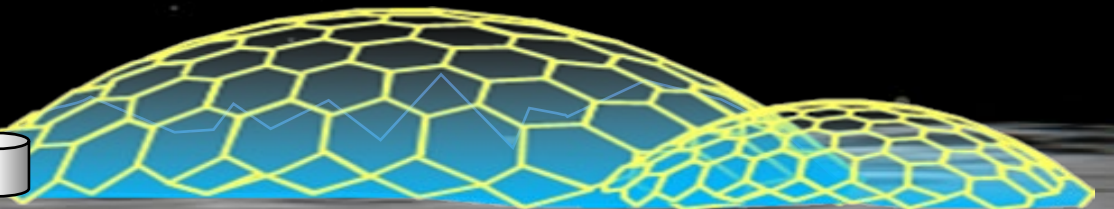
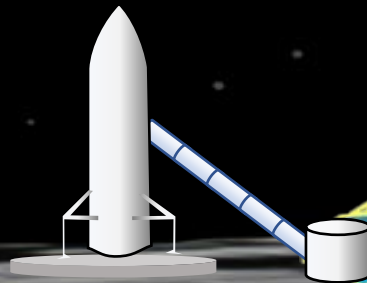
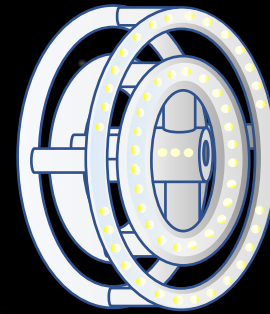
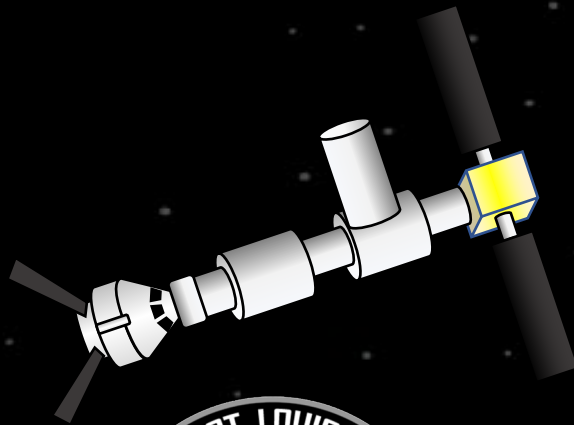


Selected Slides ARCHON 45

30 Sep-02 Oct 2022

Bryce L. Meyer

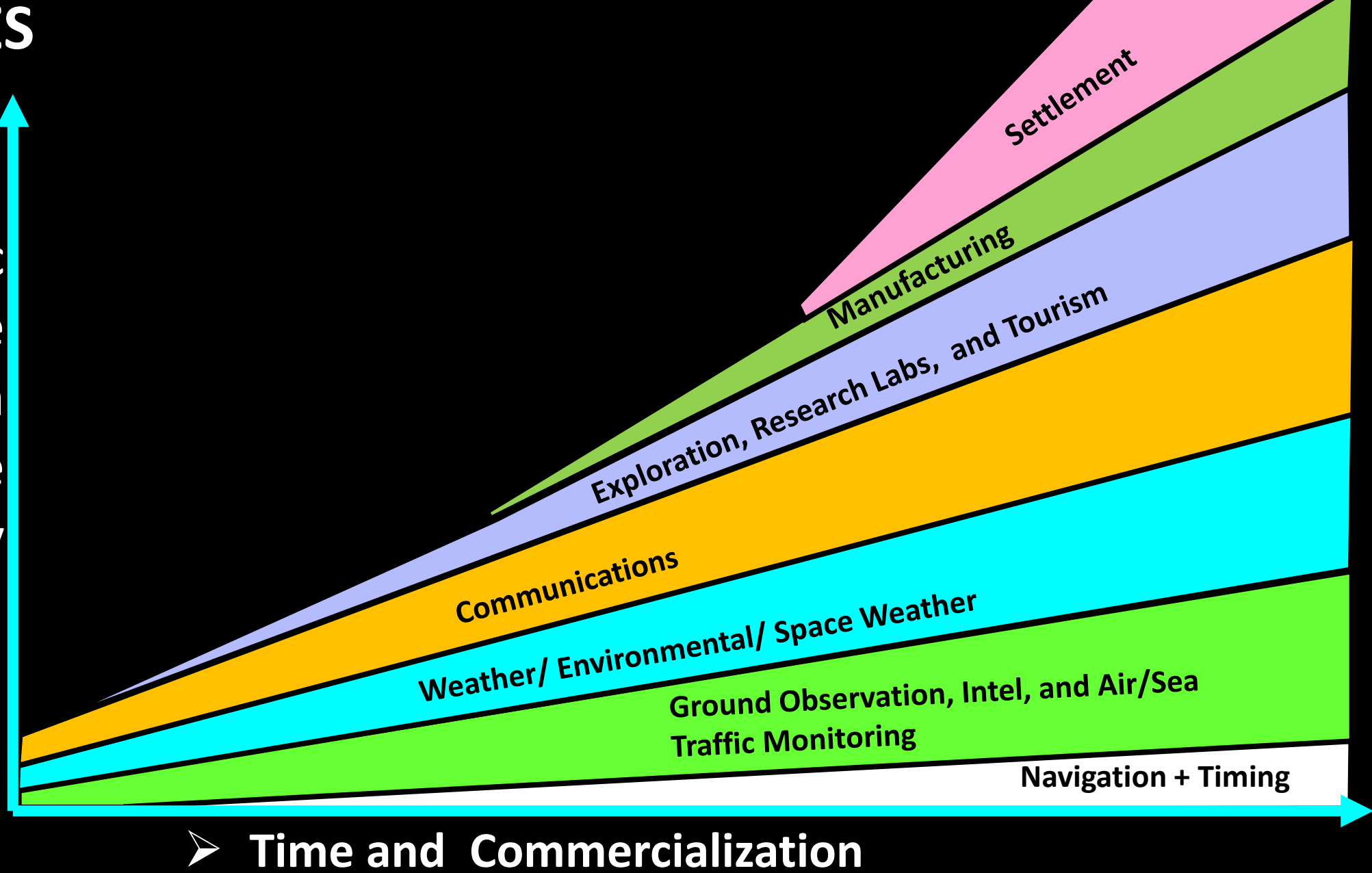


Panels I was on

- Friday 30 Sep 2022:
 - The Tiangong and Beyond: China's Space Program, 7:00 PM
 - Back to the Moon! The Artemis Mission, 8:00 PM
- Saturday 1 Oct 2022
 - Coffee and Truffles from the Moon, 10:00 AM
 - Mars as Breadbasket of the Outer Solar System, 11:00 AM
 - Space Farms 12:00 Noon,
 - Now Hiring (Astronauts): The Future of Commercial Space, 2:00 PM
- Sunday 2 Oct 2022
 - Current and Future AI, 2:00 PM

SPACE USES

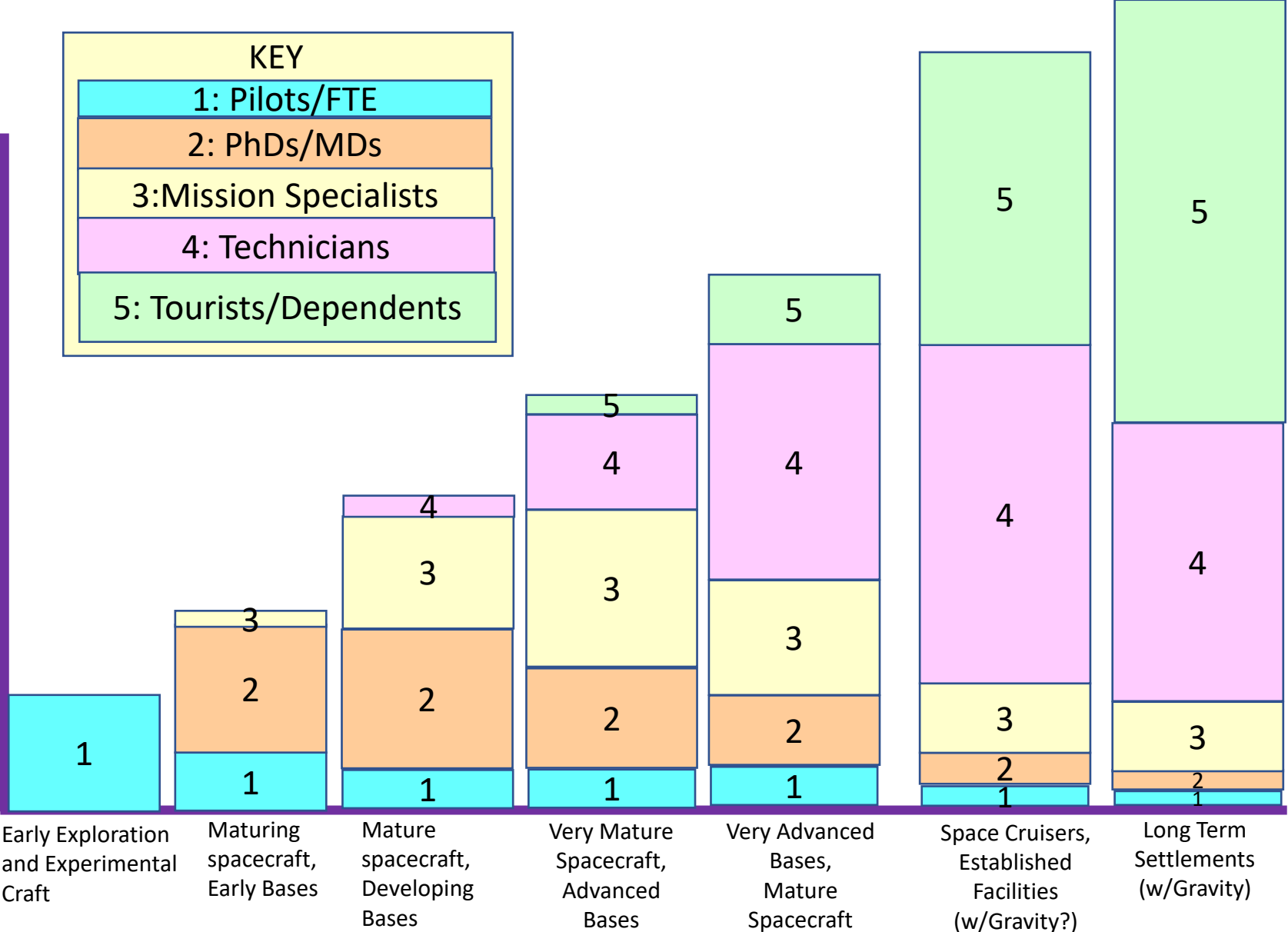
- Economic Value
- People in Space
- Criticality



Evolution of who goes to space

#	Driver	Type	Roles	Fitness
1	Very difficult to control spacecraft, complex space ops, harsh conditions, high risk	Test Pilots/Engineers (Pilots or Aircrew with Graduate Engineering Background)	Pilot, Ops	High Athlete
2	Scientific Exploration, Medical, or Engineering in moderately austere conditions, risky	Scientists, Medical, and Engineers with PhD/MD and well known in field	Mission Specialists	Middle Athlete
3	Experimentation for pre-planned experiments, some space assembly less austere conditions	Scientists and Engineers with graduate degrees, but also process oriented	Mission Specialists, Factory	Fit
4	Need for crew to perform manual technical work or process work (Plumbers, Kitchen, Servers, Welders, etc.)	Technicians with experience in area, detail oriented, and ability to adapt to space conditions	Many crew roles, Factory	Fit enough to tolerate launch and work in space
5	Tourists/Dependents	Anyone who can tolerate space environment, can pay attention to notices and warnings (as on airplanes and cruise ships)	Tourist or none	Fit enough to tolerate launch and life in space

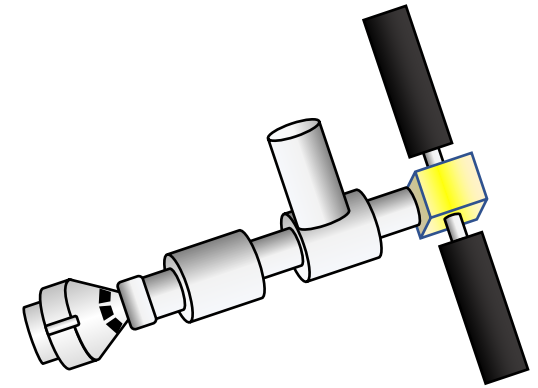
Base or settlement types for spacefarers



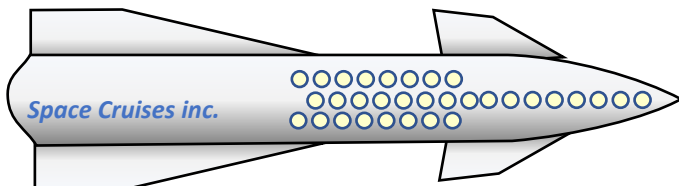
Big Note:
Up to 2022 many 'space tourists' are really classified as touring technicians in Category 4.



Near-Term Industries in Space

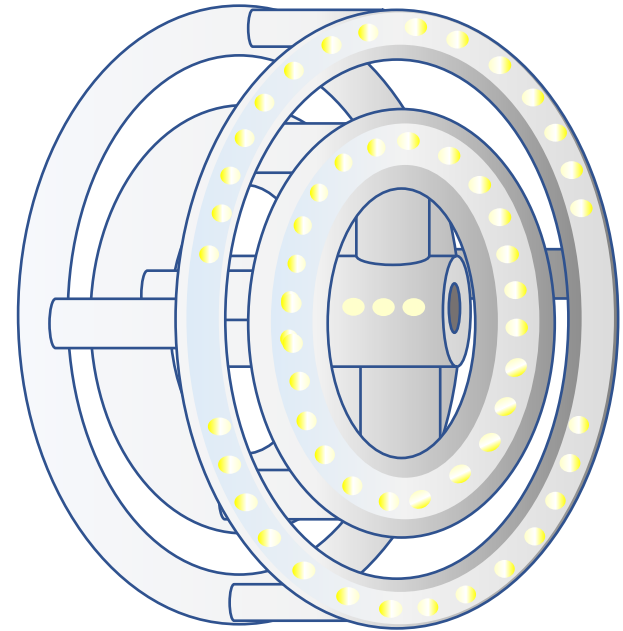


1. Uncrewed: Navigation, Intel, Communications
2. Uncrewed/Lightly Crewed: Automated Factories and similar:
 1. Communications: Fiber Optics and Amplifiers
 2. Chemistry: Crystallization of pharmaceuticals, key compounds and metals
 3. Complex High Value Items that can be 3d Printed
 1. Microelectronics
 4. Items or processes that are bad to make on Earth, but good for commercial use
 1. Many chemical processes!
 5. Collection of materials for later use: He 3, etc.
3. Items in #2 eventually drive need for **on-site workers**, due to flexibility, latency, and repair
4. Experimentation for Earth: Experiments that need local control
5. Space Tourism: Same people as #3 and #4 + run Cruise Ships, Hotels in space



Long-Term Industries in Space

1. Space Tourism: Same people and run Cruise Ships, Hotels, except in space
2. Orbital and Lunar Factories
3. Lunar Mines
4. Scientific Bases
5. Settlements



Known Timeframes

Goal	USA+ ESA+ JAXA+ Canada+ others	Russia	<u>China</u>	<u>India</u>
First Satellite	1958	1957*	1970	1975
Human Space Mission	1961	1961*	2003	2022 planned
Human Lunar Landing	1969*-1972, return 2024/5 (NASA, Blue Origen, Space X)	2025 (w/China)	2025	2030s??
Human Mars Landing	2030s (NASA, SpaceX)	tbd	2033	tbd
Commercial Space Hotel (beyond ISS, Mir, Tiangong)	2025 (OAC), 2028 (Axiom, SNC)	tbd	tbd	tbd
Commercial Space Factory (beyond ISS, Tiangong)	2025-28 (Axiom, RedWire, SNC, others)	tbd	tbd	tbd
Human Lunar Base	2025-2030s (Artemis, etc.)	2030s w/China	2030s (2036)	2030s
Human Mars Base	2040s? (SpaceX: maybe earlier in 2030s)	2035+w/China	2035-2040	2040s (likely w/USA/ESA/JAXA)

Estimated (very roughly) from public sources, Wiki, NASA.