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Pioneer of Missile Technology of the world–Tipu Sultan

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Abstract: Tipu Sultan was one of the first Indian kings to be killed on the battlefield while defending his kingdom against the Colonial British. Indian rockets in the twentieth century can be seen as a revival of the eighteenth century dream of Tipu Sultan. He was the first to introduce long travelling missiles with heat resistant tubes. Two centuries before Sriharikota and Chandipur emerged on the national scene as rocket launching and missile testing centres, the riverine island of Srirangapatnam had made giant strides in the field of "rocket science and missile technology". Tipu wrote a military manual called "Fathul Mujahidin" in which 200 rocket men were prescribed to each Mysoream 'Cushoon'. The organizational structure of Indian Rocket unit in 1793 evolved in Tippus army. At the Battle of Pollilur (1780) during the II Anglo Mysore war. Colonel William Brailles ammunition stores were thought to have been detonated by a hit from one of Haider Ali Mysore rockets resulting in a humiliating British defeat.Some rockets seized by the British army are currently on display at London's Royal Artillery Museum with the death of Tipu Sultan Indian rocketry also met its demise, to be revived only in the 1970's by VikramSarabai, Abdul Kalam and others. Kalam also went to the Wallops Flight Facility at Wallops Island in East Coast, Virginia. This place was the base for NASA's sounding rocket program. There he saw a painting prominently displayed in the reception lobby. It depicted a battle scene with a few rockets flying in the background. The painting caught his eyes because the soldiers on the side launching the rockets were not white, but dark skinned with racial features of people found in South Asia. It turned to be Tipu Sultan's army fighting the British.
Keywords: Tipu Sultan, rocket science, SrirangaPatnam, Taramandalpet, Launch pad, Abdul Kalam, Fathul Mujahidin, Cushoon.

Pioneer of Missile Technology of the world – Tipu Sultan

It is far better to live like a lion for a day then to live like a jackal for hundred years.

Every age has its heroes and every hero has a story. Tipu sultan was a fascinating figure of the 18th century who offered his blood to write the history of Free India. He had a vision and a mission in life. The vision was to make his people enlightened and prosperous and mission was to liberate his land from the yoke of the colonials. Tipu Sultan, the Tiger of Mysore will always be remembered as one of the most powerful rulers India ever had. He is known for his valiant acts in several wars and the sacrifices he made to save his land from foreign invaders. Tipu remained an implacable enemy of the British East India Company. He was one of the first Indian kings to be killed on the battlefield while defending his kingdom against the Colonial British. He was killed in 1799 while defending his fort of Srirangapatnam[1].

The development of Indian rockets in the twentieth century can be seen as a revival of the eighteenth century dream of Tipu Sultan [2]. He was the first to introduce long travelling missiles with heat resistant tubes. It was he who was responsible for the deployment of an innovating weapon - the first war rocket about two hundred years ago. Rockets had first made their impression on the world in south India under Hyder Ali and Tipu Sultan and late in the eighteenth century. These Mysorean rulers had successfully deployed thousands of Mysorean rockets against the British East India company forces, who had been awed by their glare and terrifying destruction [3]. Two centuries before Sriharikota and Chandipur emerged on the national scene as rocket launching and missile testing centres, the riverine island of Srirangapatnam had made giant strides in the field of "rocket science and missile technology". And in an era when high speed travel was limited to the speed of an Arabian stallion, Srirangapatnam was making waves with intercontinental treaties and foreign collaborations that were the envy and despair of the British. Described by historians as "the scourge of the British" and whose bravery earned him the sobriquet "Tiger of Mysore", Tipu Sultan's curiosity in experimenting with new developments led to the mastery of rocket and missile technology which almost had the Duke of Wellington "Arthur Wellesley" on the retreat in the Forth Mysore War.

A military tactic developed by Tipu Sultan was mass attacks of infantry formations with the rise of rocket brigades. Tipu wrote a military manual called "Fathul Mujahidin" in which 200 rocket – men were prescribed to each Mysorean 'Cushoon'[4]. Tipu Sultan brought the concept of using sword and blade thrust rockets in their military force to fight the advancing British army. The rocket men were trained to launch their rockets at an angle calculated from the diameter of the cylinder and the distance to the target. The Motor casting was made of steel with multi nozzle holes with a sword blade as the warhead. Propellant used was gunpowder; weight of the rocket was about 2 kg, with about one kg of propellant, 50 mm diameter and about 250 mm length, the range performance from 900 mts to 1.5 km. The organizational structure of Indian Rocket unit in 1793 evolved in Tipu's army. The army had a strength of 48,000 troops with formation of twenty seven brigades. Each brigade had one company of rocket men, the company named Jowk. Tippu's army rocketers were about 5400. This rocket force was deployed twice in Srirangapatnam war. 700 rockets and subsystems of 900 rockets were captured at Turukhanahally[5]. The Indian soil witnessed war using rocket first time in world history. Wheeled rocket launchers capable of launching five to ten rockets almost simultaneously were used in war. A rocket carrying about one pound of powder could travel almost 1000 yards. In contrast, rockets in Europe not being iron cased, could not take large chamber pressures and as a consequence, were not capable of reaching distances anywhere near it.

At the Battle of Pollilur (1780) during the II Anglo Mysore War, Colonel William Brailles ammunition stores were thought to have been detonated by a hit from one of Haider Ali's Mysore rockets resulting in a humiliating British defeat. In the III Mysore war in 1792, there is a mention of two rocket units fielded by Tipu, 120 men and 131 men. Lt. Col. Knox was attacked by rockets near Srirangapatnam on the night of Feb 6, 1792 while advancing towards the Kaveri River from the north. Mysore rockets were also used for ceremonial purpose. When the Jacobin club of Mysore sent a delegation to Tipu, 500 rockets were launched as part of gun salute. During the IV Mysore war, rockets were used on several occasions. According to one British observer, a young English officer named Bayly, "So pestered were used with the rocket bays that there was no moving without danger from destructive missiles". The rockets and musketry from 20,000 of the enemy were incessant [6].

During a conclusive British attack on Srirangapatnam on May 2, 1799, a British shot struck a magazine of rockets within Tipu's fort causing it to explode and send a towering cloud of black smoke, with cascades of exploding white light rising up from the battlement. After the fall of Srirangapatnam, 600 launchers, 700 serviceable rockets and 9000 empty rockets were found. Some of the rockets had pierced cylinders, to allow them to act like incendiaries, while some had iron points or steel blades bound to the bamboo [7].

The entire road alongside Jumma Masjid near city market and Taramandalpet Bangalore was the hub of Tipu's rocket project where he had set up a laboratory. The areas of town where rockets and fireworks were manufactured was known as Taramandalpet (Galaxy Market)[8].

India's loss was the West's gain. After the fall of Tipu the British captured more than 700 of his rockets and took them to England. They were studied by Colonel William Congreve by subjecting them to what we call "reverse engineering" today. There were no patent laws, WTO to protect the inventor. Profiting from their Indian experience, the British led by Sir William Congreve, began development of a series of barrage rockets ranging in weight from 18 to 300 pounds. These experiences eventually led to the Royal Woolwich Arsenals beginning a military rocket Research and Development Program in 1801, first demonstration of solid fuel rockets in 1805 and publication of "A concise Account of the origin and progress of the Rocket system" in 1807. Congreve rockets were soon systematically used by the British during Napoleonic wars and their confrontation with the United States during 1812-14. These descendants of Mysore rockets even find mention in the Star Spangled Banner, the American national anthem. When thousands of American voices tunelessly drone the words,

"... The rockets' red glare, the bombs bursting in air"

They will, most probably unknowingly, be paying tribute to the ingenuity of TipuSultan[9]. An official rocket brigade was created in the British army in 1818[10].

The rockets seized by the British army are currently on display at London's Royal Artillery Museum.With the death of Tipu Sultan Indian rocketry came to a standstill – to be reviewed 150 years later in independent India, by VikramSarabai, Abdul Kalam and others. Former president Dr. A.P.J. Abdul Kalam went on a mission to Europe in 1980 to study about rockets. He mentioned that it was a great thrill especially for rocket technologists to see an Indian innovation in a foreign soil well preserved and with facts not distorted with the heading "India's war rocket", Kalam also went to the Wallops Flight Facility at Wallops Island in East Coast, Virginia[11]. This place was the base for NASA's sounding rocket program. There he saw a painting prominently displayed in the reception lobby. It depicted a battle scene with a few rockets flying in the background. The painting caught his eyes because the soldiers on the side launching the

rockets were not white, but dark skinned with racial features of people found in South Asia. It turned to be Tipu Sultan's army fighting the British. The painting depicted a fact forgotten in Tipu's own country but commemorated on the other side of the planet. He was happy to see an Indian glorified by NASA as a "Hero of warfare rocketry". In 2006 Dr. Kalam was presented with a rare momento – model of a 25cm long gunpowder – propelled rocket. It was Tipu Sultan's rocket. Tipu's rocket weighed just about 2 kilograms. The metal cylinder was about 25 cm long and contained a charge of one kilogram gumpowder. It neither possessed a computer controlled guidance system, nor carried a nuclear warhead. After lightening it could be hauled into the air or skimmed along hard ground with a range of 1 to 2 Km. It could cut through the cavalry and create panic among the elephants and men, particularly when a large number of them were fired in rapid succession [12].

More than two centuries later, the saga of Srirangapatnams tryst with missiles and rockets has faded from the memory of the local population and the remains of the launch pad are in ruins. An inconspicuous structure attached to the ramparts of the Srirangapatnam fort and the high walls on three sides measuring nearly 46 ft is reckoned to be the "rocket court" or the launch pad. V. Satyanarayana, a history scholar who doubles as a professional tourist guide points out that the yard surrounded by overgrown shrubs was the rocket court from where Tipu's men would launch their missiles. In view of Srirangapatnam's association with rockets and missiles, Kalam was keen on its preservation and development. At his behest senior DRDO scientist A. Sivathanu Pillai visited the site in June 2006 and studied the place, including the adjoining ammunition store. Some efforts were made to take up restoration works but there was no further progress. R. Gopal, former Director, Department of Archaeology and Museums, said that the place had been neglected by both the state and the centre. Today, there is not much left in Srirangapatnam to stand testimony to one of the most interesting technological episodes in Indian History. The mark of Mysorean rockets on world military history however remains indelible. As aerospace scientist Prof. Roddam Narasimha explained in one of his lectures, it was Tipu who just realized the full potential of rockets as weapons – both in his mind and on the field – and used them to create havoc in the East Indian Company lines [13]. Thus, all the rockets in the world today can be traced to those used during the wars in Mysore. Dr. NarendarPani, Professor, School of Social Science, National Institute of Advanced Studies mentioned that Tipu had a fairly advanced technological set up not the same as western science but very advanced for its time.

The ministry of defence during the period of Abdul Kalam decided to give Tipu and Srirangapatnam their due when it announced it would mark the rocket court, the laboratory where Tipu tested his mini missiles at the birth place of rocket technology [14]. But after his tenure no efforts were made to convert it into a rocket museum. Both the Archaeological department and the state government blame each other [15].

The old fortress of Srirangapatnam remains the same after the siege even today [16]. The whole place is insalubrious. Lok Sabha Congress leader, MallikarjunaKharge hit back at the RSS asking,

"When they can celebrate NathuramGodse can't we celebrate Tipu Sultan"

As Indians we have failed in our duty to patronize the great hero, Tiger of Mysore and world's first Missile Man – Tipu Sultan. As historians it's our duty to make the government aware of its ignorance and set up a rocket museum in memory of this great hero who introduced rockets in an era when the world was ignorant of it. In the near future let us make true his fact "India is for Indians alone".

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