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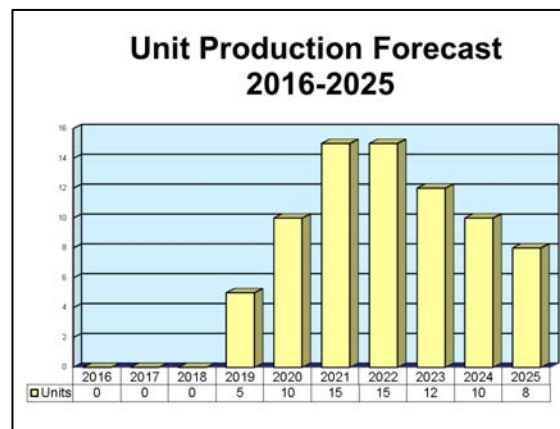
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Bi Ho Twin 30mm Self-Propelled Anti-Aircraft Artillery System

Outlook

- Since completion of the initial ROK Army serial production run in 2010, there has been no follow-on procurement
- Still no confirmed export sales, despite the contractor's marketing efforts
- Production forecast reflects only the potential for additional ROK Army procurement



Orientation

Description. A tracked, self-propelled anti-aircraft artillery system.

Sponsor. The ROK Army sponsors the development and procurement of this weapon system.

Licensees. None.

Status. Development through serial production.

Total Produced. Through 2015, we estimate the contractor produced three prototypes and 150 production systems.

Application. A mobile anti-aircraft artillery system, providing tactical air defense for maneuver forces.

Price Range. In 2016 U.S. dollars, the K30 Bi Ho maintains a unit price of \$8,998,000.

Contractors

Prime

Doosan DST	http://www.doosandst.com , Gongdan-ro 799, Changwon, Gyeongsangnam-do, Korea, South, Tel: + 82 055 280 6446, Email: doosandst@doosan.com, Prime
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Subcontractor

General Dynamics Land Systems	http://www.gdls.com , 38500 Mound Rd, Sterling Heights, MI 48310-3200 United States, Tel: + 1 (586) 825-4000, Fax: + 1 (586) 825-4013, Email: info@gdls.com (HMPT-500-3 Automatic Gearbox)
LIG Nex1	http://www.lignex1.com , 333 Pangyo-ro, Bundang-gu, Seongnam-si, Korea, South, Tel: + 82 31 8026 7768, Fax: + 82 31 8026 7093 (GSTAR-30X Radar)
S&T Dynamics Co Ltd, Tong Il	http://www.hisntd.com , 599 Nammyeon-ro, Seongsan-gu, Changwon-si, Gyungnam,

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Heavy Industry Co Ltd	Korea, South, Tel: + 82 55 280 5000, Fax: + 82 55 280 5171, Email: songjy@hisntd.com (KKCB 30mm Cannon)
Safran Electronics & Defense (Sagem)	http://www.sagem.com, Sagem - Arcs de Seine, 18/20 quai du Point du Jour, Boulogne-Billancourt, France, Tel: + 33 1 55 60 38 00, Fax: + 33 1 55 60 38 95 (Roof-Mounted Periscopic Sight)

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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

Technical Data

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

Cannon Type. Twin Oerlikon Contraves model KCB-B.

Caliber. 30mm.

Breach Mechanism. Positive lock, reciprocating bolt.

Recoil System. Hydromechanical.

Ammunition. The 30mm KCB-B ordnance fires standard 30x170mm ammunition, available in the following types:

- High Explosive-Incendiary (HE-I)
- High Explosive-Tracer (HE-T)
- Semi-Armor Piercing High Explosive-Incendiary (SAPHE-I)
- Target Practice (TP)
- Target Practice-Tracer (TP-T)

Dimensions. A modified and stretched chassis of the K200-series Korean Infantry Fighting Vehicle serves as the basis for the K30 Bi Ho. The height figure is to the top of the optical sight; with the radar raised, the height is 4.065 meters (13.34 ft).

	<u>SI Units</u>	<u>U.S. Units</u>
Length	6.77 m	22.21 ft
Width	3.15 m	10.33 ft
Height	3.27 m	10.73 ft
Combat weight	24.94 tonnes	27.49 tons
Fuel capacity	500 liters	132.98 gal

Performance. The automotive performance data reflect use on a paved road.

	<u>SI Units</u>	<u>U.S. Units</u>
Maximum speed	60 kmph	37.26 mph
Maximum range	500 km	310.70 stat mi
Step	63 cm	2.07 ft
Trench	2.06 m	6.76 ft
Slope	32%	32%
Gradient	60%	60%
Fording	Amphibious	Amphibious
Elevation	+85°	+85°
Depression	-10°	-10°
Traverse	360°	360°
Effective cannon range	3.0 km	3,280.80 yd
Effective radar range	17.0 km	18,951.20 yd
Rate of fire (per cannon)	600 round/m	600 round/m

Engine. MAN D 2840 L supercharged V-10 diesel engine. This powerplant generates 387.92 kilowatts (520 hp), with a power-to-weight ratio of 15.55 kilowatts per tonne (18.92 hp/ton). Doosan DST produces this powerplant under license. Samsung

Techwin produces a Garrett 32.07-kilowatt (43-hp) auxiliary power unit under license.

Gearbox. General Dynamics HMPT-500-3 automatic gearbox, with one reverse and three forward gear ratios.

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Suspension and Running Gear.

Transverse-mounted torsion bar suspension, with six dual-tired roadwheels and three track return rollers on each side. The drive sprocket mounts to the front. The first, second, third, and sixth roadwheel stations feature hydraulic shock dampers.

Armament

Main Armament. Two 30mm Oerlikon Contraves KCB-B cannons in a turret. S&T Dynamics produces this ordnance under license as the KKCB. Elevation (+85°), depression (-10°), and turret traverse (360°) are electrically operated, with manual backup. The vehicle carries 500 rounds of 30x170mm ammunition (250 rounds per cannon) at the ready; an additional 100 rounds are stored in reserve.

Secondary Armament. Each side of the turret mounts five electrically operated smoke-grenade launchers.

Fire Control. NEX1 Future produces the Siemens MPDR-18X X-band multimode pulse-Doppler surveillance radar under license as the GSTAR-30X. This radar features an operational range of 17 kilometers (18,951.2 yd).

The Raytheon electro-optical (EO) tracking system is the heart of the Bi Ho fire control suite. This system combines a laser rangefinder (5,000-m/5,468-yd range) with a Samsung thermal imaging system, a fire control computer, an identification friend or foe (IFF) receiver, and electronic counter-countermeasures (ECCM) equipment. The system also features a Sagem roof-mounted periscopic sight as a backup.

The EO tracking system can search out to 7 kilometers (7,655 yd) and track targets out to 6 kilometers (6,561 yd). The system can operate in four modes: automatic, semi-automatic, periscopic, and ground engagement.



K30 Bi Ho Self-Propelled Anti-Aircraft Gun System

Source: ROK Army

Variants/Upgrades

Variants. None. The K30 Bi Ho is actually a variant of the K200-series Korean Infantry Fighting Vehicle. For a detailed discussion of the KIFV, see the "Korean Infantry Fighting Vehicle" report in FI's *Military Vehicles Forecast*.

Adding a SAM Capability

In May 2010, the Defense Acquisition Program Administration selected Doosan DST to integrate the man-portable Shingung surface-to-air missile with the 30mm Bi Ho system. The program was to be completed by the end of 2013.

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Modernization and Retrofit Overview. The major potential for additional modernization and retrofit lies in the fire control suite and the basic automotive components.

Program Review

Background. In the mid-1980s, the ROK Army developed a requirement for a new tracked self-propelled air defense system. To meet this requirement, Daewoo used a stretched version of the basic K200-series Korean Infantry Fighting Vehicle chassis for its K30 Bi Ho (Flying Tiger) self-propelled air defense system.

Corporate Evolution

In April 2005, Doosan Corporation acquired Daewoo Heavy Industries & Machinery Company Ltd. The prime contractor now operates as Doosan DST.

Description. Details of the K30 Bi Ho remain scarce, due to the security concerns of the ROK Army and the prime contractor.

Piecing Together an Assessment

The K30 Bi Ho exhibits a fairly conventional interior layout. The engine and gearbox mount in the

left-forward portion of the hull; the driver sits in the right-forward portion of the hull. The driver's station features a single-piece hatch cover and a side door. The driver uses three periscopes; the middle periscope is interchangeable with a night vision device.

The steel alloy armor turret mounts on the middle of the hull. The turret houses the following major components:

- Twin 30mm KKCB ordnance
- MPDR-18X (GSTAR-30X) radar
- EO tracking system
- Fire control suite

The commander's station features a roof-mounted sight, integrated with the fire control suite.

Related News

Sites for THAAD Deployment in Korea under Consideration – The U.S. and South Korea are considering possible sites for the deployment of the Terminal High Altitude Area Defense (THAAD) system on the peninsula. These systems would defend South Korea from Pyongyang's growing arsenal of ballistic missiles.

Possible sites for THAAD include U.S. military bases in the southern cities of Daegu or Pyeongtaek. (*Korea Times*, 6/16)

North Korean Parade includes New & Upgraded Weapons – North Korea unveiled a set of new and upgraded weapons during a large military parade marking the 70th anniversary of the founding of the ruling Workers' Party. The parade included the KN-08 intercontinental ballistic missile (ICBM), which is presumed to have a range of 12,000 kilometers.

North Korea also revealed its 300mm-caliber multiple rocket launcher, called the KN-09, for the first time. Pyongyang's new submarine-launched ballistic missile (SLBM) was not part of the parade. (*Korea Herald*, 10/15)

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Funding

The Republic of Korea Ministry of National Defense, through the Agency for Defense Development and the ROK Army, funds the development and ROK Army procurement of the K30 Bi Ho system.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Mid-	1980s	Concept development for a new self-propelled air defense system
	1988	Design of second-generation KIFV

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<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Late	1990	Contractor completes initial Bi Ho prototype
Feb	1997	ROK Army issues production order for K30 Bi Ho
May	2010	DAPA selects Doosan DST to integrate Shingung man-portable SAM with K30 Bi Ho platform
	2010	Initial serial production run complete for ROK Army
	2016	K30 Bi Ho production line remains dormant

Worldwide Distribution/Inventories

Export Potential. Although the Republic of Korea is a relative newcomer to the international weapons market, its designs have already attracted considerable attention. Malaysia and an unidentified South American nation have reportedly expressed interest in the Bi Ho. To date, however, the K30 Bi Ho has yet to score any export sales.

Country. Republic of Korea (3 prototypes, 150 production units).

Forecast Rationale

Despite fulfillment of the ROK Army's stated procurement objective for the K30 Bi Ho in 2010, the opportunity for additional domestic orders may still exist. With the Republic of Korea's recently renewed emphasis on defense spending, we expect the ROK Army may enhance its short-range air defense capabilities by retiring at least a portion of its remaining K263A1 Chungung (20mm Vulcan) inventory in favor of additional K30 Bi Ho systems.

Threats and Opportunities

Given North Korea's continuing threats to attack South Korea with swarms of lethal drones, the K30 Bi Ho

could prove a particularly effective countermeasure against "low and slow" targets. Even the limited amount of technical data available indicates the K30 Bi Ho is clearly a well-designed, capable tactical air defense system.

Doubtful Export Potential

Although Doosan DST continues to aggressively promote the K30 Bi Ho on the international market, the weapon system has yet to score its first export sale. Despite its tactical capability, the K30 Bi Ho may have little future beyond the possibility of ROK Army follow-on orders.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program	High Confidence					Good Confidence			Speculative			Total
	Thru 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Doosan DST												
BI HO <-> Korea, South												
	153	0	0	0	5	10	15	15	12	10	8	75
Total	153	0	0	0	5	10	15	15	12	10	8	75