Overby Industries

An Ethical, Zero-Waste Roadmap to Sustainable Space Industry

Metals. Stone. Plastics. Fuels. Everything humanity needs — gathered beyond Earth responsibly and sustainably.

Overby Industries is committed to building the resources backbone of a solar system economy without repeating the environmental damage caused by terrestrial extraction.

Through reusable shuttlecraft (**Starlifter II**), autonomous miner/refinery pods, and distributed In-Situ Resource Utilization (ISRU) systems, we will deliver **metals, aggregates, plastics, and fuels** for space construction and expansion — with **zero debris, zero waste**.

Mission: To become the **ethical steward** of humanity's industrial expansion into space.

The Problem

- Earth's industrial extraction is environmentally destructive and limited by finite resources.

- Current space infrastructure costs are dominated by the mass of materials launched from Earth.

- Space mining proposals risk repeating the same mistakes unless **sustainability and reclamation** are designed in from the start.

The Vision

Overby Industries will:

- Extract metals from **M-class asteroids** (nickel, iron, PGMs).

- Manufacture **Ultra High-Performance Concrete (UHPC)** and basalt composites from silicate-rich asteroids and lunar regolith.

- Establish a **Titan Moon Base** for hydrocarbons → plastics, polymers, and fuels.

- Provide **propellants** (H_2/O_2/CH_4) cracked from asteroid ice and CO_2.

✅ All operations operate under a **Zero-Pollution, Zero-Waste Certification.**

✅ Every residue (dust, slag, rock) is repurposed → shielding, bricks, aggregates.

Core Technologies

Starlifter II Shuttle

- Fully reusable runway-landing spacecraft.

- Hybrid propulsion:

  - **Ion thrusters** (in space + Air-Breathing Electric Propulsion in atmosphere).

  - **Lorentz rail accelerators** (boost maneuvers).

  - **MHD solar-wind dynamo** for power & thrust.

- **Ionic liquids** serve as propellant, electrolyte, and *internal thermal shielding* during reentry.

Autonomous Miner/Refinery Pods

- Anchored drill rigs + **expandable containment bag systems** (based on NASA ARM concepts).

- Zero-dust excavation.

- In-situ refining: ingots, volatiles captured, slag→ building materials.

Power Systems

- **Magnetohydrodynamic (MHD) reactor cores.**

- **Graphene supercapacitors** for burst thrust.

- **Aluminum-ion & ionic liquid batteries** for safe, flame-proof energy storage.

- **Solar wind particle capture** → "endless trickle power."

ISRU Output Streams

- **Metals:** Nickel, iron, PGMs.

- **Aggregates:** Silicates → UHPC, basalt fiber composites.

- **Polymers:** Titan methane/ethane → plastics.

- **Fuels:** O_2, H_2, CH_4 → for depots & propulsion.

Ethical & Environmental Stewardship

Overby Industries sets the **Space Zero-Waste Standard**:

- **Containment-first mining:** no dust, no orbital debris.

- **Reclamation Mode:** every miner pod compacts residual material.

- **Closed-loop ISRU cycles:** nothing is left behind.

- **Transparency:** public certification of every mission.

> *"Humanity's future in space will be sustainable — or it will fail.*

> *Overby Industries ensures it will succeed."*

Roadmap Timeline

| Phase | Years | Milestones ||---|---|---|| Foundations | 2030–2040 | Starlifter prototypes, Miner Pod testbeds, NEA mining demo || Industrial Pilot | 2040–

2055 | Fleet of Starlifter II, lunar depots, first profitable asteroid resources || Expansion | 2055–2080 | UHPC structures in orbit, Mars staging post || Outer System | 2080–2100 | Titan Base, plastics and fuels economy || Civilization Scale | 2100+ | Full solar system closed-loop infrastructure, Overby Certification becomes global standard |

Market Opportunity

- **Trillions in metals** (Ni, Fe, PGMs).

- **Orbital construction boom**: stations, habitats, megastructures.

- **ISRU fuels in depots**: reduces launch costs dramatically.

- **Plastics and polymers from Titan**: off-Earth manufacturing supply chain.

Closing Statement

Overby Industries is not simply a mining company.

We are the **infrastructure backbone** for an interplanetary civilization.

Our operations will:

- Move polluting industry **away from Earth**.

- Create sustainable habitats **built from asteroids**.

- Fuel fleets with **resources drawn responsibly from Titan and beyond**.

Investing in Overby Industries means **investing in humanity's sustainable expansion into the cosmos.**

References

Asteroid Mining & Containment

- Johnson, L., et al. (2014). *Asteroid Redirect Mission: Concept Development.* AIAA SPACE Conference.

- NASA ARM Overview: https://www.nasa.gov/feature/asteroid-redirect-mission

Ion Propulsion & ABEP

- Rayman, M. D., et al. (2007). *Dawn: Exploring Vesta and Ceres.* Acta Astronautica.

- ESA (2018). *First Tests of Air-Breathing Electric Propulsion.* https://www.esa.int/...

Solar Wind Capture / Magnetosails

- Janhunen, P. (2006). *Electric Sail for Spacecraft Propulsion.* Journal of Propulsion and Power.

- NASA NIAC E-Sail Summary: https://www.nasa.gov/directorates/spacetech/niac

Ionic Liquids

- Lozano, P. C. (MIT, 2010). *Ionic Liquids in Electrospray Thrusters.* Progress in Propulsion Physics.

- Hayden, C. (2019). *Ionic Liquids for Space Applications.*

ISRU (Concrete, Fibers, Basalt)

- Stark, J., et al. (1998). *Basalt Fiber Reinforced Concrete for Lunar Construction.*

- Cesaretti, G., et al. (2014). *Lunar 3D Printing with Regolith.* Acta Astronautica.

Titan Hydrocarbons

- Stofan, E. R., et al. (2007). *The Lakes of Titan.* Nature.

- Lorenz, R. D. (2008). *Physics of Titan's Hydrocarbon Lakes.*

Reusable Shuttles

- Sierra Nevada Corp. *Dream Chaser Spaceplane*. https://www.sierranevcorp.com/space-exploration/dream-chaser-spaceplane/