

# Black Arrow: How Does a Country Create then Lose Orbital Rocket Capability?

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## Overview

How does a country have, then lose, their homegrown orbital rocketry capabilities? There have been over a dozen countries to create orbital rockets, then fly them successfully, but only one completely removed itself from any space ventures following a successful orbit: The United Kingdom. The UK launched the Black Arrow vehicle four times, but cancelled the program before its greatest success: launching the *Prospero* satellite into Low Earth Orbit.

NASA was extremely interested in the Black Arrow vehicle, as launching from Australia offered a wide range of opportunities to launch into different orbits than was possible in the United States, but despite the program's enthusiasm for NASA money and support, but Parliament never gave them the chance.

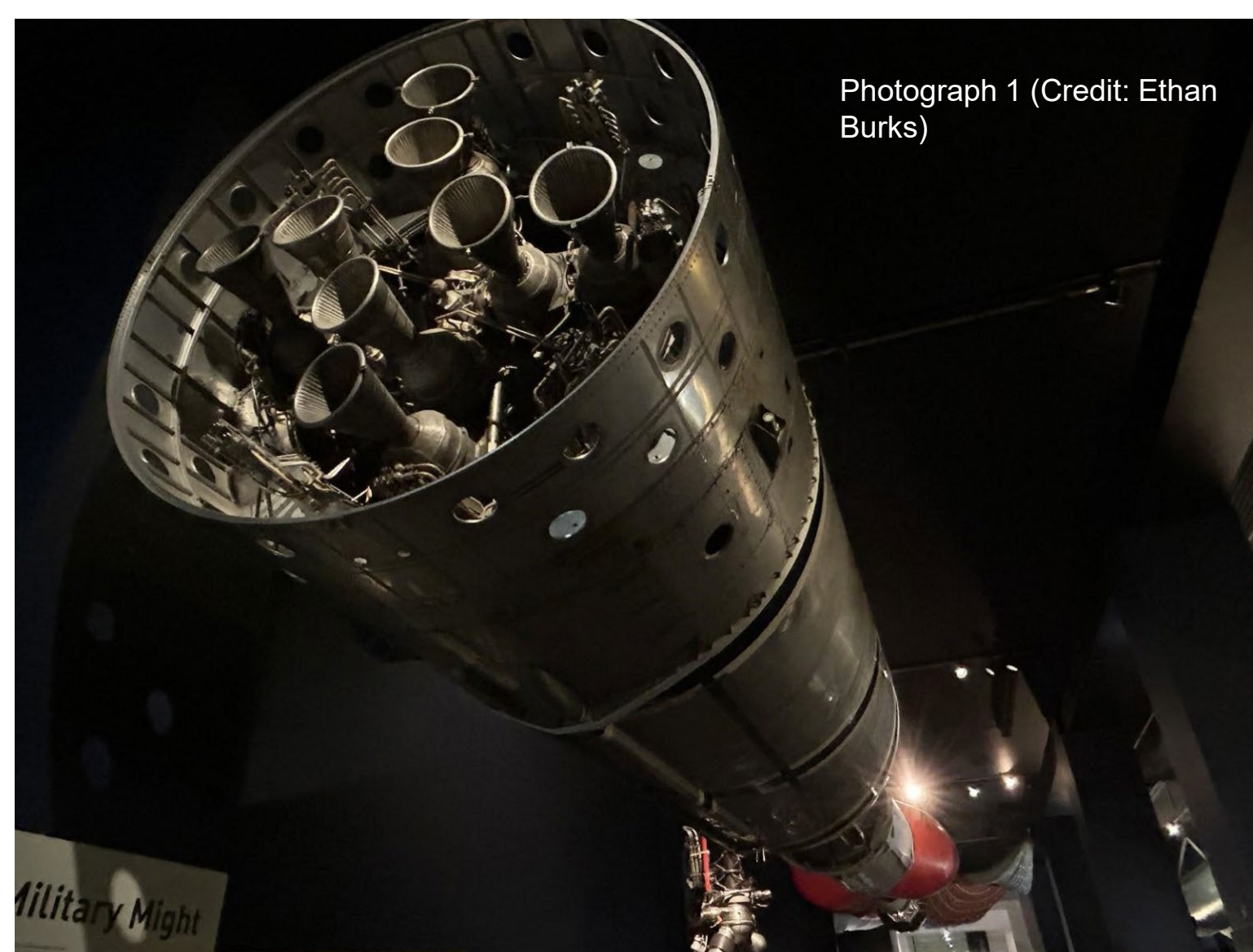
## Impact

Black Arrow had aspirations not just inside the UK, but outside of it, too. Its launch was a major collaboration between the UK and Australian governments, occurring from a site in Woomera, and the Woomera launch facilities have since largely sat vacant, as the UK never returned with a launch vehicle. Additionally, while countries like the US and USSR celebrated their space ventures, the UK (and to a lesser extent, France) rarely discussed such things; seeing them as merely military matters, and removing them from the public eye, cursing them to a life and legacy of obscurity. Something long noticed by British rocketry experts and enthusiasts is that when students go to places like the London Science Museum, they are cruelly unaware that their own country ever went to orbit, as it's but a footnote in the majestic history of space exploration.

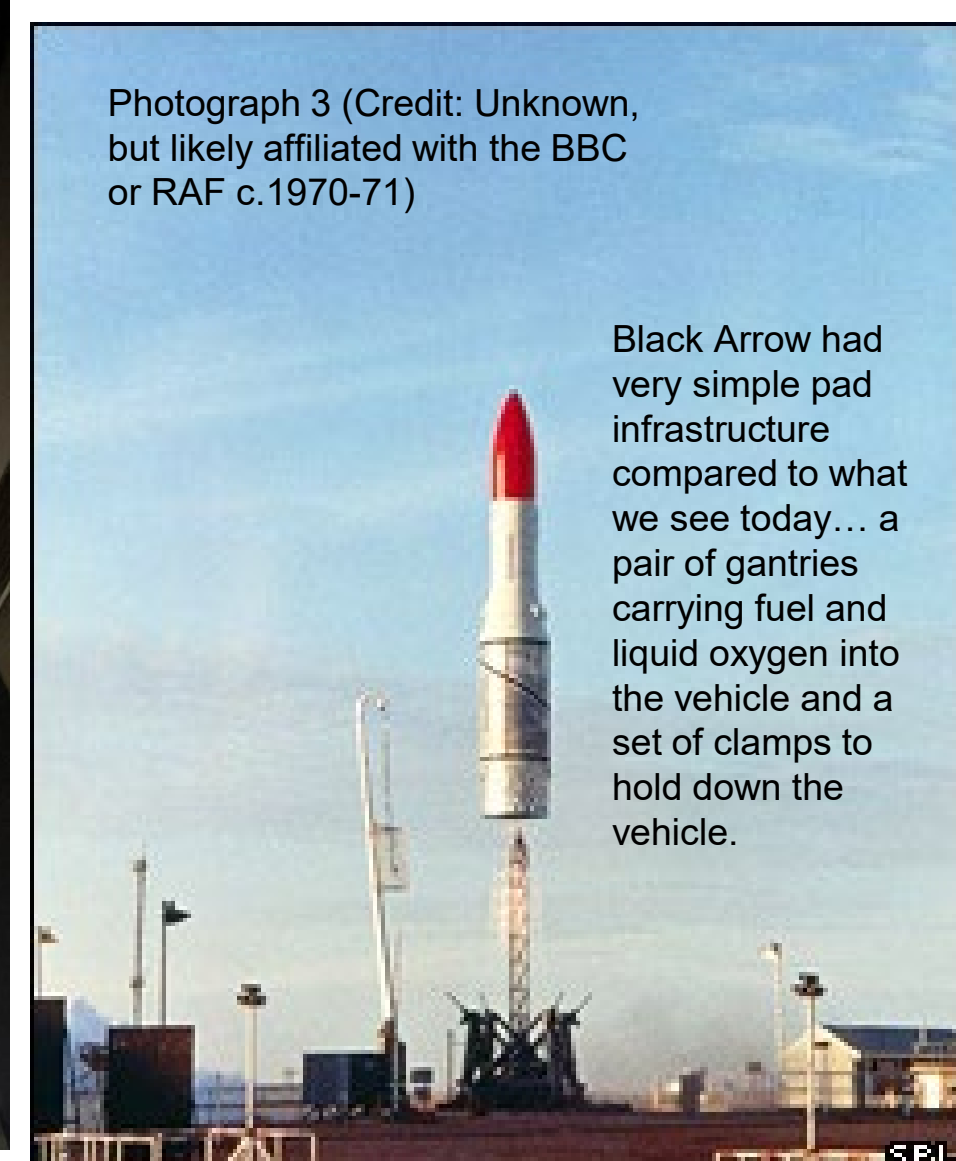
## Key Findings

I was blessed with not one, but two excellent opportunities to learn more about the Black Arrow. What I discovered, though, was that even the British have largely forgotten their own history of spaceflight. Parliament, and the UK space program, had received very little interest in the Black Arrow vehicle commercially, and canceled it after just three launches, none to orbit, despite a looming deal with NASA for a ride-swap agreement between Black Arrow and NASA's Scout launcher, a similarly capable vehicle. Scout flew until the late 1980s, while Black Arrow, very much its equal, was cancelled in 1971, and the ride-swap deal fell through.

## Photographs



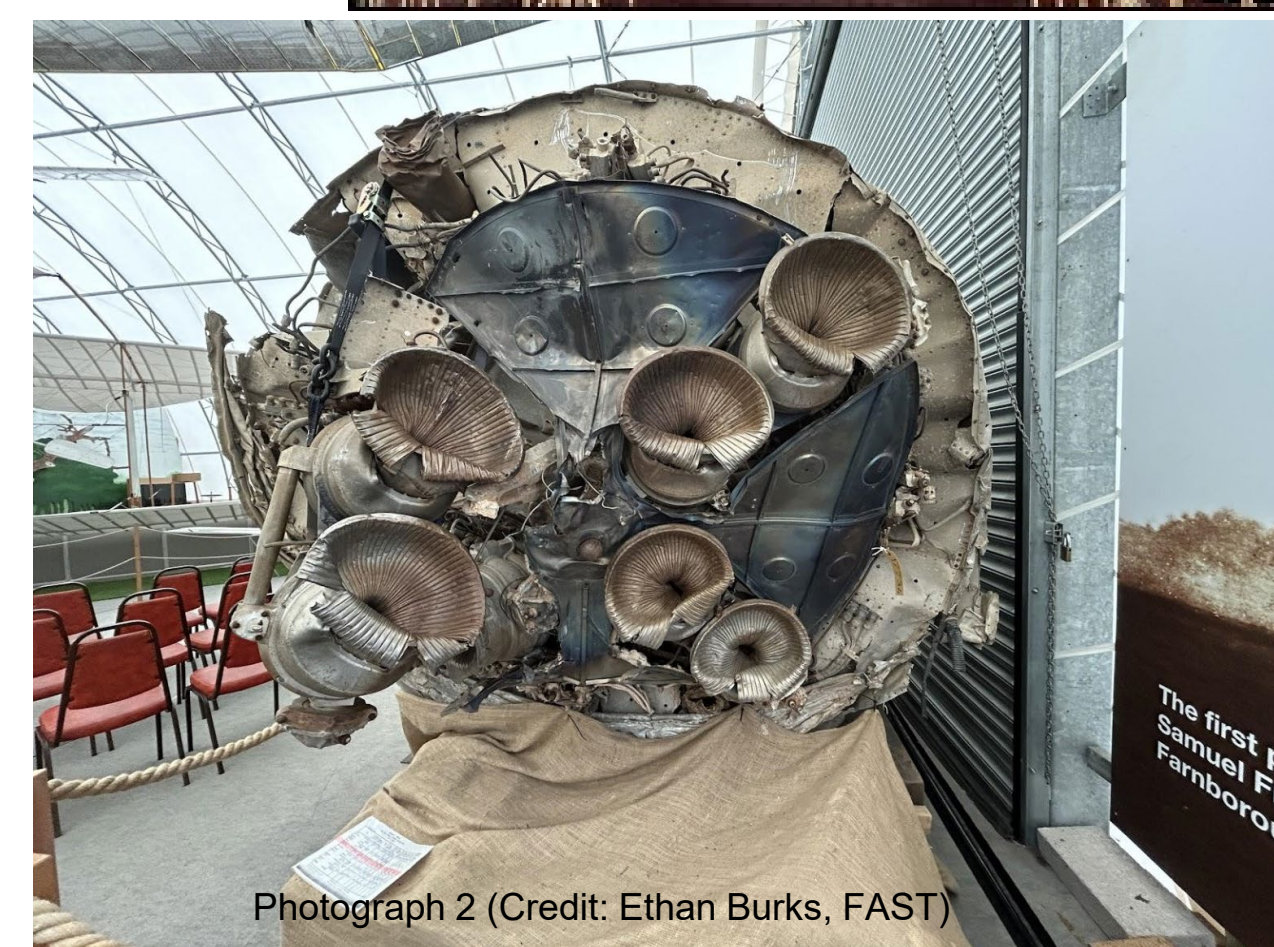
Photograph 1 (Credit: Ethan Burks)



Photograph 3 (Credit: Unknown, but likely affiliated with the BBC or RAF c.1970-71)

Black Arrow had very simple pad infrastructure compared to what we see today... a pair of gantries carrying fuel and liquid oxygen into the vehicle and a set of clamps to hold down the vehicle.

The R4 Vehicle (top), unflown, in the London Science Museum. The R3 Vehicle's spent first stage, in the FAST museum (right). This stage was recovered from the Australian Outback some 50 years after launch.



Photograph 2 (Credit: Ethan Burks, FAST)

## Bibliography/References:

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- Buchholz, Katharina. "The Countries Capable of Launching Space Rockets." *Statista*, Statista Inc., 18 Jul 2022, <https://www.statista.com/chart/27792/countries-capable-of-launching-space-rockets/>
- Photographs 1 & 2, taken by me during the trip to London; March 12th and 14th, 2024, respectively.
- John Allen, *The Black Arrow Rocket: A History of a Satellite Launch Vehicle and its Engines*: Douglas Millard; *Science Museum/Gazelle, Lancaster, 2001*, *Space Policy*, Volume 18, Issue 2, 2002, pp.167-168
- Amos, Jonathan. "Plans for UK Satellite Launcher." *BBC News*, BBC, 3 Feb. 2009, [news.bbc.co.uk/2/hi/science/nature/7862827.stm](https://www.bbc.com/news/science-nature-7862827) (also the source of Photograph 3)

## Acknowledgements

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