CRITICAL ASSESSMENT OF MAGNETO- OPTICAL RECORDING TECHNOLOGY

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Various forms of optical storage have made their way from the laboratory to the marketplace over the last several years. The most recent of these, and perhaps the one with the most promise, is based on magneto-optic recording materials. Investigation of magneto-optic materials for laser based data storage extends over thirty years. The current class of rare earth - transition metal materials were discovered nearly two decades ago, and products started to appear in the market place nearly five years ago. The ultimate acceptance of magneto-optic recording technology within the storage hierarchy is still evolving, and this acceptance will critically depend on improvements in the magneto-optic materials that support this industry. Alternative storage technologies continue to improve at a rapid pace, and if magneto-optic recording is to play an expanding role, it will have to advance at a similar or higher rate.

This talk will review the current status of magneto-optic recording versus its competitors, examine what applications are best suited for this technology, and then review areas of required improvement. Today, the major strength of optical recording in general, and magneto-optic recording in particular, is that it provides a low-cost, high capacity removable random access memory. All four of these attributes are required to justify optical recording today. Without removability, magnetic recording is a better solution; and without random access, magnetic tape is a lower cost solution. Applications that can be cost justified today when optical library solutions are considered with a re-engineered work place include; paper replacement (folder management), computer output to microfilm replacement, film displacement, and a low cost, low performance extension to magnetic DASD. Future applications include use as a primary storage device for multimedia applications, and the displacement of floppy disk technology.

In order to achieve its full potential, magneto-optic recording will have to improve in cost, recording density, and performance. Media cost versus competing technologies, i.e. tape, are still excessive, and improvements in manufacturing cost and recording densities are required to close this gap. Improved recording densities are key to future growth, and here materials compatible with mark edge recording and shorter wave-length lasers are needed. On the performance side, higher data rates are required and thus improved sensitivity materials with appropriate thermal design will be needed. Also, materials or system solutions that mitigate the multi-pass write performance penalty are needed to close the performance gap.

Magneto-optic recording has established a presence in the storage hierarchy, and the pieces are in place for rapid expansion of that role. The opportunity for this technology will critically depend on the pace with which cost, density, and performance improvements can be brought to the market place.