

How New Horizons “talks” to Earth

A signal that took 265 minutes to travel from NASA's *New Horizons* probe shows that it survived a close encounter with Pluto, and can now begin transmitting images and data back to Earth – a 16-month process

High-gain antenna: Primary dish with 0.3° wide beam requires probe to be pointing directly at Earth in order for NASA to receive signal

5 billion km to Earth

8-12 GHz frequency

Medium-gain antenna: Secondary dish with wider, 4° beam. Used as backup when probe not pointing directly at Earth

Seven instruments collect mass of data on geology and atmosphere of Pluto and its five moons

Data sent to solid-state memory banks

8 GB

Processor compresses and reformats data files

CPU

New files put in flash memory and transmitted

NASA'S DEEP SPACE NETWORK (DSN)

Earth rotation

Goldstone
California

Madrid
Spain

Johannesburg

South Africa
Closed in 1974 for political reasons, and moved to Spain

Canberra
Australia

DSN: Three sites – spaced out approximately 120° apart longitudinally around world – keep in constant contact with spacecraft as Earth rotates. Before *New Horizons* sinks below horizon at one DSN site, another one picks up signal