

Western Digital's HGST: Helium-Filled Hard Drives

Western Digital's newest subsidiary, HGST, Thursday unveiled a hard-drive platform in which helium replaces the air inside the drives, pointing the way for many more years of potential development in the hard-drive business.

HGST, which was known as Hitachi Global Storage Technologies or Hitachi GST before [it was acquired by Western Digital](#) last year, next year expects to become the first manufacturer to make helium-filled hard drives available on a commercial basis, said Brendan Collins, vice president of product marketing for the Irvine, Calif.-based company.

"It's our biggest technological innovation in the last eight years," Collins said. "We've been filling hard drives with air forever."

Collins said that replacing the air inside a [hard drive](#) with helium is key to developing hard-drive capacity beyond the five-platter, 3-TB to 4-TB capacity models now coming to market.

The drag caused at the edge of a disk spinning at high speeds in air causes the drives to use more power to spin the disks and requires a certain space between the disks to account for vibrations in the heads and disks from the turbulence.

"At some point in the next two to three years, you can't push the capacity in air," Collins said. "We will need to migrate to a new platform. We can go to a smaller form factor where there is no flutter. But that would double the cost per GB."

Instead, HGST developed the ability to seal helium in the drives in place of air, he said.

Because helium has only one-seventh the density of air, spinning disks generate much less drag force in helium, which results in a lower power consumption, HGST said. The lower turbulence also significantly reduces the amount of space needed for the heads and platters, resulting in the ability to build drives with more platters in the same space as today's air-filled drives, the company said.

"With helium, we can cram seven platters in the same space as five platters today," Collins said. "So capacity rises by 40 percent. At the same time, this cuts the energy needed to run the drive by 23 percent."

NEXT: Advantages Of Helium In Hard Drives Well Known

The advantages of helium over air for filling hard drives have been known for decades, and the idea of doing so was patented as early as 1980, according to a recent [white paper published by Xyratex](#), a Fremont, Calif.-based storage vendor.

Helium dramatically reduces the turbulence caused by the spinning disk, cuts power consumption, and results in a more uniform temperature within the disk drive. It is also less damaging to the protective coatings of components within the drive, Xyratex wrote.

While helium has been used for testing hard drives for leaks for years, it has not been found suitable for sealing inside a drive for commercial purposes. Hard drives have not been able to be hermetically sealed with existing technology so that helium will gradually leak out and while atmospheric pressure will eventually cause air to leak inside, Xyratex wrote.

Helium poses another long-term potential problem in terms of availability. There is a finite amount of the gas available on earth, and it is difficult to extract in quantity. The primary reserve is held by the U.S. government, which stockpiled it years ago when it was used for lighter-than-air aircraft. The government is now selling off all but a strategic reserve by 2015, after which the price could increase by about 50 times, Xyratex wrote.

HGST has invested in the components and processes needed to seal hard drives hermetically to prevent helium from leaking out and air from leaking in, Collins said.

For now, the process is being applied to large-capacity 3.5-inch hard drives, which use disks with a 95mm diameter, Collins said. "The bigger the disk, the more the flutter, and so helium helps," he said. "Performance drives use 65mm disks, so there is less flutter. But that may be an issue in another three to five years."

[Western Digital's HGST](#) business will be first to market with helium-filled hard drives even though competitors have been working on the technology for at least as long as HGST, Collins said.