Million-year storage solution is set in stone

July 13 2012, by Nancy Owano

An uncut/rough yellow sapphire found at the Spokane Sapphire Mine near Helena, Montana. Image: Wikipedia.

(Phys.org) -- A sapphire hard disk can last one million years and resolve a problem worrying archaeologists. Thursday, Patrick Charton of the French nuclear waste management agency ANDRA, presented a way out of data storage problems, an information-engraved sapphire disk using platinum. The disk is being called the ultimate, if not ultimately unaffordable, HDD. The disk was announced at this week's Euroscience Open Forum, a pan-European event drawing researchers, as a way to provide information for future archaeologists.

The solution is in the form of two thin disks of industrial sapphire, molecularly fused, with a thin layer of inscribed platinum. The disks were immersed in acid to test their durability and to simulate aging.

With the sapphire disk, up to 40,000 miniaturized pages of text or images etched can be inscribed in the platinum. The information would be read with microscope.

A key application would be as a solution for how future societies will be able to identify areas of buried nuclear waste. Nuclear reactors produce radioactive waste that needs to be safely stored for up to one million years. Once a disposal method is determined, future societies will need to know where the waste is buried. According to *Science* magazine. Finland, France, and Sweden are the furthest advanced in the process of finding a geologically suitable site. While designers of such repositories are confident the waste can be buried safely, the fear is that future archaeologists may dig in t he wrong places. Markers would be a way to allow them to know the sites where they should not dig.

With a sapphire disk, the warning message could be encoded into varied forms of written human communication, including words, pictograms, and diagrams, and in turn linguists and artists are involved in the project. The researchers say thus far they have no idea what language to use.

Another application is seen is as a Rosetta Stone to preserve the wealth of knowledge that humans have accumulated. The prototype shown costs $30,000 to make.

Euroscience Open Forum is a meeting drawing scientists, researchers, policy makers, and the general public. Talks focus on the direction that research is taking in the sciences, humanities and social science.