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Vimanas: Bridging Modern Aerospace Innovations with Ancient Spacecraft Technologies

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Abstract: The TV show Ancient Aliens on the HISTORY channel experimented with an ancient VIMANA model in a wind tunnel and found that it produced lift. This event sparked curiosity among people unaware of ancient Indian technologies. This paper reviews the technologies purportedly utilized in ancient Indian airplanes, as described in the Vedas. These texts frequently referenced various technologies resembling those used in contemporary aircraft and included myths and traditions about Hindu gods. Shivkar Talpade, an Indian with a strong interest in aviation, was inspired by these accounts. He later built and piloted an aircraft called Marutsakha, using mercury as fuel. Additionally, the Rukma Vimana has been cited as an inspiration for SpaceX's Crew Dragon module. These ancient aviation concepts share similarities with modern ideas, such as ion propulsion engines, antigravity aircraft, and stealth technologies. Research on vimanas has been made possible by translating old manuscripts into modern languages. The aim of current research is to inspire the younger generation to revive the nation's glory through scientific inquiry.

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1. Introduction

When we think of airplanes, the Wright Brothers are the first names that come to mind, as they are widely recognized as the first to achieve powered flight. Similarly, Robert Goddard is remembered for inventing the rocket engine, earning him recognition as a pioneer in rocketry. However, there is another side to this story that often goes overlooked: India's unsung aviation heroes. Shivkar Bapuji Talpade is believed to have been the first person to build and fly a manned aircraft and create an ion engine. This highlights how advanced some past civilizations were in comparison to our own. Unfortunately, much of this historical knowledge has been lost due to wars, natural calamities, and other events. However, dedicated historians have extensively studied these ancient technologies, uncovering evidence from Vedic writings and other sources. For instance, the Rigveda refers to vimanas as "Ratha," describing them as triangular-shaped vehicles that carried three pilots. These vehicles were said to be crafted from fine gold and were so fast that they produced noise. The Yajur Veda also mentions vimanas, noting a variety of shapes for these vehicles. This ancient technology serves as a reminder of the sophisticated capabilities of past civilizations, which we are only beginning to rediscover.

2. Literature Review

2.1. Earlier Concepts and Theories

Eshwar Reddy Cholleti et al. 2017 [1] primarily studied ancient manufacturing techniques. The most significant point they noted was that the Rukma Vimana was made from Raja Loha. This material was designed to withstand high temperatures as well as cold conditions. The propulsion technique utilized solar crystals to generate electricity and various gases to power the engine. Magnetic materials were used to provide lift. The

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primary concept was to replace cesium in an ion engine with mercury, which was purified using ancient Rasa Shastra methods.

Figure 1. Solar Crystal on Vimana with Electromagnets [1]

Kavya V. et al. 2013 [2] discussed various ancient technologies and compared them with modern techniques used by different space agencies. They began by mentioning ancient Atlantean communities, asserting that they were so advanced that they had aircraft with both ends tapered, capable of flying in water and space. They also highlighted an unsung Indian hero who developed an airplane before the Wright Brothers. Their research further described different types of Rukma Vimanas, noting that a subtype closely resembled modern spacecrafts from SpaceX and the UK. These Micro Rukma Vimanas have potential future applications on other planets.

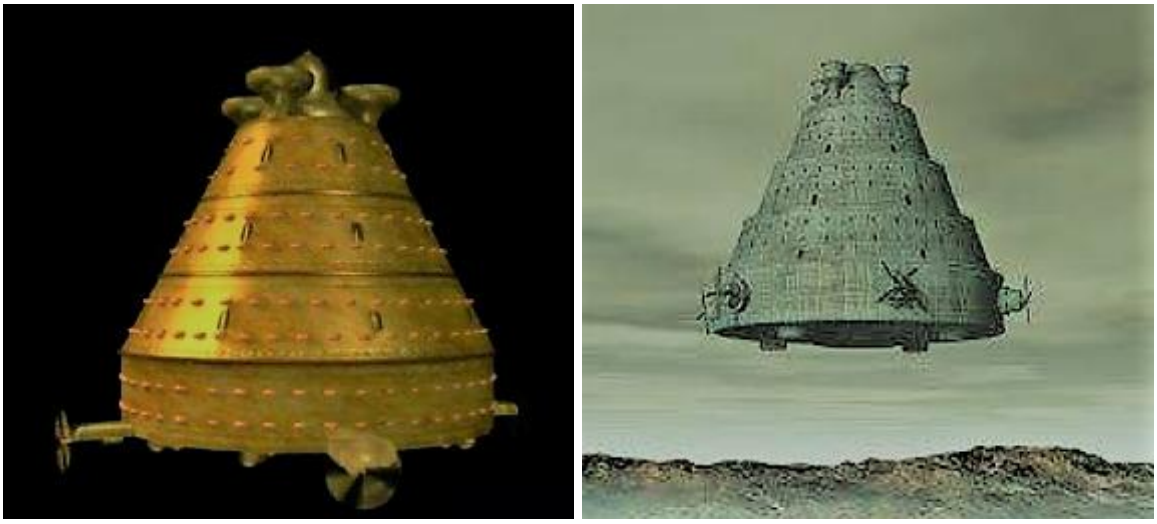


Figure 2. Design of Rukma Vimana Resembling to Micro Air Vehicle [2]

Shruthi K. R. et al.1996 [3] compared various mythological stories with today's technologies. They started with Salva's attack on Dwarka using aircraft equipped with destructive weapons, comparing this to modern bomber aircraft. They also mentioned Arjuna's journey to heaven in the Mahabharata, likening the fast, advanced vehicles he encountered to current aircraft carrying weapons. Additionally, they described a space city called Hiranyapura and concluded with the similarities between ancient aircraft and modern air vehicles.

V.V.S. Nikhil Bharadwaj et al. 2014 [4] researched the construction and special features of ancient aircraft. They started with the Pushpaka Vimana, which always had one more seat than the total number of passengers, regardless of its internal space. They suggested that achieving near-light speed might be possible using a special method of bending light and, consequently, bending space and time, as light and space-time are interrelated. To support this idea, they mentioned an ancient technique to reduce the weight of a spacecraft using plasma, mercury, and a magnetic disruptor, which nullified gravity's effect. They concluded that the reduction of mass was due to the relationship between inertial mass and gravitational mass, as proposed by Einstein.

Figure 3. Spacecity : Hiranyapura and Salvas Vimana Compared to Current Aircraft Carrying Bombs [3]

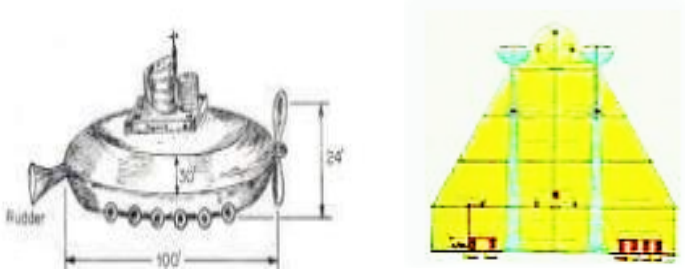


Figure 4. Sundara Vimana Architecture [4]

Shruthi K. R. et al.1996 [5] described technologies from the Ramayana that resemble modern aviation techniques. They began by discussing two methods used to make aircraft invisible in ancient times and mentioned ongoing research to achieve invisibility by harnessing dark matter. They also cited examples of various sculptures found at historical sites in India, such as Ellora, where carvings depict Ravana wearing a helmet with a horse-mouth engine and holding devices resembling GPS systems. These carvings are compared to modern jetpacks, which feature a similar number of strips.

Figure 5. Ravna and Pushpak Vimana Carvings in Ellora and Current Quadcopter Controlled by Brain [5]

Kavya Vaddadi A. et al. 2016 [6] conducted a study on the Rukma Vimana's structure and analyzed it. They mentioned that the vimana had three floors, four wings, and eight propellers. A special type of plant called Lodhra was used to protect travelers from harmful radiation in space. The team performed computational and aerodynamic studies on the vimana, highlighting the special property of certain crystals that absorb more sunlight than modern solar panels. The research suggested that combining ancient techniques with modern applications could lead to the development of new aircraft models.

B.V. Sai Anoop et al. 2014 [7] studied ion engines, using the Marutsakha Vimana, which Shivkar Talpade used in his first flight, as an example. The unique feature of this vimana was its use of an ion engine. Although

Goddard is credited with using the ion engine for the first time, Talpade's earlier use of the technology involved a boiling device with a solar application at its center. When heat was generated, it produced a power similar to that of a thunderstorm. NASA was inspired by this technology, opting to use electrically charged particles with high velocity paths instead of boiling liquid. The propellant underwent evaporation, ionization, and transformation into plasma, before reacting with electrons and exiting the craft. NASA chose xenon as a propellant due to the disadvantages of the ancient technique.

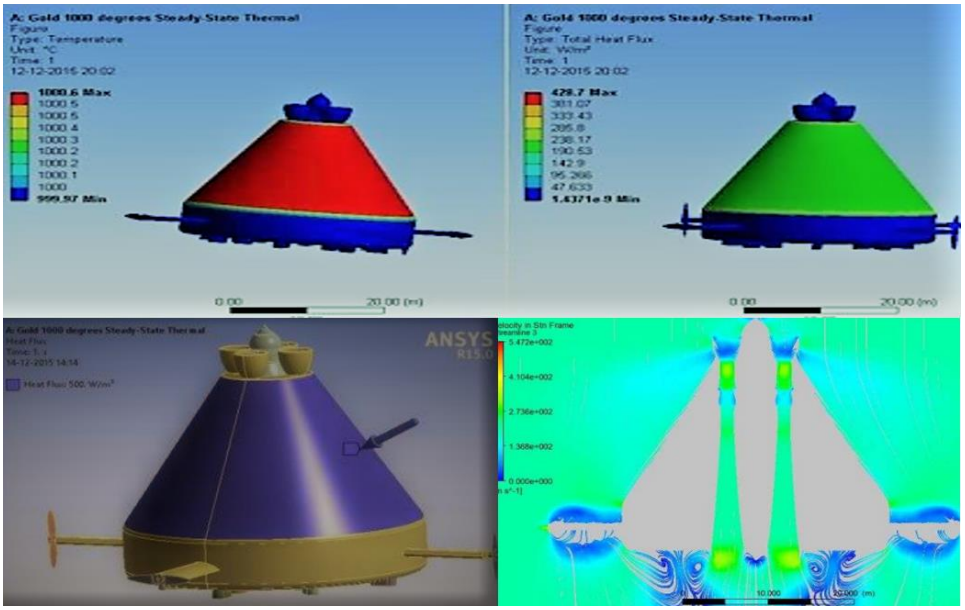


Figure 6. Simulations on Rukma Vimana in Ansys Fluent [6]

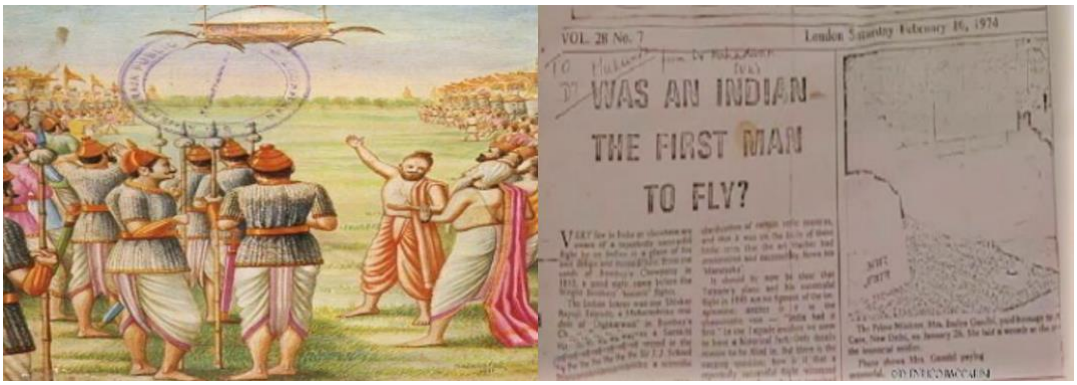


Figure 7. People Observing Marutsakha Vimana on Juhu Chaupati [7]

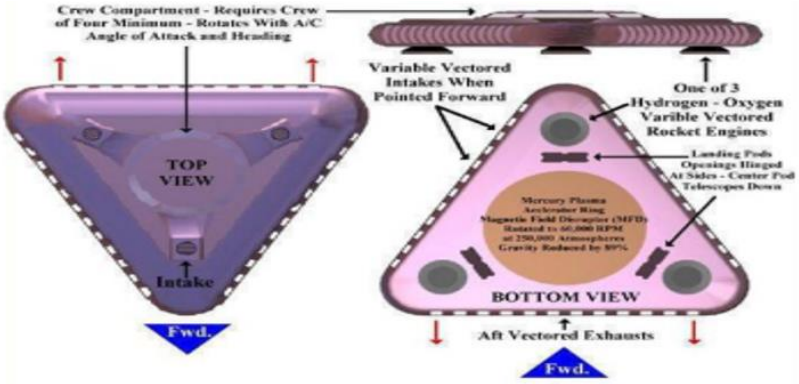


Figure 8. Mercury Vortex Engine Components [7]

H. S. Mukunda et al. 1974 [8] conducted a study on the science of building airplanes called Vaimanik Shastra. They described the characteristics and actual dimensions of four major vimanas. The Shakuna Vimana had a bird-like shape, with its tail contributing significantly to lift. The Sundara Vimana had four engines, wind blowers, and

electricity generation components. The Tripura Vimana featured a cylindrical base, and its power was generated using solar rays. The authors also detailed the dimensions and principles of the Rukma Vimana.

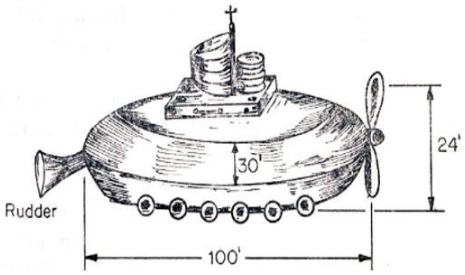


Figure 9. Tripura Vimana [8]

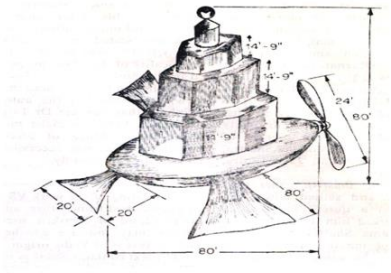


Figure 10. Shakuna Vimana [8]

2.2. Present Studies, Research, and Concepts

Karl La Fluer et al. 2013 [9] explained an aerial device that can control vision by establishing a connection between the brain and a computer. This device was specially designed for individuals with neural disorders, allowing them to move the device three-dimensionally according to their will. The structure incorporated motor and mechatronic subsystems. This research can be compared to the Indian mythological Pushpak Vimana, which was said to fly according to the user's will.

Charles E. Garner et al. 2003 [10] studied NASA's mission to explore two significant asteroids in the asteroid belt using the Dawn spacecraft. This spacecraft employed an ion propulsion engine, inspired by ancient vimana technology, with the main difference being the use of xenon instead of mercury. A titanium composite fuel tank was used in the spacecraft, and the xenon feed system was designed for multiple thrusters, reducing the mechanical component mass and allowing for large fuel storage. This research suggests that ancient technologies were not only conceptual but also feasible.

Christoph Von Bar.et. al. 2003 [11] invented an aircraft engine capable of reducing its weight in the direction of travel. This engine featured an additional rotor that operated on the principle of magnetic fields. Accelerated ionized gas surrounded an electromagnet, and the high-energy electrons and positrons reacted with electric and magnetic fields, creating gravitons. This study evokes the ancient Indian Rukma Vimana and Pushpaka Vimana, which allegedly used anti-gravity technology, demonstrating that modern research corroborates the advanced nature of ancient Indian technology.

D. Howe.et.al. 1991 [12] conducted a study on the fundamentals of stealth in fighter aircraft. Aircraft emit signals that range from visible to infrared during flight. The intensity of audio signals decreases with distance, providing crucial warnings to adversaries. The primary source of noise in aircraft is the engine, followed by compressor assemblies, combustion-turbine assemblies, and exhaust systems. High wing loading also generates noise from the airframe. Local flow interactions create more noise than boundary layer noise. To reduce audible noise, sound absorbers can decrease sound intensity. Increasing the bypass ratio reduces most aircraft noise but can increase front-end engine noise. Curved inlet guide vanes can reduce noise effectively. Aircraft also emit thermal signals or reflect signals, typically in the infrared spectrum, useful for tracking and identification. The true value of the wavelength depends on the emitter's absolute temperature, and emissivity can be used to detect waves, with aircraft radiation energy calculations depending on temperature.

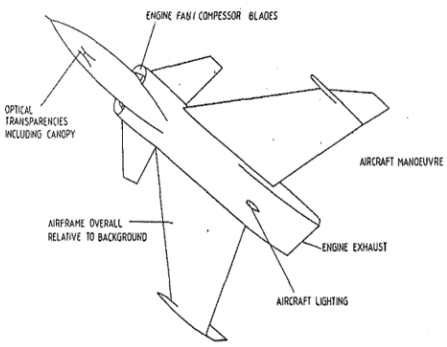


Figure 11. Sources of Visual Signals [12]

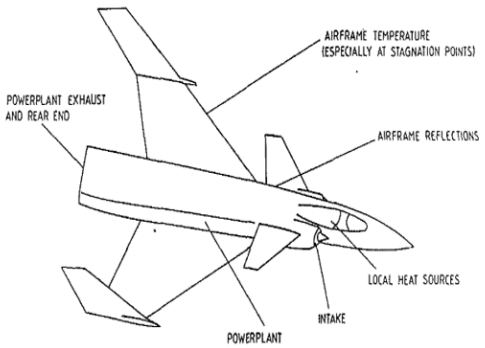
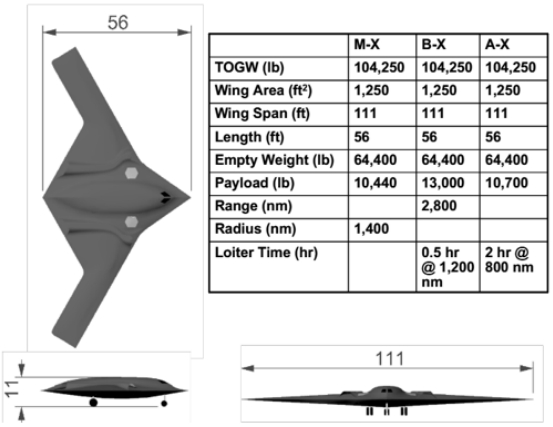


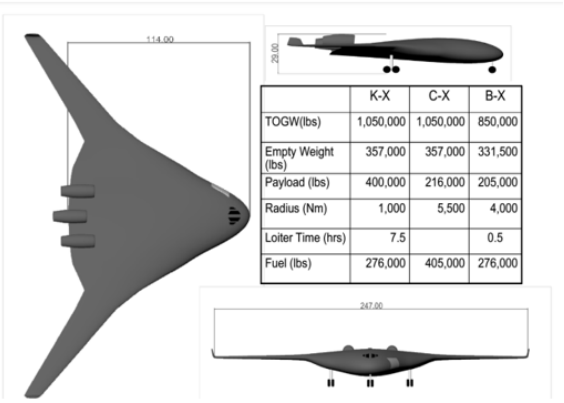
Figure 12. Sources of Thermal Emission [12]

The concept of the Future Military Common Aircraft was proposed by **Funk et al. 2006** [13]. The United States boasts advanced fighter aircraft like the F-22 and F-35, which are among the best globally. The primary goals of the future military common aircraft include enhancing loiter duration and improving battlefield survivability. These aircraft will be capable of missions such as cargo and transport, equipped with advanced sensors and weaponry, and have high cruise speeds for quick target reach. Various configurations were developed, including those with low observability (LO) and short takeoff and landing capabilities. Compact Lift Off and Landing aircraft are beneficial for bomber and attack missions, while longer takeoff and landing configurations suit cargo and tanker missions. The research proposed modifications to the fuselage layout and engine placement while retaining the same wings and tails. One key advantage was the use of medium bypass ratio engines for gunships and bombers and high bypass ratio engines for cargo and tankers. Aircraft configurations were classified by size: large aircraft for cargo and tanker missions, and small aircraft with vertical takeoff and landing capabilities for gunship and bomber missions.



	M-X	B-X	A-X
TOGW (lb)	104,250	104,250	104,250
Wing Area (ft²)	1,250	1,250	1,250
Wing Span (ft)	111	111	111
Length (ft)	56	56	56
Empty Weight (lb)	64,400	64,400	64,400
Payload (lb)	10,440	13,000	10,700
Range (nm)		2,800	
Radius (nm)	1,400		
Loiter Time (hr)		0.5 hr @ 1,200 nm	2 hr @ 800 nm

Figure 13. Notional Small Common Aircrafts [13]



	K-X	C-X	B-X
TOGW(lbs)	1,050,000	1,050,000	850,000
Empty Weight (lbs)	357,000	357,000	331,500
Payload (lbs)	400,000	216,000	205,000
Radius (Nm)	1,000	5,500	4,000
Loiter Time (hrs)	7.5		0.5
Fuel (lbs)	276,000	405,000	276,000

Figure 14. Notional Large Common Aircraft [13]

3. Future Scope and Application

Bhavna Narain et al. [14] studied the importance of the Sanskrit language in developing new artificial intelligence techniques. The paper covers basic concepts of machine learning and artificial intelligence, noting that these programming languages are typically developed in English. However, English is a verb-oriented language and does not provide a clear indication of the exact time taken by a machine to learn. In contrast, Sanskrit has a well-structured grammar that describes the properties of objects. This is why NASA is also researching Sanskrit for potential use in future supercomputers. The study suggests that Sanskrit could simplify AI, potentially validating the secrets described by pilots in ancient Indian scriptures, as these texts are in Sanskrit. Additionally, the Vedas describe the use of destructive weapons activated by chanting specific Sanskrit mantras, which were believed to grant power.

4. Conclusion

The techniques mentioned in this research should be used to develop our own aerospace components. These techniques will be instrumental in making India a superpower, fulfilling the vision of Dr. A.P.J. Abdul Kalam. The most intriguing aspect is that ancient science can help establish India as a peaceful space force, rather than an aggressive one. Even foreign scholars have studied our ancient literature; it is time we do the same. Let's support the "Vishwanayak" campaign, recently launched by our Prime Minister, to make our country a leader in the world. Currently, many patents for research originally conducted in India are owned by Western countries. If we, as Indians, study more ancient manuscripts and demonstrate that these patents rightfully belong to us, we may reclaim our lost glory.

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7. Conflict of Interest

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