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Burst and Transient Source Experiment

*I*n the late 1960's, some of America's nuclear bomb detection satellites unexpectedly discovered intermittent bursts of gamma rays—high-energy particles of light associated with nuclear reactions. However, these gamma rays weren't coming from nuclear

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bomb tests on Earth. Instead, they seemed to be originating from unknown points in deep space.

In order to better investigate the source of these mysterious gamma-ray bursts, NASA launched the Compton Gamma-Ray Observatory (GRO). The unmanned orbiting observatory was deployed from the cargo bay of the Shuttle orbiter *Atlantis* (STS–37) in April 1991. Weighing in around 17 tons, GRO was the largest science satellite every carried by a Shuttle, filling half of *Atlantis*' cargo bay.

One of the four main astronomical instruments aboard GRO was the Burst and Transient Source Experiment (BATSE), built in-house at Marshall in the mid-1980's. Operated by the BATSE team in Huntsville, BATSE has already yielded new information about the origin of high-energy gamma-ray bursts in the universe.

A robotic telescope managed to take the first-ever optical images of a gamma-ray burst as it was exploding on Saturday, January 23, 1999, guided by a BATSE location in the sky.

BATSE's discoveries have shown that gamma-ray bursts do not originate in our own galaxy as was previously assumed, but emanate instead from the most distant parts of the observable universe, indicating the occurrence of violent cosmic events on a nearly unimaginable scale.

BATSE has also discovered several black hole and neutron star binary systems, and other strange celestial objects, which emit bursts of gamma rays.

BATSE findings and the other GRO instruments are now putting together a picture of our universe more incredible than anyone had ever previously guessed.