Renegade Tech 2.0 – 'Primitive Aerospace Technology' Rules

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PRIMITIVE SYSTEMS: ARMOUR

Although even 'primitive' modern armour seems nigh-magical to some observers, it does have marked limitations compared to more advanced formulations. Small Craft, Large Craft and fixed installations equipped with primitive armour suffer a +2 penalty to all Armour Threshold critical-checks.

PRIMITIVE SYSTEMS: SMALLCRAFT FIRE-CONTROL

Early aerospace-fighter and shuttle fire-control suites were notoriously short-ranged and hadn't quite caught up to the realities of high-velocity combat. Fighters and smallcraft equipped with a primitive cockpit have effective ranges of only 2/4/6/8 for any onboard energy weapons; anti-missile bays are unaffected. Missiles are addressed below.

PRIMITIVE SYSTEMS: LARGE CRAFT FIRE-CONTROL

DropShips and capital vessels have more room for fire-control computers and sensor-suites than fighters or shuttles, but fire-prediction algorithms were still in their infancy and had not yet been refined by decades of operational experience. DropShips equipped with primitive fire-control suites have effective ranges of 3/6/9/12 for any conventional-scale energy weapons, such as point-defence turrets; PD energy weapons mounted on JumpShips and WarShips have ranges of 4/8/12/16; anti-missile bays are unaffected. Missiles and (sub-)capital weapons are addressed below.

PRIMITIVE SYSTEMS: FIGHTER-SCALE MISSILES

The fusion-rockets employed by fighter-missiles in the early days were heavy, bulky, and underpowered by modern standards; their guidance-systems were 'smart' only by the loosest of definitions and they were notorious for their light throw-weight. Nonetheless, with energy-weapons in their infancy and most ballistic systems impractical at the velocities typical of aerospace combat, they were often the only practical way to give a fighter a useful striking range.

NOTABLE PRIMITIVE FIGHTER MISSILES

ATM/04 "Cyclops" aerospace missile
(Service entry-date: 2246 (Terran Alliance))
(Used by: Terran Alliance, Inner Sphere States and their clients)

	PYLON SIZE	INTELLIGENCE	ECM/ECCM	RANGE	DAMAGE (FIGHTER)	DAMAGE (DROPSHIP)
ATM/04 "Cyclops"	4	8	-/-	6	18	1*

Following the Outer Reaches Rebellion and the Demarcation Declaration, the proto-nations which began forming out of the abandoned colonies began subjecting each other to the joys of 'privateers', essentially state-sponsored pirates. While many of these 'privateers' did not use capital missiles, enough did that point-defence quickly became a priority for every power that wished to protect their spacecraft from multi-kiloton nuclear warheads, and Terran Alliance vessels were often prime targets. (The Alliance might have withdrawn inside its self-imposed thirty-light-year border, but many of the raiders still harboured grudges over their worlds' treatment during the colonial period, or over their abandonment, and were sufficiently motivated to strike within Terran space.) Most civilian vessels could not afford to devote volume to heavy beam weapons or capital-missile launchers as defences, and the fire-control systems of the time's anti-missile guns were prone to 'target saturation', so a number of the proto-states began crash programmes to develop a relatively light, fusion-drive missile which could supplement a JumpShip's defences without taking up too much cubage or mass. Several of these parallel programmes bore fruit around the same time, with broadly similar results.

Many Terran Space Navy commanders judged the Cyclops well-named: its guidance system was myopic, and they were similarly unimpressed with the short range of its 240/30 fusion-drive and the underwhelming throw-weight of its warhead. Nonetheless, it did improve a vessel's chances of defeating nuclear-tipped missiles, which meant it was better than nothing.

(The Cyclops and its counterparts pre-dated the development of the aerospace fighter and were used almost exclusively as point-defence on capital vessels, although some accounts mention combat deployment by combat shuttles. They are included in this document primarily for historical reference.)

ATM/06 “Phoenix” aerospace missile
(Service entry-date: 2322 (Terran Hegemony))
(Used by: THAF, Inner Sphere States and their clients, Near Periphery powers and their clients)

	PYLON SIZE	INTELLIGENCE	ECM/ECCM	RANGE	DAMAGE (FIGHTER)	DAMAGE (DROPSHIP)
ATM/06 “Phoenix”	3	7	-/-	8	18	1*

The first truly practical fighter-missile, the Phoenix was little more damaging than the conventional-scale laser cannon (which had been introduced less than a decade beforehand), but used a then-revolutionary 320/30 drive that gave it unprecedented range. Expensive, heavy, and not especially bright, the Phoenix nonetheless gave Terran aerospace fighters and combat shuttles a stand-off weapon that incurred no heat-burden. The Phoenix was superseded by lighter, smarter weapons within the century and is little more than an historical curiosity today.

ATM/15 “Basilisk” aerospace missile
(Service entry-date: 2395 (Terran Hegemony)
(Used by: THAF, Inner Sphere States and their clients, Near Periphery powers and their clients)

	PYLON SIZE	INTELLIGENCE	ECM/ECCM	RANGE	DAMAGE (FIGHTER)	DAMAGE (DROPSHIP)
ATM/15 “Basilisk”	2	7	-/-1	8	18	1*

Although it still used a 320/30 drive, advances in fusion rocketry allowed designers to build the next generation of fighter-missile, the Basilisk, smaller and somewhat smarter than its predecessor. This allowed fighters to carry larger missile-loads and expect higher hit-probabilities, while at the same time giving larger craft a greater ability to defend themselves against fighters. Introduced just before the acknowledged start of the Age of War, the Basilisk missile served throughout that turbulent period and helped define fighter-tactics of the time.

ATM/19 "Hydra" aerospace missile
(Service entry-date: 2470 (Terran Hegemony)
(Used by: THAF, Inner Sphere States and their clients, Near Periphery powers and their clients)

	PYLON SIZE	INTELLIGENCE	ECM/ECCM	RANGE	DAMAGE (FIGHTER)	DAMAGE (DROPSHIP)
ATM/19 "Hydra"	2	7	+1/-1	10	18	1*

An incremental development over the Basilisk, the Hydra showcased Hegemony advances in fusion technology and KF-theory by using a newly-developed 400/30 drive. Despite this engine giving the missile better operational range than its predecessor the Basilisk, it was not noticeably smarter, and some commanders thought any improvement was only nominal. Nonetheless, it superseded the Basilisk for front-line use in the THAF before the end of the century and contributed to the success of several Hegemony campaigns before being itself replaced by the legendary pairing of the Griffin and Medusa missiles (q.v.) in the middle of the twenty-sixth century.

ATM/22A "Griffin" aerospace missile
ATM/23C "Medusa" aerospace missile
(Service entry-date: 2559 for both)
(Used by: THAF, Inner Sphere States and their clients, Near Periphery powers and their clients)

	PYLON SIZE	INTELLIGENCE	ECM/ECCM	RANGE	DAMAGE (FIGHTER)	DAMAGE (DROPSHIP)
ATM/22A "Griffin"	1	6	+1/-1	6	18	1*
ATM/23C "Medusa"	2	6	-/-	10	18	1*

Introduced soon after the Treaty of Geneva and used by all sides of the Reunification War, the Griffin and Medusa missiles were arguably the war's biggest killers of fighter-pilots. Combining a compact 360/30 drive with the latest generation of seeker technology, the Griffin was most pilots' preferred 'dogfighting' missile; using a more powerful but heavier 480/30 powerplant, the Medusa had less room for 'smarts' and was never as highly favoured as its lighter colleague, but significantly outranged most other fighter-weapons of the day. Coming soon after the Lyran Commonwealth had introduced the *Lucifer* medium fighter and its revolutionary new 'XO pylon' construction-techniques (which soon proliferated to all of the known powers), the two missiles were destined to become legends within living memory, with countless news-stories from the front lines etching their names into the public consciousness. Less glamourous, but arguably more decisive, was their use as point-defence on most DropShips and capital vessels, where they protected untold vessels from capital-missiles and reaped bloody harvests among attacking fighter-units.

ATM/28C "Minotaur" aerospace missile
(Service entry-date: 2682)
(Used by: SLDF, Successor States and their clients, Near Periphery powers and their clients)

	PYLON SIZE	INTELLIGENCE	ECM/ECCM	RANGE	DAMAGE (FIGHTER)	DAMAGE (DROPSHIP)
ATM/28C "Minotaur"	2	5	+1/-	12	18	1*

Superseding the famed Griffin/Medusa pairing, the Minotaur used a new-generation 480/30 drive that allowed a significant improvement in the seeker-head. Although transitioning to a single missile-type made economic and logistical sense, many commanders and pilots were dubious of the reduction in overall ordnance-loads inherent to a pure inventory of Minotaurs and quietly hung on to stocks of the trusty Griffin as backup weapons. (Contrariwise, few pilots mourned the decommissioning of the 'idiotic' ATM/23.)

MISSILE EQUIVALENTS BY NATION

Capellan Confederation:

ATM/04 "Cyclops"	*Objekt 2256.7 «Topor»* ["Axe"] (Tikonov Grand Union, 2256)
ATM/06 "Phoenix"	*Objekt 2348.2 «Bulava»* ["Mace"] (2348)
ATM/15 "Basilisk"	*Objekt 2403.2 «Kop'ye»* ["Spear"] (2403)
ATM/19 "Hydra"	*Objekt 2474.5 «Shpaga»* ["Shortsword"] (2474)
ATM/22A "Griffin"	*Objekt 2562.6 «Kinzhal»* ["Dagger"] (2562)
ATM/23C "Medusa"	*Objekt 2561.3 «Garpun»* ["Harpoon"] (2561)
ATM/28C "Minotaur"	*Objekt 2680.9 «Samostrel»* ["Crossbow"] (2680)
ATM/34A "Manticore"	*Objekt 2750.7 «Sablya»* ["Sabre"] (2750)

Draconis Combine: (designations are last two digits of the Imperial Year of adoption, i.e. A.D.+660)

ATM/06 "Phoenix"	Type-07 *Anzu* ["Apricot"] (IY 3007/AD 2347)
ATM/15 "Basilisk"	Type-74 *Momo* ["Peach"] (2414)
ATM/19 "Hydra"	Type-43 *Orenji* ["Orange"] (2483)
ATM/22A "Griffin"	Type-26 *Ringo* ["Apple"] (2566)
ATM/23C "Medusa"	Type-24 *Budō* ["Grape"] (2564)
ATM/28C "Minotaur"	Type-49 *Ichigo* ["Strawberry"] (2689)
ATM/34A "Manticore"	Type-22 *Sakura* ["Cherry"] (2762)

Federated Suns:

ATM/04 "Cyclops"	AA-2F 'Kestrel-F' (Anti-Aerospace Missile Mk-2F, Marlette Association, 2282)
ATM/06 "Phoenix"	AA-3E 'Falcon-E' (2336)
ATM/15 "Basilisk"	AA-3M 'Falcon-M' (2401)
ATM/19 "Hydra"	AA-4G 'Goshawk-G' (2482)
ATM/22A "Griffin"	AA-6C 'Shrike-C' (2563)
ATM/23C "Medusa"	AA-5E 'Wedgetail-E' (2562)
ATM/28C "Minotaur"	AA-7L 'Arrowhawk-L' (2688)
ATM/34A "Manticore"	AA-8A 'Osprey-A' (2768 – produced under licence from/for SLDF)

Free Worlds League:

ATM/04 "Cyclops"	*Letectví Raketa vz.74 "Čermák"* [Aerospace Rocket, Model of 2274, "Robin"]
ATM/06 "Phoenix"	*LR vz.43 "Drozd"* ["Thrush"] (2343)
ATM/15 "Basilisk"	*LR vz.99 "Vrabec"* ["Sparrow"] (2399)
ATM/19 "Hydra"	*LR vz.72 "Vlaštovka"* ["Swallow"] 2472
ATM/22A "Griffin"	*LR vz.61 "Holub"* ["Pigeon"] (2561)
ATM/23C "Medusa"	*LR vz.53 "Husa"* ["Goose"] (2553)
ATM/28C "Minotaur"	*LR vz.84 "Kachna"* ["Duck"] (2684)
ATM/34A "Manticore"	*LR vz.68 "Bažant"* ["Pheasant"] (2768 - produced under licence from/for SLDF)

Lyran Commonwealth:

ATM/06 "Phoenix"	Aerospace Missile-3j 'Dirk' (Protectorate of Donegal, 2339)
ATM/15 "Basilisk"	AM-6b 'Claymore' (Lyran Commonwealth, 2409)
ATM/19 "Hydra"	*Flugabwehrraketen-11 ‚Knüppel'* [Anti-Aircraft Missile-17 "Cudgel"] (2475)
ATM/22A "Griffin"	*Flarak-17 ‚Dolch'* [AAM-17 "Dagger"] (2561)
ATM/23C "Medusa"	*Flarak-28 ‚Zweihander'* [AAM-28 "Greatsword"] (2560)
ATM/28C "Minotaur"	*Flarak-36 ‚Langschwert'* [AAM-36 "Longsword"] (2679)
ATM/34A "Manticore"	*Flarak-47 ‚Säbel'* [AAM-47 "Sabre"] (2768 – produced under licence from/for SLDF)

Taurian Concordat:

ATM/06 "Phoenix"	*Missile Aérospatiale Lumière* 01 "*Bourdon*" [Light Aerospace Missile, Model 01, "Bumblebee", 2373]
ATM/15 "Basilisk"	MAL.02 "*Gûepe*" ["Wasp"] (2406)
ATM/19 "Hydra"	MAL.03 "*Scorpion*" ["Scorpion"] (2475)
ATM/22A "Griffin"	MAL.05 "*Veuve Noir*" ["Black Widow"] (2552)
ATM/23C "Medusa"	MAL.04 "*Frelon*"/"Hornet" (2550)
ATM/28C "Minotaur"	(Imported from TH, designated MAL.06 "*Abeille*" ["Bee"] in service)
ATM/34A "Manticore"	MAL.07 "*Tarantule*" ["Tarantula"] (2763 – unlicenced copy from blueprints supplied by Amaris)

Magistracy of Canopus:

ATM/19 "Hydra"	Type-12 "Diamondback" (Unlicenced copy of LR vz.99, 2530)
ATM/22A "Griffin"	Type-20 "Cobra" (Licenced copy of Taurian MAL.05, 2568)
ATM/23C "Medusa"	Type-32 "Mamba" (Licenced copy of Taurian MAL.04, 2568)
ATM/28C "Minotaur"	(Imported from TH, designated Type-41 "Krait" in service)
ATM/34A "Manticore"	Type-53 "Boomslang" (2763 – unlicenced copy from blueprints supplied by Amaris)

Rim Worlds Republic:

ATM/06 “Phoenix”	Mark.VI (2373)
ATM/15 “Basilisk”	Mark.XIII (2406)
ATM/19 “Hydra”	Mark.XXI (2488)
ATM/22A “Griffin”	Mark.XXVII (2562)
ATM/23C “Medusa”	Mark.XXXIII (2560)
ATM/28C “Minotaur”	Mark.XLII (2703)
ATM/34A “Manticore”	Mark.LVI (Produced under TH licence, 2762)

Outworlds Republic:

ATM/19 “Hydra”	(AA-4G Goshawk, Imported from FS, 2489)
ATM/22A “Griffin”	MAL.05 “Black Widowr” (Imported from TC, 2566)
ATM/23C “Medusa”	MAL.04 “Hornet” (Imported from TC, 2566)
ATM/28C “Minotaur”	(Imported from TH)
ATM/34A “Manticore”	MAL.07 “Tarantula” (2763 – unlicenced copy from blueprints supplied by Amaris)

PRIMITIVE FIGHTER ANTI-SHIP MISSILES

"Remora" anti-ship missile
(Used by: THAF, Inner Sphere States and their clients, Near Periphery powers and their clients)

	SERVICE ENTRY-DATE	PYLON SIZE	INTELLIGENCE	ECM/ECCM	RANGE	DAMAGE (DROPSHIP)	DAMAGE (CAPITAL)
"Remora Mk.I"	2345	9	7	+1/-	9	9 (or nuke)	- (or nuke)
"Remora Mk.II"	2429	8	6	+1/-	10	9 (or nuke)	- (or nuke)
"Remora Mk.III"	2563	7	5	+1/-1	11	9 (or nuke)	- (or nuke)

The first production mark of Remora missile was a victim of the day's immature fusion-rocketry technology and was so big that even the *Eagle*, the largest aerospace fighter of that century, could only carry a single round. Attempts to compensate by tipping the missile with a high-yield physics package were foiled by a raft of technical limitations, and consequently most commanders had (and have) to content themselves with 'only' a Type-IIIa when operating against capital targets.

Advances in fusion rocketry allowed the second-generation Remora to use a 400/30 powerplant while still shrinking in size and mounting a more sophisticated seeker-head. However, many light fighters still could not carry the weapon, and even those spaceframes that could had to cope with its significant impact on their performance characteristics and warload-capacity.

The third-generation Remora was introduced shortly before the ratification of the Star League Accords and promptly went into action in the Reunification War – on all sides. Indeed, fighter-strikes with Remora-III missiles played a major role in the TCN's humiliating victory over the FSNS at Tentativa, and Rim Worlds *Vulcans* equipped with Remora-IIIs and the new 'XO stanchions' copied from Lyran *Lucifers* remained a major concern for League forces throughout Operation MAILED FIST.

PRIMITIVE SYSTEMS: CAPITAL AND SUB-CAPITAL WEAPONS

Also known as 'first-generation' capital weapons, these older systems were bigger, short-ranged, and less efficient than their successors, and any power which has the technology-base to support them inevitably prefers to deploy the 'modern' versions. Nonetheless, they still make occasional appearances, either as 'legacy' systems left over from the Age of War or being re-invented by powers that find themselves 'climbing the tech tree' without support from the more advanced nations of the Inner Sphere.

SUB-CAPITAL LASERS

Light, ammunition-independent, and offering enough punch to shatter a DropShip or obliterate fighters, sub-capital lasers are the primary direct-fire armament of many GunShips. Owing to the size of the mounts and traverse-speed limitations, sub-capital lasers suffer a +3 penalty to hit when targeting small-craft, but can use Anti-Aircraft Targeting (*Strategic Operations* p.99) or Dispersion Fire (q.v.) to offset this.

	MASS	CRITS	TYPE	HEAT	DAMAGE (Capital)	TO-HIT	SHORT	MEDIUM	LONG	EXTREME	COST
SCL/1 (P)	225	1-C*	CAP, AE	30	1/ 1/ */ *	-	5	10	15	20	180,000
SCL/2 (P)	300	1-C*	CAP, AE	40	2/ 1/ 1/ *	-	5	10	15	20	280,000
SCL/3 (P)	375	1-C*	CAP, AE	52	3/ 2/ 1/ 1	-	6	12	18	24	370,000

* At these ranges, the weapon's beam has dispersed to the point where it cannot damage capital armour, but it still has enough energy to destroy a missile or fighter.

CAPITAL LASERS

Although they lack the raw punch of mass drivers, and their penetrative capabilities are sharply limited by the nature of modern armour, the range-performance of capital lasers is almost unparalleled in space-combat direct-fire weaponry. Owing to the size of the mounts and traverse-speed limitations, capital lasers suffer a +5 penalty to hit when targeting small-craft, but can use Anti-Aircraft Targeting or Bracketing Fire (*Strategic Operations* p.99) or Dispersion Fire (q.v.) to offset this.

	MASS	CRITS	TYPE	HEAT	DAMAGE (Capital)	TO-HIT	SHORT	MEDIUM	LONG	EXTREME	COST
NL/35 (P)	1,100	1-C*	CAP, AE	70	4/ 3/ 2/ 1	-	6	12	18	24	400,000
NL/45 (P)	1,400	1-C*	CAP, AE	85	5/ 4/ 3/ 2	-	7	14	21	28	680,000
NL/55 (P)	1,700	1-C*	CAP, AE	120	6/ 5/ 4/ 3	-	8	16	24	32	1,000,000

CAPITAL PPCS

The longest-range direct-fire weaponry available to WarShips, the extreme heat and near-lightspeed velocity of the particle-streams fired by capital particle-projection cannons gives them far greater penetration capabilities than lasers or nuclear initiations, albeit in very narrow 'tunnels'. Owing to the size of the mounts and traverse-speed limitations, capital PPCs suffer a +5 penalty to hit when targeting small-craft, but can use Dispersion Fire (q.v.) to offset this.

	MASS	CRITS	TYPE	HEAT	DAMAGE (Capital)	TO-HIT	SHORT	MEDIUM	LONG	EXTREME	COST
Light N-PPC (P)	2,400	1-C*	CAP, AE	180	6/ 4/ 2/ *	-	7	14	21	28	1,600,000
Medium N-PPC (P)	3,600	1-C*	CAP, AE	240	10/ 8/ 6/ 4	-	8	16	24	32	2,600,000
Heavy N-PPC (P)	4,800	1-C*	CAP, AE	360	14/12/10/ 8	-	9	18	27	36	4,800,000

CAPITAL AND SUB-CAPITAL MASS DRIVERS

All primitive capital and sub-capital mass-drivers share the same muzzle-velocities and ranges.

	MUZZLE VELOCITY	RANGES		
		SHORT	MEDIUM	LONG
SCMDC (P) or CMDC (P)	3,600 m/s	3	6	9

SUB-CAPITAL MASS-DRIVERS

Owing to the size of the mounts and traverse-speed limitations, sub-capital mass-drivers suffer a +3 penalty to hit when targeting small-craft, but can use Dispersion Fire (*Renegade Tech Aerospace Combat*, p.29) to offset this.

	MASS	CRITS	TYPE	HEAT	DAMAGE (Capital)	AMMO (tons/round)	TO-HIT	COST
SC/MDC/2 (P)	500	1-C*	CAP, AE	60	5	0.16	-	750,000 (20,000)

CAPITAL MASS DRIVERS

Owing to the size of the mounts and traverse-speed limitations, capital mass-drivers suffer a +5 penalty to hit when targeting small-craft, but can use Dispersion Fire (*Renegade Tech Aerospace Combat*, p.29) to offset this.

	MASS	CRITS	TYPE	HEAT	DAMAGE (Capital)	AMMO (tons/round)	TO-HIT	COST
CMDC/5 (P)	2,000	1-C*	CAP, AE	85	5	0.40	-	2,000,000 (30,000)
CMDC/10 (P)	3,000	1-C*	CAP, AE	100	10	0.80	-	5,000,000 (60,000)
CMDC/15 (P)	4,000	1-C*	CAP, AE	120	15	1.20	-	10,500,000 (90,000)
CMDC/20 (P)	5,000	1-C*	CAP, AE	135	20	1.60	-	18,000,000 (120,000)

CAPITAL AND SUB-CAPITAL MISSILES

Using compact fusion engines designed for maximum acceleration (and which effectively consume themselves in the process), sub-capital and capital missiles can reach velocities of almost eleven kilometres-per-second by the time their drives burn out. However, this use of a fusion plant subjects them to 'kinetic censorship', meaning their damage-potential lies solely in their warheads. The high-explosive warheads commonly used against fighters, missiles, and DropShips are ineffectual against WarShip-grade armour, although they can cripple exposed systems, and so nuclear payloads are preferred for anti-'Shipping operations.

Although the base designs vary between manufacturers, the sub-capital and capital missile launchers built across the Inner Sphere are functionally identical in gameplay. The individual rounds used vary depending on tactical role, and are loaded in the launchers based on the projected threat-environment. (Please note that the construction details below are used only for Mobile Structures and fixed installations; space-bound craft use the Turret rules explained later in this document.)

	LAUNCHER MASS	COMPATIBLE WEAPONS	CRITS	TYPE	COST	INTRODUCTION (KNOWN SPACE)	RETIRED (KNOWN SPACE)
AR-1	150	Lamprey, Skipjack, Pike	1-C*	CAP, AE	75,000	2125 (TA)	2224 (TA)
AR-2	200	Blackfin, Skipjack	1-C*	CAP, AE	90,000	2219 (TA)	2300 (TA)
AR-3	250	Redtail, Skipjack	1-C*	CAP, AE	120,000	2294 (TA) 2474 (IS)	2530 (TH) 2597 (IS)
AR-4	300	Hammerhead (all marks)	1-C*	CAP, AE	150,000	2526 (TH) 2591 (IS)	2612 (TH) 2650 (IS)

	MISSILE MASS	HEAT	MISSILE RANGE	WARHEADS	SEEKER INTELLIGENCE	SEEKER DETECTION RANGES	ECCM/ECM & PEN-AIDS	COST
SUB-CAPITAL MISSILES								
LAMPREY[1]	20	10	10	1	5	12/18/24	-1/--	5,000
SKIPJACK	30	15	12	1	5	10/20/30	--/--	5,000
PIKE[1]	30	15	12	1	7	8/16/24	--/+2	5,000
CAPITAL MISSILES								
BLACKFIN[1, 2]	40	15	12	3	7	12/24/36	--/--	8,000
REDTAIL[1]	40	15	16	3	6	12/24/36	--/+1	10,000
HAMMERHEAD-A[1]	50	20	16	4	6	10/20/30	-1/--	15,000
HAMMERHEAD-B[1]	50	20	16	4	6	8/16/24	--/--	15,000
HAMMERHEAD-C[1]	50	20	16	4	7	8/16/24	--/+2	15,000
HAMMERHEAD-D	50	20	16	4	5	10/20/30	--/--	15,000

[1] This missile lacks an anti-smallcraft targeting mode and incurs the usual +3 or +5 penalty when attacking such craft (including missiles).

[2] The Draconis Combine independently developed a tactically-identical weapon known as the Dart.

Bays consisting of multiple missile-tubes cannot mix missile types in their salvoes: all must be of the same missile- and warhead-type. All missiles launched from the same bay attack the same target and share the same to-hit roll.

Primitive sub-capital missiles use 400/30 or 480/30 drives; introduced in the earliest days of fusion rocketry, the Blackfin used a bulky 480/30, while all later capital-missile designs have enough size and mass to use the more powerful first-generation 640/30 drives.

MISSILE CLUSTERS

Missile clusters share targeting data and ECM/pen-aid coverage; missiles which carry ECM/pen-aids also gain a bonus to this coverage owing to the increased signal:noise ratio. These bonuses degrade as missiles within the salvo are destroyed, shrinking in accordance with the number of missiles remaining.

Missiles in salvo	ECCM Bonus	ECM Bonus
1	-	-
2-3	-1	+1
4-5	-2	+2
6	-3	+3

Fighters and small-craft can attack hostile (sub-)capital missiles that pass near them, as per *Strategic Operations*, subject to the range-limitations of their XO and onboard weapons. Onboard weapons such as machine-guns and ground-combat ACs/missiles have an effective range of only one hex.

Bearing-Only and Pre-Programmed Waypoint launches operate as per *Strategic Operations*, but missiles have a base Launch Velocity equal to their range.

MISSILE	WARHEAD OPTIONS
LAMPREY*	1 x HE or 1 x Mark.92
SKIPJACK	1 x HE (only)
PIKE*	1 x HE or 1 x Mark.92
ALBACORE*	3 x HE or 3 x Mark.92 or 1 x Mark.95
REDTAIL*	3 x HE or 3 x Mark.92 or 1 x Mark.95
HAMMERHEAD-A*	4 x HE or 4 x Mark.92 or 1 x Mark.95
HAMMERHEAD-B*	4 x HE or 3 x Mark.95 (or 1 x strategic)
HAMMERHEAD-C*	4 x HE or 3 x Mark.95 (or 1 x strategic)
HAMMERHEAD-D	4 x HE (only)

NUCLEAR PAYLOADS

The high-explosive warheads detailed above are used only for attacking hostile missiles, small-craft, delivering 'warning shots' to DropShips, and for conducting orbit-to-surface bombardments when aerospace fighters are unavailable and the kiloton-level energies of other capital weapons are deemed excessive. However, even a warhead containing several tons of modern chemical explosives simply cannot do meaningful damage to the metres-thick battle-steel of WarShip hulls; if (sub-)capital missiles are to be used against a hostile WarShip, the only effective payload they can deliver is a nuclear 'physics package'.

Note that the crit. chance listed beside each physics package is applied only to the possibility of damaging important equipment within the target WarShip or space station; under these rules, the '10x damage to SI on a successful critical hit' rule (*Historical: Reunification War*, p.193) does *not* apply. However, each nuke generates Threshold critical chances as normal for its listed damage value, meaning that every nuclear event can mandate *two* checks for critical hits.

NUCLEAR PHYSICS PACKAGE	**YIELD (kilotons)**	**DAMAGE (Capital scale)**	**CRIT CHANCE**
Mark.73 ('Type-II'/'Alamo')	5	1	11+
Mark.83 ('Type-IIIa'/'Santa Ana-A')	50	10	10+
Mark.92 ('Type-IIIb'/'Santa Ana-B')	100	20	9+
Mark.95 ('Type-IIIc'/'Santa Ana-C')	200	40	8+

* The inefficiencies of nuclear events in open space mean that as much as 80% of a physics package's yield is not transferred to the target unless it initiates in almost direct contact.

COMBAT RULES

Unlike direct-fire weapons, offensive missile-fire must be declared during the *movement* phase, at any point along a given vessel's movement, at which point a token representing the missile-salvo is placed on the game-board. (Any missile-system that does not declare offensive fire during the movement phase is presumed to be operating in defensive-fire mode.) Once all other vessels on the game-board have moved (including fighters), players take turns (in initiative order) moving their missile-tokens from their starting-points towards their targets, along any valid path between the two points. At any point along that path, the defender may declare and resolve defensive fire from any vessel whose weapons have the missile-token in range at that point; if any missiles survive this defensive fire, they continue their movement.

Once the missile-token arrives at the target, the controlling player makes the to-hit roll, using the salvo's Intelligence rating as the base Gunnery skill and applying its ECCM rating to counter the target's ECM field; multiple-missile salvoes also make a Cluster Hits roll on the column appropriate to the surviving number of missiles, applying the To-Hit roll's Margin of Success (or Failure) to that roll, treating a modified roll of '2' or less as a complete miss. The target vessel's own defensive weapons, including anti-missile systems, then resolve their fire against those warheads which would hit.

If any warheads survive the target vessel's defensive fire, they hit the target: the controlling player rolls hit-locations and centre-points as normal, with the target vessel applying the appropriate damage-template and any critical-hit effects.

APPENDIX: PRE-WORKED MISSILE CLUSTERS

CLUSTER SIZE ->	1 Missile	2 Missiles	3 Missiles	4 Missiles	5 Missiles	6 Missiles
	Warheads ECCM/ECM	Warheads ECCM/ECM	Warheads ECCM/ECM	Warheads ECCM/ECM	Warheads ECCM/ECM	Warheads ECCM/ECM
LAMPREY	1 -1/--	2 -2/+1	3 -2/+1	4 -3/+2	5 -3/+2	6 -4/+3
STINGRAY	1 --/--	2 -1/+1	3 -1/+1	4 -2/+2	5 -2/+2	6 -3/+3
PIKE	1 --/+2	2 -1/+3	3 -1/+3	4 -2/+4	5 -2/+4	6 -3/+5
BLACKFIN	3 --/--	6 -1/+1	9 -1/+1	12 -2/+2	15 -2/+2	18 -3/+3
REDTAIL	3 --/+1	6 -1/+2	9 -1/+2	12 -2/+3	15 -2/+3	18 -3/+4
HAMMERHEAD-A	4 -1/--	8 -2/+1	12 -2/+1	16 -3/+2	20 -3/+2	24 -4/+3
HAMMERHEAD-B	4 --/--	8 -1/+1	12 -1/+1	16 -2/+2	20 -2/+2	24 -3/+3
HAMMERHEAD-C	4 --/+2	8 -1/+3	12 -1/+3	16 -2/+4	20 -2/+4	24 -3/+5
HAMMERHEAD-D	4 --/--	8 -1/+1	12 -1/+1	16 -2/+2	20 -2/+2	24 -3/+3