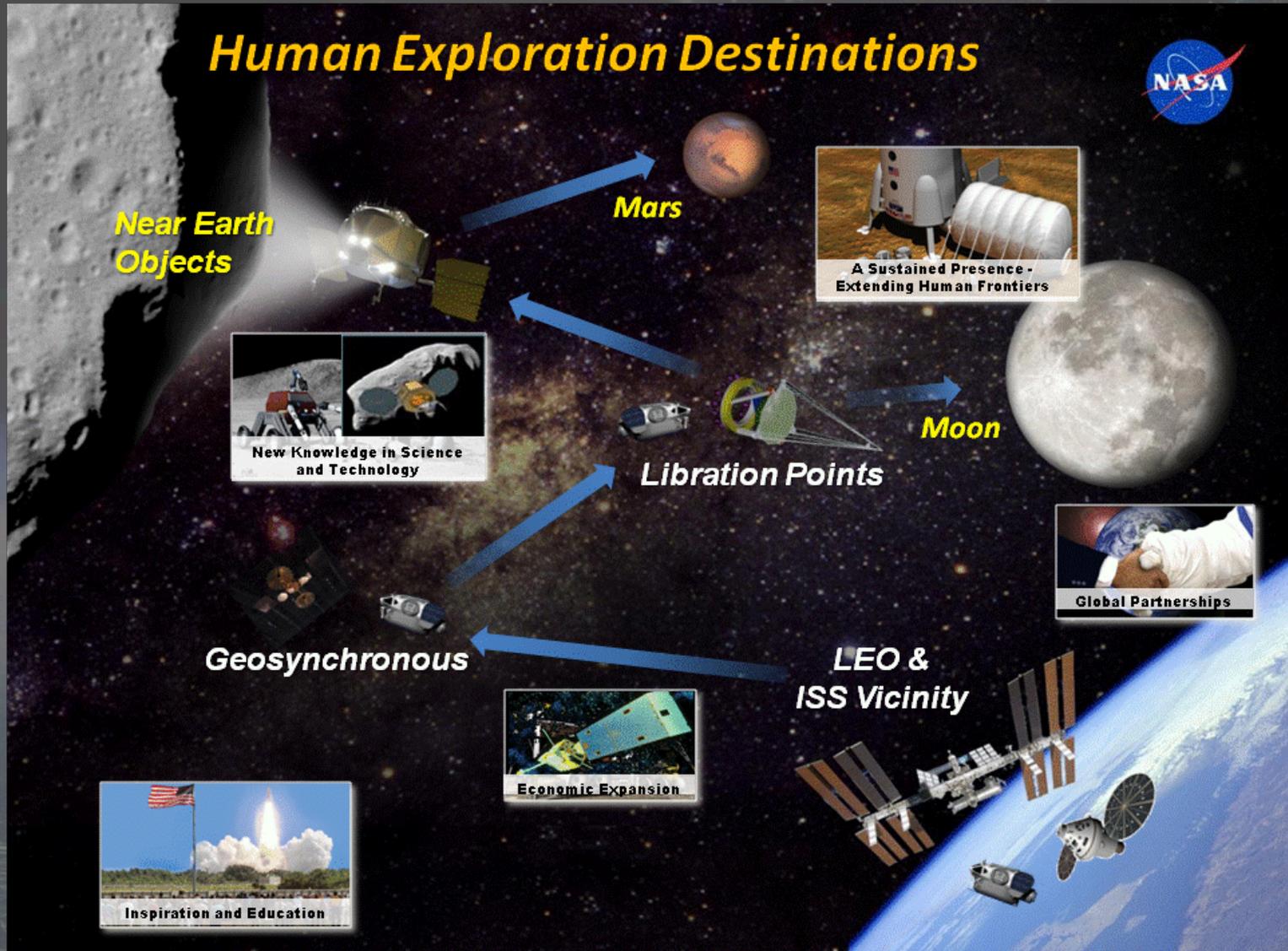


# National Interests - ISECG



# Private Interests Asteroids

## THE SPACE ECONOMY: A MODERN DAY GOLD RUSH

### Asteroid Mining Will Create A Trillion-Dollar Industry

As our **population grows** we need to find a **sustainable supply of natural resources** to fuel exploration in space and prosperity on Earth.



#### PLATINUM-RICH ASTEROID

Could contain more Platinum Group Metals than what's been mined on Earth in all of history

#### USES OF PLATINUM GROUP METALS ON EARTH

REDUCE COST OF ELECTRONICS



ELECTRIFY TRANSPORTATION



DRIVE INNOVATION, AND CREATE A GREENER EARTH



#### MORE ASTEROIDS DISCOVERED NEAR EARTH EVERYDAY

- + 1,500 EASIER TO REACH THAN MOON
- + 8,800 DISCOVERED TO DATE
- + 1,000+ NEARLY 1K+ FOUND EVERY YEAR

#### NEAR-INFINITE SUPPLY OF PRECIOUS RESOURCES

#### WATER-RICH ASTEROID

One water-rich asteroid could produce enough fuel for every rocket launched in history.

#### USES OF WATER IN SPACE

- ROCKET FUEL
- BREATHABLE AIR
- DRINKABLE WATER

#### ONE SINGLE 500M water-rich asteroid

\$ 5 trillion would produce over \$5 trillion worth of water for use in space.

It currently costs \$20,000 to send a liter of water from Earth to Deep Space

#### ONE SINGLE 500M platinum-rich asteroid

At current market prices, one ounce of platinum is valued over \$1,500

Worth \$2.9 Trillion

174 times more than the yearly world output of platinum

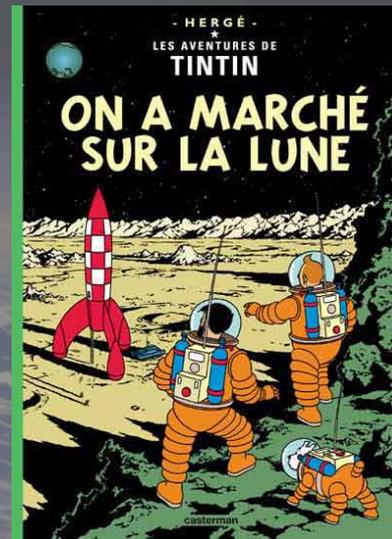
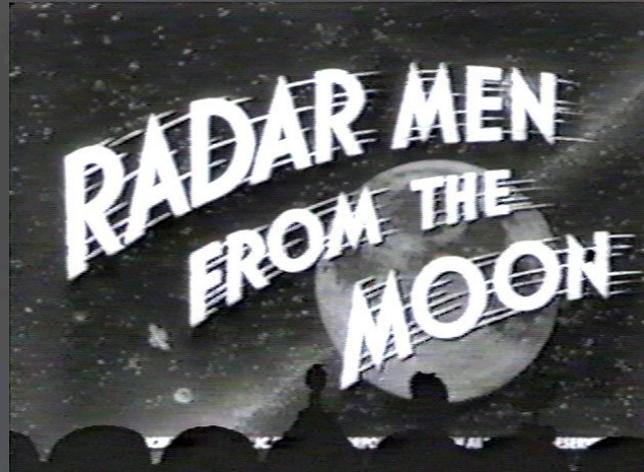
50% More than the known world-reserves of PGMs

Asteroid mining will open a trillion-dollar industry and provide a near-infinite supply of Platinum Group Metals and water to support our growth both on this planet and off.

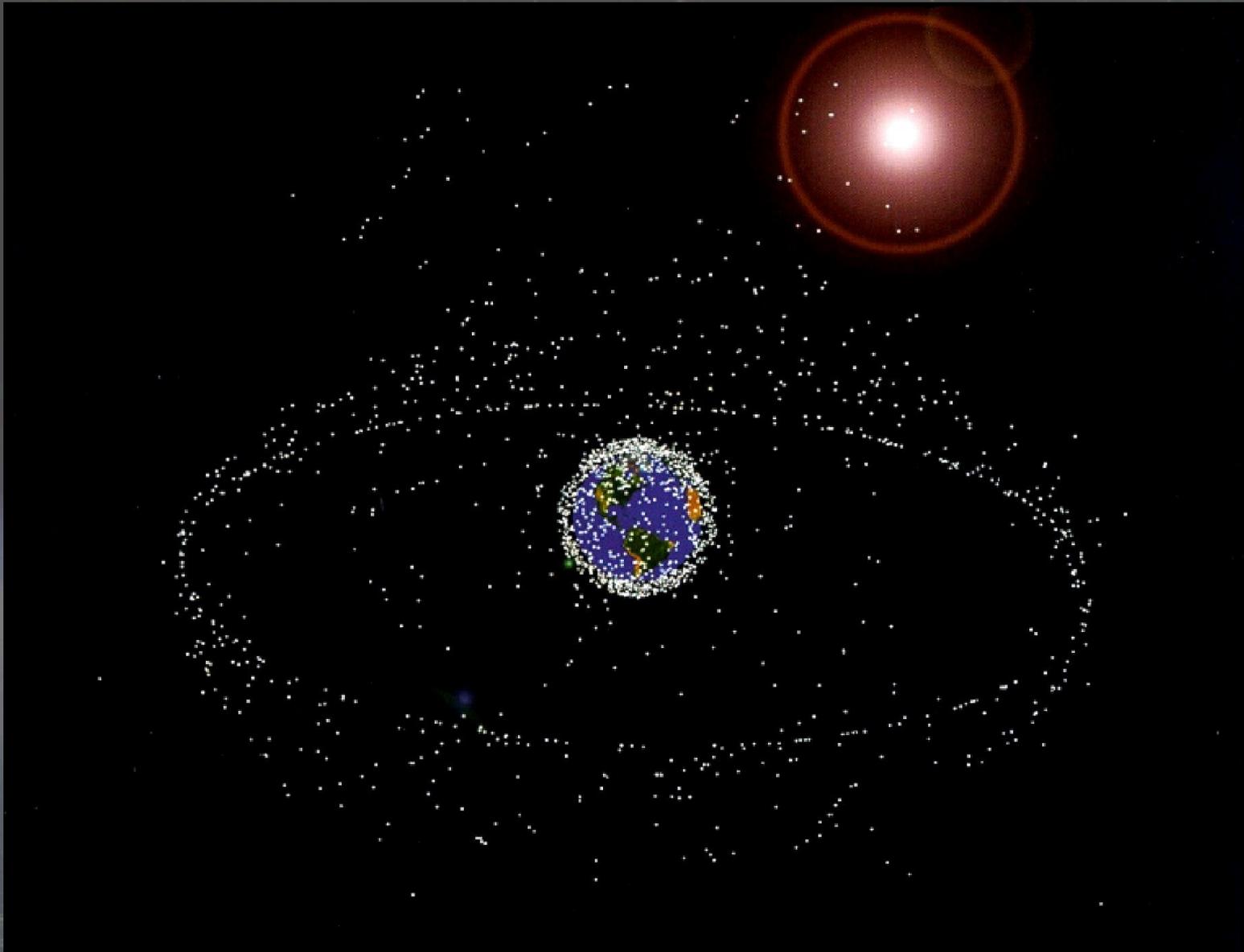


# A Nearby Big Asteroid with a Stable Orbit

Been There...Done That OR  
You will never need more than 640K memory



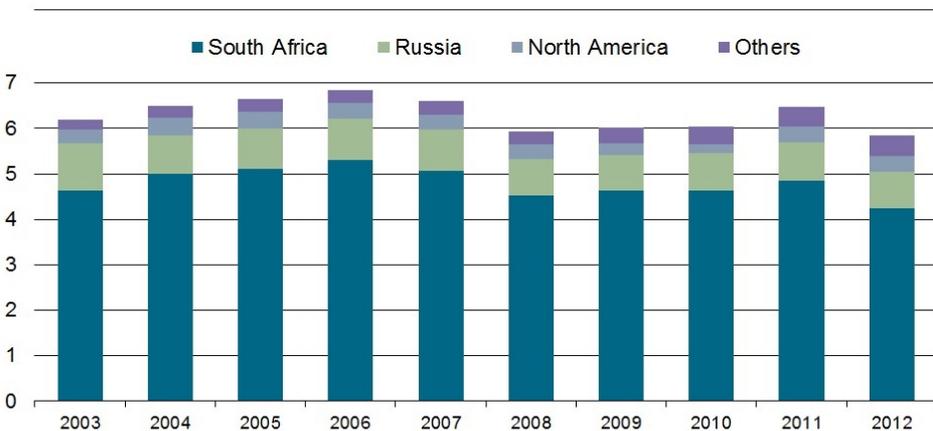
# Global Economic Sphere



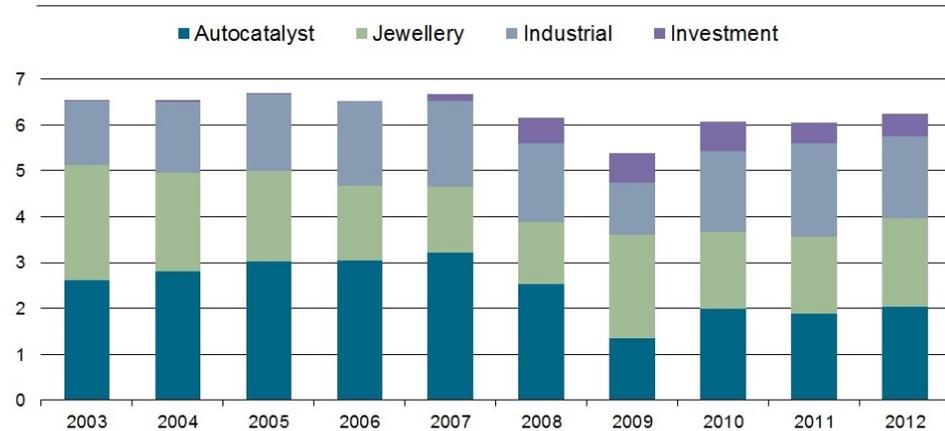
# Platinum Factoids:

- Average yearly production: 130 Tons refined platinum
  - 50% of all Pt produced is consumed (ie destroyed)
  - PT is used in industry (50%) Jewelry (40%) and investments (10%)
- Spot Market price of Pt is 1657 US\$ per ounce (price on Feb 8, 2012)
- Major suppliers are: Sudbury, South Africa, Russia
- Pt is “hosted” by other minerals, such as nickel
  - “grade” is approx 7 gm/tonne of ore
  - Refining the PGE out of the host ore is technically difficult and time consuming (some time lines quote up to 6 months to complete the process)

Platinum supply by region  
Million oz

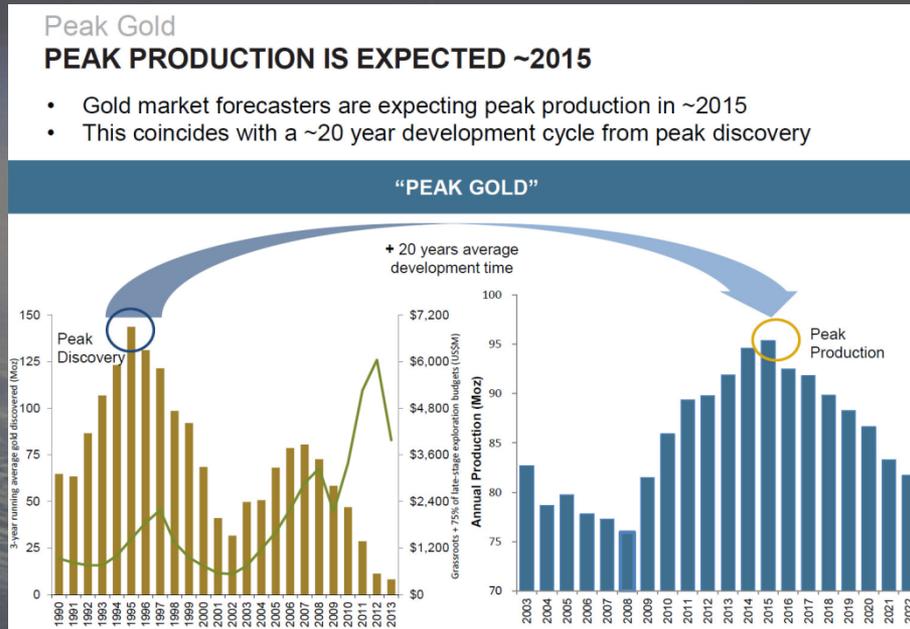


Platinum demand by application  
Million oz net

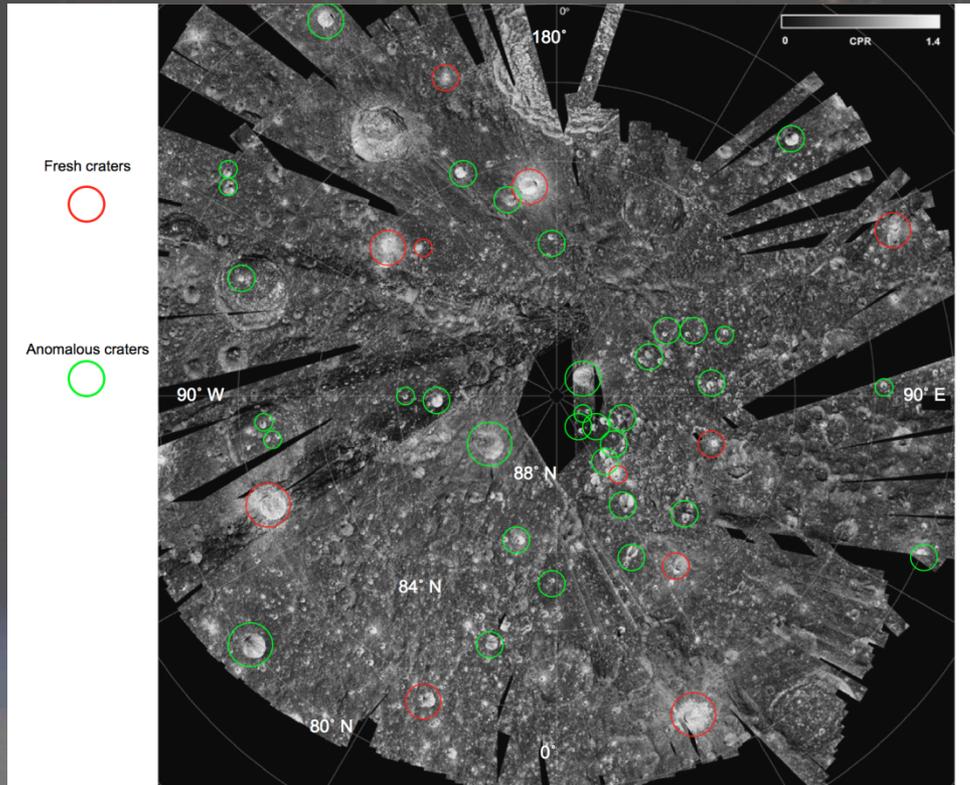


# Gold Factoids:

- Average yearly global production: 2700 Tonnes refined gold (2012)
  - Canadian output (2012): 107 tonnes
- Major consumers are: India, China
  - 52% jewellery, 12% industrial, 16 % investment, 18% Official Holdings
- Spot Market price of Au is 1264 US\$ per ounce (price on May 9, 2016)
- Average Canadian “grade” is approx 2.3 gm/tonne of ore (2012)
- Lunar permanently shadowed regions assay (estimated) 5000 g/tonne (Platt et al, LCROSS)



# Water? On the Moon?



1	D (km)	A (km <sup>2</sup> )	V (m <sup>3</sup> )/m (mT)
2	12	113.04	24000000
3	8	50.24	16000000
4	7	38.465	14000000
5	5	19.625	10000000
6	6	28.26	12000000
7	8	50.24	16000000
8	3	7.065	6000000
9	5	19.625	10000000
10	4	12.56	8000000
11	4	12.56	8000000
12	8	50.24	16000000
13	21	346.185	42000000
14	18	254.34	36000000
15	7	38.465	14000000
16	12	113.04	24000000
17	3	7.065	6000000
18	8	50.24	16000000
19	6	28.26	12000000
20	11	94.985	22000000
21	6	28.26	12000000
22	4	12.56	8000000
23	5	19.625	10000000
24	4	12.56	8000000
25	6	28.26	12000000
26	4	12.56	8000000
27	3	7.065	6000000
28	3	7.065	6000000
29	8	50.24	16000000
30	17	226.865	34000000
31	4	12.56	8000000
32	34	907.46	68000000
33	4	12.56	8000000
34	6	28.26	12000000
35	5	19.625	10000000
36	4	12.56	8000000
37	4	12.56	8000000
38	3	7.065	6000000
39	8	50.24	16000000
40	5	19.625	10000000
41	11	94.985	22000000
42			
43	Total ice (m <sup>3</sup> )		608000000
44			
45	Total reg (m <sup>3</sup> )		5.652E+11
46			
47	Concentration		0.001075725

- Total North Polar ice ~  $6 \times 10^8 \text{ m}^3 = 600 \text{ million Tonnes}$ 
  - Within 2 metres of surface
- Enough LH<sub>2</sub>/LO<sub>2</sub> for one Shuttle launch equivalent *per day* for more than **2200** years
  - Average fuel mass in Shuttle ET = 735 Tonnes

# Space Mining is one form of In Situ Resource Utilization (ISRU)

**UTILIZATION OF EXTRATERRESTRIAL  
RESOURCES PROVIDES POTENTIAL  
FOR UNLIMITED RANGE**

