding the LSA category
  - Rulemaking split apart from drone/UAS rulemaking (which led to one year delay)
  - NPRM expected mid 2023 (one year delay from last workshop)
  - Rule expected to go live at the end of 2024 (one year delay from last workshop)
  - Simple/Easy to Fly, Operate, and Maintain: What if it were possible to put the definition/bounds of LSA in consensus standards instead of the rule?
  - FAA has made clear that standards need to be in place

Supporting MOSAIC LSA in F37

- New standards being developed
- Considering all major standards next to one another as new standards are being developed
- Considering new classes of aircraft during standards development
- Looking to add rotorcraft standard
- Looking at requirements for eVTOL
- Introduction of new technology



Supporting MOSAIC LSA in F37

- Introduction of new technology
- Overspeed warning already part of flutter standard.
- AOA will most likely be a requirement of ANAC (will help significantly with Loss of Control LOC accidents
- Considering requiring EFIS systems. Other warnings possible such as canopy warning.
- Instrument flight dependent on the development of a standard

Brazil ANAC Update

- Brazil ANAC MOSAIC-like Effort
  - Rule is live as of July 2022!
  - Fixed-wing only with more targeted scope based on market demand
  - Single engine (reciprocating or electric)
  - Max take off weight / mass—2,994 lbf / 1361 kg
  - Max 4 seats
  - Stall speed in landing configuration—≤ 61 KCAS
  - Max level flight speed at max continuous power—V_H = 185 KCAS
  - In-flight adjustable propellers allowed

MOSAIC LSA Aeroelasticity

- Uses current ASTM F37 standards plus a flutter standard
- F3619-22 recently published to accommodate likely speed increased for MOSAIC fixed-wing aircraft
- Requires Report 45 analysis or GVT and flight test.

Part 21 Light – Current LSA

- Future alignment of MOSAIC and Expanded LSA?
- What will be an acceptable means of compliance?

- Part 21 Light limited to fixed pitch propellers
- Part 21 self declarative limited to 2 persons 1200 kg (2645 lb)
- Part 21 certified limited to 4 persons 2000 kg (4400 lb)
- Instrument flight allowed

Part 21 Light – Current LSA

- Future alignment of MOSAIC and Expanded LSA?
- What will be an acceptable means of compliance?

Looking at current LSA

- FAA has issued 16 notices of availability. The first was March 2005 and the most recent was February 2022.
  - Overall, this has worked very well and has generally kept up with the standards development process.
- EASA references standards within CS-LSA (with some modifications).
  - This has *not* worked very well as it has not been kept up-to-date even as the standards have implemented recommendations from EASA and gone beyond in several areas.
- Other countries have a mix of self-declarative systems and type certification using standards as the agreed means of compliance.
- The lack of TC issuance in some countries (including the USA) does cause some issues with import/export of the products.

How to become involved in MOSAIC?

Bi-Weekly Meetings (Online)
Friday 3:00-4:00 pm EST, 12:00-1:00 PST Next Meeting April 7th
Contact Adam Morrison to be added to the group adam@enablingflight.com
This group is working on the standards content that will be balloted to enable the expansion of LSA aircraft size, weight, and performance.

Spring Meeting (in Person and Online)
Title: Light Sport Aircraft
Dates: Tuesday May 23, 2023 - Wednesday May 24, 2023
Location: EAA Headquarters, 3000 Poberezny Road, Oshkosh, Wisconsin
Event Name: F37 May 2023 Meeting
For F37 members Registration is now https://na.eventscloud.com/website/52098/

Informal Meetings at Air Venture Oshkosh
Wednesday July 26th Oshkosh, Wisconsin 9:00am in the EAA Heritage Gallery (the building where we normally meet for those who have been in the past)

Fall Meetings (in Person and Online)
Title: Light Sport Aircraft
Dates: Monday October 30, 2023 - Thursday November 02, 2023
Location: Washington Hilton, 1919 Connecticut Ave NW, Washington, DC, District of Columbia
Event Name: October 2023 Committee Week

Join the new MOSAIC / Expanded LSA Subcommittees
F37.01 Scoping
F37.02 Functional Content
F37.03 Aircraft Integration

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Thank you!

Questions?

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