

# INTRODUCTION

I wanted to make the second edition of *Sufficiently Advanced* a big deal.

Second editions can be tough to write. You want people to feel like they got their money's worth from the new version of the game, but at the same time you don't want to create something that's so different that people don't recognize it. You want to substantially improve the game without fundamentally altering its assumptions.

People who liked the first edition of *Sufficiently Advanced* often asked about the use of the Transcententials' time-spanning technology. It's old news in the game's timeline, something that *should* be available to everyone. Some of the beta-tester GMs even introduced "oracle" devices to carry bits of information back in time, but it really is fairly difficult to work with time travel in any form. My response to questions of time travel was always "It's your can of worms" or "Go buy the *Continuum RPG*" (which I still highly

recommend). In the second edition, however, I had the opportunity to create another answer.

This supplement is that answer. It introduces Chronotech, a sixth Capability score built around cross-time information channels. It also introduces a new Expertise that takes advantage of Chronotech, a Civilization and a pair of Societies to help show how Chronotech could influence a setting, and more.

Chronotech is explicitly an optional supplement. You can create characters with or without the Chronotech Capability, just like you can create someone with or without Biotech. It's balanced against the other Capabilities. This makes Chronotech slightly less powerful than it might be, but that just means that there's room for improvement at Chronotech 6 and beyond.

I hope that you enjoy it.

# CHRONOTECH: THE CAPABILITY

The Chronotech score allows your character to send messages into the past and receive them from the future. It gives your character intuition, insight, and inspiration. When taking basic actions and participating in conflicts, Chronotech is used to understand something immediately, guess how to use a device, get a “feel” for someone, or guess one correct option from many. In other games it might be represented by a “luck” or “intuition” attribute.

Chronotech is primarily a mental Capability. For characters who have it, it steals a bit of territory from Cognitech and Metatech, in the same way that Biotech’s physical prowess includes some things that might otherwise fall into Nanotech or Stringtech.

When calculating your Tech score, treat Chronotech just like any other Capability and base your Tech on the average of your two highest scores.

## RATINGS

0. You get your information like most people – from the past.
1. You have a single temporal channel that sends **only one message at a time**. The data carries no timestamp, so the message is from an **unknown span in the future**, from minutes to hours. The messages are **cryptic**, relying on your knowledge of yourself to trigger memories and suspicions. The clearer the message, the less time you will have to act on it.
2. Your short-term messages are more reliable. This gives you **improved reflexes**, and you often **react to events just before they happen**. In social situations, you **avoid serious faux pas** that would cause other people to react noticeably. You can **reliably win fast games of chance** like three-card Monte. Information from more than a few seconds in the future is still difficult to receive – the low bandwidth means that **short messages are a must**, perhaps just a sentence at a time.
3. You have **several temporal channels**, optimized for durations from milliseconds to

hours. Many issues with message degradation have been solved, and you can reliably **ask your future self about the best course of action** for the next few minutes. There is no guarantee that this course remains wise in the long term. You can **easily guess passwords**, code keys, and the like. Your messages are also **timestamped**, letting you know when to expect trouble. You have access to the **Temporal Expertise** (see page xx) that allows you to re-try actions many times and use the most effective method.

4. Your **bandwidth expands significantly**. You can successfully **guess maps and other large data sets**, as long as you can check their accuracy within an hour or so. You can ask yourself **advice about the next few hours**. You still receive cryptic messages from farther in the future. If you have a Mesh you can filter these through your subconscious, giving you **prophetic dreams**. If not, you will have to puzzle the message out during your waking hours.
5. You can ask yourself **advice about the next few days**. You receive not only good advice, but **alternatives and options**. Your less reliable channels send **unclear messages from years into the future**. Your **first impressions are always correct**. Your understanding of the future makes you **impossible to surprise**.
6. (Such stable and reliable channels require careful stabilization and maintenance. They are not available to individuals yet, but civilizations might maintain them.) Reliable channels stretch for weeks, unreliable ones for years. Bandwidth improves to the point where one can **send entire digital minds into the past**.

## CAPABILITY SYNERGIES

A rating of 3 or higher in two technologies will allow you to take advantage of the benefits listed below.

**Chrono and Bio:** Your Chronotech information channels can be **entirely supported by biological means** – you no longer lose access if you lose all electrical power.

**Chrono and Cog:** You can speed your mind through temporally distributed computation: using the future and past times when your mind is idle to process and cogitate. You can **borrow just one point of Reserve from the future**, but must pay it back for the same length of time you borrow it.

**Chrono and Meta:** You perceive the flow of events and society. **You become aware of Plots** when they arise, and have a rough idea of how close they are to completion.

**Chrono and Nano:** You can **engage in contests of stealth even with high-tech opponents**. You know exactly what wavelengths to disappear on, what objects to hide behind, and when to walk through a blind spot.

**Chrono and String:** You always know exactly the amount of power required to achieve a particular effect. This efficiency means that **you need half as much time to recharge your energy reserves** every day.

# EXPERTISE AND PROFESSIONS

## NEW EXPERTISE: TEMPORAL

This Expertise requires Chronotech 3. Taking it increases your Tech score by 1 point, which decreases your Import by 1 as well.

You attempt the same task dozens of times, sending back information as to which path is most effective, refining your efforts each time. From the point of view of others, you act just once, with uncanny awareness. **Raise the rating of every Profession you have by 1 point.** This applies both to Expertise that you have now, and any that you might gain in the future. You technically gain an effective rating of 1 in any Profession that you don't have, but you cannot attempt specialized tasks with those Professions.

Yes, the Temporal Expertise can raise Professions to 6. Yes, it also applies to Competence Lenses.

Note that raising your Tech score also gives you an extra point of Reserve, which can speed projects to completion as you guess the right approach and cut the right corners.

## NEW PROFESSIONS

### ENGINEER AND RESEARCHER

The Engineer and Researcher professions from the core rules have new specializations for Chronotech. Cognitech is still the appropriate attribute to use for these professions.

### ANALYST (CHRONOTECH)

Analysts use their own temporal bandwidth to assess the work of others. In particular, they understand how to predict the overlapping influences and effects of multiple Chronotech actors. Analysts are often called upon for board meetings, diplomatic exchanges, and military councils to give their insight into the possible results of actions. Since analysts are often asked to examine or make predictions for fields of study they themselves are not versed in, they are generally good at communicating with people from other fields.

Specialized tasks include interpreting long-term predictions when Chronotech is in play from multiple sides.

### FLUCTUATOR (CHRONOTECH)

Fluctuators find places where systems are moving away from their usual state, and push them farther to strengthen or break them. They act in ways that will be enhanced rather than smothered by random fluctuations, as reported by future data. This is not the same as the Darwinian's "Crisis Creation" Profession, which is more about deploying dangerous weaponry to cause maximum damage in a specific way. A fluctuator, instead, takes systems that are already deviating and moves them farther from the norm. Sometimes the opportunity is for positive change; sometimes for negative.

Specialized tasks include predicting which systems will be vulnerable to such disruption and in what direction.

### KISMET (CHRONOTECH)

Some people are in the right place at the right time again and again and again. Kismets tune their Chronotech channels to provide this sort of guidance from as far in the future as they can. None of it is planned; all a follower of kismet does is to hope for the best and minor good fortune just rains out of the sky for them. They win minor prizes from contests they enter on a whim, hold the door for people who turn out to be grateful kings and queens, and meet new best friends by chance on the street. People can make a living with this profession, but many followers of kismet eventually give up the path. It's not the sort of job that leaves a legacy.

Specialized tasks include meeting celebrities on the bus, winning lotteries, dodging bullets with cartoon-like bumbling, and generally being annoyingly lucky.

Kismet seems like an all-powerful super-skill, but it doesn't focus well. It can't be used to accomplish

any particular purpose, and you can't attack someone with it in a conflict. However, it does defend well in many different types of conflict.

### SYTHESIST (CHRONOTECH)

The term "infosphere" is used because information is pervasive in a high-tech society, as ever-present as the atmosphere. The job of the synthesist is to separate the valuable data from the chaff. Synthesist look at vast swaths of raw data or facts and use Chronotech to pinpoint the elements that will be most important later. They're often found in a supporting role for detective work and economists, although some simply sell the information they notice on the open market, confident that there will be a buyer.

Specialized tasks include identifying important trends in the absence of significant evidence.

### WAVECALMER (CHRONOTECH)

Chaos is destructive. Randomness and fluctuations may be productive in many fields, but they need to be managed. Managing the chaos requires expertise in planning... or in prediction. Wavecalmers keep their senses tuned for disruptions, and take actions to reduce them. When a conversation might turn into an angry argument, a wavecalmer says the right thing to smooth things out. When a financial market is about to crash, a wavecalmer buys and sells the right things to reduce its severity.

Specialized tasks include reducing the level of truly random fluctuations in a system.

# TECHNOLOGY

**C**hronotech is all about moving information through time. This is sort of like saying that Nanotech is all about manipulating chemical bonds, and Cognitech is about information theory. They're all true statements, but they're not very useful, because they're fundamentals rather than applications. The question is how people *apply* these sciences to create the technologies that define each Capability.

Here are a few of the key technologies of Chronotech, as well as a few that are designed to augment or counter it.

## CHRONAL BEACON

Chronal Beacons are used to alert people to an upcoming event that might otherwise be unexpected, such as a nanophage assault or wormhole opening. Naturally, the person triggering the event is unlikely to have Chronotech, or else the beacon would simply warn that everything is going to be ok – a less useful device. Group resources are used for extensive error checking, to ensure that a message is propagated backward unchanged across a much longer time than a single person can achieve. Chronal beacons requires that Chronotech be a public utility, and

also require a temporally active infosphere. The Dreamers (page xx) use these extensively as a planetary defense mechanism against unwanted wormhole transits.

**Descriptors:** Dataform, Infrastructure, Loud

**Auxiliary Tech:** Cognitech

**Level:** Chronotech 3+

## CHRONAL TRIPWIRE

This device looks like an electronic lock, and acts like one for the most part – it keeps people out of a room (or in one). The difference is that it's not meant to be opened with a key, or a code, or even at all. It's not even a lock at all: it's a detector.

This lock's combination is randomized every microsecond – even with Nanotech 5, no one would be able to type in the key correctly. Anyone who correctly unlocks the door clearly has guessed the code using Chronotech. Characters with higher Chrono scores might have a feeling of foreboding while working with the lock, depending on how soon the negative repercussions of opening the lock (or stopping midway entering through the combination) strike them, but by the time they feel the warning it's too late – someone already knows.

These are also known as Temporal Honeypots, after the counter-hacking technique that creates bogus targets too good to pass up.

**Descriptors:** Silent

**Level:** Nanotech 2

### COMPETENCE LENSES

As described in the core rulebook, characters with a Dynamic neuroform can download lenses that provide them with Professions. Unfortunately, several of the Professions described in this book require Chronotech in order to use them properly, in the same way that the Athlete Profession would require a Biotech score.

The Analyst, Fluctuator, Kismet, Synthesist, and Wavecalmer Professions all require that the characters using them have a Chronotech score of 1 or greater. Beyond that, follow the same guidelines laid out in the core rules.

### CONVERSATIONAL ACCELERATION

Have you ever met someone who can finish your sentences? How about someone who knows what you're going to say before you even say it? This technology does exactly that. It short-circuits the more mundane parts of a conversation so that information can be conveyed quickly and people get to the point right away. It's not good for nice, polite conversation, but it does make arguments go much more quickly and help you get across important information as quickly as your interlocutor can possibly grasp it. It also helps you guess what someone is trying to tell you. Those with active Chronotech often find themselves taking action without even realizing why, and having it turn out that someone was just about to tell them to do exactly the complex thing they did.

**Descriptors:** Technique

**Level:** Chronotech 3

### FORTUNE RANDOMIZATION

A classic technique of Chronotech, "fortune randomization" is the technical term for sending back the right random guess to use in all situations. Most implementations also add a small random

element that "jitters" the user's hand. This helps alter dice rolls, card shuffles, and other pseudo-random events.

**Descriptors:** Technique

**Level:** Chronotech 2

### INSTANT ITERATION

Fortune Randomization takes advantage of randomness; this technique takes advantage of order. You systematically try every option until you find the one that works.

**Descriptors:** Technique

**Level:** Chronotech 2

### PHYSICAL TIME MACHINE

In a universe where wormholes can be created, they can be used as time machines. Tow one far away at relativistic speeds, and then return it to its twin. You can walk in one and come out the other before you walked in (or much later, if you go in the other direction).

Physical time machines have substantial limitations, the greatest of which is that they can't allow travel to any time before they were created. They're also limited to a particular location, unless you intend to tow the pair of wormholes somewhere else. On the plus side, if your time machine will ever be sabotaged, you'll know about it, because you won't receive any messages or shipments from beyond a certain time.

**Descriptors:** Loud

**Level:** Stringtech 4

### PREDICTIVE OPERATING SYSTEM

Predictive operating systems appear to work faster because they load information in the background before the users even know they want it. Such techniques exist even in the modern day, but they aren't 100% reliable. These are. They also go a step beyond by using guess-and-check algorithms that always guess right the first time.

**Descriptors:** Dataform

**Auxiliary Tech:** Cognitech

**Level:** Chronotech 3

# ORGANIZATIONS

The central thesis of Sufficiently Advanced is that technology changes people and how they interact with one another. New technologies create new ways of life. In accordance, we present three new groups focused around Chronotech:

***Transcendental Worshippers***, who believe that the Transcendentals are the closest things to gods that our universe can hold. Their Core Value is Worship.

***The Listeners at the Celestial Post***, who have discovered a massive time machine and built their civilization and their religion around it. Their core values are Tolerance and The Flow.

***The Perpetua***, a civilization ten trillion inhabitants strong, who live in a hollowed-out moon known as the Vault of Life. Their Core Value is Family, and various citizens also have Caution, Interlock, or Art Brings Freedom.

***The Congregation***, who gather at major historical events to observe and share in the experience. Their Core Value is Importance.

***Survivalists***, who think that the Transcendentals are up to no good, and who hide themselves in deep space. Their Core Value is the Survival of Humanity.

## THE LISTENERS AT THE CELESTIAL POST

Once, a group of Mechanicans was exiled. The matter was kept quiet, as Mechanica doesn't like to admit that such things happen. The plutocrats in charge of Mechanica at the time, however, agreed: this religious group crossed the line. They had become dataform. They had given up their physical brains, the one thing that made them human (or so said Mechanican doctrine). For such a large group they made remarkably little noise on the way out. Ten thousand and more Mechanicans willingly accepted exile, disappointed by the families and colleagues they thought they knew.

The cult traveled toward the Great Attractor, a distant feature in our universe that draws millions of galaxies toward itself. On their way, they discovered something fascinating and totally unexpected: a Tipler Cylinder. This amazingly massive, rotating cylinder forms a physical time machine, with signals passing forward or backward through time as they move near it. Despite the fact that the cylinder could only be an artificial structure, there was no other sign of intelligent life. The cult couldn't help but stay, and slowly the cylinder and its implications were integrated into their religion.

That cult grew into a civilization. Imagining the cylinder as a temporal listening post, they named themselves the Listeners at the Celestial Post. The adherents of their faith believe that the beings who created the Post are the closest things to gods that could exist in our universe. Thus, the Listeners watch for messages from those beings that might come from the distant past or future. Being a fairly practical religion, they also use the cylinder's timespace-warping effects to send their own messages into the past.

The Listeners build rings around the Post, orbiting it. The most distant rings are where most of the citizens live, though in digital form rather than physical. They use drones for building and other tasks that interact with the physical world. However, the place where a digital consciousness

is housed within the orbiting rings is actually quite important. The great mass of the cylinder not only allows for the transfer of information to the past, but also slows time for those close to the Post, in the same way that time slows around a black hole. Citizens who live close to the Post live at a slower time rate, experiencing only a few years for every decade that passes. As the deeper rings are also the best place to send and receive information, there is substantial competition for that space.

Most citizens of the Post spend several years working in the inner ring, sending and receiving messages from upstream or downstream in time. This is part civic duty, part religious obligation, and part bonding experience. Stationing so many young adults together helps to stabilize the Listeners when differences in timeflow could easily lead to multiple subcultures who have difficulty relating to one another.

The Listeners do occasionally travel to the rest of the universe, for purposes ranging from diplomacy to simple tourism. However, the Listeners are especially interested in one thing: evidence of the presence of their gods. If they built this incredible structure, they must have built something else, somewhere else in the universe. So far they've had no luck investigating other super-massive objects (like the Great Attractor itself), but that doesn't mean it's not worth looking.

The Listeners who live near the Post have access to its machinery to transmit information back and forth in time. Their Chronotech scores aren't so much a measure of their built-in technology as they are a measure of an individual's prestige and importance, which allows them to send more crosstime messages.

In other civilizations, this causes a problem. Sending messages via wormhole becomes expensive, and there's always the danger of having one's messages intercepted or interdicted. Therefore, Listeners who travel to new civilizations bring devices with them that are capable of providing Chronotech services for dozens of Listeners at once. These emplacements generate temporal

backchannels reverse-engineered from the gravitational fields around the Post itself. They're heavy, their power consumption is prodigious, and they radiate dangerous amounts of heat, but they have excellent lookback durations. You can find them in the Technology section on page xx.

The government of the Listening Post is minimal. Laws provide only protection from physical, mental, and (some) economic harm, and requiring only service at the transceiver stations. Those who do not serve at the listening posts cannot hold public office, but face no other penalty. Most citizens serve.

**Common Name:** The Listeners

**Naming Convention:** Korean

**Emblem:**

**Typical Allies:** The Listeners and the Replicants have similar views on the nature of the soul. They will also get along with the Independents, who will approve of their reaction to exile and their unique technologies.

**Typical Enemies:** The Mechanics will not be cordial to the Listeners, but they also won't assault them on sight. The Logicians are stunned by the wastefulness of the Listeners' take on Chronotech and will seek to change their approach as quickly as possible. The Disciples and the Listeners don't have entirely dissimilar religious beliefs, but they won't get along as individuals, primarily because the Listeners believe in talking and the Disciples wish they would just shut up.

**Benefit:** The Listeners have the advantage of a large, stable time machine. Treat their Chronotech score as one point higher for the purposes of determining how far they can send messages back through time. However, this reliance on outside devices means that their signals can be disrupted by any phenomenon that would disrupt outside communications. Having someone mess with a Listener's emplacements is an excellent use for the Bad Luck rule.

**Capabilities:**

Civilization: Bio --, Chrono 5, Cog 3, Meta 3, Nano 3, String 5

Citizen: Bio --, Chrono 3, Cog 3, Meta 3, Nano 3, String 3

**Common Neuroforms:** Nearly all citizens are Dataform Dynamic.

**Core Values:** Tolerance and The Flow

The Listeners believe in **Tolerance** just as strongly as their Mechanical forefathers – perhaps even more so. They know what it's like to be ostracized. Their tolerance for others drifts closer to an appreciation for differences, but doesn't quite make it to the Diversity CV of the Stardwellers. It's thanks to this CV that there are still non-believers who can call themselves Listeners.

The Listeners believe in the ability of time to change all things, and in the importance of communication. These two ideas come together in the concept of **The Flow**. All things change; all things go from one state to another or from one side to another. Interaction between human beings and interaction between physical objects are both equally important in the slow alteration of all things.

## SAMPLE CHARACTERS

### **Listener**

Neuroform: Dynamic Dataform

Themes: Cognitech (Signal Processing), Empathy (My Fellows), Wonder (Complex Systems)

CVs: Tolerance 2, The Flow 3, Belief 4, Camaraderie 3

Capabilities: Bio --, Chrono 5, Cog 3, Meta 3, Nano 3, String 2

Expertise: Adept (Nanotech). Nanotech Engineer 3, Nanotech Researcher 3, Programmer 3, Synthesist 3, Stringtech Researcher 3. Professional: Religious 3, Teacher 2, Explorer 1, Locality (Listeners) 2

Tech: 4 / Import: 6

### **Synthesist**

Neuroform: Dynamic Dataform

Themes:

CVs: Tolerance, The Flow,

Capabilities: Bio , Chrono , Cog , Meta , Nano , String

Expertise: Professional. Locality (Listeners) 2

Tech: / Import:

### ***Ring Maintainer***

Neuroform: Dynamic Dataform

Themes:

CVs: Tolerance, The Flow,

Capabilities: Bio , Chrono , Cog , Meta , Nano , String

Expertise: Temporal. Professional: Nanotech Engineer 4, Stringtech Engineer 3, Crisis Control 2, Locality (Listeners) 3

Tech: / Import:

### ***Pilgrim***

Neuroform: Dynamic Dataform

Themes:

CVs: Tolerance, The Flow,

Capabilities: Bio , Chrono , Cog , Meta , Nano , String

Expertise: Professional. Locality (Listeners) 2

Tech: / Import:

### **HOME, FOR A MOMENT**

Ten years ago, as the distant worlds measure time, I was 27. This year I turn 30, and my three years (subjective time) in the inner ring are up. I have served my people: as a technician, as a citizen, as a good child to my parents. The friends I made here are some of the best of my life. I'm going to miss them.

We have a special word, "angae'pa," for the feeling of crossing between one timeflow and another. In the inner ring I learned that other civilizations don't have that word. It's a paradoxical combination of sluggishness and lightness, of being mired in old hardware and having your mind race in the fastest of processors. It's disorienting, but it clears your head too – it lets you focus on the present. As I return home from the Post's intense gravity well, my mind is temporarily spread across many different servers, and I feel angae'pa.

I make the transfer back home. My parents are there waiting for me. They've invited the whole family. It's a nice party. Things have changed quite a bit in ten years – not in the outer world, but definitely in our little corner of it. My little brother was 16 when I left. Now he's an adult.

Soon he'll be leaving for the inner ring himself. I spend a little time talking to him about what it's like, telling him not to worry, that he's going to like it. He still seems nervous, and I wonder what his future is telling him.

Eventually, everyone goes home, including my father and my brother. My mother and I talk for a while. A portentous feeling comes over me – something is coming. Something is about to happen. I can tell that she feels it too.

She asks the question I've been dreading.

"So, what are you going to do now?"

I have no idea. I have no plans. I have no inspiration, no flow. My life has been nothing but schedule and routine and friendship for three years (my time). Every time someone has asked me what I'm going to do, I've avoided the question one way or another. I'm good at that. I even ate up choral bandwidth avoiding it. People barely saw me for my final month of service. I have no idea where I'm headed. All of that flashes through my head in the milliseconds of long, awkward pause before I receive a message.

It's simple. It's short. Verified delivery, verified sender. It's from very, very far away. It's an invitation from the Patent Office. I'm stunned. It feels like angae'pa again.

Mom asks me if everything's ok, and I show her the letter. She reads it. She gives a wry expression and says, "Looks like someone out there is looking out for you."

Back in the inner ring we all talked about getting this kind of message. If someone asked you what you would do if you "got the letter", this was the one. Would you take the call? Would you leave the Post, travel across millions or billions of light years, to unfamiliar servers and confusing protocols, for the chance to meet them? To work alongside them?

I will.

## THE PERPETUA

An exploratory team touches down on a planet. Signs indicate that the planet was inhabited until just weeks ago, when everything – people, vehicles, buildings – simply picked up and left. All that can be found are imprints on the ground.

Stardwellers explore the outer reaches of a solar system. A persistent sensor echo dogs them all the way through the Kuiper belt. They never manage to fix the problem. They ready a scout ship to investigate, but the echo goes away before it launches.

A strangely variable star catches the attention of the Mechanicans, who wormhole an observation team in to study it. When they arrive, the star's balance of elements is off, a sign of tampering – but whomever did it left months before they arrived. Distant observations show only indecipherable noise.

To the rest of the universe, they have existed only in echoes and glitches. They leave traces that lead nowhere and leave just before we might learn anything important. It's as if they know we're looking for them.

They do. The largest civilization ever known is watching us from just beyond our horizon, making a very difficult decision. You see, they've just discovered us, and they're not sure they can trust us.

The civilization is Perpetua, and they live within the Vault of Life. The Vault is a moon, orbiting a gas giant around a quiet and stable star. The moon's thick crust is honeycombed into a planet-city that supports over ten trillion physical human beings and nearly as many digital intelligences.

The Vault is packed with support space for the people who live there. Infosphere relays, living and working spaces, public transit, art displays, and more are all in place for the benefit of the citizens. Replication is energy-intensive, so hydroponic farms provide food for biological humans. The temperature is high. Heat is carefully

rationed, and the moon's surface includes millions of heat sinks radiating into the void. The entire Vault is a carefully engineered city-world.

As in many technologically advanced civilizations, most of the people in the Vault of Life don't need to work every day. Much of the Vault is filled with leisure activity. Artistry is a common pastime, and the walls, ceilings, and floor of the Vault are covered with murals. Music fills the air and the airwaves. Magnetic sculptures peek out of alcoves, ready to be resculpted with every new day. Virtual environments of all scopes and styles are generated each day in the Vault's prodigious infosphere.

The Perpetua believe in large families. Grandparents, great-grandparents, cousins, and older siblings all help to raise the children. Reproductive technology make things easier on the mother – most mothers choose to carry one or two children to term, and then let gentle synthetic wombs handle the next twenty or so. Long lifespans usually mean that parents have their first few children in the first ten years, and then slow down. Some people love raising children and have one every few years. Others are more sedate, and only feel the urge every five or six decades.

The Vault of Life is incredibly densely populated. Biotech adaptations reduce the need for sleep and keep the air clean. Chronotech manages space needs. Every street is packed, every bed slept in. Not a single person gets up from a chair without someone else sitting down in it just after them. Exercise and play and work all occupy the same spaces in a seamless busy flow. Each computer is used to capacity until the moment it fails, and then used again the instant it's repaired. It's like an organism with superfluid for blood, all cells slipping past one another without friction or turbulence. If they ever have visitors, the Perpetua will be able to walk around them, greeting them happily, giving them entire inches of personal space, without ever running into them.

Ownership is a temporary concept in the Vault. Any citizen can claim a piece of wall for a mural,

a bit of server space for a virtual environment, a hallway for a song or a game. All claims expire after no more than a day. Any citizen can sleep in any unoccupied bunk; the sheets are kept clean on a molecular level. Citizens only own what they carry on themselves. Some subcultures treat everything as communal; others personalize clothing. In still others, each person carries a single small trinket given to them by their parents as the one thing that is truly theirs.

Soon the Perpetua will need another Vault as it nears maximum safe density. Don't worry; they're not looking for yours... but if you could spare that moon there, they'd really appreciate it. They're only looking to house a trillion or so people.

Why, then, if they need help, are the Perpetua so cautious about contact with other civilizations? The answer can be seen on the side of the Vault, inscribed in the surface of the moon with patterns of heat sinks. This is Vault #2. The first one? Destroyed, cracked like an egg, blasted to rubble by a near-light-speed asteroid. Chronotech showed the interdiction field coming, the barrier that kept wormholes from reaching Vault #1 – but no one could find a way to prevent it, and by the time it was gone, the vault was a whirling mass of molten stone and debris, and the universe lost almost twenty trillion people. Most of the Vault's dataform population escaped.

From observation of the other civilizations, the leadership of the Vault has come to the conclusion that the most likely culprit is the Aia, which the Perpetua learned of by intercepting infosphere broadcasts. Something must have happened on the first Vault that came to threaten the Aia, and they were destroyed for it. Now, the Perpetua watch the core civilizations and hold their breath, trying to determine whether this event was somehow triggered by the humans who created the Aia in the first place.

The Perpetua is a futarchy: rather than voting for a policy or leader that may not lead to a particular outcome, citizens vote for the outcome, and then attempt to achieve it as a whole, guided by Chronotech. When individual leaders are needed,

they are chosen based largely on an estimation of their effectiveness guided by the future. Watching the motion of sub-groups in the Vault is sometimes like watching a school of fish respond and move together.

**Common Name:** The Perpetua

**Naming Convention:** Spanish / Latin American

**Emblem:**

**Typical Allies:** Once they meet the rest of the civilizations, the Perpetua will likely mesh well with the Independents and the Builders. As individuals, they'll get along with the Daoine and Stardwellers.

**Typical Enemies:** Their relationship with the Logicians will be mixed – while the Rationalist League appreciates the efficient design of the Vault, the Perpetua will be horrified at what the Rationalists have done to themselves. Similarly, they may appreciate the Union's sense of order and unity, but not the mind control part.

**Benefit:** The confined quarters of the Vault of Life really teaches people to work together. When they act as a team, the Perpetua gain an extra +1 Teamwork bonus, even if not all of the team is made up of Perpetua.

**Capabilities:**

Civilization: Bio 4, Chrono 5, Cog 4, Meta 3, Nano 4, String 4

Citizen: Bio 3, Chrono 3, Cog 3, Meta 3, Nano 3, String 1

**Common Neuroforms:** Roughly evenly split between Dynamic Baseline and Dynamic Dataform. Group-minds are common, representing roughly 5% of the population.

**Special Note:** The Perpetua are Infrastructure IV. Core Values: Family and either Art Brings Freedom or Caution.

The people of the Vault believe in **Family**. They love their children, their parents, their grandparents, cousins, distant relatives, pets, everything that goes into making a family what it is. They believe in the strength of blood relation, the importance of knowing who you came from and taking care of those who come after you.

Because this civilization is so very large, characters from the Vault of Life may pick one of three Core Values: Art Brings Freedom, Caution, or Interlock. The GM should also allow enterprising players to invent further groups within the Vault – ten trillion people means a lot of subcultures.

Artwork is a major form of expression for the Perpetua. It's not quite accurate to say that art is an escape from the Vault – rather, art makes the Vault what it is. It's not a cage full of an unbelievable number of people, it's a vibrant and beautiful place where people can do as they wish. **Art Brings Freedom.** This CV helps people create artwork, especially art that inspires others to see their world as full of possibility, or art that helps others break free of their chains. Artwork also has an interesting relationship with Chronotech: if you sit down in front of a blank canvas, you can choose what you make, but not predict it.

**Caution** is a newly born Core Value. The destruction of Vault #1 deeply frightened a people who believed that they had nothing to fear. The Perpetua thought that they might be the only civilized remains of humanity – and then they discovered people living on the surface of planets as their ancestors did. They seemed to be peaceful and successful, but who knows what really destroyed Vault #1? Characters with Caution use this CV to prepare for the future, look for hazards, and back out of dangerous situations. This CV is especially common among group-minds, many of whom reacted more strongly than others to the destruction of Vault #1.

**Interlock** is the belief that things work better in synchronicity, when every component of a system is in just the right place at just the right time. This CV motivates Perpetua research into Chronotech, but also into Metatech for the purposes of creating better and more efficient civic spaces. Managers and designers both benefit from the ideals of Interlock as they create systems for others to use and appreciate. Interlock does help with teamwork-oriented actions, but only to the lowest level of Interlock in the group.

## SAMPLE CHARACTERS

### **Artist**

Neuroform: Dataform Dynamic  
Themes: Magnetism (Famous Artist), Wonder (My Creations), Empathy (Art is a Window to the Soul)  
CVs: Family 3, Art Brings Freedom 5, Exploration 2, A Good Argument 2  
Capabilities: Bio 3, Chrono 3, Cog 3, Meta 3, Nano 3, String 1  
Expertise: Satori: Artist 5. Professional: Nanotech Researcher 3, Nanotech Engineer 2, Media 1, Locality (Vault) 2  
Tech: 3 / Import: 7

### **Kismet**

Neuroform: Multiple Dynamic  
Themes: Action (Tag-team), Empathy (Been Through Everything), Romance (Confusing)  
CVs: Family 4, Interlock 3, Stories 2, Meet Everyone 4  
Capabilities: Bio 3, Chrono 4, Cog 4, Meta 3, Nano 3, String 2  
Expertise: Omnicompetent, Temporal.  
Professional: Kismet 4. All other skills at 3.  
Tech: 5 / Import: 5

### **Analyst**

Neuroform: Baseline Dynamic  
Themes: Comprehension (Future), Intrigue (Hidden Details), Magnetism (Bullshit Artist)  
CVs: Family 1, Caution 3, Detail 3, Cover Your Ass 4  
Capabilities: Bio 3, Chrono 3, Cog 3, Meta 1, Nano 1, String 1  
Expertise: Professional. Analyst 3, Synthesist 2, Cognitech Engineer 1, Locality (Vault) 2  
Tech: 2 / Import: 8

### **Habitat Designer**

Neuroform: Dataform Dynamic  
Themes: Comprehension (Why Is It Made That Way), Terror (It's All Falling Apart), Empathy (The Ambitious)  
CVs: Family 2, Art Brings Freedom 3, Build for the Future 3, Grand Works 4  
Capabilities: Bio 3, Chrono 2, Cog 4, Meta 2, Nano 3, String 1

Expertise: Professional. Nanotech Engineer 3, Stringtech Engineer 2, Synthesist 1, Locality (Vault) 2

Tech: 2 / Import: 8

### HOW I GOT THIS BRUISE

I have seen an anthropophobe, you know.

I am only six, but I have seen one, I have. He came out of a hallway and ran so fast, right down our street. There were only about twenty thousand people on the street, so there was room. Everyone got out of his way. It was like watching a marble when it pushes the atoms of water out of the way – at least, I think the marble must be like this, so smooth and even. They left him a whole three centimeters on either side. Three people came around the corner after the man. Everyone got out of their way too, but they ran straight and the man ran in a crooked line with his arms over his face. He was breathing very loud.

He ran right through where we were playing, and he pushed away Uncle Claudio, who says he was trying to reach for me but didn't make it. The man must have had something wrong with his chrono because he ran right into me!

I don't have my enhancements yet. Auntie Valentina says I must wait for my mesh and my chronoception, but she says I am already smart and strong because of our genes and because I'm a big girl. He kicked me by accident – An accident! A real one! From an adult! – and it made a bruise. Right here on my shoulder. It's on my shoulder because I was coloring the floor with Sofia.

Then he tripped and fell down, just like a little baby. Everyone kept moving around him, and some of them looked, but they didn't get close to him. Only the three other people got close; one of them jumped right past Uncle Claudio. I was scared they were going to hit the man, like if they were babies too, but they didn't. They just talked to him. The man kept saying "no" and "too many" and curling up. Uncle Claudio let me watch them talk because he says it was important to know that

we all help each other, even when someone is having a hard time.

In the end they had people walk away from him. They stood out away from him to keep people walking around. Then someone came and gave them something that they gave to him. Grandma Seneca says it was probably medicine. He seemed better afterward, and he told me he was sorry. I heard the people tell Uncle Claudio he was an anthropophobe and that he was having a hard day.

I don't know what that means, but I don't want to be one.

## THE CONGREGATION

Everybody wishes they could be at important historical events. Some people set out to do exactly that. Psychohistory can help somewhat, but what really helps is being able to read the future. Chronotech enables people to be there when incredible and important events happen.

Somewhere along the line, with thousands of people appearing to observe major historical events, the Congregation was born. Some people were there to record the events, some people were there to profit from connections – but some people were just there for the thrill of the experience. To feel history shifting before their very eyes, and know that they were a small part of it. It was a compelling, almost religious experience, and while the group's name was suggested as a joke, it has stuck with them. Members often argue over whether the group is “just a flash mob” or something more.

The Congregation's symbol is the hunting horn, used to call people to gather for centuries.

**Benefits:** Their experience with significant events grants the Congregation a better understanding of them. They have access to the Diviner profession, which is equal parts Synthesist and Metatech Researcher.

**Core Value:** Importance. The Congregation is all about being there when big things happen. Members use this CV to help them figure out when that's going to happen, and to relate to others who have been involved in something monumental.

## SURVIVALISTS

Many people forget that there was a large amount of time during which the Transcenturals were nowhere to be found. Having given birth to the Diaspora, they vanished through wormholes to parts unknown for more than a thousand years. Humanity was left to itself, sometimes successfully, but more often with tragic results. Many wondered whether the

Transcenturals actually had the best interests of Humanity at heart, especially as the capabilities and repercussions of the technologies they had left behind became apparent.

When the Transcenturals re-contacted humanity, many people reacted with trepidation, suspicion, and distrust. Some even believed them to be a conquering alien intelligence, or at the least, a serious problem for humanity. While most of these groups simply left to forge colonies on distant worlds, with the coordinates intentionally erased, others took more extreme measures. They believed that the long-term survival of humanity required special planning and forethought.

The Survivalists hide. They hide very well in deep space, Oort clouds and Kuiper belts. All in all, they're not bad neighbors – most people never notice they're there. They keep low profiles and have low emission signatures. Many survivalist enclaves have constructed their own infrastructures using technology of non-Transcenturational origin, using connections to the League of Independent Worlds. Unfortunately, they also keep and maintain hacked replicators and transmutation chambers. This has brought them legal trouble more than once.

The Survivalists know that any information that reaches the Transcenturals can be sent back in time, potentially ruining thousands of years of seclusion. This makes them very secretive and a little paranoid. They maintain the mores and values of their home cultures, but in some ways they are more like a civilization unto themselves. It seems likely that there is an entire civilization worth of them hidden away somewhere, beyond the knowledge of the rest of the world.

Survivalists are primarily found in Logician, Spacer, Stardweller, and Mechanic civilizations, with a few scattered through the Independents as well. Some Disciple anchorages have even cut off communication with the outside world because of Survivalist sentiment. In settings without the Transcenturals, Survivalists might be hiding themselves from the Aia instead.

Their symbol is a fish avoiding a hook.

**Benefits:** Survivalists have their own special profession, also entitled Survivalist. They start the game with a rating of 3, for free. This profession can be used in place of both Spacer and Outdoorsman.

**Core Value:** Survival of Humanity. Survivalists are determined for humanity to survive, usually starting with themselves. This CV helps them resist attempts to convince them to do things that are self-destructive or destructive to humanity as a whole. It can also be used to convince them to do things that help preserve humanity – possibly even at the expense of their own lives.

**Benefit:** TWs have access to a profession entitled “Code Cleric,” which encompasses both the Programmer and Religious professions. All TWs receive this at level 2 for free.

**Core Value:** Worship. The TWs truly believe in the Transcententials, and will do whatever is needed to help them achieve the Desired Future.

## **TRANSCENDENTAL WORSHIPPERS**

This religious group believes that the Transcententials have risen above their mere physical shells and become literal gods. While they are presented in game terms as a single society, the TWs are more factionized than most religions, and the differences between one “church” and another can be extreme, as few agree as to the best way to worship their gods.

The Transcententials’ official response to questions about their worshipers is “no comment.” They rely on the aid of these people as little as possible, as it only encourages them. TWs exist in every civilization except the Union, Disciples, and Logicians. They are especially common in Mechanica, but quite rare in Independent space.

The largest group of Transcentental Worshipers uses an inverted hourglass as their symbol, with sand flowing upward.

Obviously, in settings where the Transcententials are impossible, this group does not exist. If the Aia exist, however, they might persist with a shift of focus.

# IMPACT ON EXISTING CIVILIZATIONS

The impact of technology on society is the central theme of *Sufficiently Advanced*. No look at Chronotech would be complete without considering how its effects will ripple through the universe and its citizens. Civilizations are presented here in the same order as in the rulebook: alphabetically by proper name. Likely Chronotech scores are listed for both the civilization as a whole, and for its citizens.

One of the major questions you will have to answer for your own game is whether Chronotech is a new invention, or whether it has been present for thousands of years. Some entries in this section present the initial impact of the technology; others present a more long-term view.

## THE ASSOCIATION OF ETERNAL LIFE

Information flowing backward through a choral channel does not survive replication. Replication is a downstream process; it cannot handle upstream propagation. In order to keep a steady flow of information, you need to offload all the information into something that will carry it while you get replicated. This opens the door to all sorts of third-party interception.

It's worth it to the Replicants, though. Their Safety and Life CVs won't let them overlook the potential benefits of Chronotech when it comes to avoiding accidents. Plus, knowing that you'll need an extra six of you this week (and will have to pay for all of their expenses) is very useful for planning purposes.

**Likely Chronotech score:** 4, citizens 3

## THE ASSOCIATION OF STORED HUMANS

The Stored are in a strange position. They're connected to each other primarily by being the "old guard" of human-derived digital intelligences. None of their core values or practices are necessarily connected to Chronotech's implications. The Stored are likely to investigate Chronotech primarily because there are a lot of curious and technically inclined folks in their population. However, they're not likely to incorporate it into every bit of their infosphere like the Stardwellers will. In many ways the Stored are still traditionalists.

This means yet another breakpoint for the Stored culture, one that may be the straw that breaks the camel's back. At the point when Chronotech is introduced, some folks will want to embrace the new technology; others will see it as merely a useful tool. This is not the first time this has happened to the Stored. They've gone through this with every new computer technology, choosing to remain human against the pull of the singularity that the Aia experienced. Chronotech is a disruptive force acting against the edges of the Stored, pulling them away toward other civilizations that are embracing new things more and clinging to old things less. The core of Stored culture will have to react against this neophilia in order to hold firm. If they do, they'll be seen as old-timers who can't keep up, and will lose both population and social credit. If they don't, it probably means the end of the Stored as a civilization.

However, this scenario assumes a late introduction of Chronotech. If it were developed long ago, things would be very different. The Stored may have even created some of the first Chronotech, determined to avoid events like their own creation happen in the future.

**Likely Chronotech score:** highly dependent on how the technology is introduced. A score of 3 is reasonable for both the civilization and its citizens, possibly higher if the Stored developed the technology in the first place.

### THE BUILDERS OF THE GREAT BEYOND

Chronotech meshes well with the Eternity CV. Those Builders who are still in physical form are likely to focus on one particular use of Chronotech: making it to their ascension. Once they're safely in the infosphere, they can take all the time they need to explore other uses of Chronotech. Life begins at death, as they say.

As a small civilization, the Builders don't always have the infrastructure to pursue multiple technologies at full strength. Advancing their Chronotech means leaving behind another technology. It's likely that they would allow Biotech or Metatech to fall behind, as Chronotech's

strengths balance out a loss in Metatech and Biotech isn't as important for a group with another route to immortality.

**Likely Chronotech score:** 4, citizens 3

### THE COGNITIVE UNION

Chronotech allows Union implants to become lighter-touch. They can sense situations that will lead someone to think in a forbidden manner and direct them away from them in a variety of possible ways. The current Union mesh just removes the thoughts from someone's mind as they arise. From the outside there's not much difference, and even from the inside the effects are similar, but the difference is in how someone reacts once they're removed from the Union. Steering someone away from a place where they might make a bad decision is very different in the long term from altering their brain so that bad decisions aren't possible. It's less of a conditioning effect.

The Union's spread accelerates with the application of Chronotech, but not in a uniform manner. Their best proselytizers will now have a much better idea of who to talk to and what arguments will best convince them. It's more efficient, but spreads out their expansion in a fractal, coral-like pattern.

It's kind of fascinating to me that this might turn the Union from a civilization that lives all in one place to a society that exists in nearly every civilization – even perhaps the ones that might outlaw them in the regular game. The first Infrastructure III society. (Hell, let the process run long enough and they'll be Infrastructure IV.)

**Likely Chronotech score:** 4, citizens 4

### DAOINE NA RÉALTA FORAOIS

While normally a high-tech civilization, the Daoine have a major ideological conflict with Chronotech. Their Zest for Life CV isn't just about enjoying things, it's about living in a challenging,

surprising universe and testing yourself against it. High levels of Chronotech take the surprise out of things. While the Daoine would certainly enjoy trying to unravel and outguess the minor “prophecy” that low levels of Chronotech provide, knowing everything that’s going to happen for the next day would drive them nuts.

Instead, the Daoine use Chronotech to provide vague hints and distant suggestions that will drag them into exciting situations. Sometimes those are fairly safe; other times they’re dangerous. Either way, it’s an interesting life.

Likely Chronotech score: 1, citizens 1

### THE DISCIPLES OF THE VOID

Disciple stealth technology will become even more effective when guided by Chronotech... but that’s where things are likely to end. As a small civilization, the Disciples don’t have the infrastructure to pursue many different kinds of technology. They are likely to stay focused on their particular goals: silence, inner peace, and enlightenment. To the extent that Chronotech enables Disciples to achieve these goals, it will be pursued. To the extent that it distracts from this, it will be ignored.

This doesn’t mean that the Disciples will have difficulty using Chronotech on their home turf. On the contrary, since their anchorages are small, well-contained environments, prediction becomes easier. Disruptions in the anchorage have ripple effects long before they appear. When a Disciple goes on a pilgrimage, however, the timestream of the “universe of noise” will be chaotic and difficult to understand. Disciples with higher Chronotech will be better able to choose how “loud” they want their environments by avoiding or seeking out certain futures.

Likely Chronotech score: 3, citizens 1

### THE ETERNAL MASQUERADE

Identity for the Masquerade means, in short form, “I choose who I am.” It’s a fundamental statement of free will and self-determinism. No Masquerader would try to pretend that the influences they’ve seen earlier in their life don’t shape them in a myriad of ways – that’s a foundational truth of Metatech – but the Identity CV lets them pick which parts of themselves to bring to the front. The “true self” behind all the masks, the self reinforced by Identity, is a continuous experience of selfhood.

On the surface, however, Masqueraders are different people on a regular basis. Chronotech is, for the Masqueraders, a strong and constant connection to a *different person*, one that they had chosen to be only temporarily. For the Masqueraders to adopt Chronotech with a large look-ahead capability, they would need to bring it and its messages into the deepest parts of their minds. The other alternative would be breaking Chronotech at each identity change, which would really handicap them and push for them to keep the same identities for longer and longer.

So they did both. The longest-term messages are sent to and from the true self. Short-term messages are kept at the mask level. This allows Masqueraders to activate specific mask-selves to deal with situations that their true-selves see coming.

**Likely Chronotech score:** 4, citizens 3.

### THE HARMONIOUS NATIONS OF GAIA

As believers in the connected nature of all things, the Gaians will take to Chronotech immediately. Of all the existing civilizations they are likely to be the least changed by the presence or introduction of Chronotech.

**Likely Chronotech score:** 5, citizens 5

## THE ILLUSTRIOUS STARDWELLING ARMADA

The Stardwellers are universally pro-technology. They're bleeding-edge early adopters with a penchant for the strange and a high tolerance for error (at least in the beta stage). Whether or not they would adopt Chronotech was never in question. The question was *how* they would adopt it.

The Stardweller view on Chronotech goes like this: There is no freedom without knowledge.

Many civilizations (and individuals) that fear Chronotech worry about predestination, free will, and the like. The fact is that Chronotech doesn't interfere with free will in the least. Anyone who knows what predictions have been made about them gains the ability to change their future. Therefore, secret information is the most powerful and valuable information. Information from the future is hoarded and kept safe, to maximize its accuracy.

The Stardwellers don't work that way. If everyone is to be free, then everyone needs to know, so that they can choose how to live. Therefore, Chronotech predictions, prophecies, and correspondences are passed around the Armada continuously. The web of social contacts that tie the Stardwellers together is woven thick with future knowledge. Those who decide to live up to what is predicted of them do so willingly, freely.

This also makes for an excellent defense system. For anyone from the outside, the Stardwellers are almost impossible to get good temporal intelligence on. The rest of the universe considers them even more enigmatic and unpredictable than before – which is just how the Stardwellers like it.

***Likely Chronotech score:*** 5, citizens 5

## THE LEAGUE OF INDEPENDENT WORLDS

The Independents are a small civilization, short on resources. They can only pursue a few technologies at once. While they've done very well with what they have, they've mostly done it by stretching Stringtech to its limits – witness the Emotion Beam. The Mechanicans do their best temporal work with wormholes; the Independents conserve energy and do theirs with glider guns.

Glider guns are self-replicating patterns of universal fields. They're Stringtech auxons, the electromagnetic analogue of self-replicating nanobots, viral memes, or dividing cells. Glider guns are good at certain computational tasks, but they're typically short-lived. They need specific environments in which to reflect and replicate without dispersing. A chronal channel can be made into just such an environment.

The Independents don't have quiet, well-maintained chronal channels – they have chronal ecosystems, filled with self-replicating, data-crunching, Turing-complete field patterns. They read in problems and grow solutions backward in time. Powerful, adaptive, elegant, and delicate, their channels are easily disrupted. The approach isn't standards-compliant, but they did it on their own, and for the League of Independent Worlds that counts for a lot.

***Likely Chronotech score:*** 4, citizens 2

## THE NANORI

The Nanori concept of Emergence fits very nicely with the way Chronotech flows. This will lead to a widespread acceptance, which is good, because Chronotech helps out the Nanori a lot. The issue with the Nanori approach was never quality or speed, it was always resources: it takes a lot of space to let a thousand flowers bloom. By iterating over thousands of different options in the same physical space Chronotech allows the Nanori to have things that are good, fast, *and* cheap.

This, in turn, means that physical (and even mental) space are no longer at a premium on

Nanori worlds. Without the pressing need for large experimental regions, the Nanori can be more social. The civilization as a whole will end up friendlier and more compact, with a larger population.

**Likely Chronotech Score:** 5, citizens 4

### THE RATIONALIST LEAGUE

As believers in (and enforcers of) strict hierarchy, it's likely that the leadership of the Logicians will have access to Chronotech and the rank-and-file will not. This makes the serfs easier to predict and easier to keep in line, which means that the Logician monarchy won't have to worry about the observer effect (see page xx) wrecking their predictions.

Of course, the Logicians will especially want to know how the deep future goes for them. They really care about having humanity make it as far into the future as possible; everything they do has that as a long-term goal. They're likely to be on the lookout for longer- and longer-term chronal channels, without worrying too much about the bandwidth of those channels. I can imagine them creating a huge concordance of predictions and waiting to hear the few bits of data that will shape their future.

Interestingly, the Logicians are also one of the few groups that would willingly lie to themselves to get a better and more efficient future. As long as their descendants give them actionable information that puts them in a better situation, it doesn't even need to be correct.

**Likely Chronotech score:** 3, or (null) for the rank-and-file.

### THE TAO OF HISTORY

The Tao are all about recreating traditions and staying true to the past. Since research methods improve over time, Chronotech allows them to send back information about the past, from a time in the future when they have a better understanding of it. Their reenactments become more accurate.

There's also the potential of "reenacting" events that have yet to actually happen. This is a bit of a waste of temporal bandwidth, since information from the future is much more limited than information from the past. However, if the Tao spend their bandwidth on this, it means other people can spend theirs on other stuff, and that can rack up some serious money for the Tao. They become future-information brokers, charging huge amounts for their performances.

**Likely Chronotech score:** 4, with 4 for citizens as well.

### THE UNITED WORLDS OF MECHANICA

Wiring future-information directly into your brain is a no-no in Mechanica. That's changing the brain, and changing the brain is not part of their definition of Humanity. Chronotech that feeds directly into a Mesh feels wrong to them.

Mechanica cares quite a bit about money and elections. As a plutocracy, those two are basically the same thing for them. Here's where things become a serious pain in the butt for Mechanica. Knowing the future means they know who's going to win the election. However, because interaction permits alteration, the results of the election are actually still in flux. This is a more complex game than Mechanica can actually handle. With their low Metatech and Cognitech scores, they're unlikely to be able to capitalize on the information from Chronotech very effectively, and their leadership is going to fluctuate more heavily as a result. They're probably going to be more vulnerable to outside manipulation.

Being skilled at Stringtech means that Mechanica is likely to have a fair number of physical time machines sitting around. This will give them a much-needed boost when it comes to research. The bandwidth on a physical time machine is much larger than the bandwidth on ordinary Chronotech, and if Mechanica can defend them properly and limit access, they should reach quite a distance into the future.

**Likely Chronotech score:** 3 with 2 for the citizenry, but the civilization as a whole will primarily be using its Competitive Advantage in Stringtech to mimic Chronotech instead.

### OLD-WORLDBERS

As with all advanced technologies, the Old-Worlders do not adopt Chronotech. Their culture sees no impact from it.

### CARGO CULTS

Let's imagine that a Cargo Cult rises up around Chronotech. It's not the easiest technology to maintain, but it might still happen somehow. What might we see?

- An oracular computer worshiped as a machine god.
- A family of assassins, so fast and graceful that no one can stand against them.
- A ruling class that subtly manipulates the world with their foreknowledge of events
- A secret society that moves unseen by knowing when they might be caught
- A family of oracles, kept prisoner and used for their unique gift

### SPACERS

If Chronotech were invented before the Spacers left, they'd love it. Something that allows them to predict danger before it arises? To more completely control their precariously balanced and oh-so-precious environment? Yes please. Whatever it

takes to adapt to this odd new sea of information, it's worth it. Every gram of oxygen saved is one you (and perhaps your descendants) can breathe for hundreds of years. It's likely that chrontal beacons will be common for the Spacers.

**Likely Chronotech rating:** 3, citizens 3.

# GUIDELINES AND ADVICE

Chronotech takes a little more time to become comfortable with than the other technologies. There are also many different ways in which retrograde information might work. This section addresses those issues and gives the canonical view for Sufficiently Advanced.

You are, of course, welcome to postulate other ways in which information transfer to the past might work, but you may need to adjust the Capability ratings to accommodate your definition.

## HOW CHRONOTECH WORKS

We're going to skim over any imagined details in the implementation, because if I knew how to do this I would be a much richer man. Instead, let's look at some general guidelines for the ways in which Chronotech works. In order of importance:

### SINGLE TIMELINE

There is only one timeline – only one set of events actually happens. Changing events does not create an alternate timeline or a parallel universe. The events that your characters experience are part of

this single timeline. You do not receive multiple overlapping messages from possible futures; you receive a single message from the future.

### INTERACTION PERMITS ALTERATION

Revealing information to someone permits them to act. If the information includes or is dependent upon their actions, they may choose to change those actions and thus invalidate the information. Only undisclosed information is guaranteed to be correct. Some people see this as a vindication of free will.

### ACCURACY

Low levels of Chronotech have poor reliability, low bandwidth, and short duration. Messages degrade as they travel farther into the past. As the technology improves these problems are largely solved.

Messages from the future can be faked, but only by someone with physical access to your channels. Someone who mesh-hacks you, or knocks you out and performs surgery, could falsify your messages,

but otherwise you're the only one who can lie to you using Chronotech.

### TECHNOLOGICAL SUPPORT

Chronotech requires the use of carefully constructed and aligned devices, some of which require electrical power. Even with low-tech batteries they can be sustained for a long time. If all power is lost or a substantial electromagnetic pulse is employed, Chronotech devices and implants will fail to function.

### NO PHYSICAL TRAVEL

Temporal channels carry energy only – and only in the amounts used for communication. Attempting to send a physical object or even a large pulse of energy will fail, destabilizing the channel and making it unavailable for some time. Messages can pass through these unstable times, but cannot be received during them.

You *can* create time machines with Stringtech, which are covered on page xx. However, your character's individual Chronotech rating does not cover these large, bulky devices.

### NOT ALL THINGS ARE POSSIBLE

Chronotech allows people to "repeat" actions, sending back information about how to best accomplish something. Sometimes the message is, "You can't." Not everyone is capable of every action.

### CHECK BEFORE LOOPING

Bandwidth and decay prevention are everything in Chronotech R&D. Someone might consider this and say, "Now that I got this message, I'm going to immediately send it back to myself to close the loop. That way I'll receive the message, but I'll free up bandwidth too!"

This is a terrible idea.

The second you send that information, it is as true as you know it to be. If future-you hasn't tested that information yet, it's as true as if you just made something up off the top of your head. You might as well not send the information at all and guess using Cognitech instead.

If you want reliable information, you need to send it back from a point where you've tested it.

### INSTANT LOOPS?

Bandwidth and decay prevention are everything in Chronotech. Someone might consider this and say, "Now that I got this message, I'm going to immediately send it back to myself to close the loop."

This is a terrible idea.

The second you send that information, it is as true as you know it to be. If future-you hasn't tested that information yet, it's as true as if you just made something up. If you're guessing someone's password and you pull it from the future, don't send back that password without testing it to make sure it's the right one. Trust your future self to send back the right thing, and be trustworthy to your past self.

## THE PIPE ANALOGY

This analogy helped me develop and think about Chronotech. Hopefully it will help you understand how it works in the game. Think of your future information as string inside a pipe.

Initially you have only a single channel of information, and it's not very reliable. It's a little like having a tiny pipe or tube, maybe even a straw, with room for just one string. Sometimes even that string won't fit, and you have to work around that spot. The string is coded with information via its color and texture. It's not a lot of information, but you're the one coding it, so you can rely on your knowledge of your past self to fill in some of the gaps.

As Chronotech scores improve, the pipe gets wider. You can fit in more pieces of string, and even the tight parts in the pipe still fit several pieces at once. You can even braid them, including "metadata" such as time-coding and error-checking information. However, the pipe is still fairly small. You can only fit so many pieces of string before it's packed completely full.

As time progresses, you move along the pipe. When you get to the end of a new piece of string, that's you receiving a message. When you get to the start of that piece of string, that's you sending the message.

Dispersion in the message is a problem. You can't send something from arbitrarily far in the future – the messages become unreadable after a certain length of time. At low Chrono scores, it takes just seconds. At higher scores, it might be days or even years. In our analogy, the pipe is rough. The longer a piece of string you try to put in the pipe, the greater the chance that it will break at some point. Higher levels of Chronotech smooth out the pipe. You can also add another piece of string to improve the odds that your message gets back, or braid it with some others for extra error correction.

Eventually the pipe will be a culvert, and then a tunnel large enough to drive a bus through.

More space means you can send messages with more detail and context. You can fit a lot of string into a space that large, but you'll always feel as if you're about to run out. The reason is that the pieces of string from all the messages you received in the past are still there as you travel toward the future. The strings don't clear out until you send the message. Empty space is wasted bandwidth, so future you has already laid down the string to cover every little bit of available space.

You might imagine that you can send a message back to your past self, or forward to the future, saying "No, send this message instead" and change the arrangement of strings in the pipe. The truth is that you've already done this. Any rearrangement that can be done has already been tried. You have the best result possible the second you read that message.

You can split your bandwidth into several "channels" – pipes designed for specific purposes. Some are for short-duration messages saying "don't say that" or "dodge left" or "pick up your foot so you don't trip." These are fairly cheap and rough pipes, so you can get a lot of them, but they aren't as useful. Some are for very long-duration messages – very smooth and straight pipes, carefully polished, and expensive because of it. Most of your channels will be somewhere in the middle, reasonably polished and of moderate number but not quite as extensive. Breaking up your bandwidth this way means having less access to it than if you had a single giant pipe, but it also means that you don't have a single massive point of failure for your entire system.

Speaking of which, if all of your messages say they were sent from the same day, you should probably be suspicious of that day. The best-case scenario is that you will be hit with an electromagnetic pulse that stops your transmitter and disrupts your channels, the equivalent of filling that bit of pipe with concrete. Alternatively, you might run out of electrical power to maintain the channels. The worst-case scenario is that you die that day.

## PUSH AND PULL

Chronal technology is built on a “push” approach. A character’s future self takes an action: to inject information into the chronal channel. That information moves upstream and is received by the character in the present.

This is a fine way to think about things for the purpose of understanding the technology. Unfortunately, it causes major problems at the game table. Running Chronotech this way forces you to play through every single retcon that happens. Even if you play through each individual one quickly, the game will still drag. Everyone will get bored, and the plot won’t go anywhere.

I recommend using Chronotech with a “pull” approach instead. Think of your character as actively pulling information from the future. Let the pushing happen automatically, behind the scenes. This makes your present character the important and active one, rather than some future character that you might never really play.

If you need to know what’s going to happen so that you can avoid danger, pull that data from a news service in the future. If you need to know who to talk to to get what you want, ask your future self. When you’re faced with a puzzle, check with your downstream self to see what the solution was. Don’t think of the past as your resource, think of the future as your resource.

There’s no functional difference between these approaches; it’s just a change of viewpoint. Make your present character the active one, and let the future serve that character.

There will still be some times when you want to push information back to accomplish something specific, such as saving someone’s life. Keep it to a minimum outside of slipshank (page xx). The more you can keep to the “pull” approach, the easier your game will be to run.

## WHY CONFLICTS?

High-Chronotech civilizations, like high-Metatech civilizations, have less violence and less overt conflict. The reasons are very different. Both of them are good at smoothing rough edges in society, keeping things from getting to the point where people even want conflict. Chronotech goes one step further, however: someone who loses a fight knows beforehand that they’re going to lose. So they send themselves a message: “Don’t get into this fight. You’re going to lose.”

Still, sometimes, things come down to that. Conflicts happen. Even fights happen. Occasionally that’s a result of pure, blinding rage, but that’s not common in civilizations where a mesh can watch your anger levels and keep you on an even keel. Flying off the handle is typically a choice (or the influence of a Theme or Complication). No, people get into fights or shouting matches or launch memetic assaults because they’ll get something out of it. Maybe they need to soften you up for the next fight. Perhaps they’re testing some mesh-hacking software and they know they can make the assault and get away. No one goes in saying “maybe I’ll win and maybe I won’t,” but a lot of people go in saying “I’m going to get beat up, but I’ll still get what I want.”

Longer-term conflicts are still very uncertain, even in high-Chronotech civilizations. Two groups might get into a research duel, only to have one side realize two weeks before the end that the other side will get there first. Psychohistory still drives large-scale movements of civilizations and societies. Some groups still go to war. Chronotech, at its current stage, just doesn’t look ahead far enough to see the results of these longer events.

## **SLIPSHANK**

Slipshank is defined as a believable addition to off-screen past events to create an immediate change in the present. It's a term I'm borrowing from the Continuum RPG, one of the best time-travel games ever made. In Continuum you are using your future self's time to do things; in Chronotech it's your past self. Slipshank is one of the best and least disruptive ways to deal with "I change the past" actions.

In its original form slipshank refers to changes to the past that you haven't made yet, but intend to make soon. A classic example is stealing someone's keys earlier today and hiding them nearby so that you can retrieve them right now. When you realize you need the keys, you can send the message to your past self to steal them. All you need to do is figure out whether past-you could have done what is necessary to steal them, and suddenly you have the keys right where and when you need them.

Let's look at the key elements of slipshank one-by-one:

- **Believable.** Slipshank is fairly close to Theme use in terms of its potential power. It's important that the things you do with it make sense within the story of the game. The things you want done need to be things that your character could actually have accomplished, either alone or with help.
- **Additions.** Slipshank is not a change in events that have already been described. It's not a retcon or "that's not what really happened" reveal. It's additional information about what happened between established events.
- **Off-screen past events.** Your character (or someone with whom your character communicates) needs to be off-screen in order to accomplish the tasks you want done. You will need minutes, hours, or days unaccounted-for that you can fill in with the details of what you were really doing. You need to have the time available to take these actions without running yourself ragged or

missing events that everyone knows you were present for. If you want your character to be able to take advantage of slipshank, arrange for some unspecified downtime.

- **Immediate change in the present.** "Change" is a misnomer, because what you're doing is ensuring that the present always turned out this way. The actions your past self is taking on your behalf become manifest right now, so that you can take advantage of them.

Here are some examples of what you can do with slipshank:

- You knew you'd need an extra battery right now, so you replicated one yesterday and hid it in those bushes over there.
- All last week you've been secretly working on a Project, the results of which are useful to you right now.
- As the authorities come into your house, you send back a message to yourself yesterday. The authorities will find nothing – you sent the secret documents to a friend for safekeeping last night.
- Give your friends a few hours of retro-notice so they can sweep in and save your neck. Of course, to do this you need to have friends capable of saving you, who are willing to help. Depending on your character background, this may be better achieved with Theme use.
- The records you need were destroyed earlier today? Good thing you hacked in and got them last night!

Here are some things you can only do with slipshank if no one else has Chronotech:

- Make tons of money off the stock market. In civilizations with Chronotech, everyone tries to do this, and it all basically balances out.
- Buy unexpected flowers for someone who doesn't like surprises. You might still be appreciated for your thoughtfulness, but it

won't be a surprise, because they'll have told themselves about it already.

- Put a brick exactly where someone will trip over it. People with Chronotech typically don't trip unless they're really low on bandwidth for some reason.

Civilizations with substantial Chronotech resources are likely to have slipshank services – groups that you can e-mail with work that absolutely must be accomplished on a particular timescale. They're not free, but if you don't have the free time to use accomplishing things yourself, they can be lifesavers.

### LIMITATIONS OF SLIPSHANK

The number one limitation on slipshank is the length of time across which you can reliably send information. Number two is the amount of information that necessary to complete the mission. Your past self might be good at guessing your present self's secret messages, but some things really require a lot more data to set in motion, such as running a Project to analyze data.

Slipshank at the outer edges of one's Chronotech horizon are a great opportunity for the GM to invoke the Bad Luck rule. You told your past self to pick up a screwdriver, but past-you didn't understand and got you a stiff drink when you needed a phillips-head.

Major uses of Chronotech in the recent past tend to make slipshank more difficult, as they eat up bandwidth. If you're slipping something past a spike in your Chronotech usage you'll need to be more concise with your directions, which makes things more difficult to understand on the other end. This is why the Transcendentals end up sounding like mad prophets sometimes.

### WHY USE SLIPSHANK?

Is Chronotech capable of changing established facts? Definitely. Whether your character is on-screen or off-screen has no meaning within the

universe of SA. Your character was still doing something, even if it was just sleeping. There's no reason you need to use slipshank.

We suggest using slipshank not because it's the only way to handle information transfer to the past, but because it's an excellent way to keep transfer manageable. Changing established past events can easily create a cascade of other alterations. This way, you're "changing" something that was never established in the first place, which means it should have fewer repercussions and cause fewer continuity problems.

## WHEN SOMEONE DIES

Game Masters, save yourself some frustration: don't kill off someone important right in front of the PCs. In a regular roleplaying game this is an emotionally wrenching move that can build a powerful story when used properly. When Chronotech is involved, however, it's just asking for trouble. You might want to use a visceral and sudden death as the beginning of a session and then flash back to "Two weeks ago...", but when Chronotech is in play, you'll *never* want to kill off a beloved NPC in the middle of a game.

The first thing the characters will do is send information back to their past selves in an attempt to undo the murder. Killing a character the PCs care about is basically begging them to change established events. You'll have to actually play through them to see what happens. It's going to be a mess.

Instead, foreshadow, foreshadow, foreshadow. Start by having a sense of foreboding come down the PCs' long-duration channels. Introduce dream-prophecies. Have a message from the future inform them that this friend, ally, or mentor is in danger. As a bonus, information from farther in the future is necessarily vague because of the way that Chronotech works. You can draw in the PCs before they even fully realize what's going on.

Next, give the PCs a chance to act on this intel. Draw them into the plot that you want to build, and make the game about character choices rather than a lack of foreknowledge.

This way, when a beloved NPC dies, the players will know they put in their all. Either they honestly weren't fast, strong, smart, or skilled enough... or they made the choice themselves. Sometimes you give up someone you care about to save a planet.

So go ahead and file "She died right in front of me and I could have prevented it" under the Inaccessible Plots header, and replace it in your repertoire with "I did everything I could."

## FAIL-FAST DESIGN

Fail-fast design (sometimes called fail-stop design) is a particular method of design in engineering. You may have heard of another "fail fast" approach where the idea that failure is a useful and productive thing – you can improve your work by failing faster, earlier, and more cheaply. That's not this; this is a different thing. Here's how it works.

Many systems fail in gradual ways that allow people to continue using them while they fail. For instance, the first crack in a bridge doesn't make it fall down. Someone entering a wrong password when retrieving their e-mail is not locked out forever; they get a second chance. Fail-fast is the opposite of that: when a system fails, the entire thing immediately stops and nothing more happens until the system is fixed.

I recommend that you treat Chronotech as a fail-fast system. At the point of uncertainty and failure, stop immediately. Solve the problem. Continue only when you're ready.

The reason I make this recommendation is that running a game with reliable information from the future requires keeping certain events fixed and definite regardless of what else happens. If one person receives a message from themselves in the future saying that they're on Planet A, and the game moves to Planet B, then that message still needs to say the same thing. If you don't know how that's going to happen, stop right away and make a decision.

The answers could be...

- Having that character stay on Planet A until they can reconnect with the team on Planet B. This is probably the best option, as the GM can work that character into other plot elements on that planet.
- Using a Complication (via the Bad Luck rule) to have the message inserted into the character from the outside. This is also a good option – you can work in a recurring enemy this way.

- Wormholing back to Planet A to send the message. If you can answer the question of why the message would need to be sent from there, this is fine. If not, this is a bad choice.
- Having that character lie or fake the message. This is a bad idea, as it sets a dangerous precedent for false information.

Resist the temptation to excuse player- or GM-level uncertainty with glitch in someone's Chronotech. Technology in SA is presented as reliable and consistent, Chronotech included. Breaking or significantly changing a technology is a great plot element, but it's a huge one, and not one that you should do lightly. Save that for your overarching campaign ideas, not a spot fix.

Pause, take a moment, consider, and make a decision you can stick with. In my own games, if I try to skim over points of confusion without making a decision about them, I end up forgetting about them. My players remember them better than I do, especially since there are more of them than there are of me, and when they ask me about it later, things have become all tangled up and impossible to clear up. The fail-fast approach is all about avoiding paradoxes and keeping your timeline in order so that your game makes sense.

## **INSPIRATION**

Continuum

Bill and Ted's Excellent Adventure

Time and Temp

## **BACKWARDS COMPATIBILITY**

For those of you who still play the original version of SA, we gladly provide a set of backward-compatible rules to help you incorporate Chronotech into your game. This section provides a 10-point scale for Chronotech, an adapted version of the Temporal Expertise, and the necessary stats to include the Perpetua and the Listeners in the original game.

### **THE CHRONOTECH CAPABILITY**

Low levels of Chronotech represent intuition, insight, and inspiration. Higher levels extend and expand a character's temporal bandwidth.

1. Your guesses are usually wrong, especially as concerns other people, the future, or probabilistic events.
2. The future is a closed book to you, but you can still win at poker once in a while.
3. You are particularly insightful. Your assumptions are correct more often than not. When you get in a fight, you can often read your opponent's moves and react before they act. You rarely make a social faux pas.
4. You have a single temporal channel that sends only one message at a time. The data carries no timestamp, so the message is from an unknown span in the future, from minutes to hours. The messages are cryptic, relying on your knowledge of yourself to trigger memories and suspicions. The clearer the message, the less time you will have to act on it.
5. You have several temporal channels, optimized for durations from milliseconds to hours. Short-term messages are reliable, but information from more than a few seconds in the future is still difficult to receive and is limited to just a sentence at a time. You can reliably win fast games of chance like three-card Monte. You have access to the Temporal Expertise (see page xx) that allows you to re-try actions many times and use the most effective method.
6. Many issues with message degradation have been solved, and you can reliably ask your future self about the best course of action for the next few minutes. There is no guarantee that this course remains wise in the long term. You can easily guess passwords, code keys, and the like. Your messages are also timestamped, letting you know when to expect trouble.
7. Your bandwidth expands significantly. You can successfully guess maps and other large data sets, as long as you can check their accuracy within an hour or so.
8. You can ask yourself advice about the next few hours. You still receive cryptic messages from farther in the future. If you have a Mesh you can filter these through your subconscious, giving you prophetic dreams. If not, you will have to puzzle the message out during your waking hours.
9. You can ask yourself advice about the next few days. You receive not only good advice, but alternatives and options.
10. Your less reliable channels send unclear messages from years into the future. Your first impressions are always correct. Your understanding of the future makes you impossible to surprise.

## TEMPORAL EXPERTISE

Increase each of your Profession ratings by two points. In exchange, lose a point of Import permanently (which will reduce one of your Theme ratings).

## THE LISTENERS

**Capabilities:** Bio --, Chrono 10, Cog 6, Meta 5, Nano 7, String 10

**Benefit:** Treat Listener Chronotech scores as two points higher for the purposes of determining how far they can send messages back through time. However, their signals can be disrupted by any phenomenon that would disrupt outside communications.

**Inspector Status:** Honored observers.

## THE PERPETUA

**Capabilities:** Bio 8, Chrono 10, Cog 8, Meta 6, Nano 8, String 7

**Benefit:** Citizens of the Vault do not lose the first point of Reserve that they spend on a particular action or conflict.

**Inspector Status:** By default, inspectors are unknown to the Perpetua at the start of the game. Later on they are likely to be afforded powers similar to those of a local law-enforcement official.