

31 May 1966

STATINTL

EXPLORATORY DEVELOPMENT LABORATORY BRANCH 1967 PROGRAM

1967 EDLB Detail Program (Revision):

In the 26 May 1966 POP meeting, the following program for the Exploratory Development Laboratory was determined, and priorities assigned in the order of their listing. These projects are specific items, selected through POP suggestions and through natural evolutions of laboratory ideas and current investigations. The completion of current 1966 projects, which may overlap slightly into 1967, is not detailed in this list. Current projects which will not terminate before 1 August are included in the list.

- 1) PHASE GRATINGS: The development of prototype diffraction gratings for use in the Direct Image Viewer and subsequent modifications. The techniques employed will be photographic or glass etching. Current efforts indicate a high probability of success for the latter method.
- 2) MICROSCOPE MTF STUDY: This study is concerned with evaluating most NPIC microscope equipment through analysis of each instrument's MTF. Included are stereomicroscopes and microstereoscopes, and the investigation will cover as much of the magnification range of each as possible.
- 3) SCREEN EVALUATION: Under current development or study there are four screens or screen material for use in several viewing applications. Before continuing with subsequent development for any or all these materials, an in-house evaluation will be made to assess their potential for future applications.
- 4) LAMP PREFERENCE STUDY: To guide future developments of viewers and viewing devices, insofar as the light source(s) is concerned, a study will be made of PI preference. This study will be aimed at determining if a preference exists; if it does, is it significant enough to affect future equipment performance specifications?
- 5a) STUDY OF COLOR REPRODUCTION MATERIALS: Increasing probability of color materials coming into the center, with subsequent reproduction requirement, requires an assessment of current state-of-technology in that area. Having determined the eventual requirements, the studies will aim at satisfactory solutions without restricting them to a single manufacturer or product.

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- 5b) COLOR VIEWING STUDY: To inspect color materials and ascertain the effects of the variation in color balance, a viewing device which permits adjustment of color values is required. The design of this equipment will follow the proposed [REDACTED] of 20 August 1965.
- 6) ISODENSITRACER INVESTIGATIONS: This considers the development of a color version of the IDT, the IDIOT, as well as general investigations into utilizing the instrument to perform gradient removal.
- 7) MONITOR'S PORTABLE EVALUATION KIT: A kit will be assembled for use of the monitors in the Development Branch for field evaluation of equipment under development. The kit(s) will include resolution targets (in proper format), length standards, B&W and color step tablets, MTF testing device, equipment for photometry, and a slide rule or similar computing device.
- 8a) OPTICAL CHANGE DETECTION: The superimposition of two related transparencies through projection can serve as the basis for a technique to eliminate their subject similarities and/or display their differences. Color addition and subtraction will be included, and the process examined through the photographic variables as well as the system MTF.
- 8b) BLINK COMPARATOR: The flicker viewing of two related transparencies to make their differences stand out has shown some promise. In pursuit of the general change detection problem, this method could prove highly useful. Initial studies will be on the illumination control circuits. Further studies will consider brightness levels, flicker frequencies, the temporal and spatial transfer functions.
- 9) REMOTE FILTER SELECTOR: This device will be designed and fabricated in or through the EDLB to improve the performance (in time) of the Durst Enlargers in PSD/PLB when using the enlarger in a color mode. The device will remotely select and mechanically place filters in the optical system, to replace the present manual technique.
- 10) MODULATED LIGHT: To establish the basic parameters of modulated light viewing and reproduction, a study will be carried out. It will aim at providing a summary of the state-of-technology in this area, and provide the basis for DB action in subsequent development programs. The potential uses of such a technique will be the prime focus for these studies.

- 11) FEASIBILITY OF TRANSPARENT FILM CAN LIDS: Towards the elimination of redundant labelling, one aspect of the use of transparent lids for film cans will be investigated: the transfer of identification from one reel to another.
- 12) ADJACENCY EFFECTS: Considerable emphasis in 1966 was given to the study of adjacency effects, particularly their characterization through mathematical models. This program will be summarized, the results of sponsored research evaluated, and a report issued which establishes the current state-of-technology. The continuation of further work by the EDLB is not contemplated until a six-month review of the branch effort takes place.

In addition to these specific problems, work will also be carried out in three areas which are in the staff's long-range interests. As results accrue, those which are applicable to Development Branch efforts will be made known. These studies are generally carried out in parallel with the specific problem assignments but do not have their immediacy. When it becomes necessary to allot more time to these areas than is otherwise anticipated, the subject will be raised at a POP meeting for approval.

- 1) DEVELOPMENT OF ANALYTICAL METHODS: This is the chief problem of the Analytical Support Section, but is currently related to specific problems in support of investigating scientists.
- 2) AMPLITUDE/PHASE IMAGERY INVESTIGATION: The problems of fluid-gating, relief images, relationship of phase to density and specific coherent illumination problems are all to be considered. With the increase in performance capability of optical systems, the problem of relife images is assuming a more fundamental importance than heretofore. A continuing branch interest is maintained in this area.
- 3) PARTIALLY COHERENT IMAGERY: In anticipation of the Image Analysis Program, the branch must be prepared to evaluate and utilize the results of the fundamental investigations proposed by the contractor. Since the effects of partially coherent illumination are not fully understood nor predictable (and will be the basis of the contractor's work), internal theoretical and experimental investigations will be required to provide a solid basis for understanding and implementing the contractor's recommendations.