

PRODUCED BY RONALD M. JONES D088-210

ABOUT THIS DIAGRAM:
The Rockwell Integrated Space Plan (ISP) is a very long range systematic perspective of America's and the Western World's space program. Its 100-plus-year vision was created from the integration of numerous NASA long-range studies including the project Pathfinder case studies, recommendations from the National Commission on Space's report to the President, the Risk Report to the NASA Administrator, and the new National Space Policy Directive. Special initiatives such as the four Pathfinder scenarios or those described in the Risk Report (i.e., Mission to Plant Earth, Exploration of the Solar System, Outpost on the Moon, and Humans to Mars) are integral parts of the ISP. These initiatives as well as the agenda described in the National Commission on Space report, are shown by shading the appropriate boxes involved. These shaded versions are included separately as attachments to the ISP. The ISP is not meant to be a definitive plan for the development of space, but rather a compilation of evolutionary opportunities for our near-term and long-range space activities.

The ISP can be read from top to bottom or left to right. From top to bottom, vertical columns are placed in chronologically to support centerline milestones. Reading across the columns from left to right will yield the total scope of required activity within a given time period in support of the total "integrated" plan. The centerline of the ISP is the critical path defined by National Space Policy which clearly remembers the NASA Office of Exploration case study 4 scenario - Lunar Outpost to Early Mars Exploration. The Space Shuttle and Space Station are essential initial elements; their value increases through the 1990's as infrastructure evolves. Arrows between boxes depict evolutionary supporting or synergistic relationships. Double-headed lines between boxes are communication/data links. Bold lines are trunk lines with numerous (2 or more) branches stemming from along their length. Boxes with bold outlines are either long-range (centerline) objectives or key "enabling programs" important because their development affects the development of many other programs. Boxes with double lines are in-space transportation nodes. The ISP is chronologically portrayed in five-year time intervals because this is a practical segment of time for planning and implementation of program objectives. Obviously, the dates shown have an uncertainty which increases with time, but the chronology is intended to be consistent. Finally, the large bubbles represent the synergistic summation of the individual elements of that period. They are the highest level group of goals; plateaus of human achievement attainable through a comprehensive execution of the depicted ISP elements.

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LEGEND

- ISP Program Element
- Key Enabling Program (see critical path)
- In-space Transportation Node
- Plateau or era of human and technical achievement
- Supporting, evolutionary or synergistic interrelationship
- Communication or data links
- Trunk line (two or more branches)
- Critical Path/Time Line

UNITED STATES LAUNCH VEHICLE CAPABILITIES

VEHICLE	# TO LEO	# TO GEO	GEO/CIRCULAR	FIRST FLIGHT
ARIANE 3	300,000			1984
SHUTTLE C	150,000		20,000 (C/SATUR)	1981
SPACE SHUTTLE	55,000		5,500 (U.S.)	1981
TITAN 4	40,000	12,500	16,000 (C/SATUR)	1989
TITAN 3	33,000	8,600	4,300 (U.S.)	1985
ATLAS 3	14,000	9,500	3,500	1991
ATLAS 2	13,300			1959
DELTA 2	7,800	3,100	1,350 (PAM-D)	1969
DELTA 1	2,500			1968
TITAN 2	5,500			1985
SCOUT	475			1961

LAUNCH VEHICLES OF EUROPE AND JAPAN

VEHICLE	# TO LEO	# TO GEO	COUNTRY	FIRST FLIGHT
ARIANE 4	15,000		EUROPE	1984
ARIANE 5	46,000	14,360	EUROPE	1996
HL-1	2,500		JAPAN	1986
HL-2	2,500		JAPAN	1992

ABUNDANT NEAR-EARTH EXTRATERRESTRIAL RESOURCES

RESOURCE	MOON	PHOBOS/DEIMOS	ASTEROIDS	COMETS	ELEMENT NAME
Al	X	X	X	X	ALUMINUM
Ca	X	X	X	X	CALCIUM
Fe	X	X	X	X	IRON
He	X	X	X	X	HELIUM-3
Hg	X	X	X	X	MERCURY
Ni	X	X	X	X	NICKEL
Q	X	X	X	X	QUARTZ
Ti	X	X	X	X	TITANIUM
W	X	X	X	X	WATER

LEO ET RESOURCE BASE

RESOURCE	LIST NAME	ELEMENT NAME
Al	56,490	ALUMINUM
Ca	2,760	CALCIUM
Cr	188	CHROMIUM
Cu	3,450	COPPER
Fe	415	IRON
H	466	HYDROGEN
Mg	268	MAGNESIUM
N	200	NITROGEN
O	1,725	OXYGEN
Si	600	SILICON
Ti	220	TITANIUM
Zn	173	ZINC

SOVIET AND CHINESE LAUNCH VEHICLES

VEHICLE	# TO LEO	# TO GEO
ENERGIA	220,000	
SHUTTLE	66,000	
SL-13	43,000	(PROTON)
SL-12	43,000	(PROTON)
SL-16	33,000	
SL-6	16,500	
SL-13	13,900	
SL-14	12,100	
SL-11	8,000	
SL-6	4,600	
SL-9	2,800	
LONG MARCH 3	5,500	
LONG MARCH 4	8,800	

PROPSION SYSTEMS AND INTERPLANETARY EXPANSION

VEHICLE	# TO LEO	# TO GEO
ARIANE 3	300,000	
SHUTTLE C	150,000	
SPACE SHUTTLE	55,000	
TITAN 4	40,000	12,500
TITAN 3	33,000	8,600
ATLAS 3	14,000	9,500
ATLAS 2	13,300	
DELTA 2	7,800	3,100
DELTA 1	2,500	
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