

	<b>Standard Modification</b> Issue 1	Mod No. SM12349
		Page : 1 of 3
		Compiled : G McDill
		Approved : F Donaldson

## TITLE : Static Longitudinal Stability Augmentation

APPLICABILITY : **Rans S-7S**  
Mod Type : **New build and Retro-fit**

### 1. Introduction

During flight testing for the initial aircraft's Permit to Fly approval it was found that at a CG between 50" and 50.5" AOD (aft of datum) the aircraft exhibited static longitudinal (pitch) instability. Positive static longitudinal stability was achieved by fitting an elevator down spring using bungee cords. As a result it was necessary to revise the range of movement of the moveable elevator trim tab.

### 2. Parts List

Qty	Part No.	Description	Source
14 ft	MIL-C-5651	Bungee cord	Skycraft Ltd 01406 371779 www.sky-craft.co.uk
4	06-12900	End fasteners	
2	T12-HT6	Hummertang	
Alternative forward attachment arrangement			
2	DG6	Cushioned clamp	
2	AN3-6A	Bolt	
2	AN364-1032	Lock nut	
2	KAAC0004-4	Raw stock for spacer	
2	AN960-10/10L	Washer	

#### List of related photo's

Photo No.	Title / Description	Issue
1 and 1a	Bungee attachment at idler bellcrank at St6	1
2	Bungee attachment at St3 welded hoop	1
3	Alternative arrangement for bungee attachment at St3 frame	1

### 3 Action

This work requires oversight and signing by an LAA inspector, with duplicate control inspections as required.

Cut the shock cord into two pieces 7 feet long. These will be trimmed to their final length later.

Attach the bungees to the Hummertangs installed at the forward AN3-25 bolt on the elevator push-pull tube/idler bellcrank in the rear fuselage at St6. See photos 1 and 1a. It will be necessary to adjust the washer arrangement to ensure free movement of the Hummertangs and retain the ability to split-pin the castellated nut. It may also be necessary to replace the AN3-25 bolt with an AN3-26 if adequate clearance cannot be achieved.

The forward bungee attachment is to the baggage bag hold-down loops which are welded to the lower longerons just aft of St3. See photo 2. Check that sufficient clearance exists between the bungee and the St4 diagonal brace on the right hand bungee. If these are in contact with each other an alternative mounting for the forward bungee attachment is via a DG-6 cushioned clamp with an AN3-6A bolt and 9mm long spacer attached to St3 diagonal brace at a distance of 3.5" from the base of the St3 frame. See photo 3.

	<b>Standard Modification</b> <b>Issue 1</b>	Mod No. SM12349
		Page : 2 of 3
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Using a suitable spring balance, set the bungees so that the combination of bungee force and elevator weight gives 4½ to 5lb aft force measured at the centre of the pilot's stick grip, with the elevator neutral. To minimise the effect of the inherent static friction in the elevator control system measure the stick force while the stick is gently moved backwards and forwards and taking the average of the two force readings. If the bungees are too tight it will affect the ability to trim the aircraft at low speed but enhance static longitudinal stability at aft CG. Conversely, if the bungees are too loose, static longitudinal stability will be compromised but low speed trimming will be enhanced.

Reset the elevator trim tab to give 24° *tab* up and 38° *tab* down movement.

#### 4 Weight and Balance

	Weight (lb/kg)	CG (in/mm)	Moment (lb.in)
Existing A/C			
+/- Weight Change	Negligible (approx. 1lb)		
Post Mod A/C			

Amend the aircraft weight and balance schedule accordingly.

#### 5 Flight Test and Special Instructions


Submit a completed Mod 1 - Embodiment of a Standard Mod form and request a Permit Flight Release Certificate from LAA Engineering. With a valid PFRC in force the aircraft may be test flown to check that the aircraft, when loaded at maximum forward CG, can be fully trimmed at the approach speed of 66mph (1.3 V<sub>S1</sub>) with full down flaps and idle power and also that the aircraft has positive static longitudinal stability when loaded at maximum aft CG. Positive static longitudinal stability is demonstrated when, following a disturbance in pitch from trimmed level flight, the aircraft seeks to return to the trimmed speed without pilot intervention. This should be checked at approach speed (flaps down, idle power) and at cruise speed (flaps up, 75% power set).

Reset tab movement and/or bungee force as required to achieve the above requirements.

Re-placard the trim indicator T/O position/range to account for the change in the neutral datum from the standard arrangement.

#### 6 Continued Airworthiness

Add a requirement to the maintenance schedule for a periodic check of bungee force on the control stick and inspect for excessive wear on the AN3 bolt at the Hummertang attachment.

Approved:	F Donaldson B.Tech C.Eng FRAeS Chief Engineer	Signed:	
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Mod 12349

Photo **1**



Mod 12349

Photo **1a**



Mod 12349

Photo **2**



Mod 12349

Photo **3**

