

# Space Settlements

Design Exercises, Competitions, and Reality

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August 16, 2022

# Agenda

1. Background on SSDC (Quick run-through of Ames Presentation)
2. Proposal example (ARSSDC 2021 Astoria)
3. Astoria Settlement in Virtual Reality
4. Space Settlements and NASA
5. Real settlement design (Work ongoing for various capabilities that would be required)

# Background on SSDC, Proposal Example, and VR Trailer

See Ames Presentation

See Proposal Example

See VR Demo Trailer

<https://www.youtube.com/watch?v=yYb6fAPgzmk>

Behind the scenes for “Virtual Mode”

# Student use of Discord for Proposal Preparation

Discord

Verenigten Flugfahrten ...

# structures All structures related communications only!

Olivine-hypersthene, L4 - 15% (Iron and Silicon)  
Olivine-bronzite (H4 and H5) - 16% (Iron)  
Enstatite Chondrite - 14% (Iron)  
Precious Metals - 6%  
Achondrite (Obrite) - 5% (Iron)  
Aluminium Silicate - 12% (Aluminium) (edited)

The brackets tell us what main elements we are extracting from those minerals

**KatherineZhao-VF-STUDENT** 02/01/2021  
@Structures Who made this picture?

Please send me the original one ASAP

**Khwaish-VF-Student** 02/01/2021  
@Maddhav Suneja-VF-STUDENT right?

*Original message was deleted.*

**KatherineZhao-VF-STUDENT** 02/01/2021  
Thanks a lot

**Maddhav Suneja-VF-STUDENT** 02/01/2021

Message #structures

Search

BOT - 5

- Groovy [BOT]
- Pollmaster [BOT] Listening to pinhelp
- Rythm [BOT] Playing new website! https://r...
- Server Password... [BOT] Playing /help | Securing 5 shar...
- sesh [BOT] Playing sesh.fyi | /help

RED TEAM VR PROJECT MEMBER...

- Carl Reinert
- David Cheuront

OPERATIONS - 1

- Aanvik-VF-Student

OFFLINE - 64

- Aadit-VF-student
- Aakarshan-VF-student
- Aarav Bhandari-VF-St...
- AARNAV-VF-STUDENT
- Aathreya-VF-STUDENT
- Abhinav - VF - Student
- Ashish Thakur

# Space Settlements and NASA

## NASA SP-413 Space Settlements A Design Study

<https://space.nss.org/nasa-sp-413-space-settlements-a-design-study/>

<https://ntrs.nasa.gov/citations/19770014162>

- A classic on the subject. Published January 1977 from work as NASA Ames

## Commercial Space Lecture Series

<https://www.nasa.gov/ames/partnerships/spaceportal/commercial-space-lecture-series>

Some relevant topics

NASA Innovative Advanced Concepts Workshop on Space Settlement (November 2021)

# Some Real Settlement Design Activities

- GrowMars, Expanding Loop System for Moon and Mars | Daniel Tompkins
- The Universal Food Project: A global collaboration for the production of food for earth and space | Scot Bryson, Orbital Farm
- Advancing spaceflight nutrition and psychological wellbeing through novel food strategies | Roxy Fournier and Aaron Persad, Astreas (formerly Mission: Space Food)
- Mining the Moon for Fun and Profit | George Sowers, Colorado School of Mines
- Space Power & Ancillary Services Beaming: Creating enabling Infrastructure as a Commercial Enterprise | Gary Barnhard, Xtraordinary Innovative Space Partnerships, Inc. - XISP-Inc
- Commercial Nuclear Technology for Enabling Exploration and Settlement of the Solar System | Christopher Morrison, USNC-Tech
- Project Olympus: Building on Other Worlds | Jason Ballard, ICON
- Artificial Gravity Solutions for Low Gravity Colonies | Joseph Parker, Mayo Clinic

## Some Real Settlement Design Activities (Cont'd)

- Commercial LEO Case Studies: In-Space Manufacturing for Terrestrial Markets | Lynn Harper, NASA ARC Space Portal Office
- Managing Lander Blast Effects for Commercial Lunar Spaceports | Phillip Metzger, University of Florida, Florida Space Institute
- Our vision and current activities towards future lunar society | Shigeru Imai, Japan Manned Space Systems Corp. (JAMSS)
- The International Lunar Exploration Phase | Doug Plata, The Space Development Network\
- Building EBIOS, Experimental BIO-regenerative Station: a closed-loop environment-controlled life support system for future space settlement and regenerative terrestrial solutions | Barbara Belvisi, Interstellar Lab
- Space Architecture for a Lunar Settlement | Daniel Inocente, Skidmore, Owings and Merrill, LLP

<https://danielinocente.com/project/moon-village/>

## Some Real Settlement Design Activities (Cont'd)

- BetaSpace: Biomanufacturing and Sustainable Technologies for Earth and Space | John Cumbers, SynBioBeta
- Connecting the Corporate Off-World by developing partnerships with the Space Industry | Chantelle Baier, 4Space, LLC
- Self-Replicating Machines are the only means through which to spread through the Solar System | Alex Ellery, Carleton University
- Entrepreneurial Firms and the Transformation of Lunar and Martian Spaces to Commercial Ones | Saikat Chaudhuri, University of California at Berkeley and Raja Roy, New Jersey Institute of Technology
- NASA's Exploration and Development of Space Narrative | Mark Craig, Space Attraction Consultant and retired NASA Senior Executive