



# **CYCLICAL VISITS TO MARS VIA ASTRONAUT HOTELS**

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**by**

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# *Cyclical Visits to Mars via Astrotels*

## **TOPICS**

- **MOTIVATION**
- **OVERVIEW**
- **SIGNIFICANCE**
- **SUMMARY**



# *Cyclical Visits to Mars via Astrotels*

## **CONCEPT MOTIVATION**



## ***Cyclical Visits to Mars via Astrotels***

# **CONCEPT MOTIVATION**

- **Create Permanent Elements of a Mars Transportation System**
- **Take Advantage of Natural Orbital Physics to Facilitate Mars Transportation**
- **Eliminate Need for New, Expensive Class of Rockets**
- **Offer Environmentally Safe Technology, Without Political Baggage, for Transportation to and From Mars**
- **Accelerate the Timeframe for Permanent Inhabitation of Mars**
- **Increase Reliance on *in situ* Resources for Mars Transportation Architecture**

# CONCEPT OVERVIEW



## ***Cyclical Visits to Mars via Astrotels***

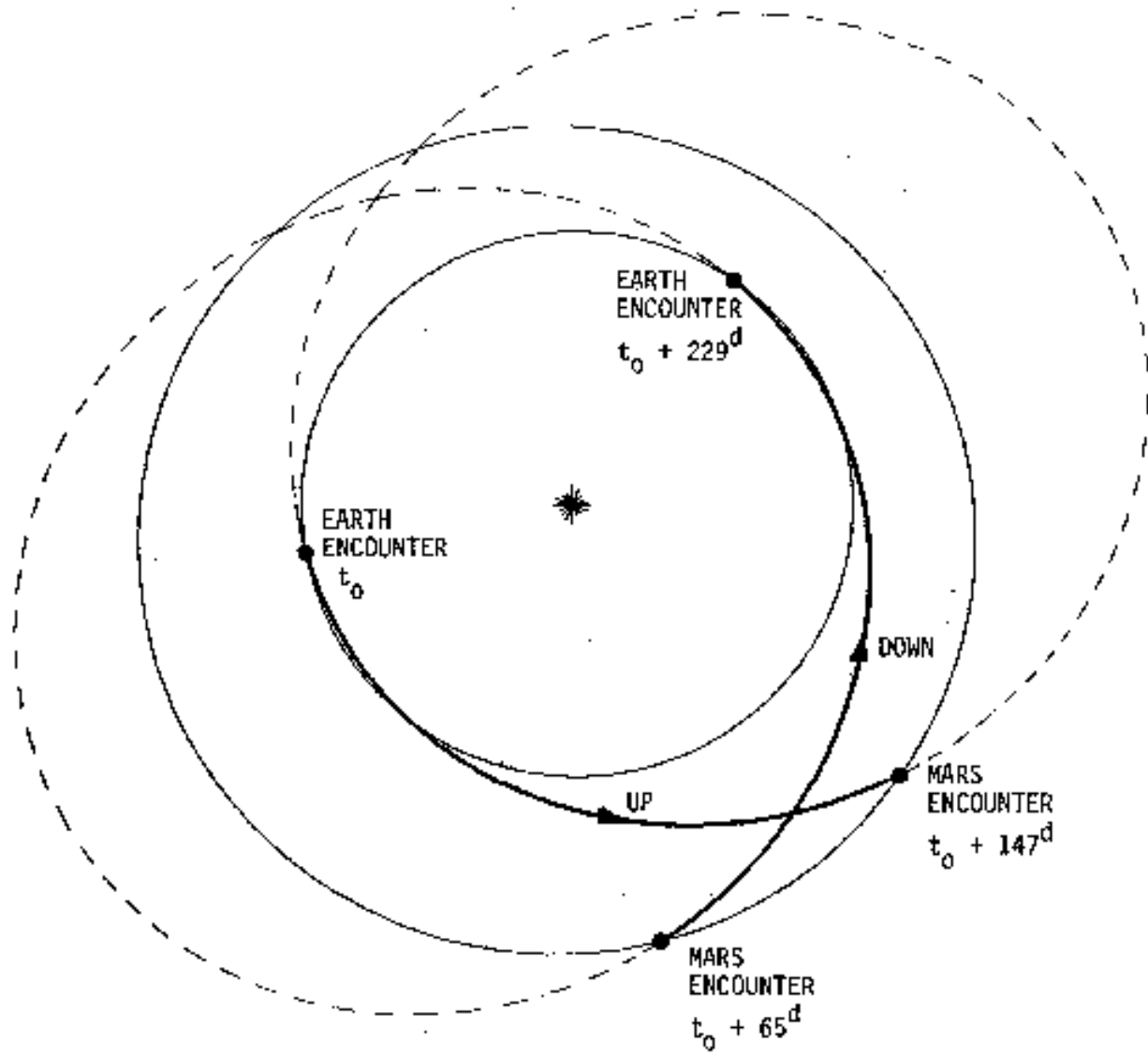
# **KEYS TO THE CONCEPT**

- **Cycler orbits between Earth and Mars that enable fast, frequent transfers between these planets**
- **Astronaut Hotels, or *Astrotels*, which are small transport vehicles capable of carrying 10 people on cycling orbits between planets**
- **Orbital Spaceports at the planets**
- **Very small, fast, hyperbolic transfer vehicles, or Taxis, between Spaceports and Astrotels.**
- **Propellant and life support *in situ* resource manufacturing plants**
- **Cargo vehicles that utilize low-energy, long-flighttime orbits to transport propellant and low value cargo to and from planets**
- **Shuttles to and from Spaceports and planetary surfaces**



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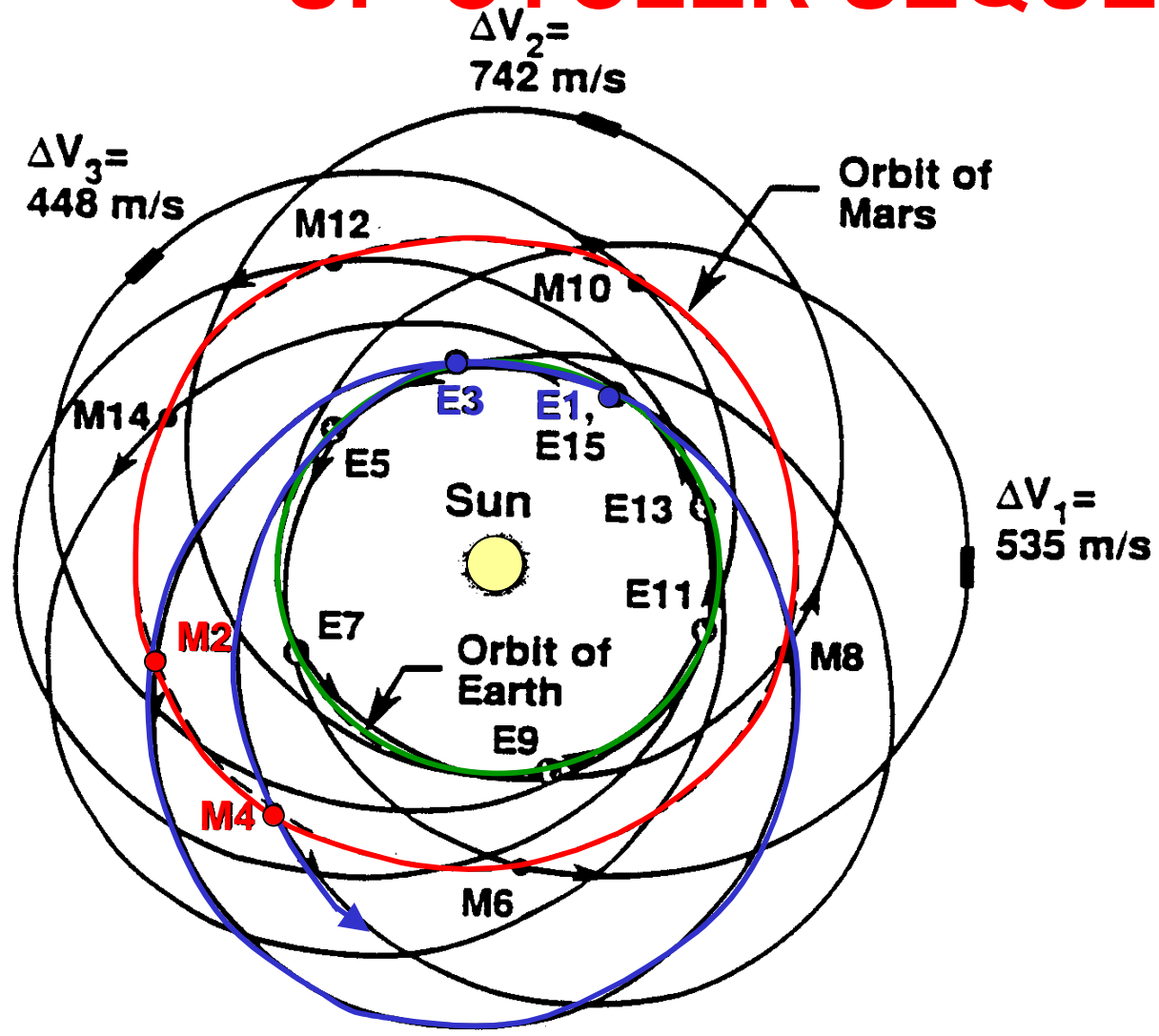
## ALDRIN CYCLERS



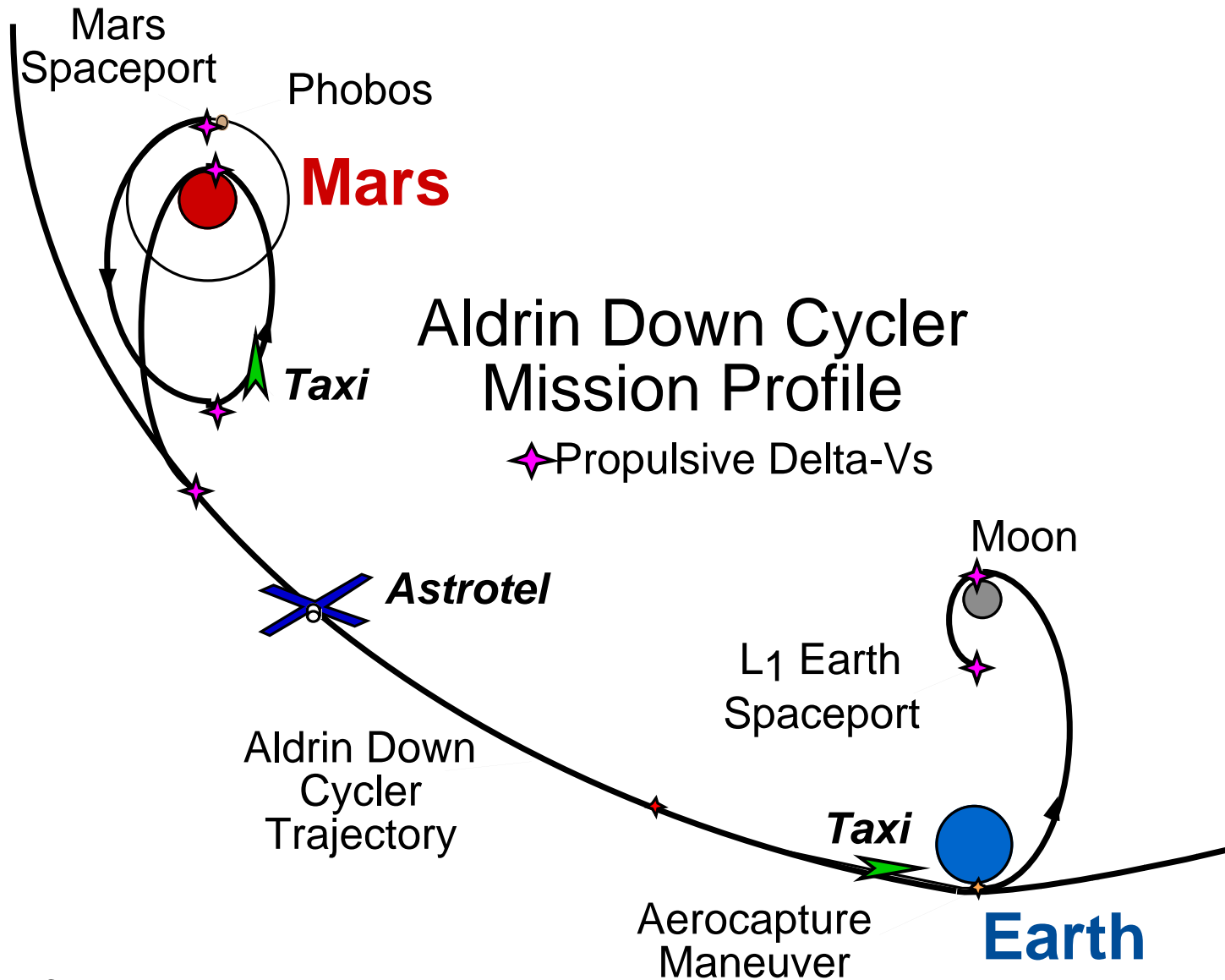
# Cyclical Visits to Mars via Astrotels

## EXAMPLE ALDRIN

### UP-CYCLER SEQUENCE



## DOWN ESCALATOR EXAMPLE

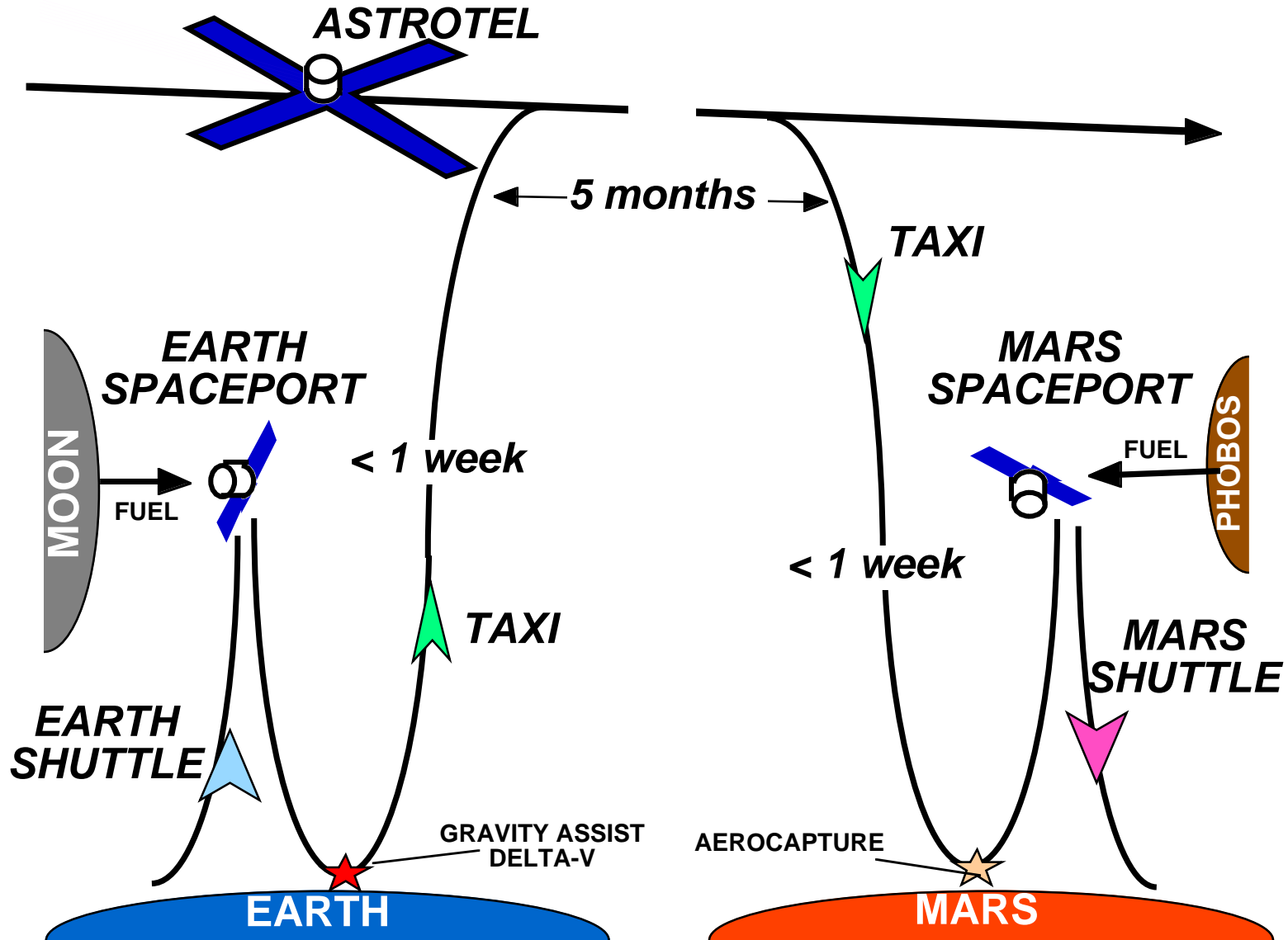


Aldrin Down Cycler Mission Profile

◆ Propulsive Delta-Vs

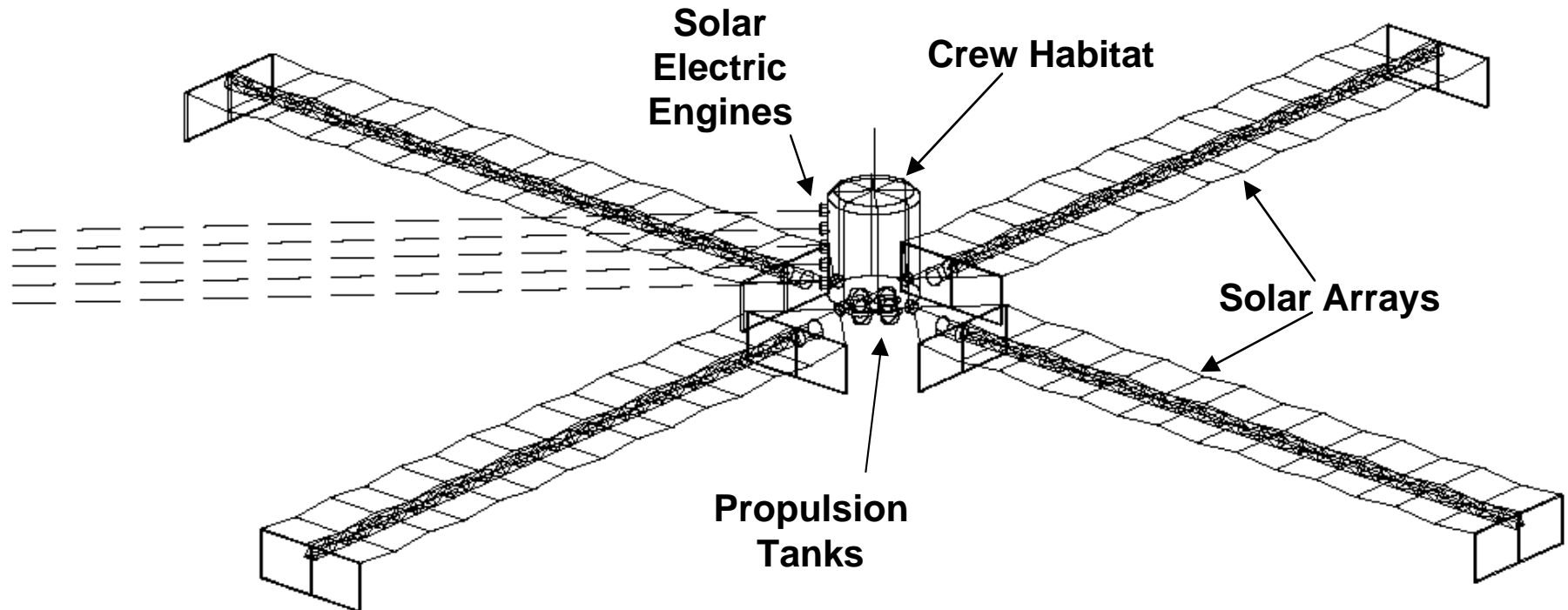
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## UP ESCALATOR EXAMPLE



## *Cyclical Visits to Mars via Astrotels*

# **ASTROTEL CONCEPT**



- In Cyclic Orbits Between Earth and Mars
- Solar Electric Propulsion for Orbit Corrections
- Untended for More Than 20 Out of 26 Months
- No Artificial Gravity

# **SIGNIFICANCE OF CONCEPT TO NASA**



## *Cyclical Visits to Mars via Astrotels*

# **SIGNIFICANCE OF CONCEPT TO NASA**

- **Facilitates Human Exploration to Mars and Beyond**
- **Assists the Expansion of Scientific Knowledge by Providing Ready Access to Mars by Scientists**
- **Provides Safe, Frequent and Affordable Access to Mars**
- **Creates a Significant Element of the Transportation Architecture Thus Contributing to the Establishment of a Permanent Human Presence on Mars**

# **SUMMARY OF CONCEPT OBJECTIVES**



## *Cyclical Visits to Mars via Astrotels*

# **SUMMARY OF CONCEPT OBJECTIVES**

- **Enable Low-cost, Frequent Access to Mars for Scientists and Explorers**
- **Develop System Concepts That Could Be Utilized in Expedition Phases of Mars Exploration**
- **Develop a Framework and Context for Future Technology Advance and Robotic Exploration**