FLIGHT TEST REPORTS

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INTRODUCTION

When modifications are introduced to an aircraft, it is often necessary to check how that modification has affected the aircraft's flying characteristics. Where possible, LAA Engineering will prescribe a standard flight test schedule to be completed, which will capture all of the necessary information about the aircraft's handling and performance that will enable LAA Engineering to approve the modification. Occasionally, LAA Engineering will ask the assessing pilot to provide a 'narrative test report' describing the effect of the modification on the aircraft.

LAA Engineering might specify what characteristics need to be assessed (e.g. by reference to a particular paragraph of an airworthiness code) or the pilot might need to liaise with LAA Engineering to determine which tests need to be flown. Some tests will require careful planning in order that they are conducted safely. This Technical Leaflet does not cover such issues.

REPORT FORMAT

Although there is no formal requirement for a 'narrative report' to take a particular form, it should contain all of the relevant information. The guiding principle should be that another pilot with a flight test report in hand should be able to replicate the flights and (in theory) obtain the same results.

The reports should contain three main sections:

1) General information.
2) Details of the tests flown and the results observed.
3) Recommendations and conclusions.

For a simple modification, the report is likely to be less than one side of paper, but a complex modification might run to several sheets.

GENERAL INFORMATION

As a minimum, the report should contain:

- Details of the aircraft (registration and type).
- Reference to the modification being looked at (LAA modification number and brief description)
- Requirement to be met/satisfied
- Date(s) of the test flight(s).
- Name(s) of the crew.
- Location of the test(s) (e.g. airfield name).
- Prevailing weather conditions.
- Configuration of the aircraft (weight, cg position, etc)

If the tests were conducted over a number of different flights or days, then the report should be logically ordered so that it's clear which conditions/parameters relate to which flight.

DETAILS OF THE TESTS FLOWN AND THE RESULTS OBSERVED

The details of the tests flown should be sufficient that the conditions could be reproduced. For instance, "the aircraft was stalled" doesn't give enough information and would be better described as "a 1kt/s wings-level stall was performed with the engine idling from a height of 5,000 feet".

Similarly, the observed results should be reported as objectively as possible, rather than skipping straight to a conclusion. For instance, "the stalls were satisfactory" would be better described as "on the stall at 35 kt, the nose dropped sharply with no wing drop and a standard stall recovery was performed with an overall height loss of 50', there was no tendency to spin, which is typical for the type".

The report should include details of any development work/adjustments or problems occurring during the test programme, even if they appear to be trivial – for example 'on flight 1 the stall

warner sounded at any airspeed below 60 knots, the angle of the vane was adjusted after flights 1 and 2 to optimise the speed at which the warner sounded'. Or 'the stall warner triggered bursts of electrical interference on the aircraft's intercom. Subsequently after flight 2 the earth connection to the buzzer was re-made and no further interference was experienced on flight 3 and 4'.

RECOMMENDATIONS AND CONCLUSIONS

One of the things that LAA Engineering is looking for in a flight test is whether the pilot thinks that the modification is successful, useful and/or suitable for the aircraft on which it is installed. In some instances, although a modification has no adverse handling or performance effect on the aircraft, it is still not desirable for other reasons (e.g. bad ergonomics or distracting to the pilot). The conclusions section is where the pilot can sum up the results of the testing and recommend to the owner any changes that could (or should) be made to make the modification more effective.

In practice, these iterations of testing and improvements often take place before the final report is written. It is very important to involve the inspector at the time of any tweaks as he or she will need to sign off any changes in the logbook. Any substantive changes might well need consultation with LAA Engineering, so check if there's any doubt. The test report should therefore document how the changes have affected the aircraft's flying qualities.

The final section of the report should contain the pilot's recommendation as to the adoption of the modification.

Finally, the pilot should sign and date the report, preferably with a pilot's qualification and licence number, so that it's clear who flew the aircraft.

The report should be supplied to the owner (or modification applicant) and they in turn should send a copy to LAA Engineering together with any other requested information.

SAMPLE FLIGHT TEST REPORT

G-ABCD, Vans RV-20

Purpose of test: Evaluate stall warner fitted under LAA mod xxxx

Requirements to be met: LAA stated requirement of a clear audible warning commencing between 4 and 12 kt above the stall and continuing to the stall, as stated in LAA flight test briefing letter dated xxxx.

Tests flown on 1/1/12 from Coventry Airport.
Pilot, J Bloggs; Observer, B Smith.

Weather: OAT at ground level 9°C, winds 5kn northerly, scattered cloud at 8,000', no turbulence.
Aircraft loaded to 750 kg (maximum take-off weight), with cg at 10.3" aft of datum.

Tests flown: with the aircraft trimmed for level flight at 50 kt at 5,000 ft, a 1kt/s wings-level stall was performed with the engine idling. The stall warner sounded at 41 kt and there was some pre-stall buffet felt through the control column at about 38 kt. The aircraft stalled at 35 kt: the nose dropped sharply with no wing drop. A standard stall recovery was performed with an overall height loss of 150'; there was no tendency to spin. The stall characteristics were typical for the type.

During the 1 kt/s deceleration the stall warner first sounded at a speed of 41 kt, representing a margin of 6 kt warning above the actual stall speed, and continued to sound at all speeds down to the stall. This meets the LAA requirement of a warning between 4 and 12 kt above the stall. However the stall warner was barely audible over the aircraft/engine noise and was therefore not considered adequately attention-getting.

It was also noted that operation of the stall warner resulted in the radio spontaneously toggling to the standby frequency, suggesting electrical interference problems.

Conclusions:

The stall warner was considered compliant with the speed requirement but not acceptable because it was insufficiently audible and interfered with the radio frequency selection.

I recommend that this modification is not approved on this aircraft unless the warner is made audible enough to attract the pilot's attention and the radio interference problem is eliminated.

J Bloggs J Bloggs 2/1/12, PPL 877878