



THOR

Bomber Command's God of Thunder

by Keith Saunders

Named Thor after the Nordic god of thunder and designed as an Intermediate Range Ballistic missile (IRBM), the system entered service with Bomber Command on 1 September 1958. In previous years there had been concerns in Washington that the Soviet Union might deploy a long range ballistic missile before the USA.

Subsequently in 1955 a trio of American companies, Douglas, Lockheed and North American were given just seven days to bid on a project to create a management team that could integrate existing technology, abilities, skills and techniques in an unprecedented time to design and develop a suitable IRBM.

The US Government then contracted the Douglas Aircraft Corporation to develop an IRBM which was dubbed SM-75 Thor. The Rocketdyne division of North American Aviation was awarded the engine contract. Maximum effort by Douglas resulted in the first missile being delivered to the US authorities during October 1956. However the flight trials programme proved difficult with the failure of the first five launches. The system was subsequently declared fully operational in 1959. The design range would provide the missile with the capability to deliver a nuclear warhead to Moscow from a launch site in the UK.

In addition the 1957 launch by the Soviets of Sputnik, into Earth orbit, had manifested a perceived missile gap by the US on the basis that if the Soviets had the ability to put a satellite into orbit, then they must have had the ability to launch an intercontinental ballistic missile. To bridge the gap the US Administration clearly believed that deploying Thor in the UK as a stop gap measure would remind the Soviets that any attack would result in the destruction of Soviet cities and defence establishments. The matter was resolved at the Bermuda Conference in March 1957 when Premier Harold Macmillan and President Eisenhower agreed, under the code name 'Operation Emily', that 60 missiles funded by the US would be delivered to the UK. The UK would then fund and provide the infrastructure for the bases. The missiles would be manned by RAF personnel. Under the dual key arrangement the missiles could only be launched by UK personnel but the warheads would be under the control of the United States. To this end the staffing of each launch site included a USAF Captain who acted as the American Authentication Officer.

When fully operational in the UK the RAF's Thor force consisted of 4 main bases, each with 3 missiles together with four satellite bases each equipped with three missiles on launchers. The four main bases in addition to launch facilities, housed all the major servicing equipment and facilities for receipt, inspection and maintenance while the satellite airfields served solely as launch emplacements. All the bases were former airfield sites. Each Thor complex was manned by some 1,000 personnel under the command of the



A rare colour picture of the first RAF Thor about to be launched by an RAF launch crew, from No.98 (SM) Squadron on 16 April 1959, at Vandenberg Air Force Base. Photo: via J.Jefford.

base commander who held the rank of Group Captain. Under his command were three Wing Commanders (Operations, Technical and Administration) based on contemporary RAF lines. A single squadron was deployed to each base. After its number each of the twenty squadrons carried the initials SM (Strategic Missile) i.e. No.130 (SM) Squadron based at Polebrook, the former wartime base of the USAAF's 351st Bomber Group which operated B-17's over Europe. The THOR force was within the remit of No.3 Group Bomber Command and commanded by Air Vice Marshal Michael Harington Dwyer C.B.E who had been appointed A.O.C. 3 Group during May 1959.

Training for RAF Thor launch crews was provided by Douglas at the company's school at Tucson, Arizona. Training

THOR - God of Thunder



comprised of missile theory, construction and operation. A simulator was utilised for countdown sequences and on completion of the course the crews moved to Vandenberg AFB, California, the home of the 392nd Missile Training Squadron, where the training culminated in the actual launch of a Thor. In addition some 50 NCOs received training in the USA to equip them with the skills to supervise continuation training and to train replacement personnel in RAF Technical Training Command. Launch crews and technicians returned periodically to Vandenberg where they launched the missiles as part of a combat-training launch programme. Indeed the first live firing by an RAF crew, from No.98 (SM) Squadron took place at Vandenberg on 16 April 1959 with the launch of Thor No.161. Altogether RAF crews launched twelve of the missiles during training, although two of the launches failed.

In the UK the Launch Control Officer was usually a Flight Lieutenant of the General Duties Branch assisted by various technicians and the USAF Authentication Officer, while the Squadron Commander usually held the rank of Squadron Leader. A typical main base commander was Group Captain Patrick P.W.Sands, M.B.E., and D.F.C., who was appointed Officer Commanding RAF North Luffenham on 9 September 1959 following Thor missile training in the USA. Sands had joined the RAF in 1936 and in 1940-1943 completed two operational tours on Wellingtons.

Each Thor main base was in direct communication with a Central Co-ordinating Authority in California, which operated a computerised system for the recording and issue of spare parts that were flown directly from the USA by the first available transport aircraft. The first RAF missile, the second production Thor was airlifted into RAF Lakenheath on 29 August 1958 aboard a Military Air Transport Service (MATS) C-124 Globemaster with No.77 (SM) Sqn becoming operational at RAF Feltwell on 1 September 1958. On 1 December 1959 No.97 (SM) Sqn at RAF Hemswell was declared operational with its satellite stations following on 22 July 1959. The Driffield Wing followed on 1 August 1959 with the North Luffenham Wing declared operational on 1 December 1959. Both C-124 Globemasters and C-133 Cargomasters were employed to deliver the missiles to the UK. Those for the Feltwell Group were airlifted into Lakenheath, with those for the remaining groups being flown into airheads at Driffield, Hemswell (later Scampton) and North Luffenham. The missiles were then transported to the various



The Thor missiles were air freighted to the UK by the USAF Military Air Transport Service. In this instance by a Douglas C-124 Globemaster pictured at one of the UK airheads. Photo: via Carpetbagger Aviation Museum - Harrington.

sites under police escort, with initially USAF Studebakers providing the power until replaced by RAF Leyland Hippos. The total length of the tractor and missile trailer amounted to 90ft, meaning that the access roads to some sites had to be modified to accommodate the unit. Eventually the trailers were modified in the USA to include steering axles which were manned by steersmen seated at the rear of the trailer and in contact with the driver.

On base each missile was housed in a retractable flight shed and stored horizontally on its own transporter erector trailer. To comply with an alert procedure the flight shed, mounted on its own rails, was rolled back to reveal the missile. A hydraulic launcher/erector then lifted the missile to its upright position preparatory to the launch. Once vertical the missile was fuelled by both Liquid Oxygen and Kerosene, the latter being known as RP1 in RAF parlance. On reaching a positive launch order the count down took some 15 minutes. Flight time from East Anglia to Moscow was approximately 18 minutes. Launch orders would have been given jointly by UK-US officers from HQ Bomber Command at High Wycombe and collocated with the USAF's 7th Air Division.

The Cuban Missile Crisis of October 1962 is often considered as the major confrontation of the Cold War and the time that the world came closest to engaging in nuclear conflict.



The four main bases for the Thor deployment utilised hangarage on the former airfield sites for maintenance of the missiles. Photo: via Carpetbagger Aviation Museum - Harrington.



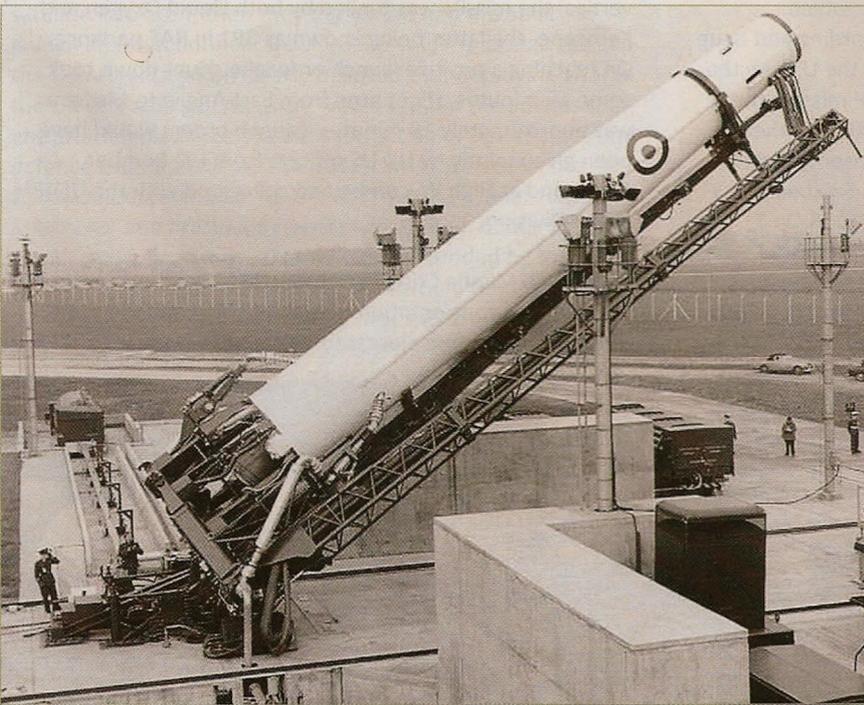
THOR - God of Thunder



Pictured above, last missile out, the North Luffenham group of stations were the last of the Thor units to stand down. A Thor from No.218 (SM) Sqn is pictured leaving RAF Harrington at the start of its return journey to the USA. Photo: via Carpetbagger Aviation Museum – Harrington.



Above, pictured on the last part of its delivery to RAF Harrington, the missile negotiates the streets of Rothwell with the steersman seated in front of the rear axles. Photo: via Carpetbagger Aviation Museum – Harrington.



Above, illustrating an RAF Thor being raised to its vertical firing position, its protective hangar having already been retracted on the railway type rails that can be seen in the photograph. Photo: via Carpetbagger Aviation Museum – Harrington.

Fifty-nine of the RAF's sixty Thor's were serviceable and placed on 15 minute readiness. With the realisation that Russian built medium range and intermediate range ballistic missiles were deployed to bases in Cuba, with the ability to attack many major US cities, behind the scenes negotiations between President J.F.Kennedy and Premier Nikita Khrushchev followed. These concluded in a deal that resulted in the Soviet missiles being withdrawn from Cuba and the US agreeing never to invade Cuba and also that it would dismantle all Thor missiles deployed in the UK and the Jupiter IRBM's deployed in Italy and Turkey. The attempt by the Soviet Union to deploy the missiles to Cuba had been to compensate for the teething problems being experienced in the initial operational deployment of the Soviet Intercontinental Ballistic Missile SS-7, which had left the Soviets dangerously exposed to attack. By August 1963 the Thor equipped RAF units were stood down and the missiles returned to the US. Indeed whilst the Thor deployment had supplemented the V-force, the missiles had become increasingly obsolescent due to their long reaction time and the vulnerability of their fixed launch sites. In addition Mk.2 versions of both the Vulcan B.Mk 2 and Victor B.Mk 2 equipped with larger wings, more powerful engines and improved electronic countermeasures, began to come on line with Bomber Command during 1960 and 1962 respectively. In due course both Scampton's Vulcan B.Mk 2A's and Wittering's Victor B.Mk 2 BS's, operated in the strategic nuclear role equipped with the new Avro Blue Steel Mk 1, inertial navigation, 100 mile range stand-off missile, which provided the UK with a viable independent nuclear deterrent. Moreover by 1963 the USAF had deployed its first ICBM, the SM-65 Atlas, with the capability to deliver a 4 megaton nuclear warhead over a range of 10,360 miles. Clearly the Cuban Missile Crisis and the introduction of the RAF's improved V-bomber force, equipped with Blue Steel's stand-off capability, contributed to the withdrawal of the RAF's Thor force. In the interim the missiles had provided a useful stop-gap deterrent. The missiles were subsequently returned to the USA. A number were

THOR - God of Thunder



later utilised as space launch vehicles while others converted to 'Thrust Augmented Launchers' were deployed in an operational role at Johnston Island in the Pacific, where they would have been tasked with destroying Soviet reconnaissance satellites in the event of hostilities with the Soviet Union.

DATA - Douglas SM-75 THOR

Intermediate-range surface-to-surface ballistic missile.

Length:- 65 ft (19.8m)
Weight at launch:- 110,000 lbs (49,900 kgs)
Max Speed:- 11,020 mph (17,740 km/h)
Max Speed at re-entry:- 10,000 mph (16,093.44 km/h)
Power plant:- Rocketdyne MB-3 liquid propellant engine.
Range:- 1,500 nautical miles (1,727 statute miles) (3,198 km)
Armament:- W49 thermonuclear warhead of 1.44 megatons (1,440 kilotons of TNT)



Pictured right, prior to the final 15 minute countdown to lift off, the missiles were raised into the vertical firing position. Targeting data was then entered into the missile's systems while fuelling took place.

Photo: via Carpetbagger Aviation Museum – Harrington.



Left, the Thor power plant, the Rocketdyne liquid propellant engine currently exhibited at the RAF Museum, Cosford. Photo: ©RAFM.

Thor UK bases and Squadrons

Group	Squadron	Base	Operational	Stood Down
Feltwell	77	Feltwell, Norfolk.	1.9.58	10.7.63
	82	Shepherd's Grove, Suffolk.	22.7.59	10.7.63
	107	Tuddenham, Suffolk.	22.7.59	10.7.63.
	113	Mepal, Cambridgeshire.	22.7.59	10.7.63
	220	NorthPickenham, Norfolk.	22.7.59	10.7.63
Hemswell	97	Hemswell, Lincolnshire.	1.12.59	24.5.63
	104	Ludford Magna, Lincolnshire	22.7.59	24.5.63
	106	Bardney, Lincolnshire.	22.7.59	24.5.63
	142	Coleby Grange, Lincolnshire.	22.7.59	24.5.63
	269	Caistor, Lincolnshire.	22.7.59	24.5.63
Driffield	98	Driffield, East Riding, Yorkshire.	1.8.59	18.4.63
	102	Full Sutton, East Riding, Yorkshire	1.8.59	27.4.63
	150	Carnaby, East Riding, Yorkshire	1.8.59	9.4.63
	226	Catfoss, East Riding, Yorkshire	1.8.59	9.3.63
	240	Brighton, East Riding, Yorkshire	1.8.59	8.1.63
North Luffenham	130	Polebrook, Lincolnshire.	1.12.59	23.8.63
	144	North Luffenham, Rutland	1.12.59	23.8.63
	218	Harrington, Northamptonshire	1.12.59	23.8.63
	223	Folingham, Lincolnshire.	1.12.59	23.8.63
	254	Melton Mowbray, Lincolnshire	1.12.59	23.8.63