

MISSILES

GENERAL DATA		AIRFRAME			GUIDANCE		POWERPLANT	MAX. RANGE (NAUT. MI.)	STATUS/OUTLOOK
DESIGNATION/NAME	MAX. LENGTH (FT.)	MAX. SPAN, WINGS OR FINS (FT.)	BODY DIAMETER (FT.)	LAUNCH WEIGHT (LB.)	CONTRACTOR	TYPE	NO., MAKE & MODEL		
AIR-TO-AIR									
<i>BGT MISSILES, Oberlingen, Germany</i>									
AIM-9L/1-1 Sidewinder	9.4	2.1	0.4	189	BGT	IR	1 x spr.	—	Upgraded and refurbished.
IRIS-T	9.7	—	0.4	196	BGT	IIR	1 x spr.	—	Deliveries to begin in 2005.
<i>CHUNG-SHAN INSTITUTE OF SCIENCE AND TECHNOLOGY (CSIST), Taoyuan, Taiwan</i>									
Skysword 1 (Tien Chien 1)	9.8	2.1	0.42	196.4	—	IR	1 x spr.	9.7	In service with Republic of China air force since 1993.
Skysword 2 (Tien Chien 2)	11.8	2.6	0.62	396.8	—	Active radar	1 x spr.	32.4	In service with Republic of China air force since 1996.
<i>DENEL (PTY.) LTD., Kentron, Pretoria, Republic of South Africa</i>									
A-Darter	9.8	1.6	0.54	195.8	Kentron	IIR	1 x spr.	—	Fifth-generation technology demonstrator.
R-Darter	11.9	2.1	0.53	264	Rafael	Radar	1 x spr.	—	Development completed 2000. For SAAF Cheetah and Gripen aircraft.
U-Darter	9.6	1.67	0.42	210	Kentron	Two-color, IR	1 x spr.	—	First revealed in 1988; similar to Magic. Entered production in 1994. In use on SAAF Cheetah and Impala aircraft.
<i>MBDA MISSILE SYSTEMS (BAE Systems, EADS, Finmeccanica), London, UK, Velizy, France, Rome, Italy</i>									
Aspide	12.1	3.4	0.67	479	Alenia	Semiactive radar, homing	1 x spr.	43	Ordered by 17 countries. In service.
ASRAAM	9.5	—	0.54	191	Raytheon	IIR	1 x spr.	—	Compatible with US & European aircraft. In service.
ATAM	6.3	—	0.29	205	SAT	IR homing	1 x spr.	3.25	Helicopter-launched. Air-to-air version of Mistral. In service.
Magic 2	9.0	2.2	0.51	196	SAT	IR homing	1 x spr.	10+	Air superiority. Ordered by 19 countries.
Meteor	12	—	—	—	Thales	Inertial/variou	1 x spr. booster, ramjet	54+	For Eurofighter, Rafale and Gripen, next generation combat aircraft.
Mica IR	10.2	1.6	0.52	247	MBDA/SAT	Inertial/IIR	1 x spr.	0.27	In service.
Mica RF	10.2	1.6	0.52	247	MBDA/SAT	Active Doppler	1 x spr.	30+	Operational. Multi-target missile.
Sky Flash	12	3.3	0.7	456.3	BAE SYSTEMS	Semiactive radar	1 x spr.	25+	Snap-up, look-down. In service.
Super 530D	12.5	2.75	0.9	606.3	ESD	Semiactive Doppler	1 x spr.	25+	For Mirage 2000. In service.
Super 530F	11.3	2.95	0.9	540	ESD	Semiactive	1 x spr.	15+	For Mirage F1. In service.
<i>MITSUBISHI ELECTRIC CORP., Tokyo, Japan</i>									
AIM-7F/Sparrow	12	3.3	0.7	500	MEC	Semiactive radar	1 x Mk. 58 spr.	24	Used on F-4EJ and F-15J. Raytheon license.
Type 99/AAM-4	—	—	—	—	—	Active radar	1 x spr.	—	AIM-7F replacement.
<i>MITSUBISHI HEAVY INDUSTRIES, Tokyo, Japan</i>									
AIM-9L/Sidewinder	9.5	2.1	0.4	187	MHI	IR	1 x spr.	2.7	For F-4EJ, F-15J.
Type 90/AAM-3	9.5	1.96	0.42	200	MHI/NEC	IR	1 x spr.	2.1	AIM-9 replacement.
<i>MOLNIYA DESIGN BUREAU, Moscow, Russian Federation</i>									
R-40RD (AA-6 Acrid)	20.3	5.9	1.1	1,047	—	Semiactive radar	1 x spr.	43.1	Used on MiG-25.
R-60M (AA-8 Aphid)	6.85	1.27	0.4	95.9	—	IR	spr.	4	Self-defense missile, widely used on fighters, strike aircraft.
<i>PEOPLE'S REPUBLIC OF CHINA (Executive-First Ministry of Machine Building; Sales-China National Aero-Technology Import & Export Co.)</i>									
PL-2A	8.2	1.7	0.43	132	—	IR	1 x spr.	4.2	Has early generation IR seeker, canard steering. Soviet K-13 derivative.
PL-5B	9.5	2.1	0.43	328	Luoyang Electro-optic	IR	1 x spr.	8.6	Has off boresight firing capability. Series production began in 1986. Made by Luoyang Electro-optic Technology Development.
PL-9	9.9	2.7	0.53	273	—	IR	1 x spr.	8.6	All aspect capability seeker. Production certified in 1991. Available for export. Made by Luoyang Electro-optic Technology Development.
<i>RAFAEL ARMAMENTS, Haifa, Israel</i>									
Python 3	9.8	2.6	0.5	267	—	IR	1 x spr.	—	—
Python 4	9.8	1.63	0.5	—	—	IR	1 x spr.	8.2	In production.
Python 5	9.8	1.63	0.5	—	—	IR	1 x spr.	—	In production.
Derby	11.9	2.1	0.5	260	—	—	—	—	In production. Beyond visual range weapon.
<i>RAYTHEON CO., Raytheon Missile Systems, Tucson, AZ, USA</i>									
AIM/RIM-7P/Sparrow	12	3.3	0.7	514	Raytheon	Semiactive radar homing	1 x Mk. 58 Mod 3 spr.	24 +	F-4, F-14, F-15, F/A-18.
AIM-9M/Sidewinder	9.4	2.1	0.41	191	Raytheon	IR homing	1 x Mk. 36 Mod 11 spr.	—	Improved IRCCM.
AIM-9X/Sidewinder	9.9	—	0.42	188	Raytheon	IR homing	1 x Mk. 36 Mod 11 spr.	—	Initial deployment expected in late 2003. 90-deg. + off boresight capability.
AIM-54A/Phoenix	13	3	1.3	985	Raytheon	Semiactive/active radar	Mk. 47 Mod 0 spr.	—	For use on F-14A/D.
AIM-54C/Phoenix	13	3	1.3	1,020	Raytheon	Semiactive/active radar	Mk. 47 Mod 0 spr.	—	For use on F-14A/D.
AIM-54C+/Phoenix	13	3	1.3	—	Raytheon	Semiactive/active radar	1 x Mk. 36 Mod 6 spr.	—	Solid-state electronics.
AIM-120B/AMRAAM	12	2.1	0.6	345	Raytheon	Inertial midcourse; active terminal radar	1 x spr.	—	In full-scale production. Follow-on to AIM-7.
AIM-120C/AMRAAM	12	2.1	0.6	345	Raytheon	Inertial midcourse; active terminal radar	1 x spr.	—	Follow-on to AIM-7. In production.
FIM-92 C/D Stinger RMP	5	0.5	0.23	23	Raytheon	IR/UV	1 x Mk. 70 Mod 1, 2 x spr.	2.7+	In production.
<i>VYMPEL STATE DESIGN BUREAU, Moscow, Russian Federation</i>									
R-3S (AA-2 Atoll)	9.3	1.73	0.4	166	—	IR	spr.	4.1	AIM-9B copy. Mostly replaced by improved R-13.
R-13M (AA-2 Atoll)	9.4	2.07	0.4	198.4	—	IR	spr.	8.1	Russian AIM-9 equivalent.
R-23R (AA-7 Apex)	14.6	3.28	0.65	491.6	—	Semiactive radar	spr.	26.9	Used on MiG-23. R-24 is improved type; both SARH and IR guidance versions.
R-27R (AA-10a Alamo)	13.1	2.52	0.75	557.7	—	Semiactive radar	spr.	43.1	Used on MiG-29, Su-27.
R-27RE (AA-10c Alamo)	15.4	2.62	0.85	771.6	—	Semiactive radar	Boost-sustain	70.1	Used on Su-27.
R-27T (AA-10b Alamo)	12.1	2.52	0.75	540.1	—	IR	spr.	37.7	Used on MiG-29, Su-27.
R-27TE (AA-10d Alamo)	14.7	2.62	0.85	767.1	—	IR	Boost-sustain	64.8	Used on Su-27.
R-33 (AA-9 Amos)	13.6	3.8	1.24	1,080	—	Semiactive radar	spr.	64.8	Used on MiG-31.

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<i>VYMPEL STATE DESIGN BUREAU, Moscow, Russian Federation</i>									
R-37	13.45	3.3	1.24	1,100	—	Active radar	spr.	161.9	Used on MiG-31M.
R-73 (AA-11 Archer)	9.5	1.67	0.85	231.5	—	IR	spr.	16.2	R-13 replacement, widely used on all current Russian fighters.
R-73M (AA-11 Archer)	9.5	1.67	0.55	242.5	—	IR	spr.	21.6	Upgraded version in development.
R-77 (AA-12 Adder)	11.8	2.29	0.65	661.4	—	Active radar	spr.	48.6	AMRAAM equivalent. Used on MiG-29, MiG-31, Su-27.
R-77M	11.8	2.7	1	800	—	Active radar	spr./ramjet	86.5	Extended range R-77 w/ramjet sustainer. In development.
AIR-TO-SURFACE									
<i>THE BOEING CO., Integrated Defense Systems, St. Louis, MO, USA</i>									
AGM-84E/SLAM	14.6	3	1.1	1,366	Boeing, Raytheon	IIR/GPS/datalink	1 x J402-CA-400 tj.	50	Standoff land attack missile.
AGM-84H/SLAM ER	14.3	7.2	1.1	1,500	Honeywell	INS/GPS/datalink/ATA	1 x J402-CA-400 tj.	150	Improved SLAM, penetrating warhead, longer range, auto. target recognition.
AGM-129A/Advanced Cruise Missile	20.8	10.3	2.4	3,700	Raytheon, Loral, Northrop Grumman	Inertial/tercom	1 x F112-WR-100 tf.	1,865	Strategic nuclear role with B-52. Improved, low-observable ALCM. Boeing built 100, Raytheon balance.
AGM-130A	12.9	4.9	1.5	2,917	Boeing	TV/Data link, IIR, INS/GPS	1 x SR122-RD-1 spr.	40+	Modular precision standoff weapon, Mk. 84 warhead.
AGM-130C	13.2	4.9	1.7	2,560	Boeing	TV/Data link, IIR	1 x SR122-RD-1 spr.	40+	Modular precision standoff weapon, BLU-109/B warhead.
<i>THE BOEING CO., Integrated Defense Systems, Seattle, WA, USA</i>									
AGM-86B/ALCM	20.7	12	2	3,000	Honeywell/Litton	Inertial/tercom	1 x F107-WR-100 tf.	1,500+	ALCM is air-launched nuclear.
AGM-86C/CALCM; AGM-86D/CALCM	20.7	12	2	3,000	Honeywell	Inertial/GPS	1 x F107-WR-100 tf.	600+	"C" version has conventional warhead. "D" version has penetrator warhead.
<i>LOCKHEED MARTIN INTEGRATED SYSTEMS, Orlando, FL, USA</i>									
AGM-158 (JASSM)	14	—	—	2,250	Lockheed Martin	GPS/IMU, autonomous	Turbojet	200+	Conventional standoff missile, US Air Force.
<i>MBDA MISSILE SYSTEMS (BAE Systems, EADS, Finmeccanica), London, UK, Vélizy, France, Rome, Italy</i>									
ALARM	14.1	2.4	0.7	584	BAE Systems	Passive radar	1, 2-stage spr.	—	Anti-SAM, AAA radar missile. In service.
Apache AP	16.7	9.3	—	2,712	Dassault	Inertial/tercom/radar	1 tj.	80	In service. Stealthy anti-airfield weapon.
AS 30 Laser	12	3.3	1.1	1,146	Thales	Laser	2 x spr.	5.9+	Laser-guided supersonic missile.
ASMP	17.7	3.1	1.1	1,852	—	Inertial	Ramjet & booster	—	Tactical nuclear. ASMP-A is improved version expected to enter service in 2008.
Durandal	7.7	1.3	0.7	482	—	—	2 x spr.	—	Solid propellant booster fired during descent for improved penetration. Operational with 19 countries.
PGM 500	11.1	—	1.2	891	—	Laser, TV or IIR	spr.	32+	In service.
PGM 2000	15.1	—	1.8	2,337	—	Laser, TV or IIR	spr.	32+	In service.
Storm Shadow/Scalp EG	16.7	9.8	—	2,866	BAE Systems	Inertial/GPS/IIR	TRI 60-30 tj.	135+	In service. Ordered by five nations.
<i>PGSUS (Lockheed Martin and Rafael), Orlando, FL, USA</i>									
AGM-142A/Have Nap	15.9	5.8	1.73	3,000	PGSUS	TV/IIR/Data link/INS	1 x spr.	50+	Derived from Rafael Popeye. In production for US Air Force, others.
AGM-154B/Have Lite	14	5	1.73	2,500	PGSUS	TV/IIR/Data link/INS	1 x spr.	50+	In development.
<i>RADUGA MACHINE DESIGN BUREAU, Dubna, Russian Federation</i>									
Kh-15 (AS-16 Kickback)	15.6	3.01	1.49	2,645	—	Inertial	spr.	80.9	Strategic penetration aid on Tu-160. Anti-ship version proposed.
Kh-22M (AS-4 Kitchen)	38.2	9.84	3	12,745	—	Inertial	Liquid rocket	270	Strategic ASM on Tu-22M Backfire.
Kh-28 (AS-9 Kyle)	19.6	6.33	1.4	1,575	—	Antiradar	Liquid rocket	65	Heavy ARM. Used on Su-17M, Su-24M, Tu-22M.
Kh-41 (Moskit)	31.9	6.88	2.5	9,920	—	Active radar	Solid rocket/ramjet	135	Air-launched version of SS-N-22 Sunburn for Su-33 naval fighter and Su-32FN.
Kh-55SM (AS-15 Kent)	26.5	10.1	2.52	3,747	—	Inertial/TERCOM	Omsk TRDD-50 turbofan	1,620	Strategic ALCM on Tu-95MS and Tu-160.
Kh-58U (AS-11 Kilter)	15.7	3.8	1.24	1,410	—	Antiradar	spr.	65	Used on MiG-27K, Su-17K, Su-24M and Su-30M.
Kh-65SE	19.8	10.1	1.68	2,755	—	Inertial/satellite	Turbojet	150	Reduced range export cruise missile.
Kh-101	24.4	—	—	5,290	—	Inertial/TV/satellite	—	—	New conventional/nuclear stealth cruise missile.
Kh-SD	19.8	10.1	1.68	—	—	Inertial/TV/satellite	Turbojet	—	New conventional cruise missile. Kh-55 replacement.
KSR-5 (AS-6 Kingfish)	34.5	8.56	2.95	8,595	—	Inertial or antiradar	Liquid rocket	130	Used mainly on Tu-16K Badger.
<i>RAFAEL ARMAMENTS, Haifa, Israel</i>									
Popeye 1/AGM-142	15.9	5.8	1.73	3,000	Rafael	IIR/TV/Data link/INS	spr.	60+	Operational in Israel 1985, operational on USAF B-52s 1989.
Popeye 2/Have Lite	14	5	1.73	2,500	Rafael	IIR/TV/Data link/INS	spr.	60+	For smaller fighters.
Spice	13.8	3.9	1.64	2,300	Rafael	IIR/TV/GPS/INS	—	—	—
<i>RAYTHEON CO., Raytheon Missile Systems, Tucson, AZ, USA</i>									
AGM-65A/B/Maverick	8.2	2.2	1	462	Raytheon	Television	1 x spr.	—	Close-air, counter-air sea support and interdiction.
AGM-65D/Maverick	8.2	2.2	1	485	Raytheon	IIR	1 x spr.	—	Day/night capability. In production.
AGM-65E/Maverick	8.2	2.2	1	645	Raytheon	Passive laser	1 x spr.	—	Contains larger, penetrating warhead.
AGM-65F/Maverick	8.2	2.2	1	675	Raytheon	IIR	1 x spr.	—	Contains larger, penetrating warhead, antiship guid. mod. In production.
AGM-65G/Maverick	8.2	2.2	1	675	Raytheon	IIR	1 x spr.	—	Used in US Air Force attack aircraft. In production. Being upgraded with G2 tracking software.
AGM-65H/Maverick	8.2	2.2	1	462	Raytheon	EO	1 x spr.	—	Upgraded CCD guidance. In production.
AGM-65J/K Maverick	8.2	2.2	1	675	Raytheon	EO	1 x spr.	—	Has larger penetrating warhead and CCD guidance upgrades. Production started in 2000.
AGM-88A/B HARM	13.7	3.7	0.83	800	Raytheon	Radar homing	YSR113-TC-1	60+	High velocity antiradiation.
AGM-129A/Advanced Cruise Missile	20.8	10.3	2.4	—	Raytheon	Inertial/tercom	1 x F112-WR-100 tf.	—	Strategic nuclear role with B-52. Improved, low-observable ALCM.
<i>TAURUS SYSTEMS GmbH (EADS/LFK, Saab Bofors), Schrobenhausen, Germany</i>									
Taurus KEPD 350 (Taurus)	16.7	6.8	1.7 x 3.5	2,998	EADS-LFK/Saab Bofors	INS/GPS/ Ternav./Image-based	1 x turbojet	189+	In production for German air force.
<i>VYMPEL STATE DESIGN BUREAU, Moscow, Russian Federation</i>									
Kh-29L (AS-14 Kedge)	12.8	3.6	1.3	1,448	—	SAL, TV or IR	spr.	5.5	Used on Su-17M and other strike aircraft. L version semi-active laser-guide. TE version TV-guided.

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AIR-TO-SURFACE									
<i>ZVEZDA DESIGN BUREAU, Kaliningrad-B, Russian Federation</i>									
Kh-23 Grom (AS-7 Kerry)	8.17	2.57	0.9	612.8	—	Radio command	spr.	5.4	Used on MiG-23 strike variants.
Kh-25L (AS-10 Karen)	11.7	2.6	0.9	696.6	—	Radio, antiradar	spr.	10.7	Used on Su-17M and other strike aircraft.
Kh-25ML (AS-10 Karen)	12.2	2.5	0.9	661	—	Semiactive	—	10	On MiG-27K, MiG-27M, Su-17M2/-24M/-25.
Kh-25MP (AS-10 Karen)	13.7	2.5	0.9	705	—	Passive radar	—	22	On MiG-27K.
Kh-25MR (AS-10 Karen)	12.09	2.5	0.9	661	—	Radio command	—	10.8	On MiG-27K, Su-24M.
Kh-27PS (AS-12 Kegler)	14.28	2.6	0.9	683.4	—	Antiradar	spr.	32.3	Used on Su-17M and MiG-27 strike aircraft.
Kh-31P (AS-17 Krypton)	17.1	2.55	1.18	1,322	—	Antiradar	Integral ramjet	37.7	Used on Su-24, Su-32FN; anti-ship version proposed. Also MiG-27/-29M, Su-30MK/-35.
Kh-59 Ovod (AS-13 Kingpost)	17.6	4.13	1.24	1,675	—	TV	spr.	21.5	Used on Su-17M, MiG-27K, Su-24M.
Kh-59M Ovod-M (AS-18 Kazoo)	18.7	4.13	1.24	2,050	—	TV	Soyuz RDK-300 tj.	62.1	Extended range version of Kh-59/AS-13. Used on Su-24M.
ANTI-ARMOR									
<i>THE BOEING CO., Integrated Defense Systems, St. Louis, MO, USA</i>									
Brimestone	5.4	1.1	0.6	105	MBDA	MMW active radar	1 x spr.	4.3	High-speed, fixed-wing weapon.
<i>DENEL (PTY.) LTD., Kentron, Pretoria, Republic of South Africa</i>									
Ingwe	5.2	1.2	0.42	39.2	Kentron	Laser guided	2 x spr.	3.2	In production for international clients. Selected by South Africa to replace Swift.
Mokopa	6.5	1.1	0.58	110	Kentron	Laser guided	1 x spr.	6.4	Being qualified for Rooivalk helicopter.
Swift	4.0	1.2	0.42	38.8	Kentron	CLOS, laser guided	2 x spr.	3.2	Operational. Production ended.
<i>EUROMISSILE (France/Germany), Fontenay-Aux-Roses, France</i>									
HOT/HOT2	4.3	1	0.5	52	Euromissile	Wire/IR	2 x spr.	2.2	Anti-tank, long-range. Production ended.
HOT 3	4.3	1	0.5	54	Euromissile	Wire/IR	2 x spr.	2.2	Anti-tank, long-range. In production.
Milan/Milan 2	2.5/3	0.9	0.4	15	Euromissile	Wire/IR	2 x spr.	1.25	Anti-tank, medium-range. In production.
Milan 2T/3	3.8	0.9	0.4	15.7	Euromissile	Wire/IR	2 x spr.	1.25/1.19	Anti-tank, medium-range for German Tiger helos. EADS/LFK and Diehl/BGT will manufacture.
Trigat Long Range	5.25	1.2	0.5	108	EMDG	Imaging IR seeker	2 stage boost and coast	4.4	Helicopter or vehicle launch, with increased warhead. In development.
<i>HELLFIRE SYSTEMS LIMITED LIABILITY CO. (Boeing and Lockheed Martin), Orlando, FL, USA</i>									
AGM-114A/Hellfire	5.4	1.1	0.6	95	Lockheed Martin, Boeing	Laser; RF-IR, IIR in future	1 x TX-657 spr.	4.3	Helicopter-borne or ground-launched anti-armor weapon. Production ended.
<i>INSTRUMENT PRODUCTION DESIGN BUREAU (KBP), Tula, Russian Federation</i>									
9K111M Fagot-M (AT-4 Spigot)	3.38	1.21	0.39	28.4	—	Line of sight-wire	spr.	—	Standard Russian man-portable anti-tank guided missile.
9K113 Konkurs (AT-5 Spandrel)	3.77	1.5	0.44	32.2	—	Line of sight-wire	spr.	2.5	Vehicle-mounted anti-tank guided missile. Konkurs-M has improved warhead.
9K115 Metis (AT-7 Saxhorn)	2.42	0.98	0.3	12.1	—	Line of sight-wire	spr.	0.62	Light anti-tank guided missile.
9K115-2 Metis-2 (AT-13)	2.98	1.31	0.42	28.6	—	Line of sight-wire	spr.	0.9	Enlarged Metis/AT-7.
9K116 Bastion (AT-10 Stabber)	3.44	0.85	0.33	40.5	—	Line of sight-laser	gun fired/rocket	2.5	100 mm. tank gun-fired anti-tank guided missile for T-55 & BMP-3.
9K116-1 Sheksna (AT-12)	3.44	0.85	0.37	40.5	—	Line of sight-laser	gun fired/rocket	2.5	115 mm. version of Bastion for T-62M tank.
9K119 Refleks (AT-11 Sniper)	2.23	0.82	0.41	37.9	—	Line of sight-laser	gun fired/rocket	3.1	125 mm. tank gun-fired anti-tank guided missile for T-80U.
9K120 Svir (AT-11 Sniper)	2.23	0.82	0.41	37.9	—	Line of sight-laser	gun fired/rocket	2.5	125 mm. tank gun-fired anti-tank guided missile for T-72.
9K129 Kornet (AT-14)	3.93	1.5	0.5	49	—	Line of sight-laser	spr.	3.4	New man-portable anti-tank guided missile.
<i>ISRAEL AIRCRAFT INDUSTRIES, Lod, Israel</i>									
Nimrod	8.7	1.3	0.6	210	IAI	Laser homing	1-stage spr.	14	Long range missile in production.
<i>KAWASAKI HEAVY INDUSTRIES, Kobe, Japan</i>									
Type 01/Kei-MAT	2.8	—	0.4	38.6	NEC	IIR homing	—	—	Portable.
Type 79/KAM-9	5.1	1.1	0.5	73	NEC	Wire/semi-auto. command	2 x spr.	2.2	Shaped-charge warhead. Anti-tank, anti-landing craft.
Type 87/Chu-MAT	3.3	—	0.4	26.5	NEC	Semiactive, laser hom	1 x spr.	1.08	Type 64 replacement.
Type 96/MPMS	6.7	—	0.5	130	—	Fiberoptic	1 x spr.	—	Anti-tank missile. Type 79 replacement. Multipurpose.
<i>LOCKHEED MARTIN MISSILES AND FIRE CONTROL, Orlando, FL, USA</i>									
AGM-114K/Hellfire 2	5.4	1.1	0.6	100	Lockheed Martin	Laser	1 x spr.	5.1	In production.
AGM-114M/Hellfire 2	5.4	1.1	0.6	105	Lockheed Martin	Laser	1 x spr.	5.1	In production. Warhead for ships, bunkers and buildings.
Predator	2.4	0.85	0.46	16	Lockheed Martin	Inertial reference autopilot	2 x spr.	0.3	In production.
<i>LONGBOW LIMITED LIABILITY CO. (Lockheed Martin and Northrop Grumman), Orlando, FL, USA</i>									
AGM-114L/Longbow Hellfire	5.8	1.1	0.6	108	Lockheed Martin/Northrop Grumman	Millimeter wave radar	1 x spr.	5.1	In production.
<i>MACHINE PRODUCTION DESIGN BUREAU (KBM), Kolomna, Russian Federation</i>									
9K11-2 Maljutka-M (AT-3d Sagger)	3.23	1.28	0.4	27.5	—	Line of sight-wire	spr.	1.86	1990 upgrade.
9K11M Maljutka-M (AT-3b Sagger)	2.82	1.28	0.4	24	—	Line of sight-wire	spr.	1.86	Man-portable/vehicle mounted anti-tank guided missile. License produced in several countries.
9K114 Shturm (AT-6 Spiral)	5.33	1.2	0.43	69.2	—	Line of sight-radio	spr.	3.1	Mi-24V Hind E anti-tank guided missile.
9K121 Vikhr (AT-16)	8.03	1.2	0.43	99.2	—	Line of sight-laser	spr.	6.2	New anti-tank guided missile for Ka-50 Hokum and Su-39.
9M120 Ataka-V (AT-9)	5.7	1.2	0.43	73.8	—	Line of sight-radio	spr.	3.7	New helo anti-tank guided missile. Anti-helo warhead available.
9M123 Krizantema (AT-15)	6.7	1	0.5	—	—	Laser/MMW	spr.	3.1	New anti-tank guided missile.
<i>MBDA MISSILE SYSTEMS (BAE Systems, EADS, Finmeccanica), London, UK, Vélizy, France, Rome, Italy</i>									
Brimstone	5.4	1.1	0.6	10.5	—	Inertial + seeker	1 x spr.	4.3	First deliveries were in late 2002. Fully autonomous, fire and forget.
Eryx	3	—	0.45	28.6	—	SACLOS	1 x spr.	0.32	Lightweight, man-portable system.
GMRLS	13.1	—	0.74	679	—	—	1 x spr.	32+	France, Germany, UK and US are partners.
Trigan	3.4	—	0.4	39.7	—	Wire-guided	—	1.3	Alternative to medium-range Trigat.

MISSILES

GENERAL DATA		AIRFRAME			GUIDANCE		POWERPLANT	MAX. RANGE (NAUT. MI.)	STATUS/OUTLOOK
DESIGNATION/NAME	MAX. LENGTH (FT.)	MAX. SPAN, WINGS OR FINS (FT.)	BODY DIAMETER (FT.)	LAUNCH WEIGHT (LB.)	CONTRACTOR	TYPE	NO., MAKE & MODEL		
ANTI-ARMOR									
PEOPLE'S REPUBLIC OF CHINA (Executive-Ministry of Ordnance Industries; Manufacturer-Norinco)									
Red Arrow 8	2.9	1.05	0.4	24.6	—	Wireguided	booster + 1 spr.	2.2	Indigenous design. Fired from a tripod system. Also known as Hong-Jian 8.
Red Arrow 9	4.6	1.46	0.5	40.7	—	SACLOS	booster + 1 spr.	2.7	9A version has millimeter wave command guidance; 9B is a laser beam rider.
Red Arrow 73	2.8	1.15	0.4	24.9	—	Wireguided, opt. tracked	booster + 1 spr.	1.6	Derived from Soviet AT-3 Sagger. Also known as Hong-Jian 73.
PRECISION ENGINEERING DESIGN BUREAU (Nudelman OKB-16), <i>Moscow, Russian Federation</i>									
3K11 Falanga (AT-2c Swatter)	3.8	2.28	0.46	63.9	—	Line of sight-radio	spr.	2.5	Mi-24D Hind anti-tank guided missile. Being retired.
9K112 Kobra (AT-8 Songster)	3	0.41	0.41	—	—	Line of sight-radio	gun fired, spr. sustainer	2.5	125 mm. gun-fired anti-tank guided missile for T-64B, T-80B.
RAYTHEON CO., Raytheon Missile Systems, <i>Tucson, AZ, USA</i>									
BGM-71A/TOW	3.8	1.5	0.5	41.6	ESCO Electronics	Wireguided, opt. tracked	2 x spr.	2.0	Anti-tank missile. Production ended.
BGM-71C/TOW	4.7	1.5	0.5	41.9	ESCO Electronics	Wireguided, opt. tracked	2 x spr.	2.0	Anti-tank missile. Production ended.
BGM-71D/TOW2	5.0	1.5	0.5	47.2	Raytheon	Wireguided, opt. tracked	2 x spr.	2.0	Anti-tank missile. Larger warhead. Production ended.
BGM-71E/TOW2A	5.0	1.5	0.5	49.9	Raytheon	Wireguided, opt. tracked	2 x spr.	2.0	Anti-tank missile. Tandem warhead. In production.
BGM-71F/TOW2B	3.8	1.5	0.5	49.8	Raytheon	Wireguided, opt. tracked	2 x spr.	2.0	Anti-tank missile. Dual EFP warheads. In production.
BGM-71F-6/TOW2B Aero	3.9	1.5	0.5	50.8	Raytheon	Wireguided, opt. tracked	2 x spr.	2.4	Anti-tank missile. Dual EFP warheads. Available for production in 2004.
RAYTHEON-LOCKHEED MARTIN JAVELIN JOINT VENTURE, <i>Tucson, AZ, USA</i>									
FGM-148 Javelin	3.6	1.2	0.42	—	Raytheon & Lockheed Martin	IIR	2-stage spr.	1.4	In production for US Army, US Marines.
SAAB BOFORS DYNAMICS, <i>Karlskoga, Sweden</i>									
RBS-56 Bill	2.97	1.32	0.5	23	Bofors	Wire	1 boost., 1 sus.	1.2	Anti-tank. Top attack, proximity fuze. elev. flight path. In use in Austria, Brazil and Sweden. Night capable.
ANTI-BALLISTIC									
ANTEY NPO, <i>Moscow, Russian Federation</i>									
S-300V/9M82 (SA-12b Giant)	20	2.62	2.62	3,305	—	Semiactive radar	spr.	54	Novator design, anti-tactical ballistic missile; outer-layer defense.
S-300V/9M83 (SA-12a Gladiator)	15.4	2	2.62	2,205	—	Semiactive radar	spr.	40	Novator design, anti-tactical ballistic missile; inner-layer defense.
S-400/S-500	—	—	—	—	—	—	—	—	Competitive development with Almaz for Russian THAAD.
ISRAEL AIRCRAFT INDUSTRIES, MLM Div., <i>Beer-Yaakov, Israel</i>									
Arrow 2	22.3	2.3	2	—	IAI	Proportional nav.	2 x spr.	80	Theater missile defense weapon.
LOCKHEED MARTIN MISSILES AND FIRE CONTROL, <i>Dallas, TX, USA</i>									
PAC-3	17	1.67	1	700	Boeing	Active or semiactive	1 x ARC spr.	10	In production.
RAYTHEON CO., Raytheon Missile Systems, <i>El Segundo, CA, USA</i>									
MIM-104/Patriot	17.4	2.8	1.3	2,000	Raytheon	Command; semiactive radar homing	1 x TX-486-1 spr.	—	Air defense weapon. Deployed in eight countries.
VYMPEL CENTRAL SCIENTIFIC PRODUCTION ASSOC., <i>Dubna, Russian Federation</i>									
51T6 (ABM-3 Gorgon)	60	8	6	—	—	Command/IIR	spr.	—	Sh-11 exo-atmospheric interceptor. For A-135 system.
53T6 (ABM-3 Gazelle)	39	6.5	6.5	—	—	Command guided	spr.	—	Sh-08 endo-atmospheric interceptor. For A-135 system.
ANTI-SHIP									
THE BOEING CO., Integrated Defense Systems, <i>St. Louis, MO, USA</i>									
AGM-84A/C/D/G Harpoon	12.6	3	1.1	1,160	Raytheon, Loral, Northrop Grumman	Active radar	1 x J402-CA-400 tj.	60+	Anti-ship missile, air-launched.
R/UGM-84A/C/D/G Harpoon	15.7	3	1.1	1,530	Raytheon, Loral, Northrop Grumman	Active radar	1 x J402-CA-400 tj.	60+	Anti-ship missile. UGM-84A, sub-launched, 1,500 lbs. Also surface ship & land-based launchers.
R/UGM-84L Harpoon Block 2	15.7	3	1.1	1,530	Raytheon, Loral, Northrop Grumman	Active radar/inertial/GPS	1 x J402-CA-400 tj.	60+	Has improved anti-surface warfare and land attack capability.
EADS/LFK MISSILES, <i>Munich, Germany</i>									
Kormoran 2	16.1	3.3	1.1	1,392	LFK	Inertial, radar	1 x spr.	21.6	In service.
ISRAEL AIRCRAFT INDUSTRIES, <i>Lod, Israel</i>									
Gabriel Mk. 2	11.2	—	1.1	1,146	IAI	Semiactive	2-stage spr.	17	Anti-ship sea skimmer. In production.
Gabriel Mk. 3	12.5	4.4	1.1	1,235	IAI	Active	2-stage spr.	20	Anti-ship sea skimmer.
Gabriel Mk. 3 A/S	12.6	3.6	1.1	1,300	IAI	Active	1-stage spr.	32+	Air launch version.
KONGSBERG DEFENCE AND AEROSPACE, <i>Kongsberg, Norway</i>									
NSM	12	4	1 x 1.5	840	Kongsberg	IIR, IMU, GPS	1 booster, 1 turbojet	100+	In development. Also for land targets.
Penguin Mk. 2 Mod 7/(AGM-119B)	9.9	4.6	0.92	775	Kongsberg	Prog. inert/IIR homing	1 booster, 1 sustainer	25	Anti-ship for helicopters, surface ships.
Penguin Mk. 3/(AGM-119A)	10.5	3	0.92	750	Kongsberg	Prog. inert/IIR homing	1 sustainer	40	For use on fighter aircraft. Anti-ship.
MACHINE PRODUCTION SCIENTIFIC PRODUCTION ASSN. (OKB-52), <i>Reutov, Russian Federation</i>									
3K55 Yakhont (SS-N-26)	27.8	4.6	2.5	5,000	—	Inertial/active radar	Integral rocket/ramjet	135	New vertical-launched anti-ship missile for naval craft. Also known as ONIKS.
3M45 Granit (SS-N-19 Shipwreck)	32.8	8.5	2.8	15,430	—	Inertial/active radar	Solid booster/turbojet	295	Ship-launched anti-ship missile. Replacing SS-N-12.
4K44 Progress (SS-N-3c Shaddock)	32.8	8.5	2.95	9,920	—	Inertial/active radar	Solid booster/turbojet	160	Anti-ship missile.
4K66 Ametist (SS-N-7 Starbright)	22.9	8.2	1.8	6,390	—	Inertial/active radar	Solid booster/turbojet	45	Sub-launched anti-ship missile.
4K80 Bazalt (SS-N-12 Sandbox)	38.4	8.5	2.9	10,580	—	Inertial/active radar	Solid booster/turbojet	295	Ship-launched anti-ship missile. Replacing P-35/SS-N-3.
4K85 Malakhit (SS-N-9 Siren)	30	8.2	2.6	5,510	—	Inertial/active radar	Solid booster/turbojet	60	Ship- and sub-launched anti-ship missile.
MBDA MISSILE SYSTEMS (BAE Systems, EADS, Finmeccanica), <i>London, UK, Velizy, France, Rome, Italy</i>									
AM.39/Exocet	15.4	3.6	1.1	1,474	Dassault	Inertial + act. homing	2 x spr.	38	Air-launched. In service.
AS.15 TT	7.6	1.9	0.6	227	—	Radar + rad. alt.	2 x spr.	9.2	Helicopter-launched.
Marte Mk. 2/A	12.4	3.2	1.0	595	Galileo/SMA	Active radar, homing	1 x spr.	20	Air-launched.
Marte Mk. 2/N	12.4	3.2	1.0	714	Alenia	Active radar, homing	2 x spr.	17	Ship-launched anti-ship weapon.
Marte Mk. 2/S	12.4	3.2	1.0	714	Alenia	Active radar, homing	2 x spr.	13.5	For EH 101 and NH90. In service.
MM.38/Exocet	17.1	3.3	1.1	1,620	Dassault	Inertial + act. homing	2 x spr.	24	Ship-launched. In service.

MISSILES

GENERAL DATA		AIRFRAME			GUIDANCE		POWERPLANT	MAX. RANGE (NAUT. MI.)	STATUS/OUTLOOK
DESIGNATION/NAME	MAX. LENGTH (FT.)	MAX. SPAN, WINGS OR FINS (FT.)	BODY DIAMETER (FT.)	LAUNCH WEIGHT (LB.)	CONTRACTOR	TYPE	NO., MAKE & MODEL		
ANTI-SHIP									
MBDA MISSILE SYSTEMS (BAE Systems, EADS, Finmeccanica), London, UK, Vélizy, France, Rome, Italy									
MM.40/Exocet	19	3.7	1.1	1,914	Dassault	Inertial + act. homing	2 x spr.	38	Ship-launched. In service.
Otomat Mk. 2	14.6	4.4	1.3	1,694	Alenia	Inertial/active radar	Rocket booster & turbojet	81+	Anti-ship weapon. On 85 ships in 10 countries. Also enhanced Block 4 version.
Sea Skua	8.2	1.8	0.6	324	BAE Systems	Semiactive radar	spr. boost & sustain	8+	Helicopter and ship-launch. In service.
SM.39/Exocet	15.4	3.6	1.1	1,444	Dassault	Inertial + act. homing	2 x spr.	27	Submarine-launched. In service.
MITSUBISHI HEAVY INDUSTRIES, Tokyo, Japan									
Type 80/ASM-1	13	3.9	1.1	1,340	NEC/JAE	Inertial/active radar	1 x spr.	25	For use on F-1. Anti-ship.
Type 88/SSM-1	16.4	—	1.1	1,450	—	Inertial/active radar	1 x tj.	80	Coastal defense.
Type 90/SSM-1B	13.1	3.9	1.1	1,455	NEC/JAE	Inertial/active radar	1 x spr.	54	Harpoon replacement for Japanese navy. Ship-to-ship.
Type 91/ASM-1C	13.1	3.9	1.1	1,124	NEC/JAE	Inertial/active radar	1 x spr.	—	Japanese navy version of ASM-1 anti-ship missile for use in P-3C.
Type 93/ASM-2	13.1	3.9	1.1	1,168	NEC/JAE	Inertial/IIR	1 x tj.	—	ASM-1 anti-ship missile replacement for Japanese air force.
NOVATOR (NPO), Ekaterinburg, Russian Federation									
Alfa (SS-Nx-27)	27.9	10.1	2.52	4,400	—	Inertial/active radar	Booster/turbojet/rocket	110	New sub-launched anti-ship missile. Separating hypersonic warhead.
PEOPLE'S REPUBLIC OF CHINA (Executive-Third Research Academy; Sales-China National Precision Machinery Import & Export Corp.)									
C-101 (CSS-C-5 Saples)	24.6	5.3	2.5	4,070	—	Active radar seeker	2 rocket boosters, 2 ramjet sus.	27	C301 (aka: HY-3) is a coastal defense version with 4 spr. boosters and a 70 nm range.
C-601	24.2	7.8	2.5	5,422	—	Active monopulse radar seeker	1 liquid-fuel rocket sus.	55	Air-launched HY-2 derivative.
C-801 (CSS-C-4 Sardine)	20	4	1.2	1,811	—	Active monopulse radar seeker	1 rocket booster, 1 spr. sus.	21.6	Ship-launched. Certified in 1987. Aka: YJ-8, HY-5.
C-802 (CSS-C-8 Saccade)	21	4	1.2	1,588	—	Active monopulse radar seeker	1 rocket booster, 1 tj. sus.	65	Upgraded C802 with turbojet sustainer. Aka: YJ-2. IOC: 1984.
FL-2 (CSS-N-1 Scrubbrush)	19.7	5.6	1.8	3,300	—	—	1 booster, 1 sus.	27	Ship-launched; smaller, lighter than Silkworm but similar.
FL-7 (CSS-N-5 Sabbot)	21.6	6.1	1.8	3,970	—	—	1 booster, 1 sus.	17	Ship-to-ship. Evolved from FL-2.
HY-2 (CSS-C-3 Seersucker)	25	9.0	2.5	6,596	—	Active radar	1 rocket booster, 1 liquid rocket sus.	32	Coastal defense.
HY-4	25	9.0	2.5	4,400	—	Active radar	1 rocket booster, 1 tj. sus.	—	Improved HY-2, primarily for coastal defense but air-launch version available. Exported as C201W.
SY-1	19	7.9	2.5	5,060	—	Active radar	1 spr. booster, 1 liquid rocket sus.	2.2	Ship-launched derivative of Soviet P-15 Styx. HY-1 is coastal defense version.
RADUGA MACHINE DESIGN BUREAU, Dubna, Russian Federation									
3M80 Moskit (SS-N-22 Sunburn)	30.8	6.2	2.5	8,710	—	Inertial/active radar	Integral rocket/ramjet	50	Supersonic anti-ship missile. On Nanuchka and Sovremenniy ships.
3M82 Moskit-M (SS-N-22 Sunburn)	31.9	6.2	2.5	9,920	—	Inertial/active radar	Integral rocket/ramjet	80	Improved Moskit.
P-15U Termit-U (SS-N-2b Styx)	19	8.2	2.6	5,070	—	Active radar	Booster/liquid rocket	21.6	Anti-ship missile. Widely deployed.
P-20/-21 Termit-M (SS-N-2c Styx)	21.3	8.2	2.6	5,510	—	Active radar	Booster/liquid rocket	43.1	P-21 has supplementary IR guidance.
SAAB BOFORS DYNAMICS, Linköping, Sweden									
RBS-15F	14.3	4.6	1.6	1,364	—	Active radar	1 x turbojet	60+	In service.
RBS-15M	14.3	4.6	1.6	1,320	—	Active radar	Turbojet, 2 boosters	60+	In service.
VYMPEL CENTRAL SCIENTIFIC PRODUCTION ASSOC., Dubna, Russian Federation									
Kh-35 Uran (AS-20)	12.3	3.05	1.37	1,060	—	Active radar	1 x turbojet	70.1	Harpoon double. Tu-142 and other naval a/c. Also MiG-29K, Su-24/-32FN/-34/-35.
ANTI-SUBMARINE									
LOCKHEED MARTIN NAVAL ELECTRONICS AND SURVEILLANCE SYSTEMS, Akron, OH, USA									
RUM-139 VLA	16	2.3	1.2	1,409	Lockheed Martin	Rate gyro strapdown	1 x spr.	—	Fired from surface ships against submarines.
NOVATOR NPO, Ekaterinburg, Russian Federation									
RPK-2 Vyuga (SS-N-15 Starfish)	21.3	1.74	1.74	3,970	—	Inertial	spr.	22	1969 sub-launched anti-sub missile with nuclear warhead.
RADUGA MACHINE DESIGN BUREAU, Dubna, Russian Federation									
RPK-6 Vodopod (SS-N-16 Stallion)	26.8	1.74	1.74	5,390	—	Inertial/torpedo	spr.	—	Vyuga with UMGF-1 torpedo.
URK-5 Rastrub (SS-N-14 Silex)	23.6	4.2	1.88	8,820	—	Inertial/torpedo	spr.	27	With improved UMGF-1 torpedo.
URPK-3/-4 Metel (SS-N-14 Silex)	23.6	4.2	1.88	8,820	—	Inertial/torpedo	spr.	27	Ship-launched, anti-sub cruise missile with AT-ZUM torpedo.
SURFACE-TO-AIR									
ALMAZ NPO, Moscow, Russian Federation									
S-75M Volkhov (SA-2f Guideline Mod5)	35.1	8.2	2.1	5,290	—	Radio command	Solid booster, liquid sustainer	16.2	Fakel-designed missile; Almaz upgrade offered.
S-125M Neva-M (SA-3b Goa)	20	7.5	1.8	2,105	—	Radio command	Solid booster and sustainer	15.6	Fakel-designed missile; Almaz upgrade offered.
S-200D Angara (SA-5 Gammon)	35.1	9.4	2.8	15,470	—	Command/active radar	4 solid boosters, solid sustainer	135	Fakel-designed missile; not widely exported until 1980s.
S-300P/5V55K (SA-10a Grumble)	22.9	3.4	1.47	3,200	—	Command	spr.	25.3	Fakel-designed missile; initial 1980 version.
S-300PM/5V55R (SA-10a Grumble)	22.9	3.4	1.47	3,200	—	Semiactive radar	spr.	40.5	1985 upgrade w/guidance & range improvements.
S-300PMU/5V55U (SA-10c Grumble)	22.9	3.4	1.47	3,262	—	Track-via-missile	spr.	48.5	1990 upgrade w/guidance & range improvements.
S-300PMU2 Favorit/48N6E2 (SA-20 Grumble)	22.9	3.4	1.69	3,750	—	Track-via-missile	spr.	105	Improved version of S-300 PMU1.
ALTAIR STATE DESIGN BUREAU, Moscow, Russian Federation									
3M41 Fort/S-300F (SA-N-6 Grumble)	22.9	3.4	1.47	3,200	—	Semi-active radar	spr.	40.5	Naval version of SA-10; export version is Rif.
3M87 Kortik (SA-N-11 Grison)	8.2	1.7	0.55	92.6	—	Command	2-stage spr.	4.3	Naval version of SA-19; export version is Kashtan.
3M90 Uragan (SA-N-7 Gaddy)	18.2	3.6	1.31	1,520	—	Semiactive radar	Dual thrust spr.	17.2	Naval version of SA-11; export version is Shtil.
3M95 Kinshal (SA-N-9 Gauntlet)	9.35	0.7	2.1	363.7	—	Command	spr.	6.5	Naval version of SA-15; export version is Klinok.
4K32 Strela-2M (SA-N-5 Grail)	4.75	0.52	0.22	21.9	—	Uncooled IR seeker	Dual thrust spr.	1.62	Naval version of SA-7.
4K33 Osa-MA (SA-N-4 Gecko)	10.3	2.1	0.68	277	—	Command	Dual thrust spr.	6.5	Naval version of SA-8.
4K65 Shtorm (SA-N-3 Goblet)	20	4.6	1.96	1,860	—	Command	Dual thrust spr.	29.7	Fakel design.

MISSILES

GENERAL DATA		AIRFRAME			GUIDANCE		POWERPLANT	MAX. RANGE (NAUT. MI.)	STATUS/OUTLOOK
DESIGNATION/NAME	MAX. LENGTH (FT.)	MAX. SPAN, WINGS OR FINS (FT.)	BODY DIAMETER (FT.)	LAUNCH WEIGHT (LB.)	CONTRACTOR	TYPE	NO., MAKE & MODEL		
SURFACE-TO-AIR									
<i>ALTAIR STATE DESIGN BUREAU, Moscow, Russian Federation</i>									
4K91 Volna-M (SA-N-1 Goa)	20	37.5	1.8	2,105	—	Command	spr. booster and sustainer	15.6	Naval version of SA-3 Goa.
9M36 Strela 3 (SA-N-8 Gremlin)	4.72	0.52	0.22	21.6	—	Cooled IR seeker	Dual thrust spr.	2.15	Naval version of SA-14.
9M39 Igla (SA-N-10 Gimlet)	5.54	0.52	0.22	23.3	—	Cooled IR seeker	Dual thrust spr.	2.43	Naval version of SA-18.
48N6 Fort/S-300FM (SA-N-6 Grumble)	22.9	3.4	1.47	3,262	—	Track-via-missile spr.	spr.	48.5	Naval version of SA-10.
Yozh (SA-N-12 Grizzly)	18.2	3.6	1.31	1,587	—	Semiactive radar	Dual thrust spr.	27	Naval version of SA-17.
<i>ANTEY NPO, Moscow, Russian Federation</i>									
2K11 Krug (SA-4 Ganef)	28.8	8.4	2.9	5,510	—	Command	4 solid boosters; liquid ramjet sustainer	54	Novator designed missile. Being retired.
9K33 Osa (SA-8 Gecko)	10.3	2.1	0.68	277	—	Command	Dual thrust spr.	6.5	Fakel designed missile; widely exported, Antey upgrade offered.
9M331 Tor (SA-15 Gauntlet)	9.35	0.7	2.1	364	—	Command	spr.	6.5	Fakel design.
<i>CHUNG-SHAN INSTITUTE OF SCIENCE AND TECHNOLOGY (CSIST), Taoyuan, Taiwan</i>									
Tien-Kung 1	18.0	3.0	1.31	—	—	Inertial, semi-active radar	—	54	Fixed system in service, mobile system in development.
Tien-Kung 2	18.6	3.0	1.38	—	—	Inertial, active radar	—	108	Fixed system in service, mobile system in development.
<i>EUROMISSILE (France/Germany), Fontenay-Aux-Roses, France</i>									
Roland/Roland 2	8.5	1.6	0.5	149	EADS/Thales	Radio command/IR	2 x spr.	4.3	Tube-launched, IR tracking.
Roland 3	8.5	1.6	0.5	170	EADS/Thales	Radio command/IR	2 x spr.	4.3	Increased range Roland. All weather.
VF-1	7.5	1.5	0.55	168	EADS/Thales	Radio command/IR	1 x spr.	6	Increased performance for Roland and Crotale.
<i>EUROSAM GIE (MBDA and Thales), Rome, Italy, Fontenay-Aux-Roses, France</i>									
Aster 15	13.8	2.7	1.0	683	Thales/MBDA	Inertial/active homing	2-stage spr.	16	For naval use. In operation.
Aster 30	16.0	3.0	1.25	992	Thales/MBDA	Inertial/active homing	2-stage spr.	60	For land and naval use.
<i>INSTRUMENT PRODUCTION SCIENTIFIC RESEARCH INSTITUTE (NIIP), Zhukovsky, Russian Federation</i>									
2K12 Kub (SA-6 Gainful)	20.3	4.07	1.08	1,320	—	Command	Integral rocket/ramjet	13	Widely exported mobile SAM. Being replaced by Buk-1.
9K37M Buk-1M (SA-11 Gaddy)	18.2	3.6	1.31	1,520	—	Semiactive radar	Dual thrust spr.	17.2	1980 Novator missile. Gang is export version.
9K40 Ural (SA-17 Grizzly)	18.2	3.6	1.31	1,565	—	Semiactive radar	Dual thrust spr.	26	Upgraded Buk design.
<i>MACHINE PRODUCTION DESIGN BUREAU (KBM), Kolonna, Russian Federation</i>									
9K32M Strela-2M (SA-7 Grail)	4.75	0.52	0.22	21.9	—	Uncooled IR seeker	Dual thrust spr.	1.62	Widely deployed man-portable SAM.
9K34 Strela-3 (SA-14 Gremlin)	4.72	0.52	0.22	21.6	—	Cooled IR seeker	Dual thrust spr.	2.15	Improved Strela-2.
9K38 Igla (SA-18 Grouse)	5.54	0.52	0.22	23.3	—	Cooled IR seeker	Dual thrust spr.	2.43	New family of man-portable SAMs.
9K310 Igla-1 (SA-16 Gimlet)	5.54	0.52	0.22	23.8	—	Cooled IR/UV seeker	Dual thrust spr.	2.32	Current man-portable SAM, also produced in Bulgaria, North Korea.
9M311 Treugolnik (SA-19 Grison)	8.2	1.7	0.55	92.6	—	Command	2-stage spr.	4.3	Used on 2S6 Tunguska air defense vehicle.
9M335 Pantsir-S1	10.5	1.7	0.55	146.2	—	Command	2-stage spr.	6.5	Extended range Treugolnik for truck-mounted system.
<i>MBDA MISSILE SYSTEMS (BAE Systems, EADS, Finmeccanica), London, UK, Vélizy, France, Rome, Italy</i>									
Albatros	12	—	0.65	528	Alenia	Active radar, homing	2-stage spr.	12+	Naval self-defense. In service.
Aspide	12.1	2.24	0.67	479	AMS	Semiactive radar, homing	1 x spr.	8.1	In service in 17 countries.
Aspide 2000	12.1	2.24	0.67	531	AMS	Semiactive radar, homing	1 x spr.	11	Upgraded Aspide.
Aster 15	13.5	—	0.59	683	Thales/AMS	Active radar, homing	1 x spr.	16	Naval self-defense.
Aster 30	15.7	—	0.59	981	Thales/AMS	Active radar, homing	1 x spr.	65	Land and naval area defense.
Mica (vert. launch)	10.2	1.6	0.52	247	MBDA/SAT	Inertial/IIR or RF	1 x spr.	5+	Naval self-defense.
Mistral 2	6.1	—	0.29	41.2	SAT	IR homing	2 x spr.	3.25	Operational.
Rapier B1X	7.3	1.25	0.44	94.8	BAE Systems	Command to line of sight	2-stage spr.	4+	Operational.
Rapier FSC/Jemas	7.3	1.25	0.55	94.8	BAE Systems	Command to line of sight	2-stage spr.	4.3+	Anti-cruise missile.
Sea Dart	14.3	3	1.3	1,200	BAE Systems	Semiactive	1 x Odin	40+	Program ended.
Seawolf (vert. launch)	6.5	2.3	0.6	176	BAE Systems	Command link	spr.	3+	Antimissile, anti-aircraft.
<i>MITSUBISHI HEAVY INDUSTRIES, Tokyo, Japan</i>									
MIM-104/Patriot	17.4	2.8	1.3	2,000	MHI	Command, semiactive radar	1 x TX-486 spr.	—	—
<i>OERLIKON CONTRAVES INC., Saint-Jean-sur-Richelieu, Quebec, Canada</i>									
ADATS	6.8	1.25	0.5	113	Lockheed Martin	CO ₂ laser beam rider	1 (ADATS)	5.4	In service in Canada and Thailand.
<i>PEOPLE'S REPUBLIC OF CHINA (Executive-Second Research Academy; Sales-China National Precision Machinery Import & Export Corp.)</i>									
FM-80	9.8	—	0.66	186	—	—	1 spr.	5	Similar to French Crotale. Aka: HQ-7, FM-90.
KS-1	18.4	—	1.3	1,980	—	—	1 spr.	23	Indigenous high altitude SAM.
PL-9	9.6	—	0.52	264	—	—	1 spr.	3	Similar to US Army Chaparral. Naval derivative designated Type 88C.
SD-1	13.1	—	0.93	704	—	—	1 spr.	4.3	Indigenous design. Aka: HQ-61, RF-61. Naval version known as RF-61.
<i>PRECISION ENGINEERING DESIGN BUREAU (Nudelman OKB-16), Moscow, Russian Federation</i>									
9K35 Strela-10 (SA-13 Gopher)	7.18	1.31	0.39	86.4	—	3-channel optical/IR seeker	Dual thrust spr.	3.7	Widely exported mobile SAM on tracked vehicle.
9M31 Strela-1 (SA-9 Gaskin)	5.89	1.23	0.39	66.1	—	Uncooled IR seeker	Dual thrust spr.	2.2	Widely exported mobile SAM on wheeled vehicle.
<i>RAFAEL ARMAMENTS, Haifa, Israel</i>									
Barak 1	7	2.2	0.6	215	—	Clos	1 spr.	6	Shipborne vehicle launch. Developed with IAI.
<i>RAYTHEON CO., Raytheon Missile Systems, Tucson, AZ, USA</i>									
FIM-92A/Stinger	5	0.5	0.23	23	Raytheon	IR/Proportional nav.	1 x Mk. 70 Mod 1, 2 x spr.	—	Replacement for Redeye.
FIM-92C/D/Stinger RMP	5	0.5	0.23	23	Raytheon	IR/UV	1 x Mk. 70 Mod 1, 2 x spr.	27+	In production.

MISSILES

GENERAL DATA		AIRFRAME			GUIDANCE		POWERPLANT	MAX. RANGE (NAUT. MI.)	STATUS/OUTLOOK
DESIGNATION/NAME	MAX. LENGTH (FT.)	MAX. SPAN, WINGS OR FINS (FT.)	BODY DIAMETER (FT.)	LAUNCH WEIGHT (LB.)	CONTRACTOR	TYPE	NO., MAKE & MODEL		
SURFACE-TO-AIR									
<i>RAYTHEON CO., Raytheon Missile Systems, Tucson, AZ, USA</i>									
RIM-116A RAM	9.2	1.4	0.42	167	Raytheon	Passive IR	1 x Mk. 112 spr.	—	Shipboard point-defense. With Germany.
RIM-7M/Seasparrow	12	3.3	0.7	500	Raytheon	Semiactive CW radar	1 x Mk. 52 Mod 2 spr., Mk. 58 Mod 4	12	Ship point-defense weapon for US and NATO. Also RIM-7M.
RIM-66E/Standard Missile 1 (MR)	14.7	2	1.1	1,352	Raytheon	Semiactive RF	1 x Mk. 56	—	Medium range. Shipboard missile.
RIM-66M/Standard Missile 2 (MR)	15.5	3	1.1	1,558	Raytheon	Semiactive radar homing	1 x Mk. 104	—	Medium range. Shipboard missile.
RIM-67D/Standard Missile 2 (ER)	21.3	3.5	1.1	3,076	Raytheon	Semiactive RF	1 x Mk. 72, 1 x 17K014	—	Extended range. Fleet defense.
RIM-162/Evolved Sea Sparrow Missile (ESSM)	12.1	1.8	0.9	650	Raytheon	Semiactive RF	1 x Mk. 134 Mod 0	30	Medium-range shipboard missile.
<i>SAAB BOFORS DYNAMICS, Karlskoga, Sweden</i>									
BAMSE (RBS-23)	8.2	2.6	0.36	12.5	Bofors	CLOS, radar	1 booster + 1 sustainer	8 +	Development finalized in 1999.
RBS-70	4.4	1.1	0.35	33	Bofors	Laser beam-riding	1 x spr. booster + 1 x spr. sustainer	3.8	Both portable and vehicle-mounted systems available. Night capable w/clip-on device.
RBS-90	4.4	1.1	0.35	33	Bofors	Laser beam-riding	1 x spr. booster + 1 x spr. sustainer	3.8	Night capable.
<i>THALES, Thales Air Defence, Belfast, Northern Ireland, UK</i>									
Blowpipe	4.6	0.9	0.25	31.9	Shorts	Radio command; visual	2-stage boost and coast	2	Man-portable, shoulder-fired.
Javelin	4.6	0.9	0.25	34	Shorts	Radio command; semiautomatic	2-stage boost and coast	2	Man-portable, shoulder-launched; multi-round.
Starburst	4.6	0.65	0.25	28	Thales Air Defence	Laser beam-riding	2-stage boost and coast	3	Man-portable, shoulder launched, multiple launch. Vehicle-mounted. In service.
Starstreak	4.7	0.98	0.43	30	Thales Air Defence	Laser beam-riding	2-stage boost and coast	3+	Helicopter and vehicle-mounted. In service.
<i>TOSHIBA/KAWASAKI, Japan</i>									
Type 81 Tan-SAM	8.8	1.9	0.5	220	Toshiba	Inertial/IR	1 x spr.	3.7	Low-level target. Vehicle-mounted.
Type 91 Kei-SAM	4.7	—	0.26	25.3	—	Imaging IR homing	1 x spr.	—	Portable SAM. Stinger replacement. Trucked version is Type 93.
Type 93 Tan-SAM Mod.	—	—	—	—	—	Imaging IR homing	1 x spr.	—	Improved Type 81.
SURFACE-TO-SURFACE									
<i>AVIBRAS-INDUSTRIA AEROSPACIAL, Sao Jose dos Campos, Brazil</i>									
ASTROS TM Mk. 1	18	10.5	1.3	3,307	Avibras	INS/GPS	Sustainer + 2 boosters	64.8	Advanced development.
ASTROS TM Mk. 2	14.8	10.5	1.3	2,228.9	Avibras	INS/GPS	Sustainer + 2 boosters	162	Advanced development.
FOG-MPM 12	6.7	—	0.6	176.3	Avibras	Fiberoptics link to TV	Sustainer + 1-stage spr.	5.4	Under development.
FOG-MPM 20	7.5	—	0.6	242.5	Avibras	Fiberoptics link to TV	Sustainer + 1-stage spr.	10.8	Under development.
FOG SSM	16.5	—	0.91	1,313	Avibras	Fiberoptics link to TV	Sustainer + 1-stage spr.	43.2	Under development.
<i>BHARAT DYNAMICS, Hyderabad, India</i>									
Agni 2	62.3	—	3.3	35,200	—	Inertial	2-stage spr.	1,550	Assumed to be nuclear warhead-capable.
Prithvi (SS-150)	27.8	—	—	30,800	—	Inertial	2 x liquid-fueled engines	95	First units deployed in 1995.
Prithvi 2 (SS-250)	27.8	—	—	29,600	—	Inertial	2 x liquid-fueled engines	155	Development completed in 1997.
<i>THE BOEING CO., Seattle, WA, USA</i>									
LGM-30G/Minuteman 3	59.8	—	5.5	78,000	Boeing	Inertial	1 x M55A-1 spr. 1 x SR19-AJ-1 spr. 1 x SR73-AJ-1 spr.	7,000+	GE Mk. 12 and 12A MIRV re-entry vehicle and penetration aids. ARC is associate contractor for PSRE. Last one assembled 11-30-78. Major rebuild effort underway.
<i>EADS SPACE TRANSPORTATION, Les Mureaux, France</i>									
M-4 MSBS	36.3	—	6.3	77,161	SAGEM/Thales SAGEM/Thales SAGEM/Thales	Inertial — —	1st stage: SPS-SNPE P401 2nd stage: SPS-SNPE P402 3rd stage: SPS-SNPE P403	2,102+	Submarine launched; MRV. Operational, 32 deployed.
M-45 MSBS	36.3	—	6.3	—	SAGEM/Thales SAGEM/Thales SAGEM/Thales	Inertial — —	1st stage: SPS-SNPE P401 2nd stage: SPS-SNPE P402 3rd stage: SPS-SNPE P403	2,210+	Improved M-4. MIRV re-entry vehicle and penetration aids. Operational, 32 deployed.
IRAN									
Shahab 3	48.6	—	3.9	32,000	—	Inertial	Single-stage liquid rocket	701	Derivative of N. Korea's No Dong 1. 0.7-ton payload.
Shahab 4	74.8	—	5.4	59,400	—	Inertial	Single-stage liquid rocket	1,080	Soviet R-12 (SS-4)-derivative. 2,200-lb. payload.
<i>ISRAEL AIRCRAFT INDUSTRIES, Be'er Yaakov, Israel</i>									
Jericho 2	41.3	8.2	5.6	48,550	—	Inertial	2-stage spr. 1 x lpr.	250	Tactical ballistic missile. Performance estimates vary widely.
<i>LOCKHEED MARTIN MISSILES AND FIRE CONTROL, Dallas, TX, USA</i>									
M26/MLRS Extended Range	13	1.5	0.75	700	—	Free rocket	spr.	23+	In production.
MGM-140/ATACMS (Block 1)	13	2.7	2	3,656.4	Honeywell	INS	spr.	89	In production.
MGM-140/ATACMS (Block 1A)	13	2.7	2	2,908.4	Honeywell	INS/GPS	spr.	162	In production.
MGM-164/ATACMS (Block 2)	13	2.7	2	3,339.6	Honeywell	INS/GPS	spr.	78	In low-rate production.
ORU	13	2.7	2	—	Honeywell	INS/GPS	spr.	162	—
<i>LOCKHEED MARTIN SPACE SYSTEMS CO., Sunnyvale, CA, USA</i>									
UGM-96A/Trident 1 (C-4)	34	—	6.2	73,000	Draper, Raytheon	Stellar inertial	3 x spr.	4,000	Nuclear MIRV warhead. Deployed Oct. 1979, scheduled retirement 2005.
UGM-133A/Trident 2 (D-5)	44.6	—	6.9	130,000	Draper, Raytheon, Kearfott, Honeywell	Stellar inertial	3 x spr.	4,000+	Deployed March 1990. Nuclear MLRV warhead.
<i>LOCKHEED MARTIN SPACE SYSTEMS CO., Denver, CO, USA</i>									
LGM-118A/Peacekeeper	70.6	—	7.7	195,000	Boeing	Stellar inertial	3 x spr.	7,000+	Deployed. Westinghouse-launch cannister contractor. Being phased-out.

MISSILES

GENERAL DATA		AIRFRAME			GUIDANCE		POWERPLANT	MAX. RANGE (NAUT. MI.)	STATUS/OUTLOOK
DESIGNATION/NAME	MAX. LENGTH (FT.)	MAX. SPAN, WINGS OR FINS (FT.)	BODY DIAMETER (FT.)	LAUNCH WEIGHT (LB.)	CONTRACTOR	TYPE	NO., MAKE & MODEL		
SURFACE-TO-SURFACE									
MACHINE PRODUCTION DESIGN BUREAU (KBM), Kolomna, Russian Federation									
9M79 (SS-21a Scarab)	20.9	4.75	2.13	4,409.2	—	Inertial	spr.	43.5	Tactical ballistic missile.
9M79M1 (SS-21b Scarab)	21	4.75	2.13	4,431.2	—	Inertial	spr.	74.6	Improved version.
Iskander (SS-26 Stone)	21.3	—	27.9	8,375	—	Inertial	spr.	175	New tactical ballistic missile. First fired 10/25/95. Scud follow-on.
MACHINE PRODUCTION SCIENTIFIC PRODUCTION ASSN. (OKB-52), Reutov, Russian Federation									
UR-100NU (SS-19 Stiletto Mod 3)	69.2	8.2	8.2	232,800	—	Inertial/stellar	2-stage liquid rocket	4,900	ICBM; 130 in Ukraine being retired.
MAKEYEV DESIGN BUREAU, Miass, Russian Federation									
9K72 Aerofan (SS-1d Scud C)	42.6	5.9	2.8	14,000	—	Inertial/optical correlation	Single-stage liquid rocket	100	Final Soviet production type. Terminally guided RV.
9K72 Elbrus (SS-1c Scud B)	36.7	5.9	2.8	12,920	—	Inertial	Single-stage liquid rocket	162	Tactical ballistic missile. Versions made in Iraq, North Korea.
R-29RL (SS-N-18 Stingray Mod 2)	46.2	5.9	5.9	77,820	—	Stellar-inertial	2-stage liquid rocket	3,500	SLBM on Delta 2 subs. 7 RVs.
R-29RM (SS-N-23 Skiff)	48.5	6.23	6.23	88,845	—	Stellar-inertial	3-stage liquid rocket	4,480	SLBM on Delta 4 subs. 4 RVs.
R-39 Taifun (SS-N-20 Sturgeon)	52.4	7.87	7.87	198,410	—	Stellar-inertial	3-stage spr.	4,480	SLBM on Typhoon subs. 10 RVs.
MBDA MISSILE SYSTEMS (BAE Systems, EADS, Finmeccanica), London, UK, Vélizy, France, Rome, Italy									
Polyphem	9	—	0.66	308	—	Optical fiber guided	Turbojet	32+	Developed with EADS/LFK in Germany.
Scalp Naval	—	—	—	2,866	—	Inertial/GPS/IRR	TRI 60-30 turbojet	600+	Precision, long-range ship and submarine-launched land attack missile. In development.
MOSCOW INSTITUTE OF THERMAL TECHNOLOGY (MIT), Moscow, Russian Federation									
9K52 Luna-M (FROG-7)	30.8	5.57	1.78	5,511.4	—	Spin-stabilized	spr.	40.4	Std. tactical artillery rocket.
RT-2PM Topol (SS-25 Sickle)	68	5.9	5.9	99,425	—	Inertial/stellar	3-stage spr.	5,940	Truck-mobile ICBM.
Topol M (SS-X-27)	74.5	6.06	6.06	104,055	—	Inertial/stellar	3-stage spr.	5,450	New version for truck & silo basing. First deployed in 1997.
NORTH KOREA									
Hwasong	36.7	5.9	2.8	12,920	—	Inertial	Single-stage liquid rocket	162	Tactical ballistic missile. Copy of Soviet 9K72 Elbrus (SS-1c Scud B). The Hwasong 5-derivative has a 183 nm range. The Hwasong 6-derivative has a 270 nm range. One-ton payload for Hwasong and Hwasong 5. Half that for Hwasong 6.
No Dong 1	56	7.9	4.2	32,000	—	Inertial	Single-stage liquid rocket	700	Basis for Iranian Shahab 3 and Pakistani Ghauri. 0.7-ton payload.
Taepo-Dong 1 (Paektu-san 1)	85.3	—	3.9	—	—	Inertial	Two-stage liquid rocket	1,080	Two-stage missile. Uses a No Dong first stage and a Hwasong (Scud) for its second stage. Warhead is about a ton.
Taepo-Dong 2	105	—	7.9	—	—	Inertial	—	1,889	Multi-stage ballistic missile. First stage is 59 ft.-long, second is 45.9 ft.-long.
NOVATOR (NPO), Ekaterinburg, Russian Federation									
3K10 Granat (SS-N-21 Sampson)	26.4	10.2	1.44	3,745	—	Inertial	Solid booster/turbojet	1,620	SLCM.
PAKISTAN									
Ghauri 1	48.6	—	3.9	32,000	—	Inertial	Single-stage liquid rocket	809	Derivative of N. Korean No Dong. First fired April, 1998. Payload, 0.7 tons. Also known as Hatf-5.
Hatf 1	15.1	—	1.8	—	—	Spin stabilized	Single-stage solid rocket	43	Payload is about 1,100 lbs.
Hatf 2	25	—	—	11,000	—	—	Two-stage rocket	162	Two-stage missile with a 1,100-lb. payload.
PEOPLE'S REPUBLIC OF CHINA									
CSS-X-4	107.5	—	10.9	—	—	Inertial	—	6,200	—
PEOPLE'S REPUBLIC OF CHINA (Executive-First Academy; Manufacturer-China National Precision Machinery Import & Export Corp.)									
M-7	34.8	—	1.6	5,600	—	Inertial	Solid booster, liquid sustainer	81	Derivative of the HQ-2 air defense missile. US designation is CSS-8. Called Tamdar & Tondar in Iran.
M-9	29.8	—	3.3	13,600	—	Inertial	Single-stage solid rocket	324	Aka: DF-15. US designation is CSS-6. Fired from mobile launcher.
M-11	29.8	—	3.3	—	—	Inertial	Two-stage solid rocket	162	Aka: DF-11. US designation is CSS-X-7. Called Shaheen 2 in Pakistan. Fired from mobile launcher.
M-18	—	—	—	—	—	Inertial	Two-stage solid rocket	540	Being developed with Iran, where it is named Tondar-68; 900 lb. warhead; fired from mobile launcher.
RAYTHEON CO., Raytheon Missile Systems, Tucson, AZ, USA									
BGM-109/Tomahawk	20.5	8.8	1.7	3,500	Raytheon	Tercom, DSMAC	1 x F107-WR-402 lf.	1,000	Sea-launched cruise missile. Block 3 has GPS guidance. Length, weight given with booster.
SOUTHERN MACHINE DESIGN BUREAU (SKB-586), Dnepropetrovsk, Ukraine									
R-36N Voevoda (SS-18 Satan Mod 5)	107	9.84	9.84	465,390	—	Inertial/stellar	3-stage liquid rocket	5,940	ICBM, 104 missiles in Kazakhstan being dismantled.
RT-23U Molodets (SS-24 Scalpel)	68.9	7.87	7.87	230,380	—	Inertial/stellar	3-stage liquid rocket	5,450	Rail & silo-based ICBM. Ukrainian missiles being dismantled.

ABBREVIATIONS:

ARC—Atlantic Research
 MMW—Millimeter Wave
 NEC—Nippon Electric Co.
 SNIA—Societa Nazionale Industria Applicazioni

IIR—Imaging Infrared
 NAC—(US) Naval Avionic Center
 SACLOS—Semi-Automatic Command to Line-Of Sight
 SPR—Solid propellant rocket

JAE—Japan Aviation Electronics
 NDRE—Norwegian Defense Research
 SAM—Surface-air-missile

