



Good afternoon, everyone. Today, we embark on a journey through Australia's groundbreaking leap into space exploration. We'll trace the story from the influential Woomera Rocket Range through significant precursor projects to the launch of WRESAT in 1967, and how that legacy propelled our role in the global space race.

INTRODUCTION

AUSTRALIA'S SPACE ODYSSEY



SPUTNIK
4 October 1957



EXPLORER 1
31 January 1958



WRESAT
29 November 1967

Australia was the third country after USSR & USA to build launch its own satellite.

“Back in the high-stakes era of the Cold War, every nation strove to push the boundaries of technology. Australia’s achievement in launching WRESAT was a proud testament to our technical ingenuity and visionary ambition, setting the stage for collaboration in the global space community.”

THE WOOMERA ROCKET RANGE



Established post World War II through Anglo Australian cooperation Woomera became an epicentre for missile testing and space launch experiments.

Woomera, range site located 183 kilometres north-west of Port Augusta.

A Woomera is an Aboriginal throwing tool that increases the accuracy and range of a spear.

Woomera, range site located 183 kilometres north-west of Port Augusta,

Construction of Woomera Range & Village began in mid-1947 to cater for thousands of people moving there as part of the Anglo-Australian Project.

Woomer is an Aboriginal throwing tool.

Woomera isn't just a geographical location; it's an icon of Australia's early aerospace endeavours.

Its remote location in South Australia made it ideal for pioneering missile tests and laid the groundwork for ambitious projects like WRESAT by providing a spacious, secure testing environment.”

PRE WRESAT INITIATIVES

PROJECT DAZZLE

Project Dazzle launched subscale warheads from the Woomera Test Range in South Australia using the British Black Knight research rocket.

While the original objectives of Dazzle centred on developing a warhead design for the British Blue Streak medium range ballistic missile. Later tests were flown in part to support the development of anti-missile systems.

By the time of the last Dazzle flight on November 25, 1965, plans were already in motion for Project SPARTA.



Prior to WRESAT, programs like Dazzle and SPARTA were instrumental in trialing new rocket configurations. Their work established the foundation for adapting American missile technology—transforming military hardware into a viable launch vehicle for scientific exploration

Project Dazzle which launched subscale warheads from the Woomera Test Range in South Australia using the British Black Knight research rocket. While the original objectives of Dazzle centred on developing a warhead design for the British Blue Streak medium range ballistic missile (which was cancelled as a weapon system in 1960), later tests were flown in part to support the development of anti-missile systems. By the time of the last Dazzle flight on November 25, 1965, plans were already in motion for Project SPARTA.

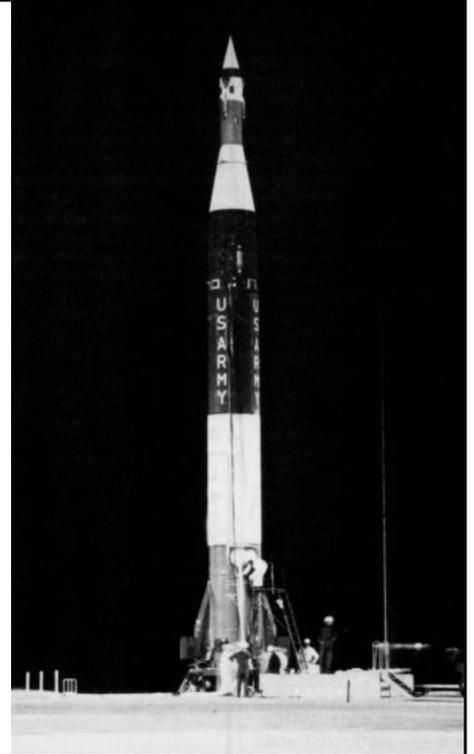
PRE WRESAT INITIATIVES

PROJECT SPARTA

The last of the US Redstone rockets were used to support a cooperative missile defence program involving the US, United Kingdom and Australia. It was known as Project SPARTA (SPecial Antimissile Research Tests, Australia)

The objective of Project SPARTA was to observe model warheads of various shapes and compositions during re-entry using radar and a range of other ground-based sensors in support of the development of antimissile systems like the American Nike-Ajax.

On the completion of these tests they had one rocket left!



The US shipped 10 Redstone rockets to Australia 9 were used for the SPARTA program. (1 failure 8 successful launches)

Transforming a military missile into a tool for discovery was no small feat.

The work at Woomera established the foundation for adapting American missile technology, transforming military hardware into a viable launch vehicles for scientific exploration.

With Australian and US engineers refining the Redstone rocket by adding the necessary components most notably the Sparta upper stage. leading directly to the historic success of WRESAT.”

THE BIRTH OF WRESAT

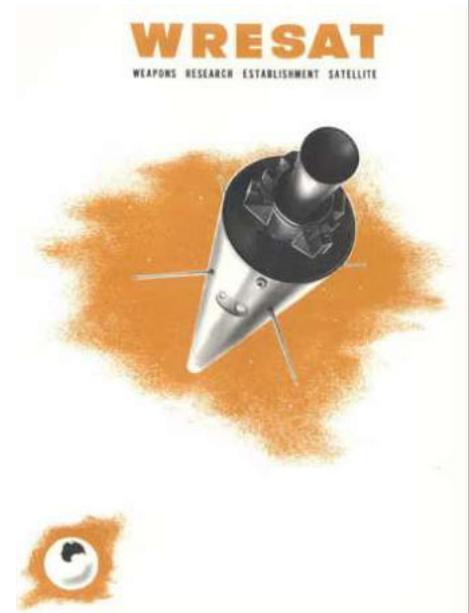
AUSTRALIA'S SPACE RACE

Anticipating that Project SPARTA would be able to meet all of its objectives with one rocket to spare, American officials approached WRE at the beginning of 1967 and offered to donate a surplus SPARTA rocket and launch services so Australia could orbit its own satellite.

The condition of the offer was that the launch would take place from Woomera shortly after the last SPARTA mission while American support personnel were still available.

WRE immediately turned to the Department of Physics at the University of Adelaide with whom they had partnered for an ongoing research program on how phenomena in the upper atmosphere affected climate.

The university already had experience with building and operating payloads for suborbital sounding rocket missions and had the expertise required to develop a satellite in the 11 months allotted.



WRESAT 1, built within 11 months by the Australian Weapons Research Establishment and the University of Adelaide.

THE WRESAT PROJECT

MISSION GOALS

The primary objective WRESAT was to provide new data on how the Sun affected upper atmospheric physics to supplement the findings from the Anglo Australian sounding rocket program.

The secondary objectives included gaining experience in launching satellites from Woomera to support the ELDO's (European Launch Development Organization) Europa and Britain's Black Arrow satellite launch vehicle programs which were also using the Woomera Test Range.

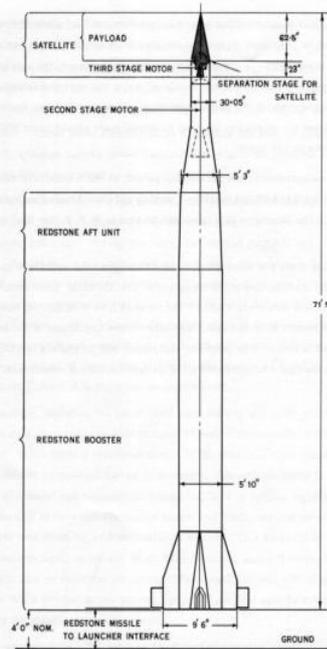


The primary objective WRESAT was to provide new data on how the Sun affected upper atmospheric physics to supplement the findings from the Anglo Australian sounding rocket program.

The secondary objectives included gaining experience in launching satellites from Woomera to support the ELDO's (European Launch Development Organization) Europa and Britain's Black Arrow satellite launch vehicle programs which were also using the Woomera Test Range.

THE WRESAT ROCKET

SPECIFICATIONS



First Stage	Redstone Rocket (USA)
Power by	Rocketdyne A-7 engine
Maxi thrust	416 kilonewtons (94,000 lbf)
Propellant	LOX/Ethanol

Second Stage	Antares 2 (USA)
Power by	(X-259)
Maxi thrust	93 kilonewtons (21,000 lbf)
Propellant	Solid propellant

Third Stage	Alcyone IA BE-3A (USA)
Power by	Solid rocket engine
Max thrust	34 kilonewtons (7,600 lbf)
Propellant	LOX/Ethanol

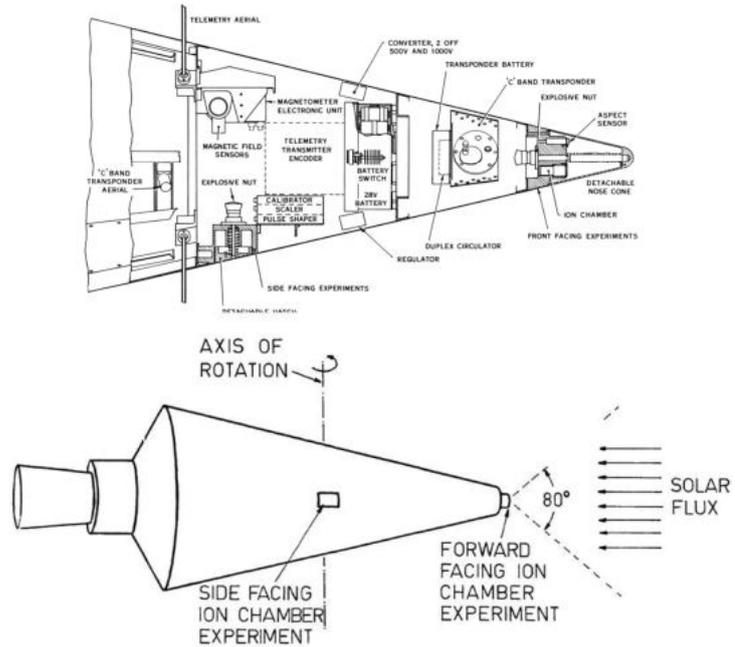
Transforming a military missile into a tool for discovery was no small feat.

The work at Woomera established the foundation for adapting American missile technology, transforming military hardware into a viable launch vehicles for scientific exploration.

Australian and US engineers refined the Redstone rocket by adding the necessary components most notably the Sparta upper stage. leading directly to the historic success of WRESAT.”

THE WRESAT PAYLOAD

SPECIFICATIONS



WRESAT had payload had a conical shape 1.59 meters long with a base diameter of 76 centimetres and a mass of 45 kilograms.

To simplify the design of the satellite, the BE-3 third stage remained attached to WRESAT once in orbit raising the total satellite mass to about 73 kilograms. This decision avoided the need to develop a separation system with its added mass and complexity while having no impact on the payload performance.

The systems inside were thermally isolated from the exterior which used a special high temperature black paint to withstand aerodynamic heating during ascent as well as provide adequate thermal control once in orbit.

The satellite included:

- a forward facing camber that housed instruments to measure UV light in three different wave bands,
- an ozone sensor to measure suns intensity,
- an X-ray counter to monitor solar activity, and
- a Lyman α telescope to detect hydrogen emissions Earth's hydrogen geocorona as well as reflections from Earth.

THE WRESAT MISSION

FLIGHT PROFILE



WRESAT lifted off from LA-8 at Woomera at 2:19 PM ACST (04:49 GMT) on November 29 1967.

American tracking facility at Guam confirmed that all three stages of the rocket performed as expected to place WRESAT into a 193 km by 1,259 km orbit with an inclination of 83.2°.

Australia had become the third nation to orbit a satellite launched from its own territory.

The first tracking pass over the American tracking facility at Guam confirmed that all three stages of the rocket performed as expected to place WRESAT into a 193 km (perigee) by 1,259 km (apogee) orbit with an inclination of 83.2°. Australia had become the fourth nation to orbit a satellite launched from its own territory

WRESAT operated in a nearly polar orbit after 642 revolutions over 42 days and re-entered the atmosphere over the Atlantic Ocean on 10 January 1968. The battery-operated satellite successfully sent back data to [NASA](#) and Australian ground tracking stations during its first 73 revolutions of the Earth

THE WRESAT REMAINS

FORGOTTEN LEGACY

WRESAT REDSTONE FIRST STAGE
RECOVERED FROM THE SIMPSON
DESERT IN APRIL 1990.



While WRESAT was a resounding success, unfortunately the Australian government was not interested in expanding the role of its nascent space program. Even after half a century, WRESAT remains the only Australian satellite launched from Australian territory. Today, this achievement is rarely remembered in Australian textbooks or collections of major 20th century news stories and so remains largely unknown to the general Australian populace.

The images on screen I took while visiting the Woomera rocket garden back in March 2024.

THE WRESAT LAUNCH

VIDEO



Video from: National Archives of Australia (n.d.).
Weapons Research Establishment Satellite
(WRESAT), 1967. Retrieved June 2025 from
YouTube:

https://youtu.be/Or5dyDmBq_I?si=1M6qcHYij9YqBGUY

REFERENCE LIST

PAGE 1 OF 4

ABC News. (2017 November 29). 50 years since Australia's first satellite, WRESAT, launched from Woomera. Retrieved May 2025 from ABC Website: <https://www.abc.net.au/news/2017-11-29/50-years-since-first-satellite-launch-wresat/9205878>.

Jetzer, M. (n.d.). Redstone Rocket Engines (A-6 and A-7). Retrieved March 2025, from Heroicrelics.org website: <http://heroicrelics.org/info/redstone/redstone-engines.html>.

Wade, M. (n.d.). A-7. Retrieved June 2025, from astronautix.com website: <http://www.astronautix.com/a/a-7.html>.

National Archives of Australia (n.d.). Weapons Research Establishment Satellite (WRESAT), 1967. Retrieved June 2025 from YouTube: https://youtu.be/Or5dyDmBq_I?si=1M6qcHYij9YqBGUY

Wikipedia. (n.d.). Antares 2. Retrieved May 2025, from Wikipedia The Free Encyclopedia: https://en.wikipedia.org/wiki/Antares_2.

Wikipedia. (n.d.). Sparta (rocket). Retrieved May 2025, from Wikipedia The Free Encyclopedia: [https://en.wikipedia.org/wiki/Sparta_\(rocket\)](https://en.wikipedia.org/wiki/Sparta_(rocket)).

REFERENCE LIST

PAGE 2 OF 4

Wikipedia. (n.d.). WRESAT. Retrieved May 2025, from Wikipedia The Free Encyclopedia: <https://en.wikipedia.org/wiki/WRESAT> .

Wikipedia. (n.d.). RAAF Woomera Range Complex. Retrieved May 2025, from Wikipedia The Free Encyclopedia: https://en.wikipedia.org/wiki/RAAF_Woomera_Range_Complex .

Dinn, M. (n.d.). Department of Supply:: WRESAT. Retrieved May 2025, from Honeysuckle Creek Tracking Station website: <https://www.honeysucklecreek.net/supply/WRESAT/index.html> .

WREA. (1967). [WREST Weapons Research Establishment. Retrieved March \[PDF 3.2MB\]](#). Australia Department of Supply, accessed from Honeysuckle Creek Tracking Station website May 2025.

Morton, P. (1989). [Fire across the Desert; Woomera and the Anglo-Australian Joint Project 1946-1980](#). Defence Science and Technology. accessed May 2025 Website:

REFERENCE LIST

PAGE 3 OF 4

LePage, A. (2017 November 19). Australia's First Satellite & The Last Redstone. Retrieved June 2025 from Drew Exmachina:

<https://www.drewexmachina.com/2017/11/29/australias-first-satellite-the-last-redstone/> .

LePage, A. (2016 April 26). Redstone: The Missile That Launched America into Space. Retrieved June 2025 from Drew Exmachina:

<https://www.drewexmachina.com/2016/04/26/redstone-the-missile-that-launched-america-into-space/> .

Engineering Heritage Australia. (n.d.). Woomera Rocket Range. Retrieved May 2025, from Engineering Heritage website:

https://heritage.engineersaustralia.org.au/wiki/Place:Woomera_Rocket_Range .

Defence Science and Technology Group. (n.d.). WRESAT — Weapons Research Establishment Satellite, from Defence Science and Technology Group website: [https://www.dst.defence.gov.au/innovation/wresat-](https://www.dst.defence.gov.au/innovation/wresat-%E2%80%94-weapons-research-establishment-satellite)

[%E2%80%94-weapons-research-establishment-satellite](https://www.dst.defence.gov.au/innovation/wresat-%E2%80%94-weapons-research-establishment-satellite) .

REFERENCE LIST

PAGE 4 OF 4

Wikipedia. (n.d.). PGM-11 Redstone. Retrieved May 2025, from Wikipedia The Free Encyclopedia: https://en.wikipedia.org/wiki/PGM-11_Redstone .

M, T, Rigby. (n.d.). WRESAT Australia's First Satellite, from The Internet Archive (Woomera on the web website): <https://web.archive.org/web/20071225084001/http://homepage.powerup.com.au/~woomera/wresat.htm> .