

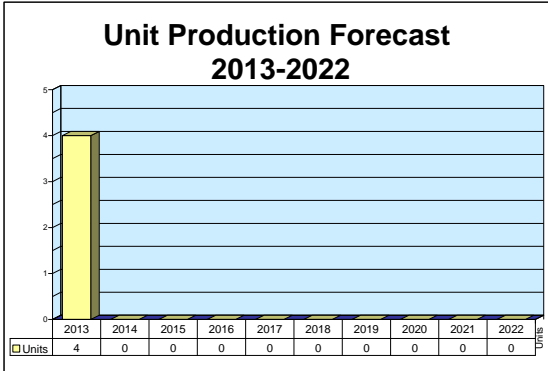
# ARCHIVED REPORT

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## Type 99 155mm Self-Propelled Howitzer

### Outlook

- Low-rate serial production, exclusively for Japan Ground Self-Defense Force procurement, will likely end this year
- JGSDF claims Type 99 is one of the world's state-of-the-art self-propelled artillery systems
- Forecast reflects remaining serial production for JGSDF procurement objective of 190 units



### Orientation

**Description.** A tracked 155mm self-propelled artillery system.

**Application.** Mobile indirect fire artillery support for maneuver forces at the battalion through division levels.

**Sponsor.** The Japan Ground Self-Defense Force sponsors the development and JGSDF procurement of the Type 99 self-propelled howitzer.

**Price Range.** Low annual procurement rates and high production costs consistently make Japanese weapons systems the most expensive in the world. In 2013 U.S. dollars, the Type 99 reportedly maintains a unit price of \$9.021 million.

**Licensees.** None

**Status.** Development through serial production.

**Total Produced.** Through 2012, we estimate the contractor produced two prototypes and 186 service-delivery models of the Type 99.

### Contractors

#### Prime

<b>Mitsubishi Heavy Industries Ltd (MHI)</b>	<a href="http://www.mhi.co.jp/en/">http://www.mhi.co.jp/en/</a> , 16-5 Konan 2-chome, Minato-ku, Tokyo, 108-8215 Japan, Tel: + 81 3 6716 3111, Fax: + 81 3 6716 5800, Prime
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#### Subcontractor

<b>Japan Steel Works Ltd</b>	<a href="http://www.jsw.co.jp">http://www.jsw.co.jp</a> , Gate City Ohsaki-West Tower, 11-1, Osaki 1-chome, Tokyo, 141-0032 Shinagawa-ku, Japan, Tel: + 81 5745 2001, Fax: + 81 5745 2025 (Type 99 Ordnance and Turret Systems)
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Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; [rich.pettibone@forecast1.com](mailto:rich.pettibone@forecast1.com)

### Technical Data

**Note:** *The Japan Ground Self-Defense Force (JGSDF) has not released any detailed data concerning the Type 99 program. The information in this report reflects the Forecast International Weapons Group's latest assessment of the Type 99 program, based on a variety of sources. The data and assessments in this report are subject to change as more reliable information emerges.*

**Crew.** Four: commander, gunner, loader/radio operator, and driver.

**Muzzle Brake.** Double-baffle.

**Recoil System.** Hydropneumatic

**Breech Mechanism.** Semi-automatic vertically sliding wedge.

**Ammunition.** The 155mm ordnance of the Type 99 is compatible with all NATO-standard 155mm ammunition types. The Japanese are also developing an indigenous line of 155mm munitions for this ordnance.

**Dimensions.** The Type 99 is reportedly based on the Type 89 mechanized infantry combat vehicle chassis. However, the following technical data are tentative, based on outside reporting.

	<u>SI Units</u>	<u>U.S. Units</u>
Length overall	11.3 m	37.07 ft
Width	3.2 m	10.5 ft
Height	4.3 m	14.1 ft
Combat weight	17.3 tonnes	19.06 tons
Fuel capacity	419 liters	111.44 gal
Ordnance caliber	155 mm	6.10 in
Ordnance length	39 cal/6.02 m	39 cal/19.75 ft

**Performance.** Vehicle speed and range data are estimated. The ordnance range reflects firing standard High Explosive (HE) ammunition; range with HE-Base Bleed ammunition is in parentheses.

	<u>SI Units</u>	<u>U.S. Units</u>
Maximum speed	49 km/h	30.44 mph
Maximum range	327 km	203.47 stat mi
Step	65 cm	2.13 ft
Trench	1.8 m	5.91 ft
Slope	35%	35%
Gradient	60%	60%
Fording	80 cm	2.63 ft
Elevation	+65°	+65°
Depression	-5°	-5°
Traverse	360°	360°
Maximum ordnance range	30 (38) km	32,808 (41,559) yd
Maximum rate of fire	6 rds/min	6 rds/min
Sustained rate of fire	2 rds/min	2 rds/min

**Engine.** Unidentified (probably Mitsubishi) diesel engine. The powerplant reportedly generates 231.26 kilowatts (310 hp), with a power-to-weight ratio of 13.37 kilowatts per tonne (16.26 hp/ton). The 24-volt electrical system features four 12-volt, 100-ampere-hour batteries and a diesel auxiliary power unit.

**Gearbox.** Unidentified (probably Mitsubishi) automatic unit, with one reverse and four forward gear ratios.

**Suspension and Running Gear.** Torsion bar suspension, with seven dual-tired roadwheels and three return rollers on each side. The drive sprocket mounts to the front of the hull.

**Fire Control.** Data currently unavailable. The JGSDF requires the Type 99 to be an autonomous self-propelled artillery system, capable of executing fire missions independent of gunnery data from a fire direction center/command post.

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### *State-of-the-Art Fire Control Suite?*

The only other 155mm self-propelled howitzer system on the market capable of truly autonomous operations is the Krauss-Maffei Wegmann Panzerhaubitze 2000. For a detailed discussion of the PzH 2000 fire control suite, see the "Panzerhaubitze 2000 155mm Self-Propelled Howitzer" report in this service.

To achieve such an autonomous capability, the Type 99 reportedly features an advanced computer-based navigation and fire control system, combined with an onboard ballistic computer. To date, the lack of available data has precluded a proper evaluation of the Type 99 fire control suite.



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Source: Japan Ministry of Defense

## Variants/Upgrades

**Variants.** None

**Modernization and Retrofit Overview.** Not applicable at this time. The JGSDF has indicated its desire to eventually replace the 39-caliber

ordnance with a 52-caliber version of the FH 155-1 ordnance, potentially increasing the ordnance maximum range to 40,000 meters (43,744 yd).

## Program Review

**Background.** In 1983, the Technical Research Institute of the Japan Self-Defense Force began developing a new 155mm self-propelled howitzer to eventually replace the Type 75. The new system features the 39-caliber ordnance of the FH 155-1 towed 155mm howitzer. Japan Iron Works was already producing this ordnance under license.

The prototype self-propelled howitzer bore the designation Type 75 SPH Kai; in 1999, the JGSDF type-classified the system as the Type 99. The Type 99 entered low-rate serial production in 2000; it is currently entering service with the JGSDF.

**Description.** To date, the JGSDF has not officially released any detailed technical data concerning the

Type 99; only limited information has trickled out of Japan.

### *Proven Components*

The Type 99 integrates the 39-caliber ordnance of the FH 155-1 towed artillery system with the chassis of the new Type 89 Mechanized Infantry Combat Vehicle.

### *Conventional Layout*

The Type 99 exhibits a conventional layout for a system of this type. The driver sits in the right-front of the hull; the powerplant and gearbox mount in the left-front of the hull. The driver's station features a single-piece hatch cover and three periscopes; the center periscope is

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interchangeable with a night vision device. The turret mounts at the rear of the chassis.

In the turret, the commander sits to the right of the ordnance; the gunner sits to the left. Both the commander's and gunner's stations feature single-piece hatch covers; the commander's station also features a pintle-mounted, shielded 12.7x99mm (.50-caliber) M2HB machine gun on the turret roof. Each side of the

turret features an access door; the rear of the hull also features a large door for crew access and ammunition loading.

The Type 99 reportedly employs an automatic loading system of some type. The vehicle features a nuclear, biological, and chemical (NBC) protective suite and passive night vision devices as standard equipment.

## Related News

***Regional Tensions Are Driving Force Behind Japan's New Defense Outlays*** – An increasingly tense regional environment is forcing a rethink on defense matters in Japan. The biggest beneficiary of the change in Japan's government – from the Democratic Party to the more hawkish Liberal Democratic Party (LDP) under Prime Minister Shinzo Abe – so far seems to be the military.

Following 11 years without an increase, the LDP government announced plans to boost the defense budget during the coming fiscal year (FY13-FY14) by \$1.15 billion (JPY100 billion). Japanese defense spending has remained below the high-water mark of 2002 – when it reached JPY4.94 billion – due to the country's gigantic public debt problem, which is more than twice the size of national GDP. But the need to deter and/or confront new security challenges has spurred Abe to call for a loosening of the constrictions on Japan's military imposed by the U.S. under the 1947 pacifist constitution. Another step the government may take is to officially renounce the defense budgeting limit of 1 percent of GDP put in place by Prime Minister Takeo Miki in 1976.

On top of the increase to the defense budget planned for next year, the Abe government also plans to allocate JPY180.5 billion (\$2.06 billion) in additional defense investment for the current fiscal year ending in March as part of a larger JPY13.1 trillion stimulus package. With the additional monies, the Defense Ministry would purchase three SH-60K patrol helicopters, two MCH-101 minesweeping and transport helicopters, an additional intermediate-range ballistic missile system battery, and additional surveillance equipment.

The emphasis on defense is a byproduct of an immediate security environment that sees a rising China undertaking a massive naval buildup and an always-unpredictable North Korea firing long-range ballistic missiles over Japanese territory. There are also territorial disputes lingering with China over a small group of islands in the East China Sea and with South Korea over a set of islands referred to by Japan as Takeshima and by Seoul as Dokdo. South Korea's outgoing president, Lee Myung-bak, visited the disputed islands in August 2012, dampening relations between the two countries. China, meanwhile, has attempted to assert de facto control over the islands referred to by Japan as the Senkaku and by China as the Diaoyu. It has increasingly deployed naval vessels to the area and conducted maritime surveillance flights that require Japanese F-15s to intercept them on their approach to the rocky outcroppings located near Taiwan.

Despite historical memories of Imperial Japan's militarism, a stronger Japan would be welcomed by the U.S., which is looking to its allies in the Pacific Rim to help alleviate some of the burden of providing a check on China's regional ambitions. The Philippines – also scarred by conflict with Japan during the Second World War – has also signaled it would welcome a stronger Japanese security presence in the region. (FI, 1/13)

***Mitsubishi Heavy Industries Restructures Defense & Space Business*** – Effective January 1, 2013, Mitsubishi Heavy Industries Ltd (MHI) will establish the Integrated Defense & Space Systems Planning Department, an ad hoc unit under the direct command of company president Hideaki Omiya, to promote integration of the company's defense- and space-related businesses.

The integration initiative is aimed at strengthening the industrial base of both fields and establishing a system enabling full support of joint operations of the Japanese Ministry of Defense and the Japan Self-Defense Forces by unifying management of all in-house defense- and space-related operations. Currently, defense businesses are handled by three separate divisions, and space systems business is conducted by the Aerospace Systems division.

The new unit will have about 10 staff members divided into three groups, respectively focusing on Planning, Integrated Defense Systems planning, and Business Development. The unit will be overseen by Takashi Kobayashi, executive vice president, who was to take charge of the Defense & Space Systems Planning unit effective January 1.

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Takuro Matsumoto, general manager of the Aerospace Systems Planning & Administration Department, is to serve as the unit's general manager.

MHI's defense-related business has until now spanned three divisions: vessels made by Shipbuilding & Ocean Development; fighters, helicopters, and guided weapon systems made by Aerospace Systems; and battle tanks made by the General Machinery & Special Vehicles unit. MHI made the decision to unify the management of these three defense-related businesses in order to efficiently support joint operations by the Japan Ground, Maritime, and Air Self-Defense Forces, as well as to further enhance security and transparency.

The new unit, working in collaboration with the three business divisions, will take up a variety of issues, among them: determination of the system best suited to comprehensive management of defense-related businesses; creation of a business strategy for integration of defense businesses and maximization of integration effects; utilization of space for defense purposes; and exploration of new business arising from the relaxation of Japan's "Three Principles on Arms Exports."

In its 2012 Medium-Term Business Plan, a comprehensive three-year plan, MHI set a basic policy calling for full utilization of its strengths and synergy effects through consolidation and restructuring of all operations into four business domains – Energy & Environment; Machinery, Equipment & Systems; Transportation; and Defense & Space – in a quest for business-scale expansion. Establishment of the Integrated Defense & Space Systems Planning Department falls in line with this initiative. (MHI, 12/12)

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## Funding

The Japan Ministry of Defense, through the JGSDF, funds the development and procurement of the Type 99.

## Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1983	Development and design initiated
	1999	JGSDF type-classifies the Type 99
Late	2000	Serial production begun
	2003	Final operational testing; low-rate serial production begun
	2013	Serial production to be complete, exclusively for JGSDF procurement

## Worldwide Distribution/Inventories

**Export Potential.** None. Japanese law precludes the export of military hardware.

**Countries.** Japan (2 prototypes and 186 production systems).

## Forecast Rationale

Low-rate serial production of 190 155mm Type 99 self-propelled howitzers, exclusively for procurement by the Japan Ground Self-Defense Force, is now in its final year.

### *State-of-the-Art Fire Control*

The Type 99 is an autonomous system, which the JGSDF hopes is at least in the same league as the state-of-the-art Panzerhaubitze 2000. To achieve such an autonomous capability, the Type 99 reportedly

features an advanced computer-based navigation and fire control system, combined with an onboard ballistic computer.

### *Production Exclusively for JGSDF*

The 190-unit production run of the Type 99 will be completed this year. After that, the center of gravity for the Type 99 self-propelled howitzer program will likely transition completely to modernization and retrofit work supporting the existing JGSDF inventory.

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In December 2011, the Japanese Cabinet reportedly lifted the constitutional ban on exports of military

weapons and associated technology. However, according to Japan's Ministry of Foreign Affairs, the ban – as promulgated under the 1967 "Three Principles on Arms Exports" – remains in effect. Thus, the Type 99 continues to have virtually no export potential, despite its advanced design and autonomous capability.

## Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program	Thru 2012	High Confidence				Good Confidence			Speculative			Total
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
<b>Mitsubishi Heavy Industries Ltd (MHI)</b>												
<b>Type 99 &lt;=&gt; Japan</b>												
	188	4	0	0	0	0	0	0	0	0	0	4
<b>Total</b>	188	4	0	0	0	0	0	0	0	0	0	4