

Saab 105 "SK60" Re-Engine Programme

by

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Abstract

New engines have been installed in the Swedish Air Force twin-engined jet trainer, the SAAB 105 "SK60". The old engines, RM9 (Turbomeca Aubisque), were replaced with RM15 (Williams-Rolls FJ44-1C). The replacement was due to that the old engines had reached the end of their technical and economical life.

The replacement was necessary. However, due to the declining defence budget, it had to be done as a low-cost project. The time and the amount of money provided for flight tests were small. It was assumed that the task merely was to verify a flawless system. This proved to be wrong, and the planned flight test program had to be expanded. The main problems were bad matching between the unmodified air inlets and the new engines. This resulted in a low engine surge margin and risk for engine resonance (fan fatigue). A large number of test sorties were devoted to investigating the surge margin, to look at the impact of the surges on the engine life and flight safety, to define a surge free envelope and to verify that this restricted envelope was adequate for training.

The a/c has now been delivered to the Swedish Air Force. It's currently used for basic flying training by the Central Flying School. The flight test programme is nearly finished. The flight tests proved once again to be essential in order to deliver the a/c that it was asked for; a reliable and versatile a/c which can be used as a primary and as an advanced trainer as defined by the Swedish Air Force.

This supposed "low cost - minimal effort" project clearly demonstrated the need for flight tests in order to verify that the modified system met the requirements for performance and safety. Today, due to heavy budget restrictions, it's a tendency to accept greater risks. Cutting down on verification and validation might save time and money in the short run. However, in the long run a carefully planned and well judged verification and validation process will prove to be essential in order to optimize an a/c. In order to make the verification and validation process efficient, it's essential that engineers and pilots who are experienced in the field get involved early in the projects. There is no such thing as a bolt-on-engine.