

Regional Precision Guided Munitions Survey

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Guided munitions are a key measure of an air force's capability. In the past year there have been numerous incremental improvements to existing weapons, but also the introduction of a number of new weapon types, especially of Russian origin, in the Asia Pacific region.



EGBU-12 Enhanced Paveway II.



GBU-28 Paveway III.



Datalink aided JDAMs impact the former LST USS Schenectady.



GBU-39 Small Diameter Bomb.



EGBU-15 Enhanced Cruciform Wing Weapon.

GBU/EGBU-10/12/16 Paveway II

The Paveway II laser guided bombs continue to be a mainstay of US and coalition forces close air support and interdiction tasks. The latest variants in this family of weapons are the dual mode variants, the first of which is the 500 lb EGBU-12 model. The EGBU-12 adds an inertial unit, GPS receiver with dual antennas, and a Mil-Std-1760 interface, to the existing laser guidance head. As a result the weapon uses the laser illumination to refine its aimpoint during flight but can continue to guide to a preprogrammed aimpoint if laser illumination is lost. The weapon has been integrated on the Tornado, Harrier, Super Etendard, with work ongoing on the F/A 18, F-16, AMX, Eurofighter.

GBU/EGBU-24/27/28 Paveway III

The 2,000 lb GBU-24 and GBU-27 continue in service as high precision proportional nav-guided laser-guided weapons. The recently introduced Enhanced Paveway III EGBU-24 and EGBU-27 variants incorporate a GPS receiver and inertial unit and provide, like the Enhanced Paveway II, an autonomous all weather dual mode capability. With the 5,000 lb bunker busting GBU-28 sharing the same seeker hardware, with alternate software loads, as the GBU-24, it was inevitable that the enhanced seeker would find its way on to the GBU-28. The new EGBU-28 is now the replacement for the legacy 5,000 lb GBU-37/BLU-113 GAM used by the B-2A, carried on the internal rotary launcher. The F-15E is the only other type capable of carrying the GBU-28/EGBU-28, although the baseline EGBU-28 was cleared on the F-111F.

GBU-31/32/35/38 JDAM

The JDAM GPS/ inertially guided bomb has been an unqualified success story, with 112,000 kits manufactured since 1998. The latest US\$609 million Lot 9 contract is for 30,072 kits, of which 60 per cent will be the 500 lb GBU-38, the latter proving to be a very popular weapon for urban strikes in Afghanistan and Iraq. Two recent developments have been of importance. The first of these was the late 2004 Resultant Fury maritime strike exercise conducted by PACAF. In this trial JDAMs equipped with Link-16 receivers were used to engage and destroy moving maritime targets. An E-8C JSTARS tracked the targets using its APY-3 radar and used the datalink to transmit continuous position updates to the bombs in flight. The second development was the successful trial this May of the 'Laser JDAM', intended for use against moving battlefield targets. A 500 lb GBU-38 was modified with a nose mounted laser seeker, and used to hit a moving vehicular target. JDAM was also recently selected for the RAAF under the AIR 5409 program. Australia's ACTD effort with the winged JDAM-ER is continuing at the time of writing.

GBU-39/40 Small Diameter Bomb

The 285 lb GPS/inertially guided Small Diameter Bomb was devised as a compact weapon for the F/A-22A, and sized around its weapon bay. It will be also carried by a wide range of legacy aircraft and the Joint Strike Fighter, should the program survive the Quadrennial Defence Review. The baseline GBU-39/B is a glide wing equipped GPS/inertial weapon analogous to the JDAM, for attacking fixed targets. The GBU-40/B is a version equipped with a datalink receiver, for attacking moving targets. The SDB program is currently in chaos as a result of re-competition.

Raytheon/ASI/Boeing EGBU-15 Enhanced CWW

In 1999 the US Air Force contracted Applied Sciences Engineering and Raytheon to perform a major upgrade on the legacy EO/datalink guided Boeing GBU-15 Cruciform Wing Weapon (CWW) kit stockpile, bringing these up to enhanced EGBU-15 configuration with a GPS receiver, strapdown inertial package and Mil-Std-1760 interface. The GBU-15 was initially carried by the F-111, and is currently carried only by the F-15E. The EGBU-15 is more flexible, and capable of autonomous all-weather operation should the datalink channel be lost. An issue for this family of weapons is the impending loss of the L-band datalink frequencies used by the AXQ-14 and ZSW-1 pods, the original plan being to re-engineer the stockpile of weapons and pods to operate at a higher frequency.



AGM-130 stand off weapon launch.



AGM-84K/L SLAM-ER.



AGM-154B JSOW
6 x BLU-108/B Sensor Fuzed Weapon Submunitions



AGM-154C JSOW
1 x BLU-111 Unitary Warhead



AGM-154A JSOW
145 x BLU-97A/B Combined Effects Bomblets

JSOW Variants.



Rafael AGM-142E on F-111C



LM AGM-158 JASSM



Raduga Kh-59M Ovod

Boeing AGM-130

The GBU/EGBU-15's sibling is the AGM-130, a rocket boosted derivative of the baseline weapon, which was used extensively in the 1999 Kosovo campaign. It was initially carried by the F-111, and now the F-15E. Late production weapons incorporate a GPS/inertial navigation system, software enhancements exploiting the accurate midcourse nav system - these permit the seeker to be cued to the aimpoint automatically, a day/night thermal imaging seeker based on a 256x256 Midwave (3-5 Micron) Mercury Cadmium Telluride Focal Plane Array chip, a daylight only CCD seeker, and optional Mk.84 unitary or BLU-109/B bunker busting warheads.

Boeing AGM-84K/L SLAM-ER and AGM-84D Harpoon Block II

The established AGM-84 Harpoon anti-shiping missile remains in production. The air launched AGM-84A entered service during the late 1970s. It was followed by the improved AGM-84C Block 1B in 1982, the AGM-84D Block 1C in 1985, and the first generation AGM-84E Block 1E SLAM (Stand-off Land Attack Missile) in 1990. The latest Block II Harpoon variant incorporates the HG1700 inertial unit from the JDAM, and the GPS receiver, antenna, mission computer and software from the SLAM-ER, in a lengthened fuselage. Unlike the legacy Harpoon, specialised for blue water maritime targets, the Block II is designed to also attack littoral brown water targets and coastal targets, exploiting the near precision GPS/inertial capability. The 1,600 lb SLAM-ER evolved from the earlier cruciform wing AGM-84E Block 1E SLAM (Stand-off Land Attack Missile). It has a new pop-out swept wing, larger 360 kg (800 lb) WDU-40/B penetrating warhead from the Tomahawk Block III, and a revised AN/DSQ-61 guidance/seeker package with a new nose window design. Later blocks of the SLAM-ER include the Automatic Target Acquisition (ATA) function, which allows the weapon to autonomously select an aimpoint using a stored bitmap image. Cited range for the SLAM-ER is in excess of 150 nautical miles and launch weight 1,600 lb (730 kg). South Korea is the first export customer.

Raytheon AGM-154 JSOW

The JSOW is an offspring of the USN Advanced Interdiction Weapon System (AIWS) program intended to replace the obsolescent post-Vietnam era Walleye glidebomb. The primary role of the weapon is to enable indirect attack against vehicular, air defence and other soft or semi-hard targets from outside the range of point air defences, with a lethality similar to that provided by cluster weapons such as the Rockeye and APAM, and with high accuracy. The JSOW is a modular weapon and three variants were developed. All variants share the basic airframe and navigation guidance system, but differ in payloads and in some instances, a seeker will be added. The intent was to produce a reconfigurable 'bomb truck'(refer <http://www.ausairpower.net/TE-GPS-Guided-Weps.html>). The first variant of the weapon is the AGM-154A intended for use against soft targets such as parked aircraft, vehicles, SAM sites and mobile command posts, and for close support of troops on the deck. It carries 145 BLU-97A/B Combined Effects Bomblets (CEB). The second variant of the JSOW is the AGM-154B, a specialised anti-armour weapon, which carries six sticks of Sensor Fused Weapon (SFW) submunitions. The third variant is the AGM-154C intended to replace the Walleye. This variant carries a 500 lb BLU-111 Mk.82 blast fragmentation warhead, and a thermal imaging terminal seeker and datalink. The datalink is compatible with the Walleye AWW-13 pod.

Rafael AGM-142

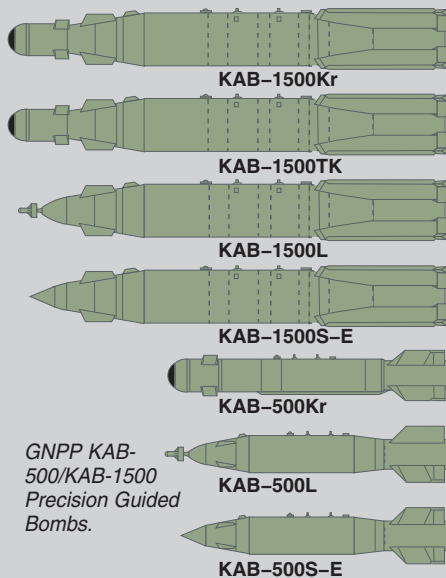
The AGM-142E has been integrated on the RAAF's F-111 Block C-4 variant, and the existing F-111Cs are currently being retrofitted with Mil-Std-1760 pylons to support this missile. A number of late model variants exist. The AGM-142F uses a zoom capable seeker, 770 lb I-800 penetrator warhead, and shortened wingspan. The AGM-142G is the South Korean export model, with I-800 penetrator warhead and daylight CCD seeker, carried by the F-4E. South Korea has also acquired the AGM-142H, with a zoom capable seeker. The US Air Force carries the AGM-142A TV, AGM-142B thermal imaging, AGM-142C TV/penetrator and AGM-142D thermal imaging/penetrator variants on the B-52H. Long term planning is to replace the weapon with the AGM-158 JASSM.

AGM-158 JASSM

The JASSM is intended to arm the B-52, B-1B, B-2A, F-15E, F-16C, the USN/USMC withdrew and opted for SLAM-ER on their F/A-18s. The JASSM was devised as a cheaper replacement for the cancelled Northrop AGM-137 Tri-Service Standoff Attack Missile (TSSAM). Uniquely, JASSM was designed for the outset for a lower than US\$400k unit mass production cost, half or less the cost of a typical US\$1M cruise missile or stand-off missile. Like the TSSAM, JASSM was designed for high performance stealth. An 500+ nautical mile range AGM-158B JASSM-Extended Range, powered by a turbofan, has been proposed as a replacement for the legacy AGM-86C/D Conventional Air Launched Cruise Missile (CALCM) carried by the B-52H. Other proposed evolutionary upgrades to the JASSM include submunition payloads and a specialised deep penetrating warhead, as well as a Synthetic Aperture Radar imaging all weather seeker. While the US Air Force intends to acquire 4,900 JASSMs, the missile has been bedevilled by political problems, mostly as a result of test failures.

Raduga Kh-59/59M/D Ovod

The 2,000 lb (920 kg) 62 NMI (115 km) range Kh-59M/D (AS-18 Kazoo) series stand-off weapon is a direct equivalent to the Israeli AGM-142 missile. Evolved from an anti-radiation missile, it shares the common Granit 7TM1 optical seeker and Raduga APK-9 Tekon DL pod with the KAB series. The D-model is fitted with a thermal imager, and uses an RDK-300 jet sustainer. The PLA-N is reported to have ordered an anti-ship variant equipped with a radar seeker, designated the Kh-59MK2, for the Su-30MK2, concurrently with PLA-AF buys of the basic variant for the Su-30MKK and Su-27SMK. Su-27SMK/30MK fitted for the Kh-59M/MK2 carry two rounds on wing stations 3 and 4, using AKU-58 adaptors, the APK-9 is carried on inlet station 9.



GNPP KAB-500/KAB-1500 Precision Guided Bombs

Russia's KAB-1500 and KAB-500 smart bombs are equivalent to the US Paveway II/III and GBU-15 family of guided bombs encompassing all of the baseline capabilities in their US equivalents. The KAB (Korrektiruyeskaya Aviatsionnaya Bomba) family of weapons were developed during the 1970s by Moscow based GNPP - it is believed that warstocks of the Paveway, Walleye and GBU-8 HOBOS captured in South Vietnam during 1975 played an important role in the design process. Two common seekers are currently available - the first is the '27N' semi-active laser homing seeker similar to the Paveway II series (KAB-500L, KAB-1500L), providing similar characteristics. The cited 4 metre Circular Error Probable is consistent with a proportional control algorithm eg GBU-24/27. Compatible designators are the Klyon PM/PS, Kaira 24M, I-25 Shkval, the Sapsan-E pod, or an Israeli pod with a Russian coded laser exciter. The second '7TM1' seeker bears a striking resemblance to the GBU-8/15 configuration, with a gimballed TV camera. The daylight TV seeker is available with two different guidance packages - the 'Televizionno-Komandnaya' is a 'man in the loop' command link arrangement similar in concept to the GBU-15 (KAB-1500TK), using a Raduga APK-8 or APK-9 datalink pod. The 'Korrelatsionaya' alternative employs a Scene Matching Area Correlator package (KAB-500Kr, KAB-1500Kr), which guides the bomb to a set of coordinates within a preprogrammed image surrounding the target - it is similar technology to the DSMAC in the BGM-109 Tomahawk. Multiple rounds can be released in a single pass at multiple aimpoints, not unlike the JDAM. The third alternative guidance package is used by the KAB-500/1500S-E and is a satnav aided inertially guided equivalent to the JDAM, recently introduced. The 3,000 lb (1,500 kg) class KAB-1500 bombs are available with blast, blast fragmentation and subcalibre bunker busting warhead options, the latter claimed to be capable of penetrating up to 20 metres of soil and 2 metres of reinforced concrete. The 1,000 lb (500 kg) class KAB-500 bombs are GBU-16/32/35 equivalents, with blast, submunition dispensing, blast fragmentation and fuel-air explosive warhead options. The Su-27/30 is cleared to lift up to 6 KAB-500s or 3 KAB-1500s on wing stations 3 and 4, inlet stations 9 and 10, and centreline tandem stations 1 and 2. The KAB-500 is carried on a BD-3U adaptor, the KAB-1500 on a BD4 adaptor.



Su-27SMK armed with two Tactical Missiles Corporation Kh-31MP.



Kh-61 Yakhont on Su-27K



Raduga Kh-55SM.

Tactical Missiles Corporation Kh-31P/A/MP/MA

A unique Russian weapon the supersonic Turayev ramjet powered Kh-31P (AS-17 Krypton) was originally designed as an anti-radiation missile to suppress Patriot and IHawk batteries, with an L-111E seeker. Since the end of the Cold War it has evolved an extended range airframe (Kh-31MP / Type 2 - 100+ NMI range). An anti-ship variant equipped with an active radar seeker, the Kh-31A/MA, was recently introduced, adaptation of this seeker permitting 'counter-ISR' roles as an 'AWACS-Killer'. At altitude the Kh-31 achieves Mach 4.5, as sea level Mach 2.7. Su-30MK fitted for the Kh-31 series carry up to six rounds on wing stations 3, 4, 11, 12 and inlet stations 9 and 10, using AKU-58 adaptors, the Su-27SKU four rounds on 3, 4, 9 and 10. The PLA is reported to use this weapon with recent claims of plans for licence production.

NPO Mashinostroyeniya 3K-55/3M-55/Kh-61 Yakhont/PJ-10 Brahmos A/S

Recently licenced by India as the Brahmos A (Air) and Brahmos S (Surface) 'Supersonic Cruise Missile', the Yakhont is regarded to be the best Russian anti-ship missile in service, and provides a complete family of supersonic rocket-ramjet missiles. Ship, submarine, air and ground launched variants exist. The missile weighs 3 tonnes at launch, and uses a liquid propellant for the ramjet which propels it at speeds between Mach 2.0 and 2.5. The Yakhont typically cruises to the target area at high altitude, and then descends for a sea skimming attack from under the horizon. The distance at which it begins its descent can be programmed before launch, this determining the achievable range which is between 65 and 160 nautical miles (Refer Tsarev V., Melnikov V., 'Yakhont - New Generation Antiship Missile', Military Parade, Exclusives, 2000.). Indian sources indicate indigenous DRDO (India's DSTO) designed guidance improvements to the Brahmos over the original design, and the intent to deploy shipboard, mobile coastal defence and air delivered variants. There has also been speculation about a land attack or 'dual role' variant, requiring a more accurate midcourse navigation system. At 6,000+ lb launch weight, up to three Yakhont/Brahmos would be carried by Su-27/30 on a centreline adaptor and wing stations.

Raduga Kh-55/55M/SM Kent

The Kh-55 most closely resembles the early US BGM-109 Tomahawk, with a cylindrical fuselage, pop out planar wings, folding tail control surfaces, a ventral turbofan engine, and with guidance provided by a TERrain COntour Matching (TERCOM) aided inertial navigation system. The Kh-55's Omsk AMKB TVD-50 two spool turbofan is mounted in a nacelle, which deploys via a ventral door on a pylon after launch. The TVD-50 is a compact turbofan in the thrust and size class required to power cruise missiles, standoff missiles and UAVs. The cited thrust rating is 400 to 500 kp (880 to 1,000 lbf), with a dry mass of 95 kg (210 lb), a Specific Fuel Consumption of 0.65, a length of 0.85 m (33.5 in) and diameter of 0.33 m (13 in). For comparison, the Tomahawk has a 21 in diameter, the Kh-55 a 20.5 in diameter, the Tomahawk weighs 2,700 lb at launch, the Kh-55 2,870 lb. The Sprut and BSU-55 guidance package is designed around a digital computer running Kalman filter and TERCOM software, with an onboard memory storing a digital map, coupled to a radar altimeter for terrain profiling and a low drift inertial unit. The Soviets had DSMAC (Digital Scene Matching Area Correlator) technology but it not known whether this was added to the Kh-55 series. First generation Kh-55s appeared in three configurations, entering service in 1984. The 'Izdeliye 120' Kh-55 / AS-15A was air launched from the Tu-95MS using a MKU-6-5 rotary launcher and external pylons, the RKV-500A / SS-N-21 Sampson was tube launched from the Type 671 Victor, Type 945 Sierra and Type 971 Akula submarines, and the RK-55 / SSC-X-4 Slingshot tube launched from a MAZ-543M (MAZ-7310) 8x8 TEL, carrying six rounds. The air launched Kh-55 was supplanted in production by the extended range 'Izdeliye 125' Kh-55SM / AS-15B subtype in 1987, using conformal fuselage fuel tanks. Derivative weapons are the conventional Kh-555, and the Kh-65. China is known to have acquired samples of the Kh-55SM from the Ukraine.



Kh-41 Moskit on Su-27K.

Raduga 3M-80, 3M-82 and Kh-41 Moskit

The Raduga 3M-80, 3M-82 and Kh-41 / ASM-MSS Moskit (SS-N-22 Sunburn) are variant 4.5 tonne supersonic rocket-ramjet missiles. This missile is the primary armament of the PLA-N's new 956E Sovremenny class destroyers and is credited with a range between 50 and 120 nautical miles. An air launch centreline tunnel adaptor enables Su-27/30 family strike fighters to carry a single round and this configuration was been displayed on the navalised Su-33. Inertial midcourse guidance is supplemented with an Altair active radar seeker. Unlike Western anti-ship missiles such as the subsonic Harpoon and Exocet, the Moskit is a supersonic sea-skimmer. It can be programmed to fly high altitude Mach 3, or sea-skimming Mach 2.2 trajectories. If the sea skimming mode is chosen, the missile will be first detected when it emerges over the radar horizon at a distance of about 15 to 25 nautical miles. Warning time is thus about 25-60 seconds before impact.



KD-63 land attack and maritime stand off missile.



HY-2 Seersucker and C-601 Kraken



PLA land attack cruise missile.

Raduga Kh-22M Burya

Designed during the 1960s for dual role use as a nuclear armed standoff weapon equivalent to the RAF's Blue Steel, and as an anti-ship missile with either radar or anti-radiation seekers, the Kh-22 remains in service as the primary armament of the RuAF's fleet of Tu-22M3 Backfires. The Kh-22 is powered by an Isayev R-201-300 (S5.33) liquid rocket delivering 83 kN full thrust and 5.9 kN cruise thrust, it is claimed to exceed 4.6 Mach in cruise at 80,000 ft AGL. Around 3 tonnes of fuel and oxidiser are carried. The toxic propellant mix presents handling problems in fuelling and defuelling the missile, contemporary Isayev engines ran with AK-20K oxidiser (80% nitric acid, 20% dinitrogen tetroxide with fluorine or iodine additives) and TG02 fuel (50% xylidine and 50% triethylamine). Cited range varies between 145 NMI (270 km) and 300 NMI (550 km), subject to variant and launch speed/altitude. The 900 kg shaped charge warhead is claimed to blow a 5 metre diameter hole, penetrating 12 metres deep, when impacting a large warship. Seven variants are known. A mid life upgrade for the APK-22 guidance package has been reported. The Backfire carries up to three rounds, although typical payloads are one or two, on BD-45K/F adaptors. Any Backfire sale to China would likely include the Kh-22.

Novator 3M-54 Club/Kalibr

Deployed by India and China, the Novator 3M-54 Club (SS-N-27) comprises a complete family of ship (Club N) and submarine (Club S) launched weapons, designed for launch from a 533 mm torpedo tube, or a vertical launch tube (Refer Military Parade, 2000-1 Exclusives Issue, Kamnev P., 'The Club Missile System'). Five distinct variants of this weapon exist. The basic 3M-54E1 and 3M-14E most closely resemble the US Navy's subsonic anti-ship and land attack Tomahawk missiles, but with a range of 160 nautical miles. The 3M-54E1 uses an ARG5-54 active radar seeker and Glonass satellite and inertial guidance, the 3M-14E Glonass satellite and inertial guidance alone. The more advanced 3M-54E combines the subsonic cruise airframe of the 3M-54E1/3M-14E with a Mach 2.9 rocket propelled guided payload. Like the 3M-54E1, it approaches from under the radar horizon using the same radar seeker to detect its target. Once locked on, it discards the cruise airframe, fires its rocket motor, and accelerates to Mach 2.9 at a sea skimming altitude of 15 feet. Both the 3M-54E1 and 3M-54E are small weapons which are difficult to detect on radar. The 91RE1 and 91RE2 are rocket boosted homing torpedoes, most closely resembling the US ASROC and Sea Lance weapons. All five weapons in this family share a common launch system and thus any ship, submarine or aircraft equipped for these weapons can carry an arbitrary mix.

CHETA YJ-8/YJ-81/C-801, YJ-82/C-802 and YJ-83/C-803

The YJ-8 (CSS-N-4 Sardine) family of missiles are available in ship, sub, land and air launch variants. The basic air launch rocket powered YJ-8K achieves 27 NMI (50 km) range, the improved YJ-81 cca 43 NMI (80 km), the turbojet YJ-82 (CSS-N-8 Saccade) cca 65 NMI (120 km), and the recently trialed YJ-83 variant around 135 NMI (250 km). These Harpoon/Exocet equivalents are the primary weapon of many PLA-N warships. The FH-7 maritime fighter carries four rounds.

CHETA KD-63

The recently revealed KD-63 is a derivative of the air-breathing HY-4 Sadsack. While it retains the delta wing and fuselage shape of the HY-4, it uses a new cruciform tail design, and includes a television / datalink terminal guidance package. It is thus a dual role weapon, capable of precision strikes against land and maritime targets. It is carried by the newly designed H-6H Badger variant, replacing the pair of Krakens carried by earlier variants. Range is cited at around 100 nautical miles.

CHETA HY-1/HY-2/HY-4/C-601/C-611 'Silkworm'

The Raduga P-15/4K-40 Termit (SS-N-2 Styx) anti-ship missile was designed during the late 1950s. The original Styx was powered by an Isayev P-15 liquid rocket rated at 1.213-0.554 tonnes thrust, using toxic AK-20K/TG-02 propellant, armed with an 1,100 lb (513 kg) shaped charge warhead and fitted with a conical-scan active radar seeker. The missile proved highly successful in the Mid East and the India-Pakistan conflict. Reverse engineered Chinese Styxes entered production in 1974 as the HY-1/SY-1 or CSS-N-1 Silkworm coastal defence and shipborne ASM. A stretched 6,600 lb (3,000 kg) HY-2 (C-201) or CSS-N-2 Seersucker carrying more propellant and achieving a range of up to 73 NMI (135 km) soon appeared. The many derivatives include models with infrared homing seekers, television seekers, monopulse active radar seekers and the turbojet powered HY-4 Sadsack. The air launched YJ-6/C-601 or CAS-1 Kraken entered production during the mid 1980s, based on the HY-2, carried by naval H-6D Badgers. It was superseded by the YJ-61/C-611 with improved 110 NMI (200 km) range via higher energy propellant. It is claimed that Iran is manufacturing its own clones of the HY-2 and HY-4. The Silkworm/Seersucker/Sadsack is a subsonic sea skimmer. Its sheer size confers significant lethality. While often not regarded to be a threat to warships, it has the killing power to be a very effective blockade weapon against transports.

Chinese Land Attack Cruise Missiles

China has been developing indigenous land attack cruise missiles suitable for aerial, sub and ship deployment. The PLA is claimed to operate the HN-1 (320 NMI/600 km), HN-2 (800+ NMI/1,500+ km) and the HN-3 (1,350 NMI/2,500 km) indigenous cruise missiles. The earliest good quality image of a Chinese cruise missile to emerge suggests it is a clone of the BGM-109 Tomahawk. A 1999 report in Hong Kong's 'Sing Tao Jih Pao' claimed the existence of a 'Tomahawk-like' cruise missile with 1,080 NMI (2,000 km) range, a CEP of 5 m/16.4 feet using 'high-technology "map matching" + topography matching + inertial guidance + GPS auxiliary correction + other auxiliary guidance', with a cruise profile at 15-20m/49-65 ft AGL. The recently unveiled H-6H variant with four wing pylons carries cruise missiles similar in size to Kh-55/65 ALCM. A recently revealed image of a ground launch variant of one of these weapons shows a similar configuration to the Tomahawk, but with a larger fixed ventral inlet design.