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	FIFTH LETTER	REPORT ON EVALUATION (U)	
	(15 March	1966 to 14 April 1966)	
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		14 April 1966	
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Letter Report on Evaluation (U)

I. Work for Reporting Period

Measurements of the degree of coherence of the object plane illumination have been completed during this past month. The interferometer experiments described in the last letter report were performed for both single mode and multimode laser illumination. All measurements of the degree of coherence when the ground glass is present and rotating are in excellent agreement with what one would predict on the basis of a finite incoherent source. Specifically, the degree of coherence is found to be a function of coordinate differences only, independent of the laser mode structure, and the visibility of the fringes agrees, well within the experimental error, with the visibility predicted from the vanCittert-Zernike theorem. The laser rotating ground glass combination is, therefore, acting as an incoherent source of diameter equal to the diameter of the laser beam.

During the past month the computer program has produced numerical results showing the expected image intensity distribution for edges of five different contrasts ranging from 1.2 to ∞ and for ratios of coherence interval to lens spot size of 1, 2, and 20. The contrast of these edges is defined as $C = I_{\text{max}}/I_{\text{min}}$. Further data is expected shortly for other ratios of coherence interval to spot size. Experimental imaging of edges has begun in parallel with this analytic program utilizing the high acuity edges mentioned last month.

Since the last letter report we have shown theoretically that when the objects used are low contrast a partially coherent imaging system is linear in intensity. This is an extension to the general partially coherent case of the linearity for low contrast coherent systems which was mentioned in the proposal. We have also shown that at low contrast an intensity modulation transfer function can be found for the system and a direct comparison can then be made with incoherent systems.

II. Work for Next Period

	Work on the imaging of various contra	st edges is continuing.	As soon as			
this is completed we will examine the images of other targets, including the						
	"L" targets, for comparison wi	ch computer predictions	of the image			
struc	cture in partially coherent light. Upon	completion of this imagi	ing work we			
will continue onto the next part of the evaluation program, i.e., examination of						
the s	spatial filtering capabilities of the enlarg	ger.				
III.	Visits to Contractor					
	None.		٠.			
IV.	Changes in Personnel					
	has	s been added to the proje	ect staff.			

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V. Progress of Work

As of this reporting date approximately 31% of the contract funds have been expended and 35% of the work program has been completed.

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