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Karan

Outlook

- Karan remains in development as an alternative to the Arjun, despite the ongoing Arjun development program
- Program reportedly integrates the Arjun turret with the T-72M1 chassis
- Forecast reflects commencement of low-rate initial production of Karan

**Unit Production Forecast
2016-2025**



Orientation

Description. A main battle tank.

Status. In development.

Sponsor. The Indian Ministry of Defence, through the Defence Research and Development Organization (DRDO) and the Indian Army, is sponsoring the development of this weapon system.

Application. Armored mobile weapon systems optimized for high-speed offensive and breakthrough operations, as well as defensive fire support.

Licensees. None.

Price Range. In 2016 U.S. dollars, the Karan reportedly carries a unit price of \$5.56 million.

Total Produced. Through 2015, the contractor reportedly completed six Karan prototype and test vehicles and 19 low-rate initial production models.

Contractors

Prime

Combat Vehicle Research and Development Establishment, Avadi Plant	http://www.drdo.gov.in , Avadi 600054, Chennai, India, Tel: + 91 044 2638 5112, Fax: + 91 044 2638 3661, Email: director@cvrde.drdo.in , Prime
Heavy Vehicles Factory, Avadi	http://ofbindia.gov.in , Avadi, Chennai 600054, Tamil Nadu, India, Tel: + 91 044 2684 3000, Fax: + 91 044 2684 1824, Email: hvf.ofb@nic.com , Second Prime

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Technical Data

Note: *The Indian Ministry of Defence continues to hold any information concerning the Karan (Tank EX) program quite close to the vest. Consequently, we must base our reporting on fragmentary data and our own assessment of the program. In general, reports indicate that the Karan integrates the indigenous Arjun turret with a T-72M1 tank chassis.*

Crew. Four: commander, gunner, loader, and driver.

Armor. The Karan will most likely feature an indigenous composite armor (called Kanchan), which India originally developed for the Arjun tank program. The Karan may also mount attachments for explosive reactive armor (ERA).

Dimensions. Data currently unavailable. As the Karan is reportedly based on the T-72M1 hull, dimensional data for the T-72 tank might provide a general reference for the Karan. The Karan reportedly weighs 48 tonnes (52.9 tons).

Performance. Data currently unavailable. Performance data for the T-72 might provide a general reference for the Karan. The Karan prototype reportedly achieved a maximum road speed of 60 kmph (37.28 mph) and a cross-country speed of 35 kmph (21.75 mph).

Engine. The Karan prototype reportedly mounts a version of the V-46 liquid-cooled V-12 engine. This powerplant generates 581.9 kilowatts (780 hp), with a power-to-weight ratio of 12.12 kilowatts per tonne (14.74 hp/ton).

The production Karan will reportedly mount an enhanced diesel powerplant, generating 745.7 kilowatts (1,000 hp), with a power-to-weight ratio of 15.53 kilowatts per tonne (18.90 hp/ton).

Gearbox. Data currently unavailable. The Karan may mount the hydraulically assisted manual gearbox of the T-72, featuring one reverse and seven forward gear ratios.

Suspension and Running Gear. Torsion bar suspension, with six diecast, rubber-tired dual roadwheels and three track return rollers on each side. The track drive sprocket mounts to the rear of the hull. The first, second, fifth, and sixth roadwheel stations feature hydraulic shock dampers. The track is a live type, featuring single track pins and rubber bushings.

Armament

Main Armament. The indigenous Indian 120mm rifled tank gun, originally developed for the Arjun tank program. Few details of this gun are available other than that it features a thermal sleeve and a fume extractor. The Karan carries 32 rounds of 120mm Armor Piercing Fin Stabilized Discarding Sabot (APFSDS) and High Explosive Squash Head (HESH) ammunition, with 18 ready rounds in the turret.

Secondary Armament. One coaxially mounted 7.62x51mm NATO (.308 Winchester) TK715A machine gun; one pintle-mounted 12.7x107mm NSVT heavy machine gun on the turret roof. The tank also mounts six smoke-grenade launchers on each side of the turret.

Fire Control. Data currently unavailable. Unconfirmed reporting suggests the Arjun/Karan fire control suite features an independent, fully stabilized commander's sight, a thermal imaging unit integrated with the gunner's sight, backup articulated sights, and a GPS navigational component.

Variants/Upgrades

Variants. None at this time. As with the Arjun program, the Indian Ministry of Defence could eventually propose a number of Karan-based variants, including an armored vehicle-launched bridge (AVLB),

a self-propelled anti-aircraft artillery system, and an armored engineer vehicle.

Modernization and Retrofit Overview. Not applicable at this time.

Program Review

Background. In 1972, the Indian Army issued a requirement for a new tank to replace the Vijayanta, the license-produced Vickers Mk 1 tank. Work began on the new tank – known at various times as the Chetak, MBT-80, MBT-90, and finally the Arjun – at the

Combat Vehicle Research and Development Establishment (CVRDE) in 1974. Based on its experience with licensed production of the Vijayanta, T-54/55, and T-72, India planned to produce the Arjun using nothing but indigenous components.

Karan***The Arjun Saga Continues***

In April 1985, the first Arjun prototype was rolled out from CVRDE at Madras. Although the original program schedule called for delivery of the initial 34 tanks (10 prototypes and 24 preproduction models) by 1990, a series of technical problems delayed delivery of the first low-rate initial production Arjun for testing until 1996.

The Indian Army originally planned to procure up to 124 Arjun tanks through 2002 for extended operational tests. Based on these tests, CVRDE was to finalize the Arjun design before beginning full-scale serial production of the Arjun Mk II tank. Numerous problems concerning the propulsion, fire control, and survivability of the initial 12 Arjun prototypes led to further delays and cost overruns. Reports of these problems led to a series of Indian government investigations of the entire Arjun program.

Salvaging a Failing Program

CVRDE is currently working on 93 improvements to the Arjun, of which 13 are considered major. The Indian Ministry of Defence has reached out to French, German, and Israeli contractors for technical and material assistance in getting the Arjun program back on track.

Nevertheless, in 2010, the Indian Army ordered an additional 124 Arjun tanks.

In reaction to the disarray of the Arjun program, the Indian Ministry of Defence looked to procurement and licensed production of the Russian T-90 tank as an alternative to the Arjun and as an answer to Pakistani procurement of the Russian T-80. In 2001, India purchased 310 Russian T-90S main battle tanks for \$780 million; the Indian Army accepted the first of 123 license-assembled T-90S tanks from the Avadi factory on January 7, 2004.

The Indian Army accepted the first five serial-production Arjun tanks on August 6, 2004. In May 2009, the Indian Army finally completed a regiment of 45 Arjun tanks. The Indian Army reportedly does *not* intend to use the Arjun main battle tank in its full configuration as anything other than a training tank.

In addition, a number of Arjun chassis were to serve as the basis for the Bhim self-propelled howitzer, mounting the Denel 155mm T-6 turret. However, in May 2005, Indian Defence Minister Pranab Mukherjee suspended all negotiations and business with Denel,

pending an investigation by the Indian Central Bureau of Investigation (CBI) into Denel's dealings with Varas Associates Inc, a consultancy registered in the Isle of Man. In January and June 2003, Denel allegedly paid Varas \$3.6 million to influence the 1999 contract award by the Indian Price Negotiating Committee for production of the Denel Mechem NTW 20/14.5 anti-materiel rifle.

While the Avadi facility will reportedly continue to produce Arjun tanks, the Arjun program has clearly been a failure in terms of providing the Indian Army with its next first-line main battle tank.

Advent of the Karan

In 2001, information surfaced that the Indian Ministry of Defence had initiated another new indigenous Indian MBT program: the Karan. If nothing else – in light of the Arjun fiasco and now T-90S procurement and licensed production – the fact that India would even pursue another such program certainly provides insight into its determination to develop and field an indigenous tank.

Description. As indicated in the **Technical Data** section (above), details on the Karan remain scarce.

Fragmentary Information

The Karan is reportedly an amalgamation of the T-72M1 hull with the Arjun turret, mounting the Arjun's indigenous 120mm rifled tank gun and fire control suite. The Karan features an over-pressure nuclear, biological, chemical (NBC) protective suite, possibly a version of the standard Russian PAZ suite in the T-72.

The Indian Defence Metallurgical Laboratory developed a new composite armor (designated Kanchan) for the Arjun. The Karan will likely also feature this armor suite. If this is true, Mishra Dhatu Nigam Ltd will produce the Kanchan armor for the Karan.

The status of the Karan program is further complicated by the uncertainty surrounding the DRDO's Future Main Battle Tank program. Press reports indicate that the FMBT is a successor to the Arjun Mk II design, featuring a reduced combat weight and improved weapons systems. Reports suggest that prototypes of the FMBT are scheduled for delivery by 2020. However, as with the Arjun program, FMBT development has reportedly faced delays, setbacks and rumored cancellations, leaving its current status uncertain.

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Related News

Indian Army Seeks to Design, Develop Modern Platform to Replace Aging T-72 Tanks – According to the Tribune News Service, the Indian Army is planning to design and develop a new-generation, state-of-the-art armored vehicle platform to replace its existing fleet of Soviet-origin main battle tanks.

The move comes as the service branch and the state-run Defence Research and Development Organization – charged by the government with designing, developing and managing all indigenous defense programs – remain at loggerheads over the indigenous main battle tank, the Arjun. Since the type was introduced into operational service with the Indian Army in 2009, the Army has proven less than enamored with the Arjun and instead opted for its Russian-legacy models, the T-72 and T-90, to be the centerpieces of its armored corps. Disputes between the DRDO and Army over the Arjun concern the tank's performance and capabilities.

The Army's Request for Information (RFI) regarding a new family of modular armored fighting vehicles is being undertaken with an eye on repopulating its armored vehicle fleet. Under the Army's plans, the newest vehicle, the Future Ready Combat Vehicle (FRCV) will begin being inducted into service by 2025-2027. As the FRCV is brought on line, subsequent development of other specialist variants – bridgelayers, anti-mine vehicles, command posts, engineer and recovery vehicles, medevac vehicles, and self-propelled guns – will follow. (FI, 6/15)

75 Percent of India's Arjun Mk 1 Fleet Inoperable – According to reports by *Defense News*, nearly 75 percent of India's 124-vehicle fleet of Arjun Mk 1 main battle tanks is currently inoperable due to technical failings and a shortage of components.

The Arjun was envisioned in the mid-1970s as the ambitious culmination of the progress made by India's burgeoning domestic defense industry, an indigenous MBT concept that would be both designed and manufactured by Indian contractors.

However, the program quickly became mired in seemingly perpetual development delays, and the core design was continually beset by serious technical problems. Although the first prototype was revealed in 1985, these constant challenges prolonged the testing process for the vehicle well into the late 1990s.

Due in part to economic considerations, the Indian Army was eventually compelled to order 124 Arjun Mk 1 MBTs in the early 2000s, but the vehicle continued to receive low marks from Army personnel tasked with evaluating its performance. Indeed, despite the numerous efforts made by the Army to resolve the Arjun Mk 1's many problems since its induction into service, the military brass has resolved to preclude the tank from combat duty, due in large part to its excessive weight.

According to Indian officials quoted by *Defense News*, the problems that have now rendered so many Arjuns inoperable relate primarily to the vehicles' transmission and thermal sighting and targeting systems. Elements of these individual systems rely on imported components that are reportedly in short supply.

Nevertheless, despite the travails of the Arjun Mk 1 program, its successor, the Arjun Mk 2, may at last represent the indigenous MBT that the Indian Army has been so long desired.

The Indian Army says that it has cleared some 118 Arjun Mk 2 MBTs for acquisition in the coming years. The tank was judged favorably by military officials during its evaluations, reportedly delivering performance comparable to that of the Indian Army's imported T-90S vehicles. (*Defense News*, 5/15)

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Funding

The Indian Ministry of Defence, through the Defence Research and Development Organization (DRDO) and the Indian Army, funds development of the Karan main battle tank.

Contracts/Orders & Options

Not available, as the Indian Ministry of Defence has not released contractual information regarding this program.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1974	Arjun development begun
	1986	Licensed production of T-72
Jan	1999	India decides to procure T-90 tank, effectively killing Arjun program
Late	2001	First reports of Karan program; India purchases 310 T-90S tanks
Jan	2004	Indian Army accepts first license-assembled T-90S tank
Aug	2004	Indian Army accepts first Arjun tanks
May	2009	Indian Army completes first Arjun regiment of 45 tanks
May	2010	Indian Army orders 124 additional Arjun tanks
	2013	Karan reportedly enters low-rate initial production
	2016	Karan MBT development program continues



Karan Prototype (Tank EX)

Source: www.bharat-rakshak.com

Forecast Rationale

The service timelines for the Karan and Arjun MBT programs have both been impeded by near perpetual development delays, extensive cost overruns, and procurement shortfalls of key components and weapons systems. In addition, the prevalence of departmental infighting and entrenched operational inefficiencies within the primary institutions of India's defense industrial base have frequently ground the development of both programs to a standstill.

An Uncertain Future

Despite the numerous challenges that have faced the Arjun MBT program throughout its development history, the Indian MoD has remained dedicated to the eventual success of the program. Its efforts now tentatively appear to be paying off at last, with the Arjun's base model having entered serial production and full-rate manufacture of the improved Arjun Mk 2 model slated to begin this year. However, the date is subject to delay.

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The Indian MoD ordered 124 base-model Arjun MBTs in 2010 and announced an additional contract for the acquisition of 118 Arjun Mk 2 models in August 2014.

Prospects for the continued development and acquisition of the Karan MBT by the Indian armed forces have diminished considerably with the relative stabilization and increasing feasibility of Arjun MBT procurement. Initially designed as a potential alternative to the faltering Arjun program, the Karan now appears to be largely redundant to India's operational requirements.

Acquisition of the T-90S and Arjun Mk 2 alone should prove capable of providing India with a sufficiently modern armored force structure.

Although production of the Karan may continue at a low rate for several years, the tanks will likely be relegated to rear-guard duties and training exercises. Ultimately, we anticipate that production of the Karan will enter dormancy within a year.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program		High Confidence				Good Confidence			Speculative			
	Thru 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
Heavy Vehicles Factory, Avadi												
Karan <> India												
	19	1	0	0	0	0	0	0	0	0	0	1
Total	19	1	0	0	0	0	0	0	0	0	0	1