TechSense

A Hard Sci-Fi RPG with Variable Crunch

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Contents

1 Introduction

Welcome to TechSense! TS (for short) aims to provide a crunch-lite space adventure with a hard sci-fi background. Inspired by the works of authors like Robert Heinlein and Ursula K. Le Guin, TS aims to give truly alien experiences without delving into space-fantasy or space-opera. We designed this system to keep things at least a little realistic, without bogging players down with excessive math or killyjoy-type limits on what you can do.

Almost completely devoid of combat, TS instead focuses on role-playing and acquiring the skills necessary to traverse the universe. Skills are easy to acquire and level up, but take a lot of work to perfect.

That being said, there is the option for a *lot* of math and calculation for technology and ships. If this is fun to you, crack out your slide rules (or go to Wolfram Alpha) and reckon your tragectory through the stars. If you'd like to keep the rocket science in the realm of story, that's also possible (though I did do a lot of research for all that).

We hope you enjoy playing, but remember: if you don't like something, change it, and ignore any rules that ruin your fun. If "fun" to you is always following all the charts and calculating orbital transfers and insertations, then stick to that. If it means skipping by all that and just spending some fuel, then that's fine too. This is only a guide, after all. The most important part is the people at the table.

-Alexander Lowry

2 Basics of Playing

TechSense is best for 3-6 players, plus a GM. Each game session will probably take from two to four hours. Games can take as many sessions as your groups wants to play.

If you already know how to play tabletop RPGs, you can probably skip this section. If you don't, welcome! We hope this will be far from the last one you'll play.

The game is a collaborative story told by the players with the help of the Game Master (GM). The players navigate characters through the universe that the GM creates. The players don't play against each other, and definitely don't play against the GM, nor does the GM try to act as an enemy of the players. They all negotiate the story together.

Before the game starts, players create a character using a character creation sheet.

The Game Master(GM, for short) creates a universe of planets, ships, and locations, and people. They sit at the head of the table, and failitate the players and their player charcters interacting with this universe. The GM acts as every person and environment that the player charcters come across.

The GM will have to plan out the planets, cities, ships, people, and aliens encountered by the player charcters. They should arrive at each game session prepared for the next places the players may go. Ability to plan, but be flexible with those plans, is important. Having a stockpile of extra places and people ready will help tremendously when players go someplace unexpected. More on running a game is outlined in the TechSense GM's Book.

3 Sense and Tech

There is only one stat in TS, and it's not *terribly* important. It's the Sense and Tech axis. It's pretty simple: the closer you are to sense, the better you are at interpersonal relationships, diplomacy, talking, etc., and the closer you are to tech, the better you are at using technology, navigating, piloting, and so on. But both are on the same axis, and your character keeps track of just *one* number. We'll call this your *gestalt number.*

Actions work like this: roll a twelve-sided die (a.k.a a *d12*). If you're rolling for a tech action, then you succeed if you roll your gestalt number or higher. But if you're rolling for a sense action, you succeed if you roll your gestalt number or *lower*. So the better you can roll on tech, the worse your ability to succeed on sense rolls, and vice-versa.

You're not locked in to a single gestalt number, though. Every time you take an action that requires a tech roll, your gestalt number goes up by one (up to a maximum of 11), making a future tech success less likely (as you get too much in your own head), and you gain one point. Every time you take an action that requires a sense roll, your gestalt number goes *down* by one (down to a minimum of 2), making a sense success less likely (as you socially exhaust yourself), and you gain one point. So you may bounce back and forth along the Sense and Tech scale, depending on what actions you take. Up to 11 then down to 2 again. You'll get better and worse and different rolls over time. If you want to focus on one, you'll have to take both types of actions equally to keep your advantage at one end.

But here's what's important: you don't lose the modifiers that you acquire from spending your points whether that be +1 or +2 or -1 (remember, this isn't a bad thing for tech rolls) you might get on rolls while using *that* skill. So even though you, normally playing with tech, may move toward the sense side over time, making rolls harder, your specialized tech skills will still push your tech rolls toward success.

Note: Abilities are not affected by the player charcter's current gestalt number at all. You don't roll on abilities.

3.1 Failure

If you roll, and fail, then something goes wrong. It's up to the GM to determine what goes wrong. The GM should use their best judgement to determine the severity of what happens. If, for example, a shuttlecraft's instruments are out, a player may try to land by the seat of their pants, and choose to roll with a pilot skill aiding that roll. If their gestalt number is 4, and their pilot skill is 2, but they roll a 1, they get a total of 3 and they fail. However, it might be cruel to TPK (*total-party kill; killing every player's character*) and end the game right then.

Instead, the GM may choose some consequences. Perhaps the shuttle lands far off-course, and has its landing gear damanged on touchdown, preventing the players from taking off until they repair it. Perhaps they crash-land in someone's barn, making the locals upset. Depending on the severity of the failure, and how much pity the GM wants to take on their hapless players, the consequences could be lesser or greater.

Be sure not to let a failure halt all action; that kills the pacing of the story and morale of your players. Players *do* enjoy a challenge when they're forced to fight harder, but making success impossible will discouage them and make them disengage with the game.

4 Character Creation

4.1 Fiction First, then Mechanics

It can be tempting to create a spreadsheet of skills and slap on a face later. This can help with the numbers of your character, but you will have a hard time interacting with other players or non-player characters if you don't know *who* your character is.

It's better to come up with an interesting character, full of story and life, then choose the skills and abilitiesthat fit that character. Since you will be changing your skills and abilitiesfrequently, you shouldn't define your character by those things alone.

Here's an example backstory:

An Example Backstory *Maverick is a human from Terra. He grew up in the state of Iowa in the American Union. He is on the ship to be an envoy, with a specialization in cultural traditions. He hopes to find his uncle who went off with an interstellar mining guild fifteen years ago.*

This example includes a number of good elements. It includes a species and heritage, providing a cultural background. It also has a job you can build skills around. Finally, it has some abstract personal goal unrelated to the character's job. Try to keep it short, but rich. Specific details are good, but don't bog down your character with too much. Create only what you need to play out the story, and don't be afraid to discover more as you go.[1]

4.2 Superobjective

It can also be useful to have an overarching goal or development that your character may have during the story arc. This major goal is called a *superobjective*[2]. This superobjective may be something like *reinvigorate my love and wonder for the universe* or *find my long-lost brother* or even *exact revenge on the asteriod-mining mogul who cost my mother her life.* These goals should carry an emotinal component, because they are *important* to your character. Don't force your character to go through these changes or complete their superobjective, but take opportunities to explore them. Your character doesn't even have to be aware they have this need or want, but should have a tendency toward completing it. If you make your Game Master aware of your character's superobjective, they may integrate more opportunities or encounters into the story to help your character along.

Another note: A lot of stories are about change and irony. Maybe the completion of your superobjective doesn't satisfy them like they thought it would. Maybe they change their standards and learn to be happy with never knowing some truth, or never getting what they wanted. Maybe they do get it, but it costs them *everything* else important to them like other friends, honor, or their own identity.[3]

To take our *exacting revenge on the asteroid-mining mogul* objective from earlier, and play it out, perhaps your charcter realizes they cannot bring themselves to commit murder, or refuse to save him when he's in danger, or perhaps your character *does* kill him,

[1] If you have any formal acting training, what we're doing here is exploring the *given circumstances.*

[2] Again, a term taken from the theatre.

[3] Also known as the principle of *Yes, But...*

but ends up leading a violent gang and falling through the morals-event-horizon, never to be the same.

4.3 Switching Characters

You may also switch characters frequently, so you don't have to be locked in to one forever. At the end of a session, you can switch to any character on your crew, or who is a (semi-)permanent resident of your ship. Be sure to work with other players so that your new character doesn't fulfill a need that another character already fills.

Before you come to the next session to dive into this new character, make it your own. You may know a few things about this character, or even quite a bit, depending on how much you interacted with them when they were an NPC. Try to keep them true to what you've learned so far, but also add backstory, beliefs, experiences, history, and motivation to them, so that you can play them fully. The GM may also choose to give you certain notes about this person to help you.

Note to GM: don't make a crew member NPC a critical piece to a plot, just in case a player switches to that NPC. If you must have a traitor or mole, make them either a temporary traveller joining the ship for a short time, or some other member of the faction that this ship is part of, to be transported or taken care of for a short time. This way, the critical NPC can play their role, but not get in the way of players.

4.4 The Crunch

Once you have a character in mind, it's time to get into the numbers, baby!

1. Choose a gestalt number.
   The higher the number, the more likely a sense roll will suceed, and the lower the number, the more likely a tech roll will suceed.

2. Choose a skill to max out.
   Presumably, your character is an expert at something! That's why they were chosen to be on this ship. Pick any skill, and give yourself the maximum level.

3. Choose two more skills at level one.
   You have other skills and training. Choose two things to have a basic proficiency at.

Our Example from Earlier *Let's continue creating Maverick. Maverick now needs a gestalt number, skills, and abilities. Since he's an envoy, he should probably start with a high gestalt number, so he can roll better on sense rolls. Let's go with 9. We should also mostly give him sense-based skills. Let's give him Envoy as his maxxed-out skill. Let's also give him Anthropologist at level 1, since that fits his mission well. It might be wise to also give him a tech skill, too. Let's pick User Interfacer (his second level-1) because it helps round him out, but also fits with his character as someone who figures out strange and alien civilizations.*

As you take actions, remember to gain one point every time you roll. At the beginning and end of sessions, you can spend your point on gaining skills and abilities. How to aquire new skills and abilities is outlined in the section on skills and abilities .

That's pretty much it for basic character creation. Add more backstory to taste.

5 Skills

Skills are specific areas of expertise that help you complete actions by giving a helpful bias to certain rolls. When you roll for an action, you can apply **one** of your skills to that roll, as long as the GM agrees that your skill is relevant to the action you're trying to do.

Whenever you roll, you get one point. You can acquire a skill by spending one point. You can also 'level up' skills. Leveling up skills means it biases your roll more strongly. A skill can be upgraded twice, meaning that it can be as high as level 3. Each skill upgrade costs its level in point. You can do this at any time, during the game, before or after the session, or sitting at home in between sessions. The types of situations in which a skill can be used are written underneath the skill's name. Also, the amount of the modifier is listed.

Check the skill's description since level 3 doesn't necessarily mean that it gives a +3 or -3 bias.

Remember, the bias given by the skill's modifier does not change based on your gestalt number. If you are heavily towards a sense direction, a tech skill modifier is just as strong. Your overall odds of success on a tech roll is still low, but for certain skills it will still be higher than it would be without the skill.

Some skills have prerequisite abilities.

5.1 Abilities

Abilities are like skills, in that they cost points but instead of aiding a roll, they allow you to do something you could not before. Abilities cost 5 point per level, across the board. Skills are about increasing the chances of success for things you already know how to do, but abilities are about doing new types of things. They may unlock new skills for you to acquire and upgrade.

6 Session Zero

So you're ready to play. Your characters need to get to know each other (and maybe your players, too). The GM should block out an hour or so for everyone to get on the same page. Start by introducing the world, the ship, and what kinds of missions or goals your organization has. What are the "given circumstances"? What is the recent history of this this world? What's the organization you're part of like? Try to give a sense of the vastness of this universe, and the strangeness of its inhabitants.

Next, the characters should introduce themselves to each other. After giving a real-life name, switch into the character, talking as if you *are* that charcter. While not essential, a character voice helps differentiate your character's opinion and questions from your own. Before talking about what your character does, talk about who they are. Where are they from? What do they look like? What's their cultural background? What skills do they bring to this starship? Why did they want to become an astronaut? Highlight things that are important to the character.

An Example Introduction I'm Jane. My character's name is Natalie Cook. [Here, you can switch into your character.] *I'm a nuclear engineer from the South Pacific League. My parents worked on Earth's space elevator. I'm a woman who looks South Pacific and have short black hair that I keep in a bun. I usually wear the standard jumpsuits, even on shore leave. Since I grew up around the kids of other engineers, I know a English-Polynesian-German creole unique to the area around the project. I work on the ship's propulsion systems, and became an engineer specifically to join a starship crew. I became an astronaut because I want to discover how other planets and cultures solve engineering problems. I play board games in my free time and brought chess in my personal items. Hit me up for a match!*

The astronauts (the whole crew of the ship) would have gone through several months of training with each other. They know each other well, trust each other, and are open with feelings and concerns. Maybe they don't know each other's personal lives in detail, but there should be no loners. After all, a starship is only so big. A broody or antisocial person would have been weeded out pretty early on. Have everyone discuss what friendships or friendly rivalries were developed during training and mission simulations. Then, have characters introduce and describe these relationships with each other.

An Example Relationship *Debola and I are the two main pilots on this ship. During training, we spent a lot of time competing for high evaluations on simulations. Sometimes we would play the same senarios dozens of times to shave the smallest amounts of fuel off of docking or landing costs. We relentlessy mock each other's skills, but go out for a drink together once we're done for the day. Debola's probably my closest friend on the ship.*

Finally, the GM should introduce the players to the first mission. They'll be able to choose which missions to take on later, but a short, simple one to begin will help give a sense of how the game goes. Play through this in about an hour, ending on a cliff-hanger, like a distress call, a strange ship exiting lightspeed nearby, or a failure being discovered on the ship. A sense should be given that something is about to happen at the beginning of the next session.

7 List of Skills

7.1 Sense

Aldrin +2/level on piloting, orbital rendezvous, and docking *without instruments.*

Anthropologist +1/level understanding and learning a new culture.

Chameleon +1/level disguising as another species or culture.

Cook +2/level on making food.

Critter Wrangler +1/level on creature-related shenanigans.

Diplomat +1/level for persuading politicians, businesspeople, or leaders.

Envoy +2/level on first contact messages and interactions.

Haggler +1/level while negotiating a deal with a salesperson or trader.

Linguist +1/level learning any new language.

Mathemagician +1/level doing anything cool with math.

Medicine Man +2/level on identifying cures from flora or fauna.

Trekker +1/level on figuring out where you're going on unfamiliar ground, with or without maps.

7.2 Tech

Botanist -1/level on identifying and finding plants.

Cartographer -1/level on making and reading maps.

Engineer -1/level on operating and repairing machines.

Firefighter -1/level on suppressing or preventing fires.

Historian -1/level on inferring or learning about local history.

Marksman -1/level for accuracy on onboard instruments that require aiming like directional antenna or artillery.

Mechanic -2/level fixing devices you're familiar with.

Navigator -1/level on figuring out where you're going dirtside.

Pilot -2/level on operating a flying vehicle. Tricks encouraged.

Radio Operator -2/level on operating radios.

Radio Scanner -1/level on identifying objects on radar and long-distance imaging.

Schematisizer -1/level on reading unfamiliar schematics.

Surgeon -1/level for first aid, or large healing during resting times.

User Interfacer -1/level on figuring out an unfamiliar or alien control scheme or device, or discerning something's function.

8 List of Abilities

Astrogator Ability to navigate interstellar travel.

Dialectist Ability to learn a dialect of a language already known, in 7 days. At level 2, this is reduced to 3 days. At level 3, the player charcter can figure out the jist of the dialect in about 1 conversation's time.

Experimenter Ability to operate medically on alien physiology.

Star-Pilot The player charcter can pilot an interstellar vehicle.

9 Injury and Bodily Harm

So, you've taken some damange. The fleshy structure you call home isn't doing so hot. Let's figure out how bad it really is.

9.1 Radiation Dosage

Yet to research and write.

10 Ships

If you want to travel the stars, it's likely you're going to want a ship to get around in. Most ships in TechSense are *torch ships*. A torch ship is a ship that, within the universe, still obeys normal physics like orbital mechanics (that is, doesn't fly around like an airplane), but its engines are absurdly powerful.

Despite many attempts to be as realistic as reasonable, faster-than-light travel (*FTL*) is also possible in TechSense. We made this concession only to allow for wider exploration. Near-light travel would allow travel to other solar systems within a lifetime, but only to those within the ship. To the outside universe, decades would go by. So we have faster-than-light drives.

Ships have many differences between them, so here is an overview of what ships can have.

10.1 Maneuvering

Burns

A *burn* is any time an engine turns on, and causes the velocity of the ship to change. All maneuvers are made through burns. Burns cost fuel, of course.

Ballistics

Ballistics are traditional rocket maneuvering using optimized burns. These burns can be quite complex[4] thanks to the unintuitive nature of orbits. You can't just point the direction you want and *go*. You've got to calculate how your velocity will change over time as planets and moons pull on your ship.

Fortunately, we've included several charts for simple calculations, and program tools to do some more complex stuff... to a point. If you already know about orbital mechanics and just *love* calculating plane changes and phase matching then go ahead.

If you don't love all that stuff just use the charts or do torch burns for everything. What's a torch burn? Glad you asked...

Torch Burns

You know what we just said about not being able to point where you want and just *going?* Actually, you can, it's just absurdly expensive. But as we mentioned, our ships can be absurdly powerful. A Torch burn is also called a *burn-flip-burn*. You point to your target, burn toward it until you reach the halfway point, flip 180°, then burn until you come to a stop.

The key is that since there's no brakes or friction in space, you have to spend just as much time slowing down as you did speeding up. Hence, the flip at the halfway point. It's also possible to have a coast period in the middle, though obviously you wouldn't speed up as much, and would consume less fuel.

The time for a torch burn is:

$$t = \sqrt{\frac{d}{a}}$$

The fuel consumption for a torch burn is:

$$f = 2F\sqrt{\frac{d}{a}}$$

The maximum velocity during a torch burn is:

$$v = a\sqrt{\frac{d}{a}}$$

where

[4]Not rocket science complex, but *almost*.

a is the acceleration rate during the burn,
d is the distance to be covered during the burn,
F is the fuel consumption rate for the engine at the given accelaration.

FTL Jumps

FTL jumps in TechSense are called *Punch-Tunnel* Jumps. A Punch-Tunnel jump is a Dodge #2^5-type FTL drive. It reduces the amount of space needed to travel, meaning the ship has to travel a shorter distance thanks to the FTL technology.

A punch-tunnel is an Einstein-Rosen bridge created by the ship from its location to its destination. A 3D hole appears in space in front of the ship, at first stationary to the ship's frame of reference, and the hole moves *through* the ship while the ship remains on its current trajectory. As the hole passes through the ship, the entire ship's matter is moved, slice-by-slice, to the new location. This process happens in roughly a tenth of a second. The time in between the two locations is 20 miliseconds.

Because the slices are 3D out of the 4D shape that all matter has, the ship appears to suddenly collapse along its long axis until it dissapears. Likewise, when it appears, it seems to extend from a thin slice into its full length.

Time and Calculations All jumps are instantanious from the ship's perspective, and forty-one minutes from a typical outsider's reference frame, no matter the distance. Calculations take longer time to complete for longer distances. Per lightyear travelled, it takes 12 minutes to complete the calculation. That is, given d lightyears travelled, the time t it takes to complete the calculation in minutes is given by:

$$t = 12 \times d$$

This calculation results in a destination accuracy of about 1 AU[6], give or take. Note that a hole can only open in empty space, making jump collisions impossible. You cannot accidentally jump to within the center of another object. Instead, the hole opens nearby. This can still be dangerous. Smaller objects cannot block a hole from opening, but can fall through the punch-tunnel, causing a collision.

Accuracy increases The accuracy of a destination's location can be increased. This calculation takes more time, of course.

Energy Usage A jump takes up more energy the farther away it is. The energy a jump takes, where d is the distance in lightyears and e is the resulting energy cost in megajoules is given by:

$$e = 8^d \, MW$$

[5]See the section on Common Hand-Waves in the Faster-Than-Light article on Project Rho
[6]1 Astronomical Unit, the distance between the Earth and the sun.

Restrictions Like many mechanics in TechSense, certain restrictions and failures are story-driven. There are no story-mechanical reasons a jump cannot work, but the GMmay restrict the ability to punch-jump under certain circumstances. Here are some reasons the FTL drive may not work:

- The ship has tidal forces applying to it, due to extreme gravity like a black hole.
- A strong magnetic field distrupts the ability of the FTL engine to maintain a cohesive punch-hole, and the ship must move away from the field.
- The ship has overheated, and must vent heat into space via thermal exhuast or radiators.

It is important to remember that the GM is not trying to defeat the players, but cooperatively build the story with them. Restrictions should make thematic sense and further the story. Likewise, the restrictions should make sense in-universe, and not exists simply to keep the players in one place.

10.2 Equation Cheat Sheet

10.3 Energy Source

Typically, an energy source for a ship will be nuclear. There are exceptions, though.

In TechSense, energy is measured in Megawatts, abbreviated as MW.

Fission

Ah, fission. Baby's first nuclear reactor. Nuclear reactors on present-day earth are fission reactors. A result of the Manhattan project, fission was researched orginally to make bombs to help the United States blast entire cities away in one go. Fission reactors are heavy and not quite as fun as other atomic toys.

Fission reactors use fuel rods of Uranium-235, Uranium-233, or Plutonium-239[7]. TechSense doesn't much distinguish between these types of fuel for practical purposes, other than that these materials may have different availabilities in different locations, different prices, and that a given reactor will only take the fuel it was designed for.

Fission reactors produce waste rods when they are spent. They still contain around 85% fuel, but too sparse (i.e. not dense enough) to continue using as fuel. Locals do not take kindly to the dumping of spent fuel rods. The materials can have a half life in the hundreds of thousands of years, and produce dangerous amounts of radiation. Note also that though fuel may be spent slowly, a minimum "critical mass" of material must be packed into a sphere, or else the reaction will fizzle out. This sphere is less than fifteen centimeters in diameter.

Fission Fuel Consumption Chart [8]

[7]This is the stuff used in atom bombs. Maybe reactors on ^{239}P are illegal in many locales. Campaign idea?

[8]Sourced largely from Project Rho: Atomic Fuel

Fuel	MeV	J/Kg	1000 MW Burn	Critical Mass
^{235}U	202.5 MeV	83.14×10^{12} J/Kg	0.00001208 Kg/s	52 Kg
^{233}U	197.9 MeV	81.95×10^{12} J/Kg	0.00001220 Kg/s	15 Kg
^{239}P	207.1 MeV	83.61×10^{12} J/Kg	0.00001196 Kg/s	10 Kg
Lazy Estimations	200 MeV	8×10^{13} J/Kg	0.00001 Kg/s	10-50 Kg

Where:
MeV is millions of electron-volts,
J/Kg is Joules produced per kilogram of the fuel, and
1000 MW Burn is grams consumed per second to produce 1000 MW.

And the fuel burn rate total is:

$r = p \times o$

Where:
r is the nuclear fuel burn rate in Kg/s,
p is the required power that you wish to generate, and
o is the energy output of the fuel, measured in joules/kilogram (the J/Kg column).

Going Subcritical As nuclear fuel is spent to generate power, keep track of how much fuel is spent. When the nuclear mass falls under the required critical mass, then the reactor will go *subcritical*, meaning that it will no longer effectively generate power. The spent fuel rods must be removed, and rich fuel rods must be put in the reactor before it will continue generating power.

Radiation Dosage Presumably, your reactor has a shield against radiation. If someone enters the shielded area or the shield malfunctions in some way, you might get a nasty dose of radiation. Here's how to calculate how cooked you get[9]:

$r = (\frac{1}{2} \times kW)/d^2$

where:
r is radiation dose in Sieverts per second.
kW is thermal power of the engine or reactor.[10]
d is the distance from the reactor in meters (m).

Calculate how bad this affects a character in the radiation dosage section of the bodily harm reference.

Fusion

Yet to research and write.

[9] From Project Rho: Atomic Fuels: Radiation

[10] This will be slightly higher than the energy output of the reactor, since you cannot collect all the thermal energy as electricity. You can assume, unless stated otherwise, the reactor will produce 220% the amount of energy in heat as it can collect in electricity. This is based on current fission reactors having a 45% thermal efficiency.

Exotic

Yet to research and write.

Fuel Breeders

Though not a direct power source, a breeder reactor can turn inert material into fissile material for use in other reactors. Spent fuel rods can usually be re-enriched for repeated use. More information on this in later editions.

10.4 Engines

There are multiple types of engines in TechSense, some of them more conventional, and others near- or far-future technologies. The handwavium ones are more powerful.

NERVA

Yet to research and write.

Nuclear Pulse

Yet to research and write.

Magneto Inertial Fusion

Yet to research and write.

Nuclear Saltwater

Yet to research and write.

Ion

Yet to research and write.

Aerospike

Yet to research and write.

Sabre

Yet to research and write.

Anti-Matter

Yet to research and write.

Exotic Matter

Yet to research and write.

10.5 FTL Engine

Yet to research and write.

10.6 Structure

Yet to research and write.

Robust

Medium

Lightweight

Foil

Plate

Reinforced

10.7 Armaments

Lasers

These are basically useless for combat. They can ablate a little material, but not fast enough to save you when you're in a bind. But sure, you can have lasers.

The one thing lasers *can* do is blind EM-based sensors. You may be able to disrupt sensors on another ship, but it's also a beacon helping them see your exact location.

Railguns

This, now *this* is what you want to use. Nothing can ruin someone's day faster than hundreds of metal slugs slamming into their ship at thousands of meters per second.

Be cautious, since some planets may not take kindly to you generating debris in important orbital lanes.

Missiles

Yet to research and write.

Magnetic Pulse

Yet to research and write.

Anti-Missile Missiles

10.8 Sensors

Radio

Pictures, spectro-analysis, radio telescopes.

Astrogation

Yet to research and write.

Telescopes

Yet to research and write.

Docking Radar

Yet to research and write.

Gravitometer

Yet to research and write.

10.9 Ansible

An ansible is similar to a radio, but its signal propagates faster than the speed of light[11]. This makes it possible to communicate with other ships and bases several lightyears away without having to wait several years for that light to travel. In TechSense, there are two types of ansibles.

Type A

The Type-A ansible can communicate with a constant round-trip time of seven minutes to any other Type-A ansible you know of, within twenty lightyears. The signal can be repeated from base to base, of course, so any non-isolated base of your faction within twenty lightyears of you can probably carry the message further, with additional delays.

Type B

A Type-B ansible can communicate instantly (or with arbitrarily low latency) to a *paired* Type-B from any distance. Unfortunately, the link between two Type-Bs only lasts seven days *relative to each ansible's time*.

[11] In real life, this would either mean that relativity would be violated, since information would be travelling faster than light, or that causality would be violated, since it would be possible to recieve news before it even *happened*, under certain conditions. But with FTL travel, we've already broken one of those two.

For example, if ansible 1 is at 'normal' time, but ansible 2 is experiencing time at an accelerated rate, then the ansibles fall out of sync when ansible 2 experiences the passage of about seven days. The link is destroyed when one ansible experiences seven days first.

It takes fifteen minutes to sync two Type-Bs together, and they must be physically next to each other, in the same frame of reference[12].

Typically, shuttles of a ship will have Type-Bs on them, each with a matching Type-B on the main ship. Even being on two different planets in the same system, radio signals can take hours.

11 The *Stone's Throw*

Stone's Throw is the basic ship for TS. Other ships are outlined in the Book of Ships, but this is the basic player's ship.

11.1 Description

Stone's Throw is a Torch Ship. A "Torch" ship is any ship with an engine that is unreasonably powerful - that is, it can get around the solar system in a matter of weeks, at unreasonably low fuel cost.

The *Stone's Throw* is a truncated sphere, with its engines and landing gear on the flat underside. The sphere is 50 meters in diameter, and there's about 58,500 cubic meters of space encompassed by the sphere. About 12,000 cubic meters are taken up by the reactor and engine assembly, plus an additional 5,000 cubic meters for other structural elements, leaving about 41,000 cubic meters of space for everything else. This feels cramped for the 300-person crew compliment. The maximum capacity of the ship is 400 people.

The ship can enter atmostpheres, land on solid ground, and take off into orbit under its own power.

11.2 Daily Life

Each person gets about 8 cubic meters of space to call their own. This seems uncomfortably tight for a bed and personal cabinets, but in null g every surface becomes a wall, a floor, *and* a ceiling.

11.3 Mass

The *Stone's Throw* is 70,000 metric tons dry[13] with no cargo, 95 tons wet[14], and up to 110 tons wet with cargo and crew[15].

[12]This means they should be under the same gravity and both moving the same speed. This will not be a problem if both ansibles are on the same ship, or on two ships that are docked together.

[13]Mass with no fuel, cargo, or crew.

[14]Mass including with fuel.

[15]Maximum total mass of ship, fuel, cargo, and crew.

11.4 Energy Source

11.5 Engines

11.6 FTL Engine

11.7 Structure and Hull

11.8 Armaments

11.9 Sensors

11.10 Ansible

11.11 Shuttles

Oxygen

Oxygen is generated via a hydroponic algae that feeds off the heat of the Torch reactor.

11.12 Other Ships

Here is a table of other ships based off the Stone's Throw. Fill in details, but here are their basic stats:

Name	Diameter	Dry Mass	Wet Mass	Max Mass	Power	Accel.
The Hammer	70 m	120 kT	160 kT	185 kT	idk	3g
The Spritely	30 m	40 kT	55 kT	62 kT	idk	6g
The Cheat	30 m	40 kT	60 kT	120 kT	idk	6g

12 Other Information

12.1 The Game

The game, plus all its rulebooks and source files, can be downloaded gratis at <github.com/Zanderwohl/Tec
.

12.2 Inspiration and Further Reading / Playing

This game was inspired by several other games, as well as books.

Lasers and Feelings by John Harper (Twitter: @john_ harper). This is a very lightweight RPG system that fits on a single page; its lasers and feelings axis inspired the creation of this game, after we played nearly an entire Apocalypse World campaign without rolling on about half our stats more than a couple times. When first under development, this game's name was even "Lasers and Feelings with Advancement".

The Left Hand of Darkness by Ursula K. Le Guin. An envoy for humanity is sent to a planet known as Winter to establish first contact. He finds a strange species of human that is biologically androgynous, and free of gender, causing him to re-examine assumptions he has made about his culture and himself. This story inspired the strange types of humanoid aliens found in this game.

The Rolling Stones by Robert Heinlein. A set of genius twins decide to use the money they made from an invention to buy a ship and wander the solar system. Unfortunately for them, their family wants to tag along. Likely influenced the Star Trek episode *The Trouble with Tribbles*.

Space Cadet by Robert Heinlein. A boarding-school story set in space. A handful of space cadets find themselves on their own when asked to investigate some strange occurances on Venus. Features a flight computer controlled by gears, where a cam must be cut for each planet according to its gravity and atmosphere, to correctly control automatic landing.

Citizen of the Galaxy by Robert Heinlein. A young slave boy is taken in by space traders after his adoptive father is executed for being a spy. He travels between many strange and incomprehensible cultures before arriving on the one which to him is strangest of all - Earth.

The Moon is a Harsh Mistress by Robert Heinlein. The moon, a former prison colony for Earth, grows restless at the poor treatment of 'loonies' by Earth. They start a rebellion, opting to lob rocks at Earth via an enormous railgun, which impact the surface like atom bombs thanks to the gravity well. Shows an enormous complex of computers becoming sentient emergently, who is probably the most interesting character in the book. Also features the sex-fantasties-disguised-as-culture endemic to Heinlein's adult novels, and even tries to defend them, though not graphically. At least it's not straight masturbatory material like *Stranger in a Strange Land*.

Star Trek: The Original Series One of the early science fiction television serials, Star Trek has both fun concepts and a healthy helping of ham. About half the episodes are watchable to a modern viewer without a literary background. The episodic format of unusual creature encounters, as well as the existence of space colonies from before the invention of lightspeed that were forgotten may have come to TechSense from this series.

The Forbidden Planet An early sci-fi movie which Gene Roddenberry credited for inspiring Star Trek. Features a totally invisible monster whose motivations are a classic sci-fi twist. Also has a classic "father and daughter alone on a desert planet with secrets to hide and maybe they'll murder people to keep it that way" which is another fun one.

12.3 The Book

This book was written by Alexander Lowry and edited by Eleanor Olson. It is typesetted in LaTeX.

12.4 Modifying the Book

Because TechSense is licensed under the GNU General Public License, you are free to modify, redistribute, and even sell (as silly as that would be) TechSense, with or without modifications, without asking for permission from the authors or paying any kind of licensing fee.

The authors ask that you would attribute credit to them, just as they have attributed credit to the works and systems that inspired the creation of this game.

The source LaTeX files can be found at <github.com/Zanderwohl/TechSense> and downloaded gratis, just like the rest of the game.

12.5 Licensing

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13 Joke Skills and Abilities

These aren't real skills and Abilities. Use them for 'the lolz' only.

Astrologer You can vibe check people. Violently.

Dealer You're *the guy* that people know.

Memist +/-10 on all meme rolls. The only gestalt skill.

Postman +4 on all post-related rolls. A sense skill.

Sam You have the most subtlety.

The Kirk Whack +4 to nailing an alien on the back of the head using your hands clenched together in Kirkly prayer.

Zuko Hardcore Parkour. -2/level on parkour. A tech skill.