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ABSTRACT

ORSER-SSEL Technical Report 11-75
DIAZO PRINTING OF ERTS COLOR COMPOSITES
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ERTS-1 color composites equivalent to those supplied from NASA have been made with the help of a Diazo developer and printer. Five single-channel density standards were established, using typical ERTS images, in order to determine exposure time. These standards were used to develop a graph from which the exposure time for any transparency can be estimated. Exposure times varied from 3 to 30 minutes, and clear colored polyester sheets from two manufactures were used with slightly different, but equally successful, results.

The method not only is useful for the manufacture of standard color-composite products, but lends itself to various forms of color enhancement for interpretation of specific features. Possible uses include temporal composites, enhancing features such as crop pattern changes, urban growth, and flood damage.

Rapid production of black line paper images, at very low cost, is another highly useful aspect of the Diazo equipment. Such copies are useful in cataloging data sets and as working copies during data processing. Mosaics of such copies have been used successfully in lineament analyses.

Interim Report

ORSER-SSEL Technical Report 11-75

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ERTS Investigation 082
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INTERDISCIPLINARY APPLICATION AND INTERPRETATION OF ERTS DATA WITHIN THE SUSQUEHANNA RIVER BASIN

Resource Inventory, Land Use, and Pollution

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DIAZO PRINTING OF ERTS COLOR COMPOSITES

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ERTS-1 color composites equivalent to those supplied from NASA have been made with the help of a Diazo developer (Model 202) and printer (Model 101). These two units, equally useful for making color composites and black line copies of ERTS, Skylab, and aircraft transparencies, can be a significant element in streamlining research efforts and data cataloging operations involving such transparencies.

Early attempts were made to create ERTS-1 color composites using a large floor-model Ozalid machine available on the University campus. Some success was achieved, but it was not possible to reproduce results from one day to the next. The large amounts of time and materials necessary to produce a usable color composite eventually discouraged these attempts. The problem here was twofold: 1) the variation in density of the transparencies from one scene to the next, making each scene essentially an entirely new "experiment" and 2) the variation in results due to the sensitivity of the large machine to heat and humidity -- a composite made on a dry hot day would be entirely different from one made from the same set of transparencies on a cool wet day, even with use of identical materials and exposure times. These problems were solved by the purchase of the desk-top Diazo developer and printer.

Color composites were made from two different types of .003 clear colored polyester sheets: Escochrome, from Diazo Specialty Company (Beltsville, MD) and GAF, from GAF Corporation (New York). The following colors were most successful in duplicating the color composite quality of the NASA product:

ERTS-1 Transparency	Escochrome Film	GAF Film
Channel 7	Cyan	Blue
Channel 5	Magenta	Red
Channel 4	Yellow	Yellow

The GAF film produces more brilliant colors, closer to those of the NASA product. However, the Escochrome film lies flatter after development and is, therefore, more easily handled in constructing composites.

Five single channel density standards were established in order to determine exposure time:

Standard	Scene	Channel
1 (lightest)	1046-15301	7
2	1080-15183	7
3	1079-15131	7
4	1046-15301	5
5 (darkest)	1080-15183	5

A graph for the standards was developed from which the exposure time for any transparency can be estimated (Figure 1). To use the graph, the transparency to be copied is compared with the standards and a visual estimate is made of its density with respect to one of the standards. Then the exposure time, which may be from 3 to 30 minutes, is estimated from the position of that standard on the graph. Using this method, a color composite can be made by a technician in less than an hour -- often while other work is being performed during the waiting periods.

This method is not limited to the production of standard color composites of three channels in the colors indicated. The method lends itself to various possibilities of color enhancement for specific features. Single channel images of the same ERTS-1 scene from two dates, for example, have been composited for analysis of gypsy moth damage in Pennsylvania,[1] and such temporal composites would undoubtedly also be useful to study features such as crop pattern changes, urban growth, and flood damage.

Another highly useful aspect of the Diazo equipment is the rapid production of black line paper images from transparencies of any kind. Such copies are extensively used in the ORSER cataloging system, in that a Diazo copy of the Channel 7 image of each scene is kept in a loose-leaf notebook for ready reference. In this way, a "first look" capability is provided of the scenes available for analysis, and such factors as cloud cover, and snow cover can be immediately determined. In addition, black line reproductions of ERTS-1, Skylab, and aircraft scenes have been supplied within a few minutes, to use for reference during a project. Such images are routinely used to outline a study area before computer analysis of the digital data, and several ERTS mosaics of such scenes have been used in Pennsylvania lineament studies.[2]

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[1]See ORSER-SSEL Technical Report 22-74.

[2]See ORSER-SSEL Technical Reports 1-74, 10-74, 5-75, 12-75, 13-75, and 14-75.

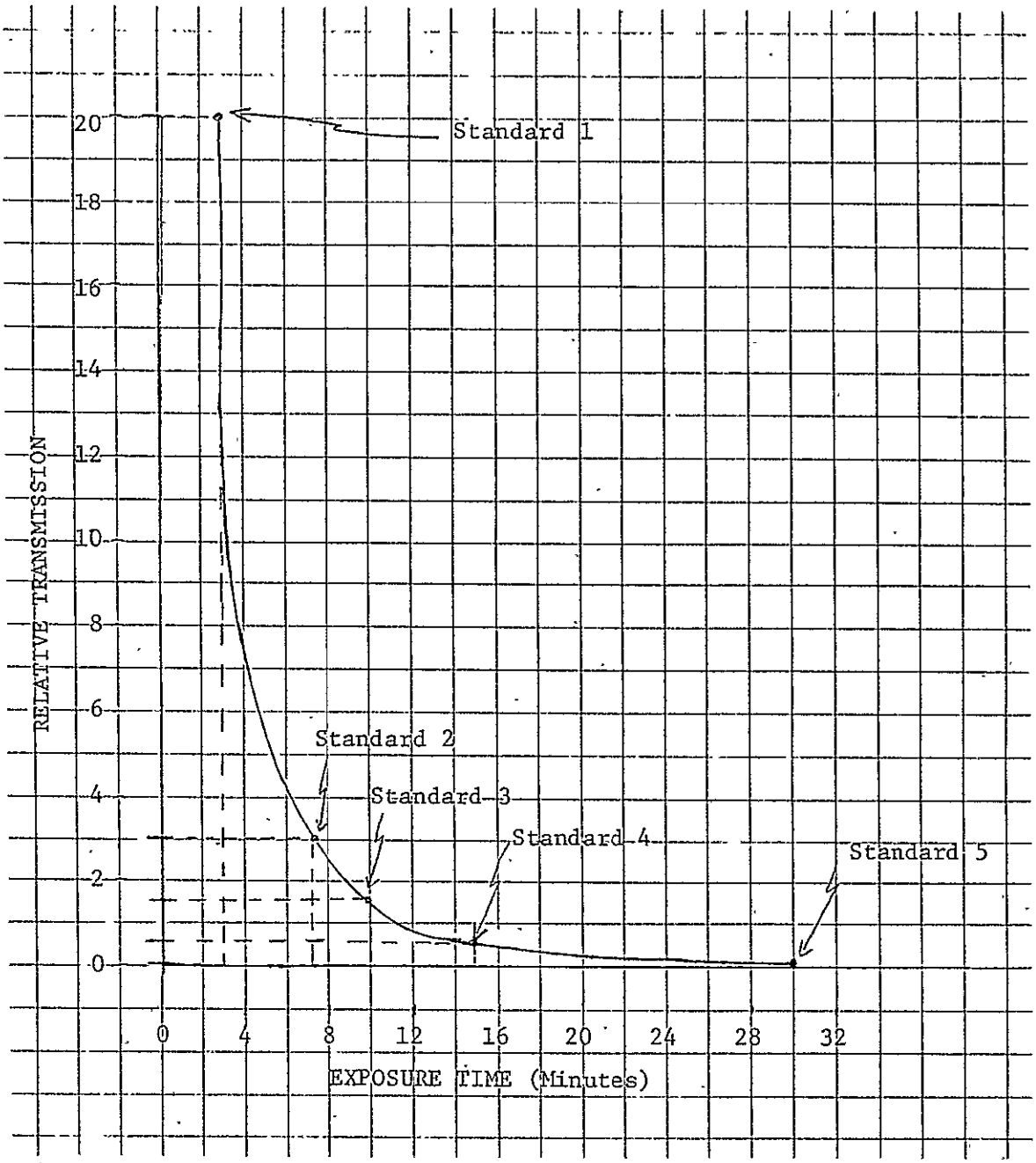
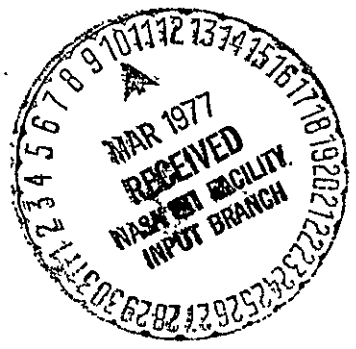


Figure 1: Exposure time estimation curve for color composites.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