

**Society of Flight Test Engineers**  
**21<sup>st</sup> SFTE EC Symposium 2010**  
**“Improving Flight Safety using cost efficient test techniques”**  
October 3 to 6, 2010

**TITLE:** Pilot Workload assessment for NO AFCS mission AW109SP helicopter dispatch.

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**ABSTRACT**

**SCOPE**

This paper presents the methodology followed by AW to measure, quantify and analyze the Pilot workload on the AW109 Grand New helicopter.

The AW109 Grand New helicopter is certified as “single pilot VFR/IFR day and night” mission capable. The standard configuration helicopter, equipped with a “digital dual channel four axis autopilot system” guarantee automatic stabilization and attitude hold features that sensibly reduce the pilot workload in all the standard flight phases.

Aim of the flight test campaign was to assess the capability of the “AW109 Grand New” helicopter to be operated by a single pilot in VFR day and night with NO Autopilot.

Two Flight test methodologies has been used in order to validate an analytical method of Pilot Workload assessment.

**INSTRUMENTATION & DATA ANALYSIS**

The test helicopter was instrumented with specific AW Flight Test Instrumentation (FTI) in order to gather data for post flight analysis.

The data analysis conduced form the data gathered during the flight test campaign brings to two different macro-area of analysis: Workload Evaluation for no AFCS conditions, and Handling qualities confirmation comparing the results with those of the basic helicopter configuration.

## **TEST METHOD**

The empirical methodology used during this flight test campaign has been used and proven to be effective during the certification process of the AW139 and AW109 Grand New helicopter models. It is based on the definition of two different parameter, the Workload Percentage (WP) and the Workload Rating (WR).

The WP assessment will provide a percentage of the time required to the pilot in order to perform the Flight Control Tasks and the Auxiliary Tasks (such as communication calls, navigation and systems checks), with respect to the total time (taken as 100%), required by the flight phase.

The WR is a “Cooper Harper” derived value. Maximum allowable Workload ratings value for each flight conditions are defined for each mission. Adequate and desired parameters are defined as well.

The evaluation has been carried out in different flight conditions and with different helicopter Gross Weight and Centre of Gravity configuration within the whole flight envelope. This has been done in order to evaluate any possible critical effect.

In addition, the qualitative pilot workload evaluations have been compared to the results of an analytical analysis of the parameters recorded during each stabilization point. This method brings to an innovative data reduction which allows the analytical evaluation of the Pilot Workload.

This principle leads to two intrinsic benefit of the method:

- The results do not suffer of “pilot practice” due to previous test points or previous flights.
- The results comparison can be useful to numerically identify critical test points.

## **CONCLUSION**

The empirical results obtained with the WR & WP values scored during the flight test trials have been compared to those of the analytical method.

The comparison results in a satisfactory matching of empirical with analytical method.