Research Areas

Technological research has two components, the Research Areas and the Technologies. Research Areas govern which technologies advance. The Research Areas are Energy Systems, Defensive Systems, Electronics, Biotech, Construction, and Weapons.

- **Energy Systems** – Propulsion and energy generation
- **Defense** – Armor & Shields
- **Electronics** – Sensors, scanners, Communications, computers, ECM/ECCM, Stealth
- **Biotech** – population and health
- **Construction** – hulls, industry
- **Weapons** – weapon systems.

RP generated are assigned to one of the six areas of research. Points do not have to all be assigned to one area.

Each point assigned to a research area applies to all available techs in that area. Each tech starts at level zero which grants some basic technologies. Advanced techs follow at levels 1+ and must be advanced prior to being available. Each tech increases at a rate of 1 point = 1%. Once the percentage hits 100%, a roll is made. 01 to 05 = Overruns; 06-95 = Tech available; 96-00 = Breakthrough.

Overruns – The project requires another 2d10% worth of RP.
Available – The tech is available for immediate use.
Breakthrough – The project has generated an additional 2d10% worth of RP.

Racial Advantages/Disadvantages

Research Bonus 5% now changes the breakthrough roll: 01-05 = Overruns, 06-90 = Available, 91-00 = Breakthrough.
Research Bonus 10% changes the roll to: 01-05 = Overruns, 06-85 = Available, 86-00 = Breakthrough.
Research Penalty 5% changes the roll to : 01-10 = Overruns, 11-95 = Available, 96-00 = Breakthrough.

Personality Advantages/Disadvantages

Research Genius adds 5 additional RP to be assigned to Research Areas.
Intuitive Mathematician adds 2 additional RP to be assigned to Research Areas.
Absent Minded subtracts 5 RP.
Incompetence changes the breakthrough roll to 01-06 = Overruns. This is cumulative with Research Penalty (Roll becomes 01-11 for Overruns).

Research Areas & Techs

Multipliers increase the number of RP to advance 1% at that tier. Levels with no tech advance still require 100% to be gained, but no roll is required. A technology can be prioritized over others. In this case the prioritized technology gains a 50% bonus to assigned RP, while the other techs at that level all suffer a 50% degradation in assigned RP.

> *A race is currently at Energy Systems level 4. They decide to focus on **Improved Engine Class.** They are allocating 30 RP to Energy Systems. Normally each tech would gain 30%. With their current focus, **Improved Engine Class** gains 45% this turn while the other technologies at that level gain 15%.*

Energy Systems

0. Primitive Fission, Nuclear Torch Engines, Basic Engine Class, Prototype Inertial Compensators, FTL Class I, Warp Anchor, Mine Reactors.

Cost x1

1. Basic Fission, Power Efficiency I, Thrust Efficiency I.
2. Standard Fission, Standard Engine Class.
3. Improved Fission, Nuclear Pulse Engine, FLT Class II.
4. Enhanced Fission, Primitive Fusion, Improved Engine Class, Power Efficiency II, Thrust Efficiency II, Standard Inertial Compensators.
5. Advanced Fission, Basic Fusion, High Efficiency Capacitance Rings I.

Cost x2

6. Standard Fusion, Ion Pulse Engine, Enhanced Engine Class, FTL Class III.
7. Improved Fusion, Power Efficiency III, Thrust Efficiency III.
8. Enhanced Fusion, Primitive Antimatter, Advanced Engine Class, Enhanced Inertial Compensators.
9. Advanced Fusion, Basic Antimatter, Grav Pulse Engine, FTL Class IV.
10. Standard Antimatter, Power Efficiency IV, Thrust Efficiency IV, HEC Rings II.

Cost x3

11. Improved Antimatter, HEC Rings Increased Charge Rate mod.
12. Enhanced Antimatter, Primitive Plasma Core, Plasma Torch Engine, FTL Class V, Advanced Inertial Compensators.
13. Advanced Antimatter, Basic Plasma Core, Power Efficiency V, Thrust Efficiency V.
14. Standard Plasma Core.
15. Improved Plasma Core, Plasma Torch Engine, HEC Rings III.

Cost x4

16. Enhanced Plasma Core, Primitive Warp Tap, Acceleration Rings, HEC Rings Increased Capacity mod.
17. Advanced Plasma Core, Basic Warp Tap.
18. Standard Warp Tap, Fusion Torch Engine.
19. Improved Warp Tap, Jump Rings.
20. Enhanced Warp Tap, Primitive Zero-Point Core, HEC Rings IV.

Cost x5

21. Advanced Warp Tap, Basic Zero-Point Core, Fusion Pulse Engine, HEC Rings Metered Output mod.
22. Standard Zero-Point Core, Jump Gates.

23. Improved Zero-Point Core.
24. Enhanced Zero-Point Core, Antimatter Torch Engine.
25. Advanced Zero-Point Core, HEC Rings V.

Cost x6

26. Stargates.
27. Antimatter Pulse Engine.

Defensive Systems

0. Alpha Armor.

Cost x1

1. Beta Armor, Power Plant Armor I.
2. Gamma Armor, Alpha Shields.
3. Delta Armor, Power Plant Armor II, Shield Penetration.
4. Epsilon Armor, Beta Shields.
5. Zeta Armor, Power Plant Armor III.

Cost x2

6. Eta Armor, Gamma Shields, Shield Regen I.
7. Theta Armor, Power Plant Armor IV, Alpha Reactive Armor.
8. Beta Reactive Armor, Delta Shields.
9. Gamma Reactive Armor, Power Plant Armor, Shield Regen II.
10. Delta Reactive Armor, Epsilon Shields.

Cost x3

11. Epsilon Reactive Armor, Power Plant Armor.
12. Zeta Reactive Armor , Zeta Shields , Shield Regen III.
13. Eta Reactive Armor , Power Plant Armor.
14. Theta Reactive Armor , Alpha Organic Armor , Eta Shields.
15. Beta Organic Armor , Power Plant Armor , Shield Regen IV.

Cost x4

16. Gamma Organic Armor , Theta Shields.
17. Delta Organic Armor , Power Plant Armor 9.
18. Epsilon Organic Armor , Iota Shields , Shield Regen V.
19. Zeta Organic Armor , Power Plant Armor 10 , EM Plating Armor Mod.
20. Eta Organic Armor , Kappa Shields , EM Bands Shield Mod.

Cost x5

21. Theta Organic Armor , Shield Regen VI.
22. Lambda Shields , Thermal Plating Armor mod.
23. Thermal Bands Shield Mod.
24. Mu Shields , Shield Regen VII.
25. Kinetic Plating Armor mod.

Cost x6

26. Nu Shields , Kinetic Bands Shield mod.
27. Shield Regen VIII.
28. Xi Shields , Armor Hardening Armor mod.
29. Shield Hardening mod.
30. Omicron Shields , Shield Regen IX.

Cost x7

31.
32. Pi Shields , Shield Reflection mod , Armor Reflection Armor mod.
33. Shield Regen X.
34. Rho Shields.
35. Polarized Armor mod.

Cost x8

36. Sigma Shields.
37.
38. Tau Shields.
39.
40. Upsilon Shields.

Cost x9

41.
42. Phi Shields.
43.
44. Psi Shields.
45.

Cost x10

46. Omega Shields.

Electronics

0. Base Sensor Class 1, Channel Class 1, Signature Class 1, Resolution Class 1, Ripple Detectors, 1st Generation Science Instruments.

Cost x1

1. Base Sensor Class 2, EWD.
2. Channel Class 2, 1st Generation ECM, 1st Generation ECCM.
3. Signature Class 2, 1st Generation Stealth.
4. Resolution Class 2.
5. Base Sensor Class 3 , 1st Generation Long-Range Scanner , 2nd Generation Science Instruments.

Cost x2

6. Channel Class 3 ,2nd Generation ECM , 2nd Generation ECCM.
7. Signature Class 3 , 2nd Generation Stealth.
8. Resolution Class 3 , Extra Range EWD mod.
9. Base Sensor Class 4 , 2nd Generation LRS , 3rd Generation Science Instruments.
10. Channel Class 4 ,3rd Generation ECM , 3rd Generation ECCM.

Cost x3

11. Signature Class 4 , 3rd Generation Stealth , Enhanced Resolution LRS mod.
12. Resolution Class 4 , 1st Generation Command Net , Basic Sensor Boost Sensor mod.
13. Base Sensor Class 5 , 3rd Generation LRS , 4th Generation Science Instruments.
14. Channel Class 5 , 4th Generation ECM , 4th Generation ECCM , Basic ECM Boost ECM mod.
15. Signature Class 5 , 4th Generation Stealth , Increased Analysis Capacity Science Instrument mod.

Cost x4

16. Resolution Class 5 , 2nd Generation Command Net , Wide-Band Sensors mod.
17. Base Sensor Class 6 , 4th Generation LRS , 5th Generation Science Instruments.

18. Channel Class 6 ,5th Generation ECM , 5th Generation ECCM , Wide-Band ECM.
19. Signature Class 6 ,5th Generation Stealth.
20. Resolution Class 6 , Increased Radius Command Net mod , Improved Resolution Sensor mod.

Cost x5

21. Base Sensor Class 7 , 5th Generation LRS.
22. Channel Class 7 , 6th Generation ECM , 6th Generation ECCM , Improved Resolution ECM mod.
23. Signature Class 7 , 6th Generation Stealth.
24. Resolution Class 7 , Enhanced Channels Command Net mod.
25. Base Sensor Class 8.

Cost x6

26. Channel Class 8 ,7th Generation ECM , 7th Generation ECCM.
27. Signature Class 8 ,7th Generation Stealth.
28. Resolution Class 8.
29.
30. 8th Generation ECM , 8th Generation ECCM.

Cost x7

31. 8th Generation Stealth.
32.
33. 9th Generation ECM , 9th Generation ECCM.
34. 9th Generation Stealth.

Biotech

0. Cryogenics I,

Cost x1

1. Anagathics I.
2. Organic Improvement I, Cryogenics II.
3. Population Improvement I, Anagathics II.
4. Cryogenics III.
5. Organic Improvement II , Anagathics III.

Cost x2

6. Cryogenics IV.
7. Population Improvement II , Anagathics IV.
8. Cryogenics V , Organic Improvement III.
9. Anagathics V.
10.

Cost x3

11. Organic Improvement IV , Population Improvement III , Anagathics VI.
12.
13. Anagathics VII.
14. Organic Improvement V.
15. Population Improvement IV , Anagathics VIII.

Cost x4

16.
17. Anagathics IX.
18.

19. Population Improvement V , Anagathics X.

Construction

0. Hull Cost 10MCr/ton, Hull Signature Tons/20, Max Thrust 5, Small Craft HTK +1, Shuttlebays, Shuttles, Barracks, Troop Bays, Magazine Capacity 1, Troop Types Available (GAR, RCN, INF, AST, HVA, ENG, HQ, MED, SEC, MAR, SCR).

Cost x1

1. Troop DV +1, Troop ATK +1, Mineral Improvement I.
2. Hull Cost 9MCr/ton, Hull Signature Tons/25, Max Thrust 6, Small Craft HTK +1, Cargo Shuttles.
3. Decoy HTK 10, Troop Types Available (AIR, ARM).
4. Hull Cost 8MCr/ton, Hull Signature Tons/30, Max Thrust 9, Small Craft HTK +1, Pinnaces.
5. Troop DV +2, Decoy HTK 13, Industrial Index x2, Magazine Capacity 2.

Cost x2

6. Hull Cost 7MCr/ton, Hull Signature Tons/35, Max Thrust 10, Small Craft HTK +1, Fighter Hangars, Assault Shuttles.
7. Decoy HTK 15, Troop ATK + 1, Light Fighters, Mineral Improvement II.
8. Hull Cost 6MCr/ton, Hull Signature Tons/40, Max Thrust 13, Small Craft HTK +1, Drop Pods.
9. Troop DV +2, Decoy HTK 18.
10. Hull Cost 5MCr/ton, Hull Signature Tons/45, Max Thrust 14, Small Craft HTK +1, Industrial Index x3, Magazine Capacity 3.

Cost x3

11. Decoy HTK 20, Docking Bays.
12. Hull Cost 4MCr/ton, Hull Signature Tons/50, Max Thrust 17, Small Craft HTK +1.
13. Decoy HTK 23, Troop DV +1, Mineral Improvement III.
14. Hull Cost 3 MCr/ton, Hull Signature Tons/55, Max Thrust 18, Small Craft HTK +1, Medium Fighters.
15. Decoy HTK 25, Industrial Index x4, Magazine Capacity 4.

Cost x4

16. Hull Cost 2MCr/ton, Hull Signature Tons/60, Max Thrust 21, Small Craft HTK +1.
17. Decoy HTK 28, Troop DV +1.
18. Hull Cost 1MCr/Ton, Hull Signature Tons/65, Max Thrust 22, Small Craft HTK +1.
19. Decoy HTK 30, Mineral Improvement IV.
20. Industrial Index x5, Tractor Beams, Magazine Capacity 5.

Cost x5

21. Decoy HTK 33, Heavy Fighters.
22.
23.
24.
25. Industrial Index x6, Mineral Improvement V.

Cost x6

26.
27.
28. Assault Fighters.

Weapons

0. Laser Aperture (5cm to 25cm), Class I Laser RoF, Far IR Laser Frequency, Fission Warheads, Basic Missile Frames, Missile Reload Rate 1, Mine Cost 0.4MCr/CP.

Cost x1

1. Troops ATK +2, Missile Decoys, Mass Cannon Caliber (1cm & 2cm), Velocity (3000km/s), Basic Solid Slugs.
2. Class II Laser RoF, Troop ATK +1, Autofire Weapon Mod.
3. Laser Aperture (30cm to 50cm), Gauss Cannon Caliber (1cm & 2cm), Gauss Cannon Cycle Rate 1.
4. Class III Laser RoF, Mid-IR Laser Frequency, Fusion Warheads, Mass Cannon Caliber (3cm & 4cm), Ultra-Dense Slugs.
5. Kinetic Beam Aperture (5cm & 10cm), Fire Delay 0, Standard Missile Frames, Hyper-Velocity Cannon Caliber (1cm & 2cm), HVC Packet Size 1, Recon Drones, PD Drone Hardpoint, Drone Sensors, Drone Armor.

Cost x2

6. Laser Aperture (55cm to 75cm), Class IV Laser RoF, Troop ATK +1, Missile Reload Rate 2, Gauss Cannon Caliber (3cm & 4cm), Armor-Piercing Weapon Mod, Standard Drone Hardpoint, Particle Weapon Aperture (5cm), Particles (Electron).
7. Particle Bomb Aperture (10cm – 20cm), Containment Strength 1, Mass Cannon Caliber (5cm & 6cm), Launch Velocity (3500km/s).
8. Class V Laser RoF, Near IR Laser Frequency, Antimatter Warheads, Hyper-Velocity Cannon Caliber (3cm & 4cm), HVC Packet Size 2, Explosive Slugs.
9. Laser Aperture (80cm to 100cm), Mine Cost 0.2MCr/CP, Gauss Cannon Caliber (5cm & 6cm).
10. Class VI Laser RoF, Kinetic Beam Aperture (15cm & 20cm), Enhanced Missile Frames, Mass Cannon Caliber (7cm & 8cm), 1st Generation Miniature Weapon Mod, Light Attack Drone, Drone Shields.

Cost x3

11. Electron Torpedo Aperture (10cm & 20cm), Missile Reload Rate 3, Hyper-Velocity Cannon Caliber (5cm & 6cm), HVC Packet Size 3, Turreted Drone Hardpoints, Particle Weapon Aperture (10cm).
12. Visible Laser Frequency, Plasma Warhead, Gauss Cannon Caliber (7cm & 8cm), Gauss Cannon Cycle Rate 2, APDS Slugs.
13. Proton Torpedo Aperture (20cm & 40cm), Mass Cannon Caliber (9cm & 10cm), Launch Velocity (4000km/s).
14. Particle Bomb Aperture (30cm – 40cm), Containment Strength 2, Hyper-Velocity Cannon Caliber (7cm & 8cm), HVC Packet Size 4, Shield Penetration Weapon Mod, Particles (Neutrino).
15. Kinetic Beam Aperture (25cm & 30cm), Fire Delay 1, Advanced Missile Frames, Gauss Cannon Caliber (9cm & 10cm), Attack Drones, Extra Drone Fuel Cells.

Cost x4

16. Near Ultraviolet Laser Frequency, Warp Warheads, Missile Reload Rate 4, Mass Cannon Caliber (11cm & 12cm), Flechette Slugs, Particle Weapon Aperture (15cm).
17. Electron Torpedo Aperture (30cm & 40cm), Hyper-Velocity Cannon Caliber (9cm & 10cm), HVC Packet Size 5.
18. Proton Torpedo Aperture (60cm & 80cm), Mine Cost 0.1MCr/CP, Gauss Cannon Caliber (11cm & 12cm), Extended Range Weapon Mod.
19. Plasma Cannon Aperture (25cm & 50cm), Troop ATK +1, Mass Cannon Caliber (13cm & 14cm), Launch Velocity (4500km/s), Particles (Muon).

20. Extreme UV Laser Frequency, Kinetic Beam Aperture (35cm & 40cm), Gravitic Warheads, Hyper-Velocity Cannon Caliber (11cm & 12cm), HVC Packet Size 6, Ultra-Dense APDS Slugs, Heavy Attack Drones, Drone Speed Boost.

Cost x5

21. Particle Bomb Aperture (50cm – 60cm), Containment Strength 3, Missile Reload Rate 5, Gauss Cannon Caliber (13cm & 14cm), Gauss Cannon Cycle Rate 3, Particle Weapon Aperture (20cm).
22. Mass Cannon Caliber (15cm & 16cm), Overloaded Weapon Mod.
23. Electron Torpedo Aperture (50cm & 60cm), Proton Torpedo Aperture (100cm & 120cm), Hyper-Velocity Cannon Caliber (13cm & 14cm), HVC Packet Size 7.
24. Soft X-Ray Laser Frequency, Plasma Cannon Aperture (75cm & 100cm), Gauss Cannon Caliber (15cm & 16cm), EM Slugs, Particles (Tau).
25. Kinetic Beam Aperture (45cm & 50cm), Fire Delay 2, Mass Cannon Caliber (17cm & 18cm), Launch Velocity (5000km/s), Assault Drone, Drone ECM.

Cost x6

26. Missile Reload Rate 6, Hyper-Velocity Cannon Caliber (15cm & 16cm), HVC Packet Size 8, 2nd Generation Miniaturization Weapon mod, Particle Weapon Aperture (25cm).
27. Gauss Cannon Velocity (17cm & 18cm).
28. Hard X-Ray Laser Frequency, Particle Bomb Aperture (70cm – 80cm), Containment Strength 4, Proton Torpedo Aperture (140cm & 160cm), Mass Cannon Caliber (19cm & 20cm), Launch Velocity (5500km/s), Flak Slugs.
29. Electron Torpedo Aperture (70cm & 80cm), Plasma Cannon Aperture (125cm & 150cm), Hyper-Velocity Cannon Caliber (17cm & 18cm), HVC Packet Size 9, Particles (Photon).
30. Kinetic Beam Aperture (55cm & 60cm), Gauss Cannon Caliber (19cm & 20cm), Gauss Cannon Cycle Rate 4, Proximity Fuse Weapon mod.

Cost x7

31. HVC Packet Size 4, Launch Velocity (6000km/s), Particle Weapon Aperture (30cm).
32. Gamma Ray Frequency, Hyper-Velocity Cannon Caliber (19cm & 20cm), Explosive Flechette Slugs.
33. Proton Torpedo Aperture (180cm & 200cm), Gauss Cannon Cycle Rate 5.
34. Plasma Cannon Aperture (175cm & 200cm), Launch Velocity (6500km/s), High-Energy Focus Weapon mod, Particles (Boson).
35. Kinetic Beam Aperture (65cm & 70cm), Fire Delay 3, Particle Bomb Aperture (90cm – 100cm), Containment Strength 5, Electron Torpedo Aperture (90cm & 100cm), HVC Packet Size 10.

Cost x8

36. Capacitor Slugs, Particle Weapon Aperture (35cm).
37. Launch Velocity (8000km/s).
38. Pulse Weapon Mod.
39. Plasma Cannon Aperture (225cm & 250cm), Particles (Gluon).
40. Kinetic Beam Aperture (75cm & 80cm), Launch Velocity (10000km/s).

Cost x9

41. Particle Weapon Aperture (40cm & 45cm).
42. 3rd Generation Miniaturization Weapon Mod.
43. Launch Velocity (12000km/s).
44. Plasma Cannon Aperture (275cm & 300cm), Particles (Baryon).
45. Kinetic Beam Aperture (85cm & 90cm), Fire Delay 4.

Cost x10

46. Enveloping Weapon Mod, Particle Weapon Aperture (50cm).
47. Particles (Meson).
48.
49. Particles (Tachyon).
50. Kinetic Beam Aperture (95cm & 100cm), Fire Delay 5, Stealth Weapon Mod.

Racial Techs

The three racial technology trees (Crystal, Psychic, and Machine Intelligence) are only available to races with the requisite advantage. The techs are grouped together, but should not be advanced together unless the race has the proper advantages.

Racial Tech

0. Psychic Scanners, Crystal Hulls, Machine Intelligence uses MI for populations.

Cost x1

1. Psionic Inhibitor, Crystal Armor, Machine Intelligence reverse engineer for ½ cost.
2.
3.
4.
5.

Cost x2

6. Psi Shields, Shard Projectors, Machine Intelligence +1 Industrial Index.
7.
8.
9.
10.

Cost x3

11. Psibombs, Shard Bombs, Machine Intelligence increase Crew Grade +1.
12.
13.
14.
15.

Cost x4

16. Psychic Annihilators, Shard Lance, Machine Intelligence buy off 1 negative trait.
17. Machine Intelligence buy off 1 negative trait.
18. Machine Intelligence buy off 1 negative trait.

Tech Changes

Along with the changes to tech trees, Armor, Shields, and Power Plants are getting a look. These components are changing from a per ton aspect to a percentage of hull.

Power Plants

Power plants are classified by Class, Type, Efficiency, and Armor. With this new scheme, only one power plant may be placed on a ship.

Power Plant Class

Class	Meltdown %	Power Base	Hull %	Cost	LP
Primitive	85%	100	10%	250	4
Basic	60%	200	10%	200	8
Standard	50%	250	10%	300	10
Improved	40%	300	10%	400	12
Enhanced	25%	375	10%	500	15
Advanced	10%	500	10%	600	20

Power Plant Type

Type	Multiplier	Cost	Hull%	LP
Fission	5	x1	10%	1
Fusion	10	x1.5	8%	2
Antimatter	15	x2	6%	3
Plasma Core	20	x2.5	4%	4
Warp Tap	25	x3	2%	5
Zero-Point Core	30	x4	1%	6

So a Standard Fusion Plant provides 2500 power, costs 300MCr, and consumes 18% of the hull space.

Efficiency and Armor remain unchanged.

Armor

The armor table remains unchanged with the exception of tonnage being changed to hull % at the same value, i.e. Delta armor provides 25EM/10Th/5K at a cost of 10% of the hull.

Shields

The shield table remains unchanged with the exception of tonnage being changed to hull% at the same value, i.e. Delta shields provides 5EM/30Th/15K at a cost of 10% of the hull.