

(3) Simulation of Computer Controlled Aircraft using software emulation of helicopter boxes;

(4) Simulation using software avionics or rehosted instruments.

c. Figure C2C illustrates the total transport delay for a non-computer-controlled helicopter or the classic transport delay test. Since there are no helicopter-induced delays for this case, the total transport delay is equivalent to the introduced delay.

d. Figure C2D illustrates the transport delay testing method using the real helicopter controller system.

e. To obtain the induced transport delay for the motion, instrument and visual signal, the delay induced by the helicopter controller should be subtracted from the total transport delay. This difference represents the introduced delay and should not exceed the standards prescribed in Table C1A.

f. Introduced transport delay is measured from the flight deck control input to the reaction of the instruments and motion and visual systems (See Figure C2C).

g. The control input may also be introduced after the helicopter controller system input and the introduced transport delay may be measured directly from the control input to the reaction of the instruments, and simulator motion and visual systems (See Figure C2D).

h. Figure C2E illustrates the transport delay testing method used on a flight simulator that uses a software emulated helicopter controller system.

i. It is not possible to measure the introduced transport delay using the simulated helicopter controller system architecture for the pitch, roll and yaw axes. Therefore, the signal should be measured directly from the pilot controller. The flight simulator manufacturer should measure the total transport delay and subtract the inherent delay of the actual helicopter components because the real helicopter controller system has an inherent delay provided by the helicopter manufacturer. The flight simulator manufacturer should ensure that the introduced delay does not exceed the standards prescribed in Table C1A.

j. Special measurements for instrument signals for flight simulators using a real helicopter instrument display system instead of a simulated or re-hosted display. For flight instrument systems, the total transport

delay should be measured and the inherent delay of the actual helicopter components subtracted to ensure that the introduced delay does not exceed the standards prescribed in Table C1A.

(1) Figure C2FA illustrates the transport delay procedure without helicopter display simulation. The introduced delay consists of the delay between the control movement and the instrument change on the data bus.

(2) Figure C2FB illustrates the modified testing method required to measure introduced delay due to software avionics or rehosted instruments. The total simulated instrument transport delay is measured and the helicopter delay should be subtracted from this total. This difference represents the introduced delay and should not exceed the standards prescribed in Table C1A. The inherent delay of the helicopter between the data bus and the displays is indicated in figure C2FA. The display manufacturer should provide this delay time.

k. Recorded signals. The signals recorded to conduct the transport delay calculations should be explained on a schematic block diagram. The flight simulator manufacturer should also provide an explanation of why each signal was selected and how they relate to the above descriptions.

l. Interpretation of results. Flight simulator results vary over time from test to test due to "sampling uncertainty." All flight simulators run at a specific rate where all modules are executed sequentially in the host computer. The flight controls input can occur at any time in the iteration, but these data will not be processed before the start of the new iteration. For example, a flight simulator running at 60 Hz may have a difference of as much as 16.67 msec between results. This does not mean that the test has failed. Instead, the difference is attributed to variation in input processing. In some conditions, the host simulator and the visual system do not run at the same iteration rate, so the output of the host computer to the visual system will not always be synchronized.

m. The transport delay test should account for both daylight and night modes of operation of the visual system. In both cases, the tolerances prescribed in Table C1A should be met and the motion response should occur before the end of the first video scan containing new information.