

pn9-10049

# NASA News

National Aeronautics and  
Space Administration

Washington, D.C. 20546  
AC 202 755-8370

For Release IMMEDIATE

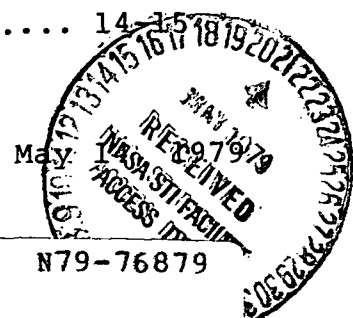
## Press Kit

Project UK-6

RELEASE NO: 79-61

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(NASA-News-Release-79-61) NASA TO LAUNCH  
BRITISH SATELLITE (National Aeronautics and  
Space Administration) 16 p

N79-76879

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IMMEDIATE

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RELEASE NO: 79-61

## NASA TO LAUNCH BRITISH SATELLITE

NASA will launch a United Kingdom satellite, called UK-6, aboard a Scout launch vehicle from the Wallops Flight Center, Wallops Island, Va., about May 24, 1979. UK-6 will become Ariel 6 when it reaches orbit.

The satellite will conduct scientific studies in the field of high-energy astrophysics.

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May 14, 1979

Information gained from the mission should provide a better understanding of astrophysical phenomena that involve large energy densities and their high-energy products, such as quasars, radio galaxies, supernovae and pulsars.

The launch is scheduled for 7 p.m. EDT, the beginning of a two-hour launch window. The Scout vehicle will place the satellite into an easterly, 625-kilometer (337-mile) circular orbit at an inclination of 55 degrees. The satellite is designed to operate for approximately two years.

The UK-6 mission will be the 100th launch of a Scout vehicle. Since July 1960, the smallest of NASA's launch systems has successfully completed 85 launches for NASA, other government agencies and several European countries. Scout is managed at NASA's Langley Research Center, Hampton, Va.

The UK-6 program is being conducted on a cost-reimbursable basis between NASA and the United Kingdom's Science Research Council. The Council's Appleton Laboratory, Slough, England, is responsible for management of the program and for post-launch operations.

UK-6 studies of the charge and energy spectra of cosmic radiation can give an insight into the conditions of the source and the processes of nucleo-synthesis that have occurred in high-energy objects.

This information is important to scientists because cosmic rays are the only sample of matter available from outside the solar system.

UK-6 will carry three primary science instruments: a cosmic ray detector for Bristol University; and two X-ray astronomy experiments, one for Leicester University and the other for Birmingham University and the University College of London's Mullard Space Science Laboratory.

Two technological experiments for the Royal Aircraft Establishment, Farnborough, England, are also on board. These experiments will investigate the performance in orbit of new types of solar cells and of metal oxide semiconductor devices in a space environment.

The four-stage, solid fueled, Scout-D launch vehicle, number S-198, is being prepared for launch by technicians from Langley and the Vought Corp. of Dallas, manufacturers of the Scout.

The UK-6 satellite was designed, built and tested by Marconi Space and Defence Systems, Ltd., of Portsmouth, England, for the Ministry of Defence, Procurement Executive, in London.

Technical advice during spacecraft development has been provided by the Royal Aircraft Establishment.

NASA direction for the project is through the Office of Space Transportation Systems, NASA Headquarters, Washington, D.C.

(END OF GENERAL RELEASE: BACKGROUND INFORMATION FOLLOWS.)

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### SPACECRAFT DESCRIPTION

The UK-6 spacecraft is a cylindrical structure similar to the UK-4 spacecraft launched in 1971. The spherical cosmic ray detector instrument is located at the top of the spacecraft, and the two X-ray experiment instruments are mounted on the sides of the structure.

UK-6 is 130.8 centimeters (51.5 inches) high; 69.6 cm (27.4 in.) in diameter; and weighs 154 kilograms (339.5 pounds). Its main structure is made of aluminum alloy.

The spacecraft has six major subsystems: structure, attitude control, solar cell arrays, power supply, data handling and radio frequency for telemetry and command functions.

Spacecraft power is provided by four solar arrays mounted on deployable booms, capable of providing 80 watts (end-of-life) at a minimum of 13.6 volts. The boom deployment angle is 90 degrees to the spacecraft centerline and is capable of operating over a Sun line aspect range of 180 degrees ( $\pm$  45 degrees). The span across the booms is 274 cm (9 feet).

Communication with the spacecraft is through redundant transmitters, redundant command receivers and a turnstile antennae array mounted on the spacecraft base.

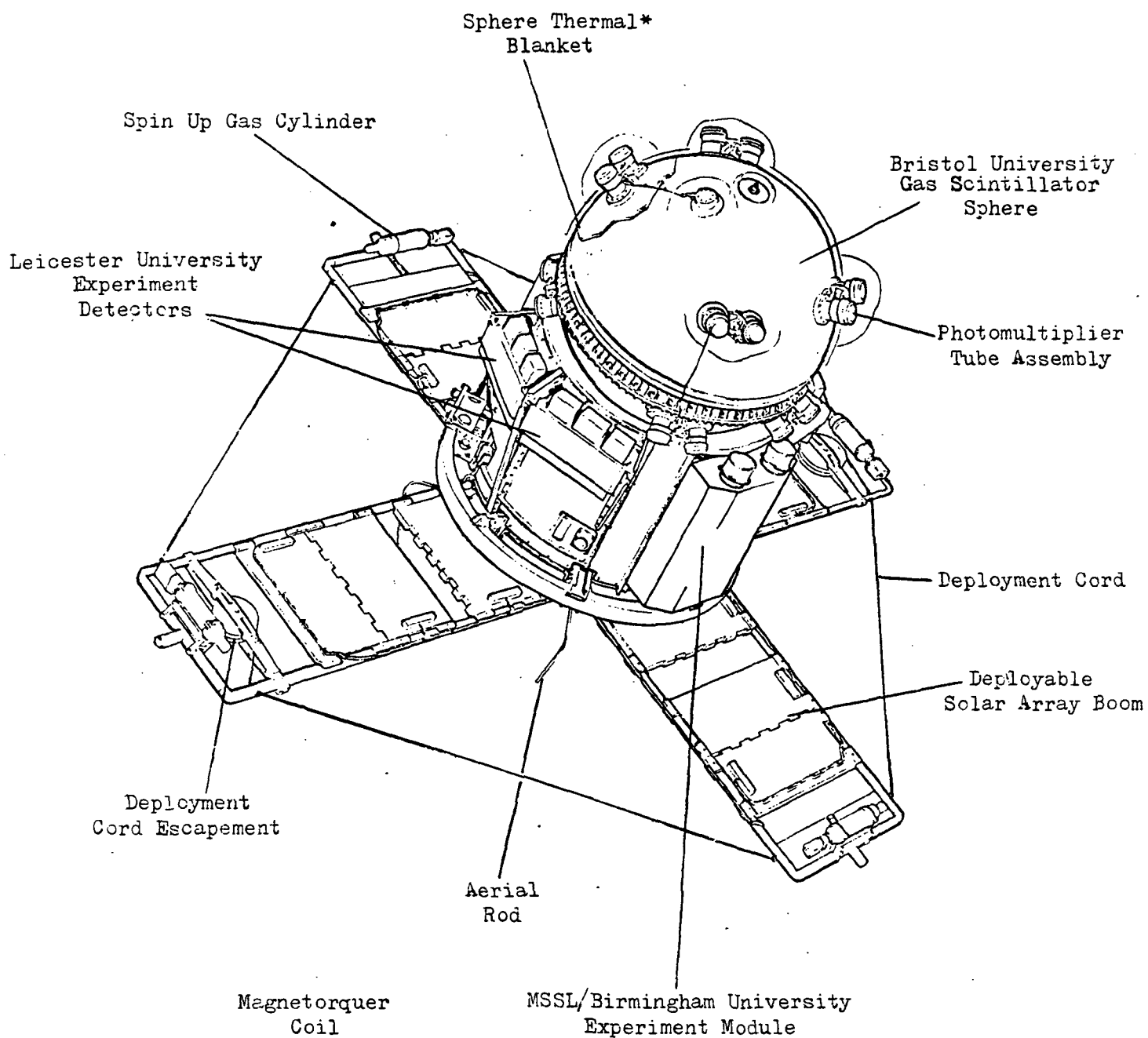
Experiment data are relayed through pulse code modulation (PCM) telemetry with real-time transmitted at 2,048 bits per second and play-back data at 8,192 bits per second.

Data not handled in real time are stored on two four-track tape units that can record up to 200 minutes per track. The two tape transports are housed in a single hermetically sealed container. Data will be stored on each track sequentially at a rate of 64 bps and played back at 8,192 bps when commanded by a ground station.

Spacecraft attitude will be determined by onboard solar aspect and albedo sensors. Attitude reconstitution is done by on-ground processing. Attitude control uses a magnetic torquing system, and torquing can be immediately initiated on receipt of command from a ground station, or be delayed by a predetermined amount by using a built-in timer in the spacecraft.

The spacecraft spin-up system uses a two-shot nitrogen gas system with the nitrogen stored in containers located on each boom tip. Gas released from diametrically opposed booms, on command from a ground station, is enough to increase spin rate from 15 to 45 revolutions per minute.

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\*Thermal Blankets not shown in complete form.

UK6 Spacecraft (Orbital Configuration)

## UK-6 EXPERIMENTS

The UK-6 satellite will conduct studies in the field of high-energy astrophysics. The scientific payload will consist of three experiments -- a cosmic ray experiment provided by Bristol University and two X-ray experiments, one provided by Leicester University and the other by the Mullard Space Science Laboratory of University College, London, jointly with Birmingham University (called the MSSL/B experiment).

Specific scientific objectives of each experiment are:

Cosmic Ray Experiment. This investigation will measure the charge and energy spectra of the ultra-heavy component of cosmic radiation with particular emphasis on the charge region of atomic weights above 30.

Leicester X-ray Experiment. It will investigate the periodic and aperiodic fluctuations in emissions from a wide range of X-ray sources, down to sub-millisecond time scales. The experiment will operate in the energy range of 1.2 to 50 kiloelectron volts (keV).

MSSL/B X-Ray Experiment. It will study discrete sources and extended features of the low-energy X-ray sky in the range of 0.1 to 2 keV. Long and short-term variability of individual X-ray sources will also be studied in conjunction with the Leicester experiment.

Two technology experiments will be flown on UK-6 for the Royal Aircraft Establishment at Farnborough, England. They are:

Solar Cell Experiment. An investigation of the performance in orbit of new types of solar cells mounted on a flexible, lightweight support.

CMOS Experiment. A complementary metal oxide semiconductor (CMOS) electronics experiment will investigate the susceptibility of these devices to radiation in a space environment.

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### SCOUT LAUNCH VEHICLE

The Scout-D launch vehicle is a four-stage, solid-fuel rocket system. It is 23 meters (75.ft.) long and weighs 21,320 kg (47,000 lb.) at liftoff.

The four Scout-D motors -- named, from base to top, Algol III, Castor II, Antares IIA and Altair III -- are interlocked with transition sections that contain guidance, control, ignition, instrumentation system, separation mechanics and the spin motors required to stabilize the fourth stage.

Guidance for Scout-D is provided by an autopilot and control is achieved by a combination of aerodynamic surfaces, jet vanes and hydrogen peroxide jets.

### 100 SCOUT LAUNCHES

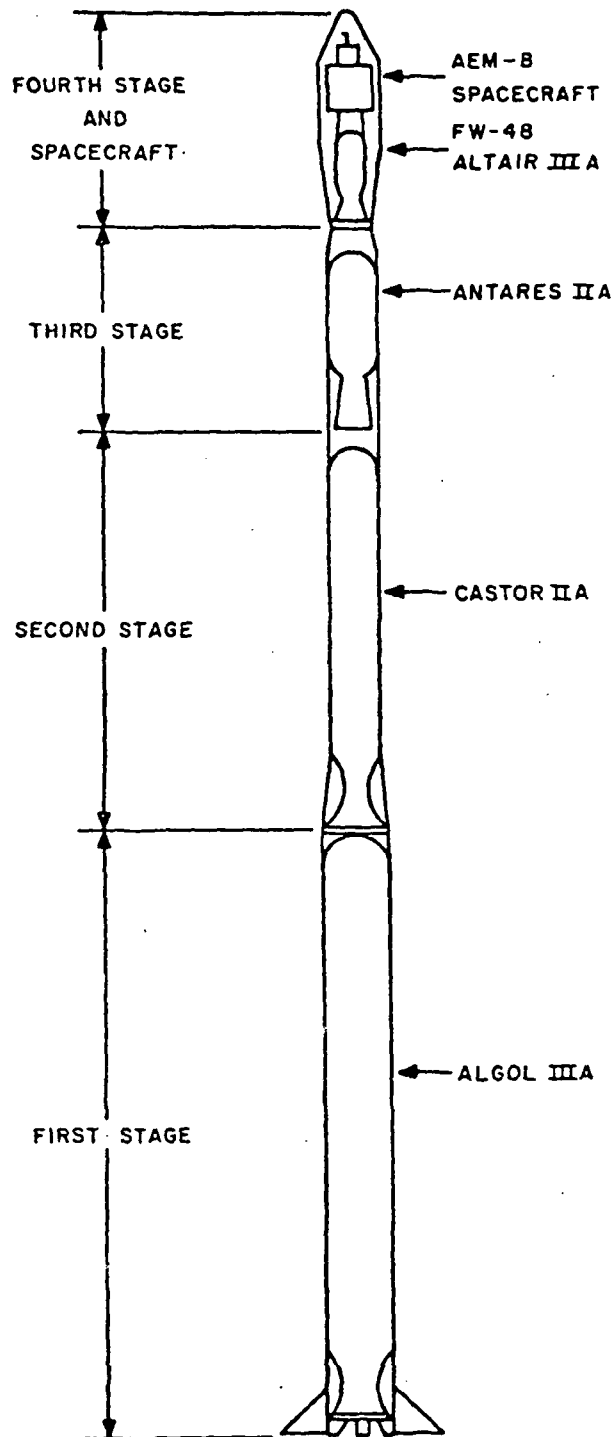
The Scout launch vehicle is the smallest in NASA's stable, but it has been one of the most active launch systems since its first liftoff on July 1, 1960.

During the past 19 years, Scout vehicles have placed a wide variety of scientific and technical payloads into Earth orbit, serving a broad range of customers. Scout has achieved an operational success rate of 95 per cent.

To date Scouts have launched 78 payloads for NASA and other government agencies and 21 payloads for European nations, including the United Kingdom, Italy, Germany, France and the Netherlands. Launch sites have included NASA's Western Test Range in California, 51; Wallops Flight Center, Va., 40; and the San Marco launch platform off the east coast of Kenya, Africa, 8.

The UK-6 launch is the sixth for the United Kingdom and the 41st to be launched from Wallops.

## SCOUT LAUNCH VEHICLE



### MISSION PROFILE

The Scout vehicle will be launched on an azimuth of 133 degrees, with the first stage ignited by blockhouse command. The first stage will burn for approximately 80 seconds and lift the vehicle to an altitude of 38 km (24 mi.) and a range of 38 km (24 mi.).

After first stage burnout, the vehicle will coast for 6.63 seconds. The second stage will then be ignited to provide thrust for 39 seconds, taking the vehicle to an altitude of 85 km (53 mi.) and a range of 119 km (74 mi.). The second stage will coast for 6.25 seconds after burnout.

Just before third stage ignition and during the coast period, the heat shield will be ejected at an altitude of 90 km (56 mi.). The third stage motor will be ignited 131 seconds after liftoff at an altitude of 94 km (58 mi.) and a range of 138 km (86 mi.).

The third stage will burn out after 34 seconds of thrusting. It will then coast for 460 seconds so the vehicle can attain the proper altitude and attitude for injection into orbit by the fourth stage.

During the coast to perigee altitude, one yaw maneuver will place the vehicle in the proper inclination for orbital insertion. When the yaw maneuver is completed, and just before fourth stage ignition, the spacecraft and fourth stage will be spun-up to 132 revolutions per minute. The spin-up is to reduce pointing errors that could influence the orbital parameters during insertion into orbit.

The fourth stage motor will thrust for approximately 34 seconds and increase the velocity to 27,207 km/hr (16,906 mph). When thrusting is completed, the fourth stage and the spacecraft will be in a circular orbit of 625 km (388 mi.). The inclination will be 55 degrees and the orbital period 97 minutes. UK-6 has a planned lifetime of two years.

The final vehicle function will be to separate the satellite from the spent fourth stage, allowing UK-6 to proceed with its mission.

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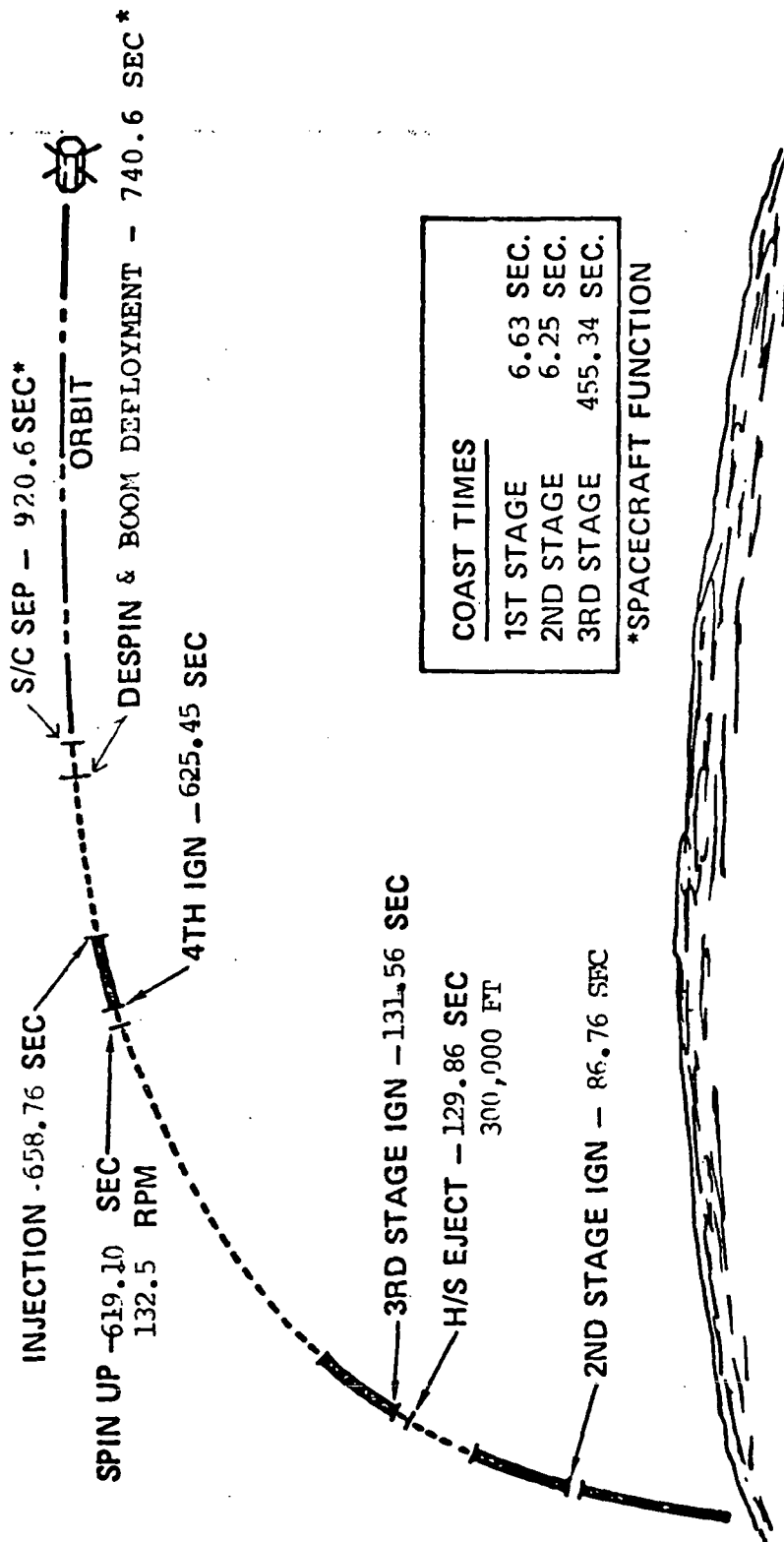
To assure mission objectives, the spacecraft spin axis will be commanded to a sequence of orientations in space, each position held fixed while data from the X-ray experiments are collected. The spin axis maneuvers will be made in accordance with the X-ray experimenter's observing program.

The cosmic ray experiment has no specific spin axis pointing direction requirement, except the need to maintain the experiment detector temperature below a specified limit.

The NASA Spacecraft Tracking and Data Network (STDN) station at Winkfield, England, will be the prime tracking, data acquisition and command transmission station for the UK-6 mission. It is controlled by the United Kingdom Operations Control Center (UKOCC) at the Appleton Laboratory, Slough, England. Changes in operating modes of experiments and satellite pointing direction will be done by commands transmitted to the satellite by data links from the UKOCC to the Winkfield station.

# SCOUT S-198 UK-6 SPACECRAFT

## MISSION PROFILE



### COAST TIMES

1ST STAGE	6.63 SEC.
2ND STAGE	6.25 SEC.
3RD STAGE	455.34 SEC.

\*SPACECRAFT FUNCTION

FLIGHT SEQUENCE

<u>Event</u>	<u>Time</u> (Min-Sec)
Liftoff	00:00:00
First Stage Burnout	01:20:13
Second Stage Ignition	01:26:76
Second Stage Burnout	02:05:31
Payload Heat Shield Separation	02:09:86
Third Stage Ignition	02:11:56
Third Stage Burnout	02:35:26
Spin Motor Ignition	10:19:10
Third Stage Separation	10:20:60
Retro-Force Command	10:21:10
Fourth Stage Ignition	10:25:45
Fourth Stage Burnout and Orbital Injection	10:58:76
De-spin Ignition and Boom Deployment	12:20:06
Payload Separation	15:20:06

UK-6/SCOUT TEAM

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