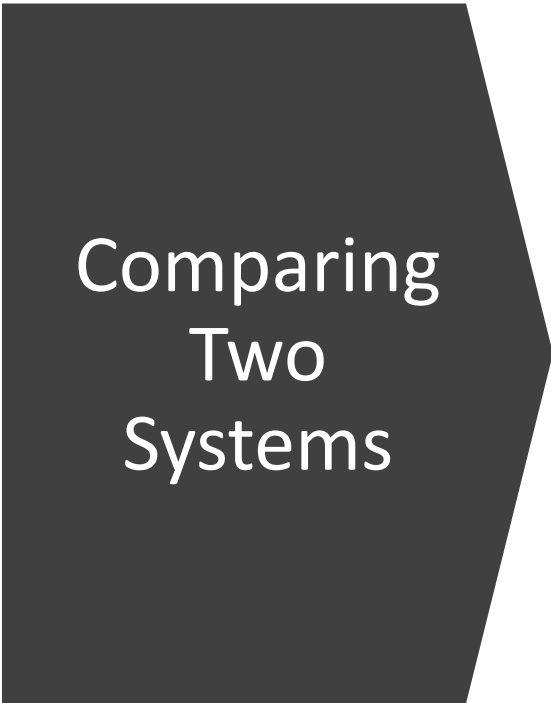




Open vs Closed Systems: The Growth Needs of  
Humanity in the 21<sup>st</sup> Century and Beyond



## Comparing Two Systems

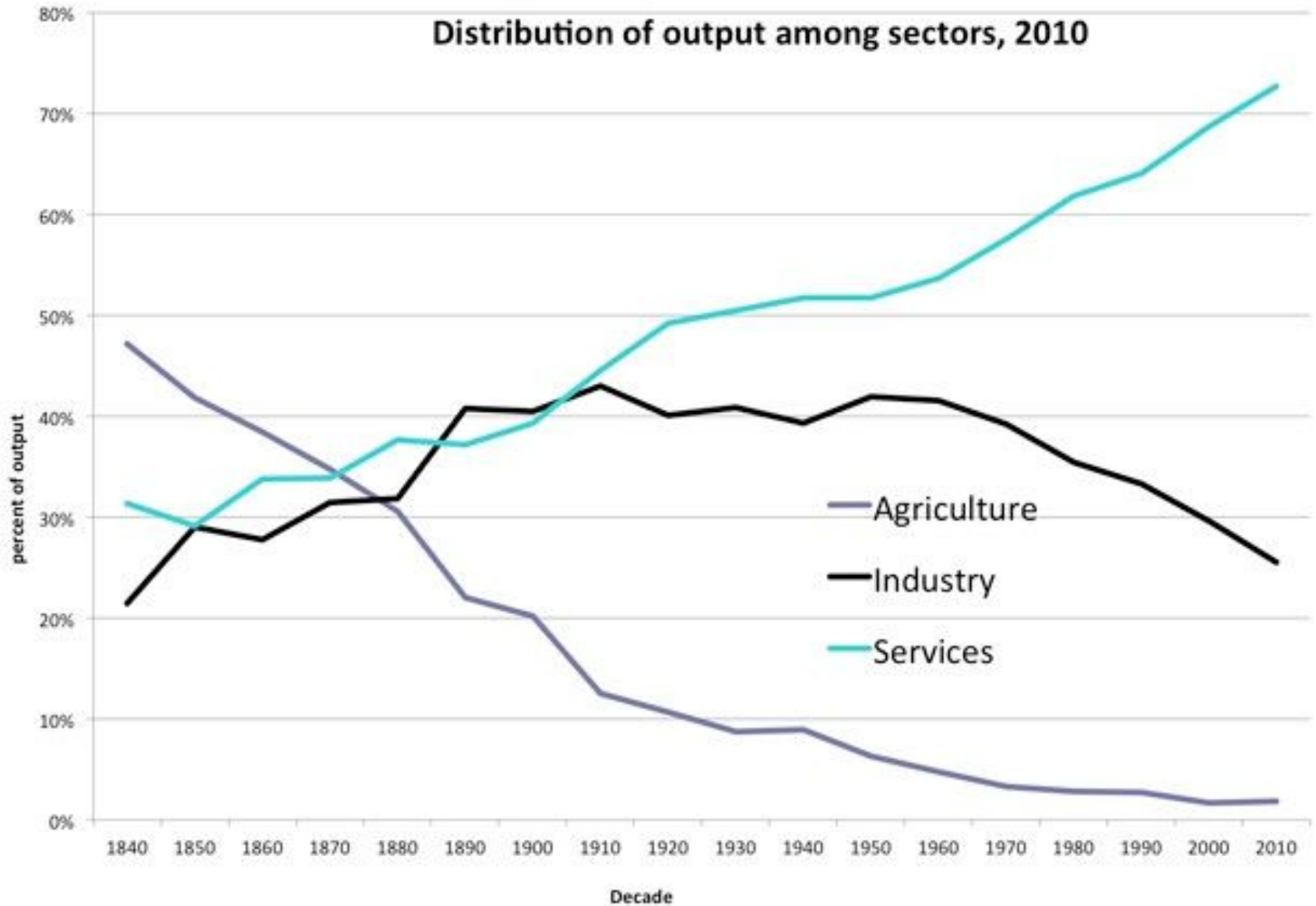
### **Open Systems**

- Non-Zero Sum
- Whole = More than Sum of Parts
- Relative limits to growth
- Win-Win Competition focus
- Multipolar (multiple centers of gravity)

### **Closed Systems**

- Zero Sum
- Whole = Sum of Parts
- Absolute limits to growth
- Win-Lose Competition focus
- Unipolar (one center of gravity)

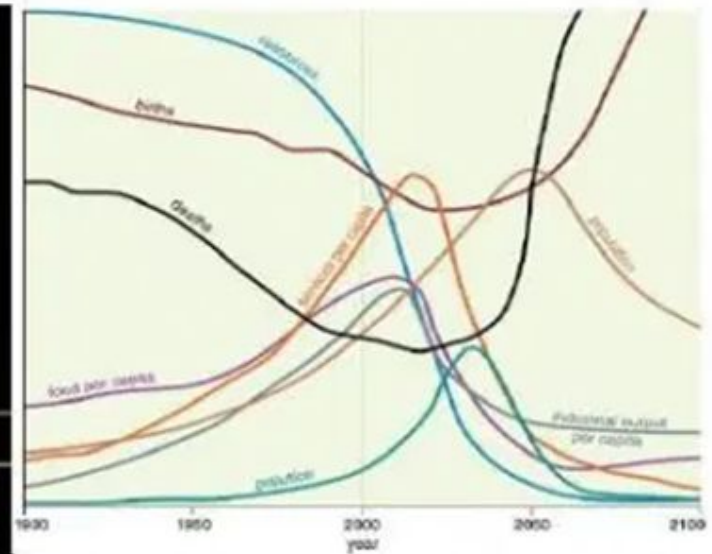
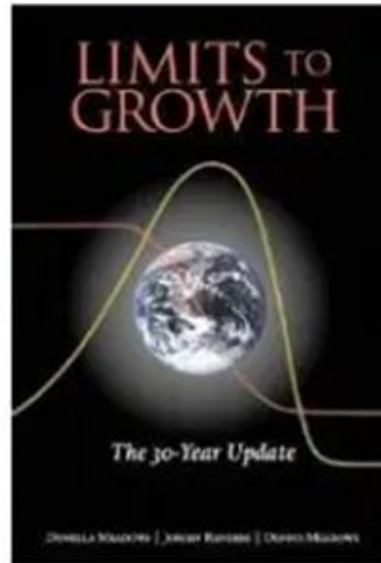
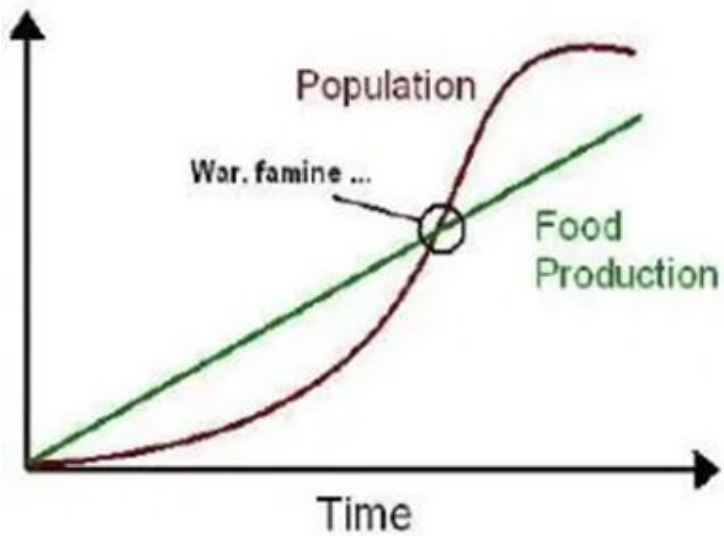
### Distribution of output among sectors, 2010



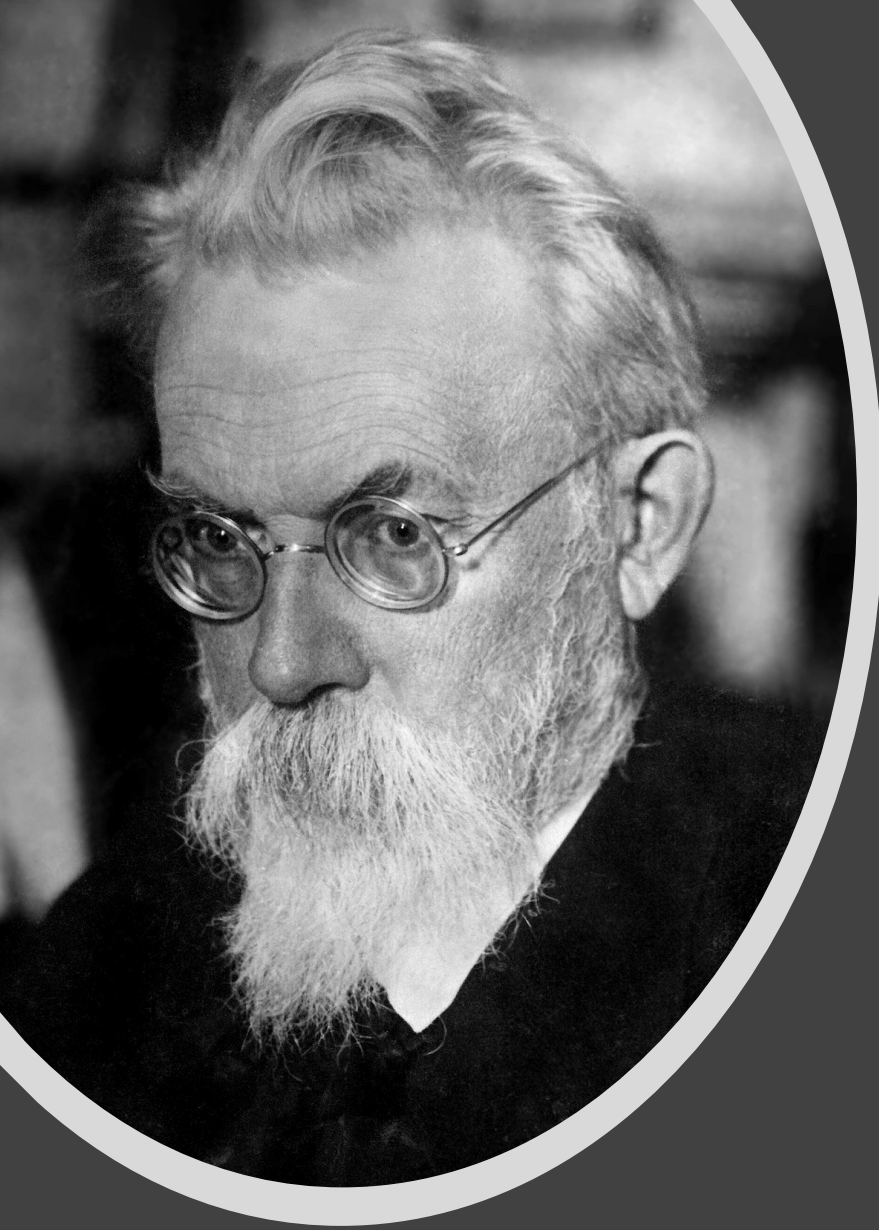


“Coordinated development is the unity of balanced development and imbalanced development. The process from balance to imbalance and then to rebalance is the basic law of development. Balance is relative while imbalance is absolute. Emphasizing coordinated development is not pursuing equalitarianism, but giving more importance to equal opportunities and balanced resource allocation.”

-Xi Jinping, 2016



*Figure 1- Rather than admit an error in Malthus's axioms, his modern followers have revived and popularized his theory which denies the existence of creative reason, with the Club of Rome's 1972 *Limits to Growth* (middle), which simply took the old formula (on left) and added more variables (right).*



# Vernadsky's 3 Phase Spaces

- Lithosphere

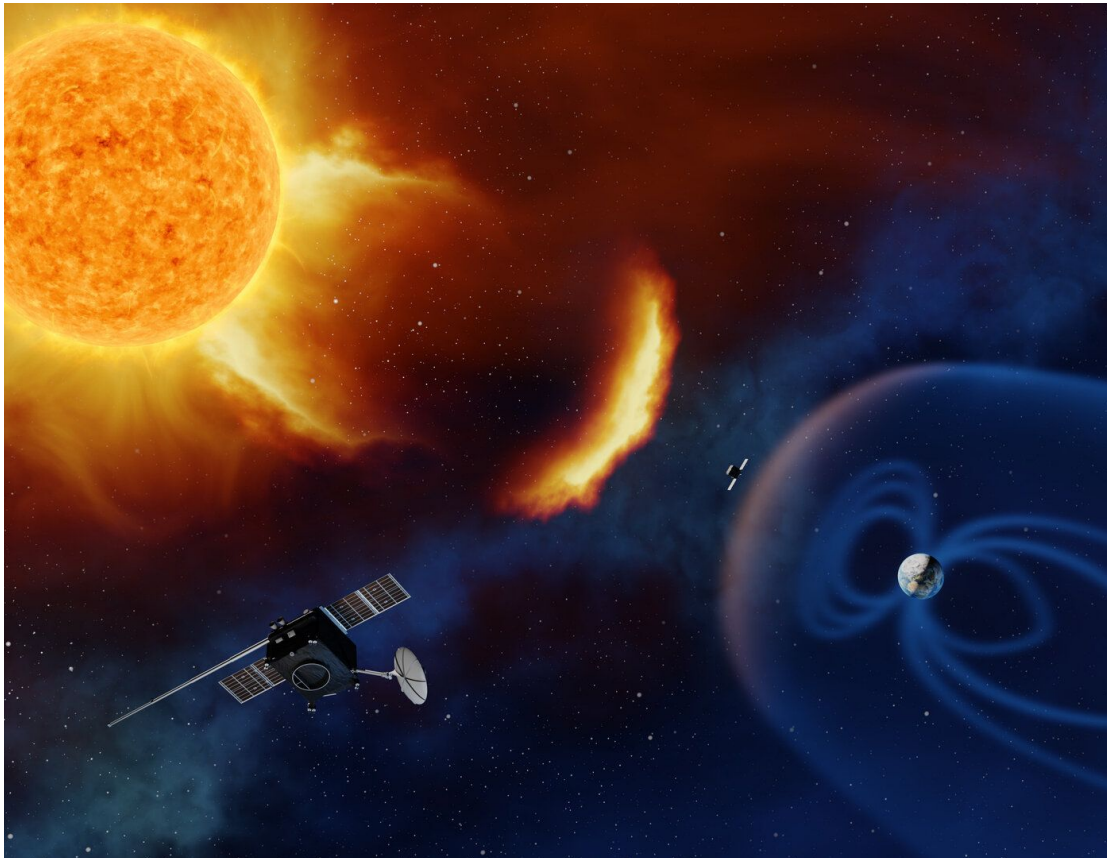


- Biosphere



- Noosphere/Techosphere





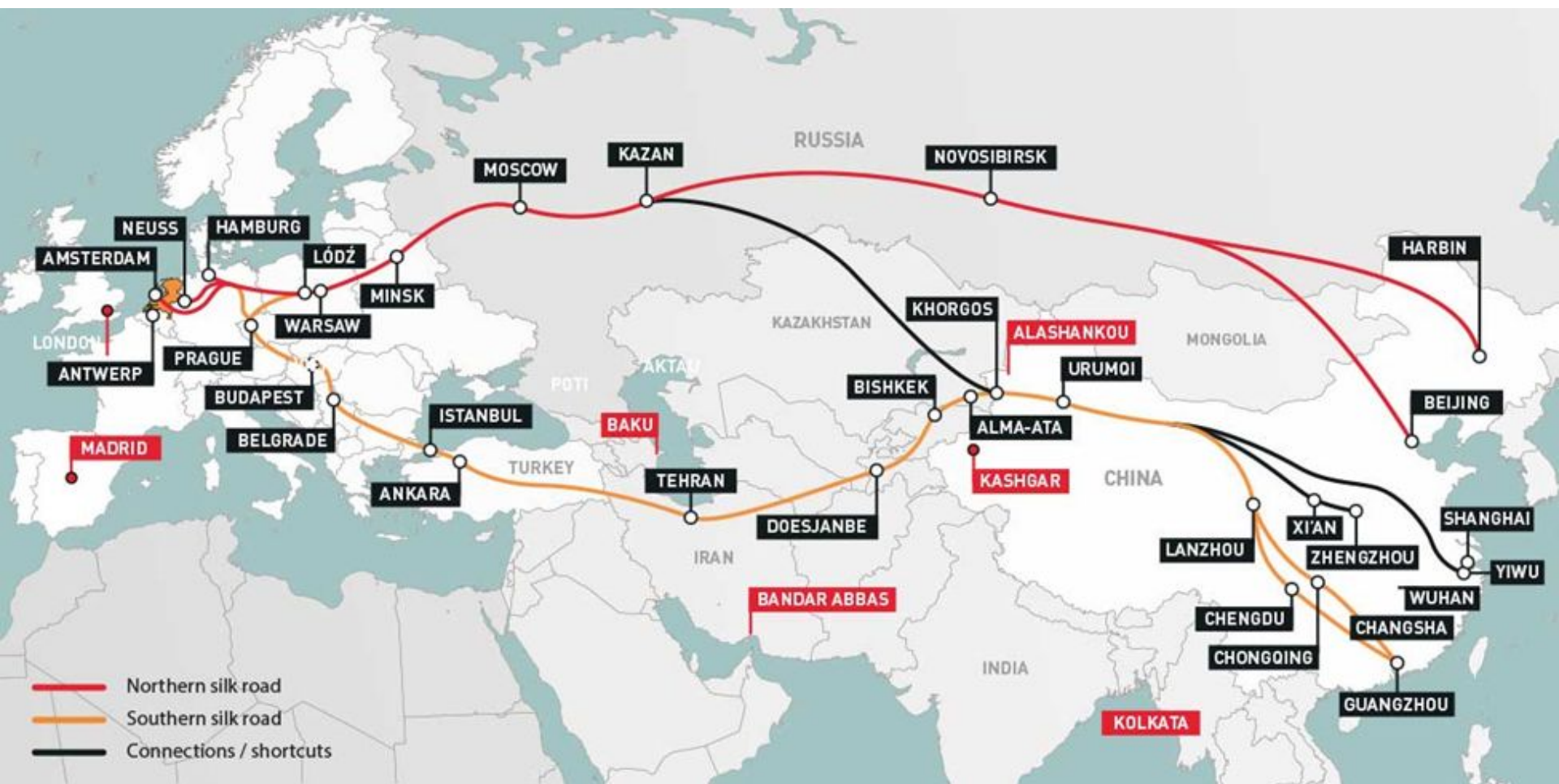
“The biosphere may be regarded as a region of transformers that convert cosmic radiations into active energy in electrical, chemical, mechanical, thermal, and other forms. Radiations from all stars enter the biosphere, but we catch and perceive only an insignificant part of the total. The existence of radiation originating in the most distant regions of the cosmos cannot be doubted. Stars and nebulae are constantly emitting specific radiations, and everything suggests that the penetrating radiation discovered in the upper regions of the atmosphere by Hess originates beyond the limits of the solar system, perhaps in the Milky Way, in nebulae, or in stars ... The importance of this will not be clear for some time, but this penetrating cosmic radiation determines the character and mechanism of the biosphere.”

-Vladimir Vernadsky, *Biosphere* (1928)



# Open System Case Study 1: | The Arctic







# Soon There May Be A Bering Strait Tunnel Connecting The U.S. To Russia



Tiffany Gabbay, The Blaze Sep 13, 2011, 12:01 PM

The U.S. and Russia have cooperated in space, and now the two countries are adding high seas to the mix, having set their minds on connecting the Eurasian and American continents via an underwater tunnel in the Bering Strait according to Russia Today.

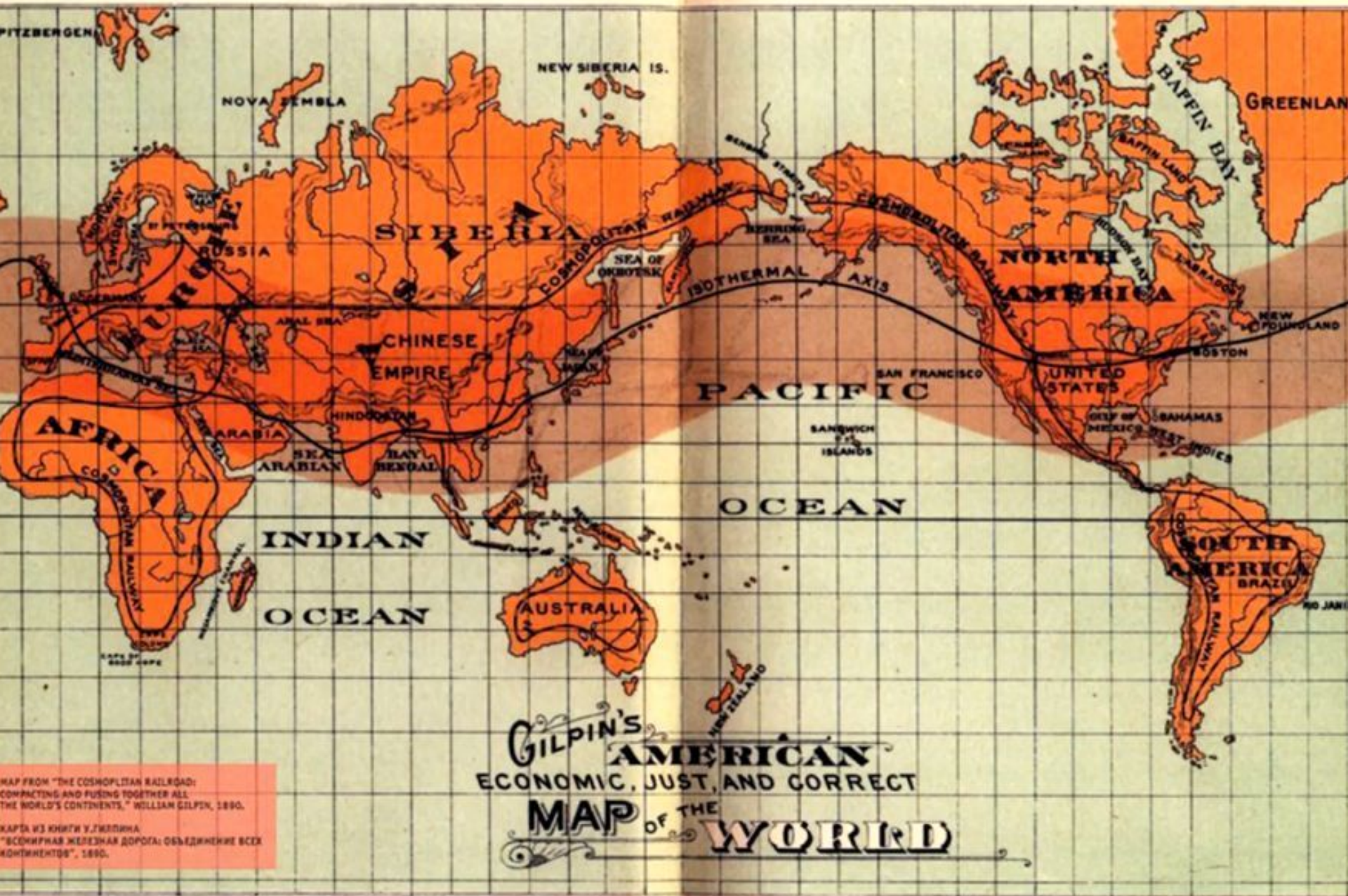


Originally conceived in 1906, during the rule of the last Russian Czar, Nicholas II, the project had been deemed unrealistic by many, and put on hold by world wars and revolutions, but now seems to have recaptured the hearts of businessmen on three continents. The tunnel is expected to be twice the size of the Channel Tunnel connecting Britain and France. The 65 mile giant would be the key component of a 3,700 mile railroad reaching from Yakutsk, Russia to



**DURING THIS TIME OF CRISIS, THE LEGION NEEDS YOUR SUPPORT MORE THAN EVER.**

SEE HOW YOU CAN HELP



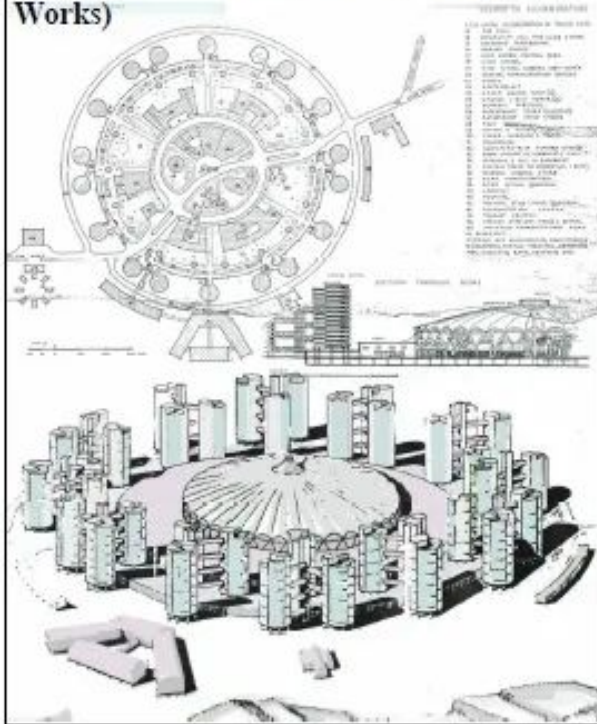
MAP FROM "THE COSMOPOLITAN RAILROAD: COMPACTING AND FUSING TOGETHER ALL THE WORLD'S CONTINENTS," WILLIAM GILPIN, 1890.

КАРТА ИЗ КНИГИ У. ГИЛПИНА "ВСЕМИРНАЯ ЖЕЛЕЗНАЯ ДОРОГА: ОБЪЕДИНЕНИЕ ВСЕХ КОНТИНЕНТОВ", 1890.

GILPIN'S  
**AMERICAN**  
 ECONOMIC, JUST, AND CORRECT  
**MAP** OF THE **WORLD**

# Arctic Science Cities

**Fig. 1: 1958 Frobisher Bay Domed City design (commissioned by the Dept. of Public Works)**



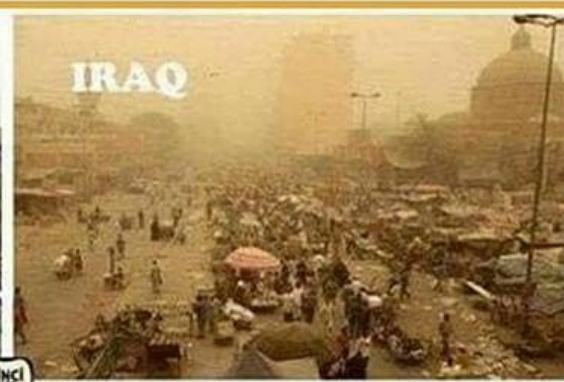


# Open System Case Study 2: The Middle East

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# Before

# After



NO ONE CARES

@NoOneCares

@NoOneCares







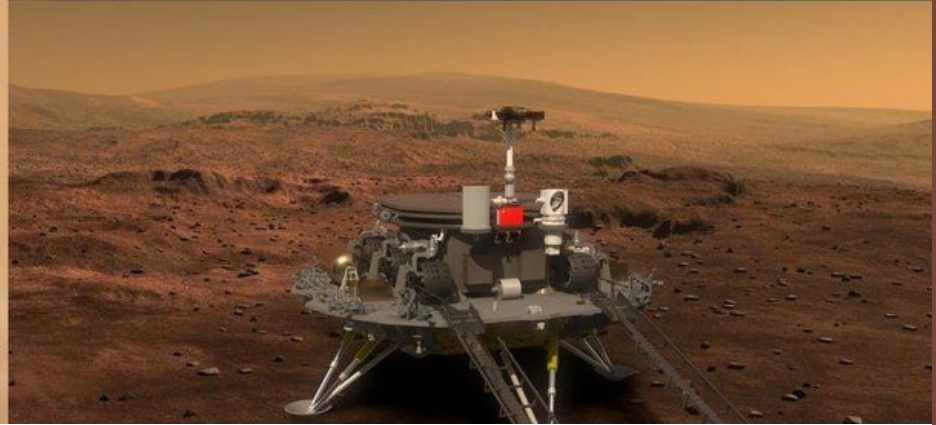
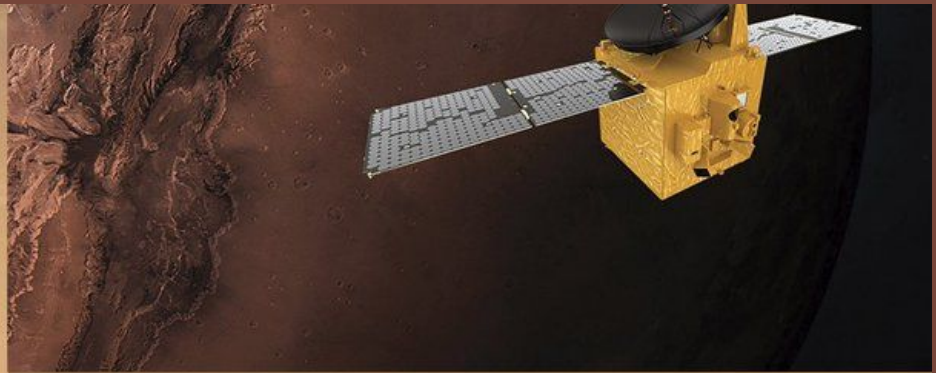
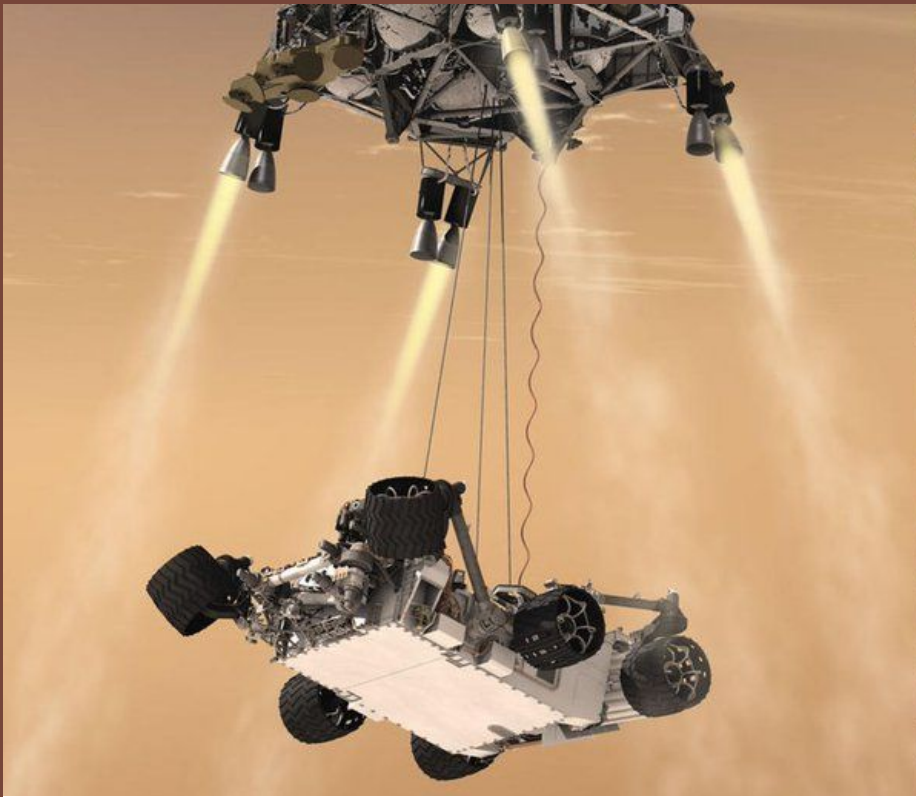
## Five Seas Grand Strategy Revived

# Possibilities for the Sinai Peninsula



# The Loess plateau, in China 2009 vs 2019





# Open System Case study 3: Space Exploration

## Peaceful Purposes

International cooperation on Artemis is intended not only to bolster space exploration but to enhance peaceful relationships between nations. Therefore, at the core of the Artemis Accords is the requirement that all activities will be conducted for peaceful purposes, per the tenets of the Outer Space Treaty.

ARTEMIS



# SPACENEWS

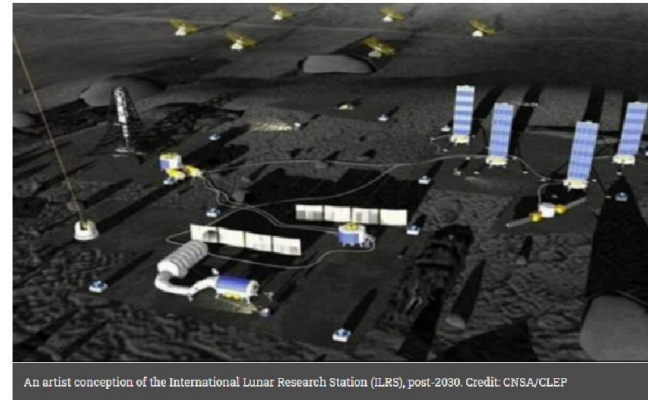
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NORTHROP  
GRUMMAN



## Russia, China to sign agreement on international lunar research station

by Andrew Jones — February 17, 2021



An artist's conception of the International Lunar Research Station (ILRS), post-2030. Credit: CNSA/CLEP

Russia opts for lunar project with China over continued cooperation with ISS partners beyond LEO

HELSINKI — Russia is preparing to sign a memorandum of understanding with China to cooperate on a vision for an international lunar research station.

“Roscosmos has completed domestic proceedings to harmonize the Memorandum of Understanding between the Government of the Russian Federation and the Government of People’s Republic of China