LAA TYPE ACCEPTANCE DATA SHEET
TADS 371
COLOMBAN MC-30 LUCIOLE

Issue 1	Initial issue	22/11/19	MR

This TADS is intended as a summary of available information about the type and should be used during the build, operation and permit revalidation phases to help owners and inspectors. Although it is hoped that this document is as complete as possible, other sources may contain more up to date information, e.g. the manufacturer's website.

Section 1 contains general information about the type.
Section 2 contains information about the type that is **MANDATORY** and must be complied with.
Section 3 contains advisory information that owners and inspectors should review to help them maintain the aircraft in an airworthy condition. If due consideration and circumstances suggest that compliance with the requirements in this section can safely be deferred, is not required or not applicable, then this is a permitted judgement call. This section also provides a useful repository for advisory information gathered through defect reports and experience.

Section 1 - Introduction

1.1 UK contact

Nil.

1.2 Description

The Colomban MC-30 Luciole is a single-engined single-seat monoplane design of composite construction, the primary structure being manufactured from a combination of plywood, spruce, carbon fibre pultrusion and aluminium alloy.

The fuselage is of conventional spruce and plywood box construction, with reinforcement provided by aluminium frames and strips of carbon fibre/epoxy pultrusion at the wing attachment location. A single fuel tank is fitted in front of the pilot's instrument panel. A one-piece canopy is fitted, hinged at the (starboard) side, allowing straightforward access to the pilot's seat. A roll-over structure is provided by a reinforced top decking hoop just aft of the pilot, plus the structural canopy frame.

The horizontal tail is of the all-flying type without fixed or moveable trim/anti-balance tab at the trailing edge. Instead, both trim and pitch control feel are provided by glass fibre spring rods introduced into the aircraft pitch control system which act as a spring bias. The tailplane has a C-spar manufactured from spruce and birch plywood with carbon pultrusion reinforcement. The ribs are manufactured from Klegecell 50 PVC foam with okoume plywood capping. The leading edge is okoume plywood covered to form a D-box, attaching to the spar at the rear edges. Attachment of the horizontal tail to the fuselage structure is via aluminium alloy fittings. The horizontal tail is actuated by a push-pull rod.

The construction of the all-flying vertical tail is similar to the horizontal tail, the rudder being actuated by control cables, with the control feel enhanced by glass fibre spring rods. The rudder cables are arranged in two lengths each side, the lengths being connected by a tubular pultruded carbon fibre 'reducer bar' which reduces the deflections of the rudder surface in relation to the deflection of the rudder pedals.

The wing is of conventional design for this class of aircraft. The wing main spar is of conventional box-spar construction with spruce and pultruded carbon fibre spar caps and birch plywood webs. The main spar of each wing panel extends across the fuselage width and joins to the other and the fuselage structure by removable steel pins. Steel pins are also used at the wing forward and rear root attachments. With the exception of the plywood wing root-rib, the wing ribs are manufactured from Klegecell 55 PVC foam. A lightweight rear C-spar is constructed with spruce caps and an Okoume plywood web. A light spruce leading edge member is provided. The wing skins are constructed from okoume plywood and are a continuous wrap from the rear spar, around the leading edge and back to the rear spar. The wing root fittings are manufactured from aluminium alloy.

The fuselage is provided with reinforced frames at the wing attachment points to transfer lift, drag and torsion loads into the fuselage. The fuselage frame accommodating the wing main spar attachments is constructed with a spruce and Okoume plywood box structure across the fuselage to constrain the wing spar tangs from lateral buckling. The wing panels are fitted with conventional ailerons and manually controlled two-piece plain-flaps, both push-rod actuated.

The undercarriage is of conventional layout with a one-piece cantilever sprung glass fibre main undercarriage leg and tubular steel drag bracing, and a glass fibre cantilever sprung tailwheel assembly. The main wheels are fitted with cable operated drum brakes, operated from a lever on the pilot's control stick.

The pilot's seat base is manufactured from a sandwich of Klegecell foam with carbon fibre faceplates. The seat base is supported at the front fuselage frame #4 and at the back by two aluminium alloy straps. The seat back is manufactured from aluminium tube with a fabric back support. The seat base is adjustable for height and the seat-back is adjustable for rake. A four-point pilot safety harness is fitted.

The Briggs and Stratton 0114-E1 engine is fitted to this aircraft, modified and installed in accordance with drawings and the installation manual provided by the designer. An Arplast 1.16m diameter ground adjustable propeller is fitted as standard. Note that the only propeller(s) approved for an individual aircraft are those listed on the individual aircraft's Operating Limitations document or in the PTL-1 (Propeller Type List) for the type.

Despite its extreme light weight, the MC-30 is only accepted in the UK as an SEP Aeroplane, not a microlight, by virtue of the stall speed in the landing configuration exceeding 35 knots CAS.

Section 2 – Mandatory information for owners, operators and inspectors

At all times, responsibility for the maintenance and airworthiness of an aircraft rests with the owner. Condition No 3 of a Permit to Fly requires that: *"the aircraft shall be maintained in an airworthy condition".*

2.1 Fast Build Kit 51% Compliance

The MC-30 is only available as a plans-built aircraft albeit small pre-manufactured components are also available from France. The aircraft therefore easily complies with the 51% rule.

2.2 Build Manual

The design is provided as a set of drawings plus build instructions, from the designer.

A special set of instructions 'Technology du Construction de L'avion' gives essential advice on building the Luciole, an English translation by Richard Mole is available.

A special set of instructions 'Bois en Plateaux Contra plaque' gives details of wood conversion and woodworking.

A special set of instructions gives details of the conversion of the Briggs and Stratton engine. An English translation by Richard Mole is available.

An electrical wiring diagram for the accepted electrical system on G-LUCL is available.

2.3 Build Inspections

Build inspection schedule MC-30 Luciole.

A special LAA set of inspections relate to the conversion of the Briggs and Stratton engine.

Inspector approval code A-A or A-W. Inspector signing off final inspection also requires 'first flight' endorsement.

2.4 Flight Manual

A Flight Manual has been provided by the designer, 'Manual de Vol de L'avion Luciole MC-30'.

2.5 Mandatory Permit Directives

None applicable specifically to this aircraft type.

Also check the LAA website for MPDs that are non-type specific (TL2.22).

2.6 LAA Required Modifications (including LAA issued AILs, SBs, etc)

2.6.1. Modification of the flap quadrant to include an inner 'stop' to prevent overload of the flap lever mounting flange. See designer's Part Nos.60241 and 60242, or R Teverson modification as carried out on G-LUCL.

2.6.2. Modification of the aircraft pitch control system to improve the strength of the parts. See designer's modifications to Part Nos. 60112, 60111 and 60107 promulgated in 'Errata Dossier Luciole du 26 March 2012'.

2.6.3. Firewall from Diafirewall as plans with all through metal fittings coated with intumescent fireproof paint.

2.6.4. Modification to the inboard flap hinge carried out in accordance with designer's errata dated 22/12/10. 2 different schemes are shown, one for aircraft where wing is already skinned, the other for wings not yet skinned. Both are accepted.

2.6.5. Introduction of stops to the pitch control system in accordance with the designer's instructions.

2.6.6. Drawing Change - Drawing 601 - Long Aileron Pushrods Part No. 60127 - Glue symbol to be added at end-fittings.

2.6.7. Modification Drawing 103 must be embodied (additional post in the wing box-spar).

The following modifications have been introduced by the builder of the UK prototype, G-LUCL, which are considered to be required on all future Luciole aircraft built in the UK:

MOD/371/001	The rudder control reducer tube Part No. 60005 has been replaced with a 16 mm OD x 1.5 mm wall thickness tube, supplied by Woolmer Forest Composites to a configuration as agreed with the Light Aircraft Association.
MOD/371/002	The rudder cable attachment to the rudder horn is by an AN 115-21 shackle and appropriately length MS 20392 clevis pin, deleting the rear cut-outs/slots shown on drawing Part No. 301-29.
MOD/371/003	The canopy has been fitted with a revised locking mechanism which allows a locked canopy to be opened from the outside (Richard Teverson drawing dated 3/8/10 – 2 sheets).
MOD/371/004	The vertical engine mounting angles, Part No. 20206 must be manufactured from 2024T351 aluminium alloy.
MOD/371/005	Improved fuel tank mounting – rear retaining screws replaced by 3mm bolts. R.Teverson drawing dated 2010 provides details.
MOD/371/006	Metal-bodied Mikuni DF44-18 fuel pump substituted (as supplied by www.allensperformance.co.uk) in place of plastic-bodied pump.
MOD/371/007	Fuel pipes to be fire resistant in engine bay i.e. suitable automotive braided rubber fuel hose.
MOD/371/008	Improved retention of tailplane to mounting tray (mounting studs drilled for wire locking above retaining nuts).
MOD/371/009	Addition of two brass anti-chafe tubes 45mm long ¼" OD x 0.028" wall glued with Araldite 420 to top of flexible glass rod which provides pitch trim and pitch self-centring, to allow smooth running through aluminium block 601-38. Block width increased to 17mm x 17mm and hole size increased to ¼" loose fit on brass tube.
MOD/371/010	Geometry change to tailwheel mounting welded assembly to give positive castoring rake angle and with raised ends to steering spring attachment to improve line of action of springs and improve steering, R. Teverson drawing dated 12/9/11 provides details.
MOD/371/011	Addition of fuel quantity gauge (e.g. Piper Cub style float and wire through bush in filler cap or SkyDrive hydrostatic type).
MOD/371/012	Grain direction in critical tailplane attachment bracket 20114 and wing rear spar attachment metal fittings to be specified for improved fatigue / stress corrosion performance. For parts 10214, grain should be along the part (horizontal as installed). For parts 20114, grain should be vertical and not horizontal as installed.
MOD/371/013	'Max power' throttle stop to be fitted at throttle lever in cockpit, Richard Teverson drawing dated 14/3/11 provides details.

MOD/371/014 Main undercarriage forward strut Part No. 40027 strengthened against buckling by foam/glass fibre bonded fairing per G-LUCL.

MOD/371/015 GRP Trim Spring Rods Part Nos. 60031 and 60136 - ensure that these are glued into their sockets. Ensure feature added at the top of rods to prevent the rudder cables pinging off the GRP rods (e.g. split pin).

MOD/371/016 Control friction nuts - ensure split-pin or other feature provided to prevent the wing nuts coming off entirely.

MOD/371/017 Trim control friction nut Part No 60157. Wire lock or split pin once adjusted to avoid taking off with friction device loose.

MOD/371/018 The control stick is bonded as well as riveted to the steel tube spigot Part No. 60103 (no bond symbol is shown on the drawing).

2.7 Additional engine operating limitations to be placarded or shown by instrument markings

Notes:

- Refer to the engine manufacturer's latest documentation for the definitive parameter values and recommended instruments.
- Where an instrument is not fitted, the limit need not be displayed.

2.8 Control surface deflections

Ailerons	Up: 25° Down: 15°
Elevators	Up: 22° Down: 14°
Rudder	Left: 25° Right: 25°
Flap	30/45°

2.9 Operating Limitations and Placards

(Note that the wording on an individual aircraft's Operating Limitations document takes precedence, if different.)

1. Maximum number of occupants authorised to be carried: One

2. The aircraft must be operated in compliance with the following operating limitations, which shall be displayed in the cockpit by means of placards or instrument markings:

2.1 Aerobatic Limitations

Intentional spinning is prohibited.
Aerobatics prohibited.

2.2 Loading Limitations

Maximum Total Weight Authorised: 200 kg
CG Range: Limits 120 mm to 228 mm aft of datum.
Datum Point is: The leading edge of the port wing.

2.3 Engine Limitations

Maximum Engine RPM: 4000
Maximum continuous engine RPM: 3500

2.4 Airspeed Limitations

Maximum Indicated Airspeed: 139 mph
Maximum Indicated Airspeed with flaps extended: 80 mph

2.5 Other Limitations

The aircraft shall be flown by day and under Visual Flight Rules only.
Smoking in the aircraft is prohibited.

Additional Placards:

"Occupant Warning - This Aircraft has not been Certificated to an International Requirement"

A fireproof identification plate must be fitted to fuselage, engraved or stamped with aircraft's registration letters.

2.10 Maximum permitted empty weight

With a 200 kg max gross weight and 28 litre tank, the empty weight must be less than 94 kg if an average weight pilot of 86 kg is to be able to carry full fuel, assuming no baggage carried, as CS-VLA specifies. This empty weight is probably not achievable however – the UK prototype weighed 96.7 kg. LAA would accept empty weights up to 103 kg which relates to a 77 kg pilot being able to carry full fuel per CS 23 code.

Section 3 – Advice to owners, operators and inspectors

3.1 Maintenance Manual

Nil known.

3.2 Standard Options

The listing below shows the designer's options that have been accepted by the LAA:

- Height of turtle deck for medium height pilots
- Carb intake incorporating ram air and pilot selectable hot air
- 28L Aluminium fuel tank used on G-LUCL, per R. Teverson drawing dated 2/8/10

The designer's composite fuel tank has not been assessed by LAA at this stage.

3.3 Manufacturer's Information (including Service Bulletins, Service Letters, etc)

In the absence of any over-riding LAA classification, inspections and modifications published by the manufacturer should be satisfied according to the recommendation of the manufacturer. It is the owner's responsibility to be aware of and supply such information to their Inspector.

Ref	*Date*	*Description*	*Designer's compliance status*	*Applicability*
Errata	5.01.09	Miscellaneous updates	mandatory	All UK a/c
Errata	2.17.09	Miscellaneous updates	mandatory	All UK a/c
Errata	26.09.09	Miscellaneous updates	mandatory	All UK a/c
Errata	12.12.09	Miscellaneous updates	mandatory	All UK a/c
Errata	10.02.10	Miscellaneous updates	mandatory	All UK a/c
Errata	28.4.10	Miscellaneous updates	mandatory	All UK a/c
Errata	09.09.10	Miscellaneous updates	mandatory	All UK a/c
Errata	22.12.10	Miscellaneous updates	mandatory	All UK a/c
Errata	26.03.12	Miscellaneous updates	mandatory	All UK a/c

3.4 Special Inspection Points

The combination of materials used in this design (for example carbon fibre pultrusion pop-riveted to aluminium alloy sheet) may promote galvanic corrosion. Similarly, aluminium alloy parts have been bonded to wood. The long-term durability of these items relies on accurate glue line thickness control during the build and also on careful storage of the aircraft. Special inspection points have been raised in the aircraft build and maintenance inspection schedules to address these issues.

Inspection of the plain bearings in the control system indicates a high margin of safety, however, the design of control system hinges does not provide for replaceable bushes to accommodate wear at these points. The inspection of the control system hinges for wear will therefore be a special inspection point, with replacement of the hinge fittings being necessary when wear is found in these parts.

It is possible for loose articles to jam the control system in the cockpit region. Pilots will be expected to carry out a loose article check in the aircraft and to ensure that pockets are empty or sealed prior to flight.

The rudder cables, at 2.5 mm diameter, do not meet the normal requirement for 3.0 mm minimum control cable diameter. Special inspection points have been added to the aircraft maintenance schedule to address this issue.

A special set of inspections relate to the Luciole but during construction and in service, which is now included with the airframe inspection document for the Luciole. Inspectors undertaking the inspection of the Luciole during construction and while in service are required first to contact LAA Engineering for a verbal briefing on this aircraft design.

A special set of inspections relates to the conversion of the Briggs and Stratton engine for the Luciole, which is now included with the airframe inspection document for the Luciole. Inspectors undertaking the inspection of Briggs and Stratton engine conversions are required first to contact LAA Engineering beforehand for a verbal briefing on this aspect of the project.

The following entries are required to be added to the aircraft inspection schedule:

1. Pre-Flight:
   a. Ensure that the fuselage inspection panel Part No. 20105 in rear fuselage bottom skin (between fuselage stations C15 and C16) is secure prior to flight.

   b. Check security of aileron control lever in aileron surface for any signs of relative movement.

   c. Check engine mount structure, especially:
      - Vertical firewall angle members Part No. 20206 for cracking
      - Engine Attachment Rods Part No. 50101 for security at the clamped attachment to the engine.
      - Clamp Part No. 50104 for cracking.
      - Security of all other attachments.

   d. Check the security of all fasteners in the adjustable seat - if adjusted prior to flight. Ensure nyloc nuts are checked for condition (locking ability) on re-assembly when adjusting the seat. Replace nuts if self-locking feature is worn.

   e. Check security of all wing attachments and aileron/flap controls plus airspeed tubes if the wings have been removed and replaced prior to flight.

   f. Ensure wing attachment pins are locked in position with appropriate safety pins prior to flight.

   g. Ensure that aileron control rods are correctly attached in the fuselage and that bolt Part No 60145 is secured prior to flight. When re-assembling this bolt, ensure that anchor nut is still providing secondary locking. If bolt rotates freely in anchor nut when threading in the bolt, then replace anchor nut.

   h. Ensure that flap system quick-release is safety wired prior to flight.

2. 25 hours/Annual:
   a. Inspect rudder cables Part No 60011 at the forward clamp (forward of the firewall) Part No. 60018, at the rudder pedal and at the reducer tube (all cables) in the rear fuselage for security and signs of wear or broken cable strands.

   b. Inspect fairleads for the rudder cables for security and wear.

   c. Inspect all glued joints between aluminium parts, aluminium parts and the wooden structure, and aluminium parts and carbon fibre for any evidence of corrosion in the joint. These areas include bonded doublers at the aileron and flap hinges (check for glue failure and loose rivets), the rear wing attachment plate bonded to the rear spar, the top rudder hinge attachment to the fuselage, carbon control system pushrod tubes (aluminium end fittings), the bonded/bolted attachments of the pilot's safety harness, pilot's

seat to the wooden structure, the rear-spar carry-through structure at Frame 5 where carbon pultrusion is glued and riveted to the aluminium frame structure, plus all other similar parts.

d. Inspect all aluminium fittings with press-fit bearings or continuously applied loads for cracking (stress corrosion), for example Part Numbers 10204, 20114, 40107, 60020, 60111, 60126, 60205, 60235.

e. Inspect all aluminium fittings for integrity of corrosion prevention coatings (paint and glue) to guard against corrosion.

f. Visually inspect welded butt-joint between the main landing gear axle Part No. 40002 and the attachment plate Part No. 40003 for cracking. Use dye-penetrant inspection if in doubt.

g. Visual inspection of engine attachments for security and freedom from cracks.

h. Security and condition of the rudder pedal assembly, including the attachment tray, Part No. 60001, the sliding rods Part No. 20221 (including attachments at each end), the attachment fittings Part Nos 60009 and 60010, and the adjustment windlass assembly.

3. Build Instructions

a. Many of the glued joints between aluminium and wood and aluminium and carbon fibre rely on proper glue line thickness control to ensure an insulating layer of adhesive in the joints to prevent galvanic corrosion. Thus, precautions in the built manual for accurate glue line control, and excessive clamping forces, must be heeded. All glues joints must be free from voids in the glue line, with an appropriate spew of glue around the edge of the joint, with the parts primed and painted overlapping the glue.

b. Ensure the clearance between the rudder pedals and the battery contactor or other electrically 'live' components is sufficient that contact could not occur even with the pedals in the fully forward position, max rudder deflection and any conceivable amount of 'stretch' in the rudder cables – bearing in mind that in a tight spot, the pilot might press up to 200 Lbs on one foot without over-exerting himself, perhaps forgetting the extremely lightweight construction of the Luciole.

c. During build ensure all electrically 'live' components are properly insulated with rubber boots or similar so that even if contact did occur, an electrical short circuit would not take place.

4. Storage

a. The Luciole is very appealing and will be great fun to build. However, it is clear from the methods of construction that the aircraft will require careful storage away from damp conditions and will require careful and regular inspection. The service calendar life will be short unless the aircraft is very carefully stored and maintained. Particular concerns are galvanic corrosion of aluminium parts where they are bonded without surface pre-treatment, particularly but not exclusively to carbon (any aluminium bond must be subject to regular inspection), and stress corrosion cracking of aluminium plate and extruded components subject to a constant stress state.

b. One approach would be to make up sample joints (multiple copies) and test one of each per year. The sample joints must be stored at all times with the aircraft.

5. Engine

a. Inspectors, please be advised special authorisation is required to sign the Briggs and Stratton engine conversion inspections (as provided in the project build book). Please contact Chief Inspector.

3.5 Operational Issues

1. *Safety Spot* reference

The following *Safety Spot* articles are relevant to Colomban MC-30 Luciole:

Light Aviation June 2019	*Colomban MC-30 Luciole – Fire Whilst Taxiing* Article notes an accident due to starter solenoid short circuiting on rudder pedal contact.

3.6 Standard Modifications

None.

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Please report any errors or omissions to LAA Engineering: engineering@laa.uk.com