

11 November 1976

MEMORANDUM TO: VLA Optical Processor File
FROM: James R. Fienup *J.F.*
SUBJECT: Method for Imaging Both Halves of u-v Plane
on Film Simultaneously

Figure 1 shows a setup for imaging both conjugate halves of the u-v plane simultaneously onto the film. This method would work for all encoding methods having $H(-u, -v) = H(u, v)$ as the transmittance of the transparency. This is true for the simple carrier method, the Lohmann Method, and for $R(u, v)$ of the real-imaginary method, but not for $I(u, v)$. A real image or a CRT display of half of $H(u, v)$ is formed in plane AI1. Lens L3 produces an inverted image $H(-u, -v)$ in plane AI3 through the beamsplitter BS1 and BS2. Lens L1 forms an inverted image $H(-u, -v)$ in plane AI2, using light reflected from BS1 and mirror M1. Lens L2 re-images AI2 to AI3 using reflected light from mirror M2 and beamsplitter BS2, forming an image $H(u, v)$. All lenses perform 1:1 magnification imaging. Thus, at AI3 appears $H(u, v) + H(-u, -v)$, the complete u-v plane. Alignment of this optical system can be facilitated by including registration marks in the image at AI1.

JRF:sd

cc: C. Aleksoff
I. Cindrich
W. Colburn
A. Klooster

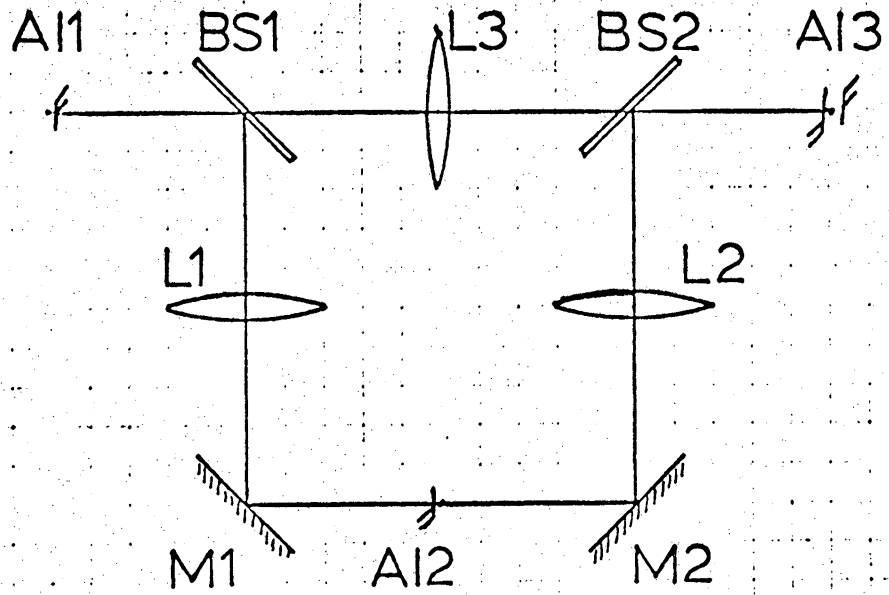


Figure 1.