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## Image Gluts Threaten Space Archivists

By [Stewart Taggart](#)Special to SPACE.com  
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SYDNEY, Australia -- While the history of the cosmos stretches back billions of years, scientists on Earth are struggling to keep abreast of the space data collected in just the past 30 years.

In the United States, [Canada](#), [Australia](#), the European Union and [Japan](#) -- where space science has a long, continuous history -- huge amounts of data now must constantly be transferred to newer, more capacious storage media.



ACRES

Staffers at the Australian Centre for Remote Sensing manage a database growing at a rate of about 40 gigabytes per day. Recent data include this March 2000 image of the Sydney Olympics site at Homebush acquired by Landsat 7 ETM+ sensor.

Massive databases now bulge with everything from [Landsat images](#) of Earth dating back to 1972, to remote sensing data from Mars and other planets. Every day brings a cascade of new material in an unending flow.

"Storage is getting to be a major issue," said Paul Trezise, manager of the [Australian Center for Remote Sensing](#) (ACRES) in Canberra. "Our database is growing at a rate of about 40 gigabytes per day."

### Faced with losing precious data, ACRES took a calculated risk, baking the disks in industrial ovens to dry out the moisture and eliminate the ruinous stickiness.

Right now, ACRES is updating storage of 120,000 gigabytes of data collected since 1979, primarily from remote-sensing Landsat satellites passing over Australia. Landsat images are among the most voluminous of space-based data, making ACRES one of the largest data repositories of its kind in the world, Trezise said.

The data now are housed on optical tape, having been rescued from disintegration in the early 1990s from aging high-density magnetic tapes. That first rescue operation occurred just in the nick of time, Trezise said, since the magnetic tapes were starting to get sticky on their spools.

Faced with losing precious data, ACRES took a calculated risk, baking the disks in industrial ovens to dry out the moisture and eliminate the ruinous stickiness. Luckily, the process worked. Other countries have since used the technique to save their early magnetic-tape data from similar jaws of destruction, he said.

Nonetheless, there's no rest for the weary, Trezise said. Now, ACRES must shift its huge data collection once again, this time onto digital linear tape to provide faster access for scientists and the public, Trezise said. The need for constant upgrades is also occurring elsewhere, particularly in the United States. For instance, [NASA's Jet Propulsion Laboratory](#) (JPL) is in its third round of upgrading data from its various space missions, said Mike Martin, spokesman for JPL's Data Distribution Lab.

Starting with magnetic tape in the early 1980s, data was transferred to higher quality magnetic tapes, and finally onto CDs a process that only ended in 1998. Now, JPL is starting all over again -- busily converting all those CDs onto even higher capacity Digital Versatile Discs (DVD), which can hold roughly seven times more data.

With some luck, this latest upgrade will give JPL a breather for a few years, he said. "DVD technology will allow us to put our whole archive collection online in DVD jukeboxes in the next couple years," he said, "We think will keep us going for another decade before we need the next generation of storage technology."

At the [National Space Science Data Center](#) (NSSDC) in Greenbelt Maryland, which archives data from NASA missions, data storage poses continual challenges, said Joseph King, spokesman for the center.

"Our digital products are not held on one media type in one system at any given time," he said, underscoring the difficulties of keeping up with constantly improved storage technologies.

For instance, NSSDC now has data spread out across 9-inch tape, 4- and 8-millimeter tape, 12-inch optical platters, CDs and Digital Linear Tape, he said. All up, NSSDC has about 20,000 gigabytes of data, with the library growing at 2 to 3 gigabytes per year.

In Sioux Falls, South Dakota, the [Earth Resources Observation Systems](#) (EROS) Data Center archives material gathered by NASA's Landsat satellites over North America and many other parts of the world. The center now archives millions of [images of Earth](#) gathered since 1972 and with more added every day.

John Faundeen, EROS chief of data management, said he like others must keep running just to stand still. After an upgrade just a few years ago, EROS is now engaged in another round of data transfer to even higher capacity storage media.

EROS is going to need it.

At present, EROS database is more than 200,000 gigabytes. By 2005, the database is expected to grow to 2.4 million gigabytes 12 times bigger -- as it expands to include material from other NASA satellites besides Landsat.

Sure, all these ongoing data storage upgrades are costly. But how can you put a price on space history?

Trezise said the value of space observations particularly early ones from the 1970s is rising all the time. For instance, Australia and other nations are increasingly studying and monitoring greenhouse gas emissions, deforestation and other impacts on the natural environment by looking at historical space data.

As a result, space-based observations of Earth are becoming critical to understanding [Earth's changing environment](#). The further back that data sets go, the better for science. Thus, the hurdle now is to ensure the data's integrity for future generations. "To do nothing with all this priceless data and just let it disappear," Trezise said, "would be criminal."

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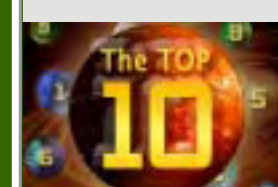


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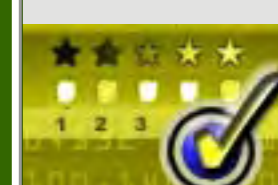
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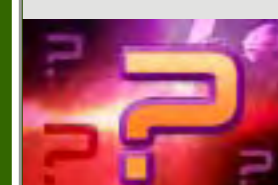
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