The Boeing Delta-2 rocket carrying the QuickBird-2 satellite about to lift off from the launch pad at Vandenberg Air Force Base in California. (Source: Digital Globe)

Update on Commerci High Resolution Sate

One Up; the Other Down!

Following on from my review of commercial high resolution space imagery published in the March 2001 issue of GeoInformatics, recently there has been another burst of activity in this field. On September 21st, the launch of the OrbView-4 satellite failed. On October 18th, the launch of the QuickBird-2 satellite was successful.

By Prof. Gordon Petrie

OrbView-4

The OrbView-4 satellite belonging to ORBIMAGE had been mounted on a Taurus multi-stage rocket built by Orbital Sciences, together with the QuikTOMS satellite belonging to NASA. The launch of the two satellites took place at Vandenberg Air Force Base in California. However, during the firing of the launcher's second stage, an in-flight anomaly took place with the rocket veering off its intended course. Although it regained its planned trajectory, the loss of energy and momentum during the anomaly resulted in the launcher failing to reach the minimum altitude and velocity needed to enter its correct orbit. As a result, the launcher and its satellites re-entered the Earth's atmosphere and fell into the Indian Ocean. The OrbView-4 satellite had been equipped with pushbroom scanners designed to produce images having ground pixel values of 1m (panchromatic) and 4m (multi-spectral). It also carried a hyperspectral imager built for the U.S. Air Force's Research Lab. The QuikTOMS (Quick Total Ozone Mapping Spectrometer) built for NASA was designed to continue the observations of the Earth's ozone layer carried out by previous TOMS instruments. The immediate effect of the failure of the OrbView-4 satellite was the announcement three days later (on September 24th) that the ORBIMAGE company is to file for reorganization under Chapter 11 of the U.S. Bankruptcy Code with a pre-arranged plan to be agreed with the holders of its shares and bonds. As discussed in the previous article, this simply adds to the many problems of Orbital Sciences and its subsidiaries. However, if the financial re-structuring plan is approved, then ORBIMAGE plans to continue its business and attempt to launch its OrbView-3 satellite in a year's time. This will have the same panchromatic and multi-spectral imagers as OrbView-4, but will not have the hyperspectral imager.

QuickBird-2

Having suffered the loss of its previous two satellites, EarlyBird (in December 1997) and QucikBird-1 (in November 2000), obviously the successful launch of QuickBird-2 came as a welcome relief to the EarthWatch company, now re-named Digital Globe. The satellite was launched from Vandenberg using a Boeing Delta-II two-stage rocket. According to press reports, this cost twice as much as the previous launches (the one successful; the other not) carried out using Russian launchers. However, given the success of the latest launch, undoubtedly the extra expense will be considered worthwhile. As mentioned in my previous article, with the granting of a new licence allowing EarthWatch to acquire imagery with a 0.5m ground pixel size, the company re-designed its flight plan for QuickBird-2. Originally the satellite was to collect panchromatic image data with a 1m ground pixel size and multi-spectral

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imagery having a 4m ground pixel size. With the re-designed orbit, flown at 450 km instead of 600km, the ground pixel size of the panchromatic imagery will be 0.6m instead of 1m (actually 0.82m), while that of its multi-spectral imagery will be 2.5m (instead of 4m). Even with these higher ground resolution values, the swath width of the QuickBird-2 imagery will be 16.5km (instead of the former 22km). This is of course wider than the swaths of the IKONOS (11km), EROS-A1 (12.5km) and OrbView-4 (8km) satellites while still having a smaller ground pixel size. This results from the use of multiple CCD linear arrays in the focal plane of the QuickBird imagers (supplied by Kodak) - along much the same lines as the arrangement used in the Indian IRS-1C and -1D satellites (albeit producing images with a 6m ground pixel size). Undoubtedly the combination of the higher ground resolution and the wider swath of each single image strip that will be produced by QuickBird-2 will be attractive to many users, particularly in the defence and intelligence communities. However it must be realised that a 90 day period will now elapse while the satellite and its imagers are checked out and calibrated. Also the telescope built (like the satellite itself) by Ball Aerospace is made of a special composite material that has to dry out prior to its operational use. Thus the QuickBird-2 satellite will not become fully operational until February 2002.

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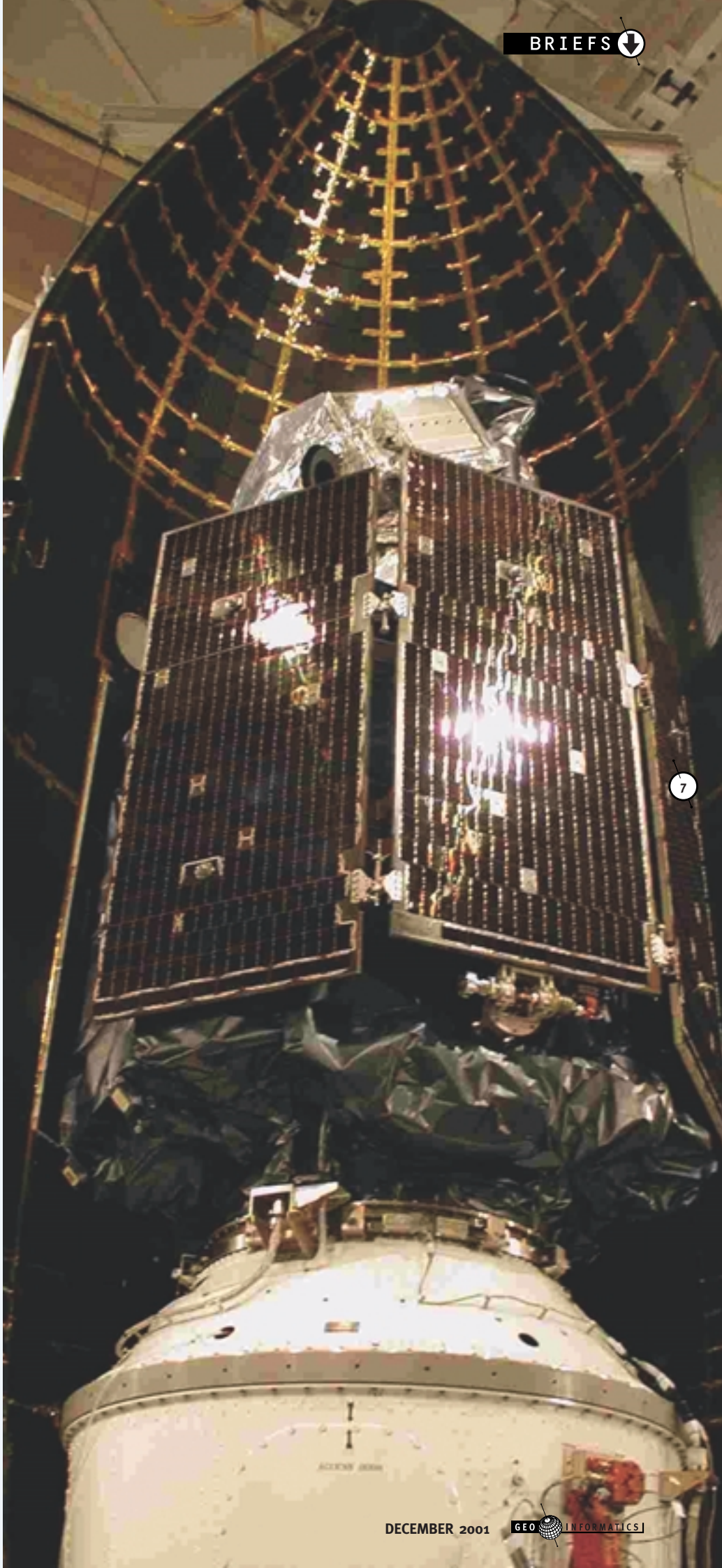

The QuickBird-2 satellite sitting inside its protective fairing prior to the second half of the rocket's nose cone being fitted during the pre-flight preparations for its launch. (Source: Digital Globe)