making a long straight approach into the wind; or holding into a high wind until some penetration is evident, then adjusting altitude and range relationship by gentle heading changes. 5) The ability to see directly beneath the vehicle as well as ahead is needed when flying a terrain display in order to determine the X-Y position of the vehicle. 6) Continuous or rapid turns frequently caused the pilot to become disoriented when using a terrain display. Reorientation could generally be obtained by reference to the heading and recognizable terrain features. The landing area should, therefore, contain easily distinguishable markings for providing visual cues to both location and heading.

References

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Added Mass in Roll of a Four-Finned Configuration

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In presenting his version of the slender-body theory almost two decades ago Bryson[1] published a formula for the nondimensional added mass in roll A_{13} of a configuration consisting of four fins mounted on a circular body. A second formula to which the first reduces when the body shrinks to zero was also published. Soon after, he discovered an error in these results and published a correction.[2] More recently a computer program has been prepared at Oceanics Inc. for calculating the loads on tail assemblies undergoing an arbitrary maneuver. As part of the program the added masses in roll for these configurations were required and the result for A_{13} was rederived. It was found that the corrections that Bryson published[2] are in error. Indeed, the true formula cannot be expressed in closed analytical form in terms of elementary functions except for the case of no body. As a consequence a subroutine for calculating A_{13} numerically in terms of quadratures was prepared. There does not appear to be any reason to publish the correct formula for the complete configuration at this time since it is very complicated and has already been incorporated into a computer program that is available. For the simpler case of no body, however, results can be obtained readily using hand computation if desired, and so the correct formula is presented below using Bryson's notation.

$$A_{13} = -(2/\pi D^3)(\tfrac{1}{2}h + f)^3 \, [\tfrac{2}{3} \sin^3\theta_0 - \tfrac{2}{3} \sin^3\theta_3 -$$
$$\tfrac{1}{2} (\cos\theta_0 - \cos\theta_3) (- \tfrac{1}{2}\pi + \theta_0 + \theta_3 - \tfrac{1}{2} \sin 2\theta_0 - \tfrac{1}{2} \sin 2\theta)]$$

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[2] Bryson, A. E., "Comment on the Stability Derivatives of a Wing-Body-Vertical-Tail Configuration," *Journal of the Aeronautical Sciences*, Vol. 2, No. 1, January 1954, p. 59.