1. Professional term

**Areal density** is a measure of the quantity of information bits that can be stored on a given length of track, area of surface, or in a given volume of a computer storage medium.

Storage device classes:

* **Magnetic disk media**: In 2015, Seagate introduced a hard drive with a density of 1.34 Tbit/in2, more than 600 million times that of the IBM 350. It is expected that current recording technology can "feasibly" scale to at least 5 Tbit/in2 in the near future. New technologies like heat-assisted magnetic recording (HAMR) and microwave-assisted magnetic recording (MAMR) are under development and are expected to allow increases in magnetic areal density to continue.

**Ramp load/unload (L/UL) mechanisms:** Currently, L/UL zone at the outer disk diameter is not used for data storage due to potential loss of magnetic information caused by head-disk contact. If the slider can be loaded/unloaded smoothly and swiftly, the L/UL zone can be minimized or even be used for data storage, and then a larger storage area is available.

**How HDD works:** Magnetic platter stores information in binary form. Write-and-read head moves over the platter to write 0's and 1's by changing polarity of the spot on the platter. To read the data back, the head goes to the same spot, notices the North and South spots flying by, and so deduces the stored 0's and 1's. <https://animagraffs.com/hard-disk-drive/>

**Self-servo track writing systems:** The magnetic head is positioned on the data track by the servo based on servo positioning information recorded magnetically on the disk, and the quality of this information greatly affects the positioning accuracy of the HDD. The servo track writing (STW) process, which writes the servo positioning information to the disk, is a unique technology in HDDs.

SSW has been attractive in HDD industries because it not only potentially saves in the cost and time of mass manufacturing, but also effectively maintains the servo writing quality.

SSW regenerates timing (tangential) and position (radial) information from the previously written track using the existing GMR head of the HDD itself.

The servo system in SSW involves two control loops: position control loop timing control loop. In the position control loop, a Voice Coil Motor (VCM) is controlled to maintain the heads over the target track centerline during the reading and writing operations. And in the timing control loop, a Phase Lock Loop (PLL) is generally used to generate the servo writing clock signal.

<https://msc.berkeley.edu/research/self-servo.html>

1. Work responsibilities

<https://www.linkedin.com/jobs/view/senior-servo-staff-engineer-at-seagate-technology-48983682/?originalSubdomain=sg>

<https://seagate.wd1.myworkdayjobs.com/en-US/EXT/job/Longmont-United-States/Servo-Firmware-Hardware-Integration-Engineer-II_201024>

1. Innovative products

**16TB Exos, IronWolf and IronWolf Pro drives**

it holds out the promise of 33 per cent more storage capacity per rack compared to 12TB drives, while maintaining the same standard 3.5in form factor for a reduced overall total cost of ownership.

 it has the field-proven reliability and continuous high performance to support a broad range of workload requirements and high-availability use cases.

Exos X16 offers built-in data protection, including Seagate‘s Instant Secure Erase technology designed to simplify decommissioning of drives at the end of their lifecycle.

It isn’t just the Exos line getting the 16TB treatment – Seagate has also extended its [IronWolf and IronWolf Pro](https://www.seagate.com/internal-hard-drives/hdd/ironwolf/) lines with 16TB versions. These hard drives are optimised for multi-user NAS environments, capable of supporting workloads up to 300TB/year.

<https://blocksandfiles.com/2019/06/04/seagate-ships-16tb-exos-x16-enterprise-hard-drive/>

**double-headed disk drives** two actuators on a single pivot point with each actuator controlling half of the drives read/write head arms – providing as much as a 2x increase in performance (demonstrating ~480MB/s sustained throughput) <https://blocksandfiles.com/2019/06/18/double-headed-seagate-disk-drives-coming/>

**HAMR (Heat-Assisted Magnetic Recording)** overcomes the tendency of smaller magnetised areas in current PMR (perpendicular magnetic recording) technology to flip their magnetic polarity, and hence their binary bit value, through temperature changes and interference from neighbouring bits.

The drives use glass platters with Iron Platinum (FePt) media, the heads use a Near-Field Transducer design and the bits are oriented perpendicularly to the surface of the drive. The writing process completes in about two nanoseconds and involves heating the bit area using a laser and then cooling it (which is a passive part of the process). <https://blocksandfiles.com/2019/09/23/seagate-assumes-ssds-wont-kill-disk-drives/>

1. Know more about Seagate

Instant Secure Erase (ISE): Seagate **Instant Secure Erase** is designed to protect data on hard disk drives by **instantly** resetting the drive back to factory settings and changing the encryption key so that any data remaining on the drive is cryptographically **erased**. This means all data on the drive is permanently and **instantly** unreadable, as needed.

[MACH.2 Multi- Actuator Technology](https://www.theregister.co.uk/2017/12/19/seagate_disk_drive_multi_actuator/)

Seagate is increasing IO performance in disk drives by separating read-write heads into two separate sets which can operate independently and in parallel. This enables a hard drive to double its performance while maintaining the same capacity as that of a single actuator drive. <https://www.theregister.com/2017/12/19/seagate_disk_drive_multi_actuator/>