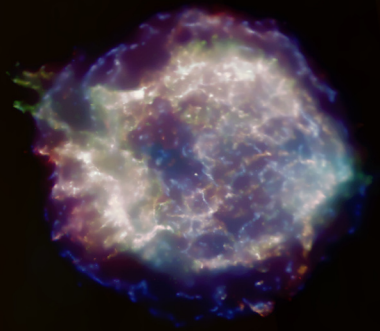
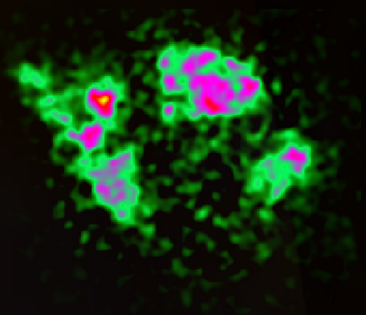
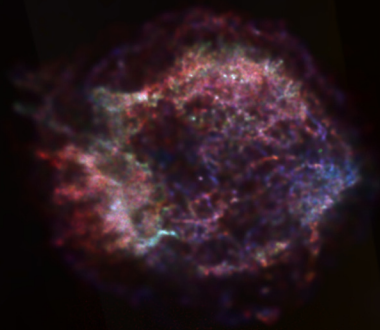
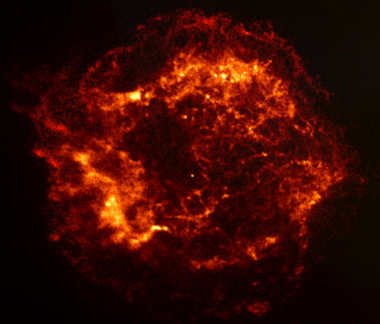
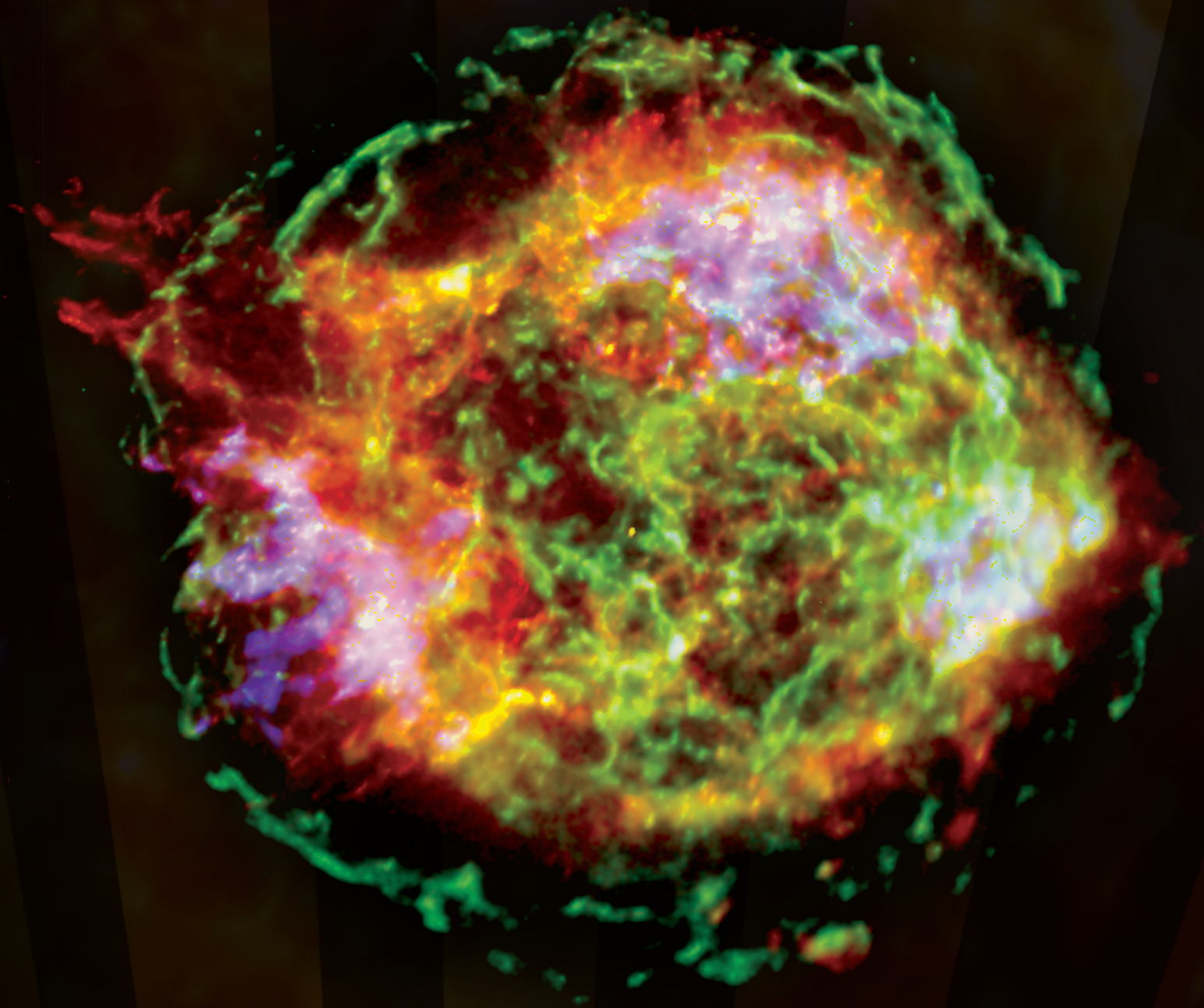
THE MANY FACES OF CASSIOPEIA A

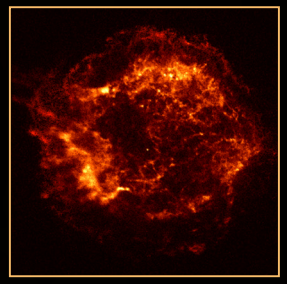






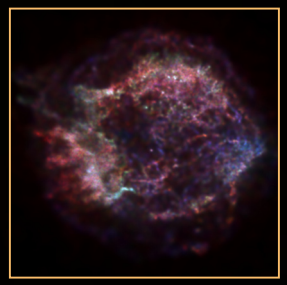






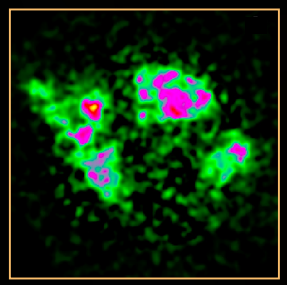
"First Light" from Chandra: Just a month after its launch in July 1999, Chandra astounded scientists with its first image of Cassiopeia A. With unprecedented X-ray detail, Chandra's "First Light" image revealed evidence for a black hole or neutron star at the remnant's center. This image helped usher in today's era of modern X-ray astronomy.

Observation Date August 19, 1999
Observation Time 1.5 hours
Release Date August 26, 1999



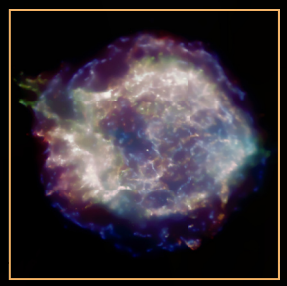
Tracing the Stuff of Stars: Since heavy elements in hot gas produce X-rays of specific energies, astronomers can use Chandra to investigate how the elements necessary for life are created and spread throughout the galaxy by exploding stars. Astronomers processed the same data from the "First Light" image to show where iron, silicon, and sulfur were located in the Cassiopeia A remnant.

Observation Date August 19, 1999
Observation Time 1.5 hours
Release Date December 21, 1999



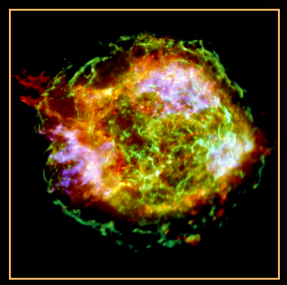
Probing the Elements Further: Utilizing Chandra's exquisite X-ray vision, astronomers took more data to reveal more information. A 14-hour observation was taken in 2000, which allowed scientists to create the best maps at that time of the heavy elements ejected in the supernova remnant Cassiopeia A.

Observation Date January 30, 2000
Observation Time 14 hours
Release Date June 27, 2000



New Data, New Detail: The Chandra data continued to reveal new faces of Cassiopeia A as scientists processed the information in various ways. This version shows additional structure in the debris of the gigantic stellar explosion, as well as the still enigmatic source in the center, which could be a rapidly spinning neutron star or black hole.

Observation Date January 30, 2000
Observation Time 14 hours
Release Date August 19, 2002



Deepest Image of Exploded Star: To celebrate Chandra's fifth anniversary, an observation with 1,000,000 seconds of data was taken - nearly 200 times more data than the "First Light" image. The new image gives clues that the initial explosion was far more complicated than suspected. It also reveals a jet (around 11 o'clock) in new detail and the presence of a counterjet (around 5 o'clock).

Observation Dates 9 pointings between Feb & May 2004
Observation Time 11 days, 14 hours
Release Date August 23, 2004

CASSIOPEIA A

CHANDRA X-RAY CENTER

When some stars die, they do not go quietly. Instead, they blast off their outer layers in one of the most energetic events in the Universe known as a "supernova." Astronomers believe that a star suffered such a fate about 300 years ago in the constellation of Cassiopeia. The remnant from the supernova, which came to be known as "Cassiopeia A" or "Cas A", has been one of the most extensively studied objects in the night sky.

The study of remnants of exploded stars, or supernovas, is essential for our understanding of the origin of life on Earth. The cloud of gas and dust that collapsed to form the Sun, Earth and other planets was composed mostly of hydrogen and helium, with a small amount of heavier elements such as carbon, nitrogen, oxygen and iron. The only place where these and other heavy elements necessary for life are made is deep in the interior of a massive star. There they remain until a catastrophic explosion spreads them throughout space.

About every fifty years in our Galaxy, a massive star explodes. The shell of matter thrown off by the supernova creates a bubble of multimillion-degree gas called a supernova remnant. Cas A is a prime example. The hot gas will expand and produce X-rays for thousands of years.

During the first five years of its lifetime, NASA's Chandra X-ray Observatory has been involved in unlocking the mysteries of this stellar explosion. With its keen X-ray vision, Chandra can resolve incredible detail and new features in the multimillion-degree gas and debris still aglow from the original explosion. Each Chandra observation of Cassiopeia A has provided new clues – and new questions to answer. The best, perhaps, is yet to come.

NASA
Marshall Spaceflight Center

For more information, visit:
http://chandra.harvard.edu

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