

1 GWe “Oil Well” on the Moon

The Jamestown Group
of High Frontier

Klaus P. Heiss
LEAG October 3rd 2007

Commodities from the Moon:

“Zero Mass & Speed of Light”

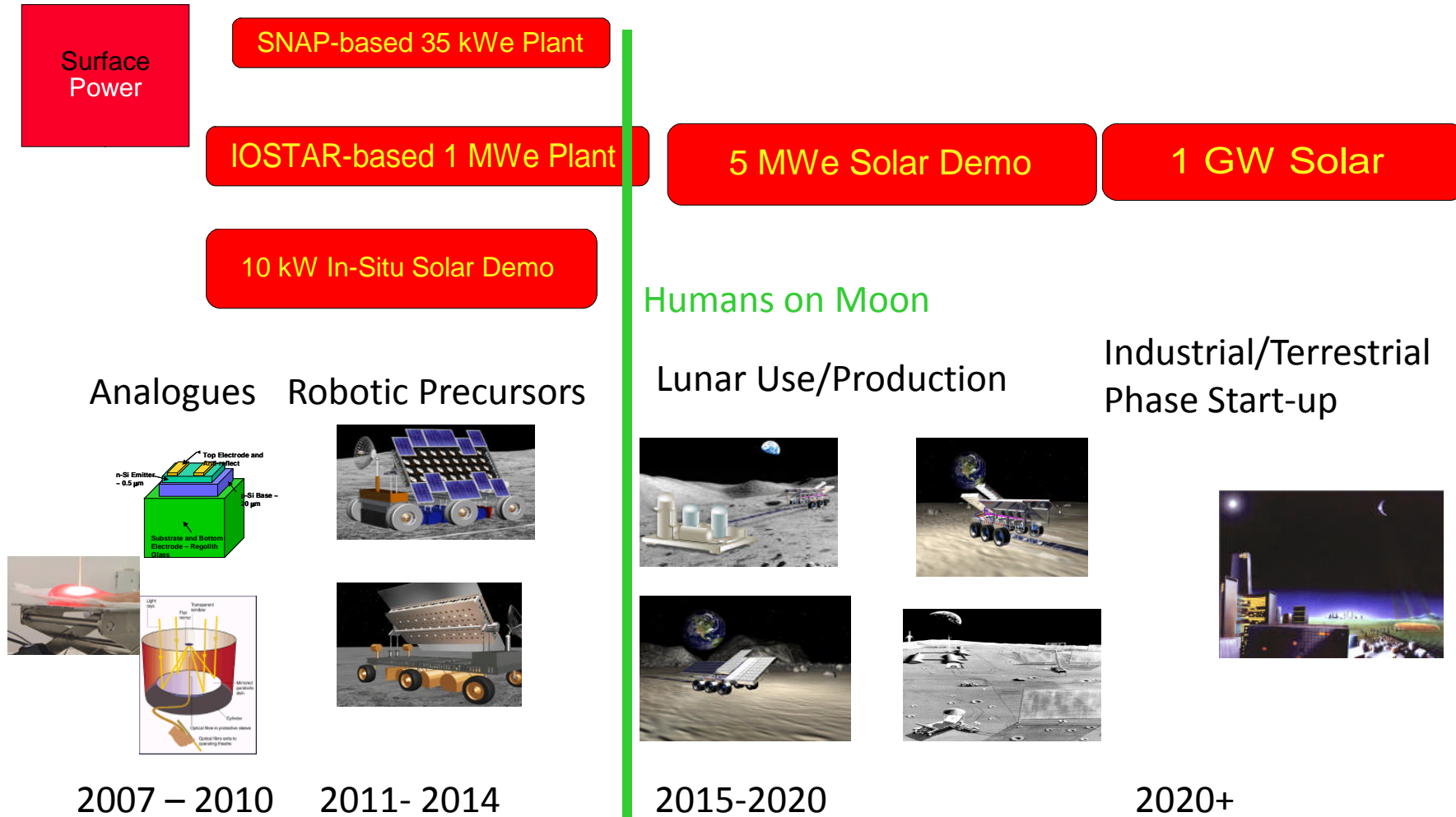
- **Information : 40%+ of economies**
 - **Communications**
 - C-Band, Ku-Band, LEO-HEO-GEO, Routers, IP
 - GPS, Navigation
 - Data Servers, Archives
 - Fifth Node
 - **Observations**
 - Earth Resources, Environment,
 - Weather, Climate
 - Solar System, Milky Way, Galaxy
- **Energy: Enabling Resource**
 - **Solar:** Lunar SP, SPS
 - **Nuclear:** Fission, Fusion, He3

Opportunities

- Communications: 2009 -
 - Early Claim/Deployment on Lunar Surface
 - Digital Human Heritage Archive “Alexandria”
 - Com/Nav Services for all Moon Users
- Observations / Condominium: 2010 -
 - Early Sun Observations Instruments Deployment
 - Lunar Cosmic Rays Water Observatory (2015-)
- Energy: 1 GWe by 2020 (2015-2020)
 - Solar Energy Technology RDT&E Missions
 - Energy for Lunar Applications/Operations
 - Moon to Earth, Moon to Geo Applications

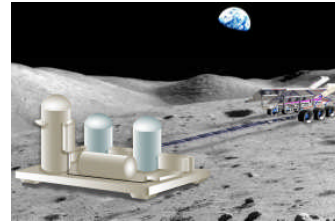
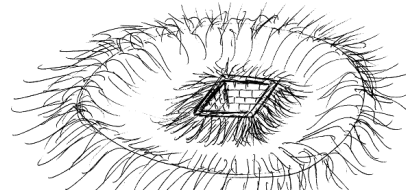
Toward A 1 GWe “Oil Well on the Moon”

A Market Financed RDT&E Decadal Effort

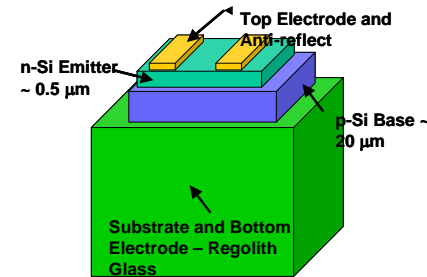
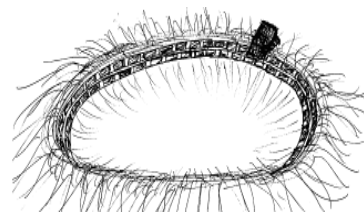
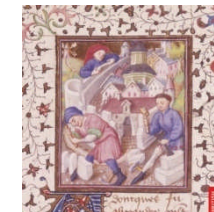
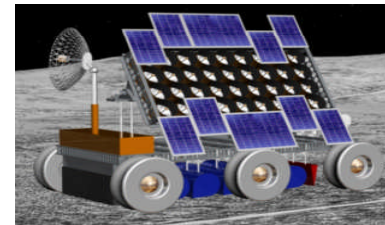
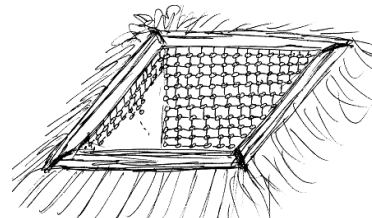
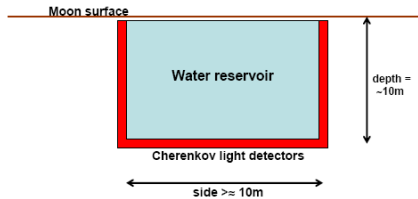


“Water Observatory”:

A Unifying Early ISRU Demonstration Driven by Non-Aerospace Applications/Users



Lunar facility for HE gamma rays and HE Cosmic Rays
(surface > ~100m² modules)

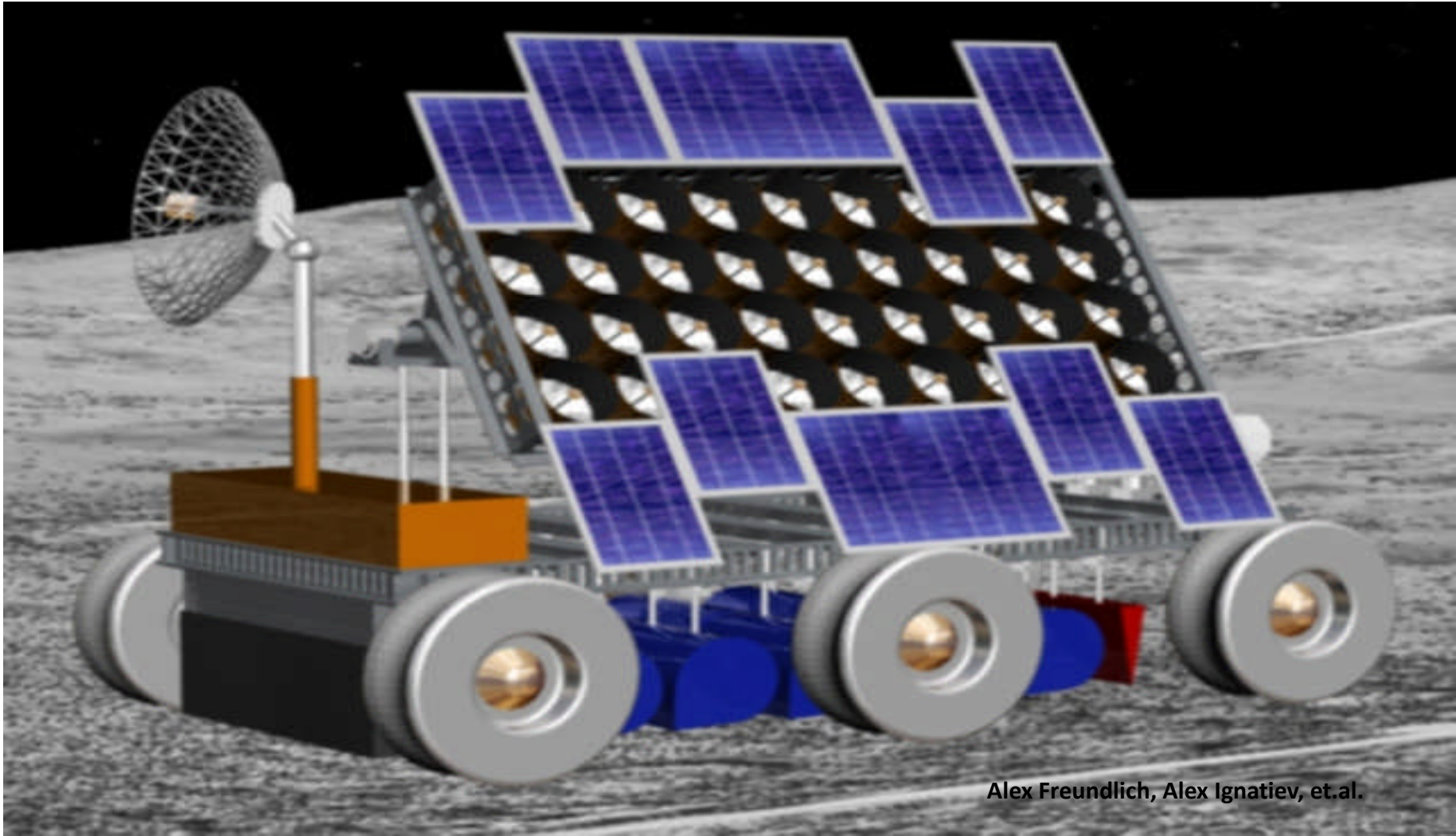


Mining Construction Engineering

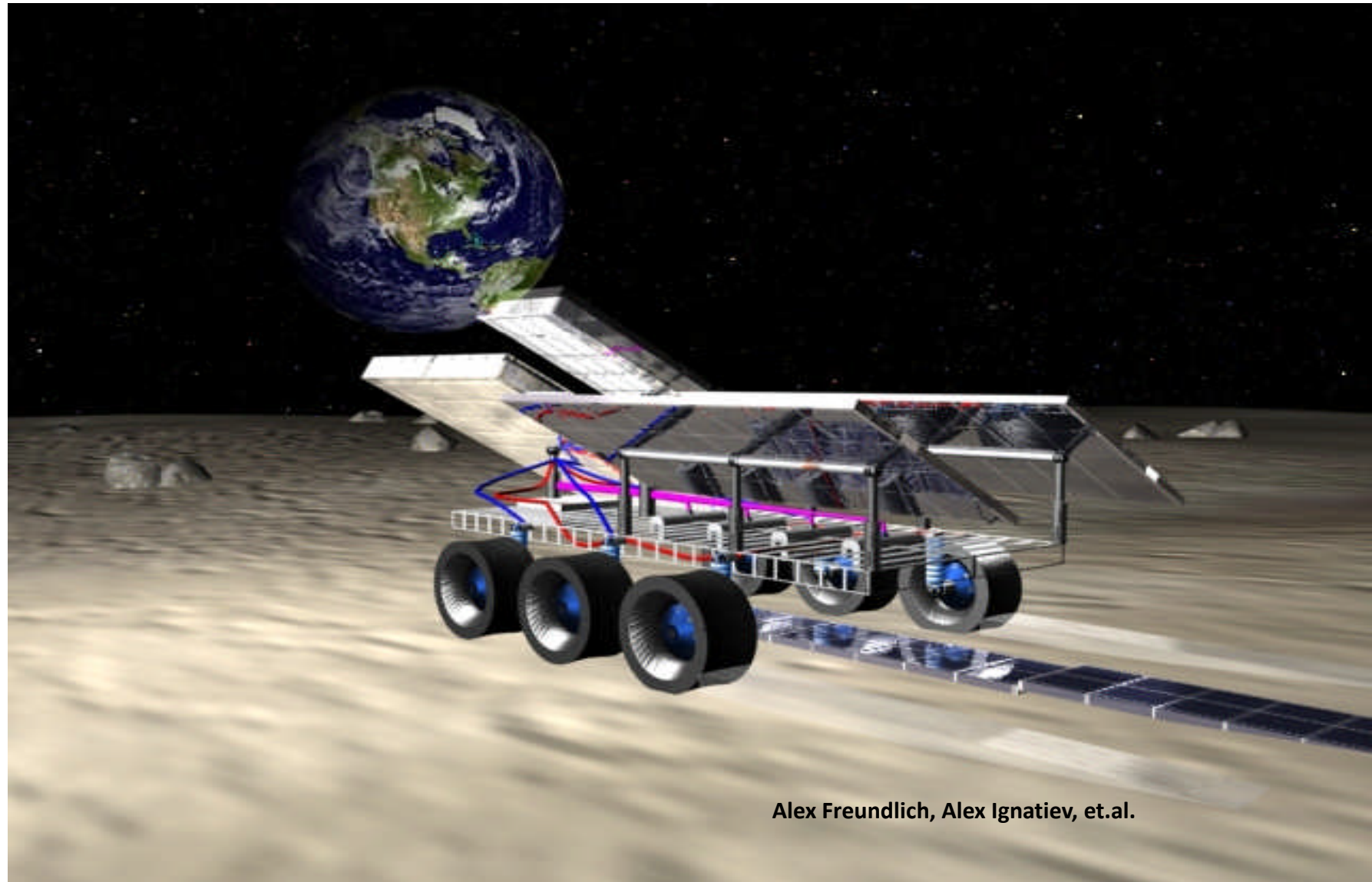
ISRU Energy Options

Data Processing Archiving
Transmission

In-Situ Automated Regolith Processing for Solar Cell Production



Automatic Solar Cell Production Unit Using in-situ Lunar Materials



Alex Freundlich, Alex Ignatiev, et.al.

Closing Thoughts on Energy

- Four key uncertainties impacting near-term decisions on new generation:
 - Future cost of CO₂
 - Future price of natural gas
 - Spent nuclear fuel storage
 - CO₂ capture and storage
- Extraordinary opportunity to develop and demonstrate a very low emissions portfolio of generation technologies for operation by 2020.

Launch Vehicle Opportunities

2010 -2020

- **The Atlas V Growth Alternative:**
 - Lower Risk – intact crew abort throughout – avoid “ketch-up” failure scenario
 - Lower Cost – anywhere from \$3 Billion to \$10 Billion
 - Earlier US Capability – 2015 vs. 2018 and slipping
- **Other US Options:**
 - Falcon IX, Aries V (2015 if accelerated!)
- Meeting the Russian and Chinese Challenges (2015 and 2017 respectively)
- Possibly even Indian and Japanese pre-emption if we stay on present “sleep-walking” course
- **The Moon will be a Multi-player world by 2015**

Toward 1 GWe on the Moon

Energy Demonstration Project BASELINE CASE

	2007-2010	2011-2014	2015-2020	2020+
Phases	RDT&E	PROTOTYPE	INITIAL OPS	FULL OPS+
Equity & Debt	~\$500MM	~\$1B - \$2B	~\$4B - \$10B	EXIT
# of Shares	100,000	120,000	140,000	140,000
Revenues	?	?	?	\$0.66-\$74B
Value	?	?	?	\$3.4-\$75B
Per Share	\$50K	?	?	\$23K-508K