

A Unified Space Vision

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WHY DOES THE U.S. NEED TO LEAD IN SPACE?

- U.S. leadership in space should achieve several goals, including:
 - Enhance competitive edge of U.S. aerospace companies in the international market
 - Strengthen US ability to more effectively operate in space and support development of commercial, security, and science sectors
 - Increase quality American jobs in high technology and engineering sectors
 - Achieve broader U.S. geopolitical goals and foster collaborative international relationships
 - Inspire and engage the American public and capture the imagination of young and old alike

NASA's current program does not achieve these goals

CLEAR GOALS + FUNDING STABILITY = LEADERSHIP

- Declare a space program focused on Mars with achievable stepping stones
 - Regain US leadership in human space transportation systems
 - *U.S. third in launches behind Russia (31) and China (19) for 2011*
- Lead and support the international community
 - Moon - NASA should support the mission but not land U.S. astronauts
 - Mars – collaborate on enabling technologies for U.S. landing
- Long-term goal of establishing a permanent human presence on Mars by 2040

Having clear objectives allows for focused budgets, programs and a cost-effective space program

KEY ELEMENTS TO A LEADING SPACE PROGRAM

- Strengthen overall management of integrated U.S. space launch capabilities
 - Avoid spending many billions on revised heritage launch systems
 - Use existing launch infrastructure over near term
- Develop new Exploration Module (XM)
 - Test at International Space Station (ISS) as part of interplanetary Mars spacecraft
 - Fly to L1, L2, Lunar Base, Phobos, Mars
 - Earth – Moon/Mars compatibility
- Engage with international community to offer clear opportunities for collaboration
- Develop next generation runway landing crew transport to and from ISS—focus on *innovative, cost effective, safe* access to space
- Develop Mars Cyclers to establish and maintain permanent international human presence

The U.S. must lead where it matters most—providing safe, cost-effective, and reliable human space transport

DON'T REPEAT APOLLO

Avoid competing in a race the U.S. already won. Focus on Mars, the ultimate goal of the U.S. human exploration space program

- U.S. has little to gain, much to lose from competition
- Don't compete with other countries:
 - China or India have much to gain, but little to lose
 - Some nations see “value” as being an alternative to the U.S.
- Don't compete with industry
 - Limit U.S. government expenditure and encourage private investment
 - Establish infrastructure that enables U.S. commercial development and scientific discoveries
 - Allows NASA to concentrate high-risk capabilities for Mars exploration
- Key attributes of international collaboration:
 - Preserve U.S. investments and protect critical technologies
 - Advance foreign policy goals

The United States space program should help other nations achieve what it has already done (while leveraging the collaboration to further U.S. goals)

A PATH TO U.S. LEADERSHIP

- Lead international lunar activities
 - Place two Mars spacecraft above the Moon's surface at L1 and L2 for science
 - Develop fuel depots and resources (especially H₂O) for commerce
 - Assemble lunar base components with international cooperation
- Bring the nations together in an International Lunar Base Authority or Lunar Development Authority, patterned after Intelsat
- Widen participation in ISS to other nations. Evaluate implications of cooperation with China regarding joint human spaceflight activities
- Replace human asteroid mission of 2025 with Humans-to-Mars transportation systems by 2030
- Defend Earth from space impacts with a combination of national and international capabilities lead by the U.S. (*not* a NASA mission)
- Enable commercial resource mining/development on asteroids and the Moon through legislation supporting space mineral rights

A PATH TO A PERMANENT U.S. PRESENCE ON MARS

- Use ISS and Hawaii as test-bed for exploration technology and operations
- Validate Mars MEV (Mars Exploration Vehicle) spacecraft at E-M L1 and L2
- Assemble International Lunar Base (ILB) near far side of Lunar South Pole
- Visit Near-Earth Objects and comets to validate MEV spacecraft and for concurrent brief exploration opportunities
- Manage robotic International Mars Base (IMB) on Mars surface via mission to Phobos with a 3×3 crew for 1.5 years
- Establish permanent human presence by 2040, 9 crew (3+6) and 6 more every 26 months

A challenging task that is noble, inspiring, and challenging for humankind.

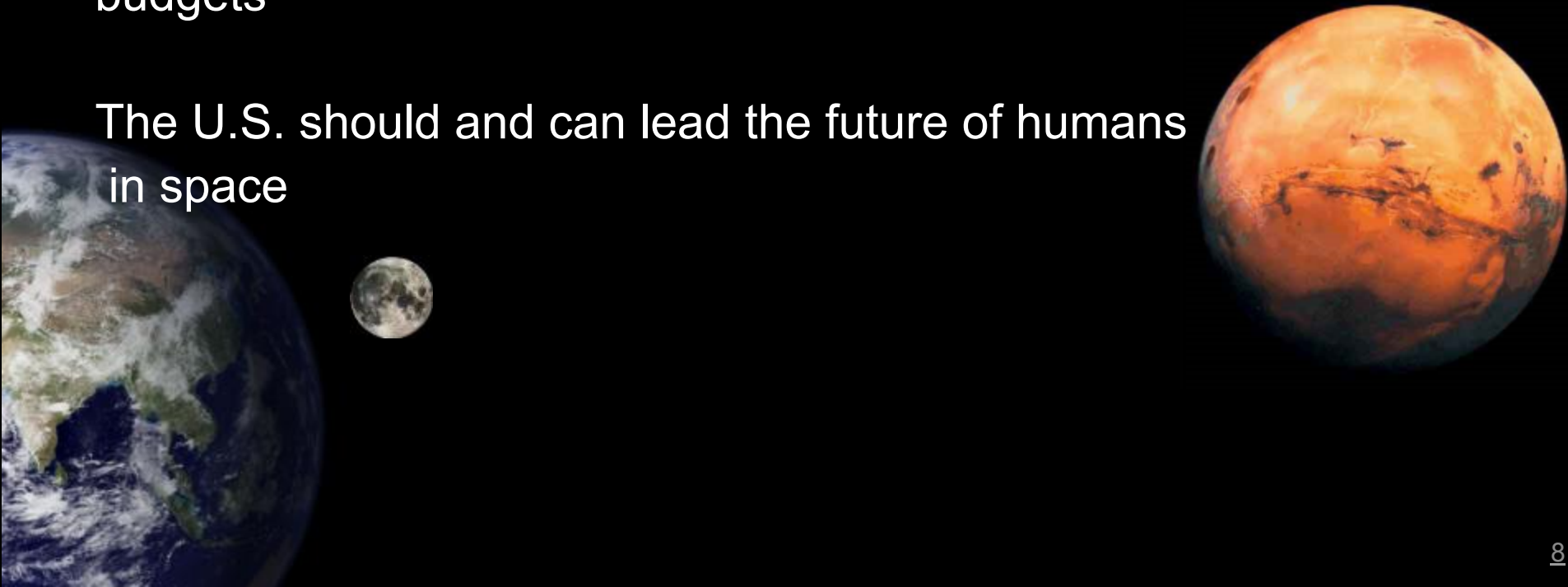
U.S. LEADERSHIP ON EARTH AND IN SPACE

We are at a critical fork in the history and future of humankind's exploration of space

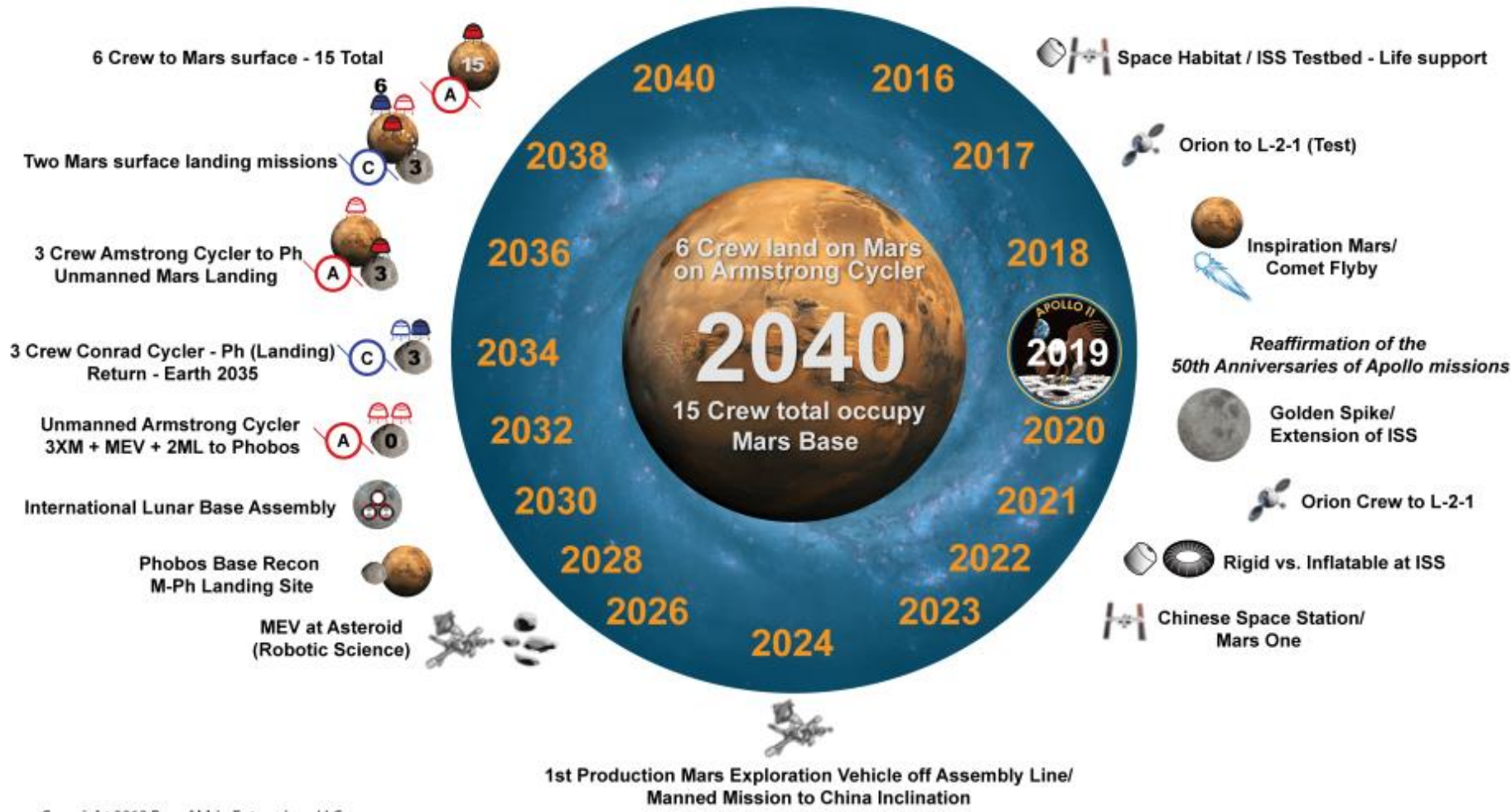
The groundwork has been laid for settlement of space

We can commit to the continued human exploration of the inner solar system and the settlement of Mars, within reasonable budgets

The U.S. should and can lead the future of humans in space



Buzz Aldrin's Unified Space Vision



UNIFIED SPACE VISION (U.S.) CIVIL SPACE MISSIONS 2013 REVISION

Unified Space Vision (U.S.) Civil Space Missions 2013 Revision

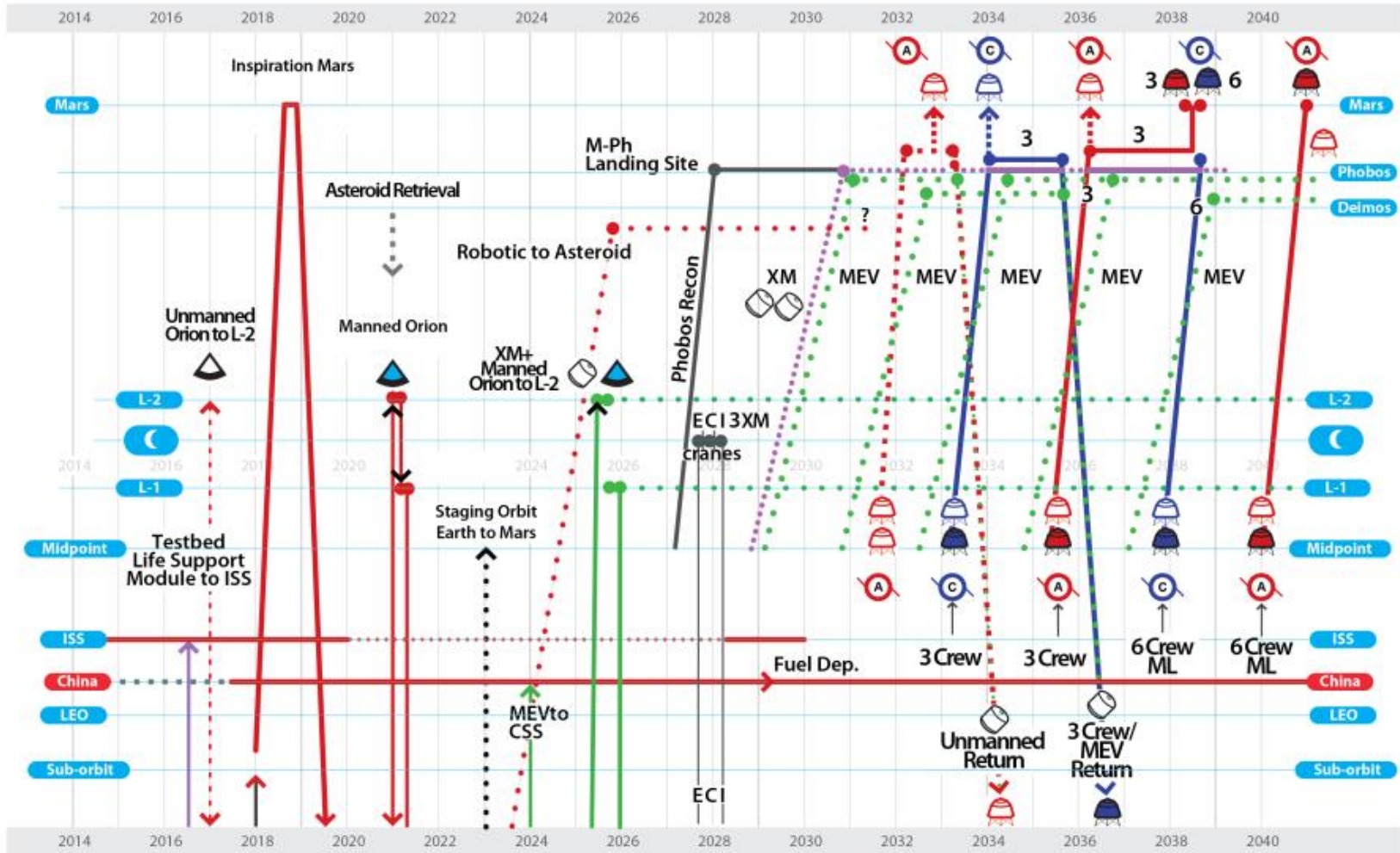
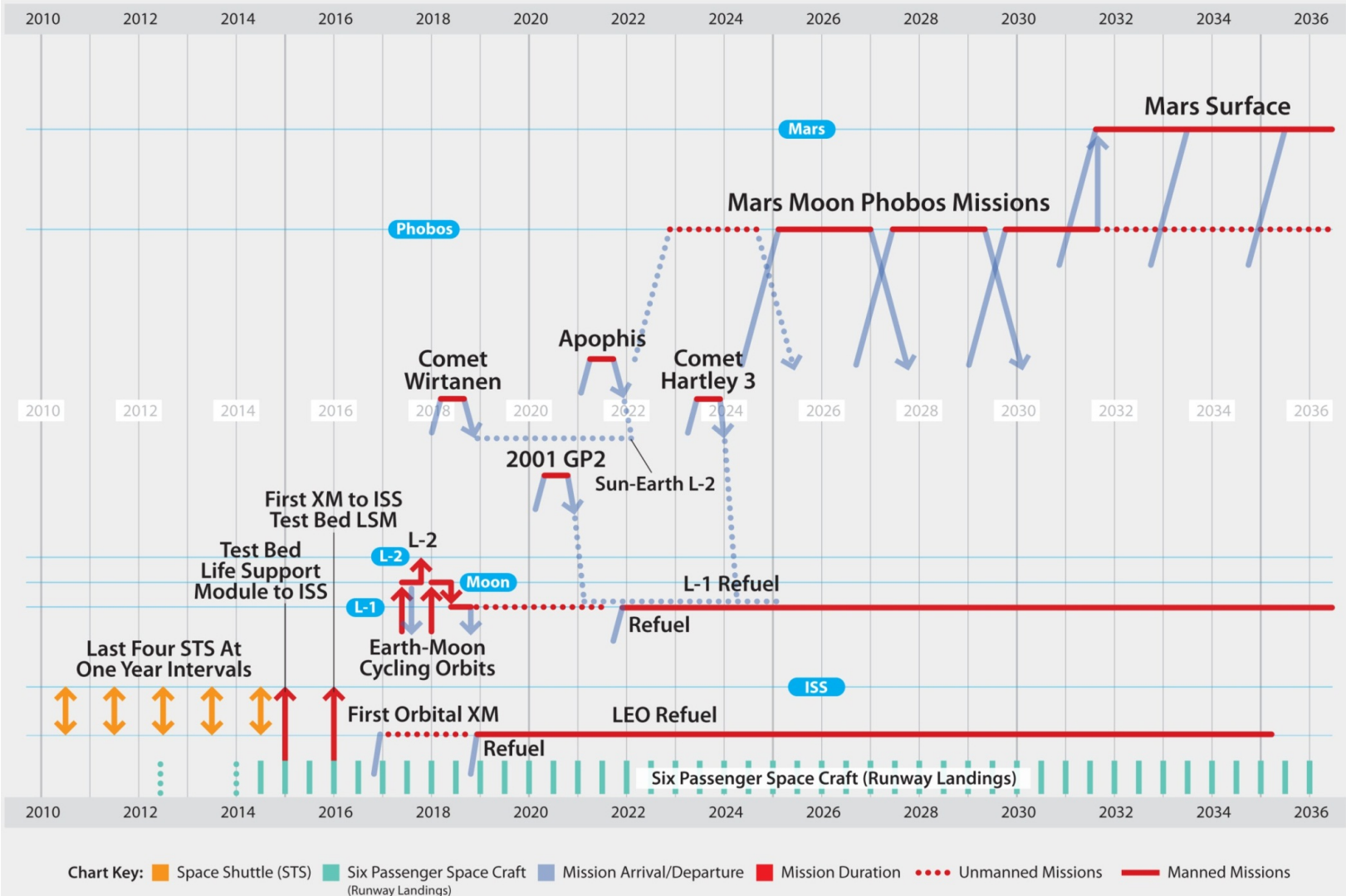


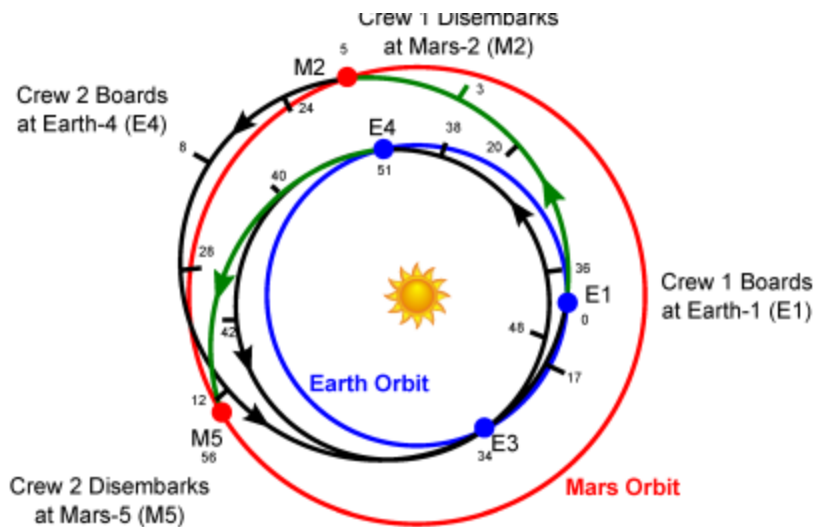
Chart Key: — Manned Missions — Manned XM ... Mars Exploration Vehicle un manned A Armstrong Cyclar Exploration Module (XM)
 - - - Unmanned Missions - - - Unmanned XM — Mars Exploration Vehicle manned C Conrad Cyclar Lander

United Space Vision 2009 Version

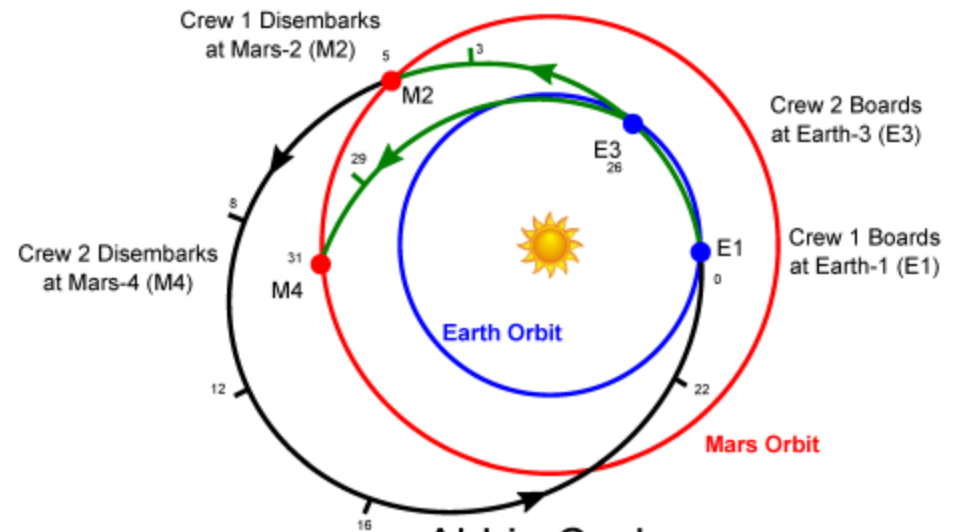
Unified Space Vision (U.S.) Civil Space Missions



1 VS. 2 Synodic Periods



S1L1 Cycler



Aldrin Cycler

Radial Distance Plot – 2 Synodic Period

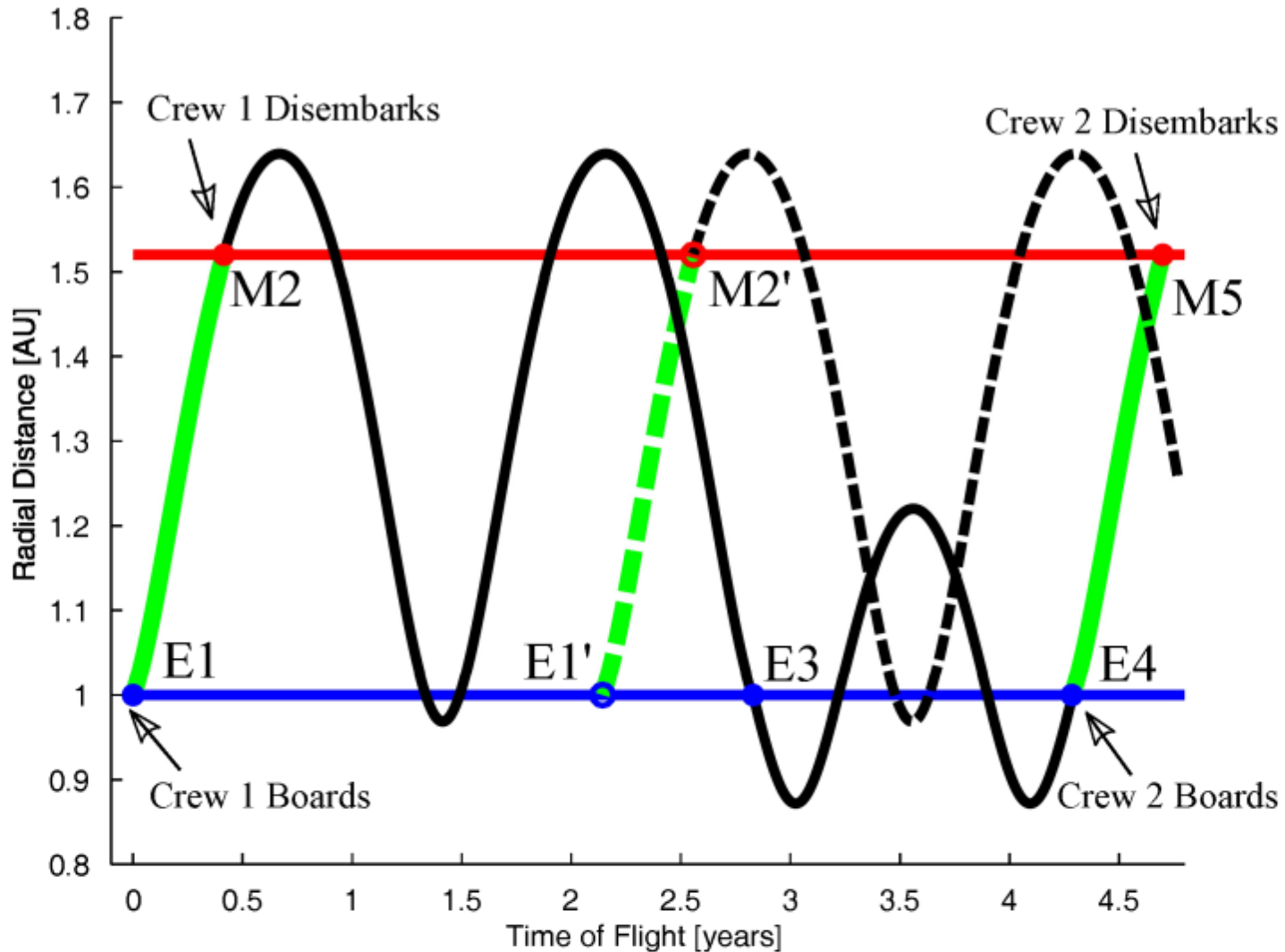


Illustration by Blake Rogers from

Purdue Aldrin 2 Synodic Period Cycler (Aldrin Cycler Added)

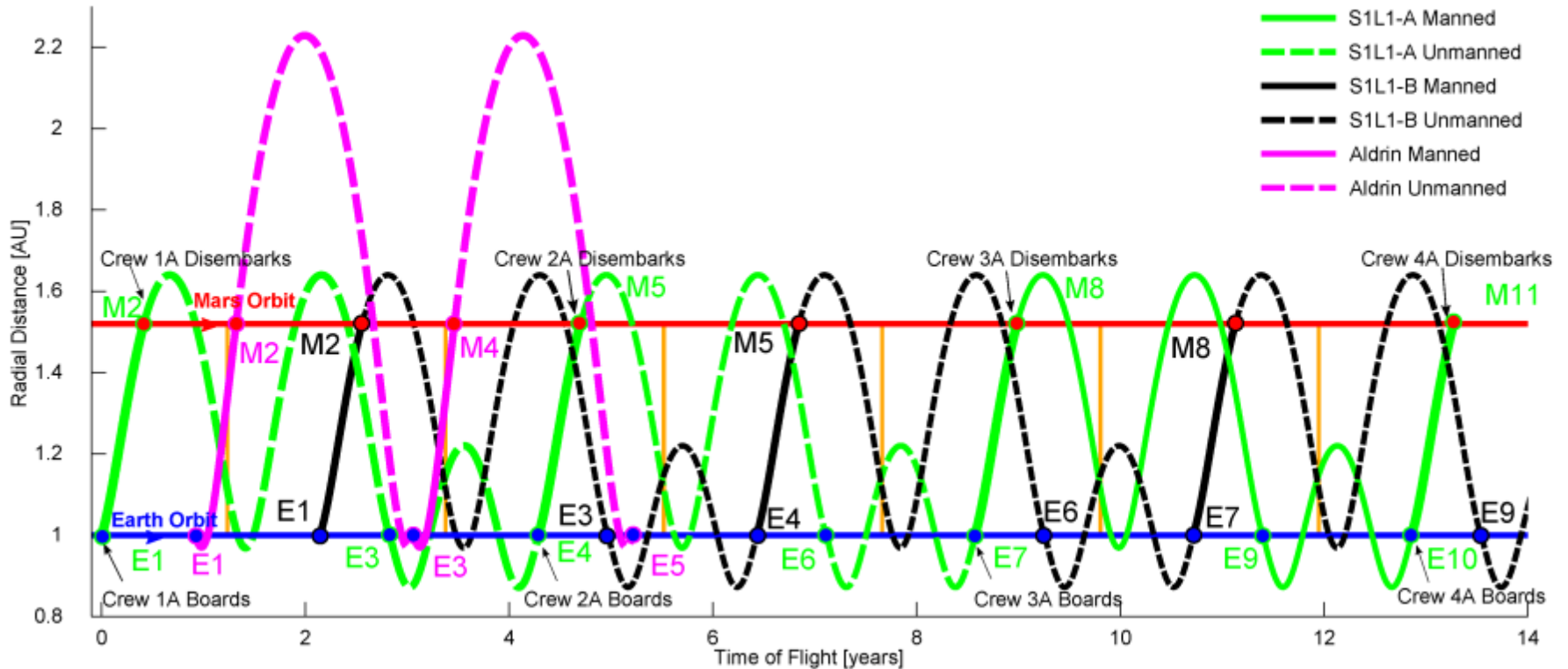


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