

data collected from specific helicopter flight tests or other flights the required design model or data changes necessary to support an acceptable Proof of Match (POM) should be generated by the helicopter manufacturer.

(2) For proper validation of the two sets of data, the helicopter manufacturer should compare their simulation model responses against the flight test data, when driven by the same control inputs and subjected to the same atmospheric conditions as recorded in the flight test. The model responses should result from a simulation where the following systems are run in an integrated fashion and are consistent with the design data released to the flight simulator manufacturer:

- (a) Propulsion.
- (b) Aerodynamics.
- (c) Mass properties.
- (d) Flight controls.
- (e) Stability augmentation.
- (f) Brakes/landing gear.

i. A qualified test pilot should be used to assess handling qualities and performance evaluations for the qualification of flight simulators of new helicopter types.

END INFORMATION

BEGIN QPS REQUIREMENT

9. ENGINEERING SIMULATOR—VALIDATION DATA

a. When a fully validated simulation (i.e., validated with flight test results) is modified due to changes to the simulated helicopter configuration, the helicopter manufacturer or other acceptable data supplier must coordinate with the NSPM to supply validation data from an “audited” engineering simulator/simulation to selectively supplement flight test data. The NSPM must be provided an opportunity to audit the use of the engineering simulation or the engineering simulator during the acquisition of the data that will be used as validation data. Audited data may be used for changes that are incremental in nature. Manufacturers or other data suppliers must be able to demonstrate that the predicted changes in helicopter performance are based on acceptable aeronautical principles with proven success history and valid outcomes. This must include comparisons of predicted and flight test validated data.

b. Helicopter manufacturers or other acceptable data suppliers seeking to use an engineering simulator for simulation validation data as an alternative to flight-test derived validation data, must contact the NSPM and provide the following:

(1) A description of the proposed aircraft changes, a description of the proposed simulation model changes, and the use of an integral configuration management process, including an audit of the actual simulation

model modifications that includes a step-by-step description leading from the original model(s) to the current model(s).

(2) A schedule for review by the NSPM of the proposed plan and the subsequent validation data to establish acceptability of the proposal.

(3) Validation data from an audited engineering simulator/simulation to supplement specific segments of the flight test data.

c. To be qualified to supply engineering simulator validation data, for aerodynamic, engine, flight control, or ground handling models, a helicopter manufacturer or other acceptable data supplier must:

(1) Be able to verify their ability to:

(a) Develop and implement high fidelity simulation models; and

(b) Predict the handling and performance characteristics of a helicopter with sufficient accuracy to avoid additional flight test activities for those handling and performance characteristics.

(2) Have an engineering simulator that:

(a) Is a physical entity, complete with a flight deck representative of the simulated class of helicopter;

(b) Has controls sufficient for manual flight;

(c) Has models that run in an integrated manner;

(d) Had fully flight-test validated simulation models as the original or baseline simulation models;

(e) Has an out-of-the-flight deck visual system;

(f) Has actual avionics boxes interchangeable with the equivalent software simulations to support validation of released software;

(g) Uses the same models as released to the training community (which are also used to produce stand-alone proof-of-match and checkout documents);

(h) Is used to support helicopter development and certification; and

(i) Has been found to be a high fidelity representation of the helicopter by the manufacturer's pilots (or other acceptable data supplier), certificate holders, and the NSPM.

(3) Use the engineering simulator to produce a representative set of integrated proof-of-match cases.

(4) Use a configuration control system covering hardware and software for the operating components of the engineering simulator.

(5) Demonstrate that the predicted effects of the change(s) are within the provisions of sub-paragraph “a” of this section, and confirm that additional flight test data are not required.

d. Additional Requirements for Validation Data

(1) When used to provide validation data, an engineering simulator must meet the simulator standards currently applicable to