Starship design & construction rules. Version 3.1, 30 October 2012

Given the lack of coherent design rules, I set out to make some for controlling the races of the Narrative Campaign. These rules are not quite tweaked in yet, and won't work for a lot of the published Babylon 5 races ships made by AoG.
What it does is give me a standard guide line so ships I design are somewhat coherently bound by a common set of design rules.

Research Points (RP) are tied into Bandits campaign rules version 6. I use those rules for getting higher tech within a campaign game with two additional modifiers.
1. If a race has contracted with another race with the superior tech wanted, the amount per turn is doubled.
2. If a race has a captured piece of working technology (not a destroyed system in a capture ship, but a working one.) the roll is doubled, minus the number of any damaged boxes the unit has.
Example: If a race has captured a medium laser on a ship with 3 points of damage, and uses a tech research lab to investigate it, its tech point roll would be 2(d6-1) -3, for a range of 0-7 RP.

Each race starts with 5000 research points to spend, this total is then modified by the systems that the race controls at the beginning of the game. Or one can just assign RP to the race!

Home world	0
Developed	-1000
Agricultural	-500
Mineral Rich	-500
Terrestrial	-250
Barren	-250
Uninhabitable	0

So a race with one of each world would start the game with 2000 RP for starship design.
For tech other then starship design (page 43 + in Bandits rules) the cost is double.
Obviously, the first thing a player needs to decide is how big a ship can they build.

Hull Size:
The chart list three items per size vs. TL.
The first is the number of maximum hull points available in that bracket.
The second item, a letter, gives one the base Turn Cost/Decel for each size.
The third item, a number, is the Accel/Decel cost for that size/TL combination.
Roll/Pivot cost are determined by taking the Accel/Decel cost and adding it by the factors given below, then splitting it between the Start+Stop cost as the designer see's fit. (Though usually should be fairly close.)

Tech Level	RP	Roll/Pivot cost (Added to Accel/Decel cost)
0	Base line	LCV +0
1	50	MCV +1
2	100	HCV +2
3	200	Capital +3
4	300	Enorm' +4
5	400	
6	500	

Hull Size:

TL	LCV	MCV 1	MCV 2	HCV 1	HCV 2	HCV 3	CAP 1	CAP 2	CAP 3	Enormous	Def
Def	21	23	25	28	29	30	32	33	34	40+	Mod
0	19-24 B2	36 C3	45 D3	60* D4	75* E4	90* F5	150* H6	210* J7	270* K8	540* L9	+2
1	21-26 B2	38 C2	50 C3	65 D3	85 D4	100 E4	165* E5	230* F	300* J7	600* K8	+1
2	23-28 B1	40 B2	55 C2	75 D3	90 E3	110 F4	180 G4	265 G5	330 H5	660* J7	0
3	25-30 A1	45 B2	60 B2	80 C2	100 D3	120 E4	200 F4	280 G4	360 G5	720 H6	0
4	27-32 A1	50 B1	65 B2	85 C2	105 D2	130 D3	215 E3	300 F3	390 G4	780 H5	0
5	29-34 A1	52 B1	70 B2	95 C2	115 C2	140 D2	230 E3	325 F3	420 G3	840 H4	-1
6	31-36 A1	55 B1	75 B1	100 C2	125 C2	150 C2	250 D2	350 E3	450 F3	900 G4	-2

Turn mode	A	B	C	D	E	F	G	H	J	K	L	M
	1/4	1/3	1/2	2/3	3/4	5/6	1	1 1/4	1 1/2	2	3	4

Def is the defense value of the ships Fore/Aft and Port/Starboard combined. This value may be spilt between F/A and P/S as the designer see's fit, with the following constraints in difference.
LCV ±2, MCV ±3, HCV ±4, Capital Ship ±5 and enormous ±5.

Enormous ships add +1 to the defense for every 30 hull points over the base.
The number shown in the box corresponding to the class and TL is the maximum spaces that the builder can use and still use the base turn modes shown.

A size with an asterisk (*) in it indicates that to use that size, the ship must have connecting struts.
Ships with connecting struts must add +1 defense to both F/A and P/S defense values, in addition to the rules regarding damage.

Turn mode applies to both Turn Cost and Turn Delay.

This Controls how many spaces C&C, Reactor, Jump Drive, Engines etc. may take up.
A ship may have as many system boxes it has hull size boxes.

Hard Points: Number of weapon mounts a ship may have. The formula is:
(Size ÷ 10 +1) x Hard Point multiplier. See Hard Points (HP) for more information.
LCV: Round up 5 max. MCV: 1.5 HCV: 1.25 Cap: +10% Enmr: As is.

Turn Cost/Delay & Accel Decel reduction:
Improvements in ship design allow for taking steps off of turn mode and acceleration and deceleration.

TL	RP	Steps Cap+/≤HCV
1	100	-1/0
2	200	-2/-1
3	400	-3/-1
4	600	-4/-2
5	800	-5/-2
6	1000	-6/-3

Turn Cost/Turn Delay steps
4, 3, 2, 3/2, 4/3, 5/4, 1, 5/6, 3/4, 2/3, ½, 1/3, ¼

Accel/Decel Step reduction steps
8, 7, 6, 5, 4, 3, 2, 3/2, 1

Agile ships:
Designs made to ship and thrusters to allow the ship to be treated as agile.

Size:	RP
LCV	100
MCV	300
HCV	600
Capital	1000
Enormous	3000

Streamlining:
Gives the ship Atmospheric capabilities. Two levels available.

Full	10% of ship size	Per B5W rules
Limited	5% of ship size	Allows slow descent, 1-2 hours.

Reduce defense rating:
Selective reduction in the hull size to reduce cross section and tell-tale emissions, like EM, IR, etc.
-1 Def ratings (either fore/aft or port/starboard) 5% of ship size
Can be taken multiple times.

Reactor:
All ships need a reactor, except ancient races and some unique races that use other power sources.
As I have no desire at this point to add that much gloss to the system, I will address this as a supplement during a future century. If anyone has an idea, please feel free to share.

TL	RP	Min/Max size	Power/box
0	Baseline	6/30	1.5
1	50	5/30	2
2	100	4/40	3
3	200	3/50	4
4	300	3/60	5
5	400	2/70	6
6	600	1/80	7

Anti-Matter Tech:
Anti-matter tech is the ability to use matter/anti-matter particles in a controlled manner.
The EP mod represents the greater power output of the reactor at that tech level.
The TL of the reactor is paid for first, and then the A/M TL is paid for.

TL	EP mod	RP
1	x1.5	500
2	x2.0	1000
3	x3.0	2000

Engines:
Ships gotta move.
Power in is how many EP may be put in. This is divided by the engine efficiency to get the number of thrust points.
Another way to do it is Thrust Points ÷ EP Input = # of engine boxes you need.
If you exceed the size of the engine, then additional engines need to be installed (ala Dilgar & Hurr.)

TL Level	RP	Min/Max size	EP input
0	Baseline	6/30	1.5
1	100	6/13	1.8
2	200	5/16	2.1
3	300	4/20	2.4
4	400	3/24	2.7
5	600	2/24	3.0
6	800	1/30	3.3

Engine Efficiency:
How many EP it takes to create one point of thrust.

TL	LCV	MCV 1	MCV 2	HCV 1	HCV 2	HCV 3	CAP 1	CAP 2	CAP 3	Enormous
0	2	3	3	4	5	6	7	8	9	10
1	2	3	3	4	4	4	5	6	7	9
2	2	2	2	3	3	3	4	4	4	7
3	1	2	2	2	3	3	3	4	4	6
4	1	1	2	2	2	3	3	3	4	5
5	1	1	2	2	2	3	3	3	4	4
6	1	1	1	2	2	2	3	3	3	4

Artificial Gravity:
The Ability to manipulate gravity to a degree that it aids the ship in maneuvering.
Also enhances the habitility of a ship.

TL	RP	Endurance	Turn Delay	
1	1000	x1.5	-	
2	2000	x2	-1 Step	Gravitic Drive
3	4000	x3	-2 Steps	" "

Thrusters:
Gotta be able to use that thrust.

TL	RP	Max thrust Output	Min size	Thrust input Size Mult
0	0	2	6	3+ (TRx3)
1	50	3	5	2+ (TRx2.5)
2	100	4	4	2+ (TRx2.25)
3	200	5	4	2+ (TRx2.00)
4	400	6	3	1+ (TRx1.75)
5	600	7	3	1+ (TRx1.50)
6	800	8	2	1+TR

Example: Our ship wants two main thrusters with a thrust rating of 3 at TL 2.
So it will take a thruster of 2+(3x2.25) 8.75 or 9 boxes in size to give it an

Thrust Rating of 3.

HCV and smaller ships my count only half the space points due to their small size if desired. If the savings in space is taken, then the Hit Number for the system must be increased by 1.

Jump Drive:

For when you have to go somewhere not on the jump routes.

TL	RP	Ship Size	Min/Max size	Size Mult	Power Input	Delay
0	0	Enormous	50/100	10+.10 HS	6+.05 HS	40 turns
1	100	Capital	12/40	5+.05HS	5+.04 HS	36 turns
2	200	Capital	10/50	4+.04HS	4+.03 HS	32 turns
3	400	Capital	9/ n/a	3+.03HS	3+.02 HS	28 turns
4	1000	HCV	8/ n/a	2+.02HS	2+.02 HS	24 turns
5	2000	MCV	7/ n/a	1+.02HS	1+.01 HS	20 turns
6	3000	LCV	4	1+.01HS	1+.01 HS	16 turns

Size Multiplier: The size of the jump drive is expressed as a function of the ships size. If the jump drive size is greater then the Tech Min/Max size, then one turn is added to the jump delay for every box it falls short.

Power Input: The power the jump drive requires based on the base # plus a multiple of the ships size.

Example: A ship with a size of 240 and a jump drive tech of one would require a jump drive of. 5+(240 x .05)= 17 boxes sizes and use 2+(240 x .03)=10 EP.

Jump Drive boosting: Boxes can be added to the jump drive (up to the maximum size) to improve the jump delay. 1 box will reduce it by 1 turn, 3 boxes (1+2) will reduce it by 2 turns, 6 boxes will reduce it by 3 turns, etc. One additional EP is needed for every turn the delay is reduced.

Additional boxes	1	3	6	10	15	21	28	36	45	55
Jump Delay	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
EP cost	1	2	3	4	etc.					

Sensors:

Gotta be able to see where ones going.

TL	RP	Class	Power	Notes
0	0	Antiquated	n/c	
1	300	Standard	2/3 Power Req'd	
2	30000	Midborne	½ Power Req'd	
3	30M	Ancient	1/3 Power Req'd	(just in case your wondering!)

Sensor Strength:

TL	RP	Max Strength	Sensor Size Min	Power Req'd
0	0	3	3+3xStr	(3xStr)-1
1	50	4	3+2xStr	(2xStr)-1
2	100	5	2+3xStr	Str+ (1/2 x Str)
3	200	6	2+2.5xStr	½ Str+2
4	300	7	2+2xStr	½ Str+1
5	400	8	1+2xStr	1/3 Str+1
6	600	9	1+1.5xStr	¼ Str+2
7	800	10	1.5 x Str	¼ Str+1
8	1200	11	1.25 x Str	¼ Str Round up

+1	+400	+1	1+Str	"	"

Elint:

TL	Class	RP	Adjusted Strength	Sensor Size add	Power Req'd
0	Primitive	100	+1	+1.5xStr	+Str
1	Standard	300	+1/4 Str	+ Str	+ ½ Str
2	Improved 1	600	+1/3 Str	+ ½ Str	+ 1/3 Str
3	Improved 2	1000	+1/2 Str	+1/3 Str	+ 1/4 Str
4	Advanced	1500	+1/2	+1/4 Str	+ 1/5 Str

Armor:

Protect the ship from damage.
Three numbers shown.
First is for light weapons & objects on non-primary locations.
Second is for medium and better weapons, thruster on non-primary locations
Third is for structure blocks and primary systems.
For ever point of TL an additional system may have +1 armor.
I.e., at TL 2, two systems may have 5 armor. At TL 5, five systems may have +1 armor.
A system is a collection of identical items. Like engines, C&C, or all of one type of weapon.

TL	RP	Rating
0	0	0/2/3
1	50	1/2/3
2	100	1/3/4
3	150	2/3/4
4	200	2/4/5
5	300	2/4/6
6	400	3/5/6
7	600	3/5/7
8	800	3/6/8

C&C:
The number of structure boxes to control the ship.
Structure ÷ 50 Round up.
+1 per weapon system. (Example: An Omega Alpha has 4 weapon systems, HL, HPC, SPB & Int-2)
Sensor strength/2 +1
x2 for Elint
+2 for jump drive
Hanger +1 box
Fighter Control: +1for first two flight of fighters, +1 per squadron (12) afterwards.
+2 per Link

Hanger:

A shuttle bay takes 1 hull space.
A Cargo shuttle takes 2 hull space.
A ultra light fighter takes .5 hull space
A light fighter takes 1 hull space
A medium fighter takes 2 hull space.
A heavy fighter takes 3 hull space.

A Breaching pod or Assault shuttle take 2 space.
If the fighters is non-atmospheric, then -.5 space.
(i.e. A Starfury is non-atmospheric, so it takes 2.5 hull spaces)

Hard Points:
The spots on the hull where weapons are attached. Ships get a free amount of Hard Points (HP) based on their size and class. Additional hard points may be purchased.
Each weapon takes Hard Points based on its size.
Light weapon: 1HP Medium: 2HP Heavy: 3HP Mega: 4HP

Over gunning:
Additional HP may be purchased. Each HP takes on point of Hull Space
Ships that buy more then their rated hard points pay an additional cost in Supply points equal to ½ percentage that they exceed their Hard Point rating. Example: If the ship could mount 10 hard points, and has 12 hard points, it pays 10% extra in supply costs.

Weapons.
The tech trees for weapons are written here. If the research for one weapon is done, it can be applied to all the corresponding tech trees.
Examples: Light particle projector can be used for particle beams, bolters, or larger particle projectors.
Some branches come off of other systems, like pulse cannons off of pulsars. The RP have to be spent to get to the next weapon after the base line weapon has been developed.

Class > Particle TL	RP	Particle A	Particle B	Particle C	Particle D	Pulse Cannon
0	Baseline	LPP	LPP	LPP	LPP	Energy Pulsar
1	100	LPB	MPP	Light Bolter	Scatter pulsar	L P C
2	200	L. Part Can	HPP	Med Bolter	Energy pulsar	M P C
3	300	SPB	Part Hammer	Heavy Bolter	Quad Pulsar	H P C
4	400	Part. Cannon	I-Part Hamm	---	---	---
5	500	H P Cannon	---	Mega Bolter	---	Mega PC

Class > TL	RP	Laser A	Laser B	Laser C	Laser D	Plasma Bolters
0	Base	---	---	---	---	L bolt + Pla Can
1	100	L Laser	L Laser	L Laser	L laser	L Pals Bolt
2	200	M Laser	Tactical L	Laser Lance	Laser Cutter	M Pals Bolt
3	300	H Laser	Imperial L	Heavy Lance	Assault L	H Pals Bolt
4	400	---	Assault L	Laser Spear	Combat L	---
5	500	Spinal Laser	Battle Laser	---	---	Mega Pals Bolt

Class > TL	RP	Plasma Cannons	Blast Cannons	Rail Gun	Matter Cannons	Gauss Weapons
0	Base	Plasma Torch	L Blast C	L Blast C	L RG	L RG
1	100	L Pals Can	M Blast C	Light RG	---	Gauss Cannon
2	200	M Pals Can	H Blast C	Med RG	Matter Can	Hvy Gauss Can
3	300	H Pals Can	---	Heavy RG	Heavy MC	Gauss Rifle
4	400	Mega Pals	---	Mega RG	---	Hvy Gauss Rifle
5	500	Fuser	---	---	---	---

Class >	Gatling	Missile		Gravitic	
TL RP	Railguns	Racks	Missiles	Weapons	
0 Base	L Blast Can	O-Rack	D Early	Grav Drive 1	Grav Drive 1
1 100	L RG	SO	B Basic	Grav Bolt	Grav Bolt
2 200	Gatling RG	S, RO	A, L, H X	Grav Cutter	Grav Cannon
3 300	Imp Gat RG	R, L	C, F, I, Z, J	Grav Beam	Grav Shifter
4 400	---	B-Rack	M, J,K,S	Grav Lance	----
5 500	---	LH Rack	G	---	---

Class >	Molecular	Molecular	Anti	x	x
TL RP	Weapons A	Weapons B	Matter	x	x
0 Base	Grav Drive 1	Grav drive 1	A/M reactor 1		
1 100	Fusion Beam	Fusion Beam	A/P Def		
2 200			A/P Gun		
3 300			A/M Conv		
4 400			A/M Gun	---	
5 500			A/M Shredder	---	---

Dual mounts (or Arrays) are an additional +50 RP from the base weapon.
So a Twin Array (LPB) is 150 RP total.
Quad mounts are an additional +50 RP, so the Quad Array is 200RP.
A Quad Particle beam is 500 RP.
Additional Hard Points may be purchased at the following rate:
Light Hard Point: 1 hull Space. Med HP 2 hull space, Heavy HP 4 hull space.