

The Role of a Lunar Development Corporation in facilitating Commercial Partnerships in Lunar Exploration



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Returning to the Moon

- ◆ Several Nations are planning lunar mission
 - China, ESA, India, Japan, Russia, and the United States
- ◆ But going it alone is wasteful
 - Duplication of infrastructure
 - Duplication of space systems
 - Potential for a race mentality to develop compromising science research



Is there a better way?

Yes, by Fulfilling the Promise of Apollo 11

- ◆ Although it was a race the Plaque on Apollo 11 proudly proclaimed “We came in Peace for all Mankind”
- ◆ Now its time to fulfill that promise by humanity returning to the Moon together.



How?

By Creating a Dedicated Multinational
Organization to Organize and Coordinate it

**The
International Lunar
Development Corporation
(ILDC)**

Base on models of previous examples of Multinational Cooperation in Space and Science

- ◆ International Geophysical Year
- ◆ International Space Station
- ◆ IntelSat
- ◆ European Space Agency

While Applying Lessons Learned

- ◆ Need for simplified decision structure
- ◆ Elimination of dependence on a single nation
- ◆ Allow flexibility in cooperation
- ◆ Leverage the potential of commercial firms and private investment

Advantages of the ILDC model

- ◆ Elimination of duplication of effort
- ◆ Moves decision making and planning beyond annual national budget cycles
- ◆ Provides a means to integrate government spending and private investment towards common objectives
- ◆ Opens the prospect of lunar exploration to all nations

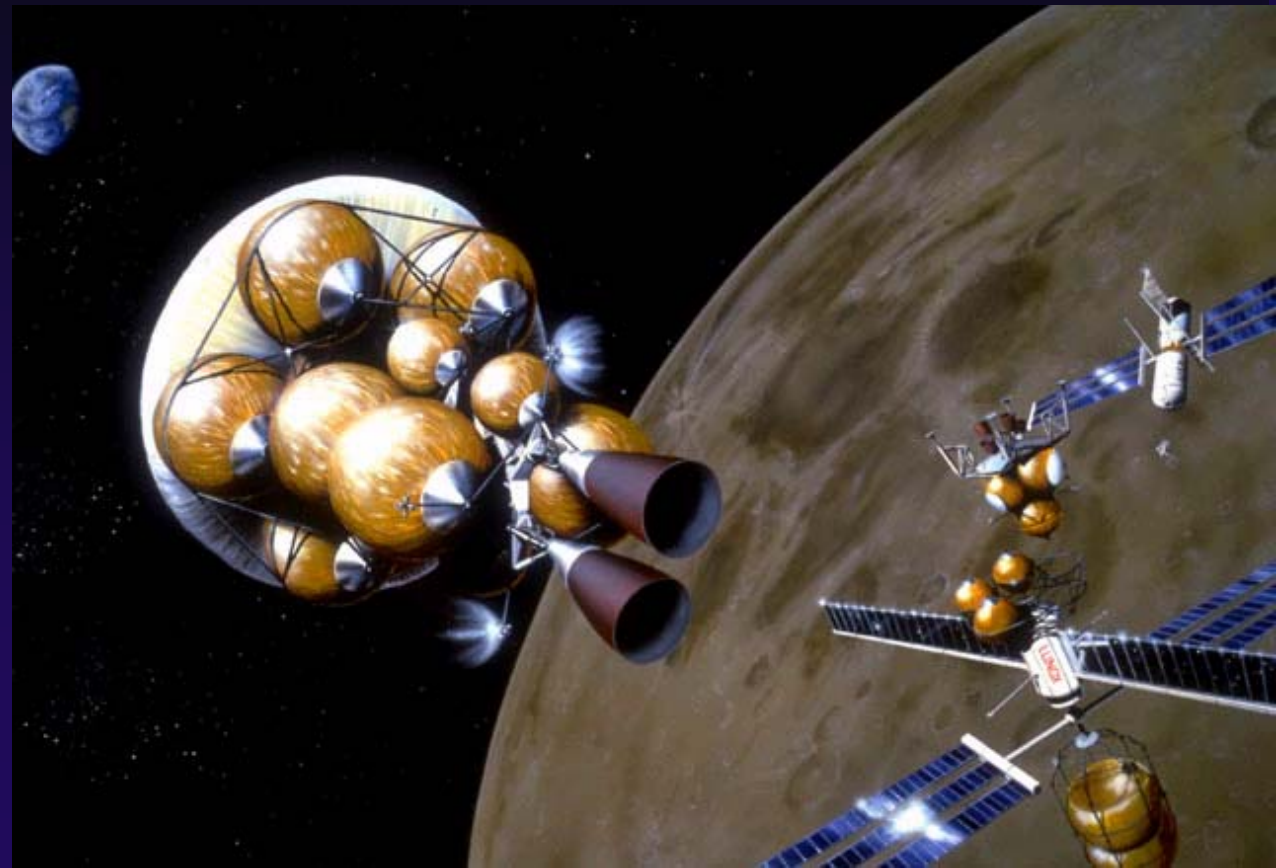
The International Lunar Development Corporation

- ◆ A Multinational Organization
 - Any nation may join as with IntelSat
- ◆ Focus on lunar exploration, mapping and infrastructure development, not profits
 - Allows nations to pool funding
 - Focus on common use infrastructure needs
- ◆ Provides a single entity for funding and management.
 - More efficient decision making and planning
 - More efficient procurement

Early Infrastructure Projects

- ◆ Lunar Communication System
- ◆ Lunar Navigation System

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Lunar Communication System

- ◆ Communication Relay Satellites in EM L1 & L2 Halo Orbit
- ◆ Provides reliable 24/7 communications to any point on the lunar surface
 - Eliminates radio blackout on the lunar farside
- ◆ Commercial Opportunity
 - Outsource to private firm
 - Private investment feasible if ILDC is anchor customer

Lunar Communication System

- ◆ Reduces risk to spacecraft in Lunar Orbit
 - Recent LCross thruster malfunction would have been handled earlier
- ◆ Enables broadband communication to Earth
 - Increase science return
- ◆ Facilitate robotic missions to the lunar farside
 - Opportunities for new discoveries

Lunar Navigation System

- ◆ Navigation is difficult on the lunar surface
 - Lack of land marks
 - Distance difficult to judge
- ◆ Allows
 - Reduce risk when exploring the lunar surface
 - More efficient use of rovers
 - Enables better identification of research locations



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Lunar Navigation System

- ◆ Potential to out source to private firm
 - Possible private investment if ILDC is anchor customer
- ◆ Reduces risks associated with lunar exploration

Later Infrastructure Projects

- ◆ EM L1 Gateport Station
- ◆ EM L1 Fuel Depot
- ◆ Ferry service to lunar surface for EM L-1
- ◆ International Lunar Base

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ILDC Exploration Missions

- ◆ Series of surface rover missions
- ◆ Standardize lander and rover designs
- ◆ Experiment slots for ILDC members
- ◆ Would allow even small nations a chance for lunar research

Avoids International Competition

- ◆ Nations have a means of working together
- ◆ Even the small nations may join in
- ◆ Provides opportunities for commercial outsourcing
- ◆ Creates a new sustainable model to replace the “Apollo model” (single nation approach) for a lunar return

Summary: Apollo Model vs ILDC Model

Single Nation

- ◆ Competition drives decisions
- ◆ Short Visits
- ◆ Unsustainable due to waste from duplication
- ◆ Output basically national prestige, science is secondary

ILDC Approach

- ◆ Cooperation enables better decision making
- ◆ Permanent Presence
- ◆ Economically sustainable due to specialization
- ◆ Output permanent *infrastructure* for long term science research

An Antarctic Analogy

Amundsen vs Scott

- ◆ Competition resulted in
 - Limited science
 - Focus on geopolitical goals
 - Limited to highly trained non-scientists
 - No surface return to the South Pole until 1956

Network of Research Stations

- ◆ Result of IGY Cooperation
 - Focus on science
 - Permanent presence on continent since 1956
 - Hundreds of visiting scientists annually

Antarctic Analogy Continued

- ◆ Infrastructure created enables commercial activities
 - 21,622 tourists visited Antarctica in 2009-2010
 - ILDC will also lower cost for commercial missions
 - Resource develop
 - ISRU experimentation

The First Step on the Journey...

A Dedicated ILDC Conference

◆ **Invite**

- Key leaders of lunar science
- Key leaders of national space agencies
- Key leaders of the global space industry
- Key experts in International NGOs and Space Policy

◆ **Objective**

- A road map to creating the ILDC
- A charter for the ILDC

Questions?

