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An Analysis on the Defence Technology Advancement in India over the Years

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ABSTRACT: Atal Bihari Vajpayee who made India a nuclear state. It was from the period of Prime Minister Jawaharlal Nehru, that India decided to develop its own missile technology, the DRDO is responsible for all the measure buildout in the defence technology. India has developed missile which can be launched from air, surface and land. Today it has the 4th largest army in the world, 7th largest Indian Navy and 4th largest submarines. India has also developed many dangerous weapons and missile along with it has unique features. India has been a country who has received threat from both external and internal forces, external forces the major once are China and Pakistan, Internal forces like Naxalite, terrorist group. Today Cyber terrorism has grown which is emerging as the new terror of the 21st century. India in the future are developing such weapons which will change the scenario of the Indian Defence making it more powerful, it is also a step toward making India Aatam Nirbhar. Buildout in aircrafts, nuclear submarines are reaching its height in India, the Modi government in the past five years, had made the defence system, way technological advance.

KEYWORDS: Indian Defence, Nuclear state, army, navy, submarine, China, Pakistan, new terror, cyber terrorism, missile technology

I. INTRODUCTION

India is a country that faces both uneven and conventional threat. Pakistan and China are the two major threat to India. Pakistan tries to attack India by supporting and funding terrorist groups in India and from Kashmir region and China wants to capture certain border areas of India which they considered as there, hardly there is any evidence of the lands being of China. China strengthening its relationship with Pakistan and using it as a weapon to attack India. India has fought many wars with Pakistan and 4 strong wars and have defeat Pakistan, there has been war between India and China also and we are seeing a rising tension between the two countries.

Today all these countries are nuclear powerful countries. India has the 4th largest army in the world, where as China as the 3rd largest army in the world. Keeping, this aside. India has a failed relation with its neighbours which creates a major concern for security forces in India. Across the borders illegal activities are doing on. Countries like China, Pakistan, Bangladesh, Myanmar supports terrorist groups in India, we see activities such as drug trafficking, infiltration, arm smuggling happening across the border, Pakistan ISIS funds Naxalite in conducting insurgency in India, moreover North-east India insurgency is supported by China, Myanmar, Kashmir has become a state for terrorist attack. India has been a victim of weapons of mass destruction, cyber terrorism. Cyber warfare has emerged as the war of the 21st century, which is being used by most countries to attack. In fact China has attacked on India 40,000 times using cyber crime in different states especially in Mumbai in the financial capital. India has the 7th largest navy in the world, the sea ports and coastline are also major target for terrorist to enter India, the 26/11 attack which is the deadliest attack India has ever experienced in 2008, the terrorist enter India through sea, in fact 90% of the



smuggling happens through the ports especially Mumbai, the biggest port and also the busiest. India also has the fourth largest air force in the world. This tri-service in India has made the country powerful. There are part of United Nations peace keeping process and manage disaster management in the country. The country in order to stop the terrorist attack and make the country safe it needs to advance its defence with modernization weapons, advancement in technology, use of satellite, artificial intelligence and robotics and improve our communication devices along with strengthen security forces at the border areas. India's border management security and maritime security requires need buildout and infrastructure buildout, along with proper construction of transportation, so that army can easily reach out. Use of space and technology has emerged as new weapons of buildout of the defence in India. Intelligence, manpower and technology together is needed to fight a war.

II. RESEARCH METHODOLOGY

For the purpose of this exploration, I have used an amalgamation of two of the archetypical social sciences research tools application – as they are authentic and brilliant method to assemble statistics from multiple appellants in a methodical and convenient way. Questions were asked to the common youth, survey, interviews – consisting of several interrogations which were dispersed among representative of each contender group.

Objective of the Research Paper

The main areas of exploration in this paper incorporates

1. India's defence buildout over the years.
2. India's rise in defence technology under each Prime Minister
3. How India has emerged as the four largest and powerful military in the world.
4. What is the future of defence technology in India.

III. DEFENCE ADVANCEMENT SINCE INDEPENDENT

India's missile programme started during Prime Minister Pandit Jawaharlal Nehru in the 1950s. In 1958 the government formed a group of Indian scientists known as Special Armament Buildout team to do research on missile weapon buildout, after the Indo-China war in 1962, and looking at the international situation. The Indian scientist first used to work from Metcalf House in New Delhi, but later moved to Hyderabad when the administration vacated their former Nizam's army dormitory. The Special Weapons Buildout Team was later called the Defence Investigation and Buildout Laboratory. The first anti-tank projectile was to be in Sarath ICVs fabricated at artillery factory Medak which later established the Bharat Potent Limited.

In 1970s under the Prime Ministership of Indira Gandhi, in 1970s SS-11B anti-tank missile was fabricated at Bharat Dynamics Limited. India also decided to update its missile technology through a plane to air missile the project was referred to as Project Devil which was on from 1970 to 1979, the Russian SAM-2 supplied to India, reserve engineering. Project Valiant was also introduced a parallel program to construct a missile engine which would be mechanised with fluid combustibles. A programme driven inertia map reading structure was formed and trail an Avro aerodyne, eventually an INA was built for aircraft and missile both and it was trailed in 1979 on board a Canberra aerodyne. By the 1980s DRDL had developed proficiency in the fields of thrust, map reading and production of substance. Thus the Prime Minister Indira Gandhi, Scientific Advisor to the Defence Minister and Defence Minister R. Venkataraman came to a conclusion that all the automation should be amalgamated. This led to the formation of Unified Guided Missile Buildout Program and Dr Abdul Kalam was lead as the Director of DRDL in 1983 and he decided the DRDL would follow numerous projects in this sector at the same time. The four projects would include which was born under IGMDP

Prithvi – short term plane to plane rocket

Akash – Medium gamut plane to aerate rocket

Trishul – Short gamut low-level-plane to aerate rocket.

Nag – Third generation anti tank missile.

The Agni rocket was initially under the IGMDP as an automation demonstrator project but was later advanced to a ballistic projectile with different gamuts.

The first Prithvi rocket was tested in 1988 and the Agni rocket in 1989, after which India faced technology issues where countries decided not to support technology access to India. For instance US denied part gear shifter for the array radar for Akash, Germany denied magnesium which required for Prithvi's wings. Spinner and gravitometer



were refused by France, Ser-values prerequisite for the electro-hydraulic stipulation system of Prithvi and Agni was not provided, Intel refused to give chips for computers used in Agni and Prithvi. The DRDO formed laboratories, academic and industries for the buildout of its these components and materials and finally the missile was tested during Rajiv Gandhi tenure.

Under the Prime Minister ship of Atal Bihari Vijpayee Chandrayaan -1 project was announced. He made India a nuclear state and in 1998, India conducted five nuclear tests in one week.

Coming to the different missile launched by India, lets start with Agni Missile which is surface to surface nuclear capable missile. There have been 5 Agni missile launched till now lets talk a bit on each one and Agni 6 work is on which can target till Europe and MIRV.

Agni	Stage	Gamut	Coverage
Agni 1	Single, engine actuated by solid fuel	Short gamut	700 km
Agni 2	Two stage solid combustible engine	Medium gamut	2000 km
Agni 3	Two stage solid combustible engine	Interposed	3000 km
Agni 4	Two stage solid combustible engine	Interposed	4000 km
Agni 5	Actuated by 3 stages solid, all composite	Intercontinental	5000km

Coming to Prithvi Missile there are 3 Prithvi Missile

Prithvi 1: Warhead weight-1000 kg and gamut of 150km

Prithvi 2: Warhead weight 500 kg, gamut of 250 km and is nuclear capable missile.

Prithvi 3: Warhead weight 500 to 1000 kg and gamut is 350 to 750 km



Dhanush missile is Prithvi 3 naval variant, it can also be launched from ships.

Nag missile which is anti tank missile and is fire and forget missile, it can be activated from land and air driven platform, the missile is furnished with advanced imaging detector, radar seeker and has unified avionics mechanism. The land version is 4 km and the air version is 7 km.

Nirbhay Missile which is a long gamut subsonic cruise missile, nuclear capable with a gamut over 1000 km and speed is less than Mach 1, it can carry warhead of 200kg to 300 kg, it can circumvent observation and has the capacity to voyage at high points as well as low 100m, it is actuated by a solid rocket booster and has a gamut of 1000 km.



Shaurya missile which can be used during war , it is surface tactical missile , with a gamut of 700 to 1900km , supersonic missile and can travel at a speed of Mach 7.5 and can carry nuclear warhead .

Aakash Missile –it is a plane to air missile with agamut about 25 km ,which is used by Indian Army as well as IMF , India has even taken decision to export Aakash Missile

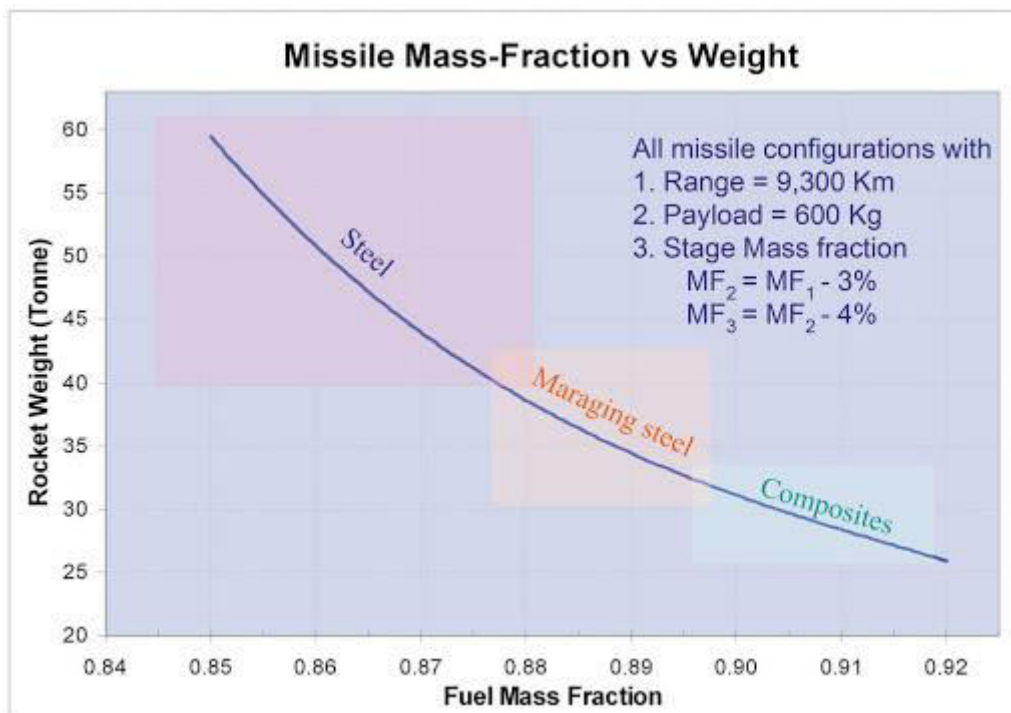
Barak-8 missile , they can move like lighting , it is a plane to air missile and the gamut is over 70 km this has been developed by India and Israel jointly , India’s DRDO and IAI together developed Missile .

BrahMos Missile : it is a cruise rocket , with a gamut of 290 km and is a nuclear competent missile and it is very difficult to predict .this missile can be launched from all platforms land , air and ship , this India and Russia has jointly developed this .

Astra Missile is an air to air missile made by DRDO .

Astra Missile –this missile has been developed with a joint work of Defence Research and Buildout Organization and IAF . It can withstand all climate conditions, weapons of destructing an opponent earmark 60 to 70 km away , BVRAAM –Beyond Visual Gamut Air successfully conduced the final buildout flight trails of Astro over off the coast of Chandipur, Odisha and Bay of Bengal ,

Kseries rocket –K15 , K4 Mark1 , K4 Mark2 and K5 not much is known about these missile but they are launched from submarine .



Under Prime Minister Modi , in today’s global sencario , Bharat is among the few nations across the globe to have its own indigenous technological supremacy , it is also among the top seven nations with its own port generation combat aircraft and one of the 7 countries to have its own main battle tank , one of the 6 country in the world to developed its own nuclear actuated submarine , one of the 5 countries to have its own ballistic missile programme , one of the 4 countries to have an air borne , early warning and control system and the only country along with Russia to have its own super sonic missile , India also has world class weapon systems , platforms and military equipments are based on cutting edge technology buildout by the Defence research and Development organization .TEJAS Indian miniature and light weight multi- purpose supersonic fighter aerodyne , single –engine , tactical fighter aircraft with compound Delta wing moving towards self-reliant .LAC Tejas modify fixed stability , Fly-by-wire command , advanced glass compartment , integrated digital avionics and composite air frame .AEW& C , Airborne early warning and control system , providing surveillance , provides capabilities for adaptive beam scheduling , active electronically Scanned Array (AESA) , identify friends and enemies .RUSTOM-11 , the multi missile ,MALE UAV , carries out surveillance and intelligences role for the 3 armed forces with an endurance of 24 hours .NAKSHATRA , AEROSTAT system ,excellent platform for mounting of sensors especially for surveillance and communication for civil and military application. NETRA ,mini unmanned Aerial Vehicle used for surveillance is a motor propulsion , noiseless electric in



containment areas .IR FLARES has been developed for different military applications like training the air crew, tracking path of a missile , ASTRA , LRSAM long gamutplane to air missile developed for Indian Navy and WHAP – Multi-Utility armoured platforms SWATHI , ARUDHRA and ASLESHA for applications for modern battlefields , The DRDO developed Sonar , surveillance systems for three dimensional navy LFDS low efficiency dunking sonar adds the third dimension for sonar operations from navy helicopter , MARREECH , the advanced torpedo defence system ,VARUNASTRA is the indigenous build Heavy weight anti-submarine torpedo anti-missile which can reach deeps into the sea .DRDO has reached to every sphere of the defence including the aspects of life sciences and psychological studies .

IV. FUTURE PERSPECTIVE

Technology is the future , India is developing deadly missile , special aircrafts are being developed , Prime Minister aim to make India Aatma Nirbhar .New submarine and aircrafts are being inventive which will help India to tackle the Indian ocean region in a smooth way , where China is trying to enter the Andaman sea , the battlefield tanks developed by India , will help in tackling the war against China , in the north-east region and Himachal Pradesh. India’s main two targets are Pakistan and China and in order to make the country security tight , these weapons will play a great role . Today China and India are in an open war against each other . India –Japan –US have joined hands together to counter China influence in Asia region. China through its one Belt and Road Initiative has gathered the support of many countries and as the China has provided them assistance which they are unable to pay back , China has got control over some parts of their region , making them moreover , the policy of string of pearls.India’s defence technology had advanced from where it had begun , making it the four largest powerful country in terms of army . There are features which only the Indian Defence has in the world , the war between the two powerful nuclear states China and India will show what the world leads to where India is planning to develop has world’s top economic in the world and a powerful global power .

INDIA & CHINA- MILITARY COMPARISON		
SUBJECTS	INDIA	CHINA
TOTAL MILITARY PERSONNEL	3,462,800	2,693,000
DEFENCE BUDGET (USD)	\$ 55.2 BN	\$ 224 BN
TOTAL AIRCRAFT	2,062	3,187
HELICOPTERS	692	1,004
FIGHTERS,INTERCEPTORS	520	1,222
ATTACK AIRCRAFT/HELICOPTERS	694/17	1,564/281
TANK STREIGHT	4,184	13,050
ARMORED FIGHTING VEHICLES	2,815	40,000
TOTAL NAVAL ASSETS	295	714
SUBMARINES	18	75

SOURCE: WWW.GLOBALFIREPOWER.COM

V. CONCLUSION

India has developed in the military sector from fighter aircraft , anti-submarine aircraft , stealth frigates , heavy artillery under the Modi government the military has been strengthened, it has improved the living conditions of many soldiers , it has dedicated 10 howitzers , inaugurated the ASC –Armoured System complex designed to make integrated advanced armoured platform .It gave orders for the construction of six nuclear actuated submarines and seven stealth frigates with focus on Project 17A and these submarine will make India’s overall deterrence capable in the Indian Ocean region. Multi-role fighters aircraft and many other advancement has taken place in the Defence . India is among the top seven countries when it comes to having navy , army and submarine buildout .



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