

Hybrid Colour Micro-Imaging

by Ara Hourdajian MicroColor International Inc. e-mail: AraH@aol.com
Hayk Hougasian MicroColour International Ltd. Hayk@microcolour.com

MicroColor International recently completed a project for Columbia University N.Y. that included colour microfiche, Photo-CD, digital colour printing and the Internet.

Columbia University initiated an investigative project funded by the **COMMISSION ON PRESERVATION AND ACCESS**. The project was to identify the most acceptable preservation and access techniques available for oversize, colour images that included a series of historical maps.

MICROFILM

MicroColor International, as one of the participating vendors, decided to handle this challenging project in stages. Having carefully looked at the merits of different storage media available today, they concluded that only Cibachrome colour microfilm (now called Ilfochrome) offered a known history of image stability. Data from the tests performed at the **Image Permanence Institute Rochester NY**, had shown that this colour microfilm has an archival dye & image stability of several hundred years. Therefore this film material was selected for the first stage of the project. A colour microfiche of each map was created using large-copyboard special design 105 mm. camera, set for 'full-frame' or one-map-per-fiche format. Microfiche was chosen because the film offers a human readable interface, a proven archival life and very high resolution in excess of 300 lp/mm (line pairs per millimetre).

SCANNING

For the second stage of this project, after the oversize maps were microfilmed, each microfiche was then scanned using an Optronics high resolution drum scanner. The images were scanned at 2000 dpi generating a 18.5MB file from each fiche. This resolution was selected to create a reasonable file size for optimum digital colour print quality and at the same time provide maximum storage on Compact Disc. The latest drum scanners offer even higher scan resolutions. In some cases higher scan resolutions may be selected but this would translate to larger file size, which would mean less maps can be stored on a given storage media.

Depending on the map size, type font and image contrast, the scan resolution (dpi) can be adjusted to balance the storage needs and desired output. When larger scale projects are planned and attempted, it is recommended that the scan levels, storage needs, access, final display and print needs are reviewed relative to colour image quality vs. file size. As higher and faster compression/decompression routines become available, performed software or hardware based, this in turn will provide alternatives in scanning the microfiche and providing more compact digital storage and faster image access.

PHOTO-CD

After scanning each colour microfiche, the file was then written to Photo-CD. This was done to provide digital access and further flexibility for choice of electronic media available now and in the future. If the storage media is changed or the reading device is modified, in this case the CD player, the film can be re-scanned without the need to return to the original archives. For the foreseeable future the safest solution for archival purposes, is to continue to use microfilm. Microfilm can either be considered an intermediate to digital imaging and storage, or as the final product for long term storage and access.

Since its introduction, the Photo-CD has evolved into a family of formats, expanding its professional capabilities to meet the needs of a wide range of imaging professions. This product, jointly developed by Eastman Kodak Company and Philips N.V., provides rapid retrieval and display of colour images as well as support for very high quality continuous tone digital printing. Photo-CD also offers high resolution, colour accuracy and quality, to work with the majority of imaging software available today and at the same time provides cross platform compatibility with the Macintosh, Windows and OS/2 environments.

COLOUR PRINTING

For the third stage of this project using the Photo-CD files, oversize colour digital prints were created on an Iris ink-jet colour printer. These high end printers particularly conspicuous in the graphic arts environment, produce high quality prints up to 34 x 44 inches. In the near future a larger selection of print media along with a significant improvement in dye image stability are anticipated. The wide availability of digital colour printers will continue to expand utilising not only ink-jet but also dye sublimation, thermal wax transfer, laser jet, bubble jet and others.

THE INTERNET

Finally the digital file from the Photo-CD was downloaded by Columbia University into their Internet server on site <http://www.cc.columbia.edu>. Thus making it accessible to anyone on Internet using Mosaic or Netscape software. So any library or individual anywhere with a modem and appropriate personal computer can now access the file.

ON THE HORIZON

In the near future when low-cost high resolution colour still/video cameras become available, it will be possible to capture the images directly from colour microfiche. Fast and convenient microfiche image conversion from analogue to digital will be accomplished by the use of software and appropriate imaging boards.

At the moment the present day display technology imposes a limiting factor for displaying higher image quality on a monitor. To achieve an improvement in image display it will be necessary to use the next generation of monitors, which will offer a flicker-free large screen colour viewing. Meantime a number of new analogue/ digital hardware equipment are being developed for microfilm that will permit the displayed microfilm image to be captured and downloaded into a computer.

SUMMARY

The original objectives of this project was achieved by using colour microfiche for the initial stage. In the subsequent stages the microfiche was scanned, written to Photo-CD and then digitally printed. Ultimately the Internet access was provided for universal access.

MicroColor International is currently working with more than twenty major institutions in the US., Canada and overseas, in developing procedures and projects utilising colour microfilm for preservation. In many cases, along with colour microfilm, a combination of Photo-CD, CD-ROM and other digital storage alternatives are being actively considered for oversize, standard, photographic and historical manuscripts. In conclusion, this project has shown that it is possible to have the best of both worlds - microfilm for long term storage and digital for access. A **Hybrid Imaging**, the merging of microfilm, digital imaging, CD storage and access on the Internet.

SAMPLE IMAGE

Below a sample Large map scanned at low resolution from the original Cibachrome colour microfiche. Further maps, as well as higher resolution of this sample map, can be downloaded from Internet WWW site at Columbia University <http://www.cc.columbia.edu/imaging/html/largemaps/oversized.html>

