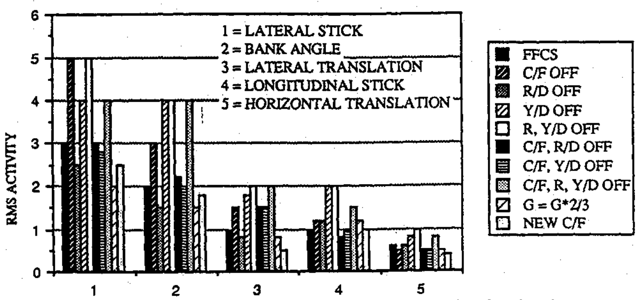

Fig. 4 RMS activity trends for simulated configurations.

(level 2) and $\omega_\phi > \omega_d$ leading to pilot-induced oscillations. Configurations 6 and 7, possessing adverse yaw, were considered difficult; however, their dynamics were to satisfy level 2 flying qualities and this result is shown in Fig. 3. Configuration 9, with reduced gain ailerons/spoilers, had the best ratings due to control effectiveness ratio values given by $C_{n\delta a}/C_{l\delta a} < 0$ for δ_{sp} (proverse yaw). Hence, the reduction of spoilers deflection leads to a decrease in proverse yaw yielding a natural frequency ratio ω_ϕ/ω_d close to unity.

Rms activity of the main variables during tracking is shown in Fig. 4 and trends consistent with pilot comments can be identified. Configurations 2, 4, 5, and 8 consistently show a higher level of stick activity and poorer tracking performance, whereas configurations 1, 3, and 9 clearly possess better flying qualities characteristics.

Conclusions

A limited fixed-base simulation has been performed in order to evaluate the capabilities of the Northrop criterion to relate flying qualities levels and the amount of pole-zero cancellation in the roll axis during tracking tasks. The objective was part of an effort, by the AGARD Flight Mechanics Panel, working group 17, directed toward the analysis of flying qualities techniques for highly augmented aircraft. The validation, although limited, has shown the capability of the method, provided the other parameters involved in the task have level 1 values.

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Errata

Fast Orbit Propagator for Graphical Display

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THE following error was inadvertently introduced during the typesetting and production of this paper.

Eq. (9) should read as follows:

$$\bar{\omega}(t) = \bar{\omega}(t_0) + (3/2)J_2R^2\bar{p}^{-2}\bar{n}[2-(5/2)\sin^2\bar{i}](t-t_0) \tag{9}$$