Lecture no. 6
Department: Information and Library Science
Subject: Information Storage & Retrieval
Name of the lecture: storage devices-3
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10. Holographic Storage Devices: because this technique is the newest and the important technique we will give more details about this technique.

Definition:

Holography is the technique of recording the scattered light off an object, and then displaying this recorded image so that it appears as if the object is present is the same position as before, relative to the viewer. In other words, holography represents a three-dimensional image of an object. Holograms are volumetric images of objects within a two-dimensional medium.

History:

Holography was first discovered in 1947, but the techniques of holography didn't really advance until the development of the laser in 1960. In 1968, the invention of white-light transmission holography enabled holographs in ordinary white light and the mass production of the type of holographs most commonly seen today.

Benefits and advantages:

According to Jet Propulsion Laboratories, holographic data storage offers the ability to store much greater volumes of data by taking advantage of the depth of the recording medium, not just its surface area, and high-speed data transfer rates. Other benefits include high-fidelity data recovery, high-fidelity imaging of data pages, low levels of noise in data recovery and a long archival life (up to 50 Years at current estimates).

Why the Interest in Holographic Data Storage?

- Increased storage capacity
- Increased read/write speed
- Longer storage life
- Security

Increased Capacity

- In today's world, digital media is becoming more and more common and is requiring more storage to meet the new demands. More industries are now using digital storage than ever before.
- 200 DVD's can fit on one 1 TB holographic disk with a future capacity of 6 terabytes.

Increased Capacity

- IBM's test platforms can store up to 390 bits per square micron (a micron is a millionth of a metre). DVDs, by contrast, have a storage density of about five bits per square micron.

	DVD	DVD	Blu-Ray	Blu-Ray	HVD
Number of Layers	Single	Dual	Single	Dual	200+/-
Recording Capacity	4.7GB	9.4GB	25GB	50GB	3.9TB
Data Transfer Rate	11.08Mb/s	11.08Mb/s	36Mb/s	36Mb/s	1GB/s

Increased Speed

- Holography allows a million bits of data to be written and read out in single flashes of light, enabling data transfer rates as high as a billion bits per second (fast enough to transfer a DVD movie in about 30 seconds).

Interesting Facts

- It has been estimated that all the books in the U.S. Library of Congress, could be stored on six (6) HVD's.
- The pictures of every landmass on Earth (Google Earth for example) can be stored on two (2) HVD's.
- With MPEG4 ASP encoding, a HVD can hold between 4,600 to 11,900 hours of video, which is enough for non-stop playing for a year.

Longer Storage Life

- HVD's have an estimated archival life expectancy of at least 50 years or more compared to CD/DVD archival life of 2 to 5 years *(even though published life expectancies are often cited as 10 to 25 years or longer for optical media, it depends on the storage conditions and quality of the disks).*