LEGAL IMPLICATIONS: ACCESSING SPACE RESOURCES

• NATIONAL
  – FEDERAL LAW
  – STATE LAW
  – REGULATIONS

• INTERNATIONAL
  – CUSTOMARY LAW
  – TREATY LAW
  – SPACE LAW

• WEIGHT OF LEGAL IMPLICATIONS
  – DEPENDS ON MANAGEMENT CONTROL SYSTEM CHOSEN
“PURE” MANAGEMENT CONTROL COMPONENTS: LARGE ENTERPRISES

PRIVATE

- Trans-Alaska Pipeline
- Satcom Companies
- East India Co.
- Hudson Bay Co.
- Transcontinental Railroads
- Interlune-Intermars, Inc.
- Space Development Corp.
- Luna Corp., etc.

PRIVATE+

- Original Comsat Corp.
- United Space Alliance (Space Shuttle)
- Interlune-Intermars, Inc.
- Space Development Corp.
- Luna Corp., etc.

PRIVATE+

- Original Aircraft Industry

MIRCORP

EUROTUNNEL

INTERNATIONAL SPACE STATION

INTERNATIONAL

INTERLUNE*

INMARSAT*

INTELSAT*

Law of the Sea Regime

Blue = Space Enterprise
Green = Comparable Modern Financial Challenge
Italics = Proposed or Not Yet Stable Space Enterprises

* = Proportionate Use Vote

National

Interstate Highways

Apollo Skylab

Antarctic Regime

International

Santa Maria” Inc.
<table>
<thead>
<tr>
<th>APPROACH</th>
<th>EXAMPLE</th>
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<tbody>
<tr>
<td>• ALL U.S. GOVERNMENT</td>
<td>• APOLLO</td>
</tr>
<tr>
<td>• INTERNATIONAL, ONE NATION / ONE VOTE (NOT EVALUATED)</td>
<td>• UN AGENCIES / LAW OF THE SEA REGIME</td>
</tr>
<tr>
<td>• MULTILATERAL CONSENSUS MODEL</td>
<td>• INTERNATIONAL SPACE STATION / ANTARCTIC REGIME</td>
</tr>
<tr>
<td>• MULTILATERAL PROPORTIONATE USE VOTING</td>
<td>• INTELSAT / INMARSAT</td>
</tr>
<tr>
<td>• PRIVATE / GOVERNMENT PARTNERSHIP</td>
<td>• MODERN AIRLINE INDUSTRY / U.S. AGRICULTURE</td>
</tr>
<tr>
<td>• PRIVATE + GOVERNMENT R&amp;D</td>
<td>• PRE-1958 AIRCRAFT INDUSTRY</td>
</tr>
<tr>
<td>• ALL PRIVATE</td>
<td>• TRANS-ALASKA PIPELINE</td>
</tr>
</tbody>
</table>
MANAGEMENT CONTROL SYSTEM: RELATIVE PRIORITIES - 1

- **ALL GOVERNMENT OR GOVERNMENT / PRIVATE PARTNERSHIP**
  - **U.S. POLITICAL ENVIRONMENT**
  - **SPACE LAW ENVIRONMENT**
  - **MANAGERIAL CONTROL ENVIRONMENT**
  - **FINANCIAL AND TECHNICAL FEASIBILITY**
    - **BUDGETARY COMMITMENT**
    - **TECHNICAL MATURITY**
  - **REGULATORY ENVIRONMENT**
MANAGEMENT CONTROL SYSTEM: RELATIVE PRIORITIES - 2

• INTERNATIONAL
  – SPACE LAW ENVIRONMENT
    • MANAGERIAL CONTROL ENVIRONMENT
      – CONTRACT DISPERSION
    – U.S. POLITICAL ENVIRONMENT
      • BUDGETARY COMMITMENT
    – TECHNICAL FEASIBILITY
      – FINANCIAL FEASIBILITY
MANAGEMENT CONTROL SYSTEM: RELATIVE PRIORITIES - 3

• MULTILATERAL (INTELSAT)
  – PROPORTIONATE USE VOTING SYSTEM
    • SPACE LAW ENVIRONMENT
    • MANAGERIAL FREEDOM
  – FINANCIAL AND TECHNICAL FEASIBILITY
    • RETURN ON INVESTMENT ?
    • TECHNICAL MATURITY
  – U.S. POLITICAL ENVIRONMENT
    • BUDGETARY COMMITMENT
MANAGEMENT CONTROL SYSTEM: RELATIVE PRIORITIES - 4

- **ALL PRIVATE**
  - FINANCIAL AND TECHNICAL FEASIBILITY
    - RETURN ON INVESTMENT
    - TECHNICAL MATURITY
  - MANAGERIAL FREEDOM
  - REGULATORY ENVIRONMENT
  - SPACE LAW ENVIRONMENT
  - U.S. POLITICAL ENVIRONMENT
SEMI-QUANTITATIVE EVALUATION OF MANAGEMENT APPROACHES: FINANCING ISSUES

- MINIMUM TOTAL START-UP CAPITAL REQUIRED
  - FIRST HE-3 DELIVERY TO FIRST ON-LINE FUSION POWER PLANT
- MINIMUM TAX REVENUES REQUIRED
- MINIMUM PRIVATE CAPITAL REQUIRED
- #MINIMUM COST OF CAPITAL / INTEREST ON NATIONAL DEBT
- *MAXIMUM FINANCING FEASIBILITY
- LEAST REGULATORY COSTS
- *MINIMUM OPERATING COSTS
- *MAXIMUM RETURN ON INVESTMENT
  - FOR GOVERNMENT: SPINOFFS, LOWER POWER COSTS, REDUCED IMPORTS, ENVIRONMENTAL BENEFITS
- *MAXIMUM STAYING POWER

# WEIGHTING FACTOR OF 2
* WEIGHTING FACTOR OF 3

SCHMITT, 1998, SPACE 98, ASCE
SEMI-QUANTITATIVE EVALUATION OF MANAGEMENT APPROACHES: MANAGERIAL ISSUES

- MINIMUM COMPLEXITY OF MANAGEMENT
- #MINIMUM COMPLEXITY OF OPERATIONS
- ACCESS TO LARGEST TECHNICAL BASE
- #QUALITY IN PLANNING
- #QUALITY IN RDT&E
- #QUALITY IN PRODUCTION
- #QUALITY IN OPERATIONS
- QUALITY IN MARKETING AND SALES
- QUALITY IN PRODUCT DISTRIBUTION
- *MAXIMUM SALES MARGINS
- #QUALITY IN FINANCIAL CONTROLS
- #QUALITY OF WORK FORCE
- *MOTIVATION OF WORK FORCE

# WEIGHTING FACTOR OF 2
* WEIGHTING FACTOR OF 3

SCHMITT, 1998, SPACE 98, ASCE
SEMI-QUANTITATIVE EVALUATION OF MANAGEMENT APPROACHES: EXTERNAL ISSUES

- *MAXIMUM ENVIRONMENTAL PROTECTION
- MAXIMUM POTENTIAL FOR TECHNOLOGY SPINOFF
- #MAXIMUM BENEFIT TO OVERALL U.S. ECONOMY
- *MAXIMUM BENEFIT TO PEOPLE IN DEVELOPING NATIONS
- #MAXIMUM POTENTIAL FOR SPACE SETTLEMENT

# WEIGHTING FACTOR OF 2
* WEIGHTING FACTOR OF 3

SCHMITT, 1998, SPACE 98, ASCE
SEMI-QUANTITATIVE EVALUATION OF MANAGEMENT APPROACHES

SCHMITT, 1998, SPACE 98, ASCE
INTERNATIONAL LAW: GENERAL - 1

• WHAT COUNTS AS INTERNATIONAL LAW?
  – LAW OF PRESENT INTERNATIONAL POLITICAL SYSTEM "GOVERNING" THE COEXISTENCE OF NATIONS
    • BODY OF PRINCIPLES
    • RULES
    • INSTITUTIONS
    • PROCEDURES AND PRECEDENTS
    • BENEFITS

• WHAT ARE ITS POTENTIAL ADVANTAGES?
  – REGULATION OF RELATIONS
  – PREDICTABILITY OF INTERACTIONS
  – RESOLUTION OF DISPUTES
• DOES INTERNATIONAL LAW WORK?
  – MOST STATES COMPLY WITH MOST OF THE TIME.

• SOURCES
  – TREATIES OR FORMAL AGREEMENTS
  – INTERNATIONAL CUSTOMARY LAW
  – GENERAL PRINCIPLES OF LAW RECOGNIZED BY MOST MAJOR NATIONAL LEGAL SYSTEMS

• TREATIES AND AGREEMENTS
  – MOST IMPORTANT COMPONENT OF INTERNATIONAL LAW
  – LEGALLY BINDING ONLY ON THOSE WHO EXPRESSLY RATIFY
    • INTERNATIONAL PRESSURES CAN BE APPLIED
  – MAY REQUIRE MINIMUM NUMBER TO "ENTER INTO FORCE"
  – "RESERVATIONS" RELATED TO PARTICULAR PROVISIONS MAY BE TAKEN BY INDIVIDUAL STATES
CUSTOMARY LAW

- WIDESPREAD PRACTICE OR COMMON TO MOST LEGAL SYSTEMS
- "RULE" FOLLOWED AS BINDING OVER TIME RATHER THAN CONVENIENT
TERRESTRIAL MINING LAW: GENERAL -1

• NATIONAL SYSTEMS PREDOMINATE

• ALL "INTERNATIONAL" MINING LAW DERIVES FROM NATIONAL LAW.

• ALTERNATIVE SITUATIONS FOR A PROSPECTIVE MINER:
  – OWNS LAND AND MINERAL RIGHTS
  – OWNS ONLY THE MINERAL RIGHTS
  – LEASES MINERAL RIGHTS FROM OWNER
  – EMPLOYED BY "STATE" OWNER

• PUBLIC OWNERSHIP OF MINERAL BEARING LANDS
  – ROOTS IN "SOVEREIGN" RIGHTS, I.E., THE RIGHTS OF THE CROWN.
TERRESTRIAL MINING LAW:
GENERAL -2

• ACCESS TO PUBLIC MINERAL RIGHTS:
  – MINING CLAIMS SYSTEM (MINER HAS TITLE TO MINERALS)

• CURRENT SPACE LAW
  – CONCESSION OR LEASING SYSTEM (STATE HAS TITLE TO MINERALS)
  – STATE PRODUCTION
  – STATE-PRIVATE PARTNERSHIPS
  – STATE MANAGED CONTRACTS WITH PRIVATE ENTITIES

• REGULATORY CONTROL MAY BE (AND USUALLY IS) EXERTED BY THE STATE
  – LAUNCH LICENSES
  – COMMUNICATION LICENSES
  – RETURN PAYLOAD LICENSES
  – ENVIRONMENTAL IMPACT STATEMENT

Figure 13-1 A, Mineral Resources, Economics and the Environment, S.E. Kesler, Macmillan
TERRESTRIAL MINING LAW: HISTORY - 1

• UNITED STATES*

  – PRIVATE ENTERPRISE UNDER REGULATORY FRAMEWORK
    • GENERAL MINING LAW OF 1872 LARGELY MODIFIED BY MODERN ENVIRONMENTAL REGULATIONS

  – CLAIMS SYSTEM (METALLIC AND NON-METALLIC MINERALS)

  – BIDDING / LEASING SYSTEM (FOSSIL FUELS)

NO EFFECTIVE NATIONAL MINERALS POLICY EXCEPT DURING WAR-TIME (WW II AND KOREA)

STRATEGIC MATERIALS "POLICY" DRIVEN BY THE INTERNATIONAL MARKETPLACE AND DOMESTIC POLITICS

STRATEGIC STOCKPILE NO LONGER A PRIORITY ISSUE (EVEN THOUGH, AS A MARITIME NATION, IT PROBABLY SHOULD BE)

*SEE <http://www.cnie.org/nle/mine-1.html> FOR DETAILS
• SOVIET UNION / RUSSIA

  - ORIGINAL OBJECTIVES OF STATE PRODUCTION
    • SELF-SUFFICIENCY
    • ECONOMIC BASE FOR SETTLEMENT OF SIBERIA
    • FOREIGN EXCHANGE

  - CURRENT OBJECTIVES OF STATE-PRIVATE PARTNERSHIPS
    • FOREIGN EXCHANGE
    • CRIMINAL AND / OR POLITICAL CONTROL
    • RE-EMERGENCE OF NATIONALISM
TERRESTRIAL MINING LAW: HISTORY - 3

- **CHINA**
  - STATE PRODUCTION THROUGH MILITARY SUBDIVISIONS
    - WARLORD TRADITION
  - STATE EMPHASIS ON INDUSTRIAL AND ENERGY SUPPLY GROWTH
  - SOME TRANSITION TO CONCESSION SYSTEM?

- **JAPAN**
  - "PRIVATE" ENTERPRISE WITH CLOSE STATE COOPERATION / INFLUENCE
  - DEPENDENT ON IMPORTS FROM FOREIGN PRODUCERS OR FROM CONCESSIONS IN FOREIGN LANDS
TERRESTRIAL MINING LAW: HISTORY - 4

• WESTERN EUROPE
  – SPECTRUM OF APPROACHES
    • UNITED KINGDOM: MIX BETWEEN U.S. AND JAPAN
    • FRANCE: SIMILAR TO JAPAN
    • NORWAY: PRIVATE INTERNALLY / CONCESSIONS IN THE OFF-SHORE
    • SWEDEN: STATE-PRIVATE PARTNERSHIPS

• THIRD / FOURTH WORLD NATIONS
  – LARGELY CONCESSIONS TO PRIVATE OR FOREIGN STATE-RUN ENTITIES
TERRESTRIAL MINING LAW: IMPLICATIONS IN AN INTERNATIONAL REGIME

• A FUTURE NEGOTIATED SYSTEM MAY NOT HAVE A ROLE FOR PRIVATE ENTERPRISE
  – ALL RESOURCE ACTIVITY MAY BE UNDERTAKEN BY THE INTERNATIONAL ENTITY

• IF PRIVATE ENTERPRISE HAS A ROLE, IT MAY BE WITH A:
  – COMPETITIVELY BID CONCESSION, WITH PAYMENT OF RENT AND/OR ROYALTIES,
  – NON-COMPETITIVE CONCESSION, OR
  – CONTRACT TO WORK FOR THE INTERNATIONAL ENTITY.
## Chronology of International Agreements Relevant to Space

### Earth
- **Antarctic Treaty**
  - 1959

### Space
- **Intelsat Agreement**
  - 1964
- **Outer Space Treaty**
  - 1967
- **Rescue/Return of Astronauts, Etc.**
  - 1968
- **Liability for Damage in Space**
  - 1972
- **Registration of Objects Launched**
  - 1975
- **Immarsat Agreement**
  - 1976
- **Moon Agreement**
  - 1979
- **Space Station Agreement**
  - 1988

### Law of the Sea
- **Law of the Sea Convention**
  - 1982

### Antarctic Mineral Resources Convention
- 1988

### Antarctic Environment Protocol
- 1991

### Rio Environmental Agreements
- 1992

### Law of the Sea Re-Negotiated “Agreement”
- 1994

### Kyoto Agreement
- 1997

**Italics** - Not ratified by U.S.

**Red** - Only space treaty directly relevant to resources.