

## Reply

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Morgan and Radok have outlined two limitations of the system described in our paper both of which we were aware of but had not stressed. We are indeed grateful for their comments and suggestions.

With regard to the use of "colored smoke" instead of "white smoke" we tried colored smoke in our preliminary experiments utilizing signal flares that are used for distress signals over water. We found the yield of visible smoke from these to be only a small fraction, say  $\frac{1}{2}$  to  $\frac{1}{8}$ , that of the same weight of titanium tetrachloride. We contacted a manufacturer of chemical tracer materials explaining our needs for a visible tracer that could be easily and reliably dispersed at a uniform rate for a few seconds, and, preferably without fire (as we were working in a wooded area)—he strongly recommended titanium tetrachloride for our needs. However, there is

no question in our minds that the use of the colored smoke would be preferable if a suitable quantity could be dispersed within our weight and safety limitations.

With regard to the second difficulty Morgan and Radok discuss, they are correct in their statements. But the wind speed they use in their example is much higher than we anticipated. We expected the average lake breeze winds to be in the order of 4 to 20 ft sec<sup>-1</sup> possibly reaching 30 ft sec<sup>-1</sup>. Thus our errors in speed measurement would generally be in the range 2 to 10%—an acceptable value for our needs. (This would be halved if the cameras were 4000 ft from the source instead of 2000 ft.) We briefly considered the stereoscopic technique but were advised a stereo plotter would cost several thousand dollars. We could not consider this expenditure and so selected the simpler, less accurate method. Where such a plotter was available or could be fabricated at a reasonable cost we would recommend its use.

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