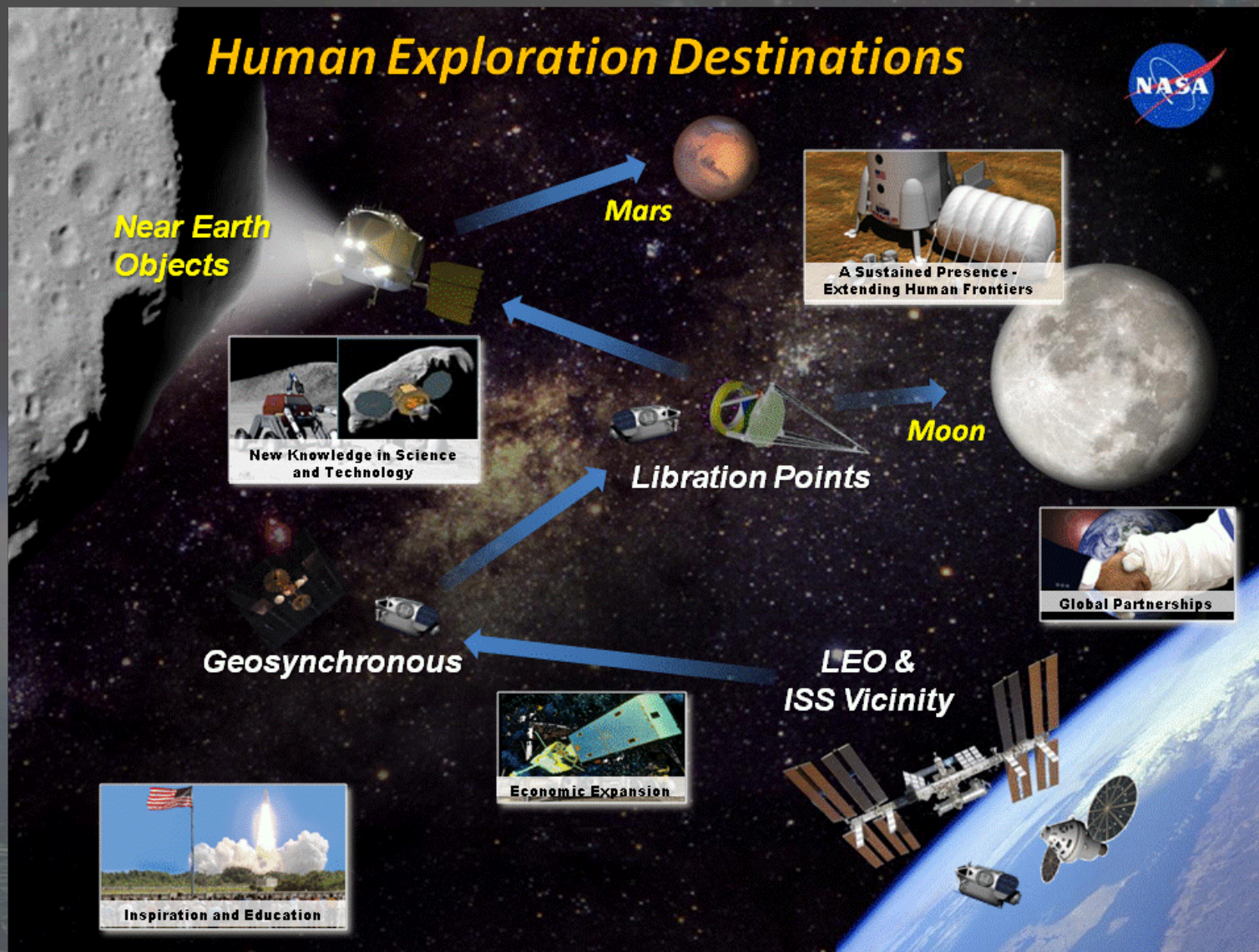


National Interests - ISECG



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.



MORE ASTEROIDS DISCOVERED NEAR EARTH EVERYDAY



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

PLATINUM-RICH ASTEROID

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

NEAR-INFINITE SUPPLY OF PRECIOUS RESOURCES



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

USES OF PLATINUM GROUP METALS ON EARTH

REDUCE COST OF ELECTRONICS



ELECTRIFY TRANSPORTATION



DRIVE INNOVATION, AND CREATE A GREENER EARTH



ONE SINGLE 500M platinum-rich asteroid

Worth \$2.9 Trillion

174 times more than the yearly world output of platinum

50% More than the known world-reserves of PGMs

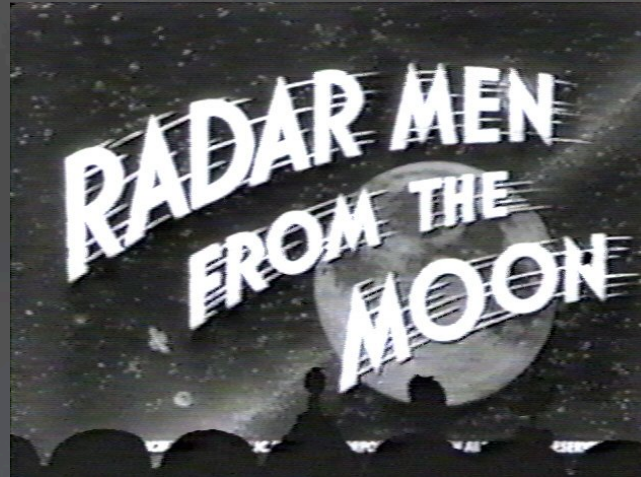
At current market prices, one ounce of platinum is valued over **\$1,500**

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.

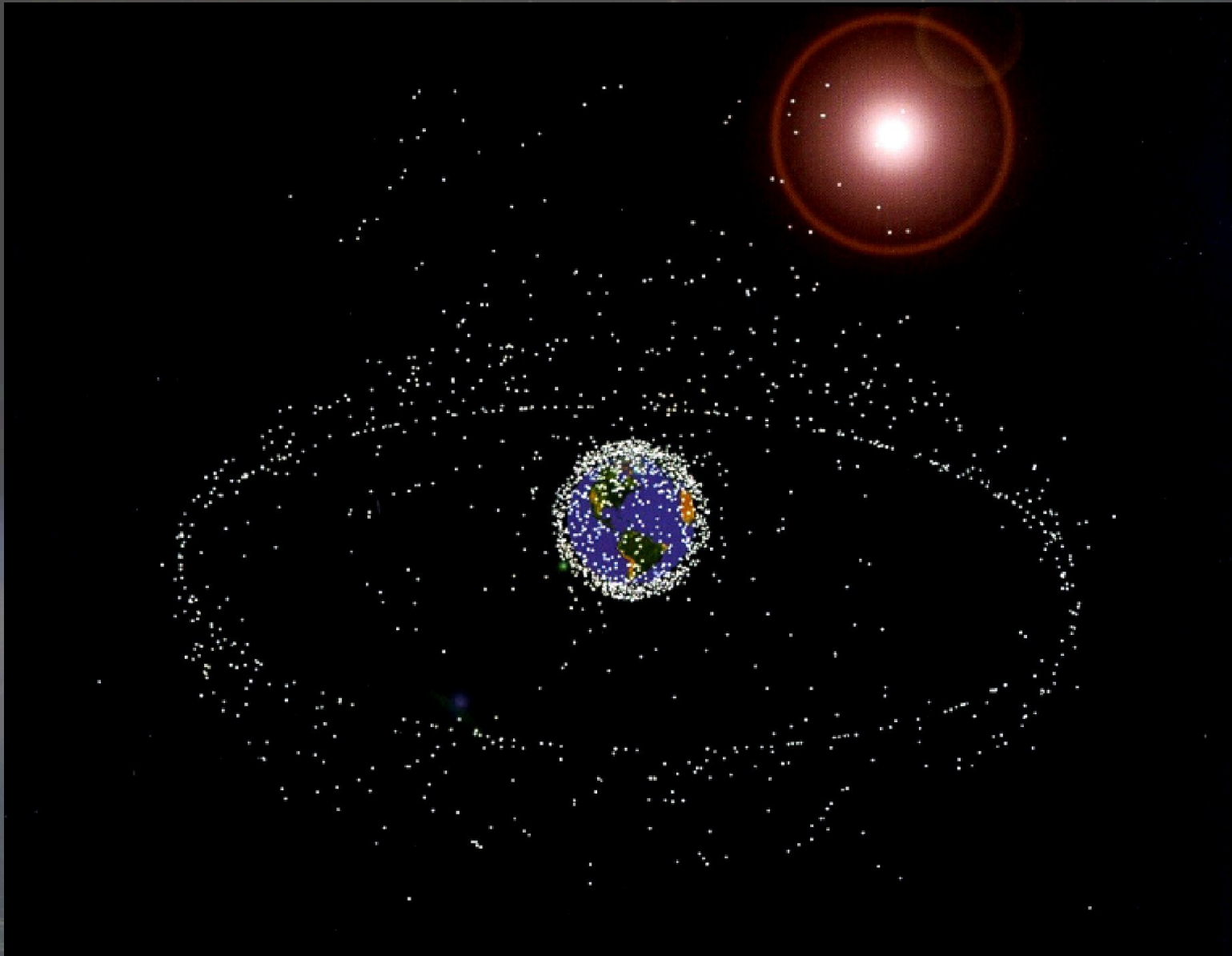
PLANETARY RESOURCES

A Nearby Big Asteroid with a Stable Orbit

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



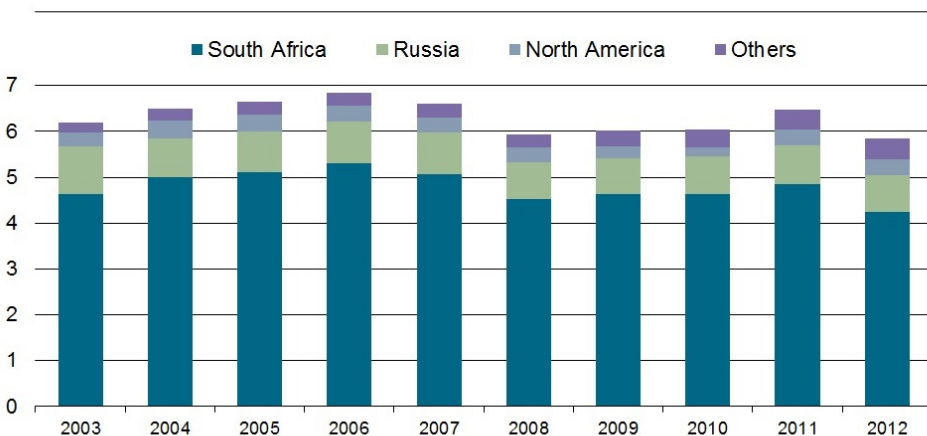
Global Economic Sphere



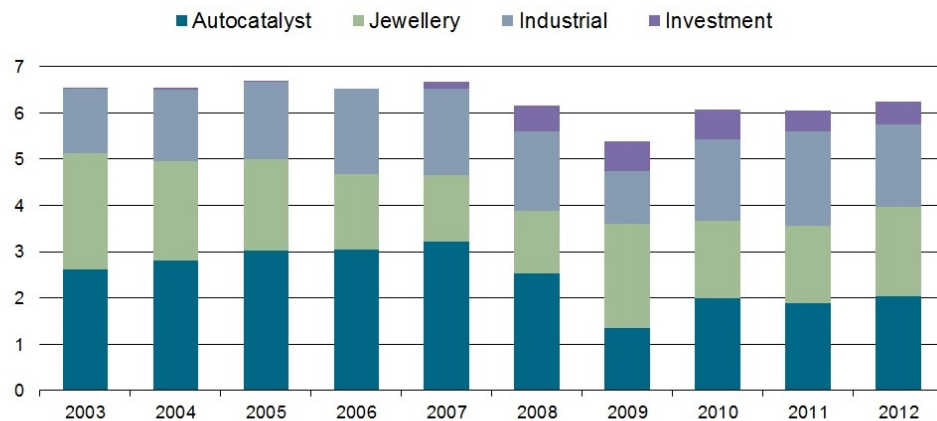
Platinum Factoids:

- 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:

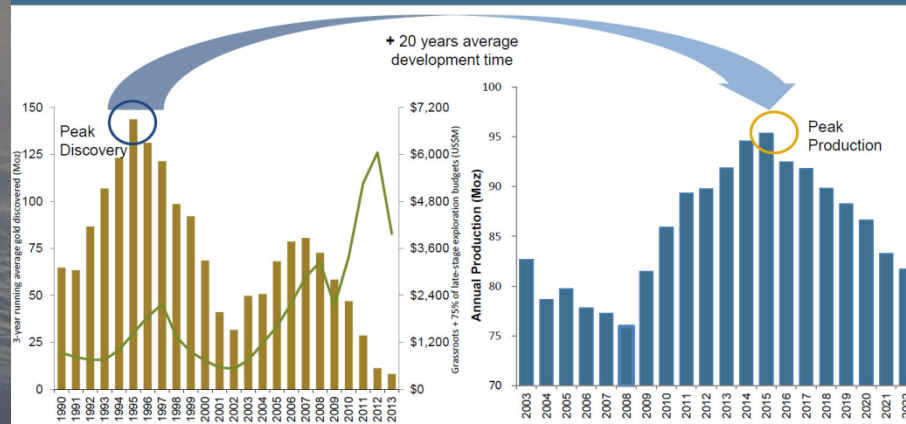
- Average yearly global production: 2700 Tonnes refined gold (2012)
 - Canadian output (2012): 107 tonnes
- Major consumers are: India, China
 - 52% jewellery, 12% industrial, 16 % investment, 18% Official Holdings
- Spot Market price of Au is 1264 US\$ per ounce (price on May 9, 2016)
- Average Canadian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

Peak Gold

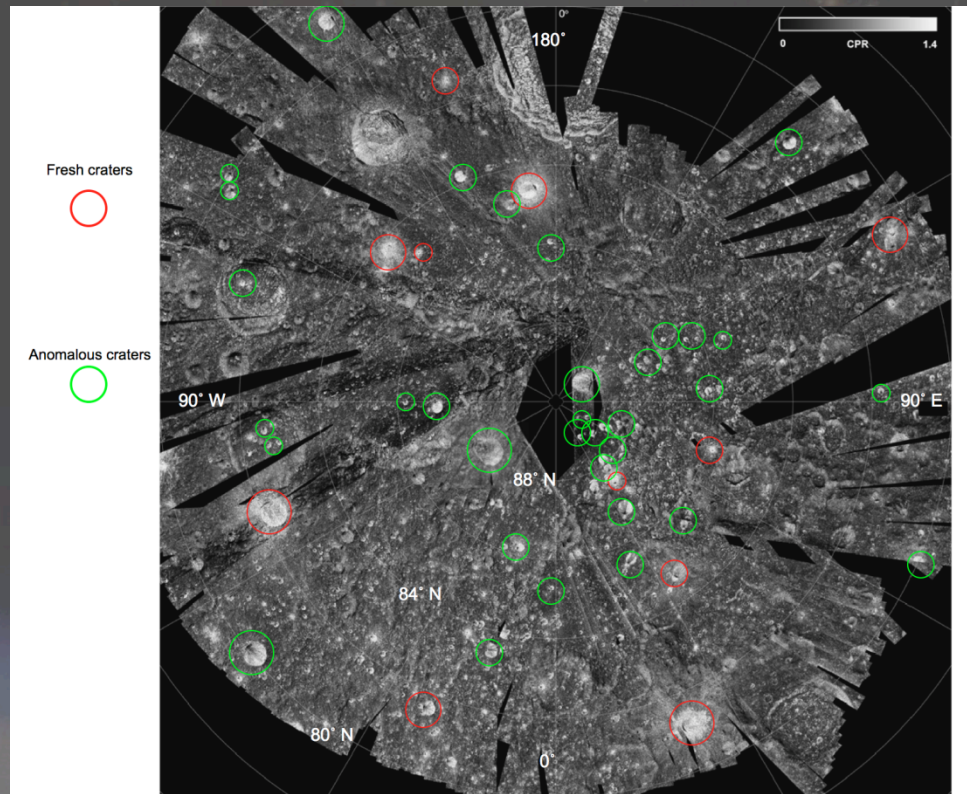
PEAK PRODUCTION IS EXPECTED ~2015

- Gold market forecasters are expecting peak production in ~2015
- This coincides with a ~20 year development cycle from peak discovery

“PEAK GOLD”



Water? On the Moon?



1	D (km)	A (km ²)	V (m ³)/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 ³)		608000000
44			
45	Total reg (m ³)		5.652E+11
46			
47	Concentration		0.001075725

- Total North Polar ice $\sim 6 \times 10^8 \text{ m}^3 = 600 \text{ million Tonnes}$
 - Within 2 metres of surface
- Enough LH_2/LO_2 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)

