

FALSTAFF LAUNCHES

All launches took place from Launch Area 2 at Woomera, Southern Australia.

No	Date	Serial	Range Altitude	Notes
1	01 Oct 1969	-		First flight of a STONECHAT motor - using a Mark 1 motor, it was flight tested under a proposal for the SKYLARK-9 research rocket and tested the basic vehicle, measuring accelerations and motor pressure to compare with the earlier ground firings. The fins were monitored for vibration and temperature, and the drag of the rocket was established. One of the most important observations was of the dispersion with the rocket.
2	09 May 1975	F.0	119km 133km	First flight of the STONECHAT-2 motor for vehicle proving of separation, flight control, telemetry etc. Successful but transponder failed at 50 sec.
3	19 Feb 1976	F.01	117km 145km	Flight test with in-flight separation of payload and fully instrumented. Completely successful.
4	22 May 1978	F.1		Test flight to make measurements of ejected payload behaviour. Motor failure with burn-through near the nozzle resulted in break up of the vehicle at 30 sec.
5	15 Sep 1978	F.2	97km 166km	Test flight to study manoeuvring of payload sub-systems after ejection to supplement firings of redundant US Navy POLARIS missiles being fired at Cape Canaveral. Successful flight with correct payload deployments.
6	05 Dec 1978	F.3	98km 144km	Another successful and correct payload ejection and deployment test flight, although complete flight activity not achieved during this launch.
7	14 Feb 1979	F.4	93km 146km	Payload separation and deployment test flight, was successful in every respect, except in roll control at beginning of sequence.
8	04 Apr 1979	F.5	104km 131km	The motor on this flight vehicle was replaced, due to propellant-slump in the STONECHAT-2 motor. When launched the vehicle made a completely successful flight with correct payload deployment.

The FALSTAFF rocket was propelled by the STONECHAT rocket motor developed by the Rocket Propulsion Establishment at Westcott, Buckinghamshire. Although not the largest solid motor fired there, it was the largest motor put into production in the UK, at 36 inches (0.914m) in diameter.

The case was made of helically welded steel, 3.8mm thick, and made by Bristol Aerojet Ltd., and was 17'7.4" (5.37m) long. It had a nozzle throat of 9.5" (0.24m) made of steel, carbon and duresitos, which eroded to 9.7" (0.246m). Empty weight was about 1,060 kg, while propellant weighed 4,030 kg, making all-up weight 5,090 kg.

Originally developed as a possible addition to the SKYLARK range of rockets, it was intended that SKYLARK-8 and 9 would use this motor, on the Mark 8 with a second stage consisting of a WAXWING motor later used as the third stage of the BLACK-ARROW satellite launcher.

Static firings began in the early 1960s and by June 1964 a motor was to be fired in the presence of the press, but an igniter failure prevented this. Total impulse of the motor was about 1.85m-lb.sec (839,154 Kg.s), while mean thrust was 23,587 kg over a burn time of about 32 seconds of useful thrust.

An early proposal was that two motors were to be used in tandem for the HYPERION vehicle, and this is the reason that very large fins were developed for the first flight vehicle, after the initial series of eight static tests had been made, using both "battleship" and flight-weight cases.

By the early 1970s it was realised that the STONECHAT would be an ideal motor to help with the testing of the up-grade for the UK-POLARIS missiles in the secret CHEVALINE programme, but this project would require higher time above the atmosphere, so STONECHAT-Mk 2 was developed. This eventually resulted in exactly the same motor but with over 7 percent more propellant added which totalled 4,343 kg, and which gave the same thrust, but for an extra four seconds.

Nine static tests were made with the STONECHAT-2 at Westcott in the early 1970s, which included light-weight casings, together with the normal "battleship" motors. Also a severe test of a slumped motor was tested, which had been expected with the greater fuel mass in the up-rated motor.

The motors were shipped out to Woomera, Australia, for flight test with the CHEVALINE test heads, but due to delays in that programme, the STONECHATS were put into storage for some time before they were flown between 1975 and 1979. In the flight programme only one launch failed, which was due to a nozzle burn-through and it went sideways to impact near the village at Woomera.

All STONECHAT-2/FALSTAFF vehicles used a nosecone the same as that used on the BLACK-ARROW rocket and was 4'6" (1.4 m) in diameter.

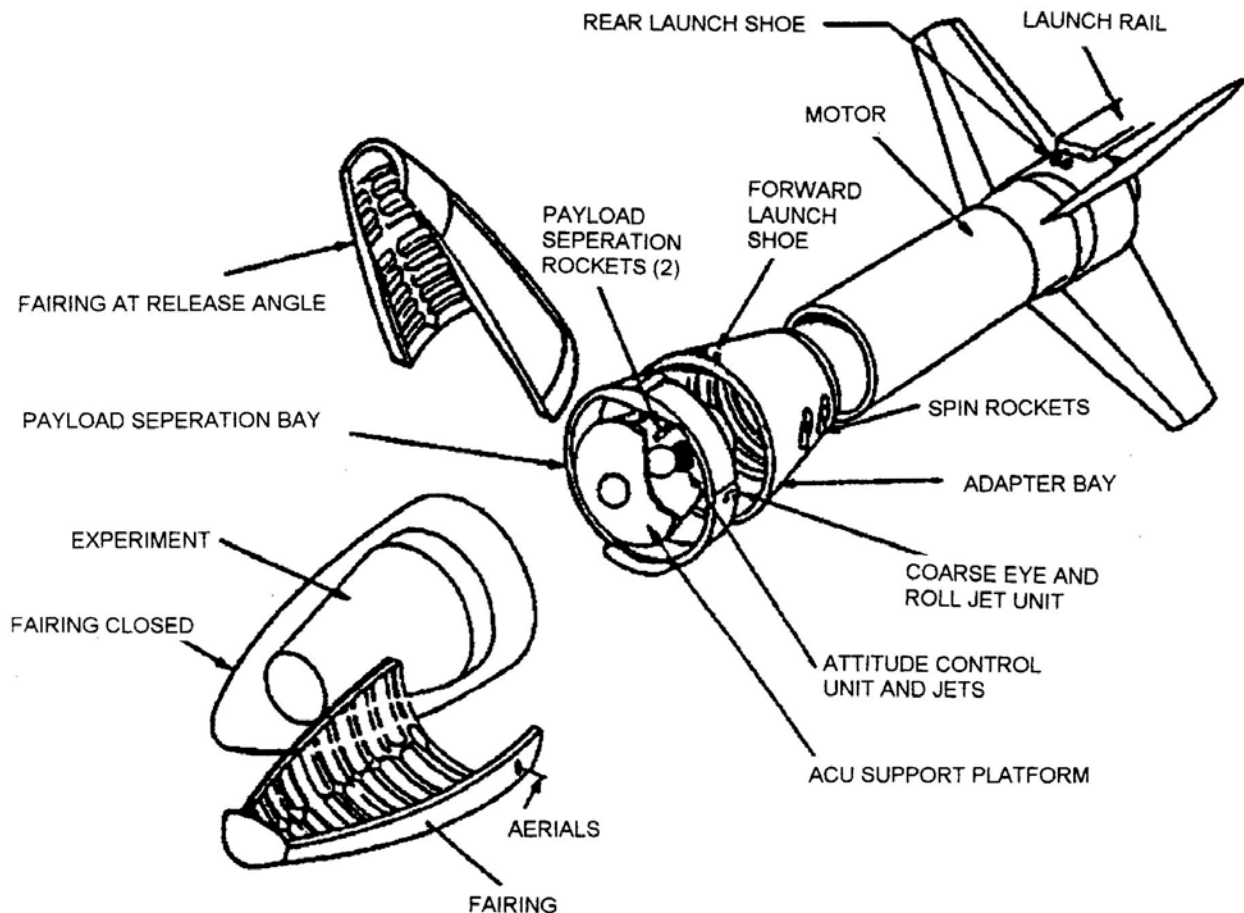


Diagram of sectioned FALSTAFF Rocket used to test CHEVALINE system for the UK-POLARIS-A3

FALSTAFF Principal Contractors:-

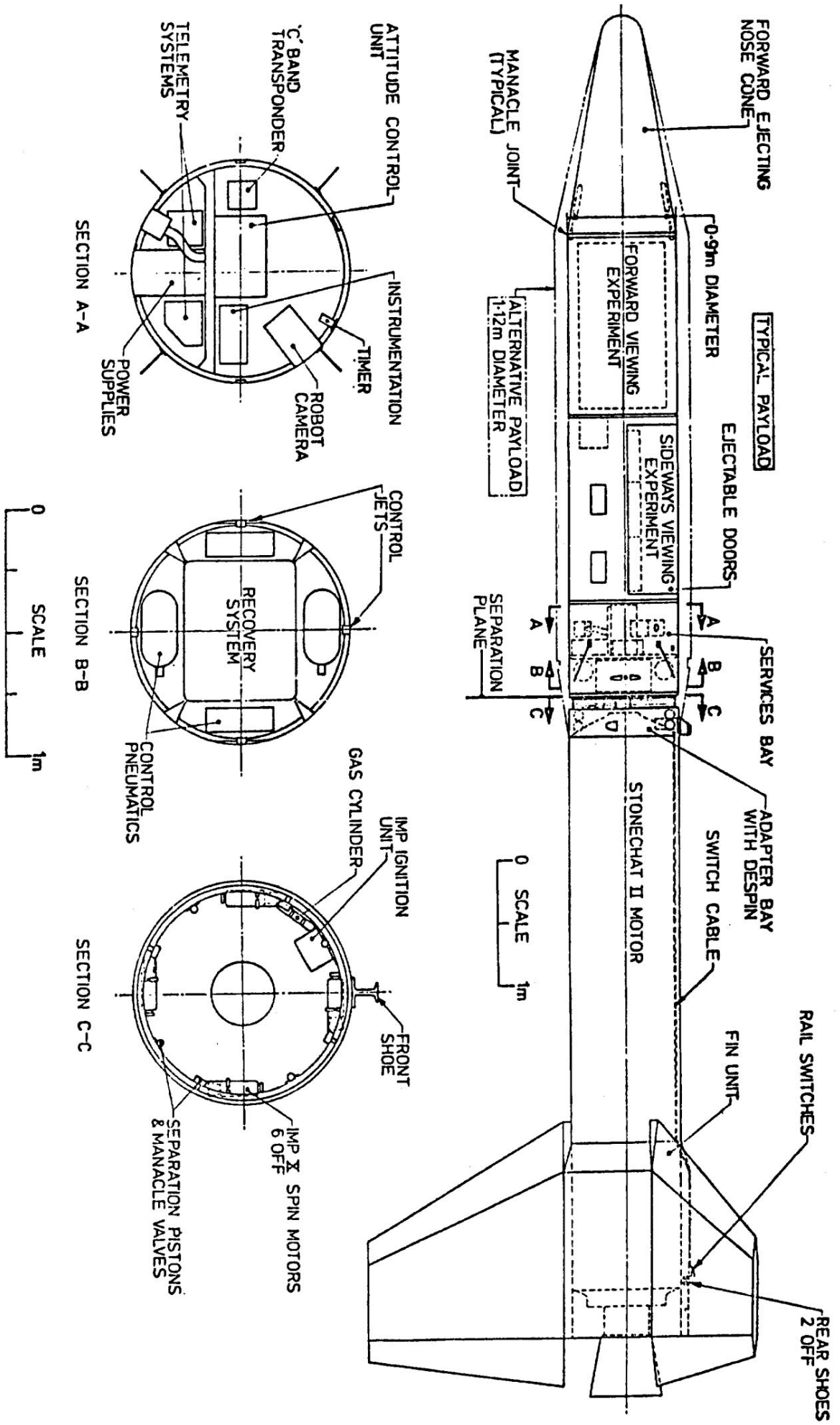
Motor: Westcott & BAJ

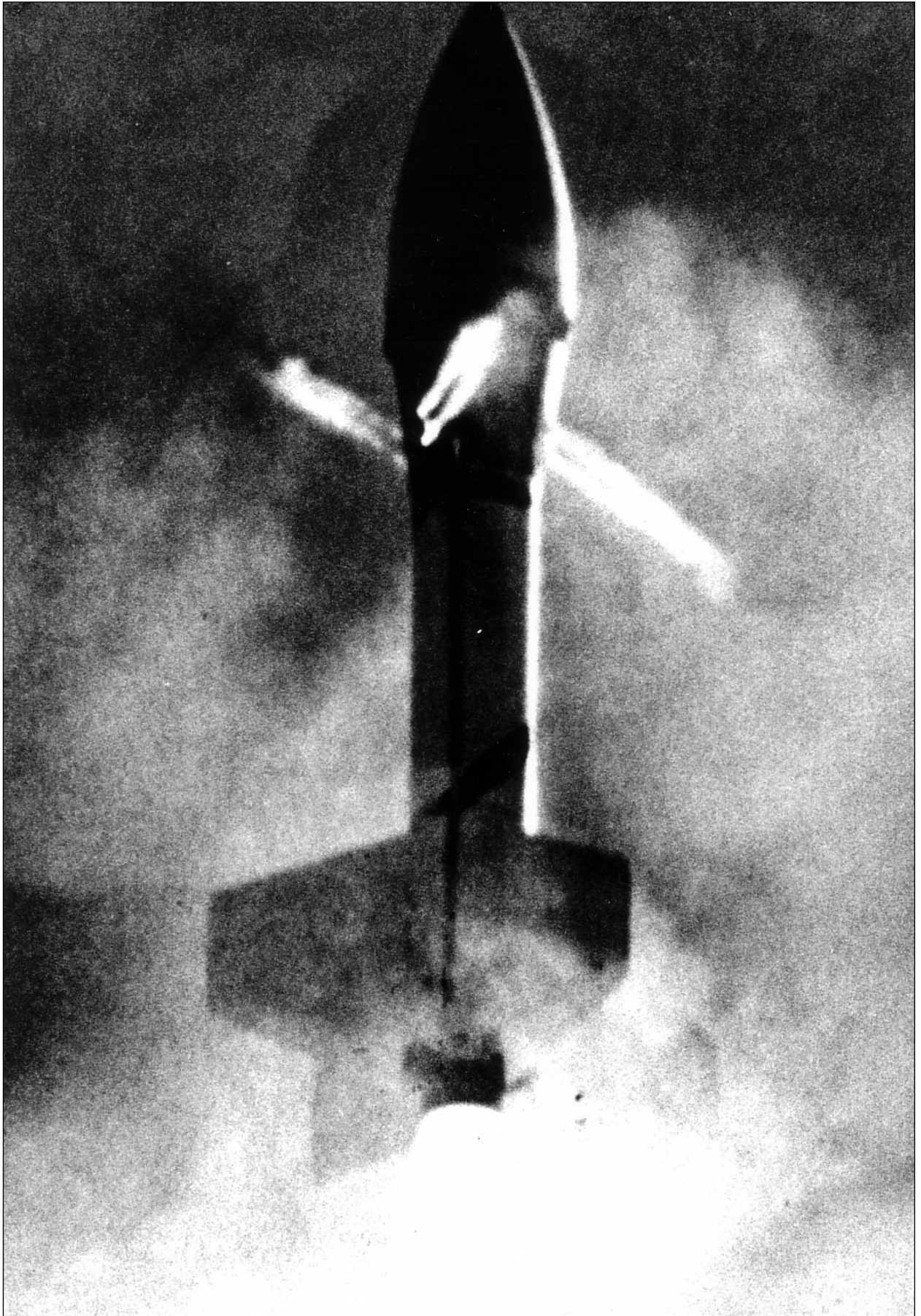
Fins: RAE

Nose fairing, umbilical & test gear: British Hovercraft

Control unit: Marconi

Payload: Hunting Engineering





FALSTAFF launch from Woomera showing IMP solid motor spin rockets firing.

STONECHAT-1 MOTOR FIRINGS

No	Date	Serial	Burn (s)	Mean Thrust (kg)	Propellant	Charge	Notes
01	05 May 61	36PWE2	52.4	10,820	E3668	CD87	Battleship motor
02	14 Dec 61	36PWE1	56.2	10,320	E3668	CD87	
03	12 Dec 62	36PWE3	53.3	13,793	S1044	CD87	
04	03 Jun 64	36PWE5	?	?	S1044	CD87	
05	15 Jun 64	36PWE4	51.5	14,097	S1044	CD123	
06	31 Jul 68	36PWE42	32.2	24,682			
07	28 Aug 68	36PWE?	17.7	43,360		CD87	Max st = 51,012 kg TI = 8.61 MNs
08	06 Feb 69	36PWE53	32.2	22,818			
09	01 Oct 69				RD2430		FALSTAFF/SKYLARK-8

STONECHAT-2 MOTOR FIRINGS

No	Date	Serial	Burn (s)	Thrust (kg)	Propellant	Charge	Notes
01	26 Oct 73	36PWE89			RD2430	CD162	Battleship motor
02	30 Oct 73	36PWE4			RD2430	CD87	Refurbished Mk1
03	26 Feb 74	36PWE88			RD2430	CD162	Development-2 firing
04	26 Mar 74	36PWE91			RD2430	CD162	Development-1 firing
05	31 May 74	36PWE92			RD2430	CD162	Proof-1, lightweight
06	11 Jul 74	36PWE90			RD2430	CD162	Battleship slumped propellant trial using Dev-2. Failed
07	09 May 75	36PWE93			RD2430	CD162	FALSTAFF-F0, success
08	19 Feb 76	36PWE94			RD2430	CD162	FALSTAFF-F01, success
09	10 Mar 77	36PWE100			RD2430	CD162	Proof-2 firing
10	22 May 78	36PWE95			RD2430	CD162	FALSTAFF-F1, failed
11	07 Sep 78	36PWE99			RD2430	CD162	Proof-3 - exploded at end of burn due to propellant-laden bolt, head end.
12	15 Sep 78	36PWE?			RD2430	CD162	FALSTAFF-F2, success
13	05 Dec 78	36PWE101			RD2430	CD162	FALSTAFF-F3, success
14	14 Feb 79	36PWE98			RD2430	CD162	FALSTAFF-F4, success
15	04 Apr 79	36PWE97			RD2430	CD162	Proof-4 for igniter trial
16	04 Apr 79	36PWE?			RD2430	CD162	FALSTAFF-F5, success

All static tests took place at Westcott, while all flight tests were at Woomera.

Info researched and compiled by Mr John Pitfield