Delivery of IBIS flight model

The ISGRI gamma camera Delivery Review took place on the CEA premises in Saclay on July 6, 2001. This device will be mounted on the IBIS gamma-ray space telescope onboard the ESA satellite INTEGRAL. This satellite will be launched in the fall of 2002 for a 5-year mission. One of the main scientific goals of the mission is the observation of the astrophysical sites where the largest energy transfers take place; with foremost the black hole environment. High sensitivity, fine imaging and spectral performance set the ISGRI camera as a key element for the INTEGRAL observing programme. With its 2600 cm^2 sensitive area, ISGRI is the first gamma camera in the world equipped with semiconductor detectors operating at ambient-temperature. With more than 16 000 independent cadmium telluride (CdTe) detectors, this exceptional device, developped by the CEA with the CNES support, takes advantage of the latest progress in crystal manufacturing and microelectronics. ISGRI was delivered on July 12 to be integrated on the IBIS telescope.

First image:
The Delivery Review provided the opportunity to demonstrate the device imaging capabilities. For this test, the eight modules forming the detection array of the camera, were assembled on a test platform. To ease the mounting, large spaces were left between modules. In the final configuration on the IBIS telescope, the modules will be mounted side by side so that these dead zones will be ten times smaller. A bronze statuette, a copy of the discobol[1], was been inserted between ISGRI and a cobalt 57 radioactive source emitting photons with an energy of 122 kilo electron-volt. Bronze is a strong absorber at this energy and photons can hardly pass through, so that the statuette shadow is cast on the ISGRI module layer. However, one should note that, because it is thinner, the thin disc is less absorbing than the athlete's arm. The source being located 60 cm above the camera centre the count rate decreases significantly (from light orange to dark orange) from the centre to the edges that are farther from the source. Attention should also be devoted to the dark points in the image, corresponding to faulty pixels (noisy detectors). They number one hundred (i.e. less than 0,6%); this small number illustrates the quality of the manufacturing and justifies, a posteriori, the confidence in these new detectors. The specification was at less than 5% noisy detectors.

In a very emphatic way, the discobol symbolizes the intense effort before launch and the light announces the dawn of a prolific era for gamma-ray astronomers.

[1]Discobol: Statue from the Greek sculptor Myron (around 460-450 av. B.C.).