



INTRODUCTION

THE PURPOSE OF THIS BOOK

Dreams Becoming Reality

Although the Case for the Moon necessarily makes arguments for the Moon in comparison to Mars and elsewhere, it is not a case against any other destination. Indeed, the argument of this book is that we are entering a window of opportunity in which all these things will become possible. Specifically, the capability of the Starship fleet will make these visions possible within reasonable public and private budgets.

The dreams of space advocates are coming true. But for many, it seems hard to believe. But keep this book close at hand. As Starships dock and transfer propellant, as they land cargo on the Moon and eventually Mars thereby buying down the risk before sending crew, the vision described in this book will become increasingly close and still relevant. It may be that the capability of the Starship fleet will become unavoidably obvious or another country will start taking the lead by securing missions that utilize them. Either way, the relevant factors underlying the scenarios described in this book won't be denied forever. This remarkable vision is a choice. We would be stupid not to seize that opportunity sooner than later.

WHO IS THIS BOOK WRITTEN FOR?

Target Audiences

Because we are approaching a point where cheap access to space (CATS) is becoming a reality thanks to fully reusable heavy lift vehicles, a point is approaching where space policy makers will need to decide whether to take full advantage of this emerging capability. The whole vision including American leadership, worldwide inspiration, the historic prize to be seized, and indeed, the future of humanity on the Moon hinges on whether these decision makers recognize and take advantage of the opportunity.

A second target audience are those space advocates with some useful skills who would like to play their part in advancing the cause of space

development. Since crew will be settling down and residing in lunar habitats, the broad range of living begins to become relevant. Crew will be growing food, cooking, dancing in 1/6th gravity, producing metal parts, speaking various languages, driving surface vehicles, and so many other things. Most everyone can contribute voluntarily in some way. Chapter 39 describes how space advocates can join together for free in Zoom working groups to coordinate work in support of the effort to advance the vision of space development.

THE INNOVATIVE PLAN FOR SPACE DEVELOPMENT

In a Nutshell

The Innovative Plan described in this book envisions fully using the emerging reusable heavy lift vehicles with Starship being the leading example. After Artemis 3 it envisions an Initial Permanent Crew entering a horizontalized Starship (i.e. StarHab) and expanding the living space into the propellant tanks. While making history as the first humans to move indefinitely beyond Earth, further cargo Starships will deliver the beginnings of the International Lunar Base (ILB). As international astronauts arrive, they will be conducting missions of lunar exploration while expanding the ILB. As flight rates go up and the Base becomes more self-reliant, private individuals will begin to arrive resulting in true settlement.

A Realistic Vision

Plenty of books have been written laying out some far future vision. The High Frontier comes to mind with its vision of millions of people living in spinning colonies near the Moon and beyond. Yet 50 years later, we seem to be no closer to those visions.

This book is different. It attempts to be realistic in terms of what is not just possible but probable. It attempts to position itself between what will actually likely happen (the probable) and then what becomes possible given that capability.

For example, given the current reality (very successful Starship Flight 11) and the probable future (continued production of engines and Starship bodies) the probable future is one where a fleet of Starships becomes reality. Then, given that probable reality, what becomes possible when that fleet is used?

If 100+ metric tons of cargo can be delivered to the lunar surface per cargo ship launch then 100+ tonne inflatable habitats can be delivered to the lunar surface. Are inflatables habitats probable? Yes, three are in space now (Genesis 1, 2, and BEAM). Is there a leading company working on surface inflatable habitats? Not that I'm aware of. So, our identification of a possible development also identifies a needed company and hence identifies a task for space advocates to work on (contacting people who can establish such a company). It also identifies work that we as advocates can do to promote the vision (i.e. render an International Lunar Base composed of large inflatable hubs).

So, it is this space between the probable and the possible where this book describes.

The Innovative Plan is based upon four principles:

- Cost-effective
- Near-term tech
- Reasonable risk
- Remarkable outcomes

Cheap access to space accounts for most of the cost-effectiveness but recycling, ISRU, and competition between companies will contribute as well.

Near-term tech means new surface systems but nothing beyond what's already been done in other settings.

Reasonable risk means that we are not going to unnecessarily risk human life but, at the same time, we shouldn't settle down into a decades-long development program before establishing a permanent base on the Moon.

If you get anything from reading this book, it is that very remarkable outcomes are possible if we just choose to take advantage of the emerging capabilities, start developing surface systems that will be needed starting about 2030, and not allowing our space policy to be trapped by expensive programs lasting decades.

Evolution

This book also seeks to describe the modest, incremental, evolutionary process by which we go from the present to a truly grand vision. Every step is not only small but predictably likely.

For example, if countries are funding their companies to compete against each other to produce goods and services at an International Lunar Base, then will the price of those goods and services come down over time after the development costs have been amortized. From the perspective of time, economies of scale, and competition, it would seem inevitable. Contrarily, it would be odd if the prices didn't come down.

Then there will be a point where wealthy individuals could afford the next increment of a good or service. Again, that would seem inevitable. Then, as the scale of those goods and services increase, will their prices continue to decrease? Again, that seems inevitable. So, the transition from a governmental base to private settlement seems to be a natural probability if it is competing companies that provide those things in the first place. And so, this book promotes that specific approach. This is an example of how this book seeks to describe each step in the most probable way possible while guiding the decisions needed towards the greatest possible outcome.

COMPARING PLANS

The Traditional Plan

The Traditional Plan (or the plan of record) is NASA's current plan for lunar exploration. It is currently composed as follows:

- **Artemis 2** - Sept. 2026 - Crewed lunar flyby
- **Artemis 3** - Late 2027 - US returns to the Moon. Includes first woman
- **Artemis 4** - Sept. 2028 - Gateway module and second crewed return
- **Artemis 5** - March 2030 - Gateway module and third crewed return

It will use SLS and the Orion capsule for each mission and the Starship lander for Artemis 3 and Blue Origin's lander for Artemis 4 and 5.

At an estimated \$93 B spent up to Artemis 2 and an estimated \$16.4 billion total for Artemis 2-5, outcomes would include:

- A lunar flyby (repeat of Apollo 8)
- First woman on the Moon (maybe first person of color)
- Three lunar surface missions (repeat of Apollo surface missions)

The Innovative Plan

The Plan described in this book would instead spend the money on surface systems and lunar surface missions.

Surface Systems (Median AI estimates - for what it's worth)

\$500 M - Solar Drapes

\$900 M - Specialty hab (inflatable)

\$700 M - Robotic ice-harvesting vehicle

\$700 M - Life support systems

\$2,500 M - Agricultural systems

\$1,000 M - Modular surface vehicles

\$900 M - Specialty hab (inflatable)

\$7.2 B - Total

Flights and Flight Hardware

\$2,900 M - Modify Starship to be a StarHab

\$6,000 M - Six, Starship-only lunar missions

\$8.9 B - Total

\$16.1 B - GRAND TOTAL

The point is that the Innovative Plan, although achieving remarkable results, doesn't necessarily require increased spending. Indeed, no single surface system will cost as much to develop will have already been spent developing the reusable launch vehicles.

But the greater comparison is in the outcomes. Whereas the Traditional Plan results in a few government astronauts repeating Apollo by picking up more rocks and establishing a small, four-person outpost, the Innovative Plan described in this book results in a very large International Lunar Exploration Phase, International Base, and eventually private settlement. It is a choice whether we continue in the expensive, moderately inspiring current path or whether, within existing budgets, we instead seek to make history by laying the foundation for humans to start spreading beyond Earth.