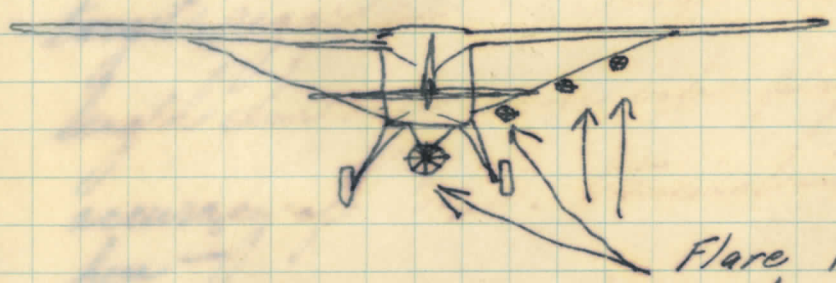
Instrumentation to provide miss distance information within the following derived limitations.

Using a single 70 mm. Camera with 2.25 X 2.5" format at 20 F.P.S. — It is assumed that flares or smoke will be used on the target and flares and/or a spotting charge will be used on the missile. Under these conditions the camera will always record the missile and target regardless of range. Camera focal length then only comes into play as a function of accuracy of M.D. determination. Derive minimum spot size here —

— First experiments should be made with the shortest possible lens for mechanical reasons + to give the largest possible angular coverage — A 10" inch lens with the above format will give ≈ 12°-13° coverage — This can be extended to 24°-26° lateral (or vertical) coverage by using an anamorphic attachment (cinemascope) —

So write all this on paper makes the paper worth less than originally for learned

reams have been written both pro and con on the subject. The logical way to prove the points are to rent a camera and lens, mount or carry the camera in one plane and photograph flares mounted as shown on the other A/C to prove the suppositions. In addition valuable operational data as to tracking cat ability could be collected.



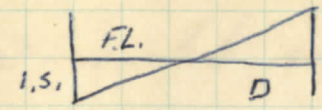
Flare mounted in these posns. could simulate various M.D's under flight conditions.

Radar ranging may be accomplished in one of two basic ways. Using the ships radar wherever possible or modifying the D-100-A or a similar radar.

D-200

Distance - 10,000'
Miss Distance - ±3'

For image size of $10^{-4}$"




$\frac{D}{M.D.} = \frac{F.L.}{I.S.}$ $\quad I.S. = \frac{F.L.}{D} \cdot M.D.$

~~I.S. =~~ $\quad F.L. = \frac{D \times I.S.}{M.D.}$

$F.L. = \frac{10^4 \times 10^{-4}}{3'} = \frac{1}{3}$'

Average Lens has Res. Pwr. of 50 lines mm - or $\frac{1}{5} \times 10^{-1} = 2 \times 10^{-2}$ mm -

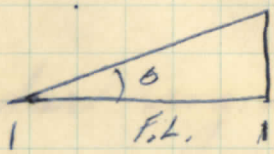
Distance $= 3 \times 10^3$ M

Miss Distance $= 1/3$ M

F.L. $= .25$ M

$I.S. = \frac{2.5 \times 10^{-1} \times 3.33 \times 10^{-1}}{3 \times 10^3}$

$\approx 2.5 \times 10^{-5}$ M $= 2.5 \times 10^{-2}$ mm




$\theta = \tan^{-1} \frac{F.S.}{F.L.} = \frac{7}{33\text{ cm}} = .212$

$\theta = 12°$

At $3 \times 10^3$ M - $.636 \times 10^3$

636 M