

Advanced Gaming Rules

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Expanded Rules for Attribute Bonus Dice

While Palladium's rules for attribute bonus dice work fairly well for humans (who use 3D6 in each attribute), they do not work very well for non-human races. These rules were written so that attribute bonus dice could be fairly applied to any R.C.C. or race, regardless of the number or type of attribute dice rolled.

1. In order to qualify for a bonus die, the attribute rolled must be higher than 84% of the maximum roll possible.

Example 1: on 3D6 the maximum possible roll is 18, with 84% of 18 being 15.12, so you would have to roll 16 or higher to qualify for a bonus.

Example 2: the maximum roll on 4D6 is 24, where 84% of 24 is 20.16, so you need to roll 21 or higher to qualify for a bonus.

2. Once you qualify for a bonus die, the 'size' of your bonus depends on the number of dice rolled for the attribute. As such, characters getting a bonus on a 1D6 attribute (where 16.6% of all rolls are exceptional attributes) are going to get a bonus that is proportional to their attribute, and folks receiving a bonus on a 4D6 roll (which happens less than 1% of the time) will receive a proportionally larger bonus. The size of this bonus is formulated by making a ratio between the attribute being rolled and the base (which is 3D6, as supplied in the books).

Example 1: since it is easier to get an exceptional attribute on a 2D6 roll, the bonus received is 2/3 the size of the bonus for an exceptional attribute bonus on 3D6.

Example 2: the exceptional bonus on 5D6 is 5/3 the size of the bonus on 3D6.

3. Expanding upon the first Conversion Book's rule about additional attribute bonus dice being gained when a 6 is rolled on an exceptional attribute, the maximum number of bonus dice a character can get is equal to the number of dice rolled for their attribute. (Note that additional bonus dice are **only** gained when a 6 is rolled on the prior exceptional attribute roll.)

Example 1: a player has an attribute roll of 16 on 3D6 (thus qualifying for a bonus die). If the player rolls a 6 on that bonus roll, they gain an additional bonus die. If a 6 is rolled on that die, they gain another attribute bonus die. However, because the attribute in question is 3D6, the maximum number of attribute bonus dice that can be had is three.

Example 2: a player rolls a 7 for a 2D4 attribute (qualifying it for an attribute bonus die). If the player rolls a 4 (the maximum number possible) on their bonus die, then they get another bonus die. As the attribute in question has two dice, the maximum number of bonus dice possible is two.

The end result the Expanded Bonus Dice Rules is that the harder it is to qualify for the exceptional roll, the more potential gain you have. (As the difficulty goes up, so do the rewards)! This means that if you manage that one-in-a-million exceptional roll on a 6D6 attribute, you *are* going to get more than a lousy 1 for your bonus!

Calculation of Exceptional Attributes

<u>Number of Dice Rolled</u>	<u>Exceptional Range</u>	<u>Exceptional Bonus</u>	<u>Maximum Exceptional Dice</u>
D6			
1D6	6	1D6*(1/3)	1
2D6	11, 12	1D6*(2/3)	2
3D6	16 - 18	1D6*(3/3)	3
4D6	21 - 24	1D6*(4/3)	4
5D6	26 - 30	1D6*(5/3)	5
6D6	31 - 36	1D6*(6/3)	6
D4			
1D4	4	1D4*(1/3)	1
2D4	7, 8	1D4*(2/3)	2
3D4	11, 12	1D4*(3/3)	3
4D4	14 - 16	1D4*(4/3)	4
D8			
1D8	7, 8	1D8*(1/3)	1
2D8	14 - 16	1D8*(2/3)	2
3D8	21 - 24	1D8*(3/3)	3
4D8	27 - 32	1D8*(4/3)	4
D10			
1D10	9, 10	1D10*(1/3)	1
2D10	17 - 20	1D10*(2/3)	2
3D10	26 - 30	1D10*(3/3)	3

Example 1:

Shargi, the Dwarven Operator rolls 22 on 4D6 for his P.S. Since 22 is within the exceptional attribute range for 4D6, he receives an attribute bonus die. On this bonus he rolls a 5. Shargi's final P.S. is 29! [22 rolled + (4 rolled on the bonus x 4/3 for the 4D6 ratio) + 2 for the R.C.C. bonus.]

Example 2:

Aarg, the Orc Headhunter, rolls 11 on 2D6 for his P.B. attribute. As his roll is more than 84% of the maximum on 2D6, he qualifies for a bonus die. For this attribute bonus die, he rolls a 6! Since that roll qualifies Aarg for another bonus, he rolls an additional 1D6, and gets a four this time. Aarg's final P.B. attribute is an incredible 17! [11 rolled for the attribute + (6 rolled on the bonus die x 2/3 for the 2D6 ratio) + (4 rolled on the second bonus die x 2/3 for the ratio).]

Example 3:

Plutar, the Gargoyle Lord, rolls 26 on 5D6 for her SPD attribute. On her bonus die, she rolls a 2. Her final SPD attribute is now 29. [26 rolled for the attribute + (2 rolled on the attribute bonus die x 5/3 for the 5D6 ratio).]

Example 4:

Luckey, the Kittani Warrior, rolls 18 on 3D6 for his P.P. attribute. On his attribute bonus die, he rolls a 6! This qualifies him for an additional bonus die, where he rolls another 6! This gets him another attribute bonus die, and he rolls another 6!! Since Luckey's P.P. attribute is based on 3D6, he is limited to a maximum of three bonus dice. His final P.P. attribute is 39!! [18 rolled + (6 for the first bonus x 3/3 for the ratio) + (6 rolled on the second bonus die x 3/3 for the ratio on 3D6) + (6 rolled on the third attribute bonus die x 3/3 for the ratio) + 3 for his R.C.C. bonus.] **Note:** the odds of rolling six 6's in a row are 1 in 46,656.

Low Attribute Penalties

The following chart can be used to determine what penalties are incurred have low attributes.

	Attribute Number Rolled						
Attribute	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
I.Q.	-90%	-80%	-70%	-60%	-50%	-40%	-30%
M.E.	-4	-4	-3	-3	-2	-2	-1
M.A.	95%	90%	85%	70%	50%	25%	15%
P.S.	-8	-7	-6	-5	-4	-3	-2
P.P.	-4	-4	-3	-3	-2	-2	-1
P.E.	-16%	-14%	-12%	-10%	-8%	-6%	-4%
	-4	-4	-3	-3	-2	-2	-1
P.B.	95%	90%	80%	60%	40%	20%	10%

I.Q.: one time penalty added to all skills

M.E.: penalty to save vs. psychic attack/insanity

M.A.: chance to invoke distrust or scorn in others

P.S.: penalty to Hand-to-Hand combat damage

P.P.: penalty to strike, parry, and dodge

P.E.: First row: penalty to save vs. coma/death. Second row: penalty to save vs. poison/magic

P.B.: chance to invoke disgust or loathing in others

High Attribute Bonuses

The types of bonuses gained from high attributes are as follows:

I.Q.: one time bonus added to all skills

M.E.: bonus to save vs. psychic attack and insanity

M.A.: chance to invoke trust or intimidation in others

P.S.: damage bonus in Hand-to-Hand combat

P.P.: bonus to strike, parry, and dodge (at higher levels, an initiative bonus is shown on the second row)

P.E.: First row: bonus to save vs. coma/death. Second row: bonus to save vs. magic and poison

P.B.: chance to charm or impress others

The following chart can be used to determine exactly which bonuses are gained from high attributes.

Attribute Score	IQ	ME	MA	PS	PP	PE	PB
17	+3%	+1	45%	+2	+1	+5% +1	35%
18	+4%	+2	50%	+3	+2	+6% +2	40%
19	+5%	+2	55%	+4	+2	+8% +2	45%
20	+6%	+3	60%	+5	+3	+10% +3	50%
21	+7%	+3	65%	+6	+3	+12% +3	55%
22	+8%	+4	70%	+7	+4	+14% +4	60%
23	+9%	+4	75%	+8	+4	+16% +4	65%
24	+10%	+5	80%	+9	+5	+18% +5	70%
25	+11%	+5	84%	+10	+5	+20% +5	75%
26	+12%	+6	88%	+11	+6	+22% +6	80%
27	+13%	+6	92%	+12	+6	+24% +6	83%
28	+14%	+7	94%	+13	+7	+26% +7	86%
29	+15%	+7	96%	+14	+7	+28% +7	90%
30	+16%	+8	97%	+15	+8	+30% +8	92%
31	+16%	+8	97%	+16	+8	+31% +8	92%
32	+16%	+8	97%	+17	+8	+32% +8	92%
33	+16%	+8	97%	+18	+8 +1 to initiative	+33% +8	92%
34	+16%	+8	97%	+19	+8 +1 to initiative	+34% +8	92%
35	+16%	+8	97%	+20	+8 +1 to initiative	+35% +8	92%

36	+16%	+8	97%	+21	+8 +2 to initiative	+36% +8	92%
37	+16%	+8	97%	+22	+8 +2 to initiative	+37% +8	92%
38	+16%	+8	97%	+23	+8 +2 to initiative	+38% +8	92%
39	+16%	+8	97%	+24	+8 +3 to initiative	+39% +8	92%
40	+16%	+8	97%	+25	+8 +3 to initiative	+40% +8	92%
41	+16%	+8	97%	+26	+8 +3 to initiative	+41% +8	92%
42	+16%	+8	97%	+27	+8 +4 to initiative	+42% +8	92%
43	+16%	+8	97%	+28	+8 +4 to initiative	+43% +8	92%
44	+16%	+8	97%	+29	+8 +4 to initiative	+44% +8	92%
45	+16%	+8	97%	+30	+8 +5 to initiative	+45% +8	92%
46	+16%	+8	97%	+31	+8 +5 to initiative	+46% +8	92%
47	+16%	+8	97%	+32	+8 +5 to initiative	+47% +8	92%
48	+16%	+8	97%	+33	+8 +6 to initiative	+48% +8	92%
49	+16%	+8	97%	+34	+8 +6 to initiative	+49% +8	92%
50	+16%	+8	97%	+35	+8 +6 to initiative	+50% +8	92%

Alternate Burst Rules: Increased-Damage Method

The amount of damage done in a burst is dependent on the number of rounds fired.

Single Shot: same

Short Burst: now fires 3 shots/blasts and does ([1 shot] x2) damage.

Long Burst/Full Burst: damage for a Long Burst (using up to half the clip, and one attack) or Full Burst (using more than half the clip, and two attacks); in either case, the damage is ([1 bullet] x [# of bullets/3]).

Variable Shot Bursts

Type of Blast	Number of Actions Used	Amount of Ammo Used	Damage Done
Single Shot	1	1 shot	damage x 1
Short Burst	1	3 shots	damage x 2
Long Burst	1	varies	damage x (# shots fired / 3)
Full Burst	2	varies	damage x (# shots fired / 3)

Example: the 7.62 Galil assault rifle in Heroes Unlimited has a 40 round clip. A single bullet does 4D6. A

short burst would now fire 3 bullets and do 4D6 x 2 damage. A long burst could be from 4 bullets (4D6 x 1 damage) to 20 bullets (4D6 x 6 damage). A full burst goes from 21 bullets (4D6 x 7 damage) to 40 bullets (4D6 x 13 damage). As you can see, this makes guns a little deadlier, and it means the guy who fires the most bullets does the most damage. Before, a guy with a .44 magnum could empty his 7 round clip and do just as much damage as the guy with the above mentioned Galil.

Alternate Burst Rules: Increased-Shots Method

Regardless of the size of the clip used in a weapon, bursts from that weapon always use the same number of shots. Therefore, larger clips allow you to fire a larger numbers of bursts.

Example 1: C-12 Heavy Assault Laser Rifle

	<u>Damage Done</u>	<u>Number of Blasts Used</u>	<u>Number Possible in a Standard E-Clip</u>	<u>Number Possible in a Long E-Clip</u>	<u>Number Possible in a Long E-Clip plus E-Canister</u>
Single Shot	4D6 M.D.	1	20	30	60
Short Burst	4D6 x 2 M.D.	4	5	7 (plus 2 singles)	15
Long Burst	4D6 x 3 M.D.	10	2	3	6
Full Burst	4D6 x 7 M.D.	20	1	1 (plus 1 long)	3

Example 2: NG-E12 Heavy Plasma Ejector

	<u>Damage Done</u>	<u>Number of Blasts Used</u>	<u>Number Possible in a Standard E-Clip</u>	<u>Number Possible in a Long E-Clip</u>	<u>Number Possible in a NG Power Pack</u>
Single Shot	1D6 x 10 M.D.	1	6	12	42
Short Burst	1D6 x 10 x 2 M.D.	2	3	6	21
Long Burst	1D6 x 10 x 3 M.D.	3	2	4	14
Full Burst	1D6 x 10 x 7 M.D.	6	1	2	7

Kitsune's Modified Burst Rules

Standard Palladium modern weapons rules list the number of shots that are fired in a burst as a percentage of the magazine. This means that for the purpose of bursts, you will fire a different number of rounds with your M-16 by having a 10 round post-Brady Bill magazine or having a 99 round snail magazine. A better system is to list the number of rounds fired instead of a percentage of rounds. The system is based on considering a magazine to be twenty rounds for an automatic or semiautomatic pistol or rifle, and a magazine of one-

hundred rounds for a full machinegun. This means that a short burst from an M-16 would be 4 bullets instead of 20% of the magazine. This of course means that you cannot do an entire-magazine burst with a ten round clip.

The numbers listed below have been adjusted for game purposes because a short burst averages four rounds but may be three or five rounds. Machinegun damages have been revised further in an attempt to represent them more accurately. These rules may be used for energy weapons if the game master and players wish.

Special Bursts

Double Tap: Most law enforcement officers are taught a technique called the double tap, which involves firing two rounds in rapid succession. This is an effective combat technique that is also very conservative on ammunition. This technique can be used with all semiautomatic and fully automatic weapons, including automatic rifles, automatic pistols, and double-action revolvers. When using a double tap, a separate strike roll is made for both of the shots and they are considered to be bursts (use burst bonuses for each of the shots rather than aimed shot bonuses), with the second shot receiving a -2 to strike penalty. Roll damage once if one round hits or roll twice if both rounds strike their target. This technique uses up one attack even though it fires two rounds.

Three Round Burst: Several weapons, including later M-16 models, have been designed to fire three rounds each time the trigger is pulled. There are huge advantages with this because it conserves ammunition and makes shooting more accurate. A three round burst does the same damage as a short burst (one round x 2) but enjoys the same bonuses as an aimed shot. Some of the weapons that can fire three round bursts cannot fire fully automatic bursts. This technique uses up one attack even though it fires three rounds.

Bursts from Fully Automatic Weapons (Pistols, Rifles, and Submachineguns)

Short Burst: Fires 4 rounds per burst and can only be directed at one target. The damage is one round x 2 and costs one attack even though it uses four rounds. The person firing has standard burst bonuses.

Long Burst (One Target): Fires a 10 round burst that is directed at a single target. The damage is one round x 5 and costs one attack even though it uses ten rounds. The person firing has standard burst bonuses.

Long Burst (Spray): Fires 10 rounds and is directed at multiple targets. The damage is one round x 1 and costs one attack even though it uses ten rounds. This is considered to be a wild shot, so characters using a weapon proficiency do not have any bonuses or penalties to strike, but those without the proper weapon proficiency suffer a -6 to strike. Roll 1D4 to determine how many targets will be hit and there is a 20% chance of striking an innocent bystander if there is one in the firing area.

Extended Burst (One Target) [was *Entire Magazine*]: Fires a 20 round burst at one target. The damage is one round x 10 and costs two attacks even though it uses twenty rounds. The person firing has standard burst bonuses.

Extended Burst (Spray) [was *Entire Magazine*]: Fires 20 rounds and is directed at multiple targets. The damage is one round x 2 and costs two attacks even though it uses twenty rounds. This is considered to be a wild shot, so characters using a weapon proficiency do not have any bonuses or penalties to strike, but those without the proper weapon proficiency suffer a -6 to strike. Roll 1D4 to determine how many targets will be hit and there is a 50% chance of striking an innocent bystander if there is one in the firing area.

Bursts from Full Machineguns

Short Burst: Fires 4 rounds per burst and can only be directed at one target. The damage is one round x 2 and costs one attack even though it uses four rounds. The person firing has standard burst bonuses.

Medium Burst (One Target)[was *Short Burst*]: Fires a 10 round burst that is directed at a single target.

The damage is one round x 5 and costs one attack even though it uses ten rounds. The person firing has standard burst bonuses.

Medium Burst (Spray)[was *Short Burst*]: Fires 10 rounds and is directed at multiple targets. The damage is one round x 1 and costs one attack even though it uses ten rounds. This is considered to be a wild shot, so characters using a weapon proficiency do not have any bonuses or penalties to strike, but those without the proper weapon proficiency suffer a -6 to strike. Roll 1D4 to determine how many targets will be hit and there is a 20% chance of striking an innocent bystander if there is one in the firing area.

Long Burst (One Target): Fires a 30 round burst that is directed at a single target. The damage is one round x 10 and costs one attack even though it uses thirty rounds. The person firing has standard burst bonuses.

Long Burst (Spray): Fires 30 rounds and is directed at multiple targets. The damage is one round x 2 and costs two attacks even though it uses thirty rounds. This is considered to be a wild shot, so characters using a weapon proficiency do not have any bonuses or penalties to strike, but those without the proper weapon proficiency suffer a -6 to strike. Roll 1D8 to determine how many targets will be hit and there is a 50% chance of striking an innocent bystander if there is one in the firing area.

Extended Burst (One Target) [was *Entire Magazine*]: Fires a 100 round burst that is directed at a single target. The damage is one round x 20 and costs an entire melee of attacks. The person firing has standard burst bonuses.

Extended Burst (Spray) [was *Entire Magazine*]: Fires 100 rounds and is directed at multiple targets. The damage is one round x 2 and costs an entire melee of attacks. This is considered to be a wild shot, so characters using a weapon proficiency do not have any bonuses or penalties to strike, but those without the proper weapon proficiency suffer a -6 to strike. Roll 2D8 to determine how many targets will be hit and there is a 70% chance of striking an innocent bystander if there is one in the firing area.

Rules for Changing O.C.C.s

Many people have found Palladium's rules for changing O.C.C.'s very confusing. This is my attempt to clarify some of that confusion.

1. You can only change O.C.C.'s when you have advanced at least 1 level in your current O.C.C. So, you could keep changing O.C.C.'s every time you hit 2nd level, if you wanted to.
2. Unless an old skill is also taken with the new O.C.C. (or any subsequent O.C.C.), it remains frozen at its last level. So, someone with 5th level HTH: Martial Artist who switches to a new O.C.C. which doesn't permit it will either need to take a new HTH (probably Basic or Expert), or simply make do with their 5th level Martial Artist bonuses from now on.

Example: Willie the Wilderness Scout, just as he has become 2nd level, decides he wants to switch O.C.C.'s and become a Ley Line Walker. He started off with 19 O.C.C., 10 O.C.C. Related, and 8 Secondary Skills as a Wilderness Scout, which will now be frozen at 2nd level. However, he gets to now choose 4 new O.C.C., 3 or 4 (depending on GM) O.C.C. Related, and 3 Secondary skills from the skills available to Ley Line Walkers. Both O.C.C.'s have Climbing, Land Navigation, and at least 2 language skills as part of the O.C.C.; my recommendation would be to "unfreeze" the Climbing, Wilderness Survival, and 1 Language skills; they will advance when he reaches 1st level as a Ley Line Walker, and will continue to advance. This uses 3 of his 4 O.C.C. Skill choices. I would recommend using the 4th choice to get Lore: Demon at +5% (important for any mage to know...). Of course, he also has the option of using those 4 choices to pick from the Ley Line Walker O.C.C. Skills that he didn't know before (Pilot Hover Craft, Math: Basic, etc.). With the remaining 6 to 7 selections he has available, he can either use them to "unfreeze" more of his Wilderness Scout skills, or can pick completely new skills. Since, however, a Ley Line Walker can pick just about any

Physical, WP, Rouge, or Wilderness Skill, I would probably recommend using them to unfreeze 6 or 7 of his Wilderness Scout O.C.C. Skills. That way, even though he's only got 37 skills (with 26 or 27 frozen), a 1st level Ley Line Walker will only have 21 skills; they will never have 37 skills, frozen or unfrozen. Basically, you're trading either skill advancement for extra powers, or vice versa.

3. You start off with the initial rules for H.P./S.D.C./M.D.C., P.P.E., and I.S.P. of your initial O.C.C. selection (by level or not, depending on the choice). When you switch O.C.C.'s, you don't lose any of these; however, any subsequent increases are based on the new class' rules. Basically, it prevents someone from learning every single mage class and gaining a ton of spells and P.P.E., or a psychic from gaining all psionic powers and a ton of I.S.P.

Example: a CS Technical Officer decides to desert one day, and becomes a Techno-Wizard. As a normal non-mage, he had a P.P.E. base of 2D6 (or 3D6, depending on your view). By becoming a Techno-Wizard, however, he does NOT get to replace it with the 2D4 x 10 base for TW's; however, he does get to increase it by 2D6 P.P.E. per level from now on.

4. You don't get to start off immediately at level 1 in this new character class. Instead, you start off with negative XP equal to the maximum for 2nd level (3rd level if a mage or psychic O.C.C., i.e.. Mind Melter or Mystic). Remember not to roll for new H.P., I.S.P., S.D.C., and/or P.P.E. yet. You get all the O.C.C. skills of the new class, but only half the normal choices for the O.C.C. Related and Secondary Skills. Also, none of the skills have bonuses (except for high IQ). Once you reach 0 XP, you reach 1st level in the new O.C.C. (this is where you also roll for your level increases of P.P.E., I.S.P., H.P., and S.D.C.), and you get to add half the normal O.C.C./O.C.C. Related bonuses to your skills, rounded down [Note: I may be wrong about it only being half for the O.C.C. skills, but I'm almost positive about the O.C.C. Related skills]. For any skills which were chosen in both the old and the new class, however, only the higher of the 2 bonuses will be applicable.

Example: our former Tech Officer-turned-TW had a +15% to his Electrical and Mechanical skills, as well as +30% to Math: Basic, +10% to Radio: Basic, and +20% to Literacy. As a TW, he gets to keep his Literacy, but gets no new bonus, as he would only get +5% (half of +10%). The same happens with Radio: Basic (half of +10% is +5%). In fact, the only place he'll make out with bonuses at all are in those Computer skills, Carpentry, Land Navigation, and the 2 Languages he gets. Of course, he had better knowledge anyway than the typical TW (no bonuses for Electrical or Mechanical skills, and each counts as 2 skills). Plus, since the TW is a mage O.C.C., he starts off in his new O.C.C. with -9200 XP; and, when he finally does reach 1st level, he's going to be have a lot less P.P.E. (4D6 or 5D6 total versus 2D4 x 10; difference actually corresponds to about -6D6).

I know it's confusing, but the rules actually make sense. They're basically reflecting that, not only will you need some retraining when switching from one occupation to the other, but that the farther apart each occupation is in terms of the knowledge used or learned, the less likely it is your former knowledge can be transferred over.

The only option I would add in, though, is that instead of starting off at negative XP, take the character out of the campaign for a period to reflect their training. I would suggest 2D6 to 4D6 months game time for normal O.C.C.'s, 3D6 to 6D6 months for psychic or mage O.C.C.'s. This would be a way to maybe let the player use someone else during the downtime (maybe role-play an NPC for the GM), or maybe to let your characters have a break in the action (take a vacation, go see the family for a bit, maybe hide out and let some heat die down... you get the idea). This gives the GM's a little more flexibility.

Alternative Credits Rules

Credits are in the form of a metal card with the owner's personal identification number on it. The card is set up for laser read/write and is NOT made of M.D.C. material. Credits are generally handled through

electronic transfer, but can be transferred to plastic for adventures going into the "wilderness." When put into transportable currency, they take the form of hard plastic with their denomination imprinted upon them.

Luck Rules- Natural 20

As a GM, I have a standard house rule that the players can invoke on any occasion (if I agree at the time). It goes something like this:

If you're in a really bad situation -such as if you are going to die- ask for a luck roll.

If you can think of something funny but nearly impossible. Ask for a luck roll.

Most of the time, if the players asked for a luck roll, I'd give it to them, they roll a 20 sided dice, if they get a 20 (modified only by rabbit's' foots, four leafed clovers etc.), they are very lucky, and/or succeed/don't die, etc.

Pain Rules

Through a recent White Wolf game I'm in and from first hand experience, I have come to the conclusion that getting hurt is not only painful, but debilitating as well. Not always from the injury itself, but often times the pain caused by continual use of an already strained muscle can be too much to bear. In other words, assuming I am all doped up on something I can probably continue to walk on my already sprained ankle without too much loss of normal motion.

In an effort towards realism in game, it can be useful to attribute the loss of ability/mobility due to injury to pain itself and let individual GMs decide about arms, legs, etc. being damaged beyond use. So, if we simplify and use "pain" as the main obstacle towards continued optimal performance than we can finally have some use for all those save vs. pain bonuses people get from their M.E. (N&SS right?).

So from here, if we desire (which I do...), we can generate some rules for the steady loss of mobility and such during combat due to injury. I have always found it very strange how people in the Palladium Megaverse can fight with all of their ability and skill when down to 4 S.D.C. and a what never seems to be enough HP. I don't know about other people's GMs but mine never made any adjustments, simply because there were no clear cut rules for doing so. So, after all of that long windedness, that is what I intend to do.

As one takes more and more damage it becomes harder and harder to move, fight, concentrate, or do much of anything. Hopefully, these penalties will reflect that without screwing up game balance too much.

% Damage Taken	Pain Difference	Move Modifier	Skill Modifier
10%	3	-1	-0% / -15%
20%	5	-2	-5% / -25%
30%	7	-4	-15% / -35%
40%	9	-5	-25% / -45%
50%	11	-6	-35% / -55%

60%	13	-8	-45% / -65%
70%	15	-10	-55% / -75%
80%	17	-12	-65% / -85%
90%	20	-15	-75% / -90%

Okay, so this is how I envision this working. First, when you make your character, take his total S.D.C. and mark down how much 10% of it is, how much 20% is, etc. Just follow the percentages on the chart.

Secondly comes the mechanics of it all. So, at the beginning of each round(or sequence of actions...) you make a roll to save vs. pain. The difficulty of your roll is determined by how much damage you currently have. If you have save vs. pain bonuses(use ME bonus chart) you subtract the bonus from your difficulty to get your new, modified difficulty. You then roll an ordinary 20 sided die to see if you save. If you save then all is well and you continue fighting as normal. If you fail, then you are out of luck and receive the accompanying negatives. The Movement(Move for short...) Modifier is a negative given to things like combat maneuvers, maintaining balance, and SPD. Basically, almost any physically oriented thing that you roll a die for. Now the Skill Modifiers are negatives given to performing skills. The first percentage is a negative given to physical activities, such as swimming, climbing, etc. The second percentage is given to skills that require precision, concentration, and steadiness.

Example:

Joe the Terrorist hates capitalist pigs. He is holding a bank at gunpoint and setting his bomb on the vault so he can sock it to the man. Little does he know that Frank the off-duty Cop was busy cashing a pay check and is always ready to defend life, liberty, and the American Way. With their weapons drawn the two men enter combat...

Both men, being fresh and uninjured, need not bother rolling vs. pain and immediately go at it. Frank rolls a 18 on initiative!! which beats out disgruntled Joe's 5. As he fires off a couple of shots, which he believes will plug one more for the good guys, Joe takes them with a smile. Frank was unaware of Joe's kevlar vest. With his vest having taken all the damage Joe is free to fire. Not being too stingy, Joe fires off a fairly large burst from his uzi at our poor unarmored hero Frank, which to Frank's regret, hits across his knee, legs, and chest. Having just lost 90% of his S.D.C., Frank falls to the ground and is not getting up to quickly. Assuming things are over with Frank, Joe takes Franks gun and turns back to his bomb and setting of the timer.

Unnoticed by Joe, Frank stirs. He knows if he doesn't stop Joe that everyone will die. He wants to get up and sneak over to the large blunt looking fire extinguisher on the wall. Since he is beginning a sequence of actions, he rolls to save vs. pain. He is a pretty strong headed cop and has a +3 vs. pain. His difficulty is 17. HE ROLLS A 20!! He sneaks over to the extinguisher quietly and confidently and deftly takes it off of the mount without a sound. Now he wants to sneak up behind Joe. This is(GM's discretion...) a new sequence of actions so he rolls again. Difficulty is still 17. This time he is not so lucky. He rolled a 12. So, he can still try but he is at a -75%. Frank, being a veteran cop, has prowled at 80%. There is still a chance he could make it. He rolls to prowl ... A 3!!! The gods must be on his side, because he successfully sneaks up behind Joe. Now he wants to hit Joe in his uncovered head with the extinguisher. This is still the same sequence(or not GM discretion...) which means he is -15 to strike. He swings ... but rolls a 1. Looks like luck caught up to Frank. His knee(which he was shot in earlier...) buckles as he swings the extinguisher over his head and he falls to the floor as his knee folds the wrong way underneath him. Now taking notice, Joe ends Franks pain quickly with a shot to the head and in a terrible tragedy the Suicide Anarchist Bomber takes the lives of 25 people along with 35 million dollars in a fiery inferno. The End.

NOTE: You can treat the psionic Deaden Pain, and any good pain killers, as negating the need to roll. Just make sure they aren't like mine. A lot of pain killers make it hard to walk a straight line, let alone flying hook kick someone.

Perception: A New Attribute for Palladium Characters

The original article brought up several interesting points concerning characters' awareness of their surroundings when outside a mecha, power armor, robot vehicle, etc. The Danger Sense ability isn't quite the Sixth Sense psionic ability, and for that reason is perfectly playable. However, the idea that a high Perception would give a bonus to strike is ludicrous. After all, Perception is supposed to be about awareness, not accuracy. Therefore, I propose instead a bonus for high Perception apply to initiative, not strike rolls, which is more in line with the Danger Sense sub-ability; low Perception results in initiative penalties. Regardless, these modifiers always apply, even in mecha or robot combat.

Danger Sense - What it does:

Making a successful Danger Sense check allows the character to dodge, parry, or roll with an attack that normally would have been a surprise attack (with no defense). A roll gained this way would be a straight dice roll, with the character's total initiative modifier added to the roll (normal parry/dodge/roll bonuses don't apply). Optionally, the character can opt to do a simultaneous return attack instead of avoiding the attack, but again, gets no bonuses other than what is normally their initiative bonus.

Negative Modifiers for low perception: this works the exact opposite way as normal checks. The character must make the Danger Sense check or *suffer* the penalty.

Example: A person with a 4 Perception has a -2 to initiative 96% of the time, but can avoid it by rolling 4 or less on the Danger Sense check.

The following chart shows the relationship between Perception score, the Danger Sense percentage, and initiative modifiers:

Perception Score:	Danger Sense %:	Initiative Modifier:
1	1	-5
2	2	-4
3	3	-3
4	4	-2
5	5	-1
6	6	-
7	7	-
8	8	-
9	9	-
10	10	-
11	10	+1
12	10	+1
13	10	+1
14	10	+2
15	10	+2
16	15	+2
17	20	+3
18	25	+3

19	30	+3
20	35	+4
21	40	+4
22	45	+4
23	50	+5
24	55	+5
25	60	+5
26	64	+6
27	68	+6
28	72	+6
29	75	+7
30	78	+7
31	80	+7
32	82	+8
33	84	+8
34	86	+8
35	88	+9
36	89	+9
37	90	+9
38	91	+10
39	92	+10

40	93	+10
41	94	+11
42	95	+11

43	96	+12
44	97	+12
45	98	+12

Dice Rolls For Perception - By Race:

Note: P.P. and Perception initiative bonuses are cumulative. Most races, such as humans, roll 3D6 for perception, gaining an additional 1D6 for a natural 16-18.

Races with enhanced senses may get an additional 1D6 on top of the normal roll (resulting in 4D6, 5 if bonus die earned from roll of the first three).

Characters with outstanding senses or with sense-related powers (a mutant with super hearing, juicers, etc.), get an additional 2D4 to their Perception roll.

If a race has a natural Initiative bonus, check the P.P. range for the race. If the P.P. range is not sufficient to produce the initiative bonus, then the bonus must come from Perception.

Example: A demon has a +6 to initiative, and a P.P. under 30. Therefore, it either has Sixth Sense or a Perception over 30.

Combining Sixth Sense with Perception:

Danger Sense only applies when Sixth Sense cannot pick up the threat (due to range, Mind Block, lack of ISP, etc.). Initiative bonuses are cumulative. Also note that a Danger Sense roll can be made during combat (at half normal chance) to notice a new danger's approach, unlike Sixth Sense, whose bonuses apply only in the first round. After Sixth Sense ends, Perception bonuses continue normally.

Combining Martial Arts Techniques with Perception:

Zanshin gives the character an additional 3D6 to his or her Perception score at all times, but the Zanshin Initiative bonuses only apply when the character is actually using his Martial Arts form. The Iai-Jutsu (fast-draw) technique is cumulative with all other initiative bonuses.

Combining Perception with Robot Vehicle/Mecha Use:

Danger Sense only applies against threats that don't appear on the vehicle's sensors. In power armors (including Cyclones), there are no penalties to the Danger Sense roll, but the chance is halved in robot vehicles, Veritechs, Battloids and Destroids. Of course, if a vehicle loses its radar, Danger Sense may be the only warning of an attack from behind. In a way, this type of Danger Sense use is based in intuition, not senses. Initiative bonuses still apply in these war machines, in that the character can more easily take in the action on the battlefield, and adjust attacks accordingly.

Suggested Rolling methods for Perception:

	Race's Gaming System of Origin		
Number of Dice Rolled:	<u>RIFTS & Palladium Fantasy:</u>	<u>RIFTS & Beyond the Supernatural:</u>	<u>Robotech:</u>
<u>2D6</u>	Goblins(normal), Orcs, Ogres, Gigantes	Dimensional Ghouls, Entities(all), Gargoyles, Gurgoyles, Gargoylites, Grave Ghouls, Gremlins, Elementals(all)	Worker & Blue Bioroids, Bioroid Terminators, Stage 1-3 Invid, Karbarrans, Spherisians
<u>3D6</u>	Changelings, Dwarves, Goblin Cobblers, Trolls, Bug Bears, Giants(all but Gigantes), Faerie Folk(all), Lizard Men, Maxpary	Banshees, Boschala, Gargoyle Lords & Mages, Spider Demons	Tyroleans(all), Stage 4-5 Invid, Perytonians
<u>4D6</u>	Canines(all), Elves, Bearmen, Centaurs, Demigods, Hatchling Dragons, All	Dybbuk, Dar'ota, Hell Hounds, Malignous, Sowki, Werebeasts(all)	Praxians, Garudans, Haydonites, Perytonians

	remaining predatory & supernatural types, up to minor demons/devils		
<u>5D6</u>	Adult Dragons, Major Demons/Devils, Godlings	Goqua, Mindolar, Spirits of Light	Invid Regent & Regis
<u>6D6</u>	Ancient Dragons, Supernatural Intelligences, Gods		

Armour Penetration Rules

These charts only apply when the character is taking damage from weapons, magic, or psionics that inflict enough M.D.C. to penetrate their armour and kill them. In all cases, the damage will be enough to totally destroy the area indicated on the chart, and the character must make a save vs. coma/death (without benefit of bonuses) to avoid falling into a coma.

Any armour-penetrating damage resulting from ballistic or melee weapons will cause massive internal bleeding. (Due to the self-cauterizing nature of energy weapons, they do not cause internal bleeding.)

Body Armour Penetration For Humanoids

01-50 Main Body*

51-72 Legs (D6; 1-3 Right; 4-6 Left)

73-88 Arms (D6; 1-3 Right; 4-6 Left)

89-92 Hands (D6; 1-3 Right; 4-6 Left)

93-00 Head+

* - Roll on Main Body Penetration Table

+ - This means instant death for the character unless GM deems otherwise.

Main Body Penetration Table

01-04 Neck*

05-20 Lung (D6; 1-3 Right; 4-6 Left)+

21-45 Liver, Rt. Kidney

46-70 Stomach, Spleen, and Pancreas

71-86 Small Intestine

87-98 Large Intestine

99-00 Heart

* - Roll a D100, a roll of 01-50 character can be saved; 51-00 death.

+ - Roll a D100, a roll of 75-00 means heart is hit and character is dead.

Attacks per Melee Clarification

Several individuals have posted questions about the number of attacks per melee that characters have. Considering as haphazardly put together as the hand-to-hand combat section is, and how virtually every NPC ever published contradicts Palladium's official answer on the topic, this confusion comes as little surprise. After much debate and old-fashioned trial and error, we were able to determine the fairest, most balanced way to determine how many attacks characters start with.

Exceptionally alert GMs (and rules-lawyer players too!) may be familiar with the following section from the main RIFTS book:

"**A reminder:** All *player* characters automatically start off with two attacks/actions per 15 second melee. Additional attacks per melee are gained from the hand to hand skills and boxing." (RIFTS, pg. 37).

This section of the RIFTS book is actually a bad cut-and-paste from Heroes Unlimited that should be ignored. [In HU, "all heroes automatically get at least TWO attacks per melee, combined with the two from Hand to Hand: Expert it gives a total of four." (Heroes Unlimited, pg. 41)]

Palladium has since confirmed that RIFTS characters do indeed use this 2+2 method of determining the number of attacks. However, while the 2+2 method is entirely appropriate for a 'heroic' system like HU, it does not fit the mold of RIFTS. Additionally, virtually none of the NPC's published in *any* of the dimension, source, or world books follow this ruling.

By ignoring these contradictory rules and instead focusing on how NPC's were created in every book, we came up with the following well-balanced rules:

HUMANS

- All humans automatically start out with one attack per melee. (This is the 'base' number of attacks.) Individuals without any combat training will gain one additional action at levels three and nine (RIFTS, pg. 28).
- Learning any of the hand-to-hand combat skills of Basic, Expert, or Martial Arts provides a first level character with **one additional** attack per melee (so, under the Hand to Hand combat skills section, when the book says, "two attacks per melee," at level one, it honestly means just that! A human character starts out with a total of TWO attacks per melee! [A base of one, plus one for the HTH skill itself, which equals two]). The hand-to-hand combat skill Assassin does *not* provide an additional attack at level one, but instead gives *two* additional attacks at level two.
- If selected, the Boxing skill also provides the character with one more attack per melee.
- Special occupational training may give the character extra attacks per melee.

NON-HUMANS

- Unless otherwise stated, non-human characters gain hand-to-hand attacks in the *exact* same manner as humans. The only possible exception to this is the base number of attacks that the character's race starts out with. Carte blanche statements such as "three attacks per melee round, plus those gained from optional hand to hand: basic" (Lyn-Srial from New West, pg. 133) and "four without any hand-to-hand combat training, or four plus those gained from hand-to-hand combat and/or boxing" (Rahu-Men from the Conversion Book, pg. 154) mean that the particular race's base number of attacks is three for Lyn-Srial and four for Rahu-Men. Statements such as "two without any combat training, or one plus those gained from hand-to-hand combat and/or boxing" (Wolfen, Conversion Book, pg. 86) and "two without any combat training, or one plus those gained from hand-to-hand combat and/or boxing" (Gigantes, Conversion Book, pg. 96) means that characters without a HTH skill have a base number of attacks of two, while those with HTH have a base of one attack per melee.

Examples:

1. 'Cutter' a Juicer has six attacks. Being human, he starts out with *one*, and gains another attack from his HTH: Expert skill. Taking the skill Boxing gives him a third attack. From his special Juicer combat training, he gets an additional two attacks, bringing him up to five attacks per melee. His sixth and final attack came as a level increase from his hand-to-hand skill when he hit level four. (Mercenaries, pp. 42-43)
2. Sir Raoul Lazarious, Cyber-Knight has five hand-to-hand attacks. He begins with one, gains another from selecting HTH: Martial Arts, gets his third from taking the skill Boxing, gets his fourth from his special Cyber-Knight training, and his fifth from HTH: MA when he obtained level four. (Vampire Kingdoms, pp. 107-108)
3. "A typical CS grunt at 1st level has 2 attacks per melee with HTH expert." (RIFTS, pg. 256)

4. "Simply combine the number of attacks gained from each skill(HTH and Robot Combat). The total number indicates the total attacks per melee possible. Most first level pilots, with both skills, will have a total of four attacks per melee." (RIFTS, pg. 39)
5. "Most player characters start off with two attacks per 5 second melee round. Additional attacks may be acquired as one advances in hand to hand combat experience and from the boxing skill, special bonuses or magic. The average person, not trained in combat will only have one attack per melee round. Experienced fighters will have an average of three to six attacks per melee, sometimes more." (Palladium RPG 2nd Edition, pg. 48)
6. From *the* premier authority on Palladium combat: "The number of attacks per melee are limited by the type of hand to hand combat/martial arts one knows. Most martial arts forms start with two (2) or three (3), but some are only one while a few start with four. Normal humans start out with one one attack per melee. Extra attacks are gained by accumulating experience in combat/martial arts. These attacks are also called actions." (Ninjas and Superspies, pg. 126)
7. Erin Tarn has 4 attacks per melee. 2 from HTH: Basic at 1st level, +1 at 4th level, +1 at 9th level. (Africa World Book, pg. 147)
8. Sir Galahad has 5 attacks per melee. 2 from HTH: Martial Arts at level 1, +1 at level 4, +1 at level 9 and +1 from boxing. (England World Book, pg. 110)
9. Lieutenant Anna Mitchels has 5 attacks per melee in her VF. 2 from HTH: Expert at level 1, +1 at level 4, +2 from VF Combat training. (Robotech: Strike Force, pg. 70)

Damage Soak Rules

Due to its inherent toughness, armour is able to resist or negate a relatively small amount of damage before it is hurt. This is called Damage Soaking, and the tougher the object in question, the more damage it is able to Soak.

This rule is quite intuitive when you think about it, and is intended to add realism to games. Examples of Damage Soaking in real life include (1) no matter how many times you pelt an elephant with stones from a slingshot, you are not going to kill it; (2) no matter how many times you fire a 9mm pistol at a M1A1 Abrams tank, you are not going to destroy it; and (3) no matter how many times you hit the Great Wall of China with a baseball bat, you are never going to break the wall.

The gaming mechanics for Damage Soaking are quite simple: an object can soak up to 10% of its damage structure (either S.D.C. or M.D.C.) from *every* attack. Therefore if the Main Body of a powered armour has 250 M.D.C., it is able to Soak the first 25 points of damage from every attack. The only kind of damage that cannot be Soaked is damage done by armour penetrating weapons (which automatically do full damage).

Example:

Three bandits in Gladius Exo-Skeletons and armed with NG-E4 attack a lone Samas. The first bandit fires a short burst from his plasma ejector and does 48 M.D., however, due to the Samas's intrinsic thoroughness, it soaks 25 points of damage (10% of its Main Body) and only takes 23 M.D. Then the second and third bandits open up and do 36 and 42 points of damage. Because the Samas is able to soak 25 M.D. from each of the two attacks, it only takes 1 M.D. from the second bandit's blasts, and 17 M.D. from the third's. Being outnumbered and outgunned, the Samas fires both its mini-missiles (one high explosive and one armour piercing) at the lead bandit. Both missiles explode on their target, and the bandit takes 20 M.D. from the HE (with his Gladius Soaking 18 points of that damage) and 30 M.D. from the AP (remember, armour piercing ordinance does full damage!).

Horror Factor Rules

Roll to save versus Horror Factor as normal.

If success:

Roll vs. M.E.

Failure means no change.

Success means nothing unless successful by [HF] points or more.

If successful in such a manner then the character permanently gains +1 to Save vs. HF against that creature/item/etc.

If failure:

Roll vs. ME.

Determine difference between Roll and M.E. [M.E. - Roll].

Consult table below. (+ is successful difference, - is failure difference)

Difference	Result
+10 and above	No change. Might be suffering from HF but has the strength to overcome it.
+9	No attack loss. But ALL bonuses to strike/parry/dodge are -1. Negatives still apply.
+8	No attack loss. But ALL bonuses to strike/parry/dodge are -1. Negatives still apply.
+7	No attack loss. Bonuses to strike are Halved, parry/dodge are -1. Negatives still apply.
+6	No attack loss. Bonuses to strike are Halved, parry/dodge are -1. Negatives still apply.
+5	No attack loss. But ALL bonuses to strike/parry/dodge are halved. Negatives still apply.
+4	No attack loss. But ALL bonuses to strike/parry/dodge are halved. Negatives still apply.
+3	No attack loss. But NO bonuses to strike/parry/dodge. Negatives still apply.
+2	No attack loss. But NO bonuses to strike/parry/dodge. Negatives still apply.
+1	Standard HF effect. -1 Attack.
0	Standard HF effect. -1 Attack.
-1	Strike/parry/dodge is -1 for remainder of combat.
-2	Strike/parry/dodge is Halved for remainder of combat.
-3	S/P/D has NO bonuses for remainder of combat.
-4	Loss of 1 attack. S/P/D has no bonuses.
-5	Loss of 1 attack. S/P/D has no bonuses.
-6	Loss of 2 attacks. S/P/D is a flat -1 plus other negatives.
-7	Loss of 2 attacks. S/P/D is a flat -2.
-8	Loss of 3 attacks. S/P/D is a flat -3.
-9	Loss of 3 attacks. S/P/D is a flat -4.
-10	Loss of 4 attacks. S/P/D is a flat -5.
-11	Loss of 4 attacks. S/P/D is a flat -6.
-12	Loss of 5 attacks. S/P/D is a flat -6... See Phobias below.
-13	Loss of 5 attacks. S/P/D is a flat -6... See Phobias below (-1 to save).
-14	Loss of 5 attacks. S/P/D is a flat -6... See Phobias below (-2 to save).
-15	Loss of 5 attacks. S/P/D is a flat -6... See Phobias below (-3 to save).

-16	Loss of 5 attacks. S/P/D is a flat -6... See Phobias below (-4 to save).
-17	Loss of 5 attacks. S/P/D is a flat -6... See Phobias below (-5 to save).
-18	Loss of 5 attacks. S/P/D is a flat -6... See Phobias below (-6 to save).
-19	Loss of 5 attacks. S/P/D is a flat -6... See Phobias below (-7 to save).
-20 or more	Loss of 5 attacks. S/P/D is a flat -6... See Phobias below (-8 to save).

Phobias:

If HF failure is enough (-12 to -20 or more) then the player could develop a phobia of the creature in question. Simply roll a Save vs. Insanity (with any applicable penalties from the above table). Success means no phobia. Failure means a phobia.

Advanced Impact Damage Rules

These rules were devised to more accurately reflect how characters suffer S.D.C. damage while inside mega-damage armour and vehicles. While most body armours and military vehicles are carefully designed and padded so that the armour absorbs the majority of the damage, the person inside is still rattled and slammed around. In most cases, the damage suffered is minimal and leads to nothing more than a few bruises.

When a character is involved in a fall, high speed crash, or is hit by mega-damage weapons, the following chart can be used to determine (1) how much damage and (2) the chances of being stunned by that damage. Naturally, the amount of damage taken and the chances of being stunned are dependent on how well the character is protected (not wearing armour, in body armour, in a small powered armour, in a large powered armour, in a small robot vehicle, or in a large robot vehicle).

	<u>Damage</u>				<u>Chance of Being Stunned*</u>			
	<u>Falls</u>	<u>High Speed Crashes</u>	<u>Impacts from MD Weapons **</u>	<u>Cave-Ins *****</u>	<u>Falls</u>	<u>High Speed Crashes</u>	<u>Impacts from MD Weapons **</u>	<u>Cave-Ins *****</u>
No Armour	1 SDC/HP per 2ft fallen	1 SDC/HP per 2mph	None (target generally dead)	10 SDC/HP per floor/ton above	5% per 2ft	5% per 2mph	1% per 1 MD	20% per floor/ton above
Body Armour	1 SDC/HP per 5ft fallen	1 SDC/HP per 10mph	1 SDC/HP per 10 MD	5 SDC/HP per floor/ton above	4% per 5ft	5% per 5mph	1% per 10 MD	10% per floor/ton above
PAs < 10ft tall	1 SDC/HP per 10ft fallen	1 SDC/HP per 10mph above 15mph	1 SDC/HP per 20 MD	2 SDC/HP per floor/ton above	4% per 10ft fallen	5% per 10mph	10ft 1% per 15 MD	7% per floor/ton above
PAs > 10ft tall	1 SDC/HP per 20ft fallen	1 SDC/HP per 10mph above 20mph	1 SDC/HP per 25 MD	1 SDC/HP per floor/ton above	4% per 15ft fallen	5% per 15mph	1% per 20 MD	5% per floor/ton above
RVs < 10ft tall	1 SDC/HP per 30ft fallen***	1 SDC/HP per 15mph above 20mph***	1 SDC/HP per 35 MD***	0 SDC/HP per floor/ton above	4% per 25ft fallen***	5% per 25mph***	1% per 30 MD***	2% per floor/ton above
RVs > 10ft tall	1 SDC/HP per 40ft***	1 SDC/HP per 20mph above 25mph***	1 SDC/HP per 40 MD***	0 SDC/HP per floor/ton above	4% per 35ft***	5% per 30mph***	Not possible***	1% per floor/ton above

* Stun lasts 1D4 melees. After the initial stunned melees are completed, the stunned victim rolls 1D20:

- If the roll is greater than the victim's ME (considered a failed roll) add 1 more round of being stunned. If the number of failed rolls exceed the victim's PE, then the victim falls unconscious for 1D4 minutes
- If roll is less than the victim's ME, the victim can continue with whatever actions they were doing, but with a -1 penalty on all of their combat attributes (attacks per melee, initiative, strike, parry, dodge, etc.)

** Modifiers to the amount of impact damage and chances of being stunned depend on the type of attack:

- Punch/Physical Attacks: +25% from supernaturally strong; no modifier from normal or robotic strength
- Explosion: +75% if hit directly; +50% if within blast radius
- Rail Gun/Auto Cannon: +25%
- Ion/Particle Beam: -25%
- Plasma: +10%
- Laser: -90%

*** If the occupants are not strapped down or buckled in, determine the damage/stun by using the next smaller vehicle class on the chart

**** All damage and stun percentages are in addition to those from the fall (if applicable)

Notes:

- 1 MDC is done for every 10 SDC of damage, that way MD critters can't walk away from 300mph crash with just a scratch :)
- A successful *Roll with Impact* will reduce damage or stun by 50%

Advanced Initiative System Rules

The biggest advantage to this system is that with it, initiatives actually count for something! Another nice feature of this advanced system is that it helps to keep everyone's attacks distributed throughout the melee (as opposed to the existing Palladium system where *everyone* acts on the first few attacks of the melee, but then towards the end of the melee, a few characters [usually in power armour] keep attacking when everyone else has run out of attacks).

We have been using this initiative system for several years now, and all of our fellow gamemasters and players love it! If you have any questions about this system, or if you would like me to explain the details of any part of the system, **please** do not hesitate to contact either of us!

1. Roll initiative as usual on 1D20.

2. Add any applicable initiative modifiers.

3. Divide the total initiative number by the character's number of attacks. The resulting number indicates how many initiative numbers or segments will pass between the character's actions.

Example: A character with 3 attacks per melee rolls a 14 for their initiative and has a +1 bonus. 15 divided by 3 is 5, so the character goes on initiative segments 15, 10, and 5 (or every five actions, counting down from their initiative roll).

By starting with the highest initiative number (31), we see that Gank goes first on initiative segment 31. Next is Gank again on 24. After that Illyana goes on segment 20. Both Gank and Victor act on segment 18, but since Gank has the highest initiative number (31 compared to Victor's 18), then Gank goes first ...

5. Once everyone has used all of their attacks, re-roll initiative for next round.

Advanced Ranged Combat Rules

Base

- Base number to strike: 8.

Called Shot

- To strike a specific target or area: -7 to hit.

Close Proximity

- Close proximity strikes (50ft or less) are +1 to strike.
- Strikes that are point blank (10ft or closer), automatically hit if the target is immobile (unconscious or tied up people, doors, etc.).

Distance

- Distance Penalty *without* Sensor Systems (targeting by line-of-sight only): -1 to strike for every 250ft of distance.
- Distance Penalty *with* Sensor Systems: -1 to strike for every 500ft of distance, up to maximum sensor system range (10 miles for most power armours, 30 miles for most robot vehicles).
- Telescopic Scope Bonus: negates one point of to strike penalty for each power of magnification.
- Target beyond maximum weapon range: -4 to strike for every 25ft beyond the maximum weapon range, plus there are no W.P. Skill Bonuses to hit.

Target Size

- Size Bonus: +1 to strike for every 10ft of height or width of a target.
- Size Penalty: -1 to strike targets between 5ft and 3ft of size, -4 to strike targets between 3ft and 1ft of size, and targets smaller than 1ft count as a Called Shot.

Moving

- Target moving up to 40mph: -3 to strike.
- Target moving 40mph+: -6 to strike.
- Shooting from a moving object (car, hover vehicle, horse, or other moving platform); all shots are Wild. This does *not* include the firing of weapon systems built into power armour, robots, cyborgs, or mounted weapons or turrets built into combat vehicles.

Aimed Shots

- All Aimed shots *with* a W.P. are at +3 to strike (+4 to hit with a Revolver).

Bursts

- All Bursts (whether short, long, rail gun, multi-pulse, etc.) *with* a W.P. are at +1 to hit.
- All Bursts (whether short, long, rail gun, multi-pulse, etc.) *without* a W.P. are Wild and -6 to strike.

Wild Shots

- All Wild shots (either un-aimed or sprayed into an area) *with* a W.P. receive neither a bonus nor a penalty to strike.
- All Wild shots *without* a W.P. are -6 to strike.

Modern Weapon Proficiencies

- Every third level advanced with a W.P. receives a +1 to hit (e.g.: a fourth level character with a W.P. would have +4 on an aimed shot, +2 on a burst, +1 on wild shots, a seventh level character with a W.P. would have +5 on an aimed shot, +3 on a burst, +2 on wild shots, etc.).

Notes:

- Virtually *all* rifles are designed as two-handed weapons for maximum accuracy, and are -1 to strike when fired with one hand (Triax FSE-Clip weapons are -2 to strike when fired one-handed).
- All missiles are either self-guided (+3 to strike) or smart (+5 to strike, +4 to dodge) and do not enjoy the firer's bonuses to strike.
- Mini-missiles are not self-guided and enjoy the firer's bonuses to strike. Bonuses may be derived from W.P. Heavy Energy Weapons where appropriate (remember that as many as two mini-missiles may be fired in an aimed shot).
- Physical training and other strike bonuses *do not apply* to modern weapons.

Knockdown Rules (Simple)

By using both the amount of damage taken, and the relative size of the target, Knockdown (KD) and Knockback (KB) can be more realistically determined than from Palladium's original rules.

Effects of a Knockdown

Knockdown:	the target's initiative is reduced to zero, and they loose one attack per melee
Knockback:	target is knocked back 1 inch per 1% chance of their knockdown

Determining the Chances of a Knockdown

Size of Target	For every this many points of damage inflicted	There is this much chance of a Knockdown	Automatic Knockdown occurs with this much damage inflicted
Below 1ft	1	10%	10
1ft - 4ft	1	5%	50
5ft - 10ft	1	1%	100
11ft - 19ft	2	1%	200
20ft - 29ft	3	1%	300
30ft - 39ft	4	1%	400
40ft - 49ft	5	1%	500
50ft - 59ft	6	1%	600
60ft - 69ft	7	1%	700
70ft - 79ft	8	1%	800
80ft - 89ft	9	1%	900
90ft - 99ft	10	1%	1000
Above 100ft	impossible	-	none

Modifications:

When different height antagonist are in hand to hand combat then:

- Any physical damage done is figured for its KD % value.
- Attacker's height divided by opponents height, then multiply the KD % by the answer to the equation.
- The result is the Knockdown percent (NOT the damage).

Knockback:

Any time a target takes damage, Knockback (KB) *always* occurs, but may mean nothing more than a step back and no loss of attacks. Distance of KB is equal to one inch per one percent of the target's KD%.

Example 1: A 10 ft tall creature suffers 134 points of damage

- 100 points = Knockdown
- Plus 34 points = 34% KD
- GM rolls %; rolls 32%
- The creature loses 2 attacks, and has an initiative of 0
- Additionally, the creature suffers a KB of 134 inches (over 11 feet)!

Example 2: A X-5000 kicks a 5ft opponent (in body armor)

- Damage 60 MD (1D6 x 10 MD) = 60% KD for 5ft opponent
- X-5000 height (50ft) divided by opponents height (5ft) = x10
- KD is now equal to 600% (-6 attack, 0 initiative)
- Impact damage: 6 SDC with a 6% chance of stun
- KB distance = 50ft !!

Knockdown Rules (Advanced)

These advanced rules can be used to very realistically determine Knockdown (KD) and Knockback (KB).

Effects of a Knockdown

Knockdown:	the target's initiative is reduced to zero, and they loose one attack per melee
Knockback:	target is knocked back 1 inch per 1% chance of their knockdown

First, take the amount of damage and multiply it by 1000 (or by 10 if it is S.D.C. damage), then multiply the result by any applicable Damage Type Modifiers and Target Modifiers. The target's chance of being knocked down (known as the KD%) is equal to this number divided by their weight.

For every whole 100% in the target's KD%, the target automatically loses one attack per melee. Example: TargetA has a 450% chance of KD. This means that TargetA loses 4 attacks without question, and has a 50% of losing another.

Any time a target takes damage, Knockback (KB) *always* occurs, but may mean nothing more than a step back and no loss of attacks. Distance of KB is equal to one inch per one percent of the target's KD%.

Damage Type Modifiers:

- Punch/Physical Attack: x1.25 from supernaturally strong; no modifier from normal or robotic strength

- Explosion: x4 if hit directly; x2 if within blast radius
- Rail Gun/Auto Cannon: x1.25
- Particle and Ion: x.75
- Plasma: x1.1
- Laser: x.1

Target Modifiers:

- Hit Head: x2
- Leg Hit: x1, but if target is not knocked down, they must roll against PP or fall (-1 attack)
- Back of Knee (from behind): x1.5, but if target isn't knocked down roll against PP at -1D6 or fall (-1 attack)
- Target has High Center of Gravity : x1.5 to x2
- Target has Low Center of Gravity : x0.5 to x0.75

Example 1: TargetB gets hit with a 35 MD punch. $35 \times 1000 = 35000$. TargetB weighs 200lbs. $35000/200 = 175\%$. Which means 1 attack is automatically lost, and there is a 75% chance of losing 2 attacks. Additionally, TargetA suffers a KB of 175 inches (14.6 feet)!

Example 2: TargetC is in the blast radius of a fragmentation grenade and takes 3 MD. $3 \times 1000 \times 2 = 6000$. TargetC weighs 150lbs. $6000/100 = 40\%$. This means that TargetC has a 40% chance of losing 1 attack. Regardless of if they are knocked down, TargetC is displaced 3.3 feet.

Weapon Knockdown Rules

The following rules can be used to determine if a weapon has been knocked out of an opponent's hands:

Chance of Weapon Knockdown:

- One-Handed Weapons: 10% per point of damage (Ex: pistol)
- Two-Handed Weapons: 5% per point of damage (Ex: rifle)
- Heavy Weapons: 5% per two points of damage (Ex: bazooka)

Bonuses to Avoid Weapon Knockdown:

- Supernaturally Strong: +5% bonus per point of P.S. (Ex: dragon)
- Robotic Strength: +2% bonus per point of P.S. (Ex: borg, powered armour, robot vehicle)
- Normal: +1% bonus per point of P.S. (Ex: normal human)

Expanded Martial Arts Hand Strikes

I personally do not like the way supernatural HTH damage is calculated in Palladium games. I prefer to have supernatural damage work in basically the same way as normal P.S. damage. This is the first part of a set of tables. This covers hand strike damage for normal, extraordinary, superhuman, and supernatural P.S.

Hand Strikes

Attack	Normal	Extraordinary	Superhuman	Supernatural
Back Hand	1D4	1D6	1D8	2D6
Black Tiger Claw	1D6+4	1D8+4	1D10+4	2D8+4
Claw Hand	1D6	1D8	1D10	2D8
Combination Grab/Head Bash	2D6	2D8	3D6	5D6
Crane Fist	1D8	1D10	2D6	3D6
Double-Fist Punch	2D4	1D10	2D6	3D6
Double-Knuckle Fist	1D8	1D10	2D6	3D6
Duo-Claw Strike	2D6	2D8	3D6	5D6
Duo-Knuckle Strike	Stun	Stun	Stun	Stun
Eagle Claw Hand	2D6	2D8	3D6	5D6
Fingertip Attack	1	1D2	1D4	1D6
Fore-Knuckle Fist	1D6	1D8	1D10	2D8
Gou Combination	3D6	4D6	5D6	1D4 x 10
Gou Grip	1D4	1D6	1D8	2D6
Gou Strike	2D6+2	2D8+2	3D6+2	5D6+2
Human Fist (untrained)	1D4	1D6	1D8	2D6
Knife Hand	1D6	1D8	1D10	2D8
Knife Hand Knock-Out	Knock-Out	Knock-Out	Knock-Out	Knock-Out
Lau	1D4	1D6	1D8	2D6
One-Hand Choke	1D6	1D8	1D10	2D8
Overhead Fore-Knuckle Fist	1D10	2D6	2D8	4D6
Palm Strike	1D6	1D8	1D10	2D8
Power Block/Parry/Claw	1D6	1D8	1D10	2D8
Power Punch	1D10	2D6	2D8	4D6
Push Open Hand	1D6	1D8	1D10	2D8
Rotary Palm Strike	1D6	1D8	1D10	2D8
Roundhouse Strike	1D8	1D10	2D6	3D6
Strike (Punch)	1D4+1	1D6+1	1D8+1	2D6+1
Two-Hand Push	Stun	Stun	Stun	Stun
Uppercut	1D8	1D10	2D6	3D6

Rifts Note: In Rifts, or other magic-rich areas, beings with Superhuman P.S. inflict M.D. equal to the damage listed for Normal P.S., plus their damage bonus from high P.S. (i.e., a superhuman P.S. of 20 provides a +5 M.D. bonus). Supernatural P.S. inflicts M.D. using the damage listed for Superhuman P.S., plus the damage bonus from a high P.S. (20 P.S. grants +5 M.D.)

Expanded Martial Arts Kick Attacks

I personally do not like the way supernatural HTH damage is calculated in Palladium games. I prefer to have supernatural damage work in basically the same way as normal P.S. damage. This is the second part of a set of tables. This covers foot strike damage for normal, extraordinary, superhuman, and supernatural P.S.

Kick Attacks

Attack	Normal	Extraordinary	Superhuman	Supernatural
Axe Kick	1D10	2D6	2D8	4D6
Backward Sweep	0	0	0	0
Crescent Kick	1D10	2D6	2D8	4D6
Flying Jump Kick	x3	x3	x3	x3
Flying Reverse Spinning Kick	2D6	2D8	3D6	5D6
Flying Reverse Turn Kick	x4	x4	x4	x4
Jump Kick	x2	x2	x2	x2
Kick Attack	1D8	1D10	2D6	3D6
Roundhouse Kick	2D6	2D8	3D6	5D6
Shin Kick	1D6	1D8	1D10	2D8
Snap Kick	1D6	1D8	1D10	2D8
Sweep Kick	1D4	1D6	1D8	2D6
Tripping/Leg Hook	0	0	0	0
Wheel Kick	1D10	2D6	2D8	4D6
Butjapgo Chagi (hand/kick)	1D6/2D6	1D8/2D8	1D10/3D6	2D8/5D6

Rifts Note: In Rifts, or other magic-rich areas, beings with Superhuman P.S. inflict M.D. equal to the damage listed for Normal P.S., plus their damage bonus from high P.S. (i.e., a superhuman P.S. of 20 provides a +5 M.D. bonus). Supernatural P.S. inflicts M.D. using the damage listed for Superhuman P.S., plus the damage bonus from a high P.S. (20 P.S. grants +5 M.D.)

Expanded Martial Arts Miscellaneous Attacks

I personally do not like the way supernatural HTH damage is calculated in Palladium games. I prefer to have supernatural damage work in basically the same way as normal P.S. damage. This is the third part of a set of tables. This covers miscellaneous strike damage for normal, extraordinary, superhuman, and supernatural P.S.

Miscellaneous Attacks

Attack	Normal	Extraordinary	Superhuman	Supernatural
Body Block/Tackle	1D4	1D6	1D8	2D6
Body Flip/Throw	1D6	1D8	1D10	2D8
Choke	1D6	1D8	1D10	2D8
Chuk	2D6	2D6	2D6	2D6
Crush/Squeeze	1D4	1D6	1D8	2D6
Elbow	1D4	1D6	1D8	2D6
Forearm	1D4	1D6	1D8	2D6
Knee	1D6	1D8	1D10	2D8
Neck Hold/Choke	1D4	1D6	1D8	2D6
Pistol Whip	1D8	1D10	2D6	3D6

Rifts Note: In Rifts, or other magic-rich areas, beings with Superhuman P.S. inflict M.D. equal to the damage listed for Normal P.S., plus their damage bonus from high P.S. (i.e., a superhuman P.S. of 20

provides a +5 M.D. bonus). Supernatural P.S. inflicts M.D. using the damage listed for Superhuman P.S., plus the damage bonus from a high P.S. (20 P.S. grants +5 M.D.)

Rules for Supernatural Martial Arts

Here is my version of various mega-damage strikes from those individuals lucky enough to have a supernatural P.S. and who are versed in a Ninjas and Superspies martial art. To use it, check the intended strike against the reference letter to use then go to the table which corresponds to that letter and use the damage listed there for the appropriate strength.

Martial Arts Attack Reference

Action	Human Damage	Supernatural Damage Table
Fist (punch)	1d4	A
Knife Hand	1d6	A
Fore-Knuckle Fist	1d6	A
Double-Knuckle Fist	1d8	B
Power Punch	1d10	B
Backhand	1d4	A
Fingertip attack	1	-
Claw Hand	1d6	A
Palm Strike	1d6	A
Double Fist Punch	2d4	A+5
Kick Attack	1d8	C
Snap Kick	1d6	B
Roundhouse	2d6	D+10
Wheel Kick	1d10	D
Crescent Kick	1d10	D
Axe Kick	1d10	D
Jump Kick	1d8 *	C
Flying Jump Kick	1d10 *	D
Flying Reverse Turn Kick	2d6 *	D+10

Supernatural Damage Reference

P.S.	A	B	C	D	
<15	4d6 SDC	1d6 SDC	4d8 SDC	1d8 SDC	
16-20	1d6	2d6	1d8	2d8	
21-25	2d6	4d6	2d8	4d8	
26-30	3d6	6d6	3d8	6d8	
31-35	4d6	1d4 x 10	4d8	1d8 x 8	
36-40	5d6	1d6 x 10	5d8	1d8 x 10	
41-50	6d6	2d4 x 10	6d8	1d10 x 10	
51-60	1d6 x 10	2d6 x 10	1d8 x 10	2d6 x 10	

61-70	2d4 x 10	4d4 x 10	2d6 x 10	3d6 x 10	(Herakles)
71-80	3d4 x 10	4d6 x 10	3d8 x 10	3d8 x 10	(Magni)
81-90	3d6 x 10	5d6 x 10	6d6 x 10	4d8 x 10	(Atlas)

Notes:

1) The first two columns are as per supernatural P.S. damage listed in various books. I believe that Conversion Book One and Mutants in Orbit agree on the matter.

2) The last three rows were made with reference to Conversion Book Two and the entities within.

3) Those actions listed with an asterisk (*) are listed in Ninjas and Superspies as automatically inflicting a critical strike. If a natural twenty is rolled then the damage is tripled. Whether or not this rule is incorporated into your particular game is entirely at the GMs discretion. See page 130 of Ninjas and Superspies for more details.

4) Anyone who has those strengths below the line is almost definitely NPC material (I can't really see Atlas spending time learning how to do a flying reverse turn kick :)). If someone wants to spend all their Chi in Kokyu (Body Chi) to obtain these levels they should be allowed to, remembering that it only lasts for one melee. Since this would use nearly all of normal Martial Artists' Chi, they would be probably be exhausted afterwards. Penalties (if any) for this life force exertion are up to the GM and he is encouraged to be creative and fair.

Rules for Parrying Area-Effect Weapons

While area-effect weapons cannot be parried in the usual sense, characters can use shields to provide themselves with partial protection.

Parry Shield: because shields are designed with parrying in mind, they can be used to partially parry area-effect weapons.

- Rail Gun Bursts: shield takes 33% of the damage, with the character taking the other 67%
- Explosions (missiles, grenades, etc.): shield takes 25% of the damage, the character takes 75% of the damage

Large Parry Shield: due to their greater size, large shields can be used to parry more of an area-effect weapon's damage.

- Rail Gun Bursts: shield takes 67% of the damage, with the character taking the other 33%
- Explosions (missiles, grenades, etc.): shield takes 50% of the damage, the character takes 50% of the damage

Rules for Parrying Energy Weapon Bursts

By using different types/sizes of objects to parry, characters can eliminate or reduce the amount of damage taken from energy weapon bursts. The number of blasts in a burst that can be parried are determined by the kind of parrying implement used.

Standard Parry Implement (sword, rifle, etc.): the character is able to parry one of the blasts in an energy burst. The parry implement takes damage x1, and the character takes the following reduced amount of damage:

- Short Burst: damage x1
- Long Burst: damage x2
- Full Burst: damage x6

Parry Shield: because shields are designed with parrying in mind, they can be used to parry more blasts. When a successful parry is performed, the shield takes damage x2, with the character taking the following reduced amount of damage:

- Short Burst: no damage!
- Long Burst: damage x1
- Full Burst: damage x5

Large Parry Shield: because of its more significant size, large shields can be used to parry the greatest number of blasts. When a successful parry is performed, the shield takes damage x3, with the character taking the following reduced amount of damage:

- Short Burst: no damage!
- Long Burst: no damage!
- Full Burst: damage x4

Extraordinary P.S.

For those who have Heroes Unlimited (Revised 2nd Edition), it clearly states on page 204 that robots are considered to have superhuman strength. That means we now have the following Physical Strength strata in the Megaverse:

1. **Supernatural P.S.:** able to carry 300 times and lift 500 times their P.S. score. (Example: monsters, aliens, supernatural creatures, PC's/NPC's with the Supernatural P.S. power)
2. **Superhuman P.S.:** able to carry 200 times and lift 300 times their P.S. score. (Example: robots, PA's, and PC's/NPC's with the Superhuman P.S. power)
3. **Extraordinary P.S.:** able to carry 100 times and lift 200 times their P.S. score. (Example: PC's/NPC's with the Extraordinary P.S. power)
4. **Strong:** able to carry 20 times and lift 40 times their P.S. score. (Example: P.S. greater than 17; no P.S. related powers)
5. **Normal:** able to carry 10 times and lift 20 times their P.S. score. (Example: P.S. up to 16; no P.S. related powers)

The damage tables for categories 4 and 5 are listed in the combat sections of each of the core rule books (Heroes Unlimited 2, Nightbane, Beyond the Supernatural, Rifts, etc.) and category 1 is listed in the applicable core rule books (S.D.C. versions are in Nightbane and Heroes Unlimited 2, with a M.D.C. version in RIFTS Conversion Book (One) and select world books). This means that we do not have P.S. damage charts for either Superhuman P.S. or Extraordinary P.S. Obviously, this is an injustice that must be corrected.

I have developed a P.S. damage chart for Extraordinary P.S., useful for those with the super power. (The [Superhuman P.S.](#) chart is available as well.)

- P.S. 22 to 30: as per normal humans. Note that, due to the power description, the minimum P.S. for this power is 22. Of course, that also means a punch will do at least 1D4+7 S.D.C. as it is...
- P.S. 31 to 35: 1D4 S.D.C. restrained punch, 1D6 S.D.C. full strength punch, 2D6 power punch.
- P.S. 36 to 40: 1D4 S.D.C. restrained punch, 2D4 S.D.C. full strength punch, 3D6 S.D.C. power punch.
- P.S. 41 to 45: 1D6 S.D.C. restrained punch, 2D6 S.D.C. full strength punch, 4D6 S.D.C. power punch.
- P.S. 46 to 50: 1D6 S.D.C. restrained punch, 2D6 +2 S.D.C. full strength punch, 5D6 S.D.C. power punch.
- P.S. 51 to 55: 2D4 S.D.C. restrained punch, 3D6 S.D.C. full strength punch, 6D6 S.D.C. power punch.
- P.S. 56 to 60: 2D4 S.D.C. restrained punch, 5D4 S.D.C. full strength punch, 1D4 x 10 S.D.C. power punch.

* Note 1: add the usual P.S. attribute damage bonus to the damage noted above (the damage bonus is option for restrained punches and slaps)

* Note 2: power punches count as two melee attacks

* Note 3: a bite or head butt inflicts half the normal punch damage

Also note that no human will be able to actually reach P.S. 60 with this super power, however, some alien and D-Bee races can. Assuming, of course, they take all the physical skills that add to P.S. (+8), and they somehow get P.S. 52 from their racial bonuses, P.S. roll, and the 2D6 +6 roll. Although there are some alien type combos in HU2 that can gain this much P.S. or more, they will be very rare (GM's: hint, hint...) and will require extremely good or lucky rolls of dice (read: high fudge factor...).

As far as M.D. attacks in Rifts: that's a tough call. Technically, these are the guys who are as strong as the equivalent Juicer or Crazy; as such, follow the CB1 guidelines (P.S. 36 or higher: 1 M.D. power punch only), if you want straight rules. However, I have a separate solution:

Augmented Humans (non-supernatural Juicers/Crazies and characters with the Extraordinary P.S. power) do triple their normal S.D.C. damage in Rifts. But, those with P.S. of 36 or higher will do 1 M.D. to M.D. structures and triple their normal S.D.C. damage to S.D.C. structures with power punch only. So, a Juicer with P.S. 30 will do 3D4 +15 S.D.C. on a normal punch and 4D6 +15 S.D.C. on a power punch. Juicer B with P.S. 40 will do 2D6 +25 S.D.C. on a restrained punch, 4D6 +25 S.D.C. on a full strength punch, and 1D6 x 10 +25 S.D.C. on a power punch, but will do 1 M.D. to M.D. structures. So, even a puny Juicer with P.S. 22 will do 2D4 +7 S.D.C. per punch, enough to seriously hurt the average civilian (probably lost all their S.D.C., if they had any...), and can deal out a 4D6 +7 S.D.C. power punch, enough to seriously hurt anyone out of armor.

Superhuman P.S.

For those who have Heroes Unlimited (Revised 2nd Edition), it clearly states on page 204 that robots are considered to have superhuman strength. That means we now have the following Physical Strength strata in the Megaverse:

1. **Supernatural P.S.:** able to carry 300 times and lift 500 times their P.S. score. (Example: monsters, aliens, supernatural creatures, PC's/NPC's with the Supernatural P.S. power)
2. **Superhuman P.S.:** able to carry 200 times and lift 300 times their P.S. score. (Example: robots, PA's, and PC's/NPC's with the Superhuman P.S. power)
3. **Extraordinary P.S.:** able to carry 100 times and lift 200 times their P.S. score. (Example: PC's/NPC's with the Extraordinary P.S. power)
4. **Strong:** able to carry 20 times and lift 40 times their P.S. score. (Example: P.S. greater than 17; no P.S. related powers)

5. **Normal:** able to carry 10 times and lift 20 times their P.S. score. (Example: P.S. up to 16; no P.S. related powers)

The damage tables for categories 4 and 5 are listed in the combat sections of each of the core rule books (Heroes Unlimited 2, Nightbane, Beyond the Supernatural, Rifts, etc.) and category 1 is listed in the applicable core rule books (S.D.C. versions are in Nightbane and Heroes Unlimited 2, with a M.D.C. version in RIFTS Conversion Book (One) and select world books). This means that we do not have P.S. damage charts for either Superhuman P.S. or Extraordinary P.S. Obviously, this is an injustice that must be corrected.

I have developed the following P.S. damage chart for Superhuman P.S., useful for those with the super power and for robot vehicles in S.D.C. environments. (The [Extraordinary P.S.](#) chart is available as well.)

- P.S. 15 or less: use normal human damage (ie. 1D4 S.D.C. Punch).
- P.S. 16 to 20: 1D4 S.D.C. restrained punch, 2D4 S.D.C. full strength punch, 4D4 S.D.C. power punch.
- P.S. 21 to 30: 1D6 S.D.C. restrained punch, 2D4 S.D.C. full strength punch, 3D6 S.D.C. power punch.
- P.S. 26 to 30: 1D6+1 S.D.C. restrained punch, 2D4 +2 S.D.C. full strength punch, 5D4 S.D.C. power punch.
- P.S. 31 to 35: 2D4 S.D.C. restrained punch, 2D6 S.D.C. full strength punch, 4D6 S.D.C. power punch.
- P.S. 36 to 40: 2D4 S.D.C. restrained punch, 2D6 +2 S.D.C. full strength punch, 5D6 S.D.C. power punch.
- P.S. 41 to 50: 2D6 S.D.C. restrained punch, 5D6 S.D.C. full strength punch, 1D6 x 10 S.D.C. power punch.
- P.S. 51 to 60: 3D6 S.D.C. restrained punch, 1D4 x 10 S.D.C. full strength punch, 2D4 x 10 S.D.C. power punch.

* Note 1: add the usual P.S. attribute damage bonus to the damage noted above (the damage bonus is option for restrained punches and slaps)

* Note 2: power punches count as two melee attacks

* Note 3: a bite or head butt inflicts half the normal punch damage

Collision Rules

Moving Objects:

Damage is determined by the weight of the colliding objects. The damage is one point of S.D.C. for every ton the object weighs, with a minimum of 1D6 damage for things under 400 lbs. Items that weigh between 400 lbs and one ton do 2D6. Things that weigh over one ton do 2D8 damage for every five tons of weight (rounded up).

This damage is multiplied for every 10 MPH that the objects are moving, or divided if speed is under 10 MPH (target not moving would do one-tenth damage; minimum consideration of 1 MPH). The speed for the two items is added up, but the objects may damage each other differently depending on their differing weights.

See the M.D.C. vs. S.D.C. Objects chart below for the effects of collisions between M.D.C. objects and S.D.C. objects.

Example: Two vehicles strike each other, a 16-ton semi going 80 MPH and a 1 ton car going 50 MPH. The total speed in the collision is 130 MPH, so the damage will be multiplied by 13. The semi weighs 16 tons, so 8D8 is rolled and multiplied by 13 to determine how much damage the car takes. Because the car weighs one ton, the semi truck takes 2D6 x 13 S.D.C.

Dropped or Falling Objects:

Dropped or falling items do 1D10 S.D.C. per 100 lbs. This damage is added again for every 10 ft fallen, for a maximum of x 10 damage. See the M.D.C. vs. S.D.C. Objects chart below for the effects of impacts between M.D.C. objects and S.D.C. objects.

M.D.C. vs. S.D.C. Objects

	<u>M.D.C. Object</u>	<u>S.D.C. Object</u>
M.D.C. Object	M.D.C. objects take 1/10th damage from other M.D.C. objects	S.D.C. objects take double damage from M.D.C. objects M.D.C. objects take 1/20th damage from S.D.C. objects
S.D.C. Object	M.D.C. objects take 1/20th damage from S.D.C. objects S.D.C. objects take double damage from M.D.C. objects	S.D.C. objects take full normal damage from other S.D.C. objects

Critical Hit Rules for Power Armour

Critical Hits on Mecha/Power Armor

This type of damage occurs when a 17-20 is rolled naturally, but these must be critical hits for the character or it has no effect. Additionally, when a section takes 1/4 (25%) of its maximum normal M.D.C./S.D.C. in one blow, there is a 25% chance of causing a critical hit.

Head/Sensor Hit

Self-Controlling Robots must make a PP save to not fall down (-1 attacks per melee if it fails), a ME save to avoid disorientation (-1 attacks per melee if the save fails), and a PE save to see if the pain stuns it for one melee action (this is very rarely needed as most bots don't feel pain.) These rules can also be applied to head shots on living beings.

All Saving Throw bases are 15. Any penalty/bonus to the save depends on what percentage the damage is, to how much the head had just before being hit.

Percentage of Damage Done	Penalty / Bonus
1 - 5%	+ 5 to save
6 - 10%	+3
11 - 20%	+1
21 - 30%	none
31 - 41%	-1

41 - 50%	-2
51 - 60%	-4
71 - 80%	-8
81 - 90%	-10
91 - 95%	-12
96% +	-14

Effects of Critical Head Hit (roll 1D4):

If an effect isn't possible, use next one.

1	Targeting Systems knocked offline (damage done is % penalty to repair)
2	IR and thermal vision lost (knocked offline)
3	Head weapon lost
4	System Backlash: Machine blinded for current and next action

Body Hit

Effect of critical hit (1D4):

1 - 2	A weapon is lost	
3	Controls hit (roll 1D12)	
	1 - 5	Falls down (lose one action)
	6 - 11	Controls damaged (roll 1D10)
	1 - 8	-1D4 to strike/parry/dodge until fixed
	9	-2D4 to strike/parry/dodge until fixed
	10	-3D4 to strike/parry/dodge until fixed
	12	Controls destroyed, the vehicle shuts down
4	Engine/power plant hit (roll 1D10)	
	1 - 4	System failure, the vehicle is immobilized for 1D6 actions
	5 - 6	System failure, the vehicle shuts down for 1D4 melees
	7 - 10	Power surge (roll 1D8)
	1 - 3	Random weapon destroyed (anywhere on the vehicle)
	4	Critical Head Hit
	5	Critical Arm Hit
	6	Critical Leg Hit
	7	Critical Pilot Compartment Hit
	8	Engine explodes doing 2D6 x (engine output / 10) to the vehicle

Reinforced Pilot Compartment (RPC) Hit

Effects of Critical Hit (1D6):

1	All targeting systems lost	
2 - 3	Controls to one weapon shut down	
4	All optics lost (but not targeting systems); note that unless the vehicle has windows, the pilot is now blind	
5	Controls hit (see Body #3)	
6	Life support hit (roll 1D6)	
	1	Offline for 1 melee
	2	Offline for 1D4 melees
	3	Offline for 1D6 minutes
	4	Offline for 2D6 x 5 minutes
	5	Offline for 1D6 hours
	6	Destroyed

Also, there is a chance for an internal explosion equal to the percentage of the armor just before being struck. Example: a 240 M.D.C. RPC is hit by 120 damage, so there is a 50% chance. This will damage the pilot and an additional critical hit effect is rolled for the RPC.

Internal Explosion Damage (1D6):

1	1/100 (1%) of the damage inflicted to the RPC
2	1/50 (2%) of the damage inflicted to the RPC
3	1/25 (4%)
4	1/10 (10%)
5	1/7.5 (25%)
6	1/5 (50%) Half the damage inflicted to RPC inflicted upon pilot

Arm

Critical Hit Effects (1D6):

1 - 3	Strength is reduced to 1/4
3 - 4	Moving part damaged, Strike/parry with that arm/hand is -2D4
5 - 6	Weapon destroyed

Arm Destruction Effects (1D6):

1 - 2	Blown off at shoulder
3 - 4	Blown off at elbow
5 - 6	Blown to useless slag, but is still attached

Hand

Critical Hit Effects (1D4):

1	Drop whatever is being held
2 - 3	Hand actuators damaged; -2D4 to strike/parry with any hand weapon
4	Hand frozen in current position

Leg

Critical Hit Effects (1D8):

1 - 2	Strength/speed reduced to half, -2D4 to strike with kick
3 - 4	Leg weapon knocked offline until fixed
5	Foot frozen in place, speed reduced to 75%, kick does half damage
6	Speed/strength of leg reduced by (roll % dice)
7	Knee frozen, speed reduced to 25%, kick does one-quarter damage
8	Leg frozen/immobilized, speed reduced to 5%

Leg Destruction Effects (1D6):

1 - 2	Blown off at hip
3 - 4	Blown off at knee
5 - 6	Reduced to scrap, but is still attached

Other Equipment:

Critical Hit Effects (1D8):

1 - 2	All Effectiveness reduced by half (damage and range if weapon, etc.)
3	Activates suddenly
4 - 5	Lost/frozen/knocked offline for 1D6 melees
6	Offline for 1D6 minutes
7	Offline for 1D6 x 5 minutes
8	Offline for 2D6 x 5 minutes

Advanced Phase World Starship Rules

I am a heavy reader of science fiction and am very choosy about what I read. Compared to most Science fiction (including Star Trek Novels, Babylon 5, and David Weber's "Honor Harrington" series) the non FTL (Faster than Light) speeds of starships in Phase World are far too slow. A good example of this is how long a Phase World starship would take to travel from the Earth to Mars. Based on how long it takes our probes to get there and how fast they are, it would take years for Phase World starships to go from the Earth to Mars. Additionally, while C.J. Carella wrote that Phase World starships are more advanced than their Robotech or Macross counterparts, simply comparing the starships from these three different dimensions shows that Robotech ships have vastly different top speeds and weapon ranges that dwarf those of the other games.

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Starship Speeds:

Phase World starships are theoretically capable of reaching .99 of the speed of light, however it is a starship's radiation and particle shields that limit how fast these starships can actually travel. Because larger ships can mount heavier and more effective radiation and particle shields, they can reach a higher top speed than smaller starships. This is somewhat equaled out by the fact that smaller ships generally have a higher top-end acceleration. With the exception of Runners (which have military grade shielding), most civilian ships have a lower top speed than military ships because civilian designers are unwilling to invest as much space for shielding.

Top Speeds:

(Note: these figures are meant for an average Sol type solar system. Systems with higher particle densities would require lower top speeds.)

Top Starship Speeds		
<u>Ship Class:</u>	<u>Size:</u>	<u>Maximum Speed:</u>
Capital Ships	6,000 tons and greater	60% of light
Heavy Fighters, Bombers, Runners	250 tons and greater	50% of light
Star Fighters	5 tons and greater	40% of light
Space Combat Power Armors & Robots	Varies	20% of light
Civilian Ships	Varies	20% of light

Robotech starships are also reduced for the same reason. Their particle and radiation shielding are not at Phase World standards which only allows the starships to reach the listed book ranges. If their radiation and particle shields were raised up to the standards for Phase World then they would have the same top-end speeds. This does not include **Robotech** and **Macross** star fighters because they are basically short range craft, which could take advantage of the higher speeds available with engine upgrades.

Robotech: Sentinels fighters are much slower than what should be expected in space, so instead of the 75% increase, revise the speed of the ship to four times the vehicle's normal speed.

Mutants in Orbit starships are similarly effected by the same rules. A starship's top speed is limited by the ability of its radiation and particle shielding. Ships with traction drives can reach up to 20% of the speed of light (equal to Phase World civilian shields) and ships with other types of engines can go up to four times greater than their listed speed when they are in space. This also includes Rifts Earth vehicles if they can break atmosphere.

Starship Acceleration:

In many ways a starship's acceleration is much more important than its top speed. Starship acceleration is affected by two factors: the capability of the starship's drive and the ability of the artificial gravity system to compensate for the starship's acceleration. If the artificial gravity system fails while a starship is accelerating, S.D.C. beings would be turned into jelly, and M.D.C. creatures such as the Kreegor would be killed when every bone in their body shatters. Completely solid organisms such as the machine people would survive, but would not be able to move.

A starship's acceleration can be calculated by dividing its Mach speed by ten. This becomes the ship's acceleration, as expressed in a percentage of the speed of light per turn. This generally means that small ships (like star fighters) have a much faster acceleration rate than large ships (such as capital ships).

Example 1: A Black Eagle has a maximum speed of Mach 16. This means that the starship's acceleration is 1.6% of the speed of light per turn.

Example 2: A Warshield cruiser has a listed speed of Mach 8.5. This means that the starship can accelerate at up to .85% of the speed of light in a turn.

A ship can exceed its top acceleration by up to three times its normal acceleration rate, but there is an 18% chance of the engine burning out each turn. If the engine burns out, emergency systems will allow the ship to accelerate up to .2% of the speed of light. This means that starships with burnt out engines take a very

long time to speed up and slow down. In addition to the chance of engine failure, there is a 1% chance per turn that when a ship is accelerating above maximum, its artificial gravity will fail and kill most of the crew.

There are two final areas that needs to be described: mass and inertia. The mass of an object increases as the speed of light is approached. This means that once a starship reaches 50% the speed of light, the ship's rate of acceleration is halved. Additionally, as a ship approaches the speed of light, its inertial mass is dramatically increased. This can be calculated with the following formula:

$$\text{Gamma} = 1 / \text{square root} (1 - (v/c)*(v/c))$$

(where v = velocity and c = speed of light)

The following table illustrates this:

Mass Increase	
<u>Speed</u> <u>(c):</u>	<u>Gamma:</u>
0	1
0.2	1.021
0.3	1.048
0.4	1.091
0.5	1.160
0.6	1.250
0.7	1.400
0.8	1.667
0.9	2.294
0.95	3.203
0.99	7.088
1	-> infinity

The apparent length of the starship is divided by the gamma factor, and the apparent time is slowed by this factor. The momentum and kinetic energy of the starship is increased by the factor, so it's apparent inertial mass (*not* gravitational mass) is also increased by this factor. In game terms, this all means that a starship acceleration is divided by the Gamma factor to calculate the ships new acceleration. In practical terms, this does not need to be worried about until 50% of light has been achieved.

Robotech and **Macross** starship accelerations use the auxiliary engines speed divide it by ten and that is the starship's acceleration in a percentage of the light.

Example: Ikazuchi Command Carriers have a top speed on its auxiliary engines of Mach 7. The starships acceleration would be .7% of the speed of Light. Note: this rule does not effect most small ships such as star fighters; they keep their Mach speeds as their top speed unless they are upgraded.

Mutants in Orbit The only kind of ship that can reach such high speeds is the traction drive ship. As the book says that these ships would take up to a year to reach .99 of light (limited by shields), the ship's acceleration is about .00005 percent of the speed of light per turn.

Starship FTL Modifications:

Before going FTL, a starship must not be inside a gravity well. Since the strongest gravity source in a solar system is normally the star, these distances are measured from the star itself. It should be noted that these figures are based on a star that is the size of Sol (our sun); in order to modify the distance from the celestial object for the actual mass of the celestial object, you simply multiply the celestial objects mass in Sol masses by the distances. This means that White and Blue Giant class stars would have very large areas that a ship must clear before going FTL and gas giant planets would still have a relatively large distance that a ship must travel away from before entering FTL.

This distance is calculated by taking the largest distance that the drive requires, dividing that number by 1000, with the resulting figure showing the distance necessary as measured in light minutes. (A light minute is a convenient distance to express longer distances. The distance from the Earth to Sol is approximately 8 light minutes.)

Phase Drives:

Instead of Phase Drives being effected by the atmosphere of a planet, they are effected by gravity. If a ship tries to activate its P-drive too far inside the gravity well of a celestial object, the ship will be ripped apart. When using a P-drive with a star the size of Sol, the ship must be at least 20 light minutes away from the star. (The original distances listed in the Phase World book is 10 to 20 thousand miles.)

Contra-Gravitonic Drives:

The distances for a CG-Drive is increased the same way that it is for P-Drives. This means that instead of 20 thousand miles the distance is 20 light minutes. (In the Phase World book, the distance is written as 10,000 miles, but it states that double is safer so I am using the larger figure)

Rift Jump Drives:

Instead of being effected by just the gravity and ley lines of the planet, a starship with Rift Jump drives affected by the gravity and ley lines of the entire system. The distance needed for the R-drive to be used is based on the magic in the system. A system that has very low magic only requires a distance of 5 light minutes, while a system with a great amount of magic will require a distance of 50 light minutes before being able to activate the R-Drive.

Spacegate Jump Systems:

These systems are the only exception to the distances for the FTL propulsion systems. This is because they work on a completely different principle. Space gates may be near a planet without interfering with their ability to be used.

Energy Weapon Ranges:

The ranges written in the Phase World book are far shorter than those of capital scale weapons in either the Robotech or Macross RPGs. While many science fiction programs seemingly show ships very close together, that is an illusion meant for viewers only. In a Babylon 5 episode they had a group of White Stars craft attack a group of Earth Force Destroyers. While the ranges appeared to only be a few thousand meters. The ranges stated were around 10,000 km. To equal out Phase World starship weapon ranges, all weapons are increased. In addition, rail guns are assumed to fire their projectiles at incredible speeds and do not propose a problem for the ships firing them.

Capital Scale Weapons:

This includes all weapons on capital scale starships that do 1D4 x 100 M.D.C. or greater. The ranges of the weapons are changed as follows:

Capital Scale Weapon Ranges		
<u>Environment:</u>	<u>New Weapon Range:</u>	<u>Special Notes:</u>
Underwater Range	Equal to the book-listed range in an atmosphere	Underwater Range is generally never more than 1/2 the Atmospheric Range
Atmospheric Range	Equal to the book-listed range in space	None
Space Range	Equal to 1000 times the book-listed range in space	Space Range is generally at least 1000 times the Atmospheric Range

Example 1: A Warshield Cruiser's main battery has a range of 10 miles in an atmosphere and 100 miles in space. The modified ranges would be that the weapon has a range of 10 miles underwater, 100 miles in an atmosphere and 100,000 miles in space.

Example 2: The secondary batteries have no listed space range. The range listed is 16 miles. This becomes the weapons underwater range, The atmospheric range becomes double listed range to 32 miles, and space range becomes 16,000 miles which is 1000 times listed range.

Star Fighter Scale Weapons:

This includes all of the lighter weapons on capital ships, all energy weapons on star fighters and other small ships, and the weapons on space robots and power armors. The ranges for Star Fighter Scale weapons are modified as follows:

Star Fighter Scale Weapon Ranges		
<u>Environment:</u>	<u>New Weapon Range:</u>	<u>Special Notes:</u>
Underwater Range	Equal to the book-listed range in an atmosphere	Underwater Range is generally never more than 1/2 the Atmospheric Range
Atmospheric Range	Equal to the book-listed range in space	None
Space Range	Equal to 100 times the book-listed range in space	Space Range is generally at least 100 times the Atmospheric Range

Example: the rail gun on a SF-69 Scorpion Star Fighter has a book-listed atmospheric range of 8 mile and a book-listed space range of 16 miles. The new ranges will become 8 miles underwater, 16 miles in space, and 1600 miles in space.

Capital Scale weapons in **Robotech** and **Macross** are not adjusted. This gives them a small range superiority over similar Phase World weapons. **Robotech: Sentinels** states that lighter energy weapon ranges should be increased from 75% to 100% in space.

Star Fighter Scale weapons in **Robotech** and **Macross** are instead quadruped (x4) in space as compared to their listed ranges. This also applies to **Rifts** Earth vehicles in space and **Mutants in Orbit** vehicle weapons

Missile Ranges, Top Speeds, and Accelerations:

In the Phase World books, you get the impression that starships lumber towards each other, not firing any energy weapons until they are at rock throwing ranges (100 miles or less) and not launching missiles until they are only 1 or 2 miles away from each other. I prefer a much more dynamic starship and missile combat. Space-based missile ranges have been vastly increased, and missiles now travel and accelerate at percentages of the speed of light. These changes mean that missile fire commonly starts at ranges greater than 1 million miles.

Missiles are not effected by a maximum speed because the missile's life span after launch is brief enough that radiation and particle damage is not generally a factor. (Less than 1% of all missiles do not reach their targets because radiation or particle damage causes them to destroy themselves, become inert, or veer off course.) Missile acceleration is calculated similarly to starship acceleration, except the top speed is higher.

Extended Range Engagements:

Missiles can be used to hit targets beyond their maximum range because missiles will travel in a straight line once they run out of energy. They are of course effected by gravity wells but that can be calculated for.

- Targets that do not move are ideal for this type of strike. These include, among other things, orbital bases and cities. There is no bonuses or penalty to hit these targets.
- To hit specific targets, such as a specific city building, the missiles are at -8 to strike.
- To hit a large moving target such as a Capital ship (Protector or Dreadnought for example), the missiles are at -16 to strike and unlike most attacks, the pilot can make dodges.

Targets smaller than about 5 million tons cannot be hit if they have the ability to dodge. This is due to the amount of time that it takes for the missile to reach its target and the fact that the ship has plenty of time to move out of the intended path. However, this is *only* true for missiles that are fired from beyond their listed maximum range.

Cruise Missiles:

Missile range is 8000 miles (12,875 km) in an atmosphere and 4,000,000 miles (6,437,376 km or 21.5 light seconds) in space. Missile has a top speed of Mach 25 in an atmosphere and in space has an acceleration of 10% of light per turn (far faster than any starship)

Long Range Missiles:

Missile range is 3400 miles (5470 km) in an atmosphere and 1,800,000 miles (2,89700 km or 9.7 light seconds) in space. Missile has a top speed of Mach 20 in an atmosphere and in space has an acceleration of 8% of light per turn (far faster than any starship)

Medium Range Missiles:

Missile range is 160 miles (257.5 km) in an atmosphere and 80,000 miles (128,750 km or 0.43 light seconds) in space. Missile has a top speed of Mach 15 in an atmosphere and in space has an acceleration of 6% of light per turn (faster than any starship except a fighter exceeding its maximum safe acceleration)

Short Range Missiles:

Missile range is 10 miles (16.1 km) in an atmosphere and 500 miles (804.7 km) in space. Missile has a top speed of Mach 10 in an atmosphere and in space has an acceleration of 4% of light per turn (faster than any starship except if it is acceding it maximum safe acceleration)

Mini-Missiles:

Missile range is 2 miles (3.2 km) in an atmosphere and 100 miles (161 km) in space. Missile has a top speed of Mach 10 in an atmosphere and in space has an acceleration of 2% of light per turn (slightly faster than any starship except if it is exceeding its maximum safe acceleration)

Robotech, Macross, Rifts Earth, and Mutants in Orbit missiles are not treated the same way although the launcher could easily be changed to the Phase World launchers. For Robotech: Sentinels, missile speed and range is 4 times that listed in the book.

How to Treat Speeds and Ranges:

The speed of light is 186,282.4 miles per second (299,729.458 km per second) in vacuum. This is to allow the person to do calculations with starship speeds/accelerations and weapons ranges. It is important to note that a starship cannot just travel in two dimensions but can travel in three dimensions and that in order for a ship to change course it must exert acceleration to make it move in the direction.

Example: a Black Eagle is traveling at 10% of the speed of light it wants to turn to port. In one turn its course is now 10% of the speed of light forward and 1.6% of the speed of light to port. Another point to remember is that when in an intercept course, the firing ranges can be very brief and that the best courses for extended engagements are either parallel courses or pursuit courses.

There are three basic methods of doing calculations:

1. Keep track of speeds, ranges, altitudes, and ranges in your head. For large combats, this and educated guesses is probably the best method.
2. Use graph paper, writing down the vertical position of the starship and calculating from there. This can work with relatively small battles.
3. Using the stands for aircraft combat, come up with a scale and use them. This method also works for relatively small battles.

Transient Movement Factor Rules

You can use TMF in RIFTS with the following rules:

- Most mechanical TMFs for 20th Century flying craft are 1-7, with futuristic stuff being 7-10
- Mutant Animals (and heroes?) with flight power have TMF equal to their Physical Prowess.
- Conventional-type items are figured out as in TMNT, etc.

Suggested TMF for Rifts items:

- Robot Vehicles have a maximum TMF of 8; figure as $10 - (\text{Vehicle's weight [tons]}/4)$

Robotech Aerial Mecha have variable TMF:

- *Jet Mode* = $1/4$ the Pilot's PP, +2
- *Guardian* = $1/2$ the Pilot's PP, +4
- *Battloid* = $1/2$ the Pilot's PP, +6.

Power Armor:

- *Winged* (generally use high speed flight as primary movement; examples: SAMAS, Titan): $1/2$ Pilot's PP.
- Jet Pack (low speed flight or flight-optional types, such as Cyclones, T-21).
- Body armors with jet packs or TW flight, and the Fly Spell on an object): $3/4$ Pilot's PP.
- Magical flight (Fly as the Eagle), Natural flight: as PP.

Advanced Phase World Missile Rules

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[Missile Warheads](#)

Introduction

Missiles used in the Three Galaxies are similar in many ways to those used on Rifts Earth and generally follow the same rules, however there are important differences. Some of the differences include much greater missile speeds, there are new some new sensors available, and new warhead types. These rules are designed to work with revised starship rules for Phase World.

Missile Ranges, Top Speeds, and Accelerations

In the Phase World Dimension books, you get the impression that starships lumber towards each other, not firing any weapons until rock throwing ranges (100 miles or less) and then slowly lumber together until 1 to 2 miles is reached before launching missiles. I prefer a much more dynamic starship and missile combat. Under these revised rules, missile ranges are dramatically increased and missiles can now travel and accelerate at percentages of the speed of light.

Missile fire now commonly starts at ranges greater than 1 million miles. Missiles can be used to hit targets beyond their maximum range because missiles will travel in a straight line one they run out of energy. They are of course effected by gravity wells but that can be calculated for. Targets that do not move are ideal for this type of strike. These include orbital bases and cities. There is no bonuses or minuses to hit these targets. To hit specific targets, such as an individual building in a city, the missiles are at -8 to strike. To hit a large moving target such as a Large Capital ship (Protector or Dreadnought for example), the missiles are at -16 to strike and unlike most attacks, the pilot can make a dodge so that no damage will be taken no matter how large the starship is. Targets smaller than 5 million tons that having the ability to dodge, cannot be hit in this fashion because they are too fast and agile.

Additionally, missiles do not have a maximum speed like starships, because their post-launch life span is brief enough that radiation and particle damage is not a factor. About 1 % of all missiles will not reach their targets because radiation or particles will either cause them to destroy themselves, become inert, or veer off course. Acceleration is effected the same way starship accelerations are affected.

Type of Missile	Range	Top Speed	Acceleration
Cruise	8000 miles (12,875 km) in an atmosphere and 4,000,000 miles (6,437,376 km/ 21.5 light seconds) in space	Mach 25 in an atmosphere	10% of light per turn (far faster than any starship)
Long Range	3400 miles (5470 km) in an atmosphere and 1,800,000 miles (2,89700 km/9.7 light seconds) in	Mach 20 in an atmosphere	8% of light per turn (far faster than any starship)

	space		
Medium Range	160 miles (257.5 km) in an atmosphere and 80,000 miles (128,750 km/0.43 light seconds) in space	Mach 15 in an atmosphere	6% of light per turn (faster than any starship except a fighter exceeding its maximum safe acceleration)
Short Range	10 miles (16.1 km) in an atmosphere and 500 miles (804.7 km) in space	Mach 10 in an atmosphere	4% of light per turn (faster than any starship except if it is exceeding its maximum safe acceleration)
Mini-Missiles	2 miles (3.2 km) in an atmosphere and 100 miles (161 km) in space	Mach 10 in an atmosphere	2% of light per turn (faster than most starships, unless they are exceeding maximum safe acceleration)

Missile Guidance Systems

Missiles from the Three Galaxies have all the guidance systems available on Rifts Earth, plus the following optional guidance systems.

Gravity Sensor:

All targets have a gravitic footprint which allows them to be tracked by gravity sensors. This includes targets that are invisible. The other advantage is that gravity sensors allow the missile to track its target in real time no matter what the distance is because gravity has no delay and is faster than light. A target can often hide under the gravity signature of other targets to trick sensors but ships that are using gravity propulsion are even easier to detect.

Neutrino Homing:

What this missile guidance system does is home on a neutrino signature. Nuclear Fission Engines, Nuclear Fusion Engines, Antimatter Engines, Fusion Thrusters, Ion Thrusters, Plasma Explosions, Fusion Explosions, Nuclear Explosions, and Antimatter explosions all create neutrinos that can be tracked. Missiles can be set to track on the strongest Neutrino signature or a specific neutrino signature.

Tachyon Beam Rider:

These missiles use a Tachyon beam to hit its target. The advantage is that the beam is FTL meaning that there is no appreciable delay in painting the target. Similar to the Rifts Earth Semi Active Laser and Radar homing and sensors can pick up the beam if they are targeted.

Brilliant Missiles:

This is a more advanced version of the smart missile and the missile actually has a limited artificial intelligence guidance system. These missile guidance systems are expensive and cost twice the normal cost for the smart missile guidance systems. This guidance system is also illegal outside of the military. This missile guidance is capable of breaking through most countermeasures even those that work against normal smart missiles. Like smart missiles, the missiles must have an autonomous guidance system. Brilliant missiles are more capable than smart missiles and have +7 to strike and +6 to dodge and providing that they can catch their target multiple times, they have three attacks per melee until they run out of fuel. Brilliant Missile also separates when launched so they cannot be destroyed as a volley. All brilliant missile automatically have the feature of IFF identification and Loiter capability. This feature can only be added to long range and larger missiles.

Note that all Phase World Missile Types (Including minis) are available as smart missile.

FTL Capable Missiles:

Star ships will often carry a small number of cruise missiles that are capable of being used at FTL speeds for limited durations. FTL capable missiles are limited to cruise missiles only, although several governments are presently working on a FTL capable long range missile. The missiles give up part of their payload in order to fit in the FTL propulsion system. A ship can fire non-FTL capable missiles at FTL speeds, but the missile will have little maneuverability and will drop in speed at the rate of 2 LY/HR per turn until it enters normal space. The ship launches these missiles to the front by firing them and then immediately decelerating. Normally a Starship will carry about 10% of its total missile compliment is FTL cruise missiles. The FTL missiles are very expensive and cost 4 times that of a conventional Phase World cruise missile.

FTL combat is in many ways more deadly then sublight combat due to the fact that there are few point defense weaponry that can be used at FTL speeds. Tachyon and Gravity based beam weapons are the only non-missile weapons that can be used at FTL speeds. Similarly, the only type of missile that is normally useful for defense are cruise missiles with Gravity-based warheads that can be used to pull incoming cruise missiles out of FTL. Shields are often the best defense against FTL capable cruise missiles.

FTL Missile Range and Speed:

The FTL Cruise Missile has an amount of fuel which is given as 50 Fuel Points. At Sublight and a speed of 1 LY per hour it burns 1 Fuel Point per turn, giving it a powered range of fifty turns. For each additional LY/hour of speed it burns one additional Fuel Point per turn, so that at 5 LY/hour it burns 5 Fuel Points per turn, giving it a powered range of 10 turns. At maximum FTL speed of 10 LY/hour it burns 10 Fuel Points per turn, giving it a powered range of only 5 turns. When the CM runs out of fuel it decelerates at a rate of 2 LY/hour per turn, until it finally hits light speed, at which time it continues to go on at 98% of the speed of light. Of course it can no longer maneuver when its fuel runs out, so from that moment on it is traveling in a straight line until it is destroyed or it self-destructs. The missiles can be used at sublight speeds as normal cruise missiles but due to their hideous cost, this is rarely done.

FTL Missile Warheads:

Some missile warheads are more effective at FTL speeds than others. This is simply because energy usually travels at the speed of light or faster. Conventional explosives, including K-Hex and Plasma Warheads inflict half damage to the front, quarter damage to the sides, and no damage to the rear of the target. Nuclear, antimatter, fusion explosives along with X-ray laser warheads (if very close) will inflict full damage to the front, half damage to the sides, and no damage to the rear of the target. The problem with X-Ray laser warheads is that the missile is too large to carry on FTL capable missiles. The only exceptions to reduced damage at FTL speeds are Gravity warheads and Tachyon based warheads which inflict full damage due to the fact that the blast travels at FTL speeds. The space for the warhead in FTL missiles, due to the size of the missiles drives, are smaller than they are in standard missiles and are limited to the smaller sizes of missile warheads. Fusion and Nuclear warheads are limited to Heavy Warheads (Inflicts 2D4x100), Antimatter is limited to Heavy Warheads (Inflicts 3D6x100), and all other warheads are similarly restricted.

Missile Warheads

Nuclear

In Space, Nuclear Missile do not have the blast that they do in the atmosphere. In space, they do the same damage as fusion warheads on the Revised Missile Tables.

Antimatter

Antimatter in an incredibly powerful munition that uses a reaction between matter and antimatter to produce an incredible reaction that does large amounts of damage to the target. The antimatter is kept in a magnetic containment until it strikes the target and releases its antimatter. This warhead is only available in Cruise Missiles. If antimatter munitions are used in an atmosphere, they have double the blast radius as a nuclear munition of the same size. The drawback of antimatter is that it does minimal damage to targets that are impervious to energy. The other limitation is that if a ship with antimatter warheads takes a magazine hit, it creates powerful explosions that can destroy the ship.

Warhead Type	Mega-Damage	Blast Radius	M.D.C.
Antimatter Cruise Missile (medium) ^[1]	2D6x100	80 ft (24.4 m)	45
Antimatter Cruise Missile (heavy) ^[1]	3D6x100	100 ft (30.3 m)	45
Antimatter Cruise Missile (extra-heavy)	4D6x100	120 ft (36.4 m)	45
Antimatter Cruise Multi-Warhead	5D6x100	150 ft (45.5 m)	45

^[1] Warheads that can be carried in FTL Cruise missiles

K-Hex

K-Hex is a special explosive that only recently has been made useable by weapon systems. In its natural state, it is very unstable and dangerous. In order to keep K-Hex rounds more powerful than standard warheads, their damages have been modified to be above other types of warheads.

Warhead Type	Mega-Damage	Blast Radius	M.D.C.
K-Hex High Explosive Mini-Missile	1D6x10	5 ft (1.5 m)	1
K-Hex Fragmentation Mini-Missile	1D6x10	20 ft (6.1 m)	1
K-Hex Armor Piercing Mini-Missile	2D4x10	3 ft (0.9 m)	2
K-Hex High Explosive Short Range Missile	2D6x10	20 ft (6.1 m)	5
K-Hex Fragmentation Short Range Missile	2D6x10	30 ft (9.1 m)	5
K-Hex Armor Piercing Short Range Missile	3D6x10	5 ft (1.5 m)	5
K-Hex High Explosive Medium Range Missile	4D6x10	30 ft (9.1 m)	10
K-Hex Fragmentation Medium Range Missile	6D4x10	60 ft (18.2 m)	10
K-Hex Armor Piercing Medium Range Missile	4D6x10	20 ft (6.1 m)	10
K-Hex High Explosives Long Range Missile	6D6x10	50 ft (15.2 m)	20
K-Hex Fragmentation Long Range Missile	6D4x10	100 ft (30.5 m)	20
K-Hex Armor Piercing Long Range Missile	5D6x10	30 ft (9.1 m)	20

X-Ray Laser Cruise Missile Warheads

This missile is a Fusion warhead that detonates and powers a burst of Laser beams. While the beams have no bonuses to hit other than those from the starship size chart, there is a fairly large number of beams and because of the beams allows the missile to standoff the target. The missile also has on other advantage, when missile goes dead, it has half the normal bonuses and minuses to strike. This warhead is to big too be carried on an missile smaller than a Cruise Missile and are too large to be carried on an FTL capable missile.

Warhead Type	Mega-Damage	Blast Radius	M.D.C.
X-Ray Laser ^[1]	2D4x100 (lasers) 1D6x100 (direct warhead blast)	80 ft (24.4 m) for the warhead	45

[1] When the warhead detonates, ten X-Ray Laser Beams are fired at the moment of its destruction. Laser Beams have a range of 4 miles (6.4 km) in an atmosphere and 40 miles (64 km) in space. X-Ray lasers do full damage against laser resistant materials. Because the laser does not have a large amount of fire control, each laser has no bonuses to strike and each laser strike should be rolled separately. With large volleys of missile, grouping the rolls may be the only way to speed up strikes but the number of lasers that should be grouped together should be fairly small.

Tachyon Beam Missile Warheads

These weapons are in many ways similar to the X-Ray laser warheads but is less powerful and far more expensive (around ten times). The weapon is powered by a very powerful fusion explosion. The explosion powers a series of Tachyon Beam Generators that fire towards the target. The missile fires a total of eight beams and each beam is less powerful than the X-Ray laser beams. While the beams have no bonuses to hit other than those from the starship size chart, there is a fairly large number of beams and the beams allows the missile to standoff the target. The missile also has on other advantage, when missile goes dead, it has half the normal bonuses and minuses to strike. This warhead is to big too be carried on an missile smaller than a Cruise Missile but is small enough to be carried on FTL Capable Cruise Missiles

Warhead Type	Mega-Damage	Blast Radius	M.D.C.
Tachyon Beam [1]	1D4x100 (tachyon beams) 1D6x100 (direct warhead blast)	80 ft (24.4 m) for the warhead	45

[1] When the warhead detonates, eight Tachyon Beams are fired at the moment of its destruction. Tachyon Beams have a range of 4 miles (6.4 km) in an atmosphere and 40 miles (64 km) in space. Because the Tachyon Beams do not have a large amount of fire control, each beam has no bonuses to strike and each beam strike should be rolled separately. With large volleys of missile, grouping the rolls may be the only way to speed up strikes but the number of lasers that should be grouped together should be fairly small. Tachyon Beam Cruise missiles are available on FTL capable missiles

Gravity Well Cruise Missile

This warhead is also to large to be carried on any missile smaller than a cruise missile. Most of these warheads have two settings but some are constructed with one setting to reduce cost of the missiles.

The first is that the warhead forms briefly a gravity effect similar to that of a black hole but much weaker. This missile has two special advantages when compared to other cruise missile warheads. The first is that because it does it damage by crushing, a physical effect, it does full damage to targets that are impervious to energy and cosmic knight. The other spacial advantage is that it can temporarily prevent starships from going FTL. It takes one gravity well cruise missile per 10 thousand tons of ship to prevent the ship from being able to go to FTL. A Warshield cruiser, for example, would take 10 gravity well cruise missiles to prevent if from going FTL. This effect only lasts for one melee (15 seconds). If there are not enough gravity wells to prevent the ship from going FTL, the ship takes double damage from ripping through the gravity wells.

The second is only for effecting FTL travel. It does this by producing a weaker but much wider gravity field. This warhead effects a 1,200 foot radius and effects 100 thousands of ton of ship to prevent the ship from being able to go to FTL. It will also pull the same amount of mass out of FTL. A ship takes about ten minutes to reset its systems before re-entering FTL. The way that the missile warheads are used against ships in FTL is that the missiles are used as mines in the path of the incoming ships. They are activated as the ship passes through the spot in question.

Warhead Type	Mega-Damage	Blast Radius	M.D.C.
Gravity Well Cruise Missile (Heavy - Setting 1) ^[1]	3D4x100	100 ft (30.3 m)	45
Gravity Well Cruise Missile (Heavy - Setting 2) ^[1]	None	1000 ft (303 m)	
Gravity Well Cruise Missile (X-Heavy - Setting 1)	4D4x100	120 ft (36.4 m)	45
Gravity Well Cruise Missile (X-Heavy - Setting 2)	None	1200 ft (364 m)	

^[1] Warheads that can be carried in FTL Cruise missiles

Protoculture Warhead

A special warhead that causes a massive explosion by putting a special mutant protoculture seeds in a matrix. Because of the expensiveness of each warhead of this type, Jammers have been added for the defense of the missiles, plus the casing is made out of a stealth material. This missile was designed by the REF in Phase World and is only available to them. Only available for Cruise Missiles

Damage: Massive explosion that inflicts 4D6x10,000 with a 3D4 mile blast radius.

Bonuses for Jammer & Stealth Material: These Missiles are at -50% to be detect and -2 to be hit when in stealth mode and can only be targeted 20% of the time and at -4 to be struck when in Jamming mode (Although it will be detected and home on Jam missiles will be effective).

Decoy

Special Cruise missile with no warhead but has special equipment to emulate engine and sensor signature of various starships. Can emulate CG Drive Engines and any other Three Galaxies or Phase World engine. Can also emulate various ship sized from fighter to battleship size. Has a 50% chance of decoying missiles. While decoy missiles have the same duration as a normal cruise missile, they can continue to operate their decoy systems after the engines have run out fuel and continue traveling on a ballistic course.

Self Destruct Package inflicts 2D6x10 MDC

Jamming Warhead

Special Cruise missiles with jamming equipment replacing the warhead. While the jammer is on, conventional radar, gravity-wave sensors, and missile guidance systems will not be able to function in the area affected (have only a 20% chance of detecting any targets in the area, including the Jammer missile). The jammer will affect a one mile (1.6 km) area in an atmosphere and 100 miles (160 km) in space. Missiles can be programmed to go after the signature of the Jamming with a weapon systems roll. While Jamming missiles have the same duration as a normal cruise missile, they can continue to operate their Jamming systems after the engines have run out fuel and are traveling on a ballistic course.

Self Destruct Package inflicts 2D6x10 MDC

Probe

Special Cruise missiles with sensors replacing the warhead. The sensors are equal to those carried on a light star fighter. While Probe missiles have the same duration as a normal cruise missile, they can continue to operate their Probe systems after the engines have run out fuel and are traveling on a ballistic course.

Self Destruct Package inflicts 2D6x10 MDC

Advanced Nuclear Explosion Rules

A Nuclear Explosion

When a nuclear weapon explodes, in about a millionth of a second a temperature of up to eighteen million degrees Fahrenheit, comparable to that inside the sun, is produced. About half of this is immediately lost in the close vicinity of the explosion as a luminous white fireball appears, expands and begins to rise.

For up to a minute, energy in the forms of radiation, EMP (electromagnetic pulse), light, heat, sound, and blast is released in all directions. The fireball then ceases to be luminous and begins to cool as its cloud rises many thousands of meters at up to 480 kilometers per hour. As the cloud billows out into its eventual mushroom shape it sucks up after it a column of dust from the earth's surface. This dust mixes with residue of the weapon and becomes radioactive fallout.

Components of the Nuclear Explosion

Light

This is largely ultraviolet and infrared, more intense than it appears to be, and liable to cause blindness, even though sight may return within a few days.

Heat

One third of the energy of a nuclear weapon is emitted in this form. It radiates in straight lines at the velocity of light, but has little penetrating power and is weakened by haze or mist. Its range, however, is greater than that of blast or of initial radiation, and it may cause injury or death to those exposed and damage to property by starting fires.

Blast

A wave of compressed air moves away from the site of a nuclear explosion at about the speed of sound. Lasting several seconds, it maintains pressure upon objects in its path in a manner more usually associated with a very high wind than the shock wave of an explosion. It is the main cause of damage to buildings, and a hazard to those outside or within. A wave of air rushes back in to fill the void seconds after the initial blast wave passes. This wave is not as strong, maybe several hundred kilometers per hour.

Side Effects of the Nuclear Explosion

Radiation

The electromagnetic spectrum consists of cosmic rays, gamma rays, x-rays, ultraviolet rays, visible light rays, infrared rays, and radio rays. Of these, gamma rays are of chief concern to us. Gamma rays, alpha and beta particles, and neutrons result from decay of radioactive substances, and all four are emitted following a nuclear explosion. Their effects are all referred to below as radiation.

When ionizing radiation enters the body, some of it is absorbed. This ionizes molecules in some of the body's cells, producing chemical changes so they cease to function. What is called "radiation sickness" may then occur.

Fallout

With surface explosions, or at altitudes low enough for the fireball to touch the ground, huge quantities of earth and debris, together with the fission products, are sucked into the fireball. As the fireball cools, the radioactivity condenses on the particles that were lifted from the ground; many of these are large particles and they come down by the force of gravity within a day, or, at distances not too far from the burst, some hundreds of kilometers. This constitutes the "local" or "early" fallout. The extent and location of the early fallout depends primarily on the meteorological conditions, e.g. the velocity and direction of the wind. They also depend on precipitation conditions; the particles may come down to earth with the rain or snow, which is referred to as "rainout" or "snowout".

In addition to surface bursts and air bursts, underwater bursts occur at times. Radioactive fission products would mainly be absorbed by the water. However, some would escape to produce radioactive materials carried in a cloud of fog/spray which could drift in over land, adding to the exposure.

It should be noted that all nuclear weapons detonated in the air give rise to fallout, but where and when it occurs depends primarily on the altitude of the explosion. With explosions in the air at altitudes such that the fireball does not touch the ground, the fission products, which are initially in gaseous form, rise with the fireball to great heights into the troposphere or stratosphere. When the temperature of the fireball becomes sufficiently low, the radioactive materials form particles, through condensation and coagulation. These particles are very small, and as a result their descent is very slow; it may take many months before they come down to the ground.

EMP (Electromagnetic Pulse)

This is a byproduct of the immediate energy release from a detonated nuclear device which, as well as the other effects mentioned above, also has the effect of altering the electrical properties of electrons in the nearby atmosphere. This can produce intense electrical and magnetic fields that can extend for considerable distances from the point of detonation. The resultant electrical current eddies which pass through these disturbed electrical fields give rise to the EMPs that can, by themselves produce so much energy that they can severely affect electronic-based equipment and electrical and radar transmissions to the point of destroying equipment circuits, components and communications. The effects of EMP diminish sharply with distance from the point of detonation but can still cause damage at ranges greater than those for the other 3 major effects (under certain circumstances). Their main significance will be to communications; the communications networks will probably be rendered inoperative for considerable periods of time by interference from EMPs, and the results of such breakdowns can well be imagined. At the very moment when radio and other links (including land lines) between various command levels are at their most important the EMPs will render them virtually useless over large areas. Even when a nuclear explosion has passed, the reverberations produced by the EMP in the atmosphere may well linger to cause continued interruptions. Heavy concentrations of fallout will produce radiation to create further interference across radio and other communication frequencies.

Mass Fires

There are two types of mass fires - the conflagration and the firestorm. Both are created from the hundreds of individual fires that are started as a result of the nuclear blast.

- **Conflagration Fire**

The conflagration is a large-area fire which is moved by a strong wind, devouring everything in its path. The wind causes a literal wall of flame to form and to move before it. This type of mass fire can be expected to occur in many forests and in dry grassy areas. If you consider the damage done over the last few years by brush and forest fires in California, you can begin to understand the destruction that would be caused by hundreds of such fires massing together.

Firestorm

The firestorm is a mass fire that burns intensely in one area. As the many smaller fires burn, they cause air to be pulled into the area, and smoke and super hot gases then escape upward. Once this airflow pattern begins, it feeds on itself, creating a sort of a chimney effect. Once the phenomenon is fully developed the air flows into the area at between 80 and 115 kilometers per hour. Temperatures reach as high as 1000 to 2000 degrees Fahrenheit, so even things that aren't actually touched by flames are consumed and destroyed. Unlike the conflagration, a firestorm doesn't travel; it moves little, if at all, due the strong winds blowing in from all sides.

A firestorm can form in an area of many smaller fires in about 15 to 20 minutes and may last anywhere from 3 to 8 hours. Many parts of the area may remain too hot to enter for a couple of days after the fires have burned themselves out.

Nuclear Weapon Explosion Data (Surface Burst)

Yield	Crater Diameter	[1] Fireball Diameter	[2] Total Destruction Radius	[3] Heavy Damage Radius	[4] Moderate Damage Radius	[5] Light Damage Radius
5 Kt	0.068	0.084	0.469	0.678	1.042	1.303
10 Kt	0.085	0.111	0.591	0.919	1.313	1.642
20 Kt	0.108	0.146	0.745	1.158	1.655	2.608
50 Kt	0.146	0.211	1.011	1.572	2.246	2.807
100 Kt	0.184	0.278	1.273	1.981	2.830	3.537
200 Kt	0.232	0.368	1.604	2.495	3.565	4.456
300 Kt	0.265	0.433	1.836	2.857	4.081	5.101
500 Kt	0.315	0.531	2.177	3.387	4.838	6.048
1 Mt	0.396	0.700	2.743	4.267	6.096	7.620
2 Mt	0.499	0.924	3.456	5.376	7.680	9.601
3 Mt	0.572	1.087	3.956	6.154	8.792	10.980
4 Mt	0.629	1.219	4.355	6.774	9.677	12.096
5 Mt	0.678	1.333	4.691	7.297	10.424	13.030
8 Mt	0.792	1.609	5.486	8.534	12.192	15.240
10 Mt	0.854	1.759	5.910	9.193	13.133	16.417
20 Mt	1.076	2.322	7.466	11.583	16.547	20.684
25 Mt	1.159	2.538	8.021	12.477	17.825	22.281
30 Mt	1.231	2.730	8.524	13.259	18.942	23.677
40 Mt	1.355	3.063	9.382	14.594	20.848	26.060
50 Mt	1.460	3.349	10.106	15.720	22.458	28.072
100 Mt	1.839	4.420	12.733	19.807	28.295	35.369
150 Mt	2.105	5.198	14.575	22.673	32.390	40.487

Kt = kiloton (1 Kt = 1000 tons = 2 million lb.)

Mt = megaton (1 Mt = 1000 kilotons = 2 billion lb.)

NOTE: All measurements are in kilometers.

Damage Radius Modification Factors for Various Bursts Heights						
Subsurface Explosion (-100 meters)						
	x0.80		x0.80	x0.80	x0.80	x0.80
Extra Low Air burst (600 meters)						
		x3.00	x3.00	x3.00	x3.00	x3.00
Low Air burst (2.5 kilometers)						
		x3.50	x3.50	x3.50	x3.50	x3.50
Medium Air burst (5.3 kilometers)						
			x4.00	x4.00	x4.00	x4.00
High Air burst (10 kilometers)						
			x4.50	x4.50	x4.50	x4.50
Extra High Air Burst (25 - 30 kilometers)						
			x0.75	x1.00	x3.00	x6.00
Outer Atmosphere Burst (Above 30 kilometers). No significant damage done, EMP is the most destructive effect of this type of detonation.						

Crater Depths

Crater formation will occur when the height of the burst is less than 1/10th of the maximum radius of the fireball.

- **Surface Explosions and Low Air bursts**

1 Mt: 36.576 meters
10 Mt: 60.960 meters
100 Mt: 100.584 meters

- **Subsurface Explosions**

1 Mt: 88.392 meters
10 Mt: 131.064 meters
100 Mt: 192.024 meters

(All values can be extrapolated for values in between.)

Radius M.D. Factors for Ground and Aerial Targets

The following damage factors take Heat and Blast effect in account.

Note: A nuclear Detonation goes out in all directions - up as well as along the ground.

TDR: Totally Destroyed
HDR: 3d6 x 1,000 M.D.
MDR: 2d6 x 100 M.D.
LDR: Only S.D.C. Inflicted

Note: For aerial targets roll the following percentage additions against the particular skill used to fly the aerial vehicle only if the vehicle survives the initial blast wave. Roll again for the second return blast wave with the same modifications.

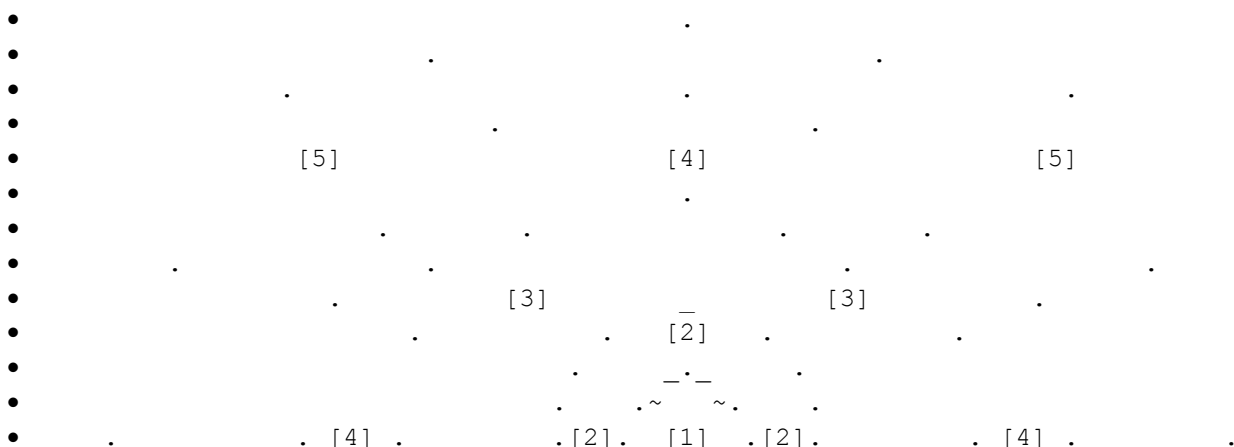
HDR: -90%
MDR: -70%
LDR: -40%

If the roll fails, the pilot loses control of the aircraft/mecha, which results in the aircraft tumbling out of the sky and should be role-played to it's fullest.

Sub-Surface Explosion:

TDR: Totally Destroyed
HDR: 4d6 x 1,000 M.D. to structures on/under the ground only
MDR: 3d6 x 100 M.D. to structures on/under the ground only
LDR: Only S.D.C. Inflicted to structures on/under the ground only

- **Breakdown of the Blast Zones**



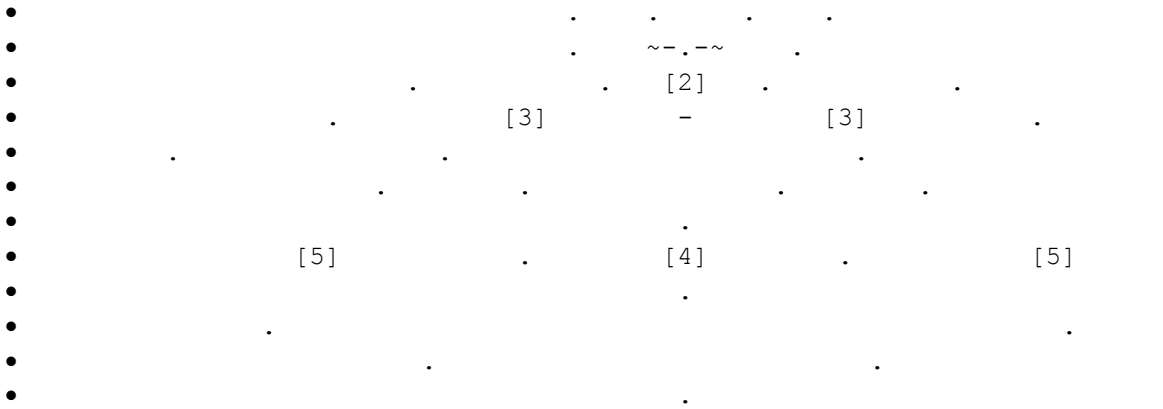


Diagram Outline

1. Vaporization Point (Crater)
Everything is vaporized by the blast.
2. Total Destruction
All structures above ground are destroyed.
3. Severe Blast Damage
Factories and other large-scale buildings collapse. Severe damage to highway bridges. Rivers sometimes flow counter-current.
4. Severe Heat Damage
Everything flammable burns. People in the area suffocate due to the fact that most available oxygen is consumed by the fires.
5. Severe Fire & Wind Damage
Residency structures are severely damaged. People are blown around. 2nd and 3rd-degree burns suffered by most survivors.

Radiation Damage

Radiation damage is permanent and any further exposure is cumulative and is added to the character's total. The following list is the classes of radiation exposure a character is placed in according to their cumulative total. The classes are to be used to determine which character should allow themselves to be exposed to radiation if they are given the choice.

New stat added for game play: Radiation Exposure Class (RC). All starting characters start out with RC-0.

Exposure Classes		
<u>Class</u>	<u>Exposure (in RADS)</u>	<u>Risk</u>
RC-0	0 Exposure	May take normal risks
RC-1	0 < RADS <= 70	Should avoid further exposure
RC-2	70 < RADS <= 150	Should not risk any further exposure
RC-3	150 <	Only in absolute emergency should any further exposure be risked

Whole Body Radiation Damage from Craters and Fallout

The following table lists the effects of different whole body radiation dosages on humans. The damage resulting from radiation is listed with the convalescent period being the time required to recover from the damage.

Note: Though the damage resulting from radiation can be healed the radiation absorbed is permanent and cannot be "healed"

<u>Dosage in RADS</u>	<u>Incidence of Vomiting</u>	<u>Convalescent Period</u>	<u>Effects</u>
0-25	0%	N/A	Practically no "short-term" effects. May be some blood cell damage.
26-100	5%	7 Days	A small amount of nausea and sickness for highest dose level. Blood changes noticeable.
101-200	100%	Up to 40 Days	Definite identifiable changes in blood cells. Highest dose causes hair loss, livid skin spots, nausea, vomiting, diarrhea, fevers, hemorrhages and great fatigue. Heart failure in some.
201-400	100%	Several weeks	Symptoms as above but more to months, severe Fatal to 25% in low range, 50% in high range.
401-600	100%	Death	Symptoms as above but now very and occurring soon after exposure. Death will occur within 1d6 days.
601-800	100%	Death	Symptoms as above but circulatory system and parts of the central nervous system malfunction rapidly. Death will occur in 1d6 hours.
801-5000+	100%	Death	Outcome very rapid. Vomiting, falling blood count, diarrhea, great fatigue, internal bleeding, organ failure, nervous system collapse heart failure, coma, and then death.

These doses are immediate or one hour doses, these are strictly worse case possible results. The same dosage acquired over a longer time span would have significantly less drastic effects.

Gaming Penalization for Radiation Levels

<u>RAD Level</u>	<u>Penalty</u>
0-25	None
26-100	P.S. -1, P.P. -1, P.E. -1
101-200	P.S. -2, P.P. -2, P.E. -2, P.B. -2, P.P.E. -10
201-400	P.S. -3, P.P. -3, P.E. -3, P.B. -3, P.P.E. -20
401-600	P.S. -5, P.P. -5, P.E. -5, P.B. -5, P.P.E. -40
601-800	P.S. -7, P.P. -7, P.E. -7, P.B. -7, P.P.E. -50
801-5000+	P.S. -15, P.P. -15, P.E. -15, P.B. -15, P.P.E. -100

The above effects are permanent and cannot be modified by normal means.

Radioactive Contamination Zones in Crater

The most radioactive area would be the bomb crater itself. This area is referred to as Zone 1, and the radioactive level of this zone varies according to the type of burst (see following table). The size of this is equal to the size of the bomb crater itself. Zone 2 is a secondary area of radiation surrounding the bomb crater. The radiation in this zone is only found in craters resulting from surface and subsurface bursts. The size of Zone 2 is equal to the diameter of the bombs fireball. The contamination levels will be very high for several decades after a ground/subsurface burst.

The residual radiation for Zones 1 and 2 are shown below:

	<u>Subsurface Burst</u>	<u>Surface Burst</u>	<u>Air Burst</u>	<u>High Air Burst</u>
Zone 1	8000 RADS/Hr	6000	4000	2000
Zone 2	4000 RADS/Hr	3000	N/A	N/A

Dose Rates

The following table lists RADs per melee.

RADS/Hr	RADS/Melee
10000	42
9000	37
8000	33
7000	29
6000	25
5000	21
4000	17

3000	12.5
2000	8
1000	4
500	2
100	0.4
50	0.2
25	0.1

To find any value in between these just divide RADS/Hr by 240 (4 meelees per minute x 60 minutes in one hour).

Fallout/Snowout

Fallout follows the t-1.2 law which states that for every sevenfold increase in time after detonation there is a tenfold drop in radiation output.

- **Example 1.** A reading of X level of radioactivity at Y hours after detonation would indicate a level of radioactivity of .1X at 7Y hours after detonation. This is accurate for 2500 hours (14 weeks) following the explosion, thereafter the dose rate is lower than t-1.2 would predict.
- **Example 2.** If a dose rate of 100 RADS/Hr was found at 1 hour after detonation (this assumes all significant fallout from the bomb has fallen, therefore starting with the seven hour point is probably more realistic) would be 10 RADS/Hr at 7 hours, 1 RAD/Hr at 48 hours (2 days), .1 RAD/Hr at 343 hours (2 weeks), .01 RAD/Hr at 2401 hours (14 weeks).

Fallout blows downwind, and will fall out at some distance from the explosion. The following are some examples of various nuclear fallout levels after Y hours and the percentage of population dead after exposure to the levels of fall out.

Time	RADS/Hr	Death Percentage in population
An area 16 Km wide by 48 Km downwind from a single 1 MT ground burst		
1 Hr.	1,000	100% dead at 1 hour of exposure
7 Hours	100	50% dead within 7-8 hours of continuous exposure
2 Days	10	50% dead for 5 days of continuous exposure
2 Week	1	50% dead for 1 month continuous exposure
14 Weeks	.1	0% dead from radiation hereafter
An area 19 Km by 152 Km downwind for a single 1 MT ground burst		
1 Hr.	0	Radiation has not arrived yet
7 Hrs.	50	50% dead for 18 hours of continuous exposure
7 Hrs.	50	50% dead for 18 hours of continuous exposure
2 Days	5	5% dead for 2 weeks of continuous exposure
2 Weeks	0.5	0% dead from radiation hereafter
14 Weeks	0.05	0% dead from radiation hereafter

The above examples indicate conditions and exposures that would only be acceptable in wartime. In the examples the wind is continuous in direction and velocity. A real wind would not make such nice neat patterns.

Examples of levels of fallout from a single 1 Mt ground burst with a 24 kph wind.

As a very general rule of thumb, you can expect fallout to move approximately 48 kph. The fallout from a medium-size bomb will extend for several 100's of with the heaviest concentrations within about 325 km of the blast. Areas farther downwind may not receive any fallout for several hours; those closer may get it within fifteen minutes.

The following table shows approximately how long it will take, under normal atmospheric conditions, for fallout to reach the ground at specified distances downwind from a 5 Mt burst.

<u>Distance from Blast</u>	<u>Fallout Will Begin After</u>
8 Km	20 Minutes
40 km	1 Hour
160 Km	3-5 Hours

Fallout usually drifts down over a period of time; it doesn't just plop down all at once. In areas receiving immediate fallout, the particles may continue to fall for a much as 24 hours. Outside the immediate burst area most of the fallout - about 80 % of it - will come down within the first 48 hours. Any rain or snow will bring it down even faster and in greater concentrations. Many of the smaller particles may stay in the atmosphere for months or even years.

The following table lists estimated levels of radiation one hour after the detonation of a 20 Mt bomb.

<u>Distance from Blast</u>	<u>Radiation Level</u>
8-24 km	10000-1000
24-120 Km	1000-100
120-193 km	100-0

For all practical purposes, radiation levels in excess of a few thousand RADs can be ignored. The areas that receive such heavy fallout also will be hit hard by the initial blast and heat.

The following table shows how a starting radiation level of 2000 RADs will decay and the total accumulation one can expect as it does so. An area receiving this amount of fallout is likely to be relatively close to a blast site. Figures such as these are not exact. The actual dosages and rates of decay will be altered by local factors such as weather and terrain, but this table does provide a good example.

<u>Time Interval</u>	<u>Interval Dose</u>	<u>Cumulative Dose</u>
1st-2nd hour	2000	2000
2nd-3rd hour	1000	3000
3rd-4th hour	640	3640
4th-5th hour	440	4080
5th-10th hour	1200	5280
10th-24th hour	1200	6480
2nd day	760	7240
3rd day	400	7640
4th day	240	7880
5th day	180	8060
6th day	140	8200

7th day	96	8296
2nd week	430	8726
3rd week	230	8956
4th week	110	9066
2nd month	175	9241
3rd month	80	9321
4th month	50	9371
5th month	30	9401
6th month	20	9421
6th-12th month	50	9471
2nd year	16	9487
3rd year	5	9492
4th year	3	9495

Areas covered by a given accumulated doses from fallout

Upper Limit of Accumulated Dose	Area (Km ²)	
	1 Mt	10 Mt
1000	900	11000
800	1200	14000
600	1700	18000

400	2600	27000
200	5500	52000
100	10500	89000
50	18600	148000
25	32700	234000
10	56000	414000

These figures are just rough estimations of the actual areas covered.

EMP (Electromagnetic Pulse)

EMP damage goes out in all directions, to distances greater than that of the effects of the blast itself.

As a general rule of thumb, the distance an EMP will travel is directly related to the height of the burst, the strength of the blast and any natural features in its path.

- **Rough rule of thumb for the EMP distance covered.**
(Height of burst in km x 1000) x (Megatonnage of bomb / 10) = radius of EMP in km
 - **Example:**
A 10 Mt bomb detonated at a height of 50 Km.
(50 x 500) x (10/10) = 25000 Km radius

Damage from Pulse

The damage inflicted from the pulse will be to electrical equipment only i.e. computers, radios, telephones, mecha, aircraft, power distribution networks and any other device not hardened from an EMP. The manifestation of this damage will be burnt out electronic components, circuits fried beyond repair etc.

Miscellaneous Notes on Nuclear Explosions

- **Visibility Distances**
The tables shows the distances at which an exposed person would suffer second-degree burns, or at which exposed dark colored clothing or paint would catch fire. It further shows how these distances are affected by varying visibilities. Distances are in kilometers.

Visibility (km)	Size of bomb (Mt)					
	1	5	10	20	50	100
16	10	18	21	24	26	28
48	11	22.5	26.5	29	35	42
80	14	27	33	42	52	61

- The next table looks at the same effects from weapons detonated at an altitude to maximize blast effects.

Visibility (km)	Size of bomb (Mt)					
	1	5	10	20	50	100
19	14	29	40	51	76	98
4	10.5	22.5	29	39	61	80
1.9	4.5	10	13	19	26	30.5

.96	0.5	3	4	6.5	11	18
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19 km visibility is considered an average clear day.

4 km visibility is considered a medium-hazy day.

1.9 km visibility is considered a day of heavy cloudiness.

0.96 km visibility is considered a day of dense cloudiness.

- **Wind Speeds**

The following table gives examples of wind speeds that could be expected at various distances from a 20 Mt explosion.

Distance (km)	Surface Burst (kph)	Optimum Air Burst (kph)
3.2	2333	3138
4.8	1046	2253
8	483	684
16	177	321
24	88.5	185
32	56	121
48	30.5	72.5
80	14.5	32

These figures are approximation, since variables such as terrain and obstructions affect the speeds. The winds will be highest in areas where the land is flat and smooth; hilly terrain or many large buildings will lower velocity. When I say that the winds will be lowered so much that they are no longer be any danger. Rather, the area of danger will simply be decreased somewhat.

Sounds Produced by Energy Weapons

This may differ from Palladium's official view, but after doing some research, here is a more realistic answer as to what sounds energy weapons make.

Energy Weapons: In general, with any weapon powerful enough to vaporize armor and flesh (M.D. in game terms), you end up vaporizing a path through the air as well. There will be a visible heat distortion around most energy projectiles, such as plasma and ion weapons. There will almost always be a loud crackling sound, and in many cases a localized sonic concussion as the air collapses on the vacuum created by the energy beam/path. Furthermore, the heat trail left behind would be visible to sensitive thermo-imaging optics, possibly giving away the source of the beam.

Lasers: Even a 50 watt laser, like the type used in large scale light shows, starts to vaporize particle in the air if the beam is left stationary for more than a second. Real life weapon grade lasers are actually quite loud. Since most are designed for short duration/pulse, there is a loud "crack" every time weapon is fired as the air is vaporized in a path to the target. In game terms, a laser capable of inflicting M.D. would be VERY loud.

Ion Weapons: Technically an ion weapon would have a fuel cell in addition to an E-clip, but we'll let that detail slide. What's important is that the weapons is firing an actual energy projectile made up of ionized gas, most likely hydrogen or helium. There would be a definite heat distortion and trail, very likely giving away the location of the shooter. An ion charge would make noise not only passing through and burning up particles in the air, but even more so on contact with matter.

Particle Beam Weapons: Here actual particles (mass) are accelerated, requiring some source of fuel in addition to an energy cell. Nobody would make an accelerated particle beam weapon without having a set of ionizing lasers. Both the ionizing lasers and particle beam would fire at the same time, but the lasers would first burn a "hole" in atmosphere so the accelerated particle stream could travel unimpeded. Of all the energy weapons, very powerful particle beam weapons have the most potential massive sonic report. The air collapsing on the vaporized path through the air would create a localized sonic concussion, very similar to the way a lightning strike initiates a thunder clap. In *Rifts* the details of particle beam weapons have been ignored, probably for the better. The actual effects of accelerated particle beams can result in massive x-ray radiation and other disastrous side effects. In game terms, particle weapons would be one of the loudest energy weapons.

Plasma: Again we drop some detail as a plasma weapon requires an actual source of fuel, not simply "energy." Most plasma weapons are in effect a type of ion weapon, firing a hyper excited, ionized gas/mass as an energy projectile. The projectile would give off an immense heat distortion and would probably have a localized blast radius on impact. In game terms, there would be a long sonic report and impact sound every time the weapon was fire.

Unfortunately I did most of my weapons research AFTER writing the *Rifts* novels. These are just a few very general types. Not all energy weapons are created equal, and there's an infinite number of variations. Use all or none of this if you want. It might add some realism to the game.

Modified Triax DU and U-Round Rules

Research into the aftereffects of NATO's use of depleted uranium (DU) rounds in both the Gulf War and the Balkans has shown that the radioactive content in these weapons is much more dangerous than first anticipated. To reflect the serious medical complications caused by exposure to these weapons, I have made the following modifications to DU and U-Rounds in my campaign:

DU-Rounds:

- like normal projectile rounds, the DU-Rounds do not have to be surgically removed; a supernatural creature's body will eventually dissolve or eject the rounds
- however, as long as the DU-Rounds remain in the body, the rounds' low level of radioactivity will slow the healing of their damage by a factor (so damage normally regenerated in melees take minutes, minutes take hours, hours take days, and days take weeks)
- removing the DU-Rounds will enable their damage to be regenerated normally

U-Rounds:

- while the rounds are still in the creature's body, none of the rounds' damage can be regenerated
- even after the rounds are removed, the healing of their damage is slowed by a factor of two (damage normally regenerated in melees take hours, minutes take days, hours take weeks, and days take months)
- the U-Rounds can cause permanent scarring! For every 1% of a creature's total M.D.C. depleted with U-Round damage, there is a cumulative 1% chance that when the wounds heal, they will be permanently scarred: subtract 1 from the creatures P.B. attribute.

Example 1: a Gargoyle with 400 M.D.C. takes 250 points of damage in battle, 200 of which from U-Rounds. If the Gargoyle manages to survive long enough to have the U-Rounds removed, there is a 50% chance that when the wounds finally heal, they will scar and decrease the creature's P.B. by one.

Example 2: a dragon with 1000 M.D.C. takes 800 points of damage in battle, with 700 M.D.C. being done by U-Rounds. Once its wounds have healed, there is a 70% chance that the dragon will suffer scarring that will reduce its P.B. attribute by one.

- the U-Rounds can cause permanent tissue damage! For every 5% of a creature's total M.D.C. depleted by U-Round damage, there is a cumulative 1% chance that the creature will suffer permanent tissue damage. Roll percentile dice on the following table to determine the tissue damage suffered:

01 - 05	-3 to P.S., -2 to P.E., and -1 to P.P
06 - 19	-2 to P.S. and -1 to P.E.
20 - 39	-1 to P.S.
40 - 59	-1 to P.E.

60 - 79	-2 to SPD
80 - 95	-5 to SPD and -1 to P.E.
96 - 100	-10 to SPD, -2 to P.E., and -1 to P.P.

- Example 1: a Gargoyle with 400 M.D.C. takes 200 points of U-Round damage. There is a 10% chance it will suffer tissue damage.
Example 2: a 1000 M.D.C. dragon suffers 700 M.D.C from U-Rounds. There is a 14% chance it will suffer tissue damage