

14 Oct. '65

Memo to Col. Ord.

Subject: Mass Determination Demonstration

The first and crucial demonstration of the validity of the oscillating spring/mass $\frac{1}{4}$ "scale" has been made using the scheme outlined in the proposal. This system utilized a small shop built (for which the shop deserves kudos) bearing and fixed weights. Although the springs and general arrangement were ~~for~~ far from optimum the system demonstrated somewhat better than the predicted time resolution of 50μ seconds, an order of magnitude better than the ΔT of 500μ seconds required for ~~xxx~~ .1% work. With approximately 25,000 gms. total weight, $2 \frac{1}{2}$ ^{wt. change can} gms. ~~could~~ be resolved with approximately 2:1 signal: noise. Calibration has not been performed for lack of adequate weights. Stability has not been determined but from cursory measurements with the same weights over several days, it appears to be on the order of 100μ seconds (equiv. to a few gms.)

The breadboard arrangement shown in the attached photo is now being rebuilt in a stable form and will be tested ~~exhaust~~ exhaustively in cooperation with biostatistics to determine its capability.

^{built +}
A man carrying air bearing has been [↑] tested and will be incorporated into a scale to determine its performance with human bodies.

Tentative arrangements have been made with Dr. Palmatier to criticize and monitor the experiment.

^{scheme}
It would seem desirable to carry this through complete and vigorous ^{under our aegis} testing ~~here~~, including some weightless flights, to validate procedures and the proposed cylindrical bearings. With the experience already acquired this may be expeditiously and economically done especially as regards time.

At the end of this period which ~~x~~ could be as short as 6-8 weeks, we would be able to provide validated experience and guidance as well as a complete theoretical and exper~~imen~~tal study to the contractor for immediate design of final hardware. In addition our training and inteface program would be months ahead on this item.

It might also be profitable to look at other areas of the experiem~~ts~~ which could benefit from mass measurements to a probabl~~y~~ accuracy of .03-.05% which should be provided by this method.