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NPIC/TSSG/RED-147-70
2 June 1970

MEMORANDUM FOR: Chief, Systems Development Branch, RED/TSSG
SUBJECT : Collimation Experiment for 1540 Light Tables

1. In spite of the attainment of 3000 foot lamberts on the subject light table, in their present configuration the illumination is marginal for magnified viewing. The need for the development of an improved illumination system for magnified viewing is indicated. Accordingly, there is a project in the FY-71 R&D Program for the development of a tracking light source for these tables.

2. Another possibility for improving this situation that we should look into is the introduction of a collimating layer between the light source and the viewer. The purpose of the collimating layer is to gather light and confine the reradiated illumination to a relatively narrow distribution angle, say about 30° . In order to determine whether or not a significant improvement in the illumination for magnified viewing can be achieved by this technique without ruining the illumination system for direct viewing of the imagery, it is requested that your branch design and monitor appropriate experiments to this end. I suggest that the Advanced Technology Branch may be of considerable assistance to you in this project.

3. The primary questions to be answered by the experiment, as I see them, are as follows:

a. Can a collimating system be developed for the 1540 light tables that will significantly improve the illumination available for magnified viewing?

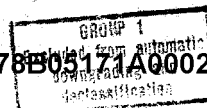
b. At reasonable cost?

c. Without introducing artifacts in the image?

d. Without hampering the direct viewing capability of the light table?

4. There are a number of variables which bear upon these questions; such as, the relationship between the acceptance angle and the re-radiation angle, the distance from the collimating layer to the microscope objective and plane of focus, the numerical aperture of the microscope objective, the utilization of various auxiliary scattering

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layers, and their relative placement in the system, etc. For determining the degree to which it is feasible to investigate these variables, I leave to your judgment. It may be advisable to obtain some analytical support to more precisely define the objectives of the experiment before the experiment design is finalized.

5. I believe there are a number of potential sources of suitable collimating materials to use in the experimentation. Some years ago, I believe I read about the development of such collimating layers but have been unable to relocate that material. IAS is using [redacted] Collimators on their Link measuring light tables, but for a different purpose. Two possible sources are [redacted] reference Image Technology for April-May 1970, page 65; [redacted] tion, reference Design News for March 16, 1970, page 54. (I have talked with [redacted] about the [redacted] material and also the District Department of Highways regarding their directional signal lights which utilize a [redacted] product.) Of course, there are probably others. If you have any questions regarding this assignment, do not hesitate to discuss them with me.

[redacted]

Special Assistant for Plans & Applications, RED

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