

Becoming an Interplanetary and Interstellar Culture

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Earth Versus Space Settlement

Earth

Population

Knowledge

Industry

Raw Material: Diversity

Raw Material:
Quantity

Space Settlement

Population

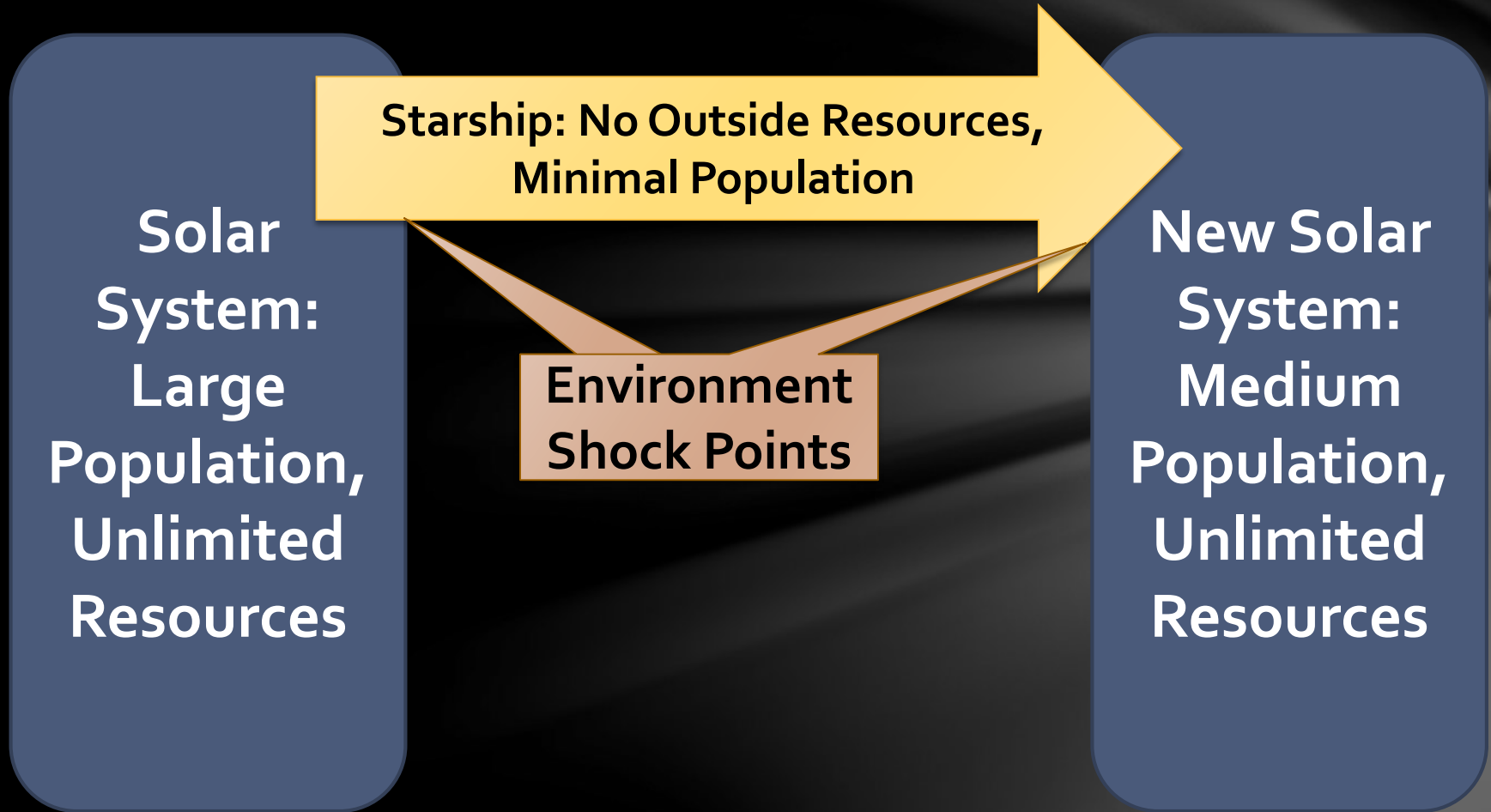
Knowledge

Industry

Raw Material: Diversity

Raw Material: Quantity

The Soda Straw Problem



What Stresses an Interstellar Culture?

- An Interstellar Culture must survive...
 - Multi-decade flight time with no additional resources
 - Arrival with unlimited resources and few tools
 - The drastic jump in scale from a minimal population to one that can claim a new solar system and built their own starships

Starship: "USS Strawman"

| Parameter | Value |
|----------------------------|---|
| Mission Flight Time | 50 Years |
| Crew, Departure | ~100 |
| Settlers, Arrival | ~250 |
| Departure Sponsor | Asteroid Mining Company |
| Mission | <ul style="list-style-type: none">• Explore, Settle, Communicate• Mine Asteroids to repair/refuel• Settle asteroids, then planets• Build a own starship in 100 years |
| Prep Time | Function as the construction/design crew for 10 years prior to departure |

Crew Demographics at Departure

| Parameter | Value |
|--------------------|---|
| Ethnic | Maximize diversity to give broad genetic pool Not all races that will exist in 100 years exist now |
| Age | Minimum 15, with parents Maximum 40, with children |
| Why Spread? | Generational diversity will help keep original crew from forming an over-focused generational identity. |
| Why Bound? | Assumes that a 15 year old has some productivity already, and a 40 year old has many years of productivity left, and a reasonable chance of seeing the destination system. |

Education and Skills

Required Knowledge/Skill Base

| Parameter | Value |
|---------------|--|
| Core Starship | Know all technologies for living in and light maintenance (status quo) of starship |
| Foundational | Know how to create these technologies from nothing, step by step. |
| Adaptive | Adapt those and other technologies from Starship to Settlement, Exploration, and related technologies. |
| Developmental | Know how to build beyond those technologies |
| Human | Soft skills, primary instruction and communication Medical and physical |
| Core Life | Basic housework, gardening, and other skills a society must have at any technology level to survive |

Risk and Opportunity

| Parameter | Value |
|-------------|---|
| Technology | <ul style="list-style-type: none">• Avoid blind faith in technology• Know it well enough to restore if lost• Know enough to advance, modify, replace |
| Soft Skills | <ul style="list-style-type: none">• Avoid irrational decisions and leadership• Know how to communicate, but also to detect propaganda, fallacy, and mathematical error. |
| Core Skills | <ul style="list-style-type: none">• Avoid dependency on any group for core life needs• If everyone knows how to survive, then survival more likely• Unlikely to have dependent class (at any social level) |

Education: Liberal Arts

| School | Grade | Study | Description |
|-------------------|--|-----------------|--------------------------------------|
| Trivium | K-5 | Grammar | Mechanics of Language/Symbol |
| | 6-8 | Logic/Dialectic | Mechanics of Thought/Knowledge |
| | 9-12 | Rhetoric | Use of Language to Instruct/Persuade |
| Quadrivium | 13, 14 | Arithmetic | Numbers |
| | | Geometry | Numbers in space |
| | | Music | Numbers in time |
| | | Astronomy | Numbers in time and space |
| Bachelor | Specializations for primary career Ability to adapt to other disciplines as needed | | |
| Advanced | Unless critical to mission, avoid overspecialization until destination reached and/or population large enough. | | |
| Adaptive | Full library of all technology needed if any new roles needed. | | |

Practicum at All Grades

| Parameter | Value |
|---------------|--|
| Productivity | <ul style="list-style-type: none">• Paid work-study geared to age range• Practicum tied to classroom studies, so question “when will I ever use what you are teaching me?” is not an issue – they use it immediately.• Work ethic - doing important simple work, not make-work.• Key self-sufficiency skills (repair, tailoring, farming) so that the colony won’t starve if the five farmers are disabled. |
| Reinforcement | <ul style="list-style-type: none">• Each task set repeated to allow elder children to help teach younger ones.• Avoid “skill rot” |
| Enrichment | <ul style="list-style-type: none">• Creativity and productivity rewarded |

Education: Unified

| Parameter | Value |
|--------------|--|
| Technology | <ul style="list-style-type: none">• Core knowledge on operations of equipment, repair, and how it works.• Extended on how to build simplified versions of it.• Any technology element in library should be understandable to any crew member, ideally. |
| Liberal Arts | <ul style="list-style-type: none">• Expanded math and science offerings• Music theory - would include resonance physics and other practical matters to engineering |
| Practicum | <ul style="list-style-type: none">• Would integrate other lessons into unified model, so cooking would be linked to thermal physics, gardening to biology, cleaning to chemistry, etc. |
| Creative | <ul style="list-style-type: none">• Avoid the Pavlovian model of multiple choice and return to essay tests, creative projects based on lessons learned. Recyclable 3D printing good here. |

Political Structure

Why Earth Structures Don't Apply

| Parameter | Earth, 2012 | Solar System | Starship |
|----------------|----------------------------------|--|--------------------|
| Radio Delay | 1 second or less | Minutes to hours | Years |
| Control | Layered by distance and location | Layered by ship commander, then sponsor nation, regardless of location (Like maritime law) | Independent |
| Trade/Resupply | Hours to days | Months to years | Information only |
| Structure | National | Explorer Bases/ Settlement | Settlement |
| Regulation | Large Population | Small Population | Minimal Population |

Scalable Government: Size

| Parameter | Value |
|-------------|---|
| Minimum | Independent ships, colonies, and automata. |
| Interlink | All under central rules concerning law, regulation, etc. |
| Independent | Pilot in command regulations regarding local decisions outside the scope of law and regulation. |

Scalable Government: Distance

| Parameter | Value |
|---------------------|--|
| Local Government | <ul style="list-style-type: none">• Settlements, ships, habitable territory or spaces.• Continent and island chain scales |
| Regional Government | <p>Limit of region may not vary depending on orbital dynamics.</p> <ul style="list-style-type: none">• Planetary system with moons seen as unit• Section of solar system that is star-centered, so inner solar system, asteroid belts, etc. would be separate territories.• Highly elliptical orbits would have to be entirely in one region or their own region |

Limits on Regulation and Law

| Parameter | Value |
|--------------------|---|
| Law and Regulation | <ul style="list-style-type: none">• More tech writers, fewer lawyers• All should be brief, clear, structured in tables with examples, non examples, and drill downs where appropriate, and clear terms with cross-links to centralized definitions. GAAP must apply. |
| Example | <ul style="list-style-type: none">• Core law – 1000 pages<ul style="list-style-type: none">• Business Law – 1000 pages<ul style="list-style-type: none">• Credit Union Regulation – 500 pages |
| If Exceeded | <ul style="list-style-type: none">• No new regulation may be put in place that does not repeal one that is obsolete |
| House of Ages | <ul style="list-style-type: none">• Regulations are reviewed every 1-10 years for:<ul style="list-style-type: none">• Technologically obsolete cases• Unintended consequences |

Strawman Constitution

| Parameter | Value |
|---------------|---|
| Senate | <ul style="list-style-type: none">• Geographical/Political Unit Representation |
| House of Rep. | <ul style="list-style-type: none">• Population representation |
| Executive | <ul style="list-style-type: none">• Core accountability and swift action• Split: Captain (ship) and President (population) |
| Supreme Court | <ul style="list-style-type: none">• Case law review |
| House of Ages | <ul style="list-style-type: none">• Consists of representatives of each generation, plus those to come, and those gone.• Review all laws to ensure no generation exploited• Similar to Congressional Budget Office + GAAP |
| Term Limits | <ul style="list-style-type: none">• All terms limited• Newly-elected pre-term and lame duck term get one-half vote, overlapped |

Economic Models

Economic Model: Distributism

| Parameter | Value | |
|-----------------|--|---|
| Basis | Distributism (AKA Distributionism): US/UK, 1900-1945 | |
| Summary | “Unbridled capitalism doesn’t produce too many capitalists, but too few.” - <i>G. K. Chesterton</i> | |
| Basic unit | Family is core economic unit. Small businesses are individuals and families with means of production. | |
| | Embraced | Avoided |
| Credit | Credit Unions | Banks |
| Labor | Training Guilds | Labor Unions |
| Incorporation | Employee-Owned | Investor-Owned |
| Economy | Distributed Manufacture | Economy of Scale |
| Class structure | Middle-class stabilized | Middle-class exploited from Statists and/or Oligarchy |

Ownership

| Parameter | Value |
|----------------|--|
| Flat Start | <ul style="list-style-type: none">• Crew each purchases/earns shares over decade prior to launch• Minimum of one, maximum of ten to start |
| Economic Units | <ul style="list-style-type: none">• Money for trade and value of things• Flat tax ? (Simplification to avoid overhead) |
| Social Units | <ul style="list-style-type: none">• Social units for value of soft elements<ul style="list-style-type: none">• Parenting and Teaching• Care for Elderly/Disabled• Open Source Development• Per person tax that is offset from social action ? (Dicey) |
| "Jubilee" | <ul style="list-style-type: none">• Means of production is not sold, it is leased for 40 years or less• Prevents one generation from selling out another's birthright |

Division and Partnership

*What did the spirit... mean by... **Division and Partnership?**...*

How can it be that a shared good makes a greater number of possessors richer by it than if it is owned by a few?'

*And he to me: 'Because you fix your eyes, again, only on earthly things, you produce darkness from true light. That infinite and ineffable good, that is up there, rushes towards love as a ray of light rushes towards a bright body. The more ardour it finds, the more it gives of itself, so that, however far love extends, eternal good causes its increase: and the more people there are up there who understand each other, **the more there are to love truly, and the more love there is, and, like a mirror, the one increase reflects the other.***

Dante, Purgatorio Canto 15, 37-81 c 1308-1321 C.E.

So what does that mean?

| Division | Partnership |
|--|---|
| Money can be split | Knowledge can be copied |
| Property can be divided | Integrity can be modeled |
| One benefits | All benefit |
| Proprietary Information | Open Source Information |
| Represented as money | Represented as virtue and knowledge |
| Society and individuals need these works to survive | Society and individuals need these works to be great |

Periodic Table of Economics

| Things | Structures | People | AP* | Data/Knowledge |
|----------------|------------|----------------|-------|-----------------------|
| Land/Asteroids | Deeds | Explorers | 90 | Astronomy, Geology |
| Raw Materials | Mines | Mining tech | 80 | Industrial design |
| Refined Goods | Refineries | Refinery Tech | 80 | Chemistry, Chem-E |
| Finished Goods | Factories | Construction | 90 | Product Design |
| Shipped Goods | Logistics | Transport | 95 | Celestial Navigation |
| Stocked Goods | Stores | Sales/Distrib. | 70 | Marketing |
| Arts | Studios | Education | 5-60 | Psychology |
| Sciences | Labs | Medicine | 10-50 | Life Sciences |

AP: Automation Percentage (Max)

This table is a notional discussion strawman – not an exhaustive reference

External Disruptions

Interstellar Communication

| Parameter | Value |
|-------------------|--|
| Light Speed | <ul style="list-style-type: none">• Real Earth and Knowledge of Earth will slowly drift out of synch like a slow watch.• Stars behind you explored by other colonies will seem more backward than ones in the same direction explored by other ships. |
| Quantum Entangled | <ul style="list-style-type: none">• Very slow baud rate but instant link to systems that are entangled before departure.• Ships should carry several, linked to Earth and other systems.• Earth would be a core relay point to ships launched after the last entangled link. |

The Next Starship to Arrive

| Parameter | Value |
|----------------------------------|---|
| Why? May Bring... | <ul style="list-style-type: none">• More quantum communications units for other starships launched later.• Second wave of settlers• Technologies not yet practical to build locally |
| Risks | <ul style="list-style-type: none">• Lack of acceptance of newcomers<ul style="list-style-type: none">• Earned versus Assumed• Over-deference to newcomers<ul style="list-style-type: none">• Risk of exploitation by newcomers |
| Mitigation | <ul style="list-style-type: none">• Enculturate the population prior to departure and en route as much as possible• Level-set expectations by the existing group |

Thank You!

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