

NSS ENVISIONED MILESTONES ON THE ROADMAP TO HUMAN SETTLEMENT OF SPACE

Based on what we know and can see now, the following are the major milestones that will be passed on the Road to Human Settlement Beyond the Earth.

Commercial Launch Purchase

Low launch costs will accompany an adequate launch market size with efficient vehicles with turnaround times measured in days, rather than weeks.

Legal Protection of Property Rights

National and/or international legislation will be enacted to provide prospective off-earth settlers with the security to make the necessary financial and personal risks.

Land Grants, Tax Credits, or other Economic Incentives

Will be provided to encourage private investment in off-earth settlements.

Technology for Self-Sufficiency

People will leave Earth with the technology and tools needed to settle, survive and prosper.

Space Power Systems

Space power systems will supply energy to Earth to supplement, and ultimately help replace, reliance on fossil fuels.

Extracting Extraterrestrial Resources for Space Industrialization

People will use the material resources available on the Moon, asteroids, comets and other worlds to support industrial manufacturing of products for use in space or on the Earth.

The milestones above will be passed enroute to the settlement of all destinations, the Moon, Mars, asteroids, O'Neill Habitats, and eventually the stars. The Roadmap will diverge somewhat based on the destination, with the following major milestones:

To the Moon:

Robotic Confirmation of Ice

Robots will determine if ice (water) is present in adequate quantity to support human activities.

Research Facility

Will be established to research human habitation and conduct lunar investigations. If appropriate, development, testing, equipment checkout and training for Mars mission may also be performed here.

Government/industry Base

The research facility will likely begin as a government base and evolve to an industry base with the beginning of commercial functions performed by the first longer-term residents.

Moon Settlement

Settlement will grow with the base as the commercial center.

To Mars:

Mission Goal for Settlement

Exploration will accelerate with the clear purpose of eventual settlement. "Flags and Footprints" will not be the objective.

Robotic Exploration

Will precede human explorers.

Mars Mission Testbeds

Development, testing, equipment checkout, and training for a human Mars mission will likely be performed close to home, on Earth, in Earth orbit, and/or on the Moon. The physical and psychological effects of a multi-year space mission will be studied close to home before sending humans such a great distance.

Human Explorers to Mars

Human explorers will follow robots to Mars either after field-testing on the Moon, in low Earth orbit, or directly from Earth. A base will be established.

Mars Settlement

Settlers will follow the explorers.

To Asteroids:

Robotic Exploration

Robots will identify the asteroids for settlement and development.

Asteroid/Comet Defense Measures

Based on information from ground observations and robotic exploration, humanity will develop plans, technologies, and spacecraft for defense against an asteroid or comet on a collision trajectory with Earth.

Human Explorers

Humans will follow robotic spacecraft to the asteroids to confirm and revise robotic information and to develop and test techniques for mining and moving asteroids and comets.

Asteroid Mining and Manipulation

Asteroids and comets will be mined for resources needed for space settlements. Those with trajectories intercepting Earth or space settlements will be moved into non-threatening orbits or otherwise rendered harmless.

Asteroid Settlement

Settlers will follow to those asteroids offering economic opportunity.

To O'Neill Habs:

Once settlers can leave the planet these "cities in space" will be built.

Ad Astra:

New Physics Propulsion

Will be developed to carry humans to the stars.