China’s Plans for Space

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Summary

- China is on a path to develop a “full spectrum” of space capabilities over next two decades, fulfilling multiple goals
  - Prestige/soft power (human spaceflight, exploration)
  - Support to military ops on Earth (PNT, ISR, satcom)
  - Deterrence (counterspace/missile defense)
  - Economic development/industrial base

- China is following same/similar paths as US and Russia, and generally not moving appreciably “faster”

- US faces important questions about the future of its relationship with China in space
CIVIL SPACE
Lunar exploration program

Phase 1
Orbital Missions

Chang’e 1 (2007)

Phase 2
Landers/Rovers

Chang’e 3 / Jade Rabbit (2013)

Phase 3
Sample Return

Chang’e 5 (2017)
Space station program

Tiangong-1 (2011)

Tiangong-2 (2016)

Tiangong-3 (2023)
China’s Space Station Planners Put out Welcome Mat

by Peter B. de Selding — October 13, 2015

JERUSALEM — China is soliciting international participation in its future manned space station in the form of foreign modules that would attach to the three-module core system, visits by foreign crew-transport vehicles for short stays and the involvement of non-Chinese researchers in placing experiments on the complex, the chief designer of China’s manned space program said Oct. 12.

China and the U.N. agree to help developing countries get access to space

July 27, 2016 by Tomasz Nowakowski, Astrowatch.net

Last month, China signed an agreement with the United Nations Office for Outer Space Affairs (UNOOSA) to open the country’s future space station for science experiments and astronauts from U.N. member states. According to a spokesperson from the China Manned Space Agency (CMSA), this cooperation heralds better accessibility to space for developing countries.
Is China really “accelerating”? 

Source: Secure World Foundation (2012)
NATIONAL SECURITY
## Chinese space-based ISR

<table>
<thead>
<tr>
<th>Satellite</th>
<th>Payloads</th>
<th>Resolutions</th>
<th>Number Operational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yaogan</td>
<td>EO, SAR, ELINT</td>
<td>1-10 meters</td>
<td>30+</td>
</tr>
<tr>
<td>Gaofen</td>
<td>EO, Staring camera</td>
<td>EO= &lt;1m-2m, Staring=50m</td>
<td>5</td>
</tr>
<tr>
<td>Haiyang</td>
<td>EO and color scanners</td>
<td>EO=250m</td>
<td>1</td>
</tr>
<tr>
<td>Huanjing</td>
<td>EO</td>
<td>30m</td>
<td>3</td>
</tr>
<tr>
<td>Jilin</td>
<td>EO</td>
<td>0.72m</td>
<td>4</td>
</tr>
<tr>
<td>Tainhui</td>
<td>Stereoscopic</td>
<td>5m</td>
<td>3</td>
</tr>
<tr>
<td>Gaojing</td>
<td>EO</td>
<td>0.5m</td>
<td>2</td>
</tr>
</tbody>
</table>

*Source: Pollpeter (2017)*
**Development Steps**

- BDS has been developing
  - in line with the *three-step* roadmap
  - the thinking of *from regional to global, and from active to passive*
  - forms a development path as *world-oriented, region-highlighted, with its unique features.*

Source: **Shen** (2016)
## ASAT/missile defense testing

<table>
<thead>
<tr>
<th>Date of Test</th>
<th>Target Object</th>
<th>Interceptor Object</th>
<th>Interceptor Type</th>
<th>Amount of Trackable Debris Created</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/5/2005</td>
<td>None known</td>
<td>SC-19</td>
<td>direct ascent</td>
<td>0</td>
<td>Likely rocket test</td>
</tr>
<tr>
<td>2/6/2006</td>
<td>None known</td>
<td>SC-19</td>
<td>direct ascent</td>
<td>0</td>
<td>Likely flyby of an unknown orbital target</td>
</tr>
<tr>
<td>1/11/2007</td>
<td>FengYun 1C</td>
<td>SC-19</td>
<td>direct ascent</td>
<td>3,280</td>
<td>Successful intercept and destruction of an orbital target</td>
</tr>
<tr>
<td>1/11/2010</td>
<td>CSS-X-11</td>
<td>SC-19</td>
<td>direct ascent</td>
<td>0</td>
<td>Successful intercept and destruction of a suborbital target</td>
</tr>
<tr>
<td>1/27/2013</td>
<td>Unknown</td>
<td>SC-19</td>
<td>direct ascent</td>
<td>0</td>
<td>Successful intercept and destruction of a suborbital target</td>
</tr>
<tr>
<td>5/13/2013</td>
<td>None known</td>
<td>DN-2</td>
<td>direct ascent</td>
<td>0</td>
<td>Likely rocket test of a new system capable of reaching GEO</td>
</tr>
<tr>
<td>7/23/2014</td>
<td>None known</td>
<td>SC-19</td>
<td>direct ascent</td>
<td>0</td>
<td>Non-destructive test</td>
</tr>
<tr>
<td>10/30/2015</td>
<td>None known</td>
<td>Possible upgraded SC-19</td>
<td>direct ascent</td>
<td>0</td>
<td>Non-destructive test</td>
</tr>
</tbody>
</table>

Total Amount of Trackable Debris: 3,280

Source: “ASAT testing in space: The Case of China”, SWF Fact Sheet

Source: “Through A Glass Darkly,” The Space Review
In-Space Eavesdropping? – China’s Shijian-17 completes High-Altitude Link-Up

December 9, 2016

China’s Shijian-17 has achieved another milestone in its extensive mission. The satellite was transported to a higher altitude orbit and has entered a long-term orbit. The spacecraft is equipped with a rendezvous and proximity operations (RPO) module, which is designed to perform complex maneuvers with other objects in space. The engineering team has now successfully completed its mission, showcasing China’s advanced space technology.

Mysterious Actions of Chinese Satellites Have Experts Guessing

By Leonard David, Space.com’s Space Insider Columnist | September 9, 2013 07:12am ET

Shijian-17 – one of China’s experimental satellites – completed its first flight on September 3, 2016. Lifted into orbit aboard a Long March 3B rocket, the 1.5-ton spacecraft’s mission is to study the ionosphere and its effects on communication systems. Shijian-17’s first test flight set a record, demonstrating China’s space capabilities.

Is China’s Mysterious New Satellite Really a Junk Collector—or a Weapon?

The Chinese say the high-tech satellite they launched will clean up space debris, but its extendable robotic arm has some wondering whether it could have a more sinister purpose.

DAVID AXE 07.05.16 12:01 AM ET
Promoting Cooperative Solutions for Space Sustainability

US ASAT/RPO testing

Bold Orion missile and B-47 aircraft. Image credit Wikimedia Foundation

Program 437AP launch. Source: Ted Molczan

DARPA Orbital Express Image credit Wikimedia Foundation

ASM-135 launch. Source: Wikimedia
COMMERCIAL SPACE
Chinese firms making commercial push

Landspace Commercial
Space Launch Services

HEAD Aerospace
Technology Co.
Suborbital tourism

Single-stage suborbital spaceplane carrying 20 passengers
(Source: ChinaWatch)
FUTURE US-CHINA SPACE RELATIONSHIP
Big questions

- Which kind of “leadership” role do we want to embrace?
  - Dominance vs Quarterback

- What is the right mix of competition and cooperation with China in space?
  - Relationship built on purely competition increases chance of conflict

- What is the right mix of government and private sector efforts to play to America’s strengths?
  - Do we really think we can run a “big government” space program better than China can?

- Will we continue to be a force for increased order in space, not disorder?
  - US helped build existing international system, will we continue to do so?
Thank you. Questions?

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