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Chinese Strategy, Military Forces, and Economics: *The Metrics of Cooperation, Competition and/or Conflict*

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Photo: AFP/ Getty Images

Introduction

China's actions, and its rapid emergence as a major regional military power, has led the U.S. to focus its military and strategic planning on China as one of two critical threats. Along with Russia, it has become the central focus of U.S. security planning in both the new *National Security Strategy (NSS)* that the President issued in December 2017, and in the new *National Defense Strategy (NDS)* that the Secretary of Defense issued early in 2018.

This analysis provides a brief summary of the new U.S. strategy, and then a survey of the metrics that help illustrate the changes in China's overall global position, and in its military forces and power projection capabilities. It draws on official U.S. reporting by the U.S. Department of Defense and Department of Energy, reporting by the Japanese Ministry of Defense and Ministry of Defense of Taiwan, reporting by the CSIS, Congressional Research Service, IISS, SIPRI and a wide range of other think tanks, and on various media reports.

The fact it relies on metrics drawn from a wide range of source help illustrate the complex relationships that are shaping China's emergence as a major global military and economic power. It draws heavily on official reporting, and particularly on the May 2018 edition of the Department of Defense's *Military and Security Developments Involving the Republic of China, Annual Report to Congress*.

At the same time, metrics and data illustrates some of the many areas where there are no reliable data and/or conflicting estimates. The report is not designed to justify the conclusions drawn in the *National Security Strategy (NSS)* and new *National Defense strategy*, but rather to illustrate a range of different assessments of key trends, and to put China's military developments in a broader context.

More generally, metrics are useful indicators, but are not a substitute for detailed analysis. There are also many aspects of China's emerging power which either cannot be portrayed using metrics or where no metrics are available. As such, this is more an aid to research and a means of quickly gaining abroad overview of g\the areas where metrics do provide useful summary indicators than anything approaching a comprehensive analysis.

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The U.S Strategic View of China

China and U.S. Strategy: The New National Security Strategy (NSS) and National Defense Strategy (NDS) on China

U.S. National Security Strategy: December 2017

China and Russia challenge American power, influence, and interests, attempting to erode American security and prosperity. They are determined to make economies less free and less fair, to grow their militaries, and to control information and data to repress their societies and expand their influence.

...Competition does not always mean hostility, nor does it inevitably lead to conflict although none should doubt our commitment to defend our interests. An America that successfully competes is the best way to prevent conflict. Just as American weakness, invites challenge, American strength and confidence deters war and promotes peace.

...Although the United States seeks to continue to cooperate with China, China is using economic inducements and penalties, influence operations, and implied military threats to persuade other states to heed its political and security agenda. China's infrastructure investments and trade strategies reinforce its geopolitical aspirations. Its efforts to build and militarize outposts in the South China Sea endanger the free flow of trade, threaten the sovereignty of other nations, and undermine regional stability.

China has mounted a rapid military modernization campaign designed to limit U.S. access to the region and provide China a freer hand there. China presents its ambitions as mutually beneficial, but Chinese dominance risks diminishing the sovereignty of many states in the Indo- Pacific. States throughout the region are calling for sustained U.S. leadership in a collective response that upholds a regional order respectful of sovereignty and independence.

U.S. National Defense Strategy: February 2018

China is a strategic competitor using predatory economics to intimidate its neighbors while militarizing features in the South China Sea... China is leveraging military modernization, influence operations, and predatory economics to coerce neighboring countries to reorder the Indo-Pacific region to their advantage. As China continues its economic and military ascendance, asserting power through an all-of-nation long-term strategy, it will continue to pursue a military modernization program that seeks Indo-Pacific regional hegemony in the near-term and displacement of the United States to achieve global preeminence in the future. The most far-reaching objective of this defense strategy is to set the military relationship between our two countries on a path of transparency and non-aggression.

... Long-term strategic competitions with China and Russia are the principal priorities for the Department, and require both increased and sustained investment, because of the magnitude of the threats they pose to U.S. security and prosperity today, and the potential for those threats to increase in the future. Concurrently, the Department will sustain its efforts to deter and counter rogue regimes such as North Korea and Iran, defeat terrorist threats to the United States, and consolidate our gains in Iraq and Afghanistan while moving to a more resource-sustainable approach.

... *Expand Indo-Pacific alliances and partnerships.* A free and open Indo-Pacific region provides prosperity and security for all. We will strengthen our alliances and partnerships in the Indo-Pacific to a networked security architecture capable of deterring aggression, maintaining stability, and ensuring free access to common domains. With key countries in the region, we will bring together bilateral and multilateral security relationships to preserve the free and open international system.

Secretary of Defense Mattis on China: Shangri-La Dialogue - 6.2.18

Americas Indo-Pacific strategy is a subset of our broader security strategy, codifying our vegetables as America continues to look West. In it we see deepening alliances and partnerships as a priority, ASEAN's centrality remains vital, and cooperation with China is welcome wherever possible. And while we explore new opportunities for meaningful multilateral cooperation, we will deepen our engagement with existing regional mechanisms at the same time.

...So, make no mistake, America is in the Indo-Pacific to stay. This is our priority theater, our interests, and the regions are inextricably intertwined. Our Indo-Pacific strategy makes significant security, economic, and development investments, ones that demonstrate our commitment to allies and partners in support of our vision of a safe, secure, prosperous, and free Indo-Pacific based on shared principles with those nations, large and small. Our Indo-Pacific strategy informs our relationship with China. We are aware China will face an array of challenges and opportunities in coming years. We are prepared to support China's choices, if they promote long-term peace and prosperity for all in this dynamic region.

Yet China's policy in the South China Sea stands in stark contrast to the openness of our strategy. It promotes -- what our strategy promotes, it calls into question China's broader goals. China's militarization of artificial features in the South China Sea includes the deployment of anti-ship missiles, surface-to-air missiles, electronic jammers, and more recently, the landing of bomber aircraft at Woody Island.

Despite China's claims to the contrary, the placement of these weapons systems is tied directly to military use for the purposes of intimidation and coercion. China's militarization of the Spratlys is also in direct contradiction to President Xi's 2015 public assurances in the White House Rose Garden that they would not do this.

For these reasons, and as initial response to China's continued militarization of the South China Sea, last week we disinvented the People's Liberation Army Navy from the 2018 Rim of the Pacific Exercise, as China's behavior is inconsistent with the principals and the purposes of the RIMPAC exercise, the world's largest Naval exercise, and exercise in which transparency and cooperation are hallmarks.

To be clear, we do not ask any country to choose between the United States and China, because a friend does not demand you choose among them. China should and does have a voice in shaping the international system, and all of China's neighbors have a voice in shaping China's role. If the U.S. will continue to pursue a constructive results oriented relationship with China, cooperation whenever possible, will be the name of the game and competing vigorously where we must.

Of course, we recognize any sustainable Indo-Pacific order, as a role for China, and at China's invitation, I will travel to Beijing soon, in our open transparent approach to broadening and deepening the national dialogue between our two Pacific nations.

I will end as I began. As a Pacific nation, the United States remains committed to building a shared destiny with this region. The U.S. offers strategic partnerships, not strategic dependence. Alongside our allies and partners, America remains committed to maintaining the region's security, its stability and its economic prosperity, a view that transcends America's political transitions, and we'll continue to enjoy Washington's strong bipartisan support.

For as, President Trump said, in Da Nang, we will never ask our partners to surrender their sovereignty or intellectual property. We don't dream of domination. Working together on basis of shared principals, we can create a future that provides peace, prosperity, and security for all, a constellation of nations, each in its own bright star, satellites to none. Thank you, ladies and gentlemen, and I look forward to your questions.

.... MR. CHIPMAN: And from China, Senior Colonel Zhao Xiaozhuo.

Q: Thank you. A couple of years ago, the United States sent the Antietam missile cruiser and the -- the Higgins missile destroyer to China's territorial waters. And the -- I think it is a violation of the law of the People's Republic of China, of territorial waters, and -- and the contiguous zone. And also it is obvious provocation to China's national security and territorial integrity. I think it is the militarization in the South China Sea under the veil of the freedom of navigation. So I'd like to have your comment on this.

SEC. MATTIS: Yes, Colonel, I think it goes to a fundamental disconnect between the way the international tribunals have looked at these waters. These waters, to us, are free and open international waters. We all talk about a free and open Pacific, a free and open Asia-Pacific, a free and open Indo-Pacific. Freedom means freedom for all nations, large and small, to transit international airspace, international waters.

Traditionally, historically, and by the rule of law, this is not -- this is not a revisionist view. This is a traditional view. This is an established view, and we've had international tribunals reinforce this, independent from us, that we don't -- we don't control it, it was under (N Kloss ?), and so when we see those kind of manifestations of interpretations of international law, then we act accordingly.

We do not do freedom of navigation for America alone. We do freedom of navigation -- it's freedom for all nations, large and small, that need to transit those waters for their own prosperity and they have every reason to do so.

So we do not see it as a militarization by going through what has traditionally been an international water space. What we see it as is a reaffirmation of the rules-based order. And we -- I -- again, I will be going to Beijing to have further discussions on this at your government's invitation here at the end of the month.

But I understand the disagreement, but it is not one on which we are unstudied and we believe it's only appropriate that we keep those waterways open for all nations.

...Well, I -- I think that -- dealing with it as a reality, I think there are consequences to China ignoring the international community. We firmly believe in the non-coercive aspects of how nations should get along with each other, that they should listen to each other....Nothing wrong with competition, nothing wrong with having strong positions, but when it comes down to introducing what they have done in the South China Sea, there are consequences.

I would tell you that up until -- if you'd asked me two months ago, I'd have said we are still attempting to maintain a cooperative stance with the PRC, with China. We (were ?) inviting them to the RIMPAC and world's largest naval exercise in order to try to keep the open lines of military communication between us and transparency.

But when you look at what President Xi said in the Rose Garden of the White House in 2015, that they would not militarize the Spratlys, and then we watched what happened four weeks ago, it was time to say there's a consequence to this. And the world's largest naval exercise will not have the Chinese Navy participating.

But that's a relatively small consequence, and I believe there are much larger consequences in the future when nations lose the report of their neighbors, when they believe that piling mountainous debts on their neighbors and somehow removing the freedom of political action is the way to engage with them.

Eventually, these things do not pay off, even if on the financial (lender sheet ?) or the power (lender sheet ?) they appear to. It's a very shaky foundation when we believe that militarizing features are somehow going to endorse their standing in the world, and -- and enhance it. It is not. It's not going to be endorsed in the world. It's not going to enhance it.

And you have to wonder why military actions that are politically injurious would be engaged in by a nation. What is the value to having carried out military operations? Number one, we all know nobody is ready to invade those features. Certainly, we could have had the dispute resolution go on in a peaceful way. To simply muscle the way in using weapons to do what international tribunals do not endorse is not a way to make long-term collaboration the role of the road in a region that's as important to China's future and we respect that, as it is to every other nation's future out here.

So, there are consequences that will continue to come home to roost, so to speak, with China if they do not find the way to work more collaboratively with all of the nations who have interest.

...let me tell you that when we have discussions on these matters, the reason why public figures do not want to give specific answers is that these are complex issues. And when you start saying, "yes, no, black, white" -- we have been on the record about international tribunals that say there is no such thing as a nine-dash line, or is no legal basis for this -- we stand by international law. We stand by international tribunals. We listen to each nation's concerns. And to simply turn it into a -- a military or non-military response is -- is a shortchanging of the issue.

This is what diplomacy is all about. Diplomacy is all about taking contrary perspectives and finding common ground. And we've got to try to do that in this world. Those of us who have worn uniforms, those who wear uniforms today, are keenly aware of the cost of war, and there has got to be a commitment, not a, "Well, when it suits me, I'll listen to other nations." Not, "When it suits me, I'll listen to international tribunals."

It's go to be that we actually want to live by these rules, these rules that have allowed China to recover many people from the depths of poverty and bring up their quality of life; these rules have helped China. There is a reason why China, I believe, will eventually come to grips with the needs and the expectations of the neighbors around them.

And further, I would just tell you that we maintain confidentiality at times in these efforts, and I -- you know, I mean it's a free and open press here, and I -- I support that, but at the same time, you can often do most of your good work and setting the conditions for a path ahead by not locking yourself into public statements where, understandably, people take each word separately apart and now pretty soon you're -- you're locked into positions that do not allow the diplomats to find common ground.

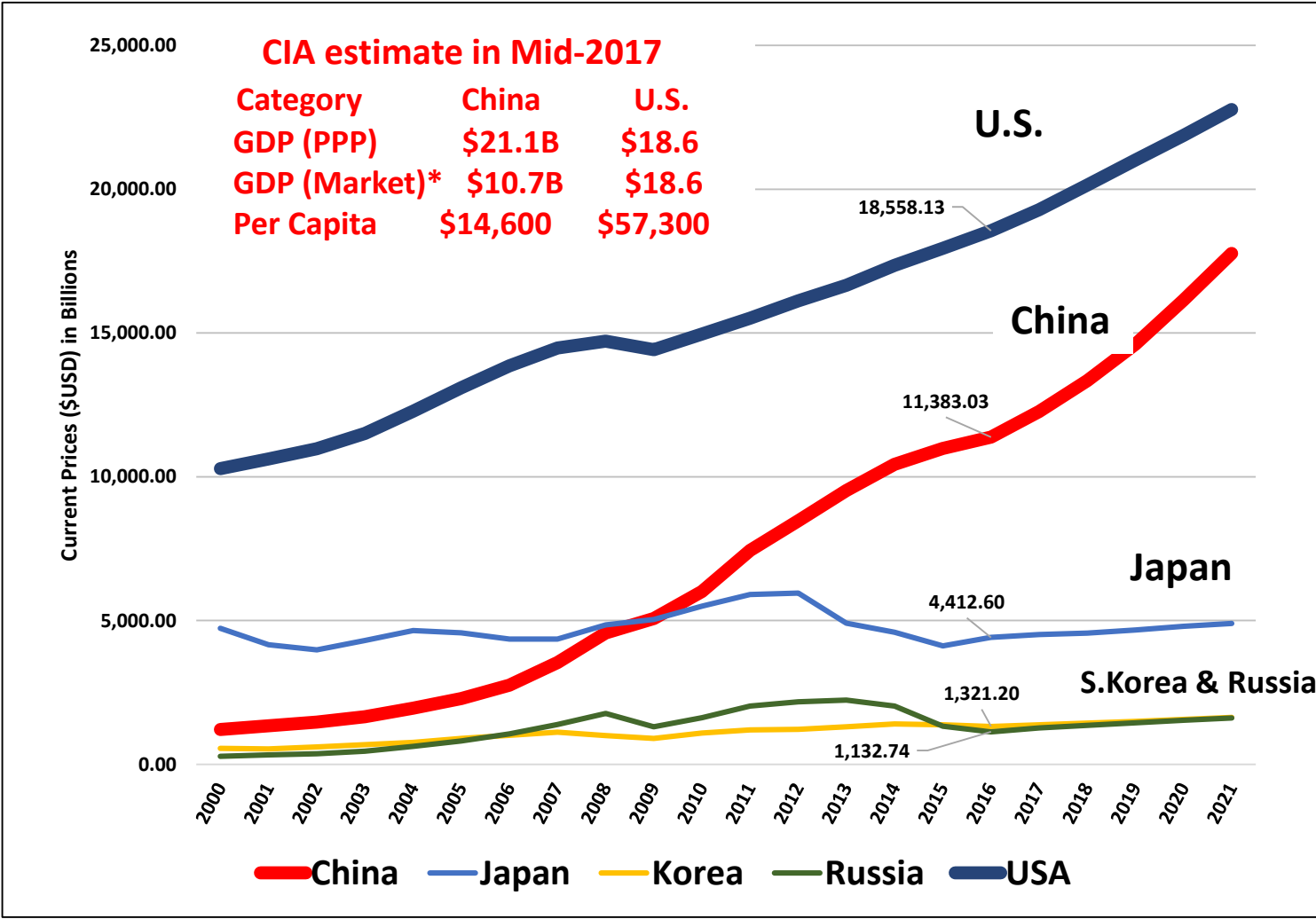
So I'm not trying to give a -- a civics class here, I just want you to understand why in many cases those who actually carry the responsibility do not go for, "It's my way or the highway," or there's only one position. That would -- might very well be a going in position, and we stand by our treaty allies, but this is a discussion between the current administration in the Manila and in Washington D.C., and it's not one that can be answered as simply as your question would indicate.

China's Steadily Emerging Role as a Global and Pacific Economic Power

The Strategic Background: Emerging from China's Dark Years

- **Opium Wars: 1839-1842 and 1856-60**
- **Foreign Concessions/Unequal Treaties: Hong Kong 1842-1997**
- **Taiping Rebellion: 1850-1864**
- **Sino-Japanese War: 1884-1895**
- **Boxer Rebellion 1899 and Siege of Beijing: 1900**
- **Revolution and Warlords: 1911-1937**
- **Manchurian Incident/Japanese Invasion: 1931**
- **Full Japanese Invasion (Marco Polo Bridge/Peking/Nanking): 1937-1945**
- **Chinese Civil War: (1927?) 1945-1949**
- **Korean war: 1950-1953**
- **Sino-Soviet Split: 1960-1984/1989**
- **Great Redoubt, Great Leap Forward, Cultural Revolution: 1951-?, 1958-1962, 1966-1976**
- **Sino-Vietnam War: 1979**

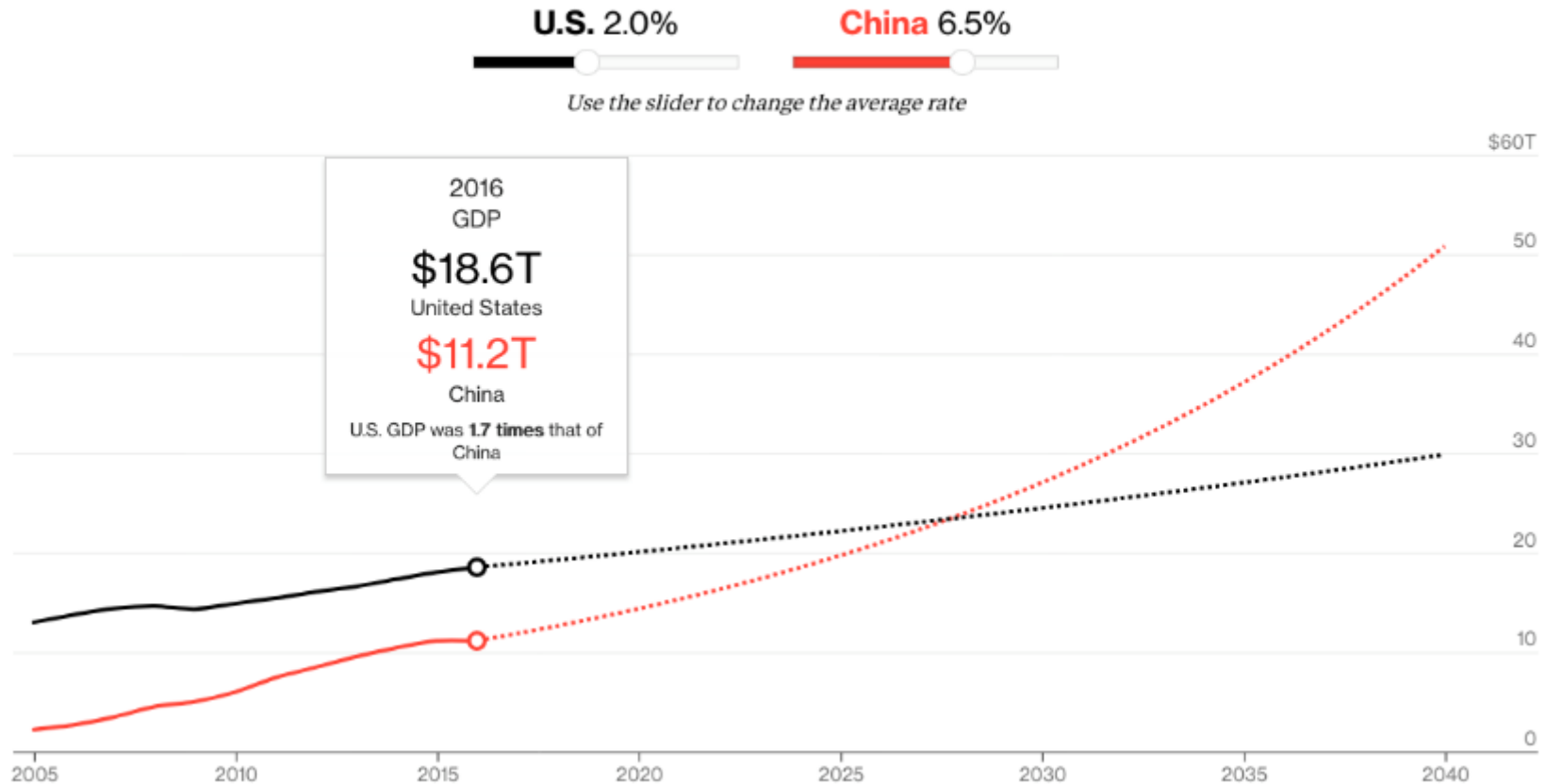
IMF Estimate of Comparative Rise in GDP: 2000-2021



Source: CIA World Factbook and IMF, *World Economic Outlook Database*, April 2016, accessed June, 29 2016, <https://www.imf.org/external/pubs/ft/weo/2016/01/weodata/index.aspx>, adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies. (* Official exchange rate)

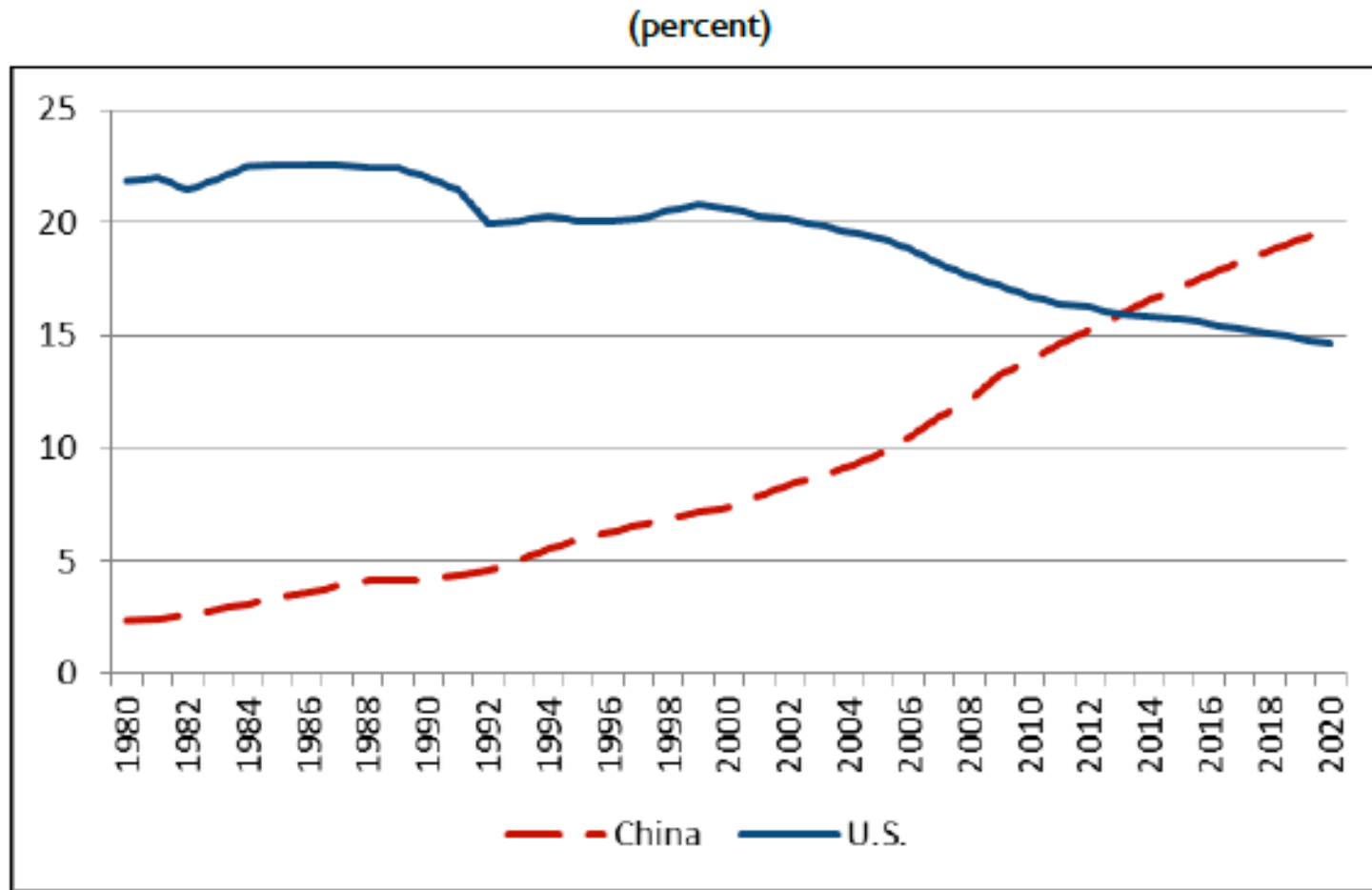
Who Will Lead in Future? China vs. US GDP: 2005-2040

China's GDP will overtake the U.S. level in 2028 at these projected average growth rates:



[Malcolm Scott](#), [Cedric Sam](#): *Here's How Fast China's Economy Is Catching Up to the U.S.*, Bloomberg May 12, 2016, Updated: November 06, 2017, and CIA World Factbook, accessed 11 May 2018

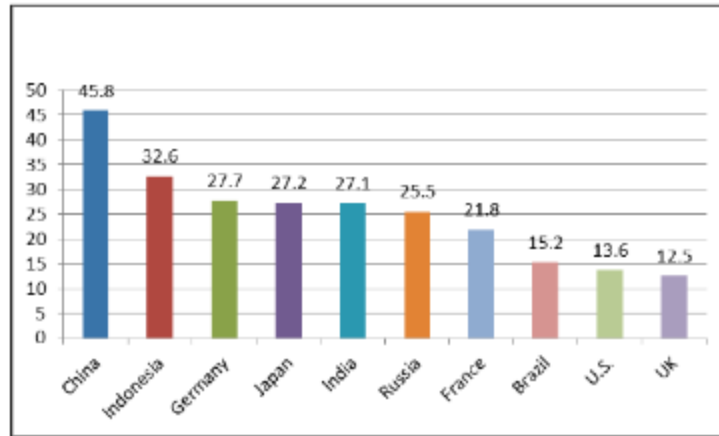
Who Will Lead in Future? Chinese and U.S. GDP (PPP Basis) as a Percentage of Global Total: 1980-2016 and Projections through 2020



Source: IMF, World Economic Outlook, October 2017.

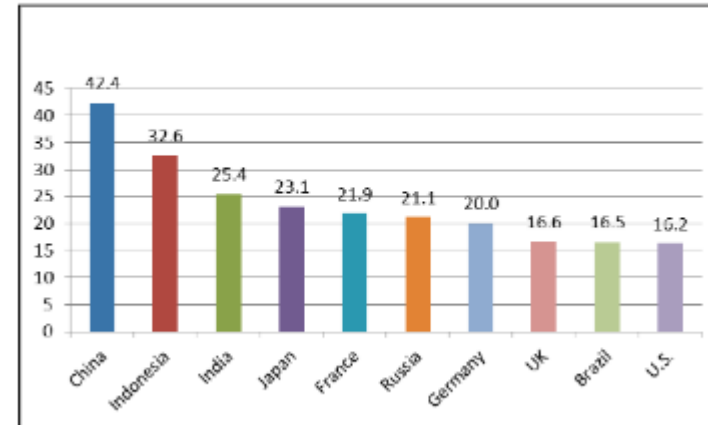
Who Will Lead in Future? Some Key Indicators

Comparison of Gross Savings Rates for Major Global Economies in 2016
(percentage of GDP)



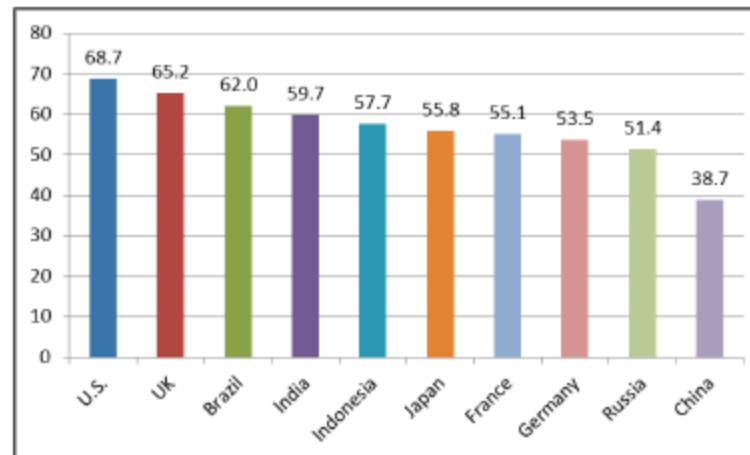
Source: Economist Intelligence Unit.

Comparison of Gross Fixed Investment for Major Global Economies in 2016
(percentage of GDP)



Source: Economist Intelligence Unit.

Comparison of Private Consumption of Major Global Economies in 2016
(percentage of GDP)

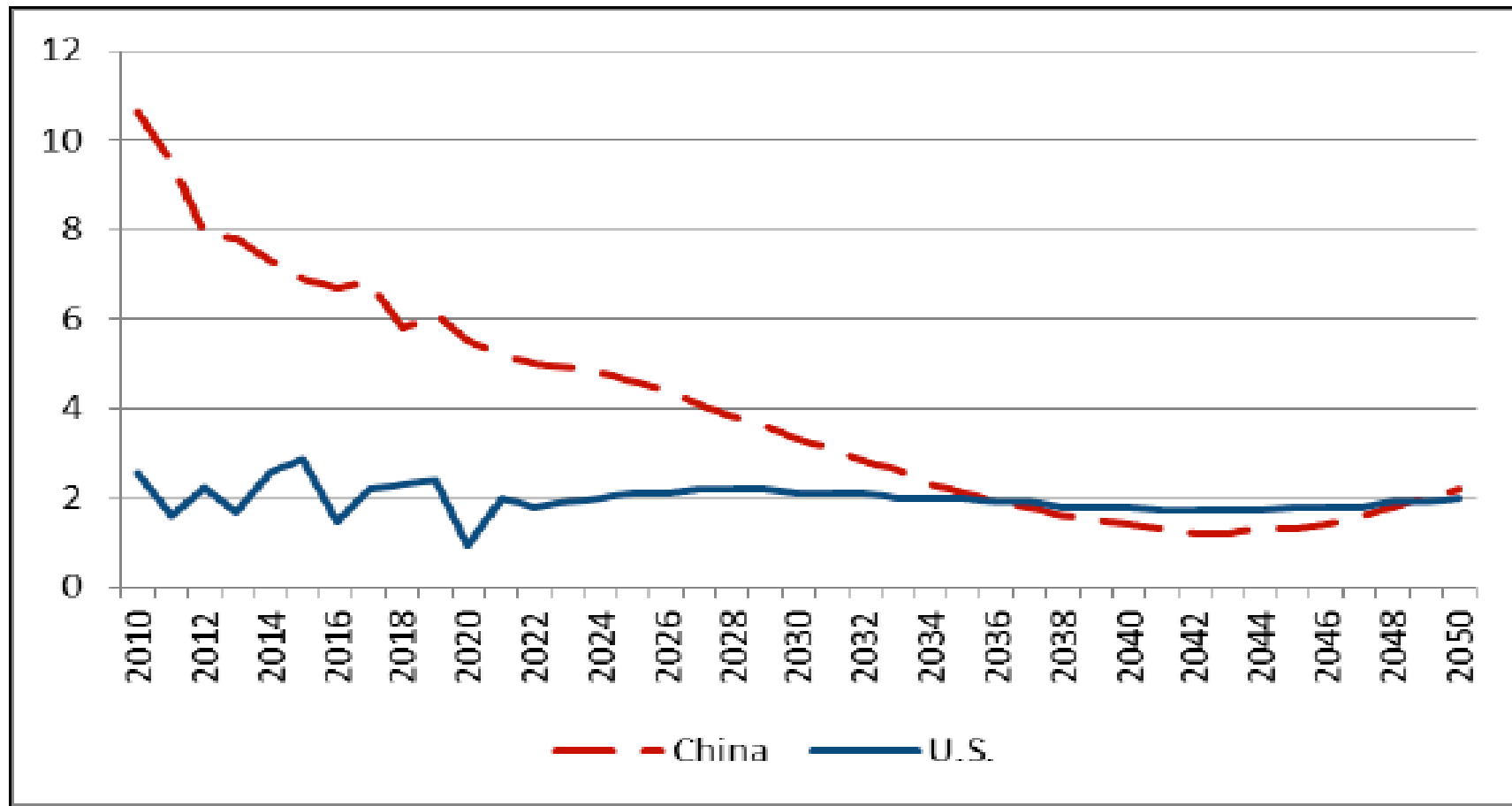


Source: Economist Intelligence Unit.

Source Wayne M. Morrison, *China's Economic Rise: History, Trends, Challenges, and Implications for the United States*, CRS RL33534, February 5, 2018, p. 36, 37.

U.S. and Chinese Real GDP Growth Rates

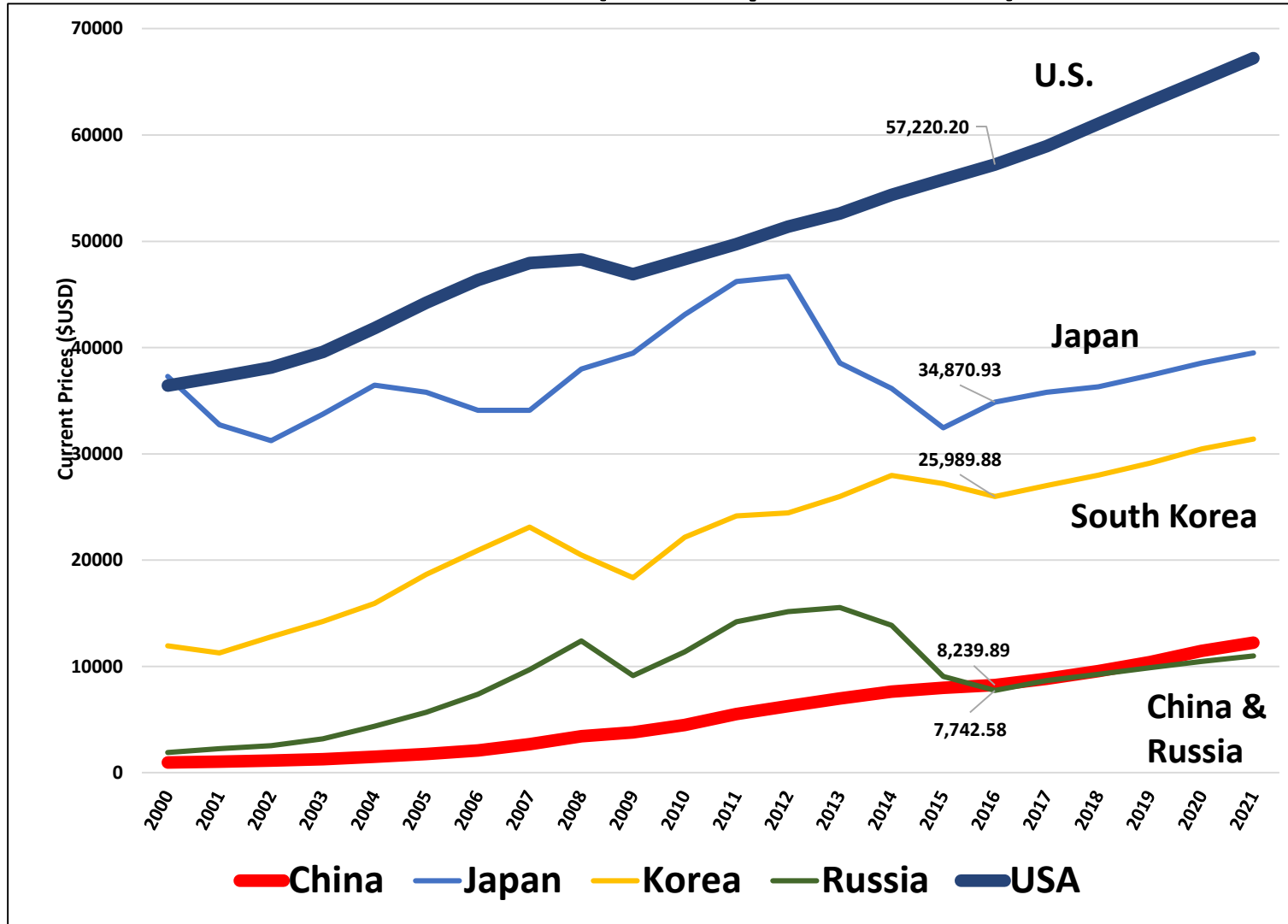
(percent)



Note: Economist Intelligence Unit Database (accessed on January 26, 2018). Long-range economic projections should be viewed with caution. EIU's projections differ from those of the IMF in **Figure 4**.

Source: Wayne M. Morrison, *China's Economic Rise: History, Trends, Challenges, and Implications for the United States*, CRS RL33534, February 5, 2018, p. 8.

Shifts in Wealth (Per Capita Income)



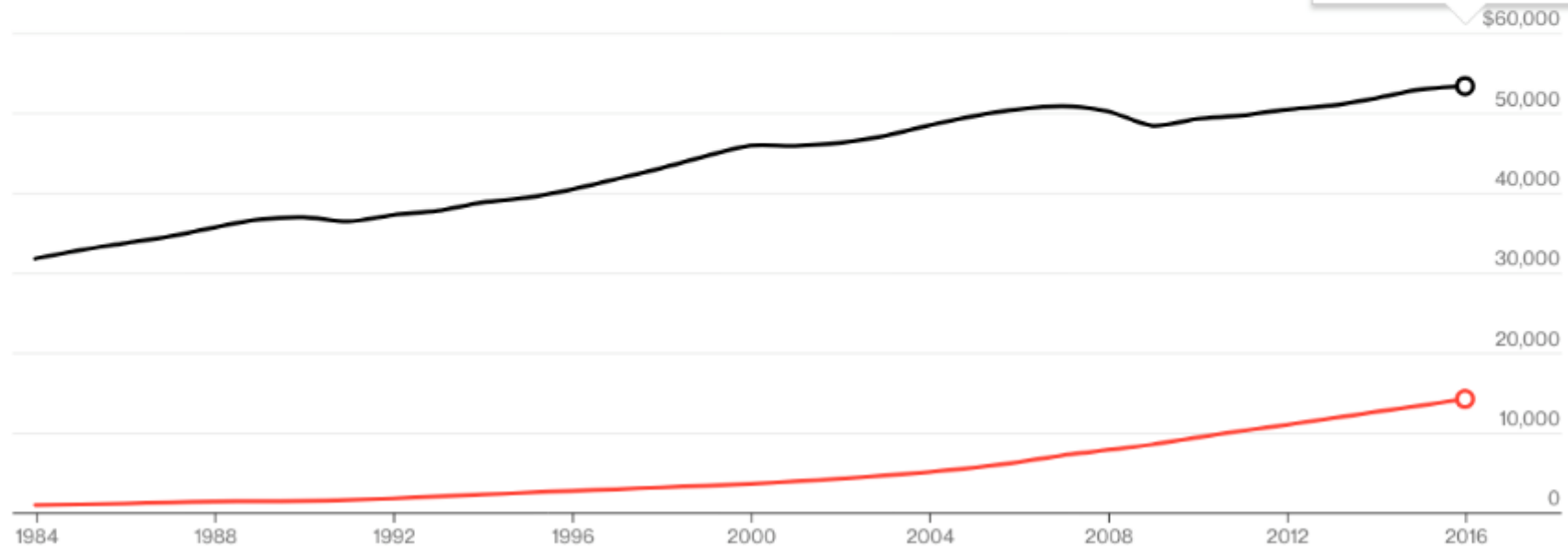
Source: IMF, *World Economic Outlook Database*, April 2016, accessed June 29, 2016, <https://www.imf.org/external/pubs/ft/weo/2016/01/weodata/index.aspx> adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies.

Chinese vs. US GDP Per Capita: 1984-2017

Most Chinese people are still much poorer than the average American

Even on a purchasing power parity basis that adjusts for price differences, the average Chinese person still has only about a third the spending power of an American. China wants to boost consumption to rebalance growth. That would also help erode the trade surplus with the U.S.—a bugbear for President Trump.

2016
GDP per capita (PPP)
\$53,417
United States
\$14,275
China
U.S. GDP per capita was
3.7 times that of China



Figures are in purchasing power parity, 2011 international dollars.

[Malcolm Scott](#), [Cedric Sam](#): *Here's How Fast China's Economy Is Catching Up to the U.S.* Bloomberg May 12, 2016 | Updated: November 06, 2017, Sources: IMF (via Bloomberg). Additional work by: Christopher Cannon, Michael Keller and Ailing Tan

China vs. US Economic Power: CIA 2018

China vs. US: 2017

CHINA

[GDP \(purchasing power parity\):](#) 

\$23.12 trillion (2017 est.)

\$21.66 trillion (2016 est.)

\$20.3 trillion (2015 est.)


note: data are in 2017 dollars

country comparison to the world: [1](#)

[GDP \(official exchange rate\):](#) 

\$11.94 trillion (2017 est.)

note: because China's exchange rate is determined by fiat rather than by market forces, the official exchange rate measure of GDP is not an accurate measure of China's output; GDP at the official exchange rate substantially understates the actual level of China's output vis-a-vis the rest of the world; in China's situation, GDP at purchasing power parity provides the best measure for comparing output across countries


[GDP - real growth rate:](#) 

6.8% (2017 est.)

6.7% (2016 est.)

6.9% (2015 est.)

country comparison to the world: [13](#)

[GDP - per capita \(PPP\):](#) 

\$16,600 (2017 est.)

\$15,700 (2016 est.)

\$14,800 (2015 est.)

note: data are in 2017 dollars

[Exports:](#) 

\$2.157 trillion (2017 est.)

\$1.99 trillion (2016 est.)

country comparison to the world: [1](#)

[Exports - commodities:](#) 

electrical and other machinery, including computers and telecommunications equipment, apparel, furniture, textiles

[Exports - partners:](#) 

US 18.2%, Hong Kong 13.8%, Japan 6.1%, South Korea 4.5% (2016)

[Imports:](#) 

\$1.731 trillion (2017 est.)

\$1.495 trillion (2016 est.)

country comparison to the world: [2](#)

[Imports - commodities:](#) 

electrical and other machinery, including integrated circuits and other computer components, oil and mineral fuels; optical and medical equipment, metal ores, motor vehicles; soybeans

[Imports - partners:](#) 

South Korea 10%, Japan 9.2%, **US 8.5%**, Germany 5.4%, Australia 4.4% (2016)

USA

[GDP \(purchasing power parity\):](#) 

\$19.36 trillion (2017 est.)

\$18.95 trillion (2016 est.)

\$18.67 trillion (2015 est.) note: data are in 2017 dollars
country comparison to the world: [3](#)

[GDP \(official exchange rate\):](#) 

\$19.36 trillion (2017 est.)


[GDP - real growth rate:](#) 

2.2% (2017 est.)

1.5% (2016 est.)

2.9% (2015 est.)

country comparison to the world: [144](#)

[GDP - per capita \(PPP\):](#) 

\$59,500 (2017 est.)

\$58,600 (2016 est.)

\$58,200 (2015 est.)

note: data are in 2017 dollars


country comparison to the world: [20](#)

[Exports:](#) 


\$1.576 trillion (2017 est.)

\$1.456 trillion (2016 est.)


country comparison to the world: [3](#)

[Exports - commodities:](#) 

agricultural products (soybeans, fruit, corn) 9.2%, industrial supplies (organic chemicals) 26.8%, capital goods (transistors, aircraft, motor vehicle parts, computers, telecommunications equipment) 49.0%, consumer goods (automobiles, medicines) 15.0% (2008 est.)

[Exports - partners:](#) 


Canada 18.3%, Mexico 15.9%, **China 8%**, Japan 4.4% (2016)

[Imports:](#) 

\$2.352 trillion (2017 est.)

\$2.208 trillion (2016 est.)

country comparison to the world: [1](#)

[Imports - commodities:](#) 

agricultural products 4.9%, industrial supplies 32.9% (crude oil 8.2%), capital goods 30.4% (computers, telecommunications equipment, motor vehicle parts, office machines, electric power machinery), consumer goods 31.8% (automobiles, clothing, medicines, furniture, toys) (2008 est.)

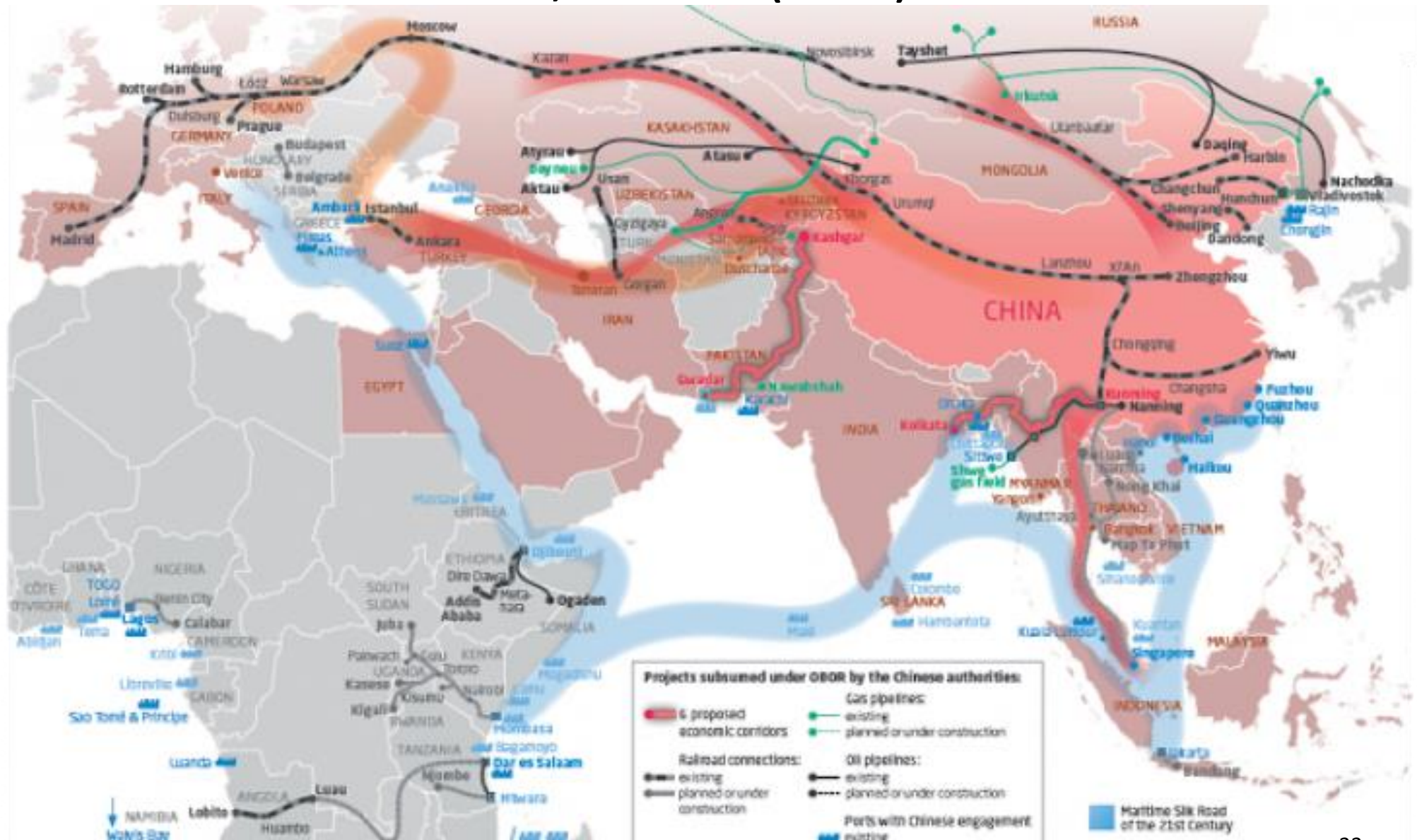
[Imports - partners:](#) 

China 21.1%, Mexico 13.4%, Canada 12.7%, Japan 6%, Germany 5.2% (2016)

- **1,379 vs. 327 million**
- **GDP PPP: 1.19**
- **GDP OER: 0.62**
- **GDP Per Capita: 0.27**
- **Exports: 1.36 (18.2% vs. 8%)**
- **Imports: 0.73 (8.5% vs. 21.1%)**

China's Growing Global Engagement

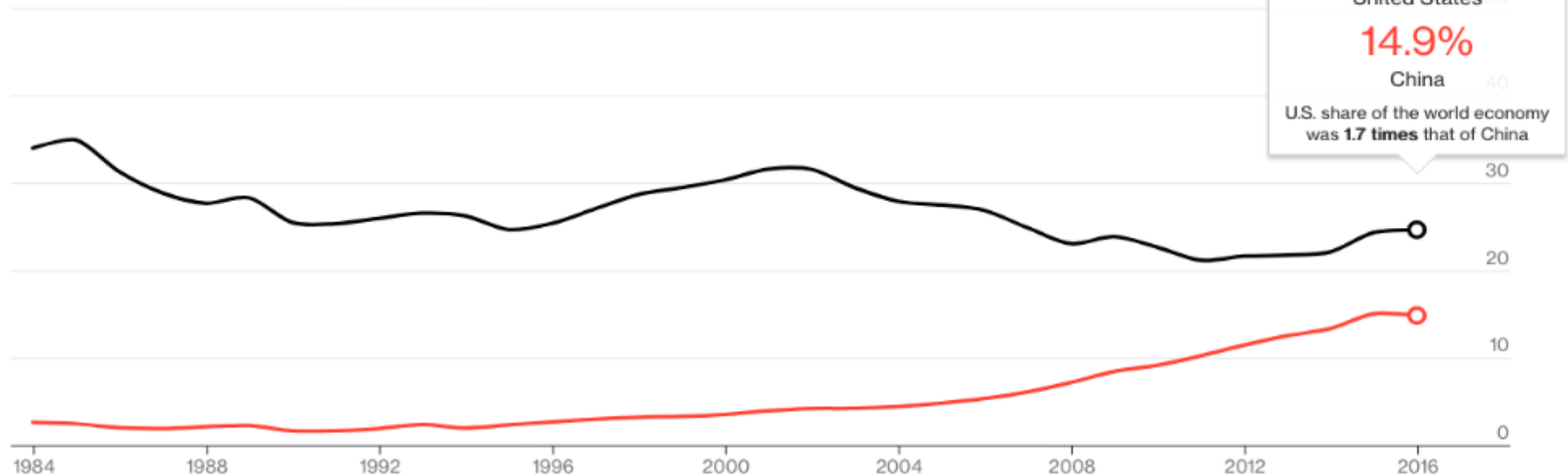
China's Expanding Strategic Interests: One Belt, One Road (OBOR) in 2017



Chinese vs. US Percent of Global Economy: 1984-2040

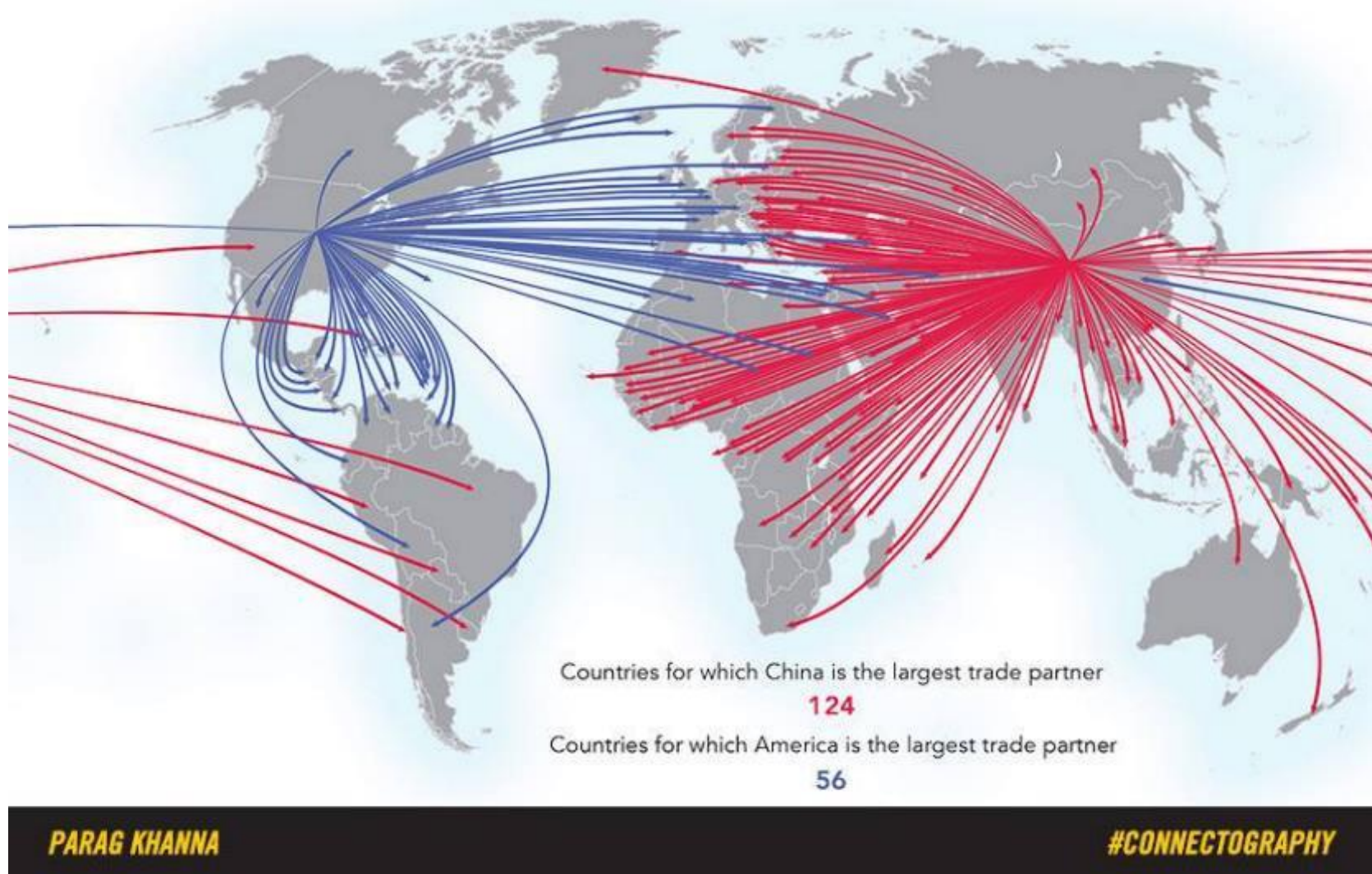
China and the U.S. make up almost 40 percent of the world economy

As China grows, it's making up a larger share of the global economy. But it's not all at America's expense—China is muscling out Europe and Japan, too. China's growing heft means it'll contribute more than a third to global growth this year, according to IMF estimates.



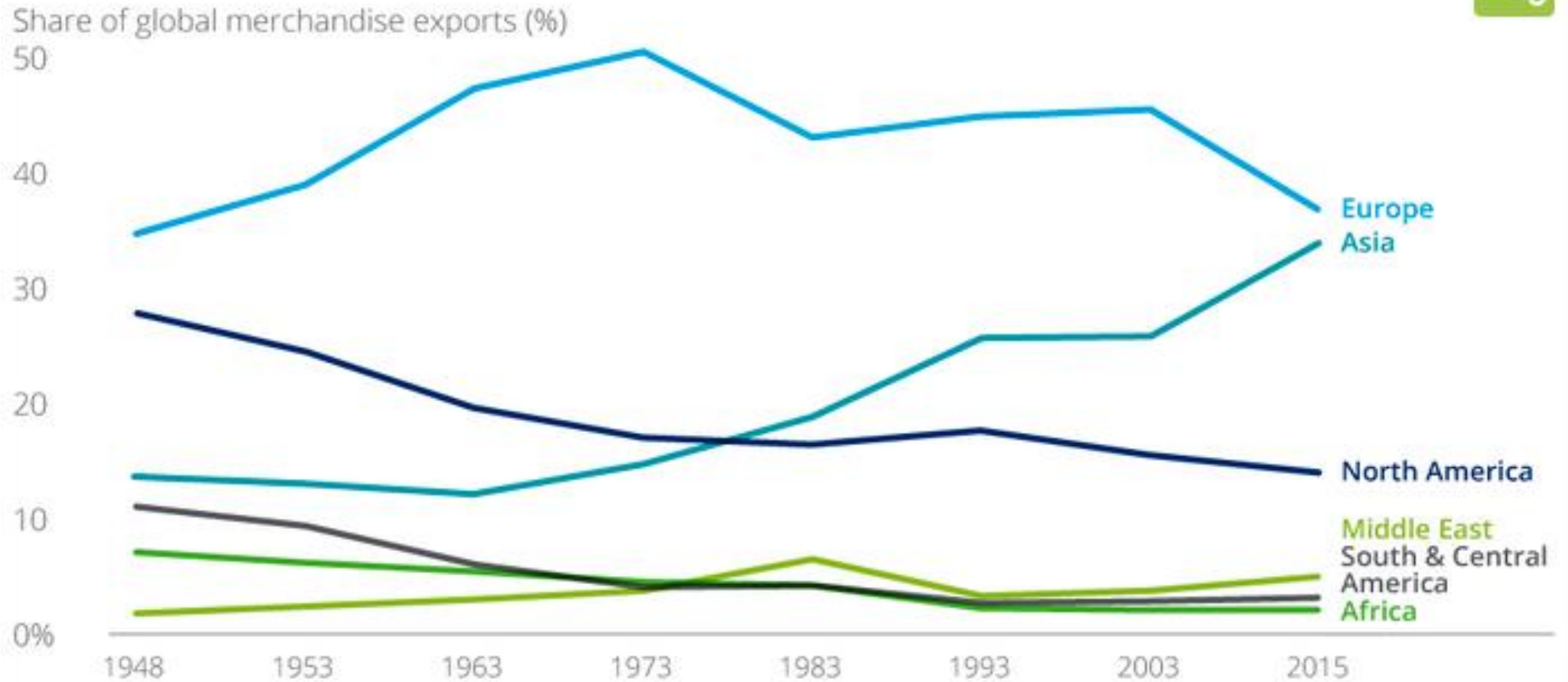
[Malcolm Scott](#), [Cedric Sam](#): *Here's How Fast China's Economy Is Catching Up to the U.S.* Bloomberg May 12, 2016 | Updated: November 06, 2017, Sources: IMF (via Bloomberg). Additional work by: Christopher Cannon, Michael Keller and Ailing Tan

China vs. U.S. Trade Flows



Source: https://www.google.com/search?q=Map+of+China%27s+trade&client=firefox-b-1&tbm=isch&tbs=ring:CT3yazFJlNebIjh9xjxu5BRSEAHh7C08FjXLTbKfehX0zxUcqsJjtx-kWGTxPaVfoIg-7FW5HMe1N73CuG5eSM6m6ioSCX3GPG7kFFIQEfQK6GOS6bDxKhIAeHsLTwWNcsRZpQw1SAjcXoqEgINsp96FfTPFRGe3Lp1h9UgeioSCRYqwmO3H6RYEboRDrAr7AzzKhIJa3E9pV-giD4RymVnNI2Wrb0qEgnsVbkcx7U3vRFLrJgRcRMtYCoSCcK4bl5IzqbqESEYozKSJeh_1&tbo=u&sa=X&ved=2ahUKEwjF2Pyo34XbAhXvV98KHdpsD88Q9C96BAgBEBS&biw=721&dpr=1.2#imgsrc=fcY8buQUUhD2rM:

Regional Shares of World Exports: 1948-2015



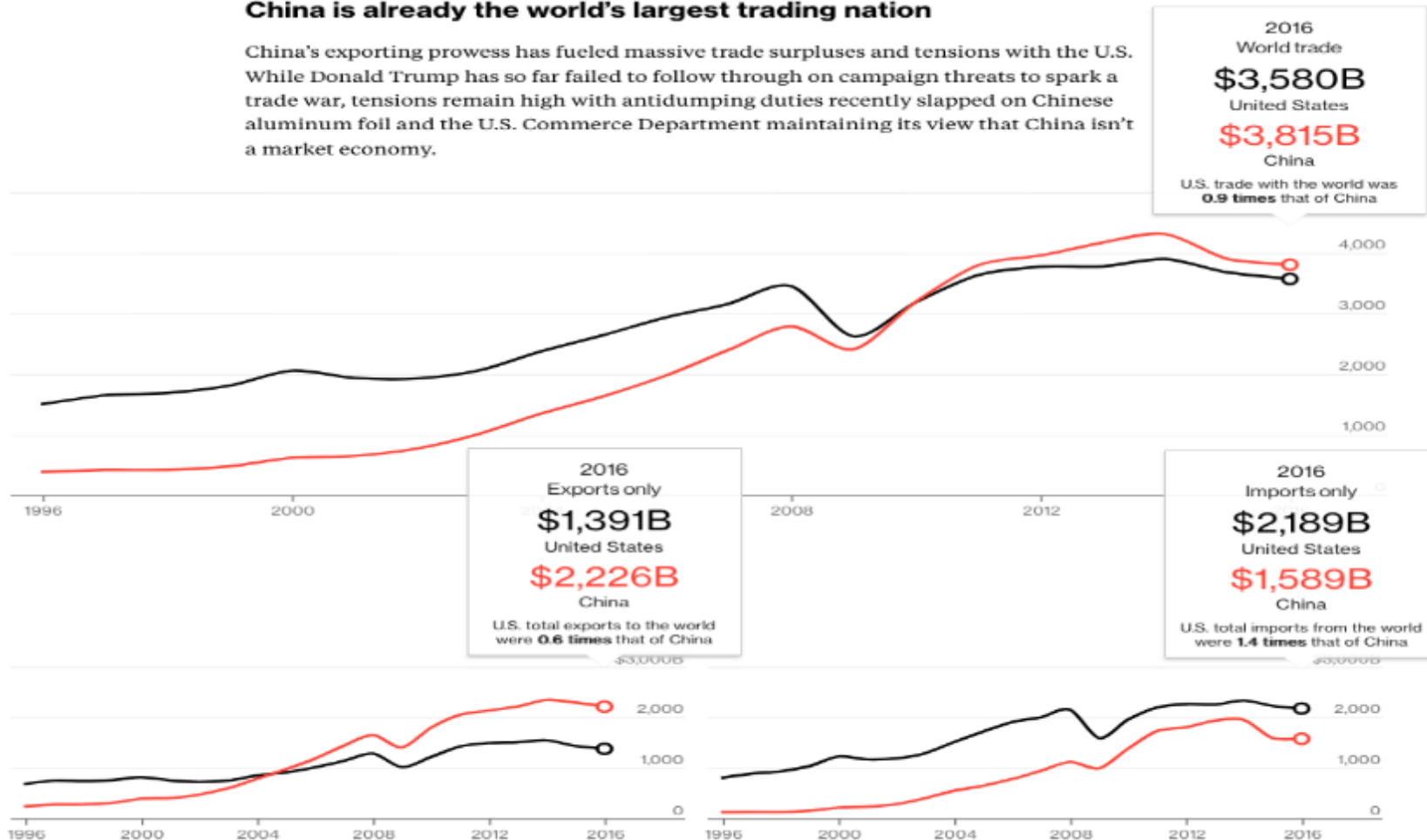
Source: World Trade Organisation.

Deloitte University Press | dupress.deloitte.com

Chinese vs. US Volume of World Trade: 1996-2005

China is already the world's largest trading nation

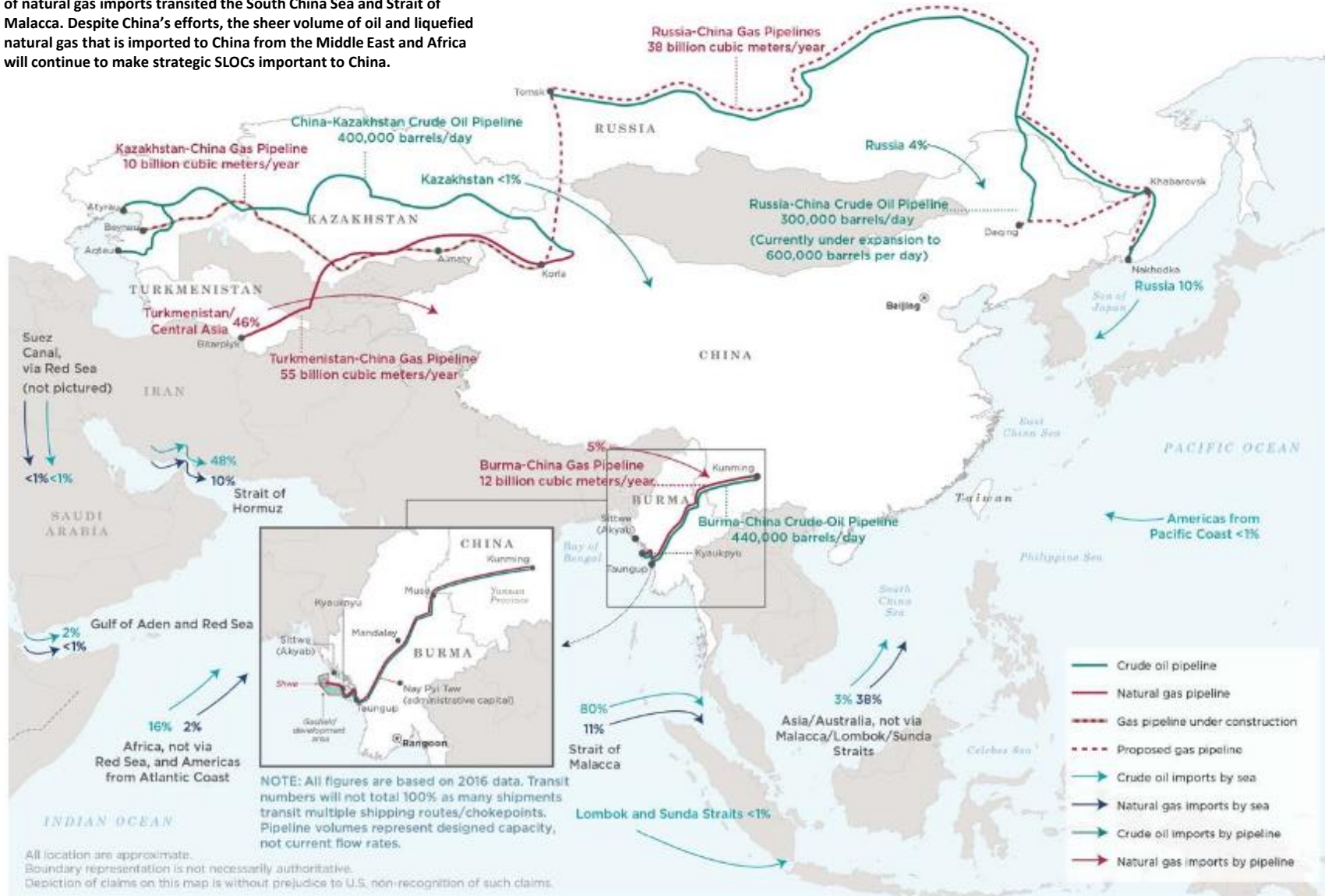
China's exporting prowess has fueled massive trade surpluses and tensions with the U.S. While Donald Trump has so far failed to follow through on campaign threats to spark a trade war, tensions remain high with antidumping duties recently slapped on Chinese aluminum foil and the U.S. Commerce Department maintaining its view that China isn't a market economy.



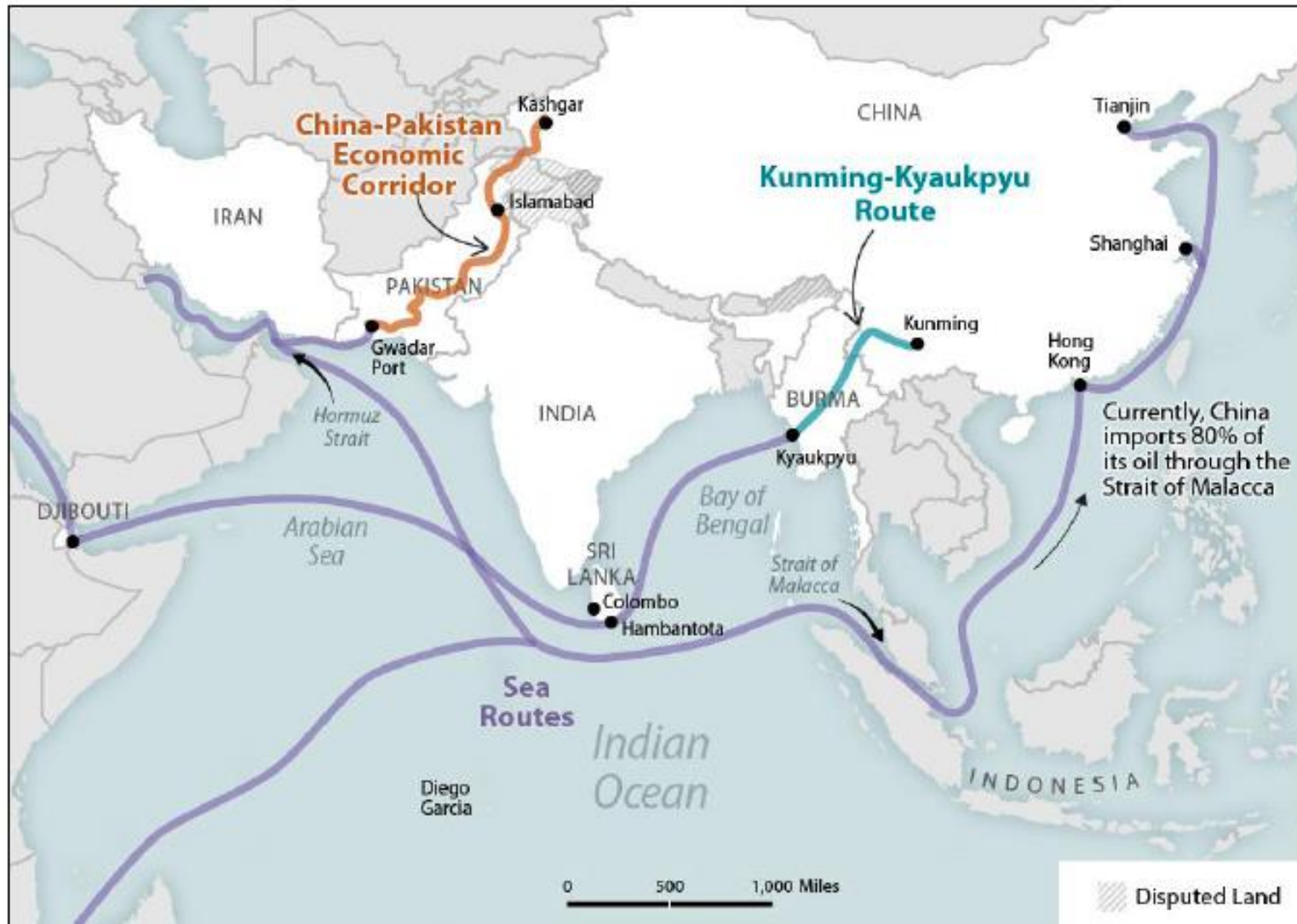
[Malcolm Scott](#), [Cedric Sam](#): *Here's How Fast China's Economy Is Catching Up to the U.S.* Bloomberg May 12, 2016 | Updated: November 06, 2017, Sources: IMF (via Bloomberg). Additional work by: Christopher Cannon, Michael Keller and Ailing Tan

China's Energy Import Transit Routes

In 2016, approximately 80 percent of China's oil imports and 11 percent of natural gas imports transited the South China Sea and Strait of Malacca. Despite China's efforts, the sheer volume of oil and liquefied natural gas that is imported to China from the Middle East and Africa will continue to make strategic SLOCs important to China.

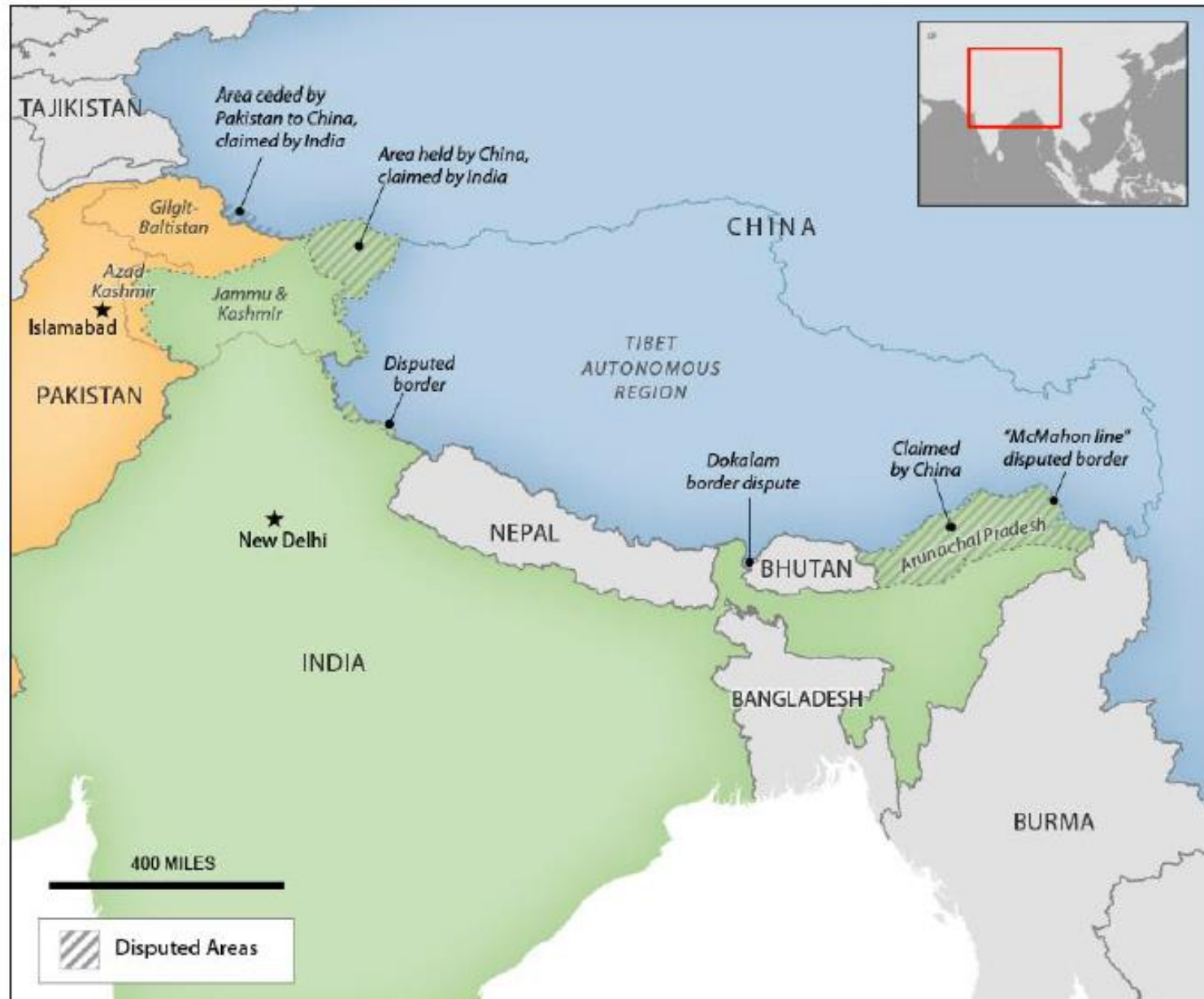


China's Indian Ocean Trade Routes



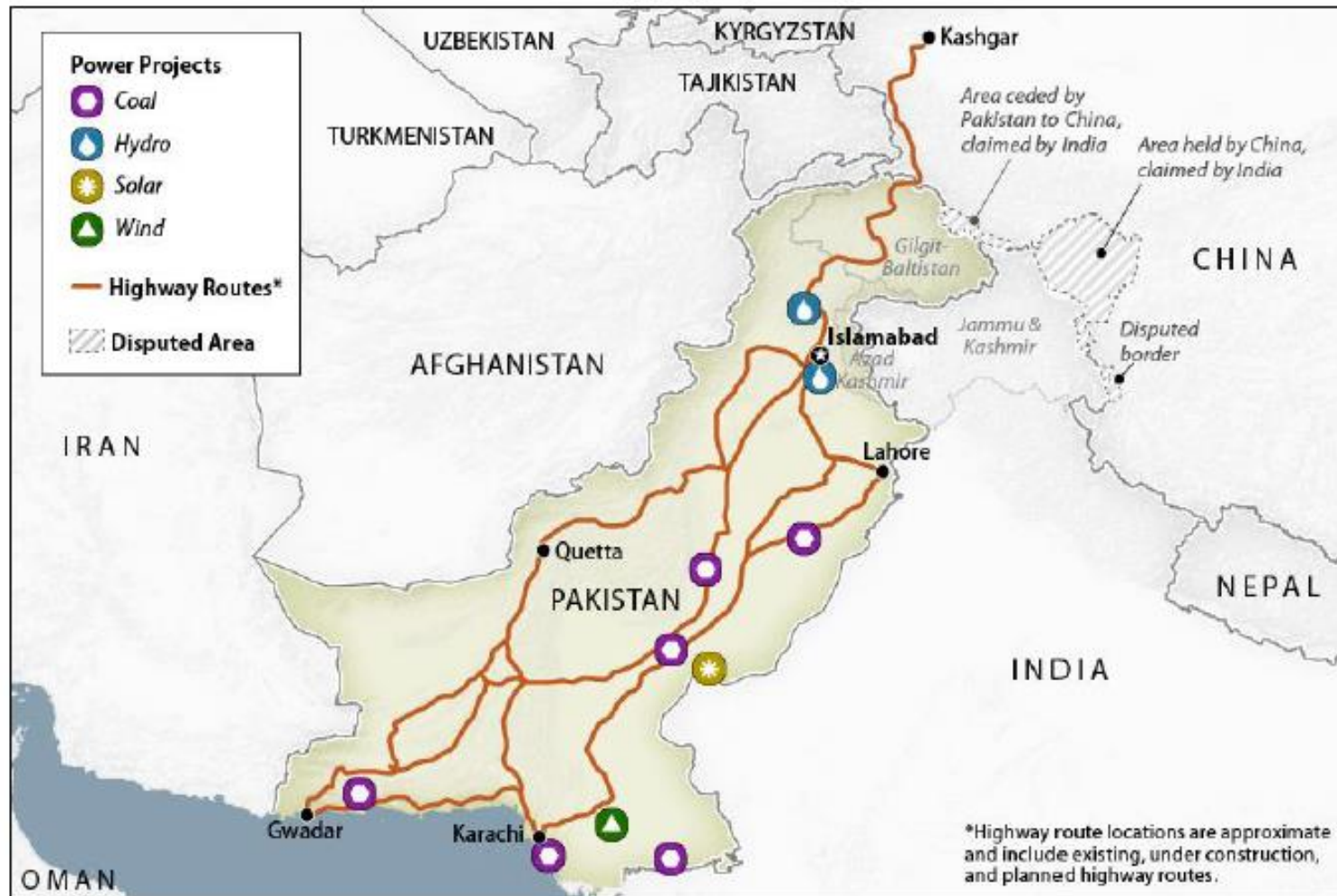
Source: Graphic created by CRS. Map and information generated by (name redacted) using data from the *South China Morning Post* (2017); the Department of State (2015); Esri (2016); and DeLorme (2016).

China-India Border Region



(name redacted) ,
China-India Great
Power Competition
in the Indian Ocean
Region: Issues for
Congress, CRS
R45194, April 20,
2018, p. 19

China-Pakistan Economic Corridor

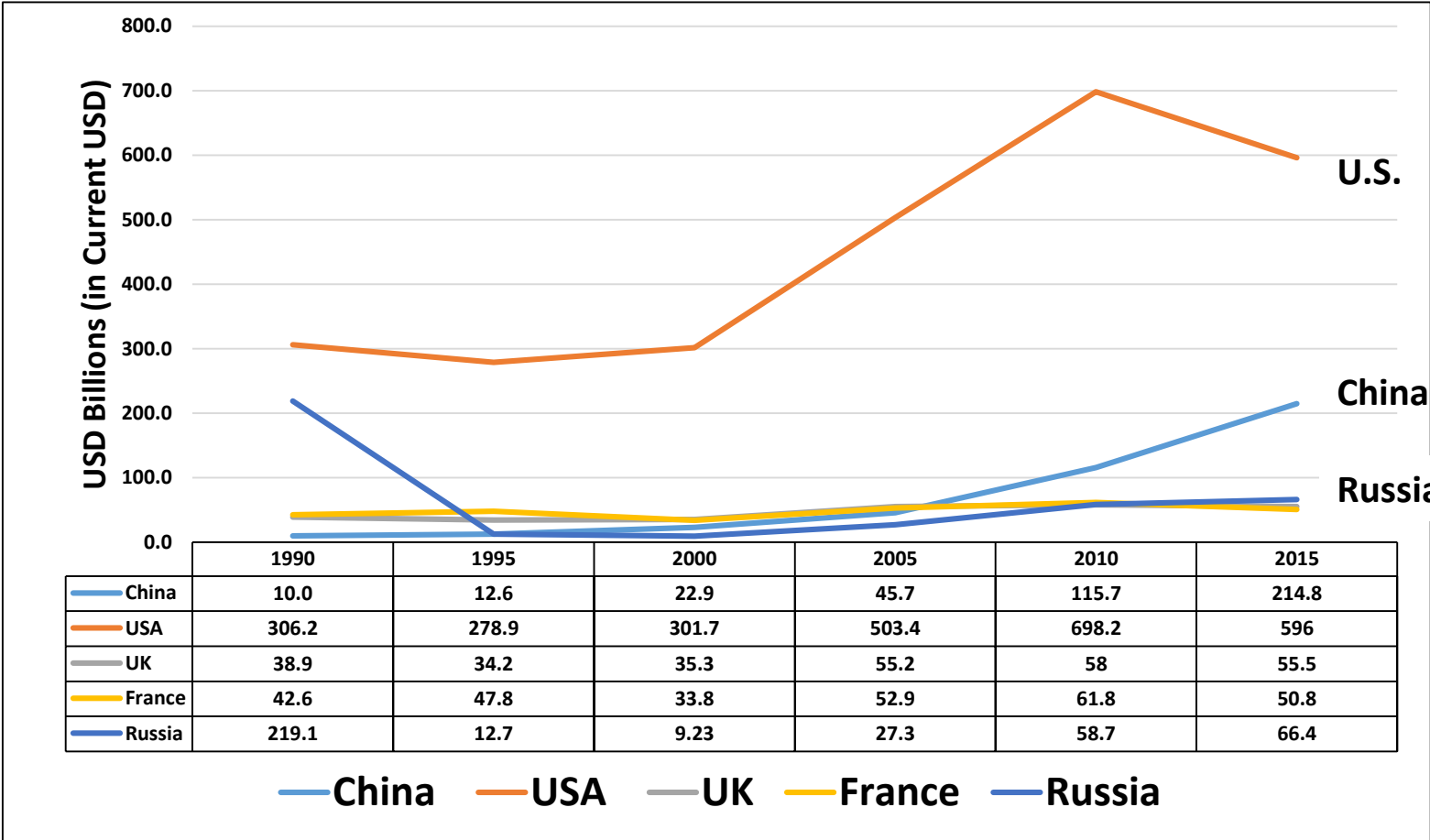


Source: Graphic created by CRS. Map and information generated by (name redacted) and Calvin DeSouza using data from the Council on Foreign Relations (2017); the *Economist* (2017); the Department of State (2015); Esri (2016); and DeLorme (2016), correspondence with Department of State (2017).

China's Emergence as a Global Military Power

Military Expenditures by UNSC Country: SIPRI 1990-2015

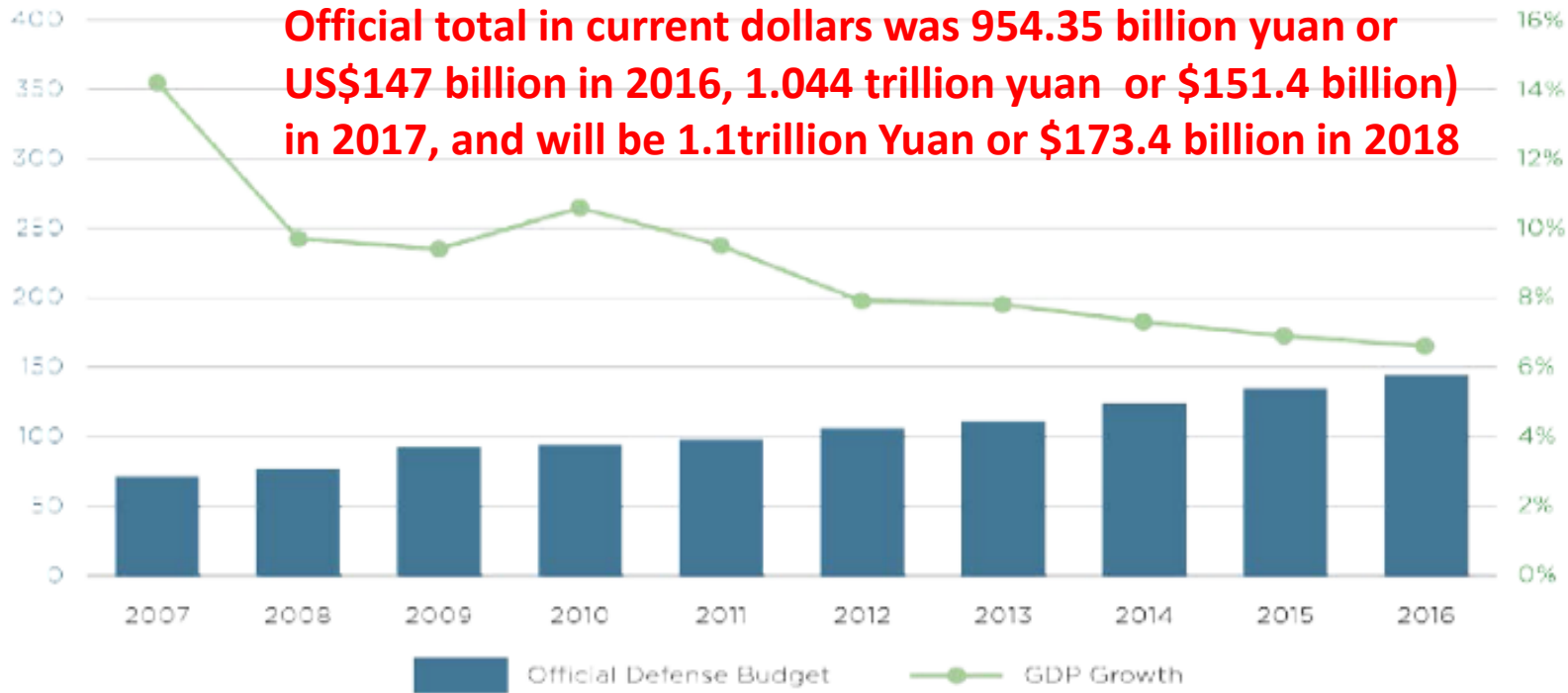
(Current \$US Billions)



Source: SIPRI, *Military Expenditure Data 1988-2015*, <https://www.sipri.org/databases/milex>. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies, September 2016.

China's Official Spending Estimate – Military vs. GDP: 2007-2016

(In constant 2016 \$US Billions)



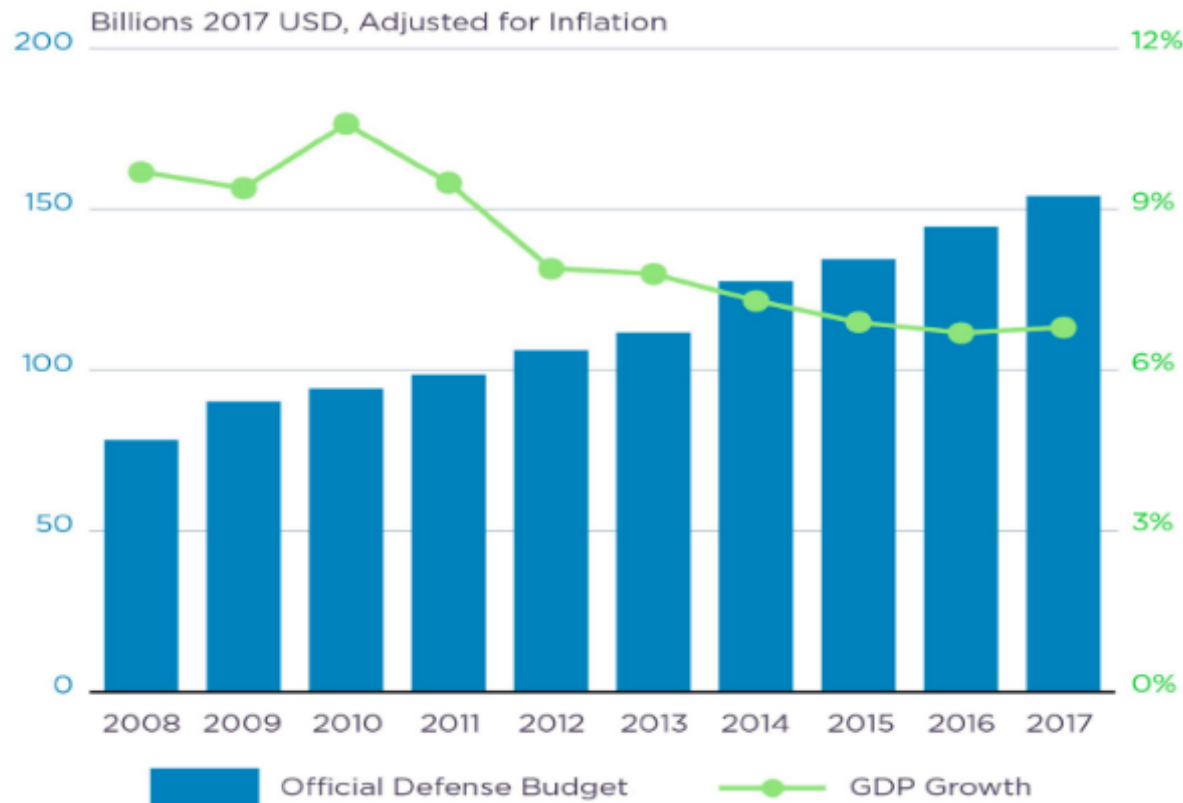
Official total in current dollars was 954.35 billion yuan or US\$147 billion in 2016, 1.044 trillion yuan or \$151.4 billion in 2017, and will be 1.1trillion Yuan or \$173.4 billion in 2018

IISS: China's officially-disclosed military budget of \$144.3 billion in 2016 had grown at an average of 9.8 percent per year in inflation-adjusted terms from 2006 through 2015, and 8.5 percent per year in inflation-adjusted terms from 2007 through 2016

OSD: China's military-related spending for 2016 exceeded \$180 billion" and its defense budget is expected to increase yearly by an average of 7 percent, growing to \$260 billion by 2020, according to the US Defense Department's 2017 China Military Power

SIPRI: Between 2007 and 2016, China saw the biggest growth in military spending, with an increase of 118 per cent, followed by Russia (87 per cent) and India (54 per cent). In the same period, Italy (–16 per cent), the United Kingdom (–12 per cent) and the United States (–4.8 per cent) were the only countries in the top 15 to see their military expenditure fall. In 2016, China spent an estimated \$215 billion, and accounted for 13% of world military spending.

China's Official Defense Budget 2008-2017



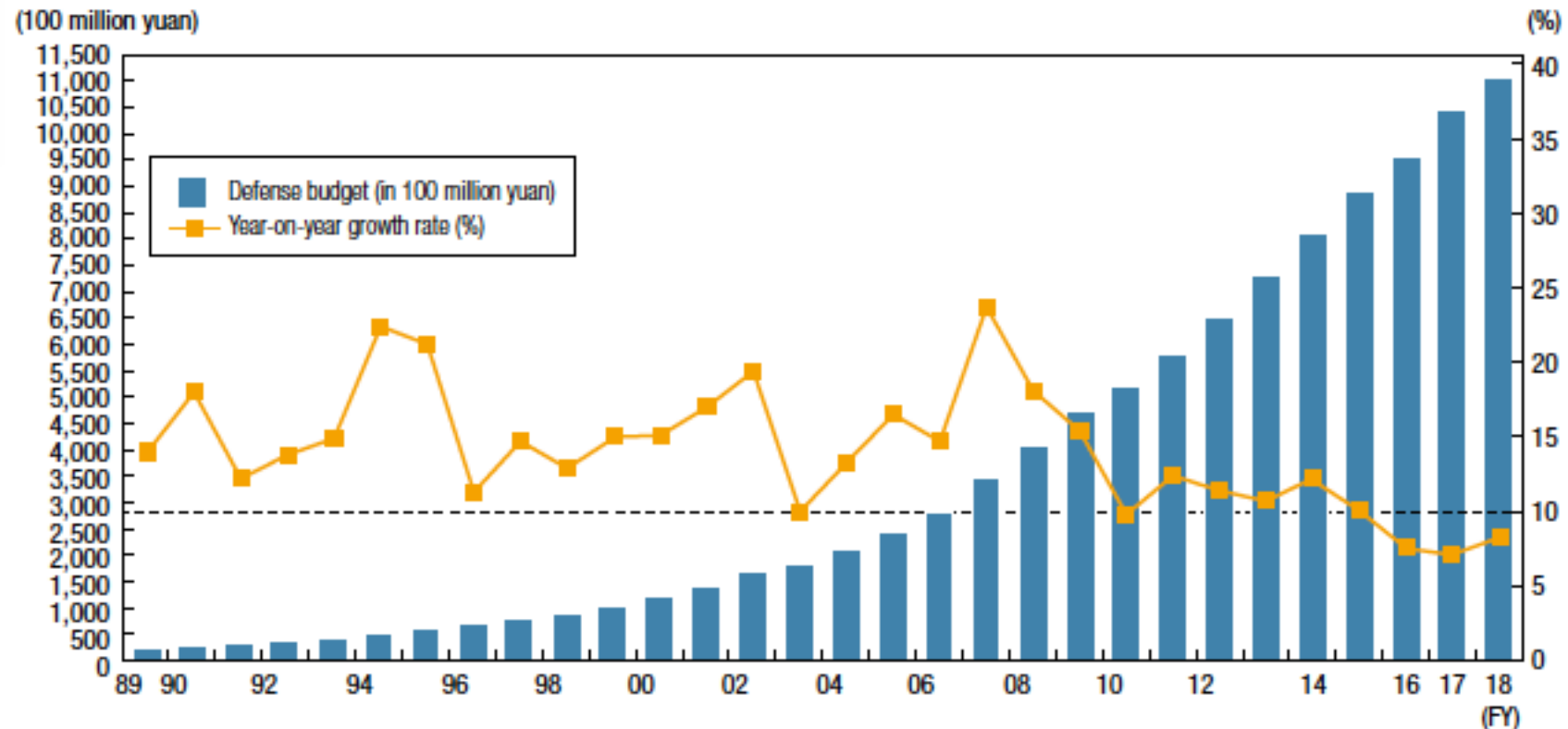
2017 Defense Budget Comparison – adjusted for inflation to 2017 \$USD

Billion (USD)	
China (Official Budget)	\$154.3
India	\$55.2
Russia (National Defense Budget)	\$48.6
Japan	\$46.1
Republic of Korea	\$33.3
Taiwan	\$10.5

CHINA'S ESTIMATED DEFENSE BUDGET GROWTH. Jane's Defense Budgets expects China's official defense budget to increase by an annual average of 6 percent, growing to \$240 billion by 2021, and will have an increasing proportion available for training, operations, and modernization following China's 2015 announcement that the PLA will reduce its size by 300,000 personnel. China's economic growth will slow during the

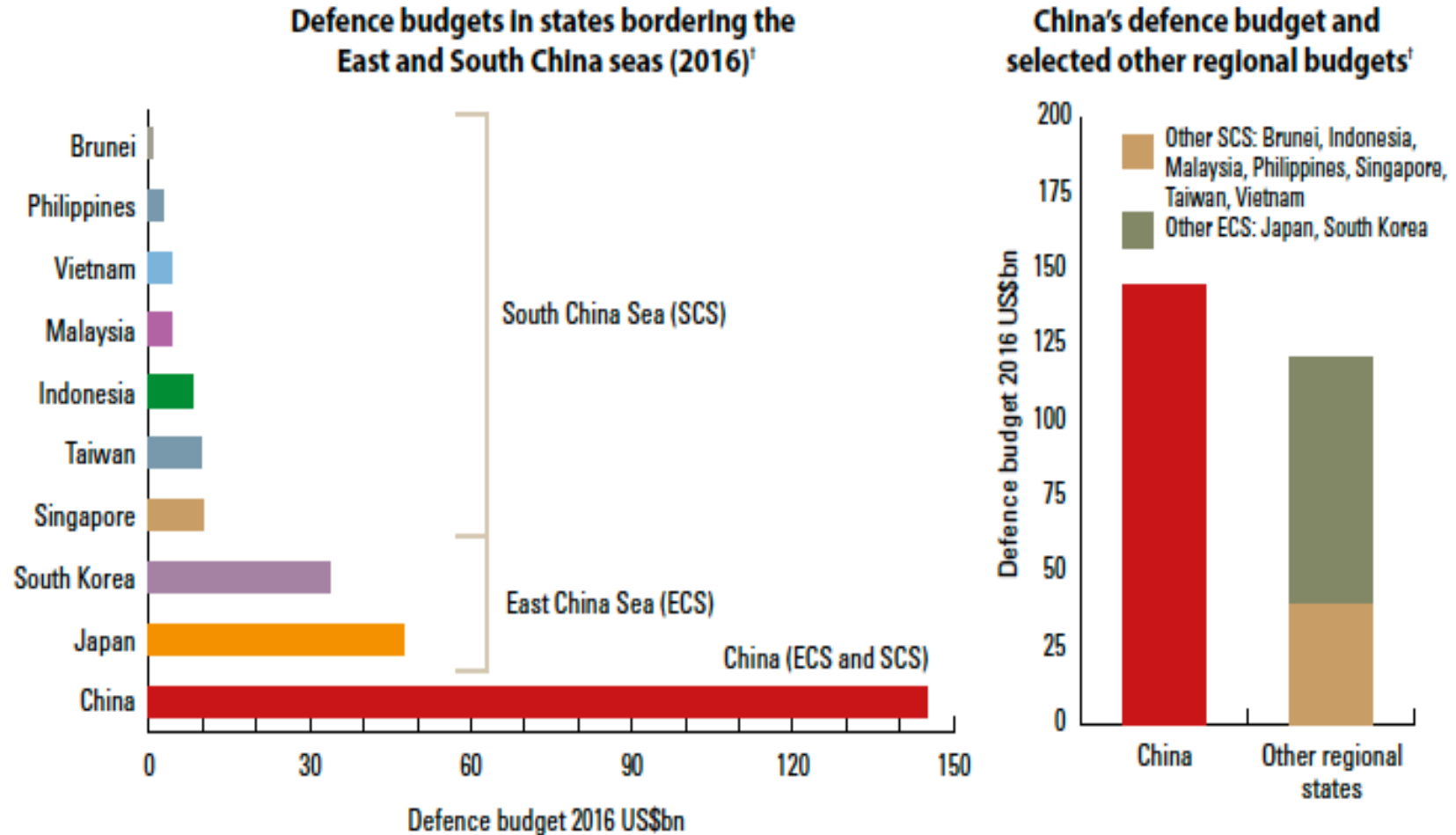
next decade, projected to fall from 6.8-percent growth in 2017 to 3 percent in 2028. This could slow, but not halt, future defense spending growth. Assuming accurate economic projections and a steady defense burden, China's official defense budget would be larger than \$240 billion by 2028, remaining the largest spender in the Indo-Pacific region, besides the United States. Economic growth and national defense requirements would drive future defense spending trends.

Japanese Estimate of China's Announced Defense Budget 1989-2018



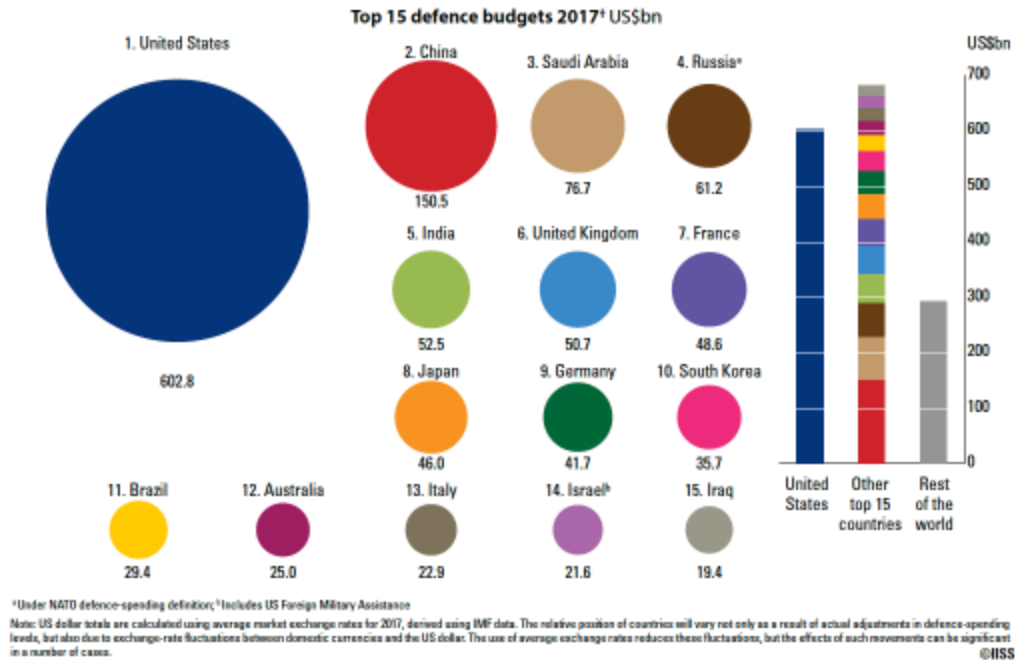
Note: This basically shows the defense budget within "the central government's general public budget," which had been named as "the central fiscal expenditures" prior to FY 2014. Year-on-year growth rate compares the budget of a given year against the budget of the previous year. Note that FY2002 defense budget was calculated based on the increased amount from the defense budget in the previous FY because only the amount and rate of growth were released. For FY 2016 and FY2018, the amount of "the central government expenditures," which are part of the central government's general public budget, are used because only the central government expenditures were announced.

China versus Asia: IISS

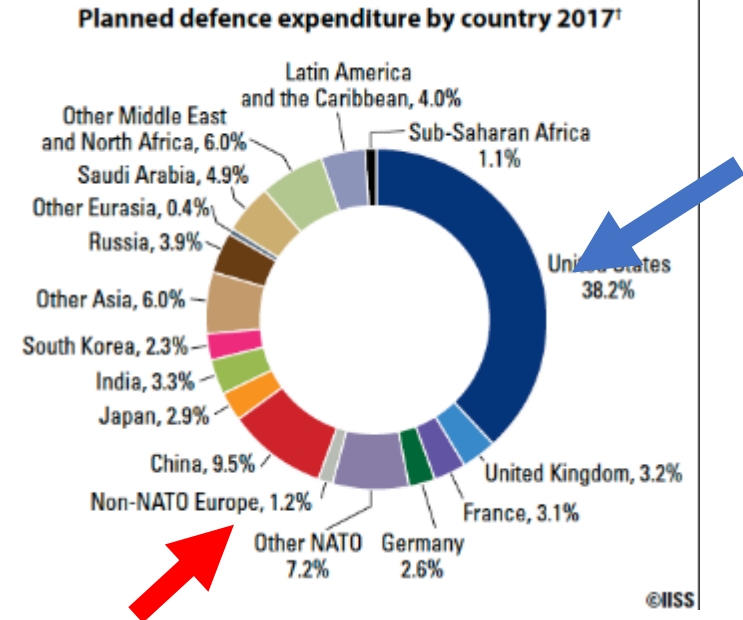


Source: IISS, Military Balance, 2017, p. 21

IISS/SIPRI Guesstimate of Comparative Military Budgets: 2017



IISS: China officially earmarked RMB1.02 trillion(US\$150 billion) in 2017 for defence, although this number is considered to exclude key expenses such as research and development (R&D) and arms imports. This represents a nominal increase of 7.1% compared to 2016, when China allocated RMB955bn (US\$144bn) to defence. The next-largest defence spenders in Asia were India (R3.6trn, or US \$52.5bn) and Japan (¥5.13trn, or US\$46bn).



SIPRI: China, the second largest spender globally, increased its military spending by 5.6 per cent to \$228 billion in 2017. China's spending as a share of world military expenditure has risen from 5.8 per cent in 2008 to 13 per cent in 2017. India spent \$63.9 billion on its military in 2017, an increase of 5.5 per cent compared with 2016, while South Korea's spending, at \$39.2 billion, rose by 1.7 per cent between 2016 and 2017.

China versus U.S. Convergence in Military Spending: IISS vs. OSD Guesstimate

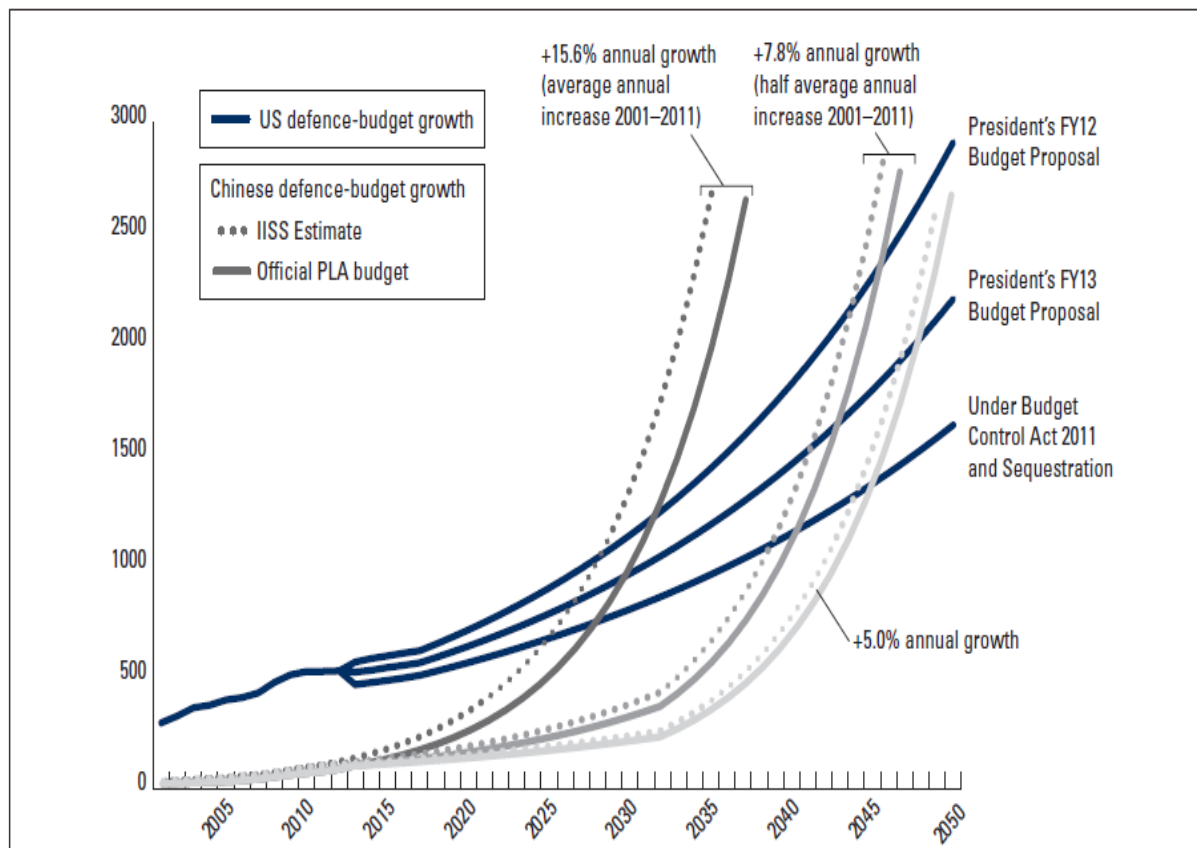


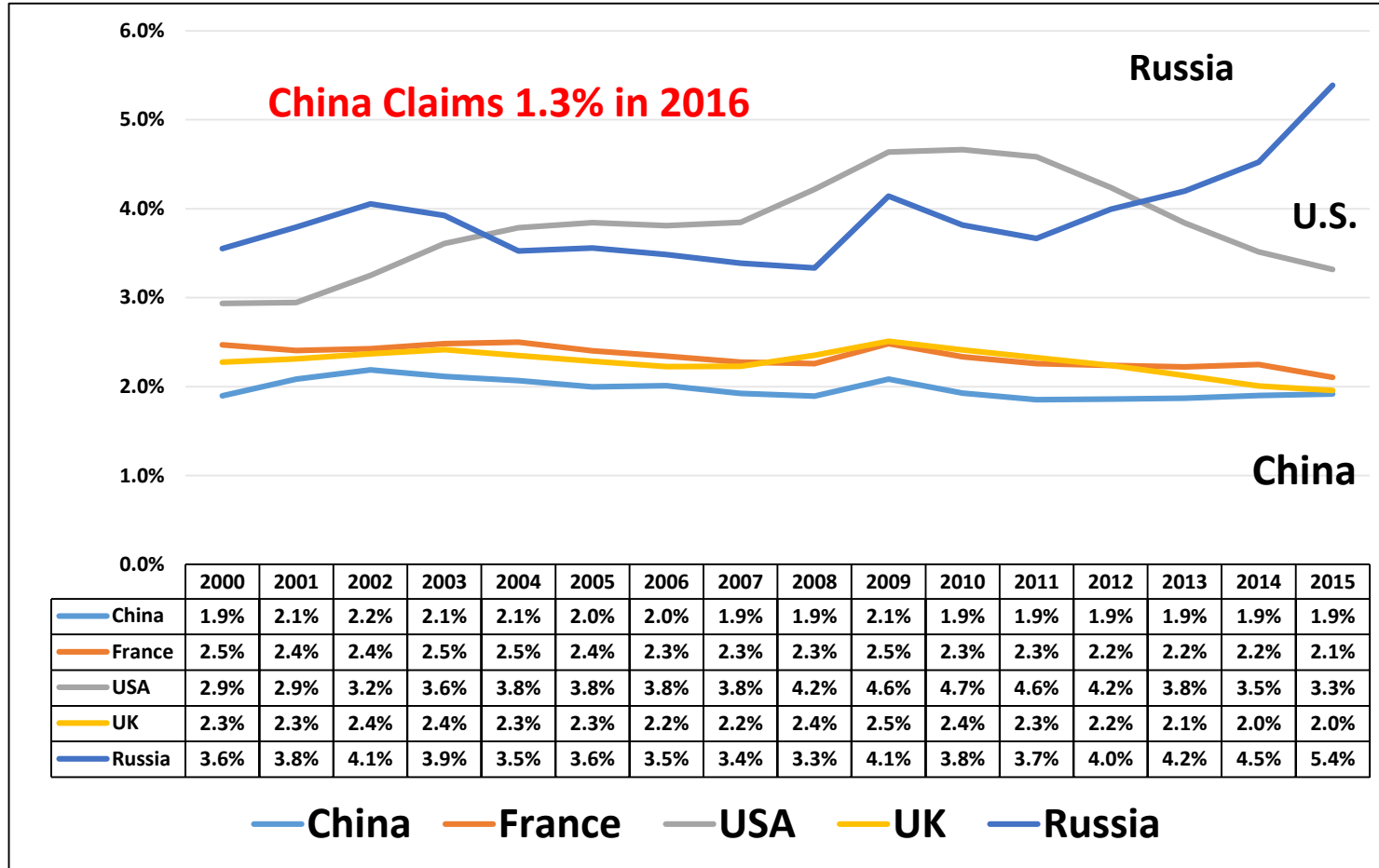
Figure 19 China–United States Defence Expenditure Convergence 2001–2050

Source: Source: *IISS Military Balance 2013* p. 256, *China Military Power 2017.*, 66.

OSD expects China's defense budget to increase by an annual average of 7 percent... Growing to \$260 billion by 2020 for a force that, although expanding, is expected over the near-term to remain primarily regional.

As of March 2016, the DoD Comptroller forecasted that U.S. defense budget outlays will reach \$606 billion in current dollars over the same period for a force with a global footprint.

Military Expenditures as Percent of GDP by UNSC Country: SIPRI 1990-2015



Source: SIPRI, *Military Expenditure Data 1988-2015*, <https://www.sipri.org/databases/milex>. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies, September 2016.

Broader Structure of Competing Claims in Asia and the Pacific

Territorial Disputes in Context

China's use of force in territorial disputes has varied widely throughout its history. Some disputes led to war, as in border conflicts with India in 1962 and Vietnam in 1979. A contested border with the former Soviet Union during the 1960s raised the possibility of nuclear war. In more recent cases involving land border disputes, China has sometimes been willing to compromise with and even offer concessions to its neighbors. Since 1998, China has settled 11 land-based territorial disputes with 6 of its neighbors. In recent years, China has adopted a coercive approach to deal with several disputes that continue over maritime features and ownership of potentially rich offshore oil and gas deposits.

China and Japan have overlapping claims to both the continental shelves and the EEZs in *the East China Sea*. The East China Sea contains natural gas and oil, though hydrocarbon reserves are difficult to estimate. Japan maintains that an equidistant line from each country involved should separate the EEZs, while China claims an extended continental shelf beyond the equidistant line to the Okinawa Trench. Japan has accused China of breaching a principled consensus reached in 2008 that both sides would respect an equidistant median line in the East China Sea for resource development while conducting joint development of oil and natural gas field in a delineated area to the north spanning the line. Japan is concerned that China has conducted oil and gas drilling on the Chinese side of the median line of the East China Sea since 2013. China continues to contest Japan's administration of the nearby Senkaku Islands.

The *South China Sea* plays an important role in security considerations across East Asia because Northeast Asia relies heavily on the flow of oil and commerce through South China Sea shipping lanes, including more than 80 percent of the crude oil to Japan, South Korea, and Taiwan. China claims sovereignty over the Spratly and Paracel Island groups and other land features within its self-proclaimed nine-dash line – claims disputed in whole or part by Brunei, the Philippines, Malaysia, and Vietnam. Taiwan, which occupies Itu Aba Island in the Spratly Islands, makes the same territorial assertions as China. In 2009, China protested extended continental shelf submissions in the South

China Sea made by Malaysia and Vietnam. In its protest to the UN Commission on the Limits of the Continental Shelf, China included its ambiguous “nine-dash line” map. China also stated in a 2009 *note verbale* that it has “indisputable sovereignty over the islands in the South China Sea and the adjacent waters, and enjoys sovereign rights and jurisdiction over the relevant waters as well as the seabed and subsoil thereof.” In 2016, the arbitration ruling in the case brought by the Philippines against China under the LOSC determined that China has no legal basis to assert a maritime claim based on historic rights that would exceed entitlements it would enjoy under the LOSC. China did not participate in the arbitration and Chinese officials publicly voiced opposition to the ruling.

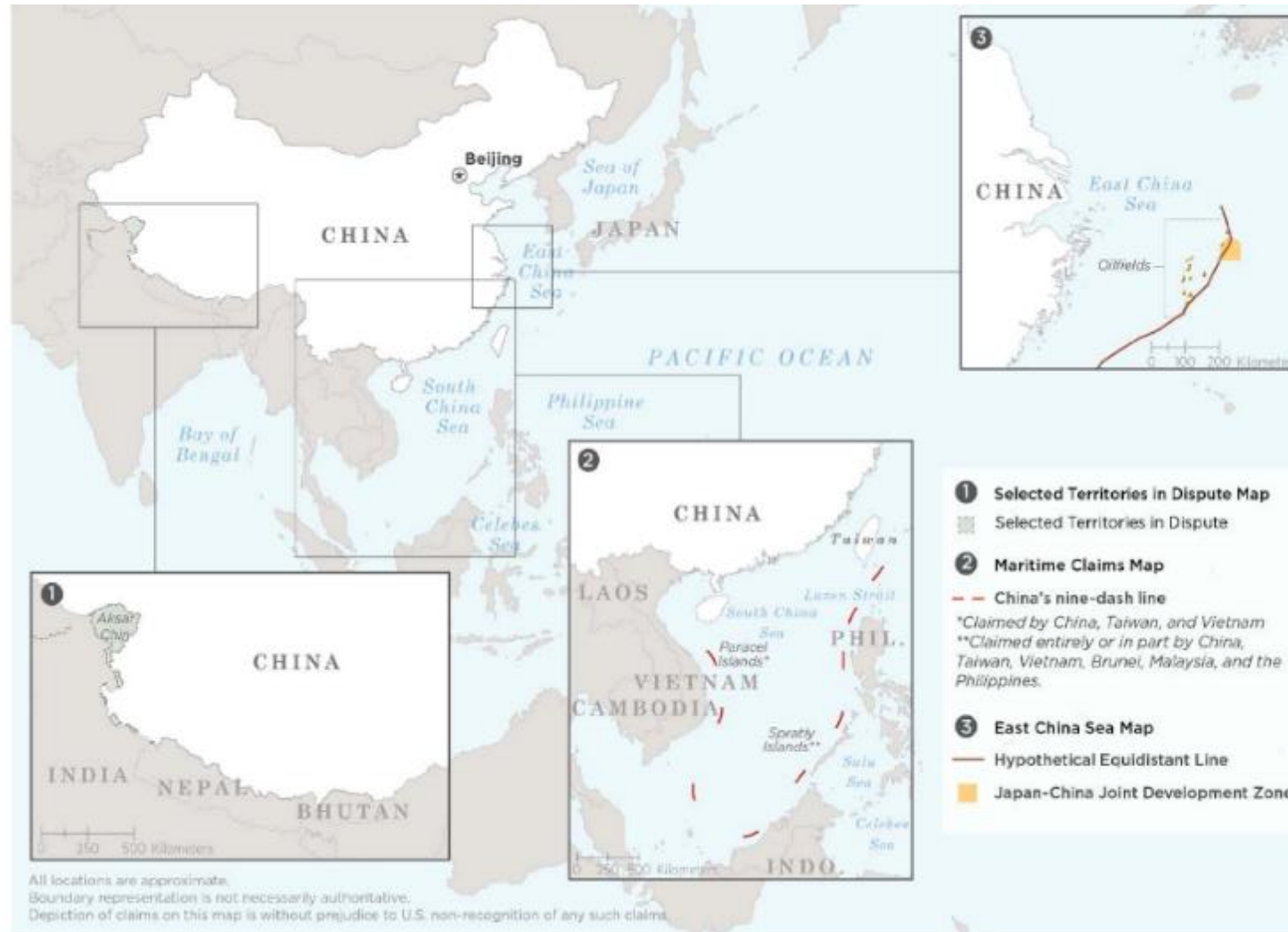
Tensions remain with India along the shared border over *Arunachal Pradesh*, which China asserts is part of Tibet and therefore part of China, and over the *Aksai Chin* region at the western end of the Tibetan Plateau. China and India continue to accuse each other of frequent incursions and military build-ups along the disputed border. In the summer of 2017, India and Bhutan accused China of road construction in Doka La Pass, near the tri-border region of China, Bhutan, and India. When India responded by intervening in Chinese road construction and increasing its military posture in the region, China accused India of invading its territory.

The Range of Chinese Territorial Claims

Selected Chinese Territorial Claims



China's Territorial Claims



Office of the Secretary of Defense, *ANNUAL REPORT TO CONGRESS Military and Security Developments Involving the People's Republic of China* 2017, May 15, 2017, https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF, p. 7

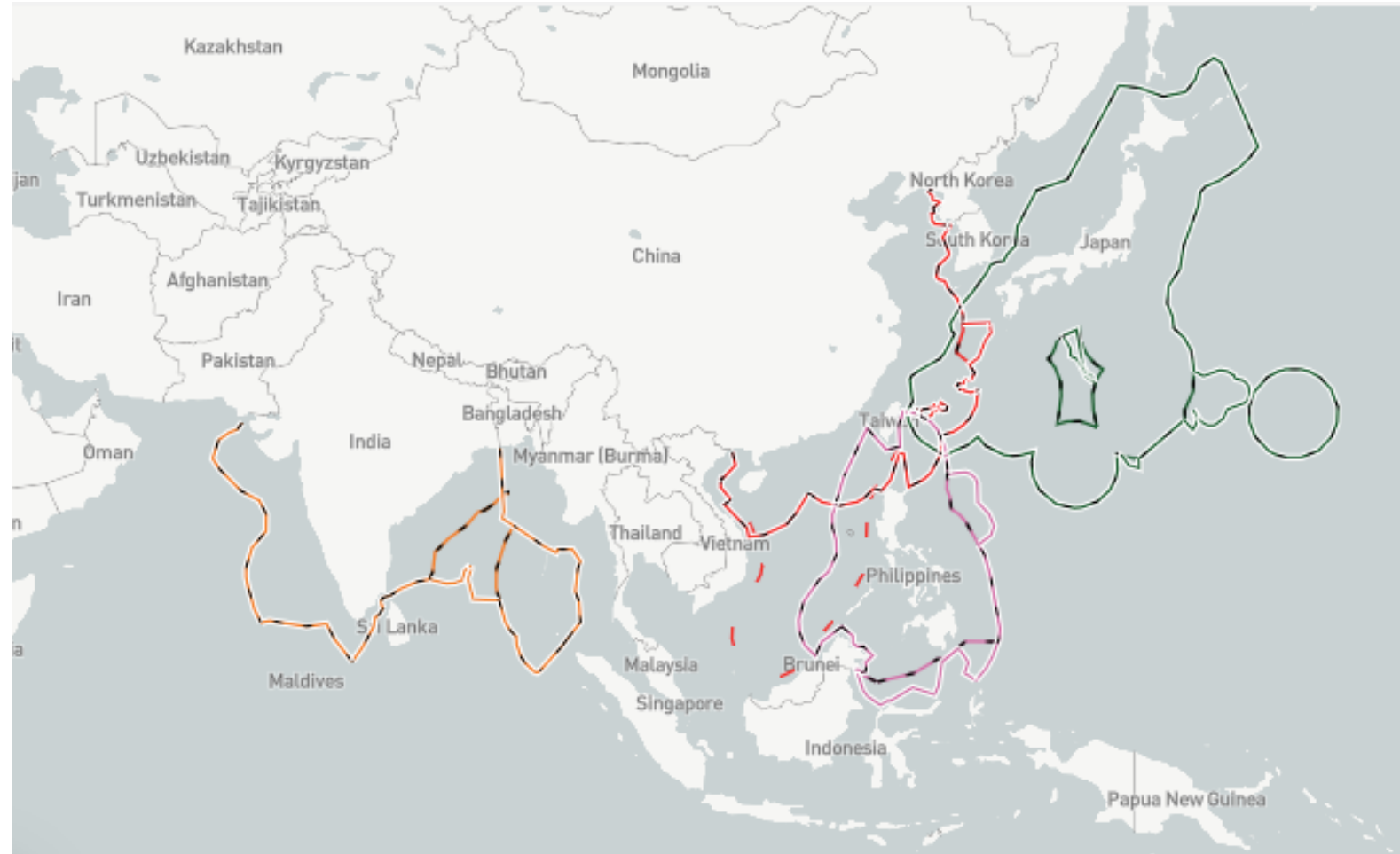
Competing Claims in the Pacific and Indian Ocean

Type of Claim **Select All** **Select None**

- ☐ - - - - Territorial Baseline
- ☐ ——— Territorial Sea
- ☒ ——— Exclusive Economic Zone
- ☒ ——— Continental Shelf
- ☒ ——— Nine-Dash/U-Shaped Line

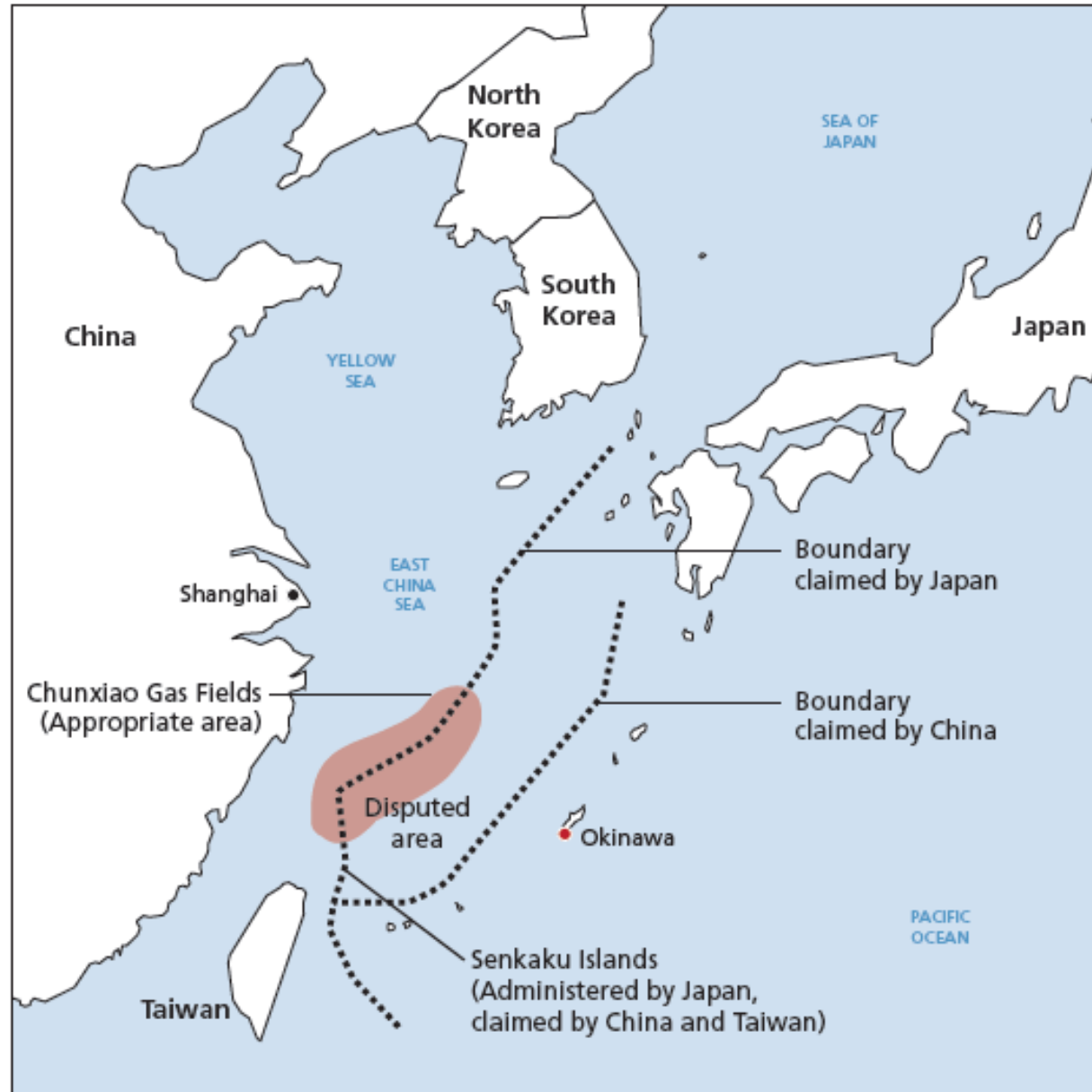
Claimants **Select All** **Select None**

- | | |
|---|---|
| <input type="checkbox"/> Bangladesh | <input type="checkbox"/> Maldives |
| <input type="checkbox"/> Brunei | <input type="checkbox"/> Myanmar |
| <input type="checkbox"/> Cambodia | <input checked="" type="checkbox"/> Philippines |
| <input checked="" type="checkbox"/> China | <input type="checkbox"/> Singapore |
| <input checked="" type="checkbox"/> India | <input type="checkbox"/> South Korea |
| <input type="checkbox"/> Indonesia | <input type="checkbox"/> Sri Lanka |
| <input checked="" type="checkbox"/> Japan | <input type="checkbox"/> Taiwan |
| <input type="checkbox"/> North Korea | <input type="checkbox"/> Thailand |
| <input type="checkbox"/> Malaysia | <input type="checkbox"/> Vietnam |



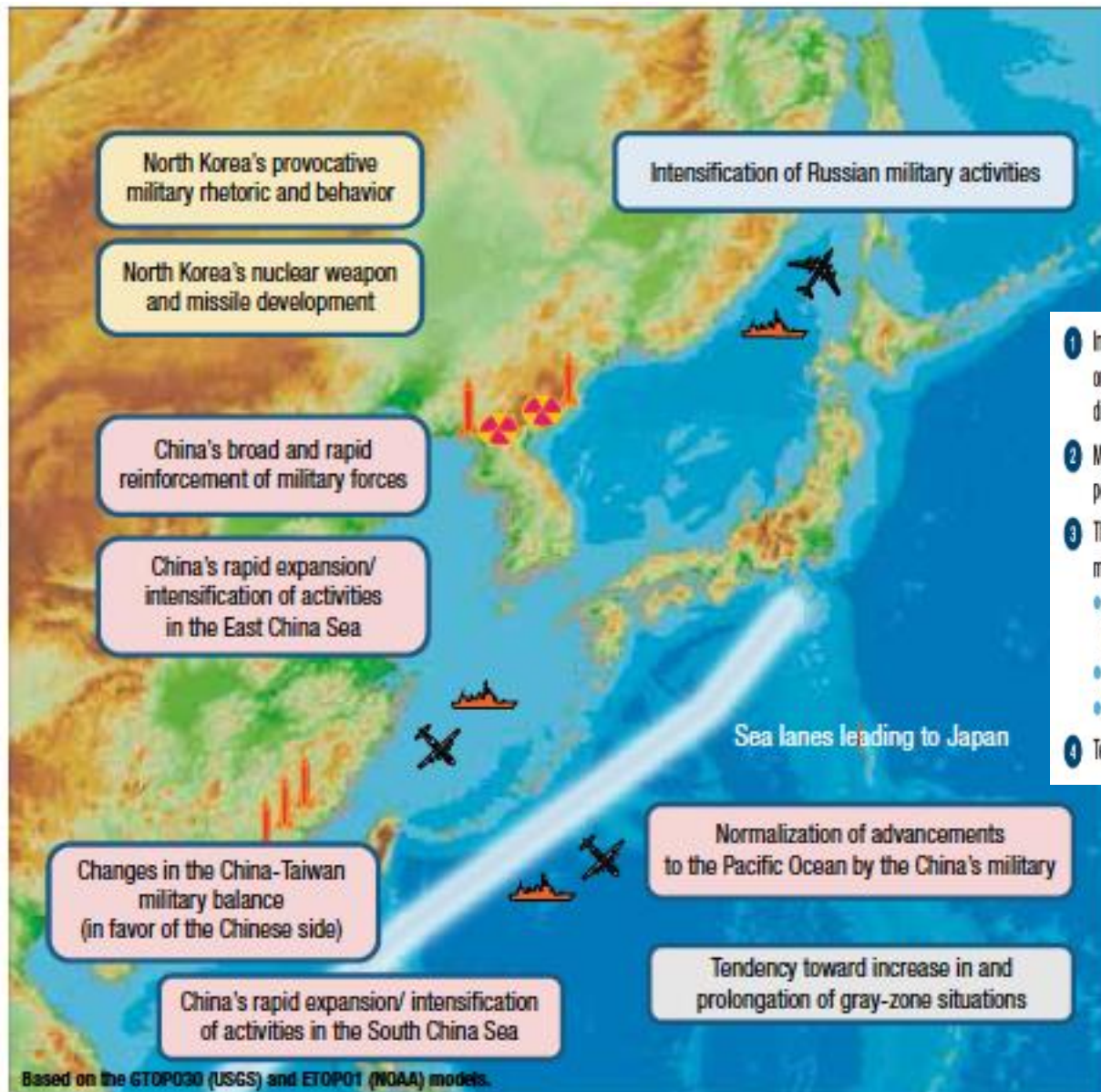
Source: CSIS AMTI Project, <https://amti.csis.org/chinese-power-projection/>

Disputed Claims in East China Sea



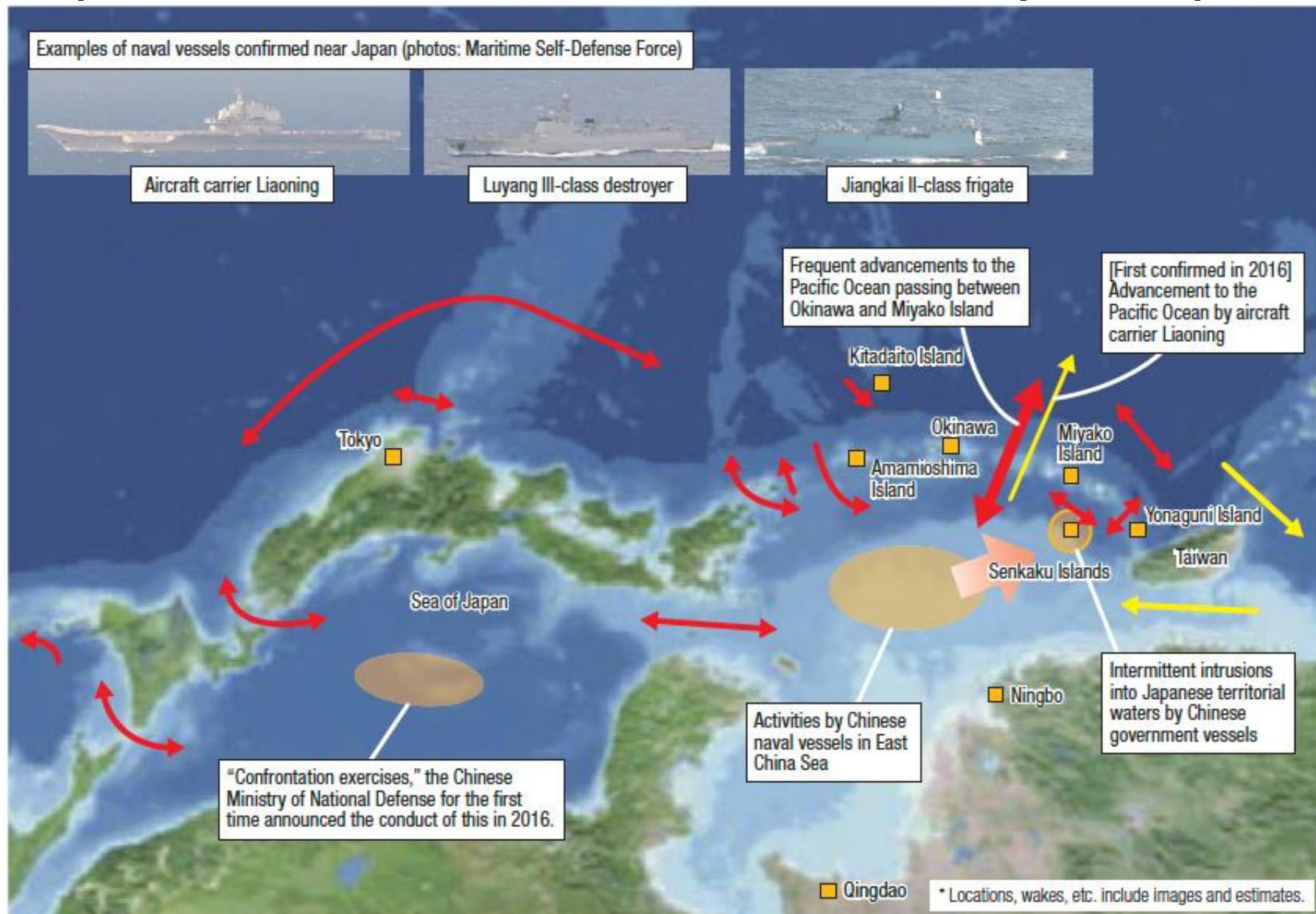
Source: RAND, *US Military Forces and Capabilities for a Dangerous World*, RR1782, 2017, p. 20

Japanese Estimate of Security Situation Surrounding Japan: 2018



- 1 In the area surrounding Japan, there is a concentration of nations with large-scale military capabilities, and a regional cooperation framework on security has not yet to be fully institutionalized, leading to the existence of uncertainty and unclarity, including the persistence of territorial disputes and unification issues.
- 2 Meanwhile, there has been a tendency towards an increase in and prolongation of so-called "gray-zone" situations; that is, neither pure peacetime nor contingencies over territory, sovereignty, and economic interests.
- 3 There has also been a noticeable trend among neighboring countries to modernize and reinforce their military capabilities and to intensify their military activities. The security challenges and destabilizing factors in the Asia-Pacific region are characterized below:
 - North Korea's military development such as nuclear weapon and ballistic missile development represents an unprecedentedly serious and imminent threat.
 - The unilateral escalation of China's military activities poses a strong security concern for the region including Japan and international community.
 - Russia has tendency to intensify its military activities, including in areas surrounding Japan, and this trend needs to paid due attention.
- 4 Territorial disputes over the Northern Territories and Takeshima, both of which are inherent parts of the territory of Japan, remain unresolved.

Japanese Estimate of Chinese Recent Naval Activity Near Japan



Japanese Estimate of Chinese Recent Air Activity Near Japan

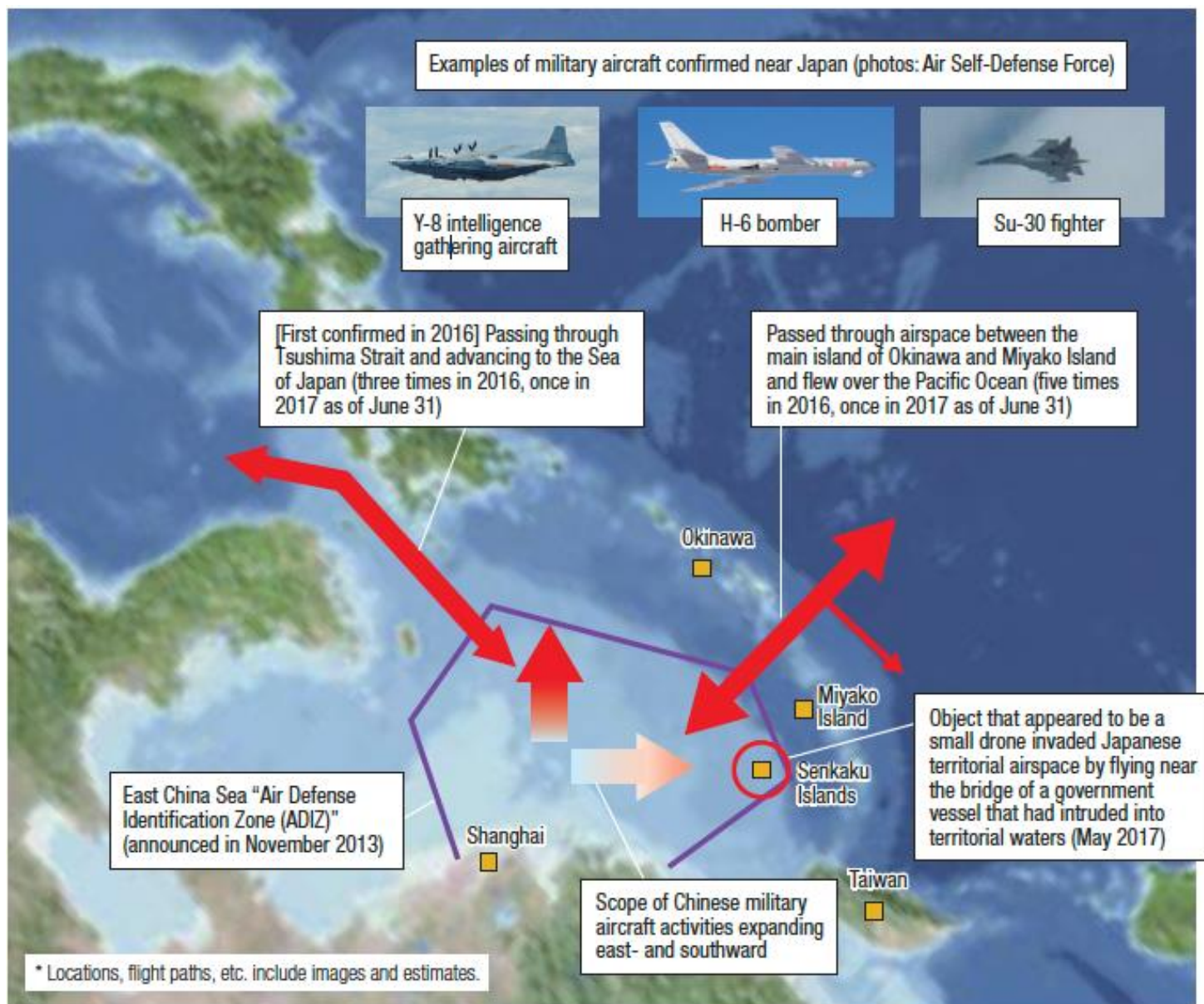
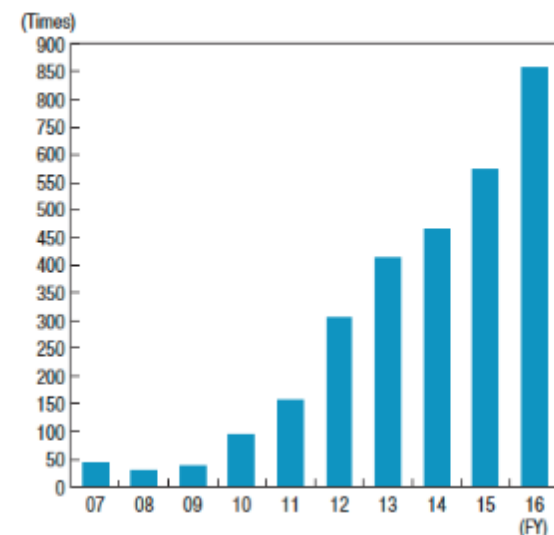


Fig. I-2-3-5

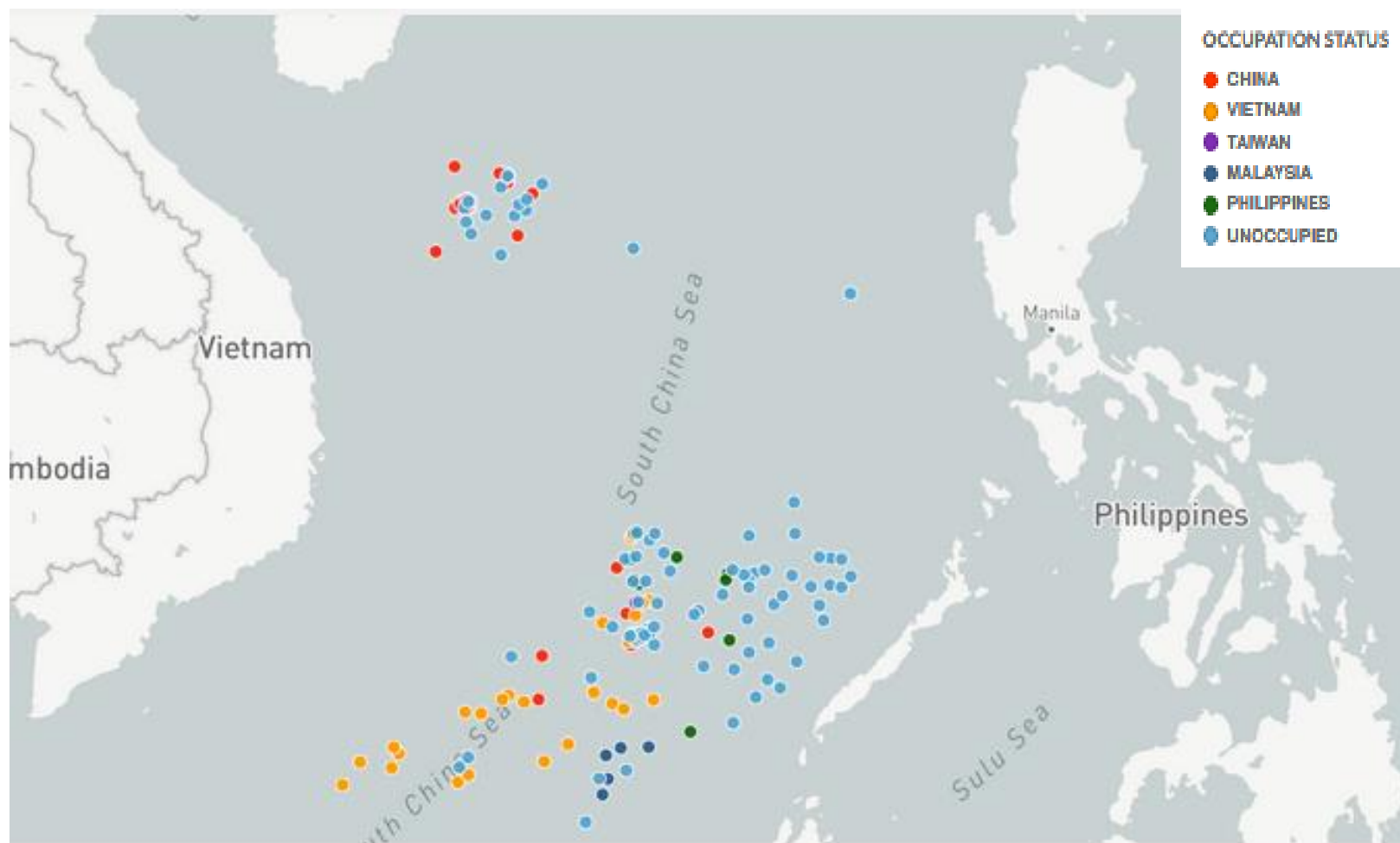
Changes in the Number of Scrambles against Chinese Aircraft



China's Nine Dashed Line in the South China Sea



Who Occupies What in the South China Sea



Source: CSIS AMTI Project, <https://amti.csis.org/chinese-power-projection/>

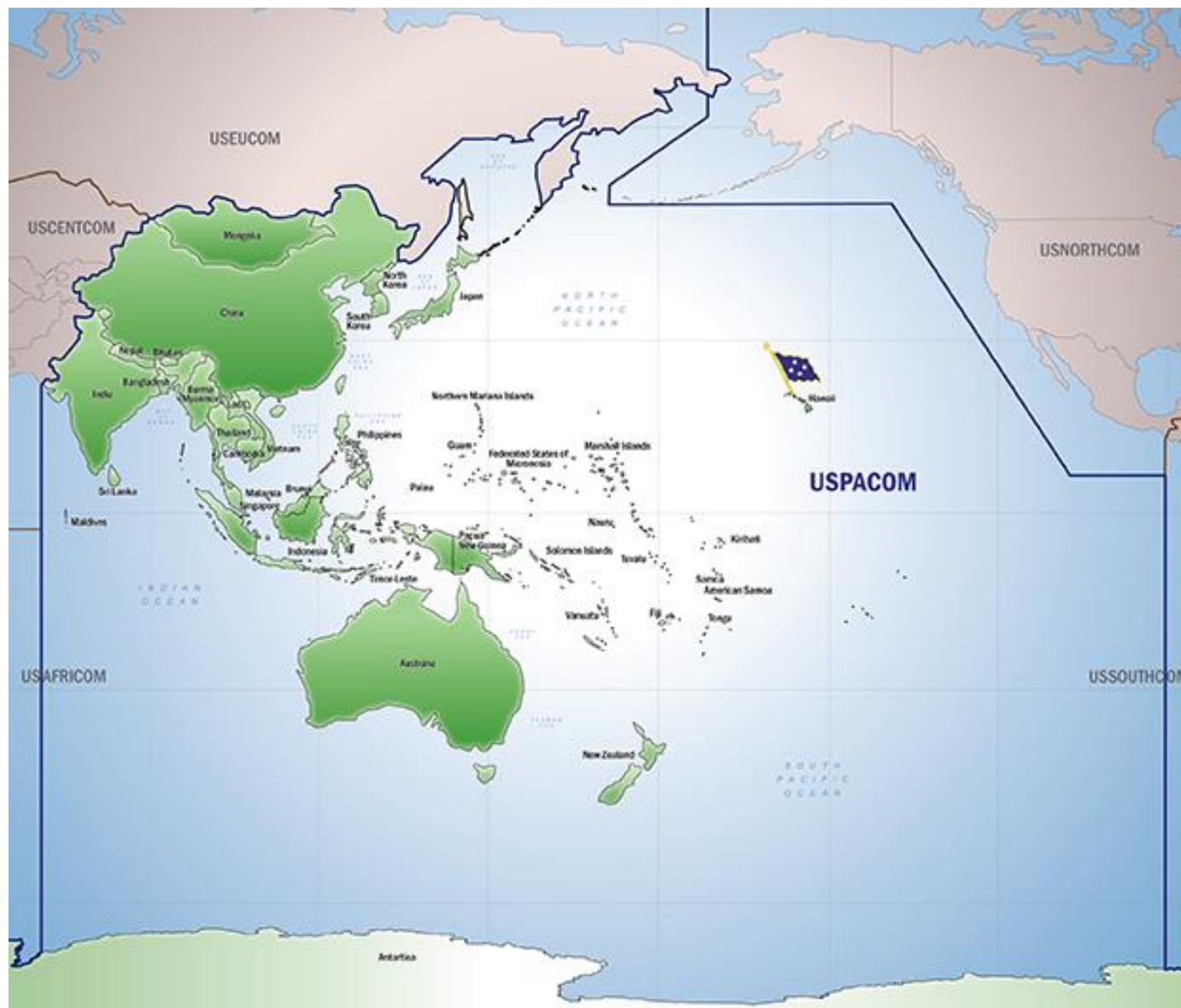
U.S. Military Forces Affecting (and Affected By) China and the South China Sea

U.S. Forces in PACOM

Approximately 375,000 U.S. military and civilian personnel are assigned to USPACOM and its different components across the Indo-Asia-Pacific region. According to USPACOM, those assignments are broken out as follows:

- **Approximately 28,500 U.S. service members and their families are stationed in the Republic of Korea**, while U.S. Forces Japan consists of approximately 54,000 military personnel and their dependents. As of September 2016, approximately 5,000 service members and their families were stationed in Guam.
- U.S. Pacific Fleet consists of approximately **200 ships** (including five aircraft carrier strike groups), nearly **1,100 aircraft**, and more than **130,000** sailors and civilians.
- Marine Corps Forces, Pacific includes **two Marine Expeditionary Forces** and about 86,000 personnel and **640 aircraft**.
- U.S. Pacific Air Forces comprises approximately **46,000** airmen and civilians and more than **420** aircraft.
- U.S. Army Pacific has approximately **106,000** personnel from one corps and two divisions, plus over **300** aircraft assigned throughout the AOR.
- These component command personnel figures also include more than **1,200** Special Operations personnel. Department of Defense civilian employees in the Pacific Command AOR number about **38,000**.

U.S. Pacific Command AOR



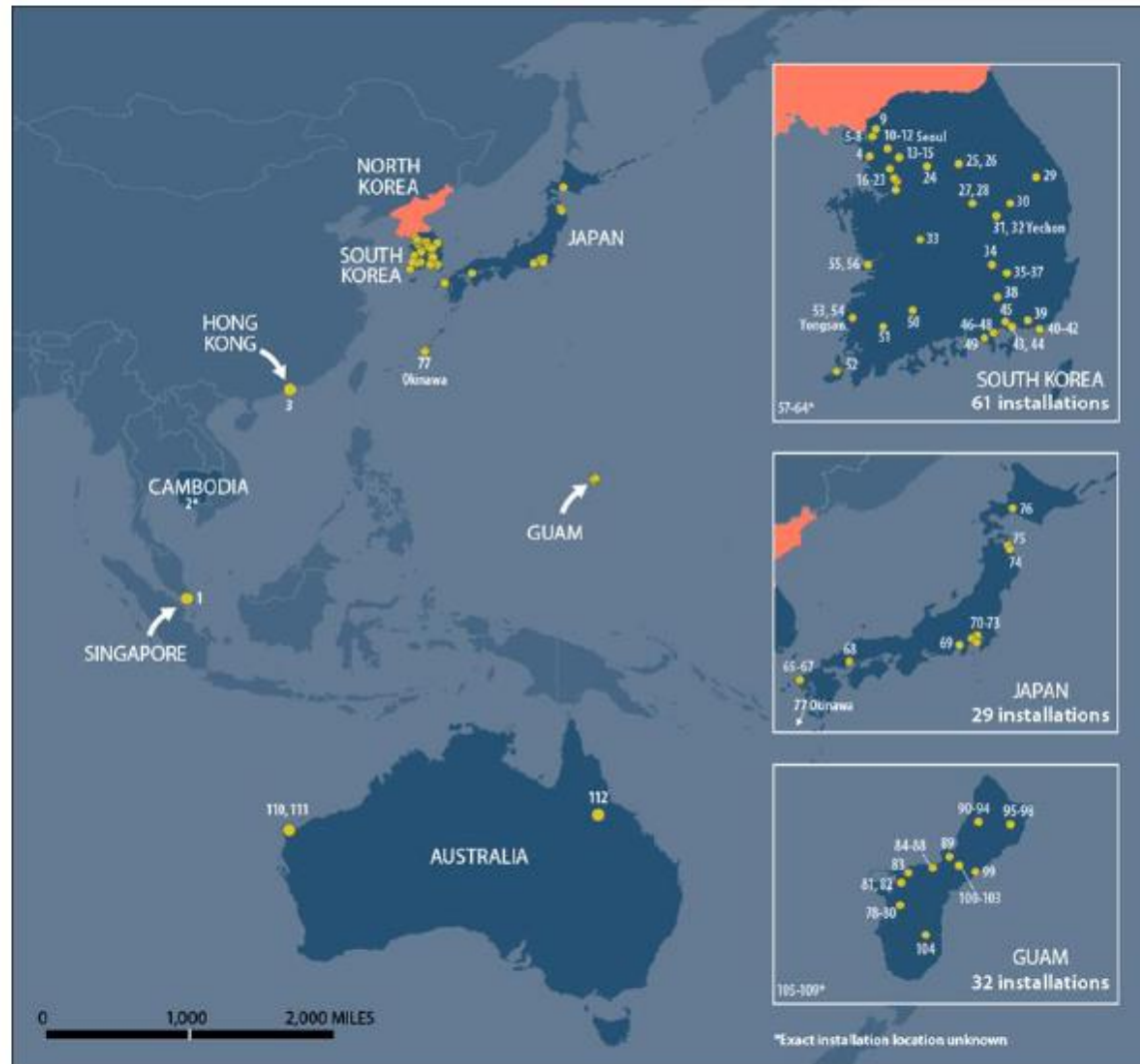
U.S. Allies and Bases in Region



Light blue denotes a treaty ally or an actual part of the United States. | (CSIS)

U.S. Bases in Pacific

Kathleen J. McInnis and others,
“The The North Korean Nuclear
Challenge: Military Options and
Issues for Congress,” Congressional
Research Service, www.crs.gov,
R44994, November 6, 2017



Sources: Graphic created by CRS. Information generated by Hannah Fischer using data from the Department of Defense Base Structure Report, FY2015, available at <https://www.acq.osd.mil/eie/Downloads/BSI/Base%20Structure%20Report%20FY15.pdf>; Department of State (2015); Esri (2016).

U.S. Joint Pacific Exercises in a “Normal” Year



U.S. Forces in South Korea

US Pacific Command • 28,500

US Army 19,200

FORCES BY ROLE

1 HQ (8th Army) at Seoul; 1 div HQ (2nd Inf) located at Tongduchon; 1 armd bde; 1 (cbt avn) hel bde; 1 MRL bde; 1 AD bde; 1 SAM bty with THAAD

EQUIPMENT BY TYPE

M1 Abrams; M2/M3 Bradley; M109; M270 MLRS; AH-64 Apache; OH-58D Kiowa Warrior; CH-47 Chinook; UH-60 Black Hawk; MIM-104 Patriot/FIM-92A Avenger; 1 (APS) armd bde eqpt set

US Navy 250

USAF 8,800

FORCES BY ROLE

1 (AF) HQ (7th Air Force) at Osan AB; 1 ftr wg at Osan AB with (1 ftr sqn with 20 F-16C/D *Fighting Falcon*; 1 atk sqn with 24 A-10C *Thunderbolt II*); 1 ftr wg at Kunsan AB with (2 ftr sqn with 20 F-16C/D *Fighting Falcon*); 1 ISR sqn at Osan AB with U-2S

USMC 250

U.S. Forces in Japan

US Pacific Command • 39,950

US Army 2,900; 1 corps HQ (fwd); 1 SF gp; 1 avn bn; 1 SAM bn

US Navy 11,700; 1 HQ (7th Fleet) at Yokosuka; 1 base at Sasebo; 1 base at Yokosuka

FORCES BY ROLE

3 FGA sqn at Atsugi with 10 F/A-18E *Super Hornet*; 1 FGA sqn at Atsugi with 10 F/A-18F *Super Hornet*; 1 EW sqn at Atsugi with 5 EA-18G *Growler*; 1 AEW&C sqn at Atsugi with 5 E-2D *Hawkeye*; 2 ASW hel sqn at Atsugi with 12 MH-60R; 1 tpt hel sqn with 12 MH-60S

EQUIPMENT BY TYPE

1 CVN; 3 CGHM; 2 DDGHM; 7 DDGM (2 non-op); 1 LCC; 4 MCO; 1 LHD; 1 LPD; 2 LSD

USMC 13,600

FORCES BY ROLE

1 mne div; 1 mne regt HQ; 1 arty regt HQ; 1 recce bn; 1 mne bn; 1 amph aslt bn; 1 arty bn; 1 FGA sqn with 12 F/A-18C *Hornet*; 1 FGA sqn with 12 F/A-18D *Hornet*; 1 FGA sqn with 12 F-35B *Lightning II*; 1 tkr sqn with 12 KC-130J *Hercules*; 2 tpt sqn with 12 MV-22B *Osprey*

USAF 11,450

FORCES BY ROLE

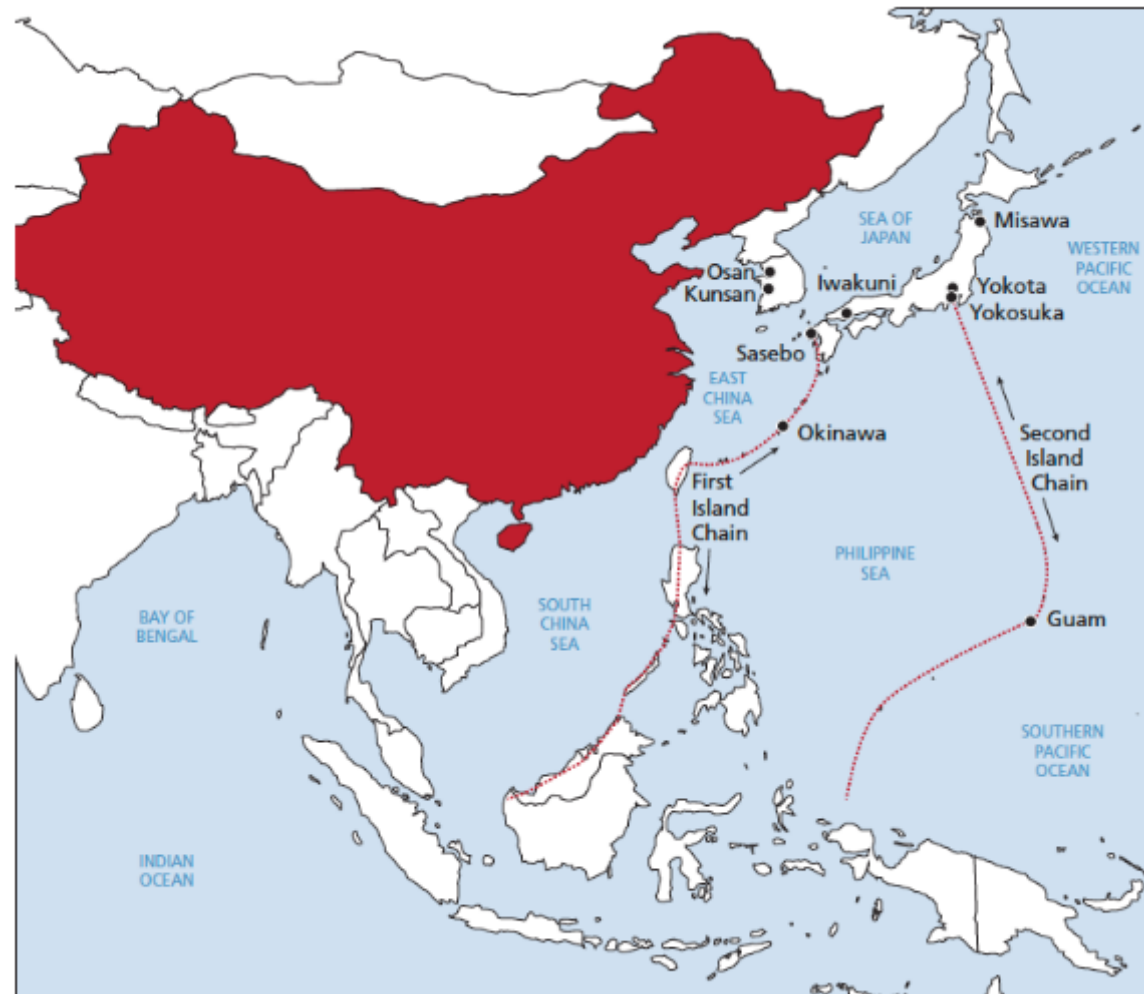
1 HQ (5th Air Force) at Okinawa – Kadena AB; 1 ftr wg at Misawa AB with (2 ftr sqn with 22 F-16C/D *Fighting Falcon*); 1 wg at Okinawa – Kadena AB with (2 ftr sqn with 27 F-15C/D *Eagle*; 1 FGA sqn with 12 F-35A *Lightning II*; 1 tkr sqn with 15 KC-135R *Stratotanker*; 1 AEW&C sqn with 2 E-3B/C *Sentry*; 1 CSAR sqn with 10 HH-60G *Pave Hawk*); 1 tpt wg at Yokota AB with 10 C-130H *Hercules*; 3 Beech 1900C (C-12J); 1 Spec Ops gp at Okinawa – Kadena AB with (1 sqn with 5 MC-130H *Combat Talon*; 1 sqn with 5 MC-130J *Commando II*); 1 ISR sqn with RC-135 *Rivet Joint*; 1 ISR UAV flt with 5 RQ-4A *Global Hawk*

US Strategic Command • 1 AN/TPY-2 X-band radar at Shariki; 1 AN/TPY-2 X-Band radar at Kyogamisaki

Cooperation, Competition, Or Conflict?

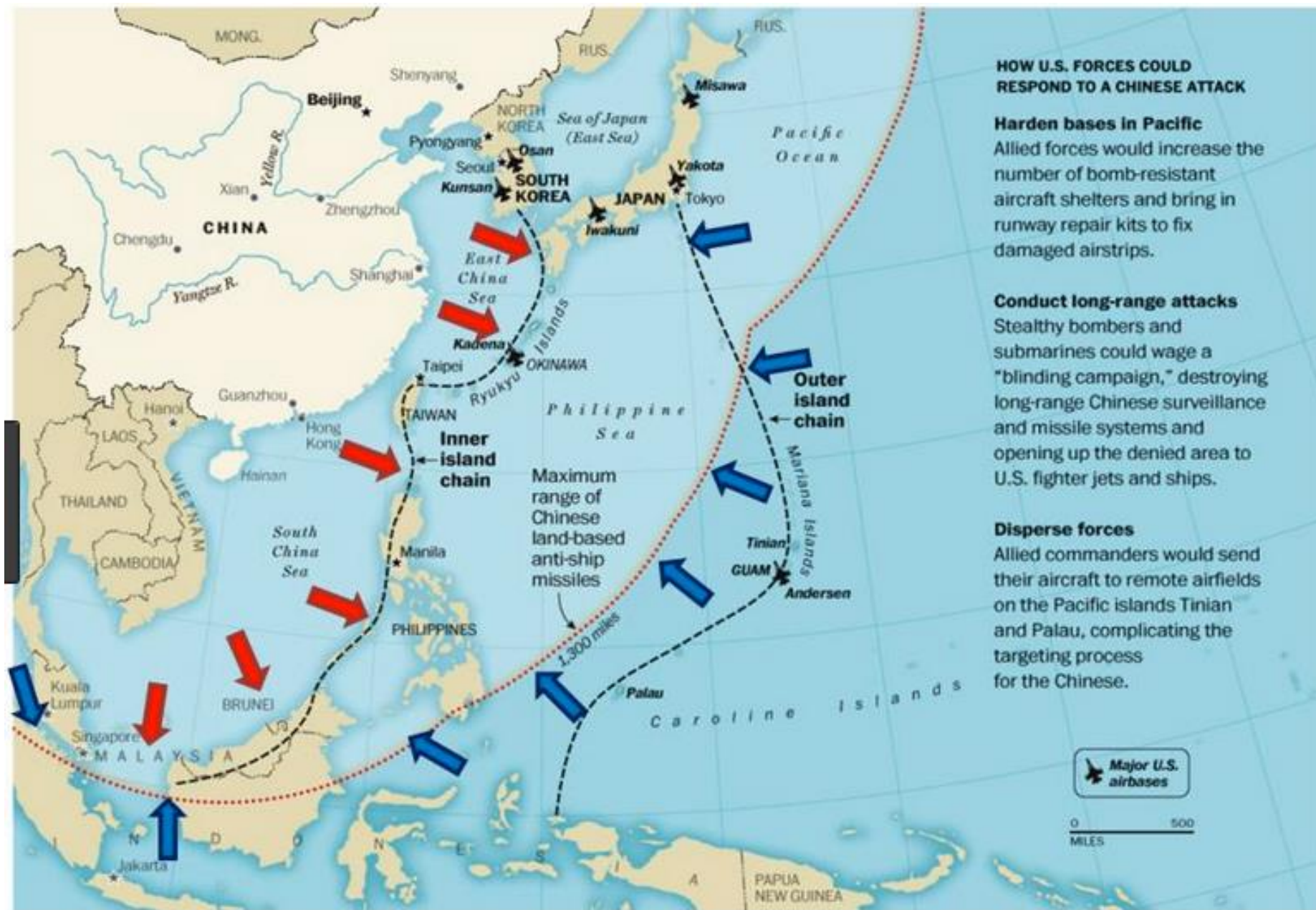
Chinese and US Strategic Postures in the Pacific

PLA Demarcation of First and Second Island Chains



RAND RR1782-2.1

Source: RAND, *US Military Forces and Capabilities for a Dangerous World*, RR1782, 2017, p. 9



China's Eastern Theater- 2018

Office of the Secretary of Defense,
*Military and Security Developments
Involving the Republic of China, Annual
Report to Congress*, May 16, 2018,
Department of Defense. China Military
Power 2018, p.98.

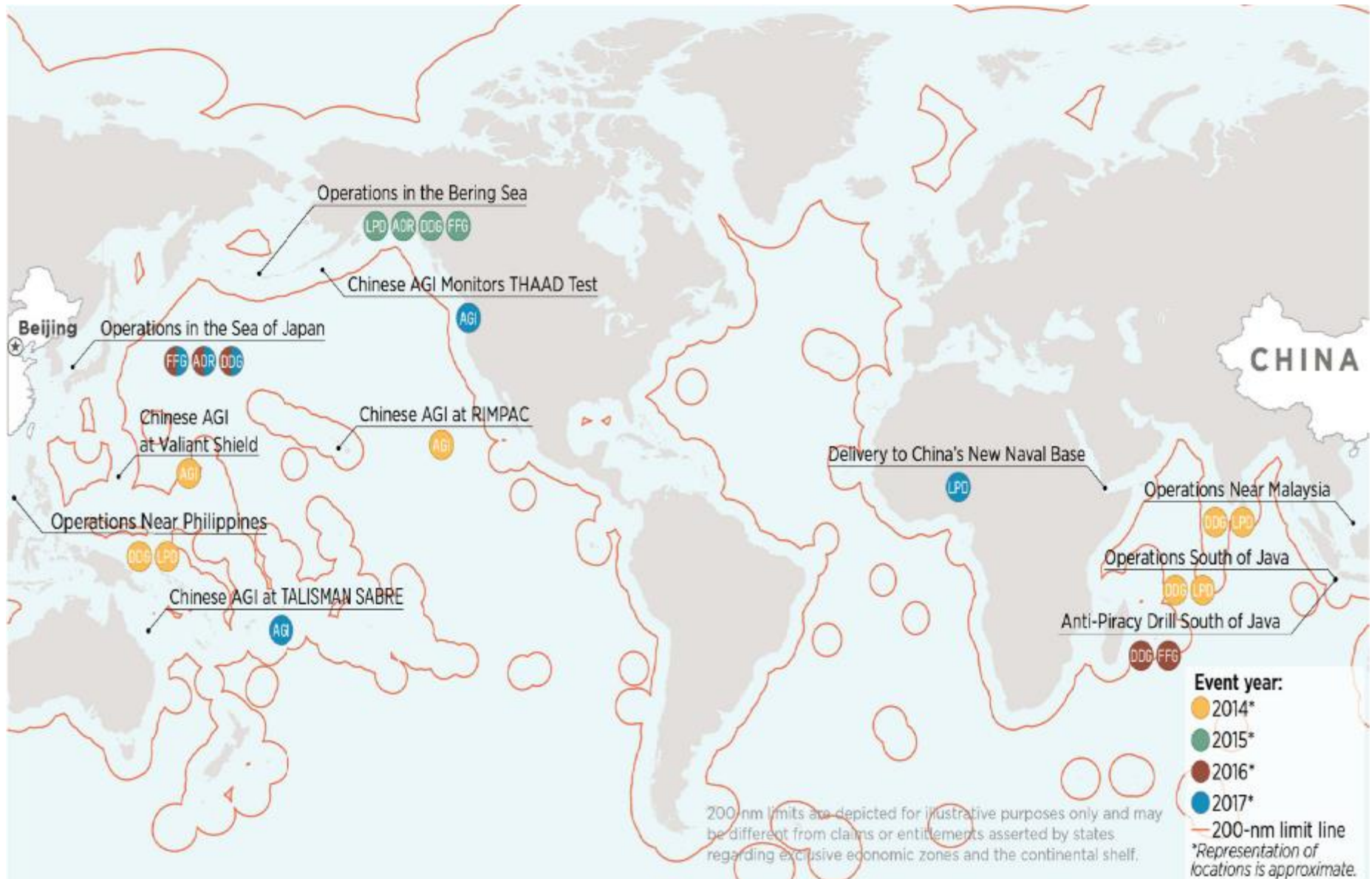


China's Southern Theater



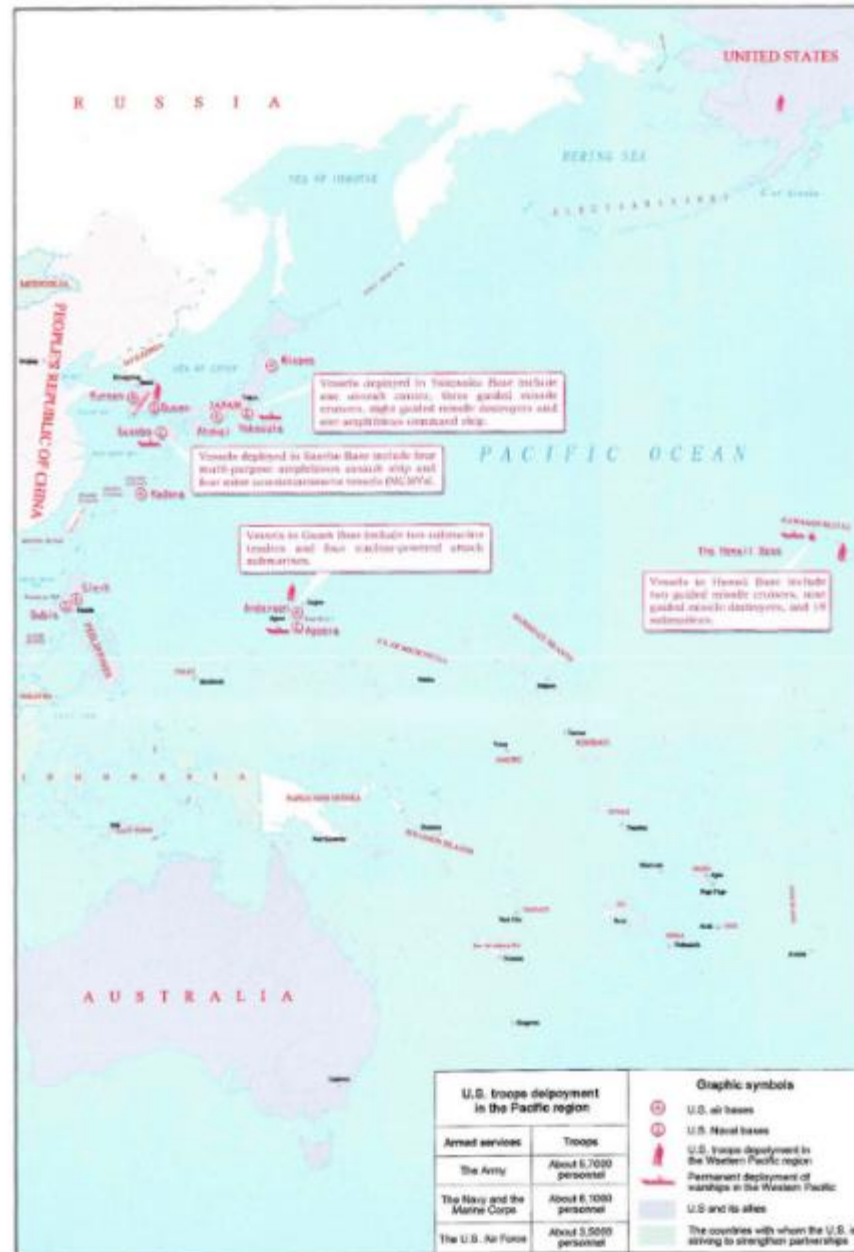
Office of the Secretary of Defense,
Military and Security Developments
Involving the Republic of China, Annual
Report to Congress, May 16, 2018,
Department of Defense. China Military
Power 2018, p. 99.

Uninvited Operations in Foreign EEZs



China's Perception of U.S. Presence in the Southern Pacific and South China Sea

Source: National Institute for South China Sea Studies, *Report on the Military Presence of the United States of America in the Asia-Pacific Region*, 2016, Current affairs Press, Hainan, 2016, p. 47



Rebalancing in Asia and the “60% solution”

China’s Perception of U.S. Presence in the Pacific

Source: National Institute for South China Sea Studies, *Report on the Military Presence of the United States of America in the Asia-Pacific Region*, 2016, Current affairs Press, Hainan, 2016, p. 47

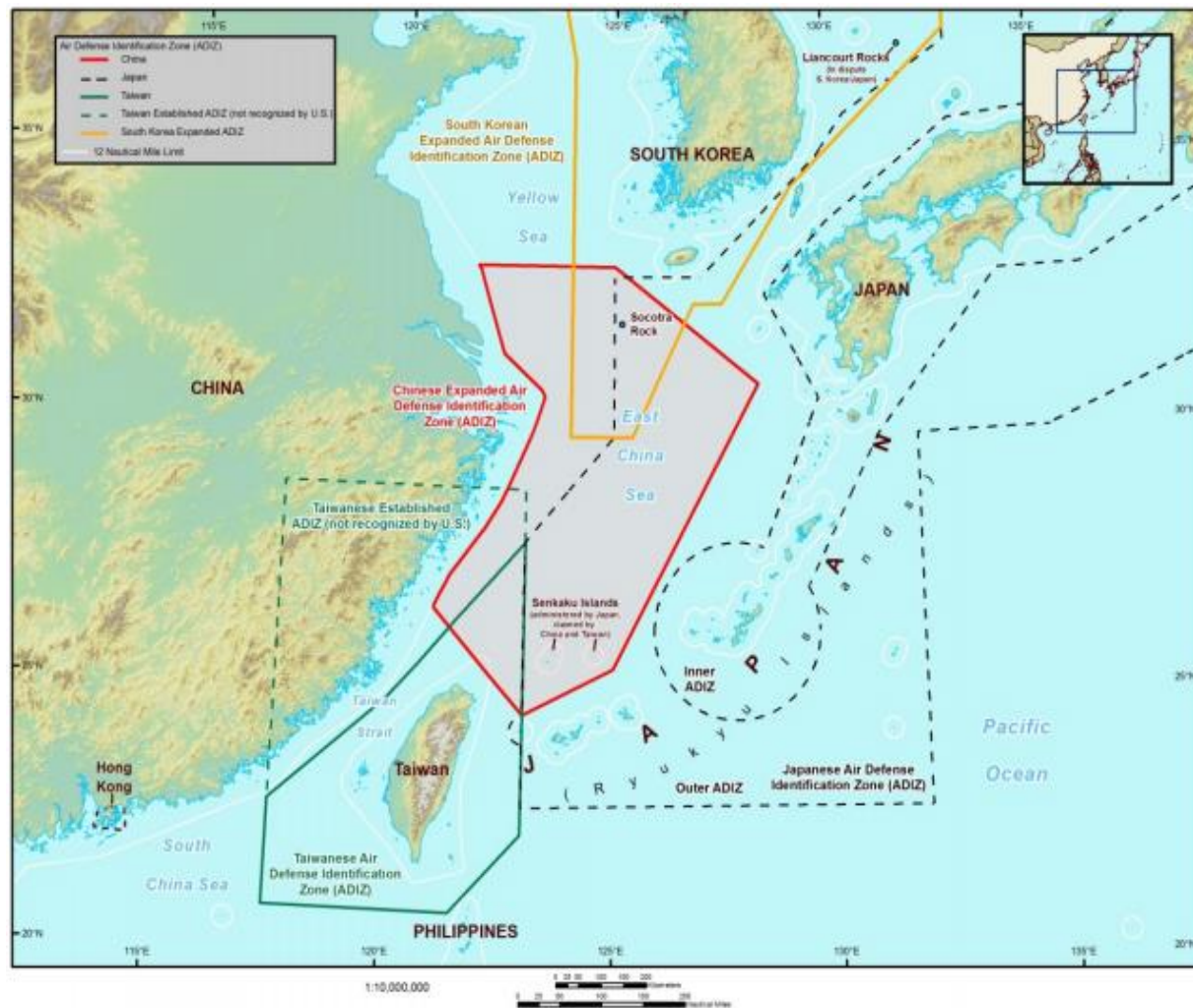


China's Perception of U.S. Presence in the Outer Island Chain

Source: National Institute for South China Sea Studies, *Report on the Military Presence of the United States of America in the Asia-Pacific Region*, 2016, Current affairs Press, Hainan, 2016, p. 47



Air Defense Zone (ADIZ) Issues



Source: DoD, *Report to Congress on Military and Security Developments Involving the People's Republic of China* 2014, June 2014, 5.

The RAND Score Card: 1996-2017

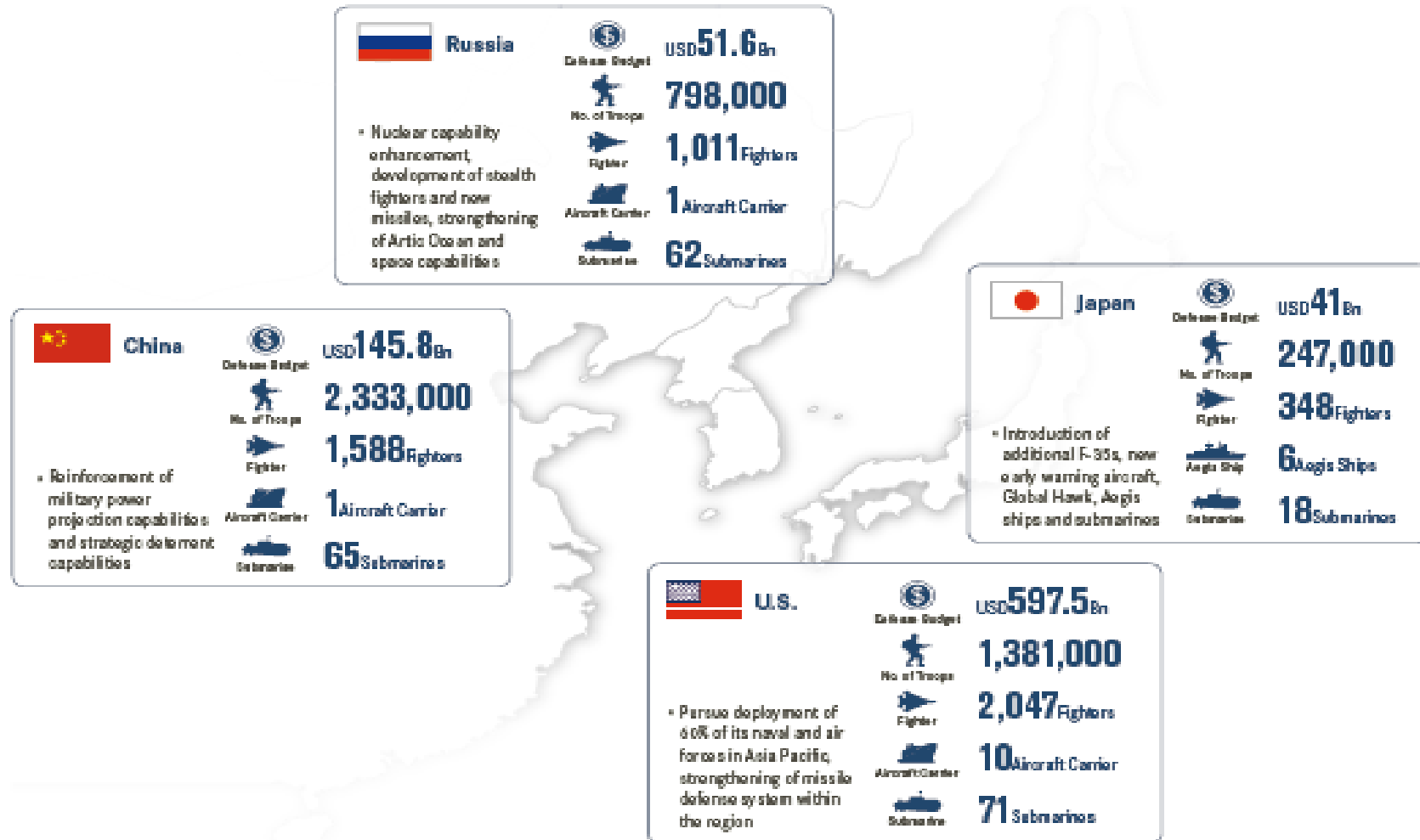
Scorecard	Taiwan Conflict				Spratly Islands Conflict			
	1996	2003	2010	2017	1996	2003	2010	2017
1. Chinese attacks on air bases								
2. U.S. vs. Chinese air superiority								
3. U.S. airspace penetration								
4. U.S. attacks on air bases								
5. Chinese anti-surface warfare								
6. U.S. anti-surface warfare								
7. U.S. counterspace								
8. Chinese counterspace								
9. U.S. vs. China cyberwar								

10. Nuclear stability (confidence in secure second-strike capability)	Country	1996, 2003, and 2010	2017
	China	Low confidence	Medium confidence
	U.S.	High confidence	

Source: RAND, The US-China Military Scorecard, 19916-2017, RAND https://www.rand.org/pubs/research_reports/RR392.html. RR-392-AF, 2015.,

The Shifting Regional Balance And China's Overall Force Development

South Korean Estimate of Regional Military Balance: 2016 - I



* Sources: *The Military Balance 2016* (International Institute for Strategic Studies, Feb. 2016.), *Defense of Japan 2016*, etc.

South Korean Estimate of Regional Military Balance: 2016 - II

Number of Troops

Unit: persons

Category	U.S.	Russia	China	Japan
Total	1,381,250	798,000	2,333,000	247,150
Army	509,450	240,000	1,600,000	151,000
Navy	326,800	148,000	235,000	45,500
Air Force	319,950	145,000	398,000	47,100
Others	Marine Corps 185,050 Coast Guard 40,000	Airborne 34,000 Strategic 80,000 Command/support 151,000	Rocket Forces 100,000	Joint Staff Office 3,550

Army

Category	U.S.	Russia	China	Japan
Divisions/Brigades	10/45	4/89	23/128	9/6
Tanks	5,884	20,200	6,540	687
Infantry combat vehicles	6,559	13,900	3,950	68
Reconnaissance vehicles	1,900	2,200	650(light tanks)	162
Armored vehicles	24,377	12,000	4,150	792
Towed artillery	1,242	13,165	6,140	422
Self-propelled guns	1,469	6,120	2,280	166
Multiple launch rocket systems	1,205	4,070	1,872	99
Mortar	2,483	4,130	2,586	1,103
Anti-tank guided weapons	SP 1,512	SP N/A	SP 480	SP 37
Ground-to-air missiles	1,207	1,520	312	700
Helicopters	4,200	1,278	760	412
Aircraft	222	-	8	8

Adapted from South Korea, *Defense White Paper*, 2016, p. 264

South Korean Estimate of Regional Military Balance: 2016 - III

Navy

Category		U.S.	Russia	China	Japan
Submarines		57	49	61	18
Strategic nuclear submarines		14	13	4	-
Aircraft carriers		10	1	1	-
Cruisers		22	6	-	-
Destroyers		62	18	19	38
Frigates		4	10	54	9
Patrol and coastal combatants		57	89	199	6
Mine sweepers		11	45	49	27
Amphibious vessels		30	19	50	3
Landing craft		245	30	73	8
Auxiliary ships		71	625	171	28
Fighters		956	72	346	-
Helicopters		720	195	111	131
Marine Corps	Marine division	3	3 brigades	2 brigades	-
	Tanks	447	250	73	-
	Reconnaissance vehicles	252	60	-	-
	Amphibious assault APC	1,311	1,000	-	-
	Personnel transport APC	2,467	400	152	-
	Cannons	1,506	365	40	-
	Anti-tank missiles	95	-	-	-
	UAV/ISRs	139	-	-	-
	Aircraft	445	-	-	-
	Helicopters	455	-	-	-

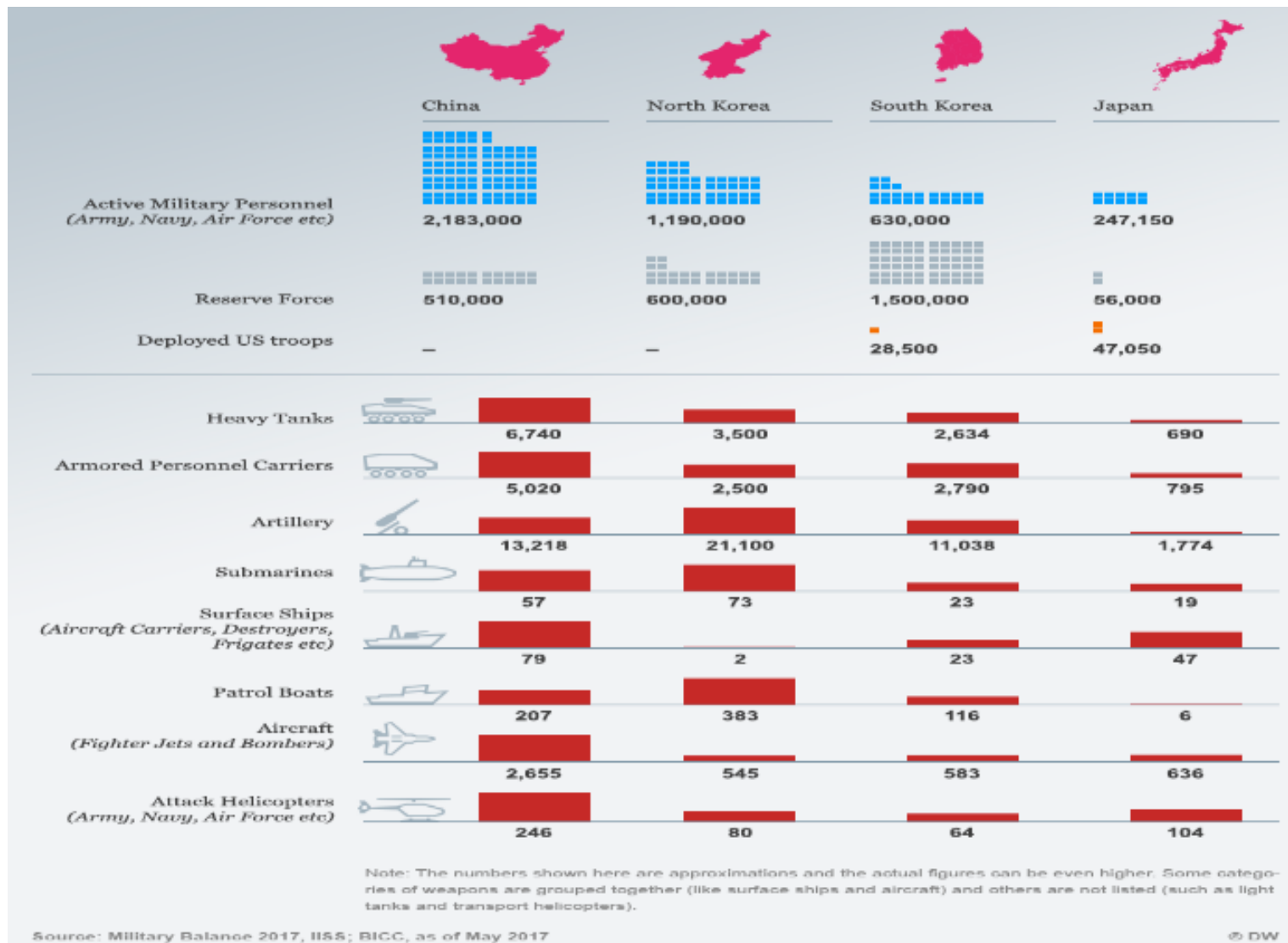
Air Force

Category		U.S.	Russia	China	Japan
Strategic bombers		157	139	-	-
Bombers		-	-	120	-
Reconnaissance aircraft		ISR-UAV-CISR 454	85	51	17
Command and control aircraft		4	8	5	-
Fighters		FTR-FGR-ATK 1,890	872	1,468	348
Transport aircraft		686	432	325	61
Tankers		461	15	11	5
AWACS		AWE&C-EW 45	18	8	17
Trainers		1,128	204	950	245
Helicopters		161	669	53	46
Civil Reserve Air Fleet		553	-	-	-
EW aircraft		ELINT 33	32	13	3

* Source: The Military Balance 2016 (International Institute for Strategic Studies, February 2016) and Defense of Japan 2016 (Annual White Paper) (August 2016)

DW Estimate of Northern Asia Balance 2017

(Varying estimates for key powers. No credible estimates of North Korea)



Deutsche Welle, "US report warns of China military development overseas," 7.6.17, <http://www.dw.com/en/us-report-warns-of-china-military-development-overseas/a-39138715>

Taiwan

Estimate

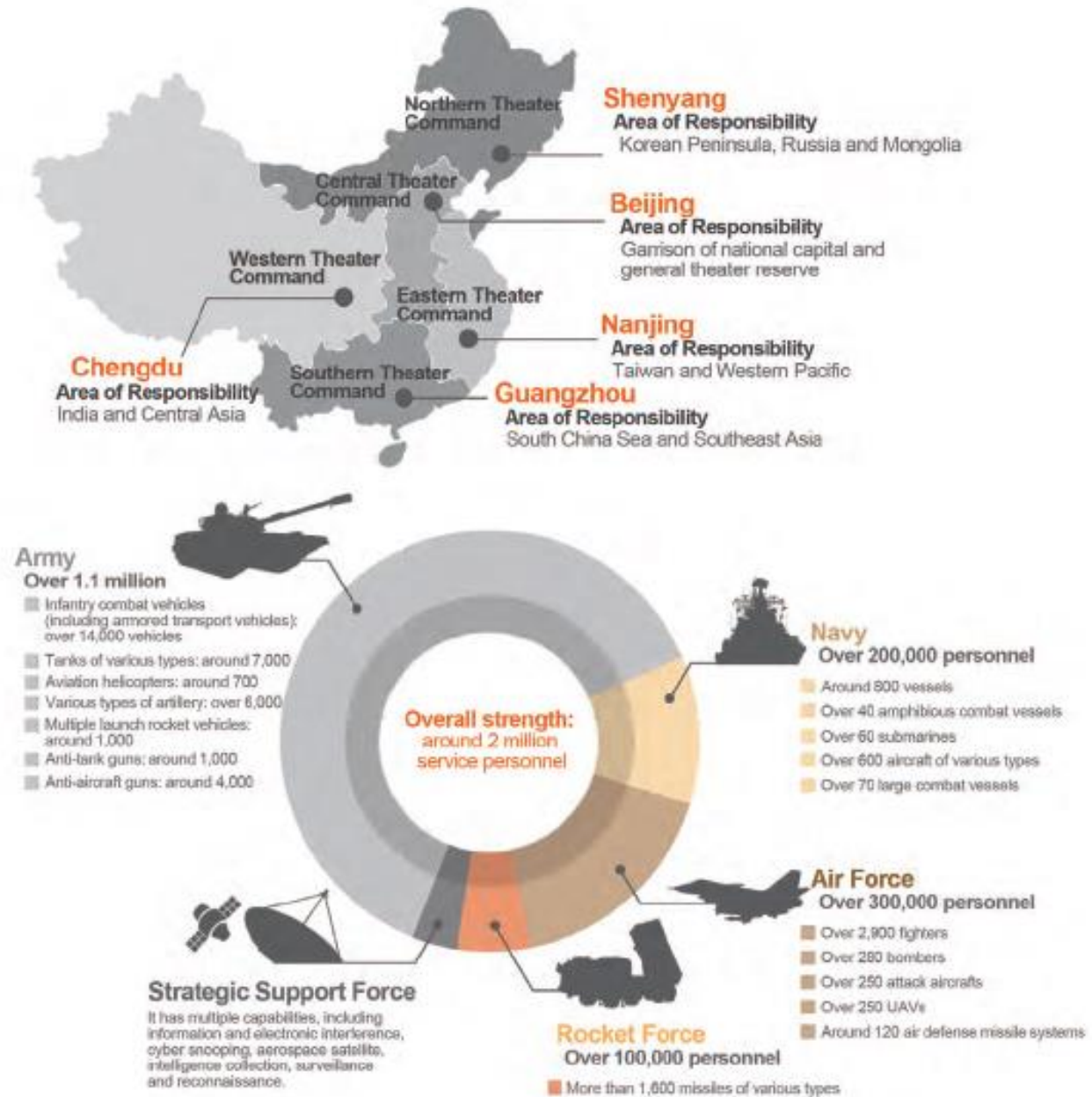
of

Chinese

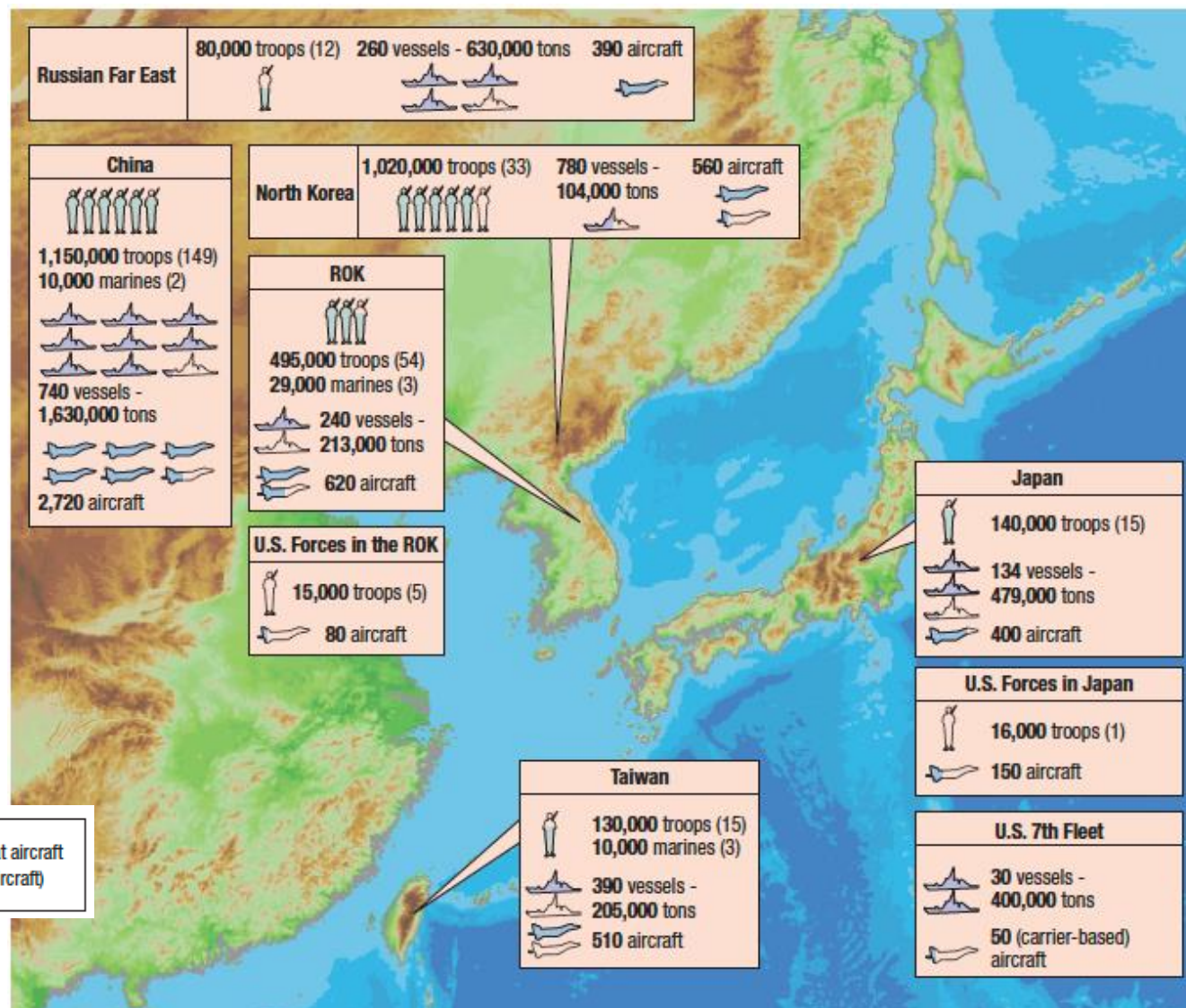
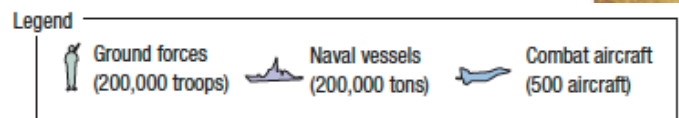
Military

Forces –

2017



Japanese Estimate of Regional Military Balance: 2017



1. Source: "The Military Balance 2017," documents published by the U.S. DoD, etc.
2. Figures for Japan indicate the strength of each SDF as of the end of 2016; the number of combat aircraft is the sum of ASDF aircraft (excluding transport aircraft) and MSDF aircraft (fixed-wing aircraft only).
3. Figures for the U.S. ground forces in Japan and the ROK are those of the Army and Marine Corps personnel combined.
4. Combat aircraft include Navy and Marine aircraft.
5. Figures in parentheses show the total number of central units, such as divisions and brigades. That of North Korea shows only divisions. That of Taiwan includes military police as well.
6. The number of U.S. 7th Fleet vessels and aircraft indicates those which are forward-deployed in Japan and Guam.
7. Figures of combat aircraft of the U.S. Forces, Japan and the U.S. 7th Fleet include only fighters.

China-India Military Balance - 2018

	India	China
Total active force	1,395,100	2,183,000
Strategic forces	na	100,000
Army	1,200,000	1,150,000
Navy	58,350	235,000
Air Force	127,200	398,000
Principal surface combatants	28	79
Aircraft carriers ^a	1	1 ^b
Submarines	14	57
Naval combat aircraft	73	348
Air Force combat aircraft	803	2,307
Nuclear warheads ^c	130	270
Defense budget ^d	\$51 billion (2016)	\$145 billion (2016)
GDP	\$2,515 billion (2017 est.)	\$12,284 billion (2017 est.)
GDP growth	6.7% (2017 est.)	6.9% (2017 est.)

Source: *The Military Balance*, International Institute for Military Studies, 2017. "Nuclear Weapons: Who Has What at a Glance," Arms Control Association, January 2018. Economist Intelligence Unit, India and China Country Reports, 2018.

Notes: na = not available.

- a. China has one operational aircraft carrier, the *Liaoning*. Its second carrier is expected to undergo sea trials in 2018. China reportedly began construction of a third carrier in 2017. India's *Vikramaditya* aircraft carrier is currently in service. Its second carrier, the *Vikrant*, is in late development stages. A third Indian aircraft carrier the *Vishal* is reportedly in mid-design stage. See Franz-Stephan Gady, "Will China's New Aircraft Carrier Start Sea Trials This Week?" *The Diplomat*, April 23, 2018, and Abraham Ait, "US and French Fighters Contend for a Place Aboard India's New Aircraft Carrier," *The Diplomat*, February 24, 2018.
- b. Includes four SSBN nuclear-armed submarines.
- c. Estimates.
- d. Between 2007 and 2016 China's military spending increased 118%; India's defense spending increased by 54% over the same period. "A New Military Order?" *Times of India*, February 14, 2018. China's 2018 military budget of \$175 billion represents a 8.1% increase from 2017. "China Boosts Military Spending 8%," *CNN*, March 5, 2018.

Building a More Capable PLA –Developments in 2017

China is committed to building a more capable PLA that can fight jointly, harness real-time, data-networked command and control and precision strike; and operate increasingly far away from China's shores.

- Highlights in 2017: cutting 300,000 personnel, flattening to a brigade structure, building expeditionary capability, and placing paramilitary forces solely under the control of the PLA.
- Notable 2017 exercise elements included air and ground operations coordination, incorporating multiple military services' intelligence, surveillance, and reconnaissance (ISR) data, and using joint air firepower guidance teams to provide targeting information to multiple services' assets.
- PLA Army reforms included disestablishment of five group army headquarters, reorganization of many divisions and regiments into combined arms brigades, and formation of some air assault brigades.
- The PLAN Marine Corps (PLANMC) is expanding. Previously consisting of 2 brigades, approximately 10,000 personnel, and limited in geography and mission, by 2020, the PLANMC will consist of 7 brigades, may exceed 30,000 personnel, and will have expanded its mission to include expeditionary operations.
- The PLAN conducted its longest goodwill tour in 2017, traveling to 20 countries in the Indo-Pacific region, Europe, Africa, and Oceania.
- In 2017, the PLAN launched an aircraft carrier and a cruiser, and three destroyers, additional surface combatants, support ships, and intelligence-collection ships entered service. The world's largest seaplane also completed its first flight in December 2017.
- The PLA Air Force (PLAAF) has been re-assigned a nuclear mission. The deployment and integration of nuclear-capable bombers would, for the first time, provide China with a nuclear "triad" of delivery systems dispersed across land, sea, and air.
- The Chinese Communist Party continued its vigorous efforts to root out armed forces corruption in 2017. In September 2017, two former Central Military Commission (CMC) members, the previous Joint Staff Department chief, Fang Fenghui, and previous Political Work Department director, Zhang Yang, were reportedly detained for questioning in an anti-graft probe, a first in decades for sitting CMC officers.
- Computer systems around the world, including those owned by the U.S. Government, continued to be targeted by China-based intrusions through 2017.

Chinese Military Power 2017: Key Findings

China's strategy is to harness the initial two decades of the 21st century as a "period of strategic opportunity" to facilitate China's development and expand the country's "comprehensive national power," which includes improving its military, the People's Liberation Army (PLA).

- At the 19th Party Congress in October 2017, President Xi enumerated objectives for the "basic realization of socialist modernization" by 2035, which included China becoming one of the most "innovation-oriented" countries, significant enhancement of the country's soft power, and continued economic prosperity.
- Xi's speeches at the 19th Party Congress and the PLA's 90th anniversary highlighted recent progress "accelerating toward informatization" that will provide the PLA with a "great rise in strategic capability."
- China's military leaders want to achieve mechanization and make "major progress" toward informatization by 2020, reach a goal of "basic modernization" by 2035, and become a world-class military by the middle of this century.

China's leaders increasingly seek to leverage China's growing economic, diplomatic, and military clout to establish regional preeminence and expand the country's international influence.

- China uses the Belt and Road Initiative to develop strong ties with other countries to shape their interests to align with China's and deter confrontation or criticism of China's approach to sensitive issues.
- In July 2017, Sri Lanka and a Chinese-state owned enterprise signed a 99-year lease for Hambantota Port, following similar deals in Piraeus, Greece, and Darwin, Australia.
- In August 2017, China officially opened its first overseas base in Djibouti, deploying a company of marines and equipment to the base.

China does not want to jeopardize regional stability, which remains critical to its economic development, but is willing to employ coercive measures to advance its interests and mitigate other countries' opposition.

- In 2017, China used economic and diplomatic pressure, unsuccessfully, in an attempt to urge South Korea to reconsider its deployment of the Terminal High-Altitude Area Defense (THAAD) system.
- In August 2017, China conducted a coordinated PLA Navy (PLAN), China Coast Guard (CCG), and People's Armed Forces Maritime Militia patrol around Thitu Island and planted a flag on Sandy Cay, a sandbar within 12 nautical miles of Subi Reef and Thitu Island, possibly in response to the Philippines' reported plans to upgrade its runway on Thitu Island.
- In 2017, China continued building infrastructure at three large Spratly Islands outposts. China also made political and economic overtures to Southeast Asian countries to diminish regional concerns over its actions in the South China Sea.
- In 2017, China entered within 12 nautical miles of the Senkaku Islands on average once every 10 days with multiple CCG vessels.
- After a 70-day standoff near Doka La Pass, India and China agreed to withdraw their military forces, but both countries maintain a heightened military presence in the surrounding region. India halted another Chinese road construction effort in disputed territory in Arunachal Pradesh in December 2017.

China also continues to employ persuasion and coercion vis-à-vis Taiwan.

- Taiwan lost an additional diplomatic partner in 2017 (Panama), and international fora denied participation or observership to Taiwan representatives.
- In 2017, the PLAAF significantly increased Taiwan circumnavigations, passing through both the Miyako Strait and the Bashi Channel in the same mission.
- In June 2017, the United States announced the sale of \$1.42 billion in defense articles and services to Taiwan, including MK-48 6AT Heavy-Weight Torpedoes, AGM-154 Joint Standoff Weapons, and AGM-88 High-Speed Anti-Radiation Missiles.

China's Changing Land Power

Major Ground Units - 2018

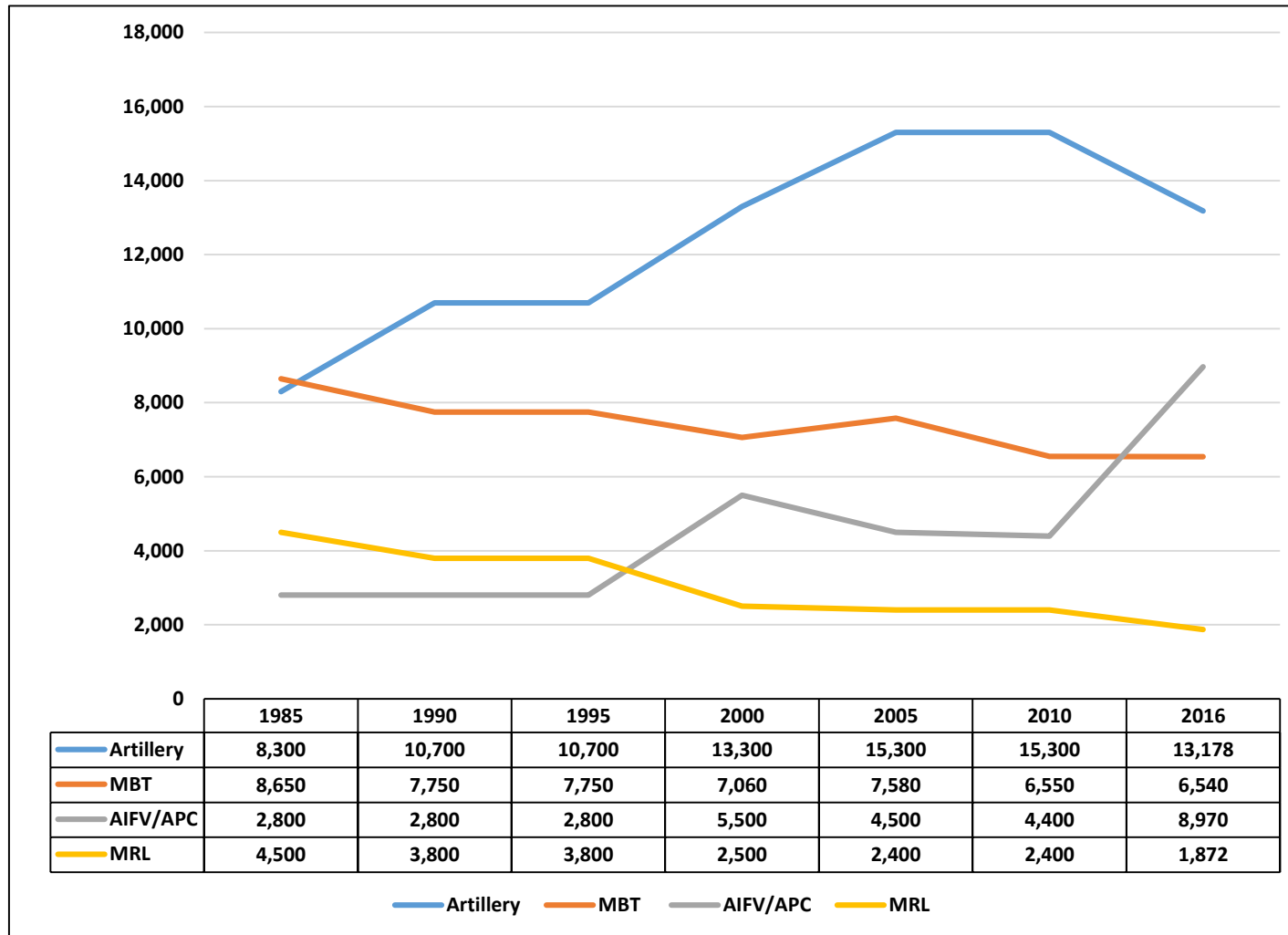


Office of the Secretary of Defense,
*Military and Security Developments
 Involving the Republic of China, Annual
 Report to Congress*, May 16, 2018,
 Department of Defense. China Military
 Power 2018, p.27.

Ground Forces in End-2016

Taiwan Strait Military Balance, Ground Forces			
	China		Taiwan
	Total	Taiwan Strait Area	Total
Personnel (Active in Combat Units)	850,000	190,000	130,000
Group Armies/Army Corps	18	6	3
<i>Infantry Divisions</i>	12	3	0
<i>Infantry Brigades</i>	23	6	7
<i>Mechanized Infantry Divisions</i>	7	1	0
<i>Mechanized Infantry Brigades</i>	25	6	3
<i>Armor Divisions</i>	1	0	0
<i>Armor Brigades</i>	17	6	4
<i>Army Aviation Brigades and Regiments</i>	11	5	3
<i>Artillery Brigades</i>	22	8	5
<i>Airborne Corps</i>	1	1	0
<i>Amphibious Divisions</i>	2	2	0
<i>Amphibious Brigades</i>	3	3	2
Tanks	7,000	2,000	1,100
Artillery Pieces	8,000	2,600	1,600
<p>Note: The 2016 chart focuses on PLA combat units and applies a changed methodology, resulting in significantly lower personnel numbers than shown in previous reports. This does not reflect a sudden drop in capability. This presentation is likely to change further as the PLA carries out its announced demobilization of 300,000 troops by 2017. This chart also changes how it presents amphibious units, which in the PLA are in both the PLAA and PLAN Marine Corps. The "Taiwan Strait Area" includes select national-level assets and units in the PLA's Eastern and Southern Theaters. The numbers of personnel and systems are approximate.</p>			

China's Changing Army: 1985-2016



Source: IISS *Military Balance*, 2016. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies.

China's Army Modernization in 2017

Theater commands appear to have assumed more operational control from the services, and probably commanded the PLA's responses to North Korea, India, and activities in the South China Sea.

After unveiling the PLA's newly established CMC Joint Operations Command Center (JOCC) in 2016, the PLA established theater JOCCs. Like the CMC JOCC, each theater JOCC is probably staffed by the Army, Navy, Air Force, and Rocket Force and equipped with a joint command system

In April 2017, the PLA began restructuring its corps-level and below units, renaming and restructuring many units across the PLA.

Most notably, the PLAA's 18 group armies were reorganized into 13 renamed group armies, dissolving 5 group armies and transitioning most of the units subordinate to the group armies into brigades.

The PLAAF is also converting its fighter and ground attack divisions into brigades subordinate to air bases, and the PLAN is creating brigade-level frigate flotillas. The PLA probably expects that a more consistent brigade structure across the force will improve joint combat capabilities.

Demobilizing Personnel. In 2017, the PLA largely completed cuts to reduce its force by 300,000 personnel. These cuts probably focused on non-combat personnel, such as those in arts and culture, administrative duties, or academic work, rather than the demobilization of combat personnel from dissolved group armies.

China's official media also reported the cuts are rebalancing the proportion of forces among the services, increasing the relative size of the PLAN and PLAAF and reducing PLAA personnel to less than half of the PLA. The number of active-duty personnel in non-combat units was likely cut in half, and almost one-third of officers were also cut.

The PLA continues to build towards an expeditionary capability by increasing the number of army aviation and marine units.

These changes will require significant revisions to PLA doctrine in the coming years to meet the PLA's modernization goals for 2020.

The PLA trained to execute large-scale, complex joint operations by increasing realism and including dedicated opposition force training, maneuver, and mobility

...Theater command exercises focused on multi-service command and control, while exercises tested brigade-level capabilities and readiness. The PLAA continued its two major \ exercise series in 2017 and introduced new, force multiplying systems that improve combat power.

The PLAA also continued to modernize in 2017, emphasizing systems that act as force multipliers and improve combat power. The year saw increases and improvements in air defense, artillery, sustainment support, engineers, and chemical defense systems at all echelon levels.

This selective modernization enables the shift to the brigade and battalion as the main operational echelons by giving their commanders critical organic force protection, firepower strike, reconnaissance, and sustainment capabilities

Japanese Estimate of Chinese vs. Taiwan Land Forces



		China	Taiwan (Reference)
Total military forces		Approx. 2.2 million troops	Approx. 220,000 troops
Ground forces	Group troops	Approx. 1.15 million troops	Approx. 130,000 troops
	Tanks, etc.	Type-99/A, Type-98/A, Type-96/A, Type-88A/B and others Approx. 7,400 vehicles	M-60A, M-48A/H and others Approx. 1,200 vehicles
Maritime forces	Warships	Approx. 740 vessels / 1,630,000 tons	Approx. 390 vessels / 210,000 tons
	Aircraft carriers, destroyers, and frigates	Approx. 80 vessels	Approx. 20 vessels
	Submarines	Approx. 60 vessels	4 vessels
	Marines	Approx. 10,000 troops	Approx. 10,000 troops
Air forces	Combat aircraft	Approx. 2,720 aircraft	Approx. 510 aircraft
	Modern fighters aircraft	J-10 x 346 Su-27/J-10 x 329 Su-30 x 97 J-15 x 13 J-16 x 2 (under tests) J-20 x 2 (under tests) (Fourth-/fifth-generation fighters (total): 789)	Mirage 2000 x 56 F-16 x 144 Ching-kuo x 128 (Fourth-generation fighters (total): 328)
Reference	Population	Approx. 1.38 billion	Approx. 23 million
	Term of service	2 years	1 year

Source: "The Military Balance 2017," etc. China's total military forces to be cut by 300,000 troops by the end of 2017.

China's Changing Naval Power

Major Naval Units -2018



Office of the Secretary of Defense,
*Military and Security Developments
 Involving the Republic of China, Annual
 Report to Congress*, May 16, 2018,
 Department of Defense. China Military
 Power 2018, p.32.

Naval Forces in End-2016

Taiwan Strait Military Balance, Naval Forces			
	China		Taiwan
	Total	Eastern and Southern Theater Navies	Total
<i>Aircraft Carriers</i>	1	0	0
<i>Destroyers</i>	31	24	4
<i>Frigates</i>	56	42	22
<i>Corvettes</i>	23	14	1
<i>Tank Landing Ships/ Amphibious Transport Dock</i>	34	32	12
<i>Medium Landing Ships</i>	21	15	4
<i>Diesel Attack Submarines</i>	54	34	4
<i>Nuclear Attack Submarines</i>	5	2	0
<i>Ballistic Missile Submarines</i>	4	4	0
<i>Coastal Patrol (Missile)</i>	88	70	45
<i>Coast Guard Ships</i>	185	N / A	25
Note: The PLAN has the largest force of principal combatants, submarines, and amphibious warfare ships in Asia. In the event of a major Taiwan conflict, the Eastern and Southern Theater Navies would participate in direct action against the Taiwan Navy. The Northern Theater Navy (not shown) would be responsible primarily for protecting the sea approaches to China, but could provide mission-critical assets to support other fleets. In conflict, China may also employ CCG ships to support military operations.			

Chinese Naval Build-Up - I

(Numbers of PLA Navy Ships Presented in Annual DOD Reports to Congress)

(Figures include both older and less capable units—including some of questionable operational status—and newer and more capable units)

Year of DOD report	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Ballistic missile submarines	1	1	1	n/a	1	1	1	1	2	2	2	2	3	3	4	4	4
Nuclear-powered attack submarines	5	5	~60	n/a	6	5	5	5	6	6	5	5	5	5	5	5	5
Diesel attack submarines	~60	~ 50		n/a	51	50	53	54	54	54	49	48	49	51	53	57	54
Aircraft carriers	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Destroyers	~20	~ 60	> 60	n/a	21	25	25	29	27	25	26	26	23	24	21	23	31
Frigates	~40			n/a	43	45	47	45	48	49	53	53	52	49	52	52	56
Corvettes	0	0	0	0	0	0	0	0	0	0	0	0	0	8	15	23	23
Missile-armed coastal patrol craft	n/a	~ 50	~ 50	n/a	51	45	41	45	70	85	86	86	85	85	86	86	88
Amphibious ships: LSTs and LPDs	almost 50	~ 40	> 40	n/a	20	25	25	26	27	27	27	28	29	29	29	30	34
Amphibious ships: LSMs				n/a	23	25	25	28	28	28	28	23	26	28	28	22	21

Source: Table prepared by CRS based on 2000-2016 editions of annual DOD report to Congress on military and security developments involving China (known for 2009 and prior editions as the report on China military power).

Notes: n/a means data not available in report. LST means tank landing ship; LPD means transport dock ship; LSM means medium landing ship. The DOD report generally covers events of the prior calendar year. Thus, the 2016 edition of the report covers events during 2015.

Chinese Naval Build-Up - II

(Numbers of PLA Navy Ships
and Aircraft Provided by ONI in
2009)

(Figures include both older and less capable units—including some of questionable operational status—
and newer and more capable units)

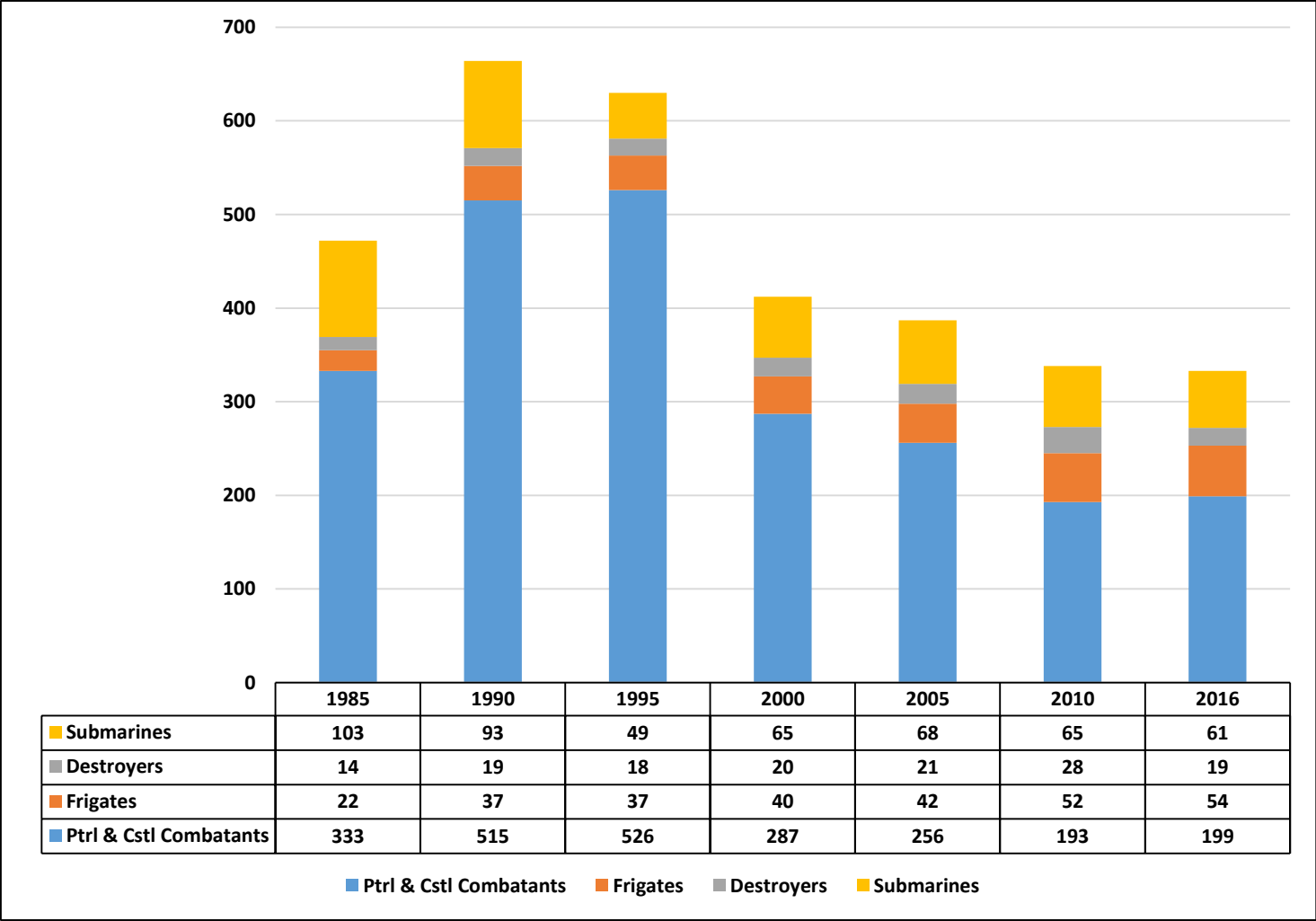
	1990	1995	2000	2005	2009	Projection for 2015	Projection for 2020
<i>Ships</i>							
Ballistic missile submarines	1	1	1	2	3	4 or 5?	4 or 5?
Attack submarines (SSNs and SSs)	80	82	65	58	59	~70	~72
SSNs	5	5	5	6	6	n/a	n/a
SSs	75	77	60	52	53	n/a	n/a
Aircraft carriers	0	0	0	0	0	1?	2?
Destroyers	14	18	21	25	26	~26	~26
Frigates	35	35	37	42	48	~45	~42
Subtotal above ships	130	136	124	127	136	~146 or ~147?	~146 or ~147?
Missile-armed attack craft	200	165	100	75	80+	n/a	n/a
Amphibious ships	65	70	60	56	58	n/a	n/a
Large ships (LPDs/LHDs)	0	0	0	0	1	~6?	~6?
Smaller ships	65	70	60	56	57	n/a	n/a
Mine warfare ships	n/a	n/a	n/a	n/a	40	n/a	n/a
Major auxiliary ships	n/a	n/a	n/a	n/a	50	n/a	n/a
Minor auxiliary ships and support craft	n/a	n/a	n/a	n/a	250+	n/a	n/a
<i>Aircraft</i>							
Land-based maritime strike aircraft	n/a	n/a	n/a	n/a	~145	~255	~258
Carrier-based fighters	0	0	0	0	0	~60	~90
Helicopters	n/a	n/a	n/a	n/a	~34	~153	~157
Subtotal above aircraft	n/a	n/a	n/a	n/a	~179	~468	~505

Source: Prepared by CRS. Source for 2009, 2015, and 2020: 2009 ONI report, page 18 (text and table), page 21 (text), and (for figures not available on pages 18 or 21), page 45 (CRS estimates based on visual inspection of ONI graph entitled "Estimated PLA[N] Force Levels"). Source for 1990, 1995, 2000, and 2005: Navy data provided to CRS by Navy Office of Legislative Affairs, July 9, 2010.

Notes: n/a is not available. The use of question marks for the projected figures for ballistic missile submarines, aircraft, carriers, and major amphibious ships (LPDs and LHDs) for 2015 and 2020 reflects the difficulty of resolving these numbers visually from the graph on page 45 of the ONI report. The graph shows more major amphibious ships than ballistic missile submarines, and more ballistic missile submarines than aircraft carriers. Figures in this table for aircraft carriers include the *Liaoning*. The ONI report states on page 19 that China "will

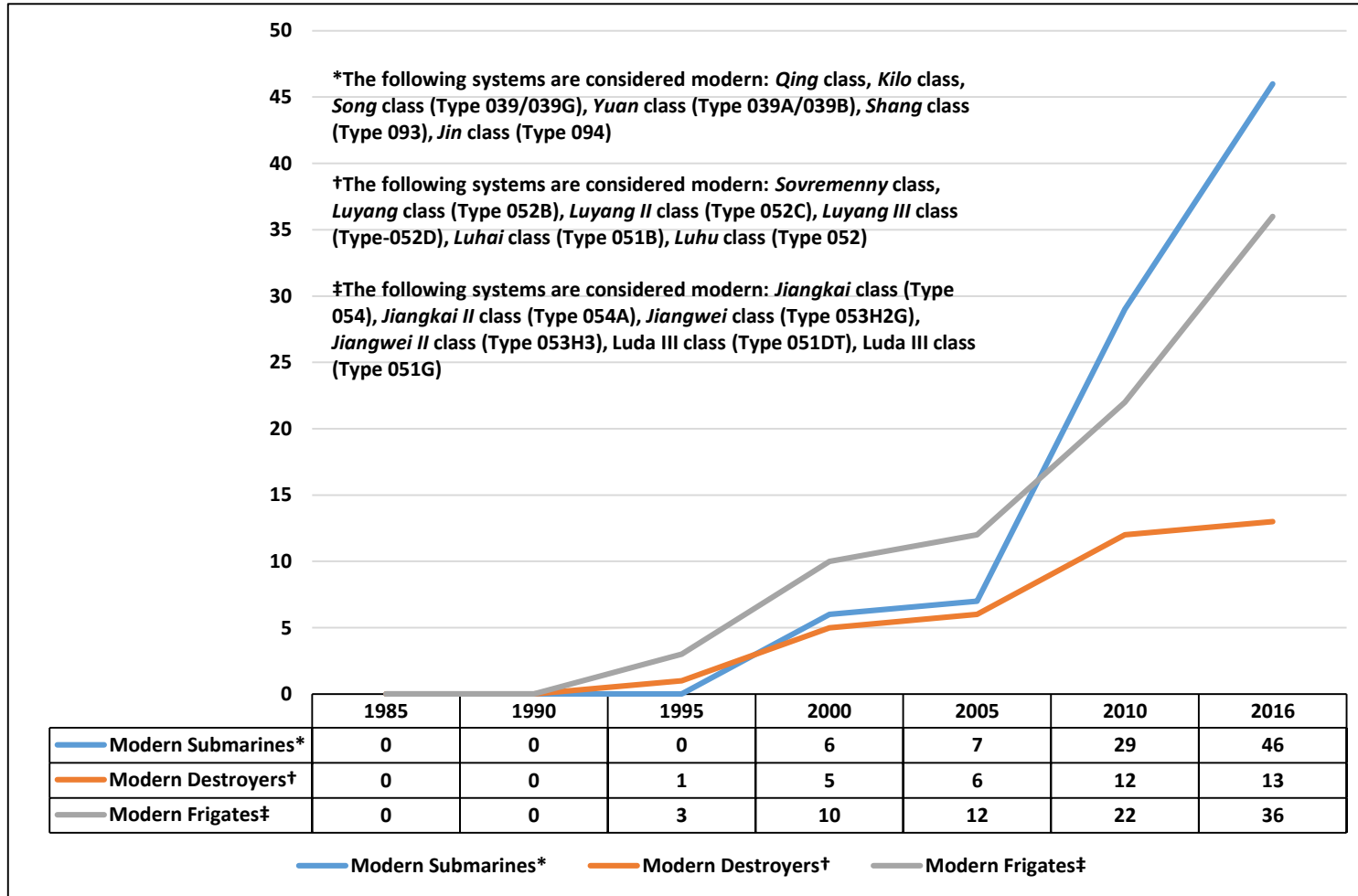
Source: Ronald O'Rourke, China Naval
Modernization: Implications for U.S. Navy
Capabilities—Background and Issues for
Congress, CRS RL33153, August 1, 2018,
p.71 .

China's Naval Modernization: Quality versus Quantity



Source: IISS, *Military Balance* 1985-2016. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies ..

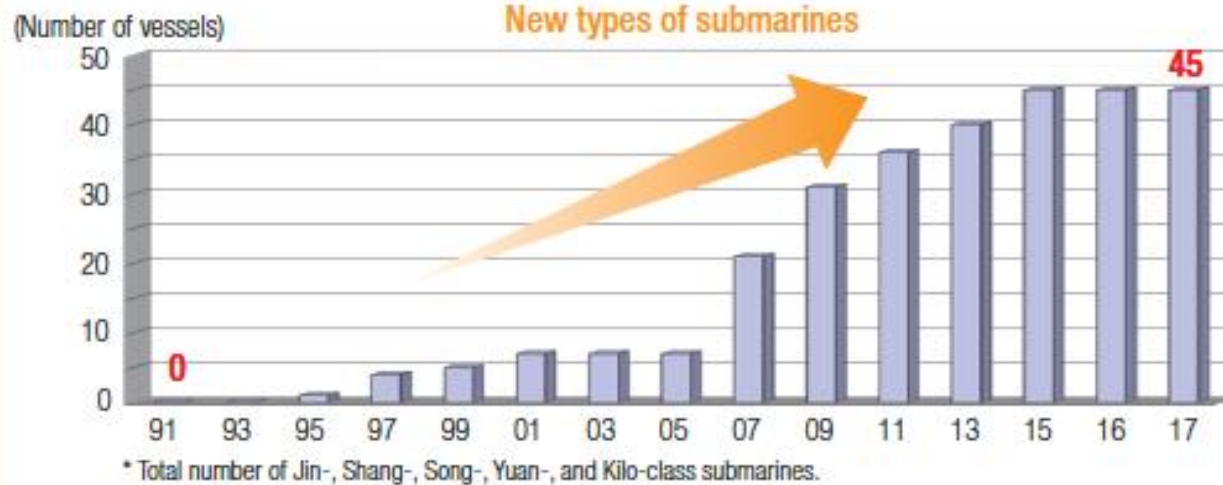
China's Naval Modernization: Increase in Modern Major Combat Ships: 1985-2016



Source: Source: IISS, *Military Balance* 1985-2016. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies

Japanese Estimate of Chinese Naval Modernization

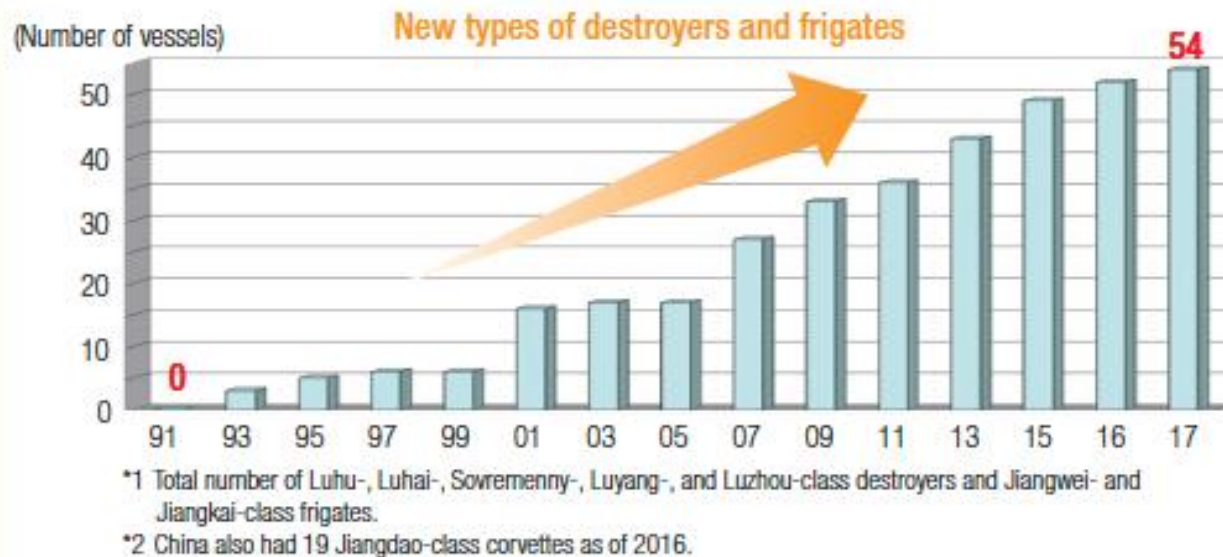
Naval Force



Jin-class SSBN



Yuan-class submarine



Luyang III-class destroyer

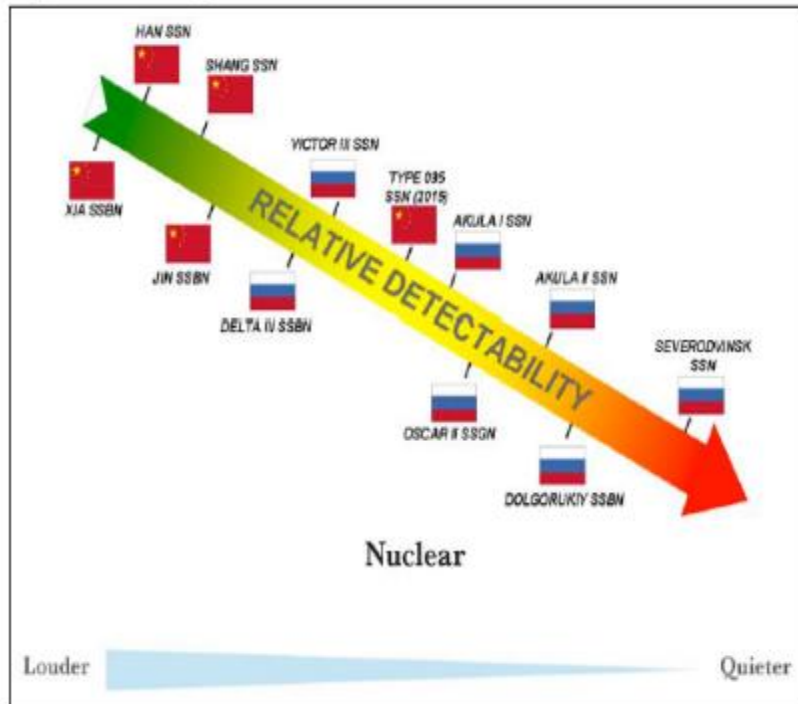


Jiangkai II-class frigate
[Jane's by IHS Markit]

Chinese and Russian Submarine Silencing

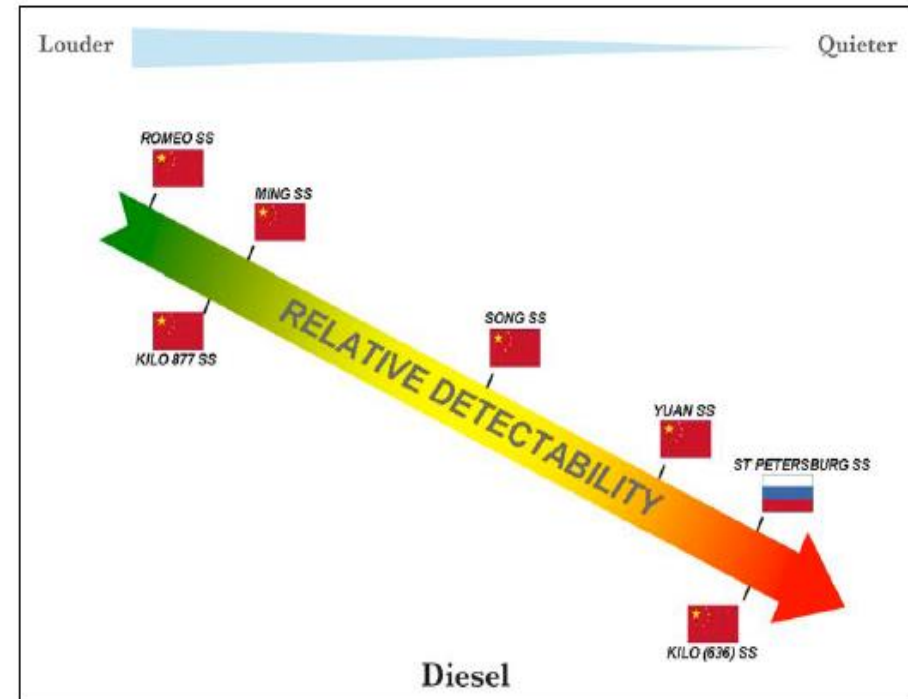
(Numbers of PLA Navy Ships and Aircraft Provided by ONI in 2009)

Figure 3. Acoustic Quietness of Chinese and Russian Nuclear-Powered Submarines



Source: 2009 ONI Report, p. 22.

(Non-nuclear-powered submarines are commonly referred to as diesel or diesel-electric submarines)



Source: 2009 ONI Report, p. 22.

Carriers vs. Islands? 001A Test Bed vs. Gerald R. Ford

Source: China,
Global Times,
2018/5/13 8:35,,
<http://www.globaltimes.cn/content/1101935.shtml>.

TYPE 001A

China's first domestically built began construction in 2013, and is expected to come into active service in the Navy before 2020



Expected to be:
315 meters long, 75 meters wide

50,000 tonnes level

Expected to be:
31 knots

Conventional power

Expected to have:
**32 to 36 J-15 fighter jets
and a number of other planes**

About 60 meters long



SIZE



DISPLACEMENT



SPEED



PROPELLER



AIRCRAFT



ISLAND



LIAONING

The Liaoning was bought from Ukraine in 1999, and was officially enrolled to the navy on Sep 25, 2012.

304 meters long, 70 meters wide

50,000 tonnes level

29 knots

Conventional power

**Currently 24 J-15 fighter jets
and 12 other planes**

Over 70 meters long

Gerald R. Ford

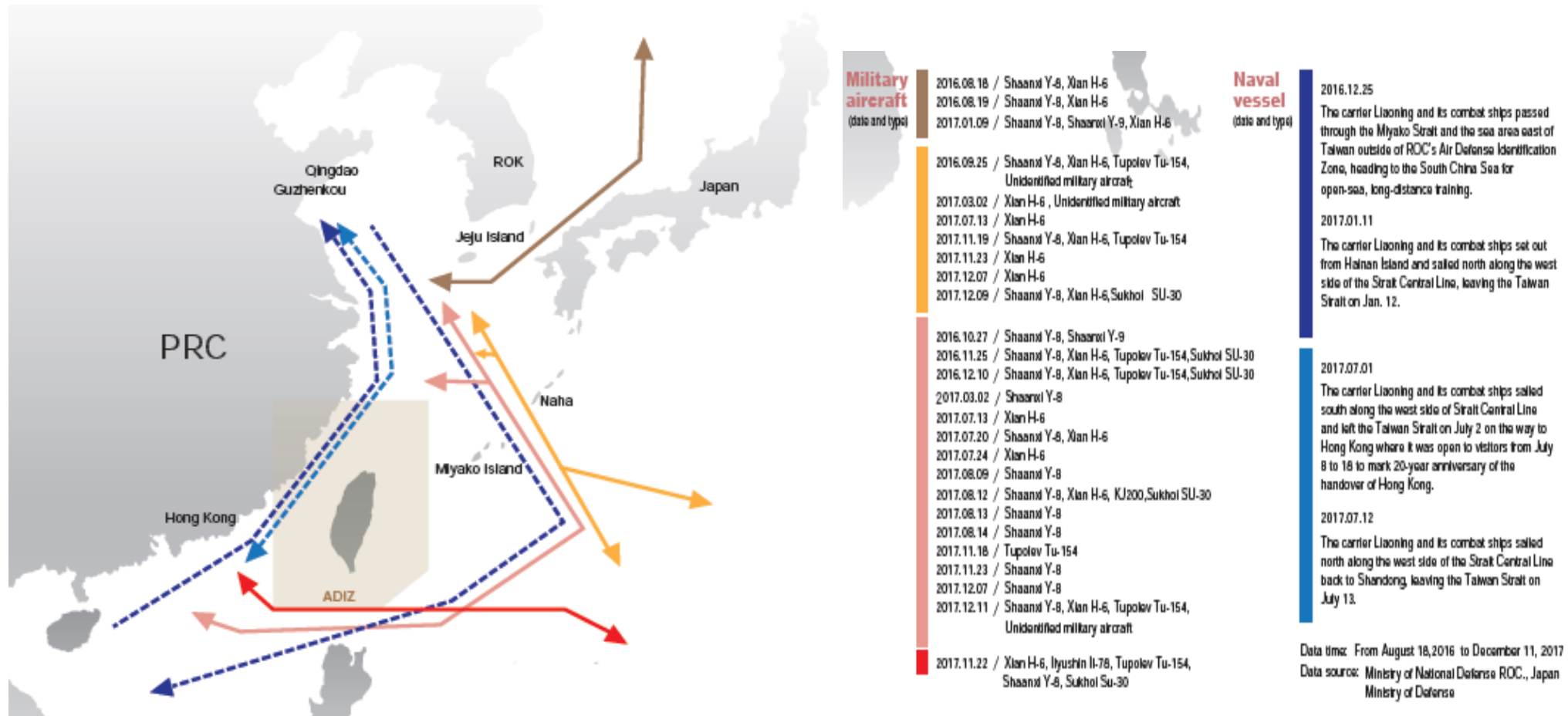
- Nuclear Power (new nuclear reactor design (2 X [A1B reactor](#)) for greater power generation.)
- 337 meters long
- 100,000 tons
- 75 vs. 36 aircraft
- 40+ Knots
- Advanced [arresting gear](#).¹
- updated [RIM-162 Evolved Sea Sparrow](#) missile.
- [AN/SPY-3 X Band](#) multifunction radar and an AN/SPY-4 [S Band](#) volume search radar.
- [Electromagnetic Aircraft Launch System](#)
- [Stealth features](#) to reduce [radar cross-section](#).
- Ability to carry up to 90 aircraft + drones

Liaoning Carrier Deployments 2014-2017



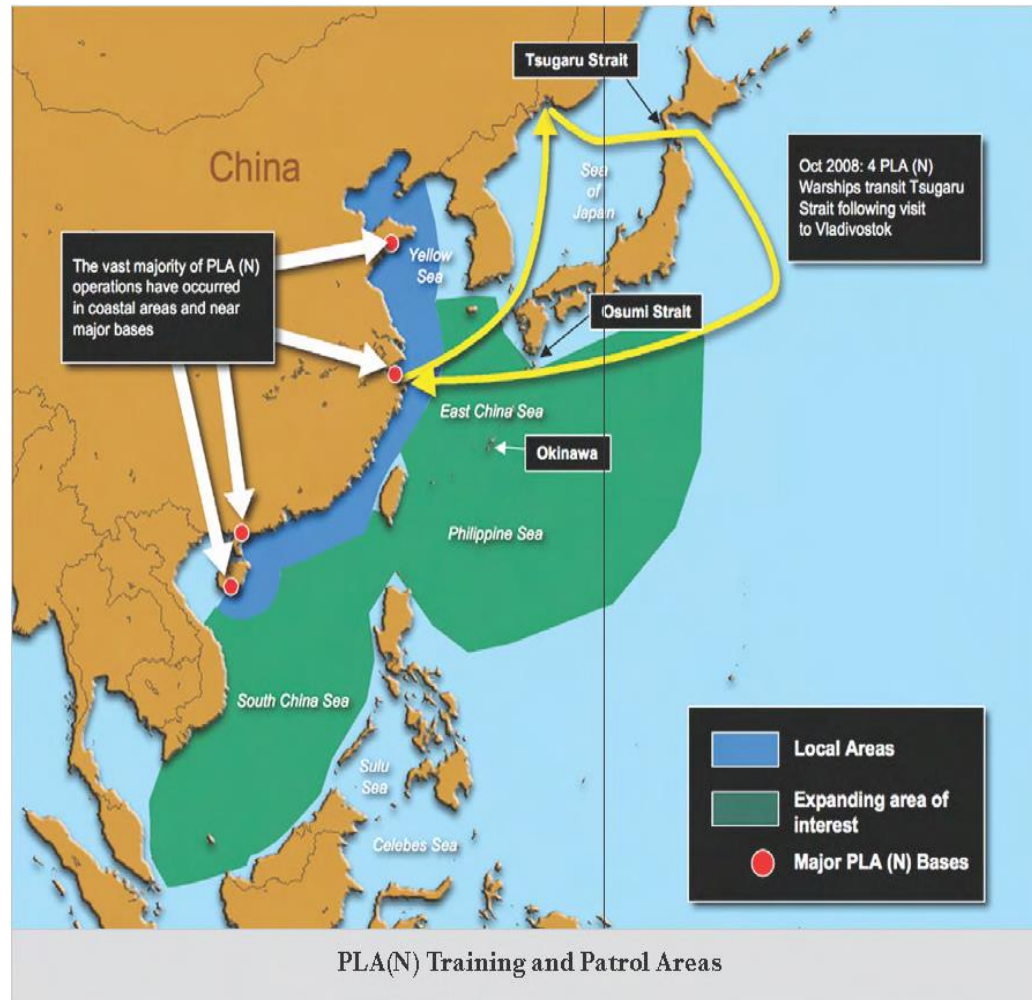
Office of the Secretary of Defense,
*Military and Security Developments
 Involving the Republic of China, Annual
 Report to Congress*, May 16, 2018,
 Department of Defense. China Military
 Power 2018, p.31.

Taiwan Diagram of Chinese Cross Region Naval and Air Training Routes



China's Naval Modernization: Expanding in PLAN

Exercise Locations



China's Amphibious Capabilities

Office of the Secretary of Defense, *Military and Security Developments Involving the Republic of China, Annual Report to Congress*, May 16, 2018, Department of Defense. China Military Power 2018, p. 103.

KEY TAKEAWAYS

- ✓ The PLAA and PLANMC continue to equip, plan, and train for sustained amphibious operations.
- ✓ The PLAN did not make significant additions to its amphibious fleet in 2017 but launched a YUZHAO LPD that could enter service in 2018.

The PLA continues to make modest gains in amphibious warfare by developing additional capabilities to conduct amphibious landings and seize and defend small islands. The PLA has 12 units organized and equipped to conduct amphibious operations. Over the last five years, the PLAA and the PLANMC have fielded new equipment designed specifically for amphibious operations such as the ZBD-05 amphibious infantry fighting vehicle and the PLZ-07B amphibious self-propelled howitzer. Both PLAA and PLANMC units equipped for amphibious operations conduct regular company- to battalion-level amphibious training exercises. However, the PLA rarely conducts amphibious exercises involving echelons above a battalion, though both PLAA and PLANMC units have emphasized the development of combined arms battalion formations since 2012.

In 2017, the PLA reorganized amphibious infantry divisions of the former 1st Group Army and 42nd Group Army as well as the former 31st Group Army amphibious armor brigade, into a total of five amphibious combined arms brigades now under the new 72nd Group Army and 74th Group Army. Amphibious training throughout 2017 continued to focus upon the ability to conduct and sustain amphibious operations while incorporating real-time ISR, precision targeting for close air support assets, integrated command and control, and nighttime reconnaissance and attack training.

The PLANMC continues to make modest gains in its proficiency to conduct amphibious operations. Despite the tripling of the number of PLANMC brigades, there are no indications that any of the new units are conducting – or are even equipped to conduct – amphibious warfare training. In 2017, the PLANMC may have reduced some of its annual training due to restructuring from PLA reforms. At least one squad of operational PLAN marines from the South Sea Fleet conducted coral reef/small island seizure training in the Paracel Islands in March 2017.

The PLAN did not make significant additions to its amphibious fleet in 2017, but launched a YUZHAO LPD that could enter service in 2018.

Civilian and Paramilitary Maritime Forces

CHINA'S GROWING CIVILIAN AND PARAMILITARY MARITIME CAPABILITY

KEY TAKEAWAYS

- ✓ The CCG is the world's largest; the PAFMM is the only government-sanctioned maritime militia in the world.
- ✓ The PAFMM has organizational ties to, and is sometimes directed by, China's armed forces, and is active in the South and East China Seas.
- ✓ PAFMM units enable low-intensity coercion activities to advance territorial and maritime claims, including a patrol with the PLAN and CCG in August 2017.

China Coast Guard (CCG). The CCG is responsible for a wide range of missions, including enforcement of China's sovereignty claims, surveillance, protection of fisheries, anti-smuggling, and general law enforcement. China primarily uses civilian maritime law enforcement agencies in maritime disputes, selectively using the PLAN to provide overwatch in case of escalation.

The CCG's rapid expansion and modernization has improved China's ability to enforce its maritime claims. Since 2010, the CCG's fleet of large patrol ships (more than 1,000 tons) has more than doubled from approximately 60 to more than 130 ships, making it by far the largest coast guard force in the world and increasing its capacity to conduct simultaneous, extended offshore operations in multiple disputed areas. Furthermore, the newer ships are substantially larger and more capable than the older ships, and the majority are equipped with helicopter facilities, high-capacity water cannons, and guns ranging from 30mm to 76mm. A number of these ships are capable of long-endurance out-of-area

In addition, the CCG operates more than 70 fast patrol combatants (more than 500 tons), which can be used for limited offshore operations, more than 400 coastal patrol craft, and approximately 1000 inshore and riverine patrol boats. The CCG is likely to add another 25-30 patrol ships and patrol combatants by the end of the decade before the construction program levels off.

People's Armed Forces Maritime Militia (PAFMM). The PAFMM is a subset of China's national militia, an armed reserve force of civilians available for mobilization. The PAFMM is the only government-sanctioned maritime militia in the world. Militia units organize around towns, villages, urban sub-districts, and enterprises, and vary widely in composition and mission. In the South China Sea, the PAFMM plays a major role in coercive activities to achieve China's political goals without fighting, part of broader PRC military doctrine stating confrontational operations short of war can be an effective means of accomplishing political objectives. The militia has played significant roles in a number of military campaigns and coercive incidents over the years, including the 2009 harassment of the USNS IMPECCABLE conducting normal operations, the 2012 Scarborough Reef standoff, the 2014 *Haiyang Shiyun*-981 oil rig standoff, and a large surge of ships in waters near the Senkakus in 2016.

A large number of PAFMM vessels train with and assist the PLAN and CCG in tasks such as safeguarding maritime claims, surveillance and reconnaissance, fishery protection, logistics support, and search and rescue. The government subsidizes various local and provincial commercial organizations to operate militia vessels to perform "official" missions on an ad hoc basis outside of their regular civilian commercial activities. In August 2017, China used PLAN, CCG, and PAFMM ships to patrol around Thitu Island and planted a flag on Sandy Cay, a sandbar within 12 nm of Subi Reef and Thitu Island, possibly in response to the Philippines' reported plans to upgrade the runway on Thitu Island.

In the past, the PAFMM rented fishing vessels from companies or individual fishermen, but China has built a state-owned fishing fleet for at least part of its maritime militia force in the South China Sea. The Hainan provincial government, adjacent to the South China Sea, ordered the building of 84 large militia fishing vessels with reinforced hulls and ammunition storage, which the militia received by the end of 2016, along with extensive subsidies to encourage frequent operations in the Spratly Islands. This particular PAFMM unit is also China's most professional, paid salaries independent of any clear commercial fishing responsibilities, and recruited from recently separated veterans.

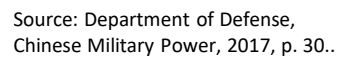
China's Changing Airpower

Major Air Units - 2018



Office of the Secretary of Defense,
*Military and Security Developments
 Involving the Republic of China, Annual
 Report to Congress*, May 16, 2018,
 Department of Defense. China Military
 Power 2018, p.35.

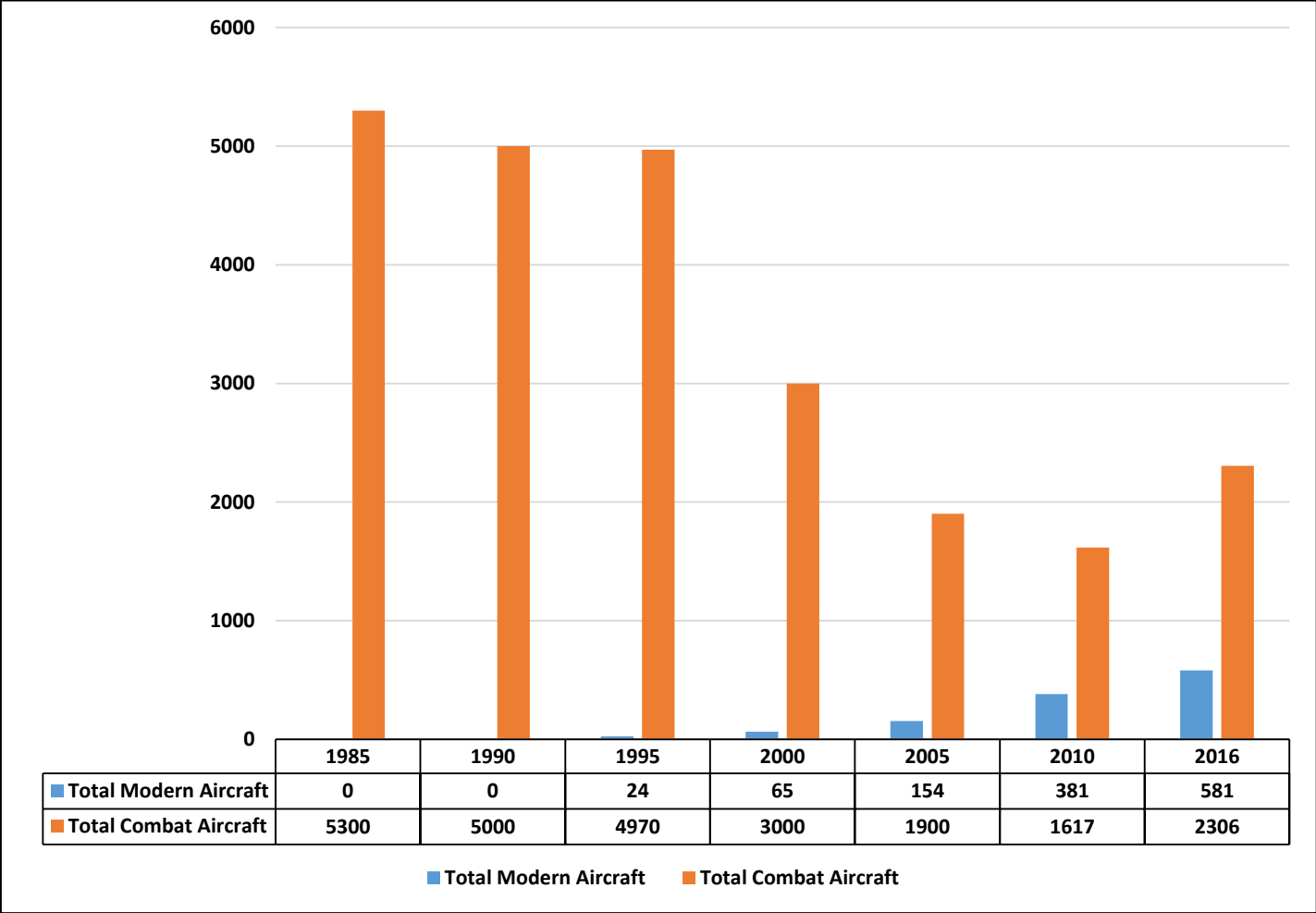
Major Air Units



Air Forces in End-2016

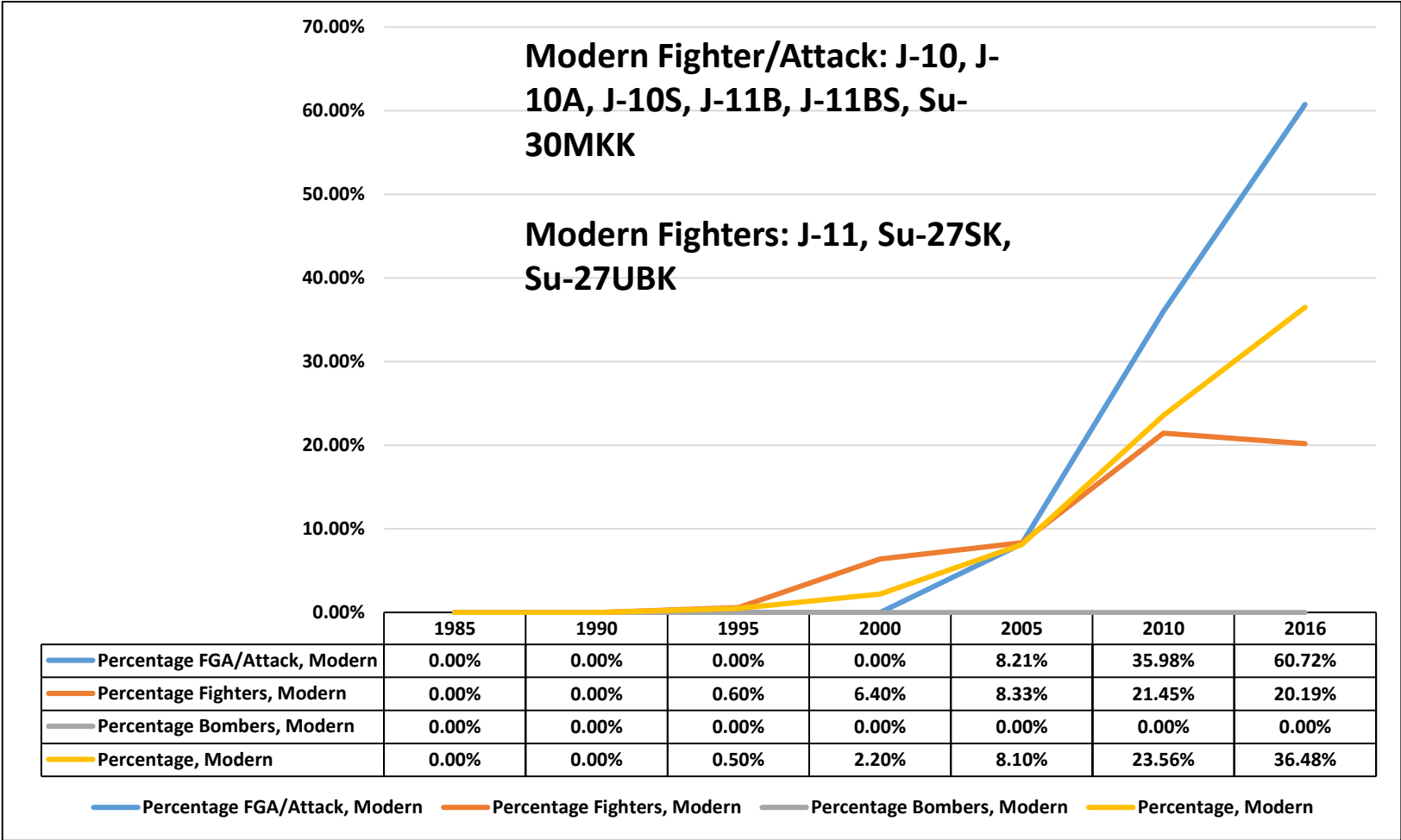
Taiwan Strait Military Balance, Air Forces			
	China		Taiwan
	Total	Within range of Taiwan	Total
<i>Fighters</i>	1,700	130	384
<i>Bombers/Attack</i>	400	200	0
<i>Transport</i>	475	150	19
<i>Special Mission Aircraft</i>	115	75	25
<p>Note: The chart displays military aircraft only, but the PLAAF may supplement its military transports with civilian aircraft in a combat scenario. The chart categorizes aircraft as "within range of Taiwan" if they are able to conduct combat operations against Taiwan without refueling from their current location; however, the number of aircraft "within range" may be significantly increased through any combination of aircraft forward deployment, decreased ordnance loads, or altered mission profiles.</p>			

China's Air Modernization: Total versus Modern Combat Aircraft, 1985-2016



*The following systems are considered modern: J-10, J-10A, J-10B, J-10S, J-11, J-11B, J-11BS, Su-27SK, Su-27UBK, Su-30MKK
Source: IISS, *Military Balance* 1985-2016 .

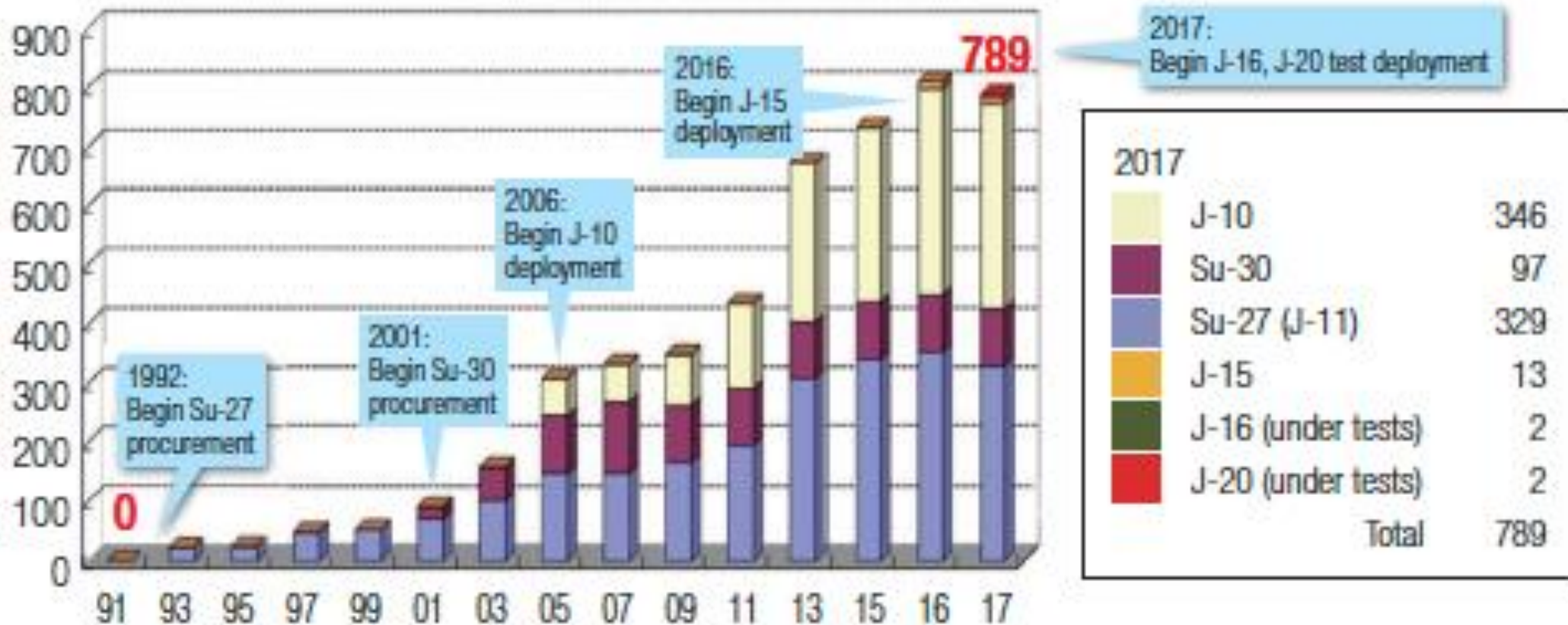
China's Air Modernization: Percent of Modern Combat Aircraft, 1985-2016



Note: "Percentage Modern" assesses only combat capable aircraft
Source: IISS, *Military Balance* 1985-2015. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies.

Japanese Estimate of Chinese 4th and 5th Generation Fighters

Number of fourth-/fifth-generation fighters



Japanese Estimate of Key Chinese 4th and 5th Generation Aircraft

J-10 fighter



[Jane's By IHS Markit]

<Specifications, performance>

Maximum speed: Mach 1.8

Main armament: Air-to-air missiles (maximum firing range 70 km), air-to-ship missiles (maximum firing range 120 km)

<Description>

China's first main fighter produced domestically. First deployed in 2003, it is reportedly in mass production.

J-20 fighter



[Jane's By IHS Markit]

<Specifications, performance>

Details unknown

<Description>

Fifth-generation fighter with stealth capabilities. First demonstration flight of two J-20 fighters at air show in 2016. Its test deployment has reportedly been started already.

KJ-2000 AWACS



[Jane's By IHS Markit]

<Specifications, performance>

Details unknown

<Description>

Airborne early warning and control (AWAC) aircraft. A Russian IL-76 strategic airlifter mounted with a radar dome.

Y-20 large cargo aircraft



[Jane's By IHS Markit]

<Specifications, performance>

Maximum cruising speed: 796 km/h

Maximum payload: 66,000 kg (estimate)

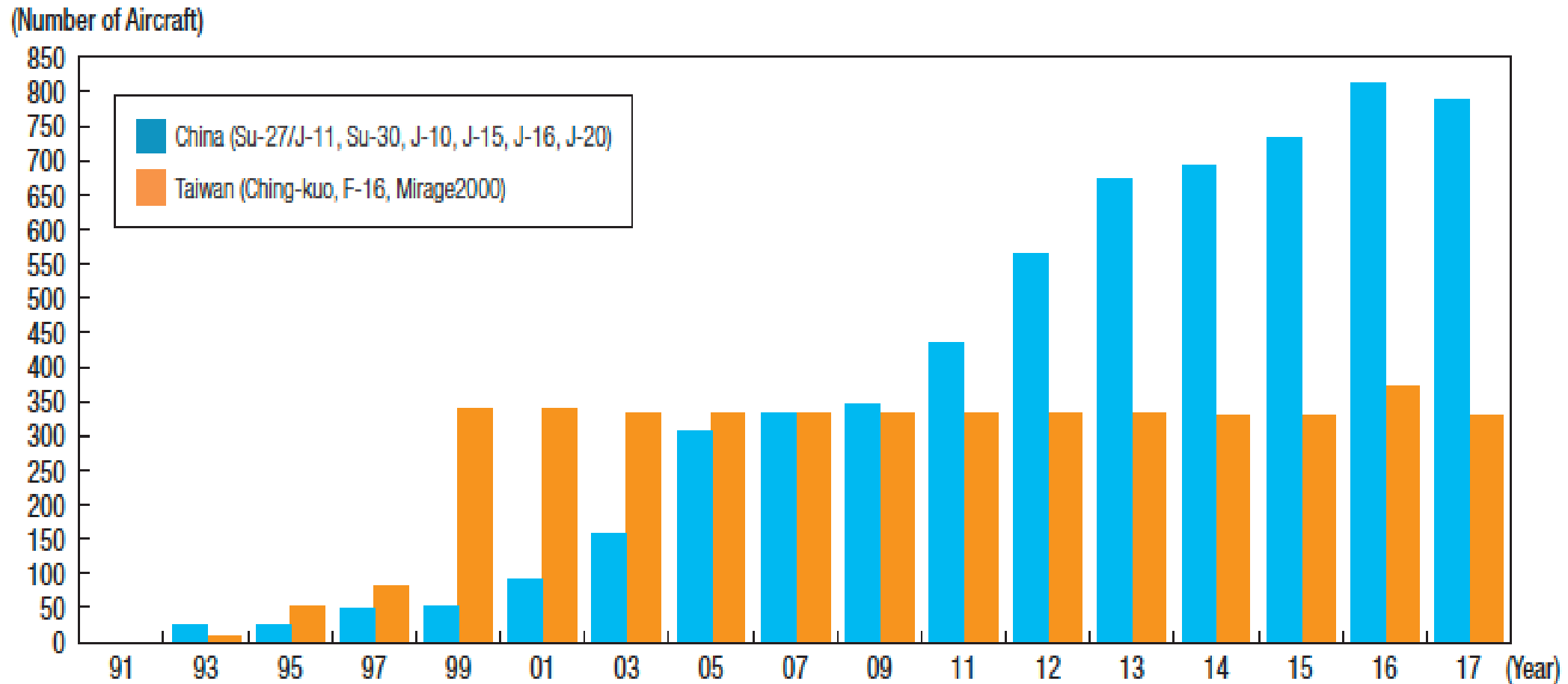
<Description>

Large multipurpose cargo aircraft independently developed by China. Deployed to military units in July 2016.

Japanese Estimate of Chinese vs. Taiwan Air Modernization

Fig. I-2-3-8

Changes in the Number of Modern Fighter Aircraft of China and Taiwan



Source: "The Military Balance" (of respective years)

China's Over-Water Bomber Operations

The PLA has long been developing air strike capabilities to engage targets as far away from China as possible. Over the last three years, the PLA has rapidly expanded its overwater bomber operating areas, gaining experience in critical maritime regions and likely training for strikes against U.S. and allied targets. The PLA may continue to extend its operations beyond the first island chain, demonstrating the capability to strike U.S. and allied forces and military bases in the western Pacific Ocean, including Guam. Such flights could potentially be used as a strategic signal to regional states, although the PLA has thus far has not been clear what messages such flights communicate beyond a demonstration of improved capabilities.

Western Pacific. PLA aircraft first operated beyond the first island chain in 2013, when a PLAN ASCM-capable H-6G bomber transited through the Bashi Channel; however, the H-6G bomber lacks the range and endurance to patrol the western Pacific Ocean effectively and strike key U.S. and allied facilities. China began to field the longer-range H-6K bomber in 2013, incorporating cruise missile pylons to turn the bomber into a stand-off strike platform. The H-6K's capabilities provided the PLAAF an offensive strike capability against Guam with LACMs.

The PLAAF began flying the H-6K past the First Island Chain into the western Pacific Ocean in 2015, alternating transits through the Miyako Strait and the Bashi Channel and flying within LACM range of Guam. In 2016, the PLAAF improved its capabilities by adding AWACS and fighter aircraft to its bomber flight packages to provide defensive counter-air protection of the bombers beyond the first island chain.

In 2016, the PLAAF also circumnavigated Taiwan for the first time by passing through both the Miyako Strait and Bashi Channel in the same mission, and significantly increased the number of circumnavigation missions in 2017. In addition to long-range flight plans, future H-6 missions may also target Taiwan. Depending on the weapons load, potential future H-6 missions could include anti-ship or shorter-range strikes targeting eastern Taiwan from all directions or supporting a blockade. Currently, such missions are vulnerable without defense counter-air support provided by fighters traveling along the route with the bombers.

South China Sea. In 2016, China began flying H-6K missions in the South China Sea, probably as far as Scarborough Reef, conducting maritime patrols and ISR. H-6s could, if deployed to airfields in the Spratly Islands, extend their range through the Balabac Strait into the Celebes Sea or through the Sunda or Malacca Strait to fly into the Indian Ocean.

Sea of Japan. In August 2016, two PLAN H-6 bombers accompanied by a Y-8 AEW&C aircraft conducted the first PLA flights into the Sea of Japan. In January 2017, they flew the same route, this time with six bombers supported by two reconnaissance aircraft. In August 2017, the PLAAF further expanded the PLA's operating area by sending six PLAAF H-6K bombers through the Miyako Strait, and for the first time, turned north to fly east of Okinawa and as far north as the Kii Peninsula. These

PLA Maritime Bomber Operations			
Date	Service	Operating Area	Notes
Sep 2013	PLAN	Western Pacific	1st PLA flight ever beyond first island chain; occurred on anniversary of Japan nationalizing Senkakus
Dec 2014	PLAN	Western Pacific	1st ever PLAAF flight beyond first island chain
Mar 2015	PLAAF	Western Pacific	
May 2015	PLAAF	Western Pacific	
Aug 2015	PLAAF	Western Pacific	
Nov 2015	PLAAF	Western Pacific	
Aug 2016	PLAN	Sea of Japan	1st PLA flight into Sea of Japan
Sep 2016	PLAAF	Western Pacific	Probably 1st flight to include fighters and AWACS with the bombers beyond the first island chain
Nov 2016	PLAAF	Western Pacific	1st circumnavigation of Taiwan
Dec 2016	PLAAF	Western Pacific	2nd circumnavigation of Taiwan
Jan 2017	PLAN	Sea of Japan	2nd mission to Sea of Japan, this time with six H-6G bombers
Jul 2017	PLAAF	Western Pacific	Circumnavigation of Taiwan, concurrent missions in each direction
Aug 2017	PLAAF	Western Pacific	Circumnavigation of Taiwan
Aug 2017	PLAAF	Western Pacific, east of Japan north of the Miyako Strait	First flights along eastern Japan
Nov 2017	PLAAF	Western Pacific	
Nov 2017	PLAAF	Western Pacific	Notably included EW and tanker aircraft in addition to fighters
Nov 2017	PLAAF	Western Pacific	Separate missions through both Miyako and Luzon Straits in one day
Dec 2017	PLAN	Western Pacific	Separate missions through both Miyako and Luzon Straits
Dec 2017	PLAAF	Western Pacific	
Dec 2017	PLAAF	Western Pacific	Circumnavigation of Taiwan; PLAAF spokesman described as a "circling-the-island patrol"
Dec 2017	PLAAF	Sea of Japan	1st PLAAF flight into Sea of Japan and entered the Korean ADIZ
Dec 2017	PLAAF	Western Pacific	Supported by a Y-8 that continued on to circumnavigate Taiwan

flights demonstrated a maturing capability for H-6K bombers to conduct off-axis strikes against U.S. and allied facilities. Previously demonstrated flight endurance of the PLAAF H-6K suggest future missions could fly around Japan, along the Philippines' coast, and use a wider area of operations throughout the Philippine Sea than current operations by Chinese aircraft.

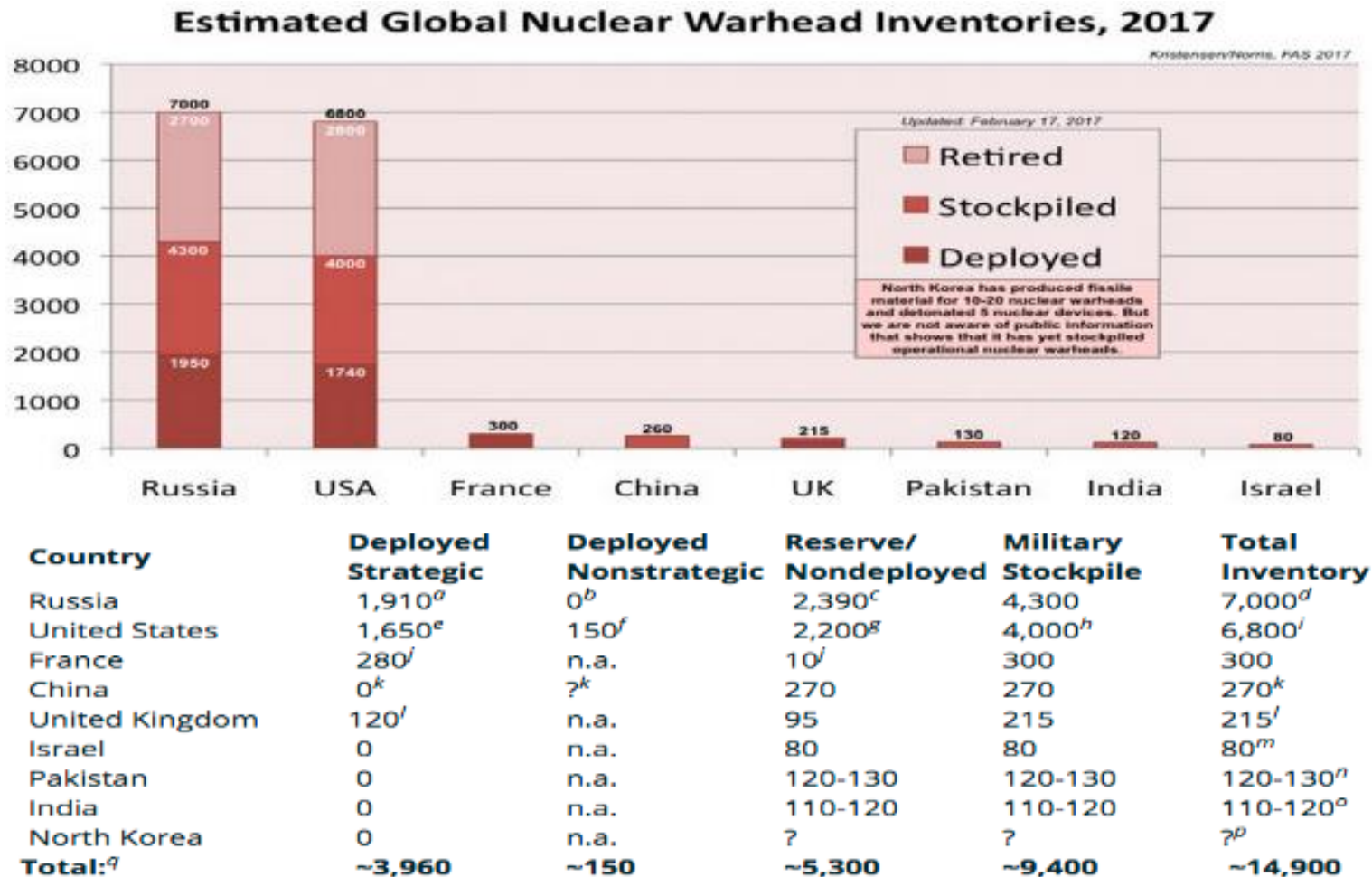
China's Over-Water Bomber Capabilities

Office of the Secretary of Defense,
*Military and Security Developments
 Involving the Republic of China, Annual
 Report to Congress*, May 16, 2018,
 Department of Defense. China Military
 Power 2018, p. 118.



The Changing Strategic Nuclear and Conventional Reach of Chinese Missiles and Aircraft

The Shifting Global Nuclear Balance: 1945-2017- II



China is thought to have “[several hundred warheads](#),” far less than the 1,600-3,000 that have been suggested by some. None of the warheads are thought to be fully deployed but kept in storage under central control. The existence of a Chinese non-strategic nuclear arsenal is uncertain. The Chinese arsenal is increasing with production of new warheads for DF-31/31A and JL-2 missiles.

Source: [Hans M. Kristensen](#) and [Robert S. Norris](#), Status of World Nuclear Forces, 2017, Federation of American Scientists,, <https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/>

Chinese Nuclear Forces

Type	NATO designation	Number of launchers	Year deployed	Range (kilometers)	Warhead x yield (kilotons)	Number of warheads
<i>Land-based ballistic missiles</i>						
DF-4	CSS-3	~10	1980	5500+	1 × 3300	~10
DF-5A	CSS-4 Mod 2	~10	1981	13,000+	1 × 4000–5000	~10
DF-5B	CSS-4 Mod 3	~10	2015	~12,000	3 × 200–300	~30
DF-15	CSS-6	?	1990	600	1 × ?	? ^a
DF-21	CSS-5 Mods 1, 2, 6	~80	1991, 2000, 2016	2150	1 × 200–300	~80 ^b
DF-26	?	?	(2017)	4000+	1 × 200–300	?
DF-31	CSS-10 Mod 1	~8	2006	7000+	1 × 200–300	~8
DF-31A	CSS-10 Mod 2	~25	2007	11,000+	1 × 200–300	~25
DF-41	CSS-X-20	n.a.	?	?	n.a.	n.a.
<i>Subtotal:</i>		~143				~163 ^c
<i>Submarine-launched ballistic missiles^d</i>						
JL-1	CSS-NX-3	n.a.	1986	1000+	1 × 200–300	n.a.
JL-2	CSS-NX-14	(48)	(2015)	7000+	1 × 200–300	(48)
<i>Subtotal:</i>		(48)				(48)
<i>Aircraft</i>						
H-6 ^e	B-6	~20	1965	3100+	1 × bomb	~20
Fighters ^f	?	?	?	n.a.	1 × bomb	?
<i>Cruise Missiles^g</i>						
DH-10	CJ-10	~250	2006?	1500?	1 × ?	?
DH-20?	CJ-20?	?	?	?	1 × ?	?
<i>Total</i>						~183 (260) ^h

^aThe CIA concluded in 1993 that China “almost certainly” had developed a warhead for the DF-15, although it is unclear if the capability was fielded.

^bThis table only counts nuclear versions DF-21 (CSS-5 Mod 1) and DF-21A (CSS-5 Mod 2), each of which has fewer than 50 launchers deployed. The conventional DF-21C and DF-21D are not counted.

^cThe missile and warhead inventory may be larger than the number of launchers, some of which can be reused to fire additional missiles.

^dThe JL-1 is no longer thought to be operational, and the JL-2 may be close to becoming fully operational. Warheads for the JL-1 may have been retired by now, and warheads for the JL-2 have been produced.

^eBombers were used to conduct at least 12 of China’s nuclear test explosions between 1965 and 1979. We believe that a small number of China’s H-6 bombers may have a secondary nuclear mission. The aircraft range is equivalent to combat radius, which for some H-6 bombers can be extended with air refueling.

^fA fighter-bomber was used in a nuclear test in 1972, but it is unknown whether a tactical bomb capability has been fielded.

^gUS Air Force intelligence lists the ground-launched DH-10 land-attack cruise missile as “conventional or nuclear.” US Air Force Global Strike Command also lists the air-launched cruise missile CJ-20 as nuclear-capable, but it is unclear whether that finding comes from a coordinated intelligence assessment.

^hThe number in parentheses includes the 48 warheads produced for the four existing nuclear-powered ballistic missile submarines, as well as about 30 additional warheads (including warheads for the DF-26, those awaiting dismantlement, and a small inventory of spares), for a total stockpile of approximately 260 warheads.



CHINA'S BALLISTIC MISSILES



China has the most active and diverse ballistic missile development program in the world, upgrading its missile forces in number, type, and capability. China is modernizing its ICBMs, developing multiple independently-targetable reentry vehicles and maneuvering boost-glide vehicles, and has begun deploying a new fleet of nuclear ballistic missile submarines. Short- and medium-range cruise and ballistic missiles form a critical part of its regional anti-access and area denial efforts.



CSIS

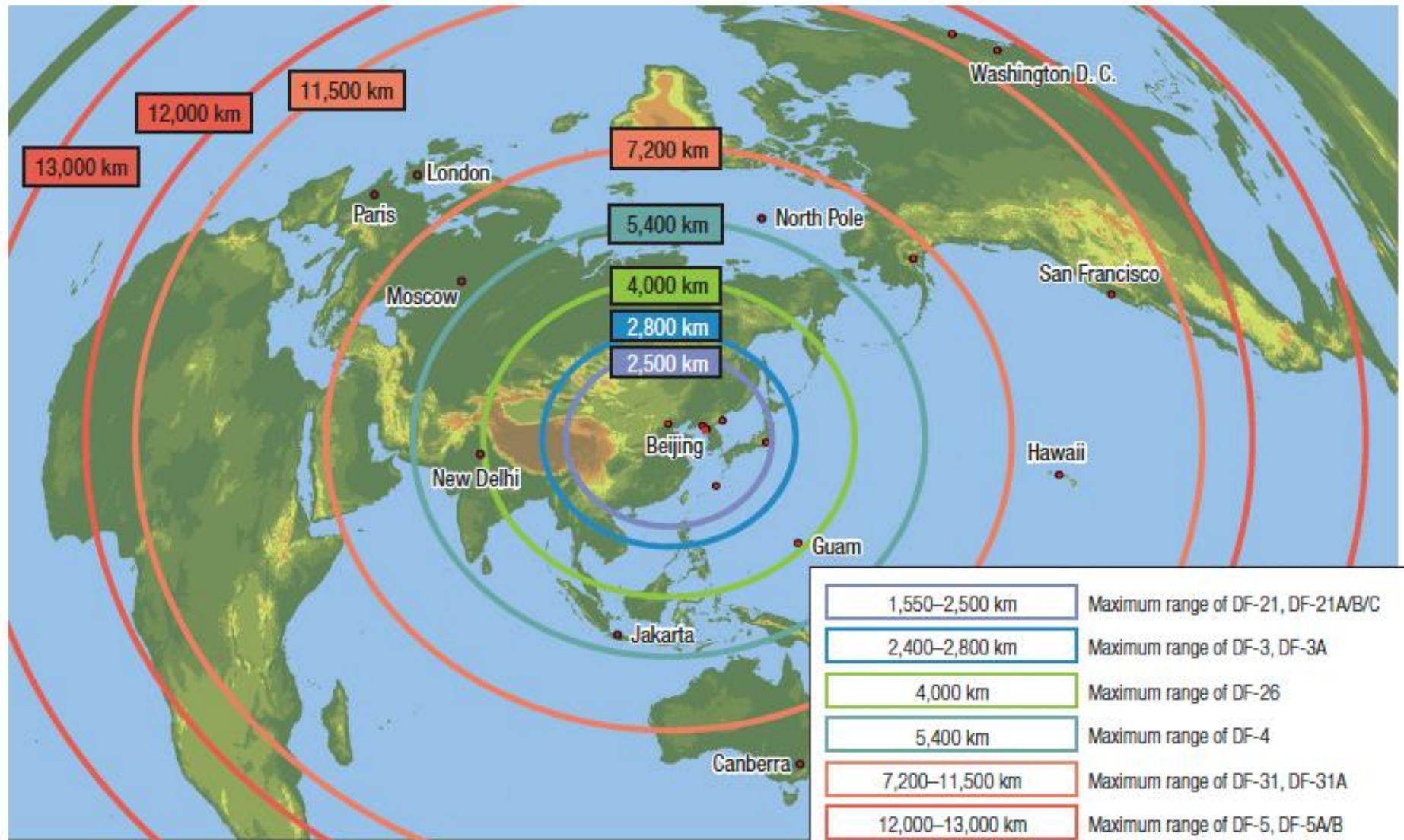
CENTER FOR STRATEGIC & INTERNATIONAL STUDIES

MISSILE DEFENSE PROJECT

China's Rocket Force

<i>System</i>	<i>Launchers</i>	<i>Missiles</i>	<i>Estimated Range</i>
ICBM	50-75	75-100	5,400-13,000+ km
IRBM	16-30	16-30	3,000+ km
MRBM	100-125	200-300	1,500+ km
SRBM	250-300	1,000-1,200	300-1,000 km
GLCM	40-55	200-300	1,500+ km

Japanese Estimate of Chinese Missile Ranges



* The figure above shows a rough image of the distance each missile can reach from Beijing for the sake of convenience.

Nuclear Armed Missile Strike Ranges

China's Rocket Force

System	Launchers	Missiles	Estimated Range
ICBM	50-75	75-100	5,400-13,000+ km
IRBM	16-30	16-30	3,000+ km
MRBM	100-125	200-300	1,500+ km
SRBM	250-300	1,000-1,200	300-1,000 km
GLCM	40-55	200-300	1,500+ km

Office of the Secretary of Defense,
*Military and Security Developments
 Involving the Republic of China, Annual
 Report to Congress*, May 16, 2018,
 Department of Defense. China Military
 Power 2018, p. 37, 125.

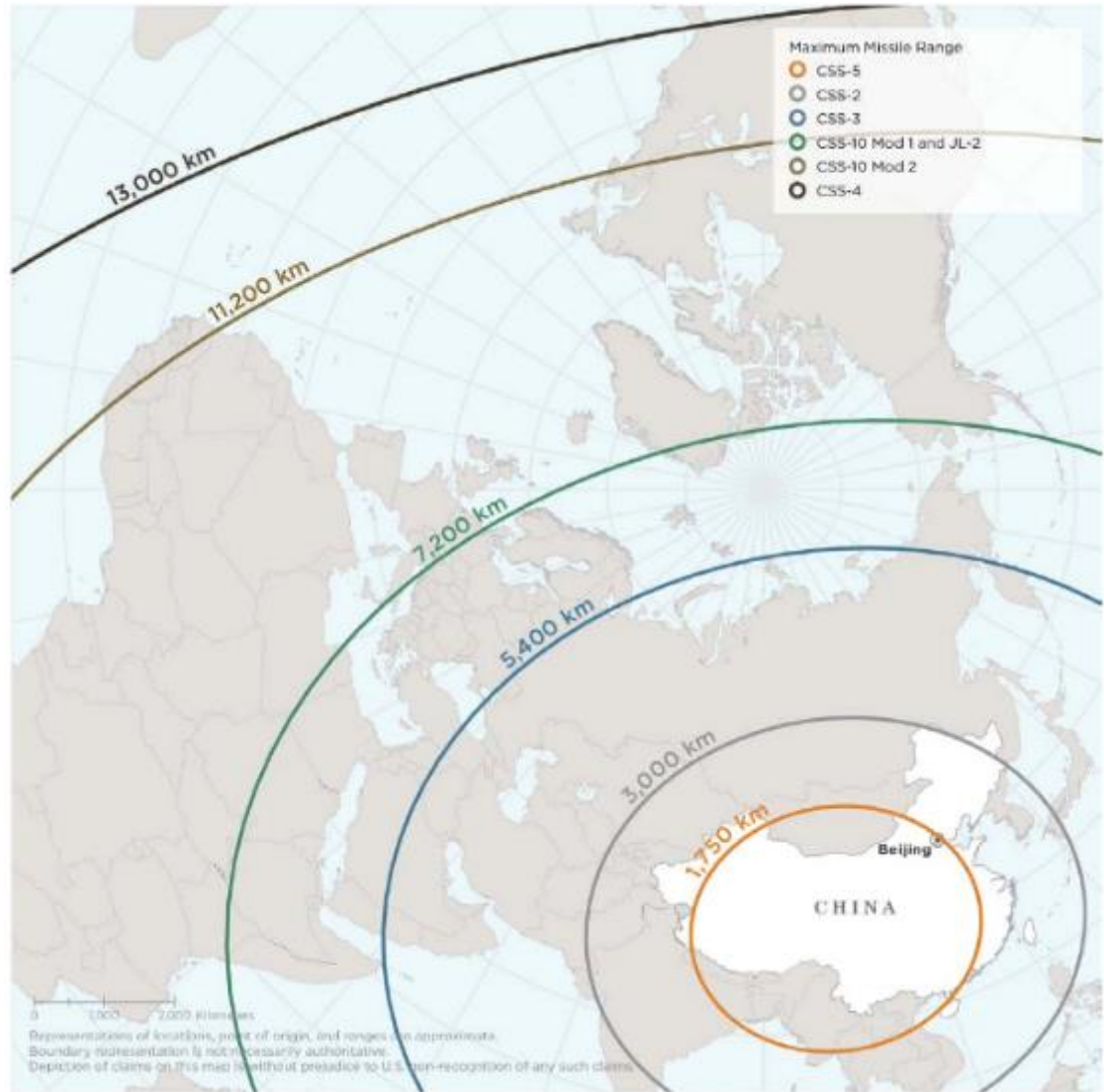


China's IRBM & ICBM Strike Capabilities

China's Missile Forces			
System	Missiles	Launchers	Estimated Range
ICBM	75-100	50-75	5,400-13,000+ km
MRBM	200-300	100-125	1,500+ km
SRBM	1,000-1,200	250-300	300-1000 km
GLCM	200-300	40-55	1,500+ km
LACM	200-300	40-55	1,500+ km

Office of the Secretary of Defense,
*ANNUAL REPORT TO CONGRESS Military
and Security Developments Involving the
People's Republic of China 2017*, May 15,
2017,

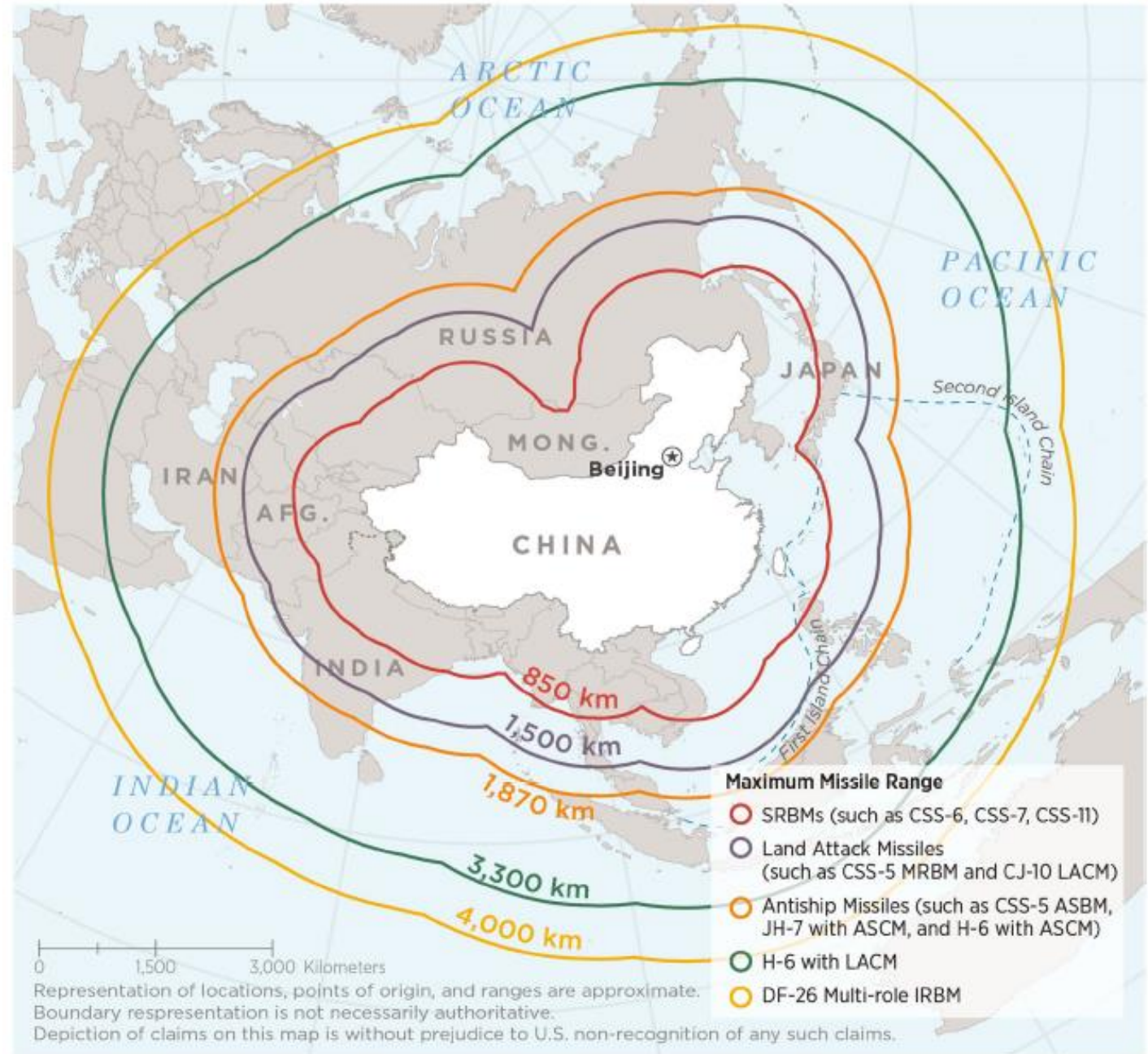
https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF, p. 33, 95



Conventionally Armed Missile Strike Ranges

China's Rocket Force

System	Launchers	Missiles	Estimated Range
ICBM	50-75	75-100	5,400-13,000+ km
IRBM	16-30	16-30	3,000+ km
MRBM	100-125	200-300	1,500+ km
SRBM	250-300	1,000-1,200	300-1,000 km
GLCM	40-55	200-300	1,500+ km



Office of the Secretary of Defense,
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 Department of Defense. China Military
 Power 2018, p.37.

Conventional Precision Strike Capabilities

Short-Range Ballistic Missiles (300-1,000 km). The PLARF has approximately 1,200 SRBMs. The force fields advanced variants with improved ranges and accuracy in addition to more sophisticated payloads, and is phasing out earlier generations lacking true precision strike capability.

Medium-Range Ballistic Missiles (1,000-3,000 km). The PLA is fielding approximately 200-300 conventional MRBMs to increase the range at which it can conduct precision strikes against land targets and naval ships operating out to the first island chain.

Intermediate-Range Ballistic Missiles (3,000-5,500 km). The PLA has begun fielding a road-mobile, nuclear and conventional capable IRBM, expanding its near-precision strike capability as far as the second island chain. The PLAN also is expanding its network of sky wave and surface wave over-the-horizon (OTH) radars. In conjunction with reconnaissance satellites, these OTH systems provide targeting capabilities at extended distances from China to support long-range precision strikes, including employment of ASBMs.

Land-Attack Cruise Missiles. The PLA continues to field approximately 200 to 300 air- and ground-launched LACMs for standoff precision strikes. Air-launched LACMs include the YJ-63, KD-88, and CJ-20 (the air-launched version of the CJ-10 GLCM). China may be adding an electro-optic or imaging infrared terminal guidance capability to the 1,500 km-range CJ-20. China recently adapted the KD-88 LACM, which has an advertised range of more than 100 km, and may be testing a longer-range version.

Anti-Ship Cruise Missiles. China deploys a wide range of advanced ASCMs with the YJ-83 series as the most numerous, equipping the majority of China's ships as well as multiple aircraft. China has also outfitted several ships with YJ-62 ASCMs. The YJ-18 is a long-range, torpedo tube launched ASCM with a supersonic terminal sprint. It has likely replaced the older YJ-82 on SONG, YUAN, and SHANG class submarines, and China claims that the new LUYANG III-class DDG and RENHAI CG are outfitted with a vertically launched variant of the YJ-18. China has also developed the long-range supersonic YJ-12 ASCM for the H-6 bomber. At China's 90th anniversary parade in July, China displayed a ship-to-ship variant of the YJ-12 called the YJ-12A. China also carries the Russian SS-N-22 SUNBURN on four Russian built SOVREMENNY-class DDGs and the Russian SS-N-27b SIZZLER on eight Russian built KILO-class submarines.

Ground Attack Munitions. The PLAAF has a small number of tactical air-to-surface missiles as well as precision munitions; guidance options include satellite positioning, laser, electro-optic, and imaging infrared. China is developing or adapting a range of smaller-sized ASMs and guided bombs for use on its increasing range of armed UAVs.

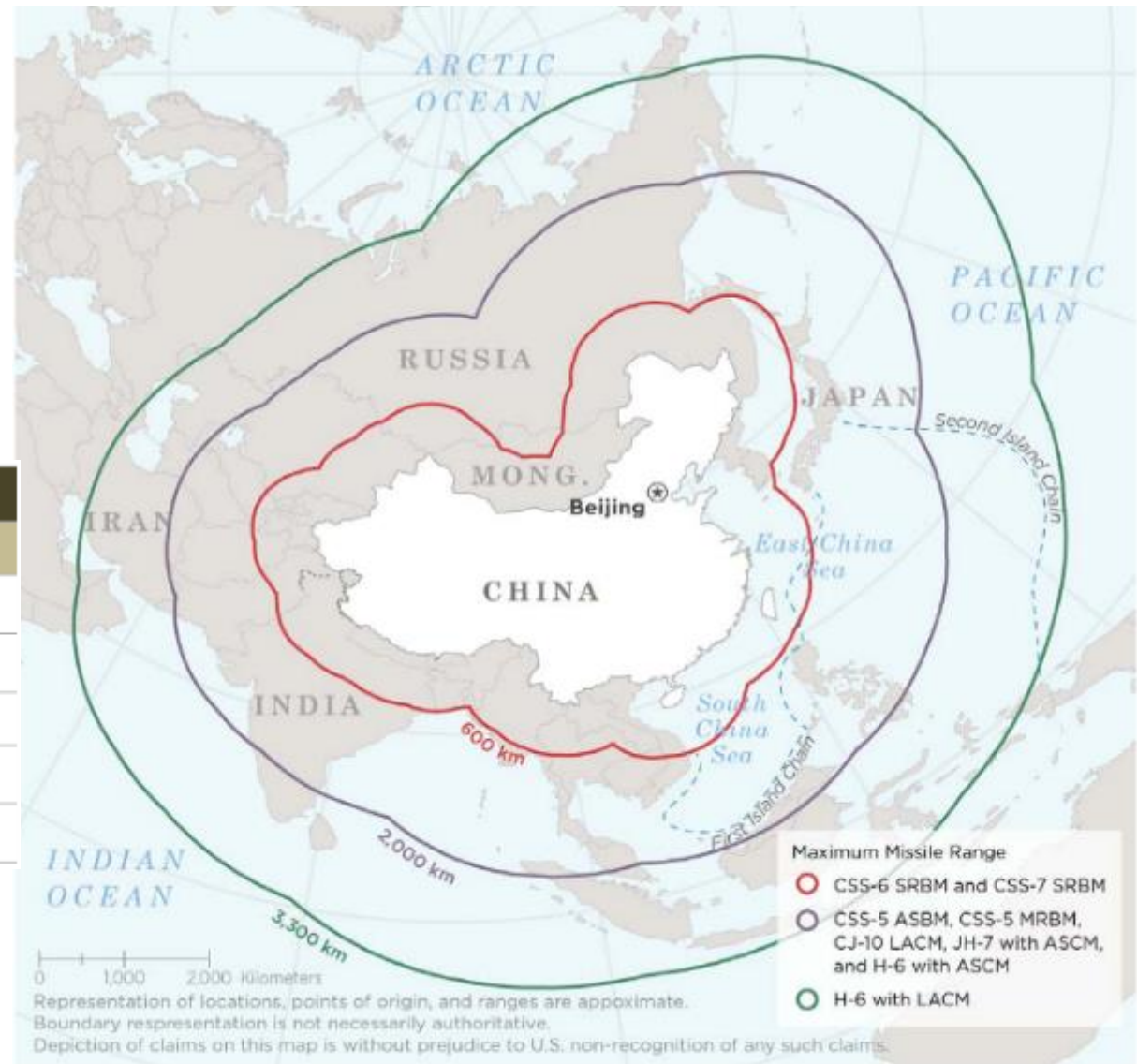
Anti-Radiation Weapons. The PLA imported Israeli-made HARPY UAVs and Russian-made anti-radiation missiles during the 1990s. As of 2017, China is integrating the YJ-91, an indigenous version of the Russian Kh-31P (AS-17), into its fighter-bomber force, and advertising the ASN-301 anti-radiation drone, an improved domestic variant of the HARPY.

Artillery-Delivered High Precision Munitions. The PLA is fielding long-range rocket artillery systems with the range to strike targets within or even across the Taiwan Strait. The most common of these is the PHL-03 12x300 mm multiple-rocket launcher – similar to the Russian 9A52-2 SMERCH, with a 150 km range. Improved warheads for these rockets may include vertical penetrators and sensor-fuzed munitions.

China's Conventional Missile and Air Strike Capabilities

China's Missile Forces			
System	Missiles	Launchers	Estimated Range
ICBM	75-100	50-75	5,400-13,000+ km
MRBM	200-300	100-125	1,500+ km
SRBM	1,000-1,200	250-300	300-1000 km
GLCM	200-300	40-55	1,500+ km
LACM	200-300	40-55	1,500+ km

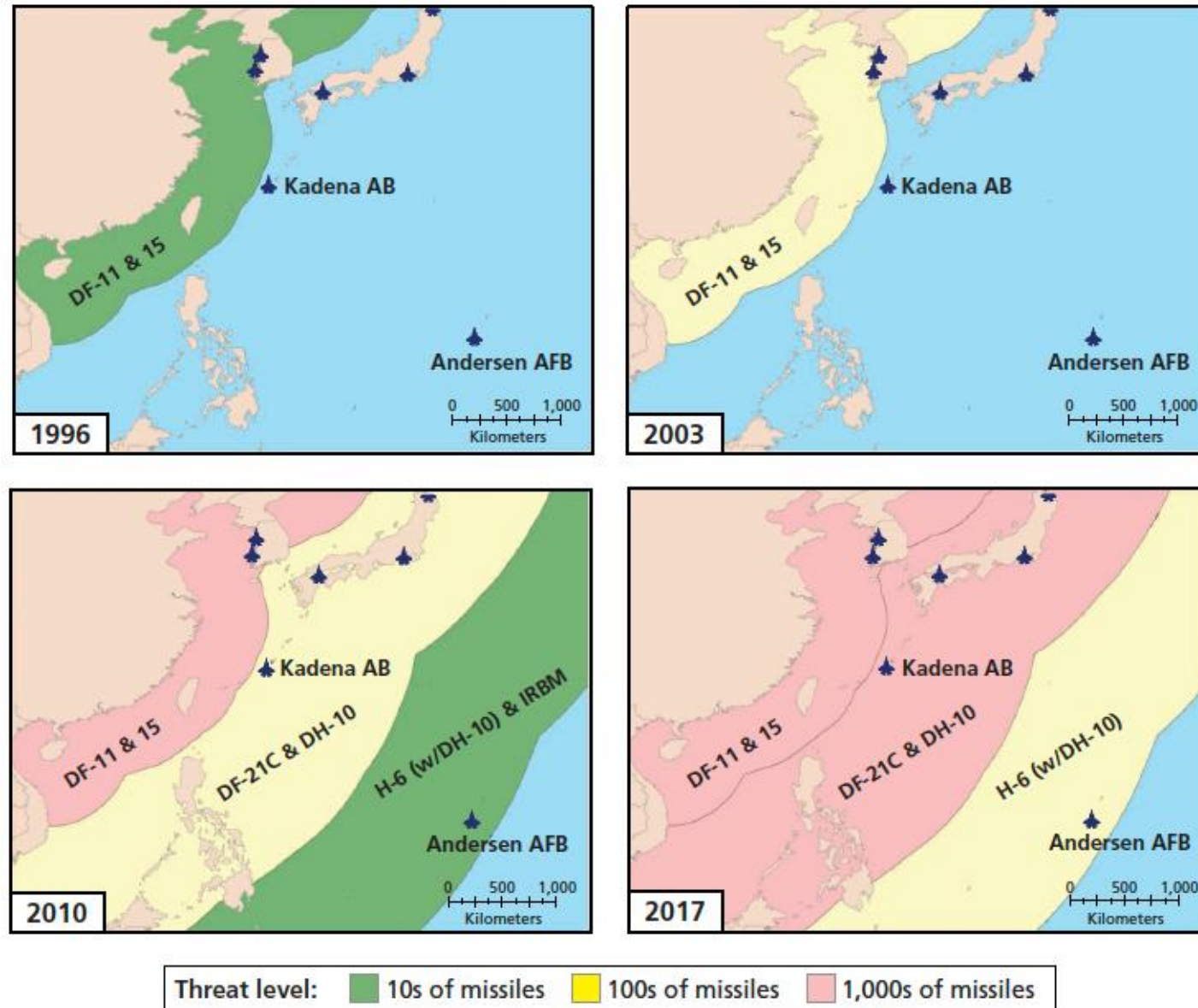
Office of the Secretary of Defense,
ANNUAL REPORT TO CONGRESS Military
and Security Developments Involving the
People's Republic of China 2017, May 15,
2017,
https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF, p. 32, 95



Growth of Chinese Land Attack Missile Capability

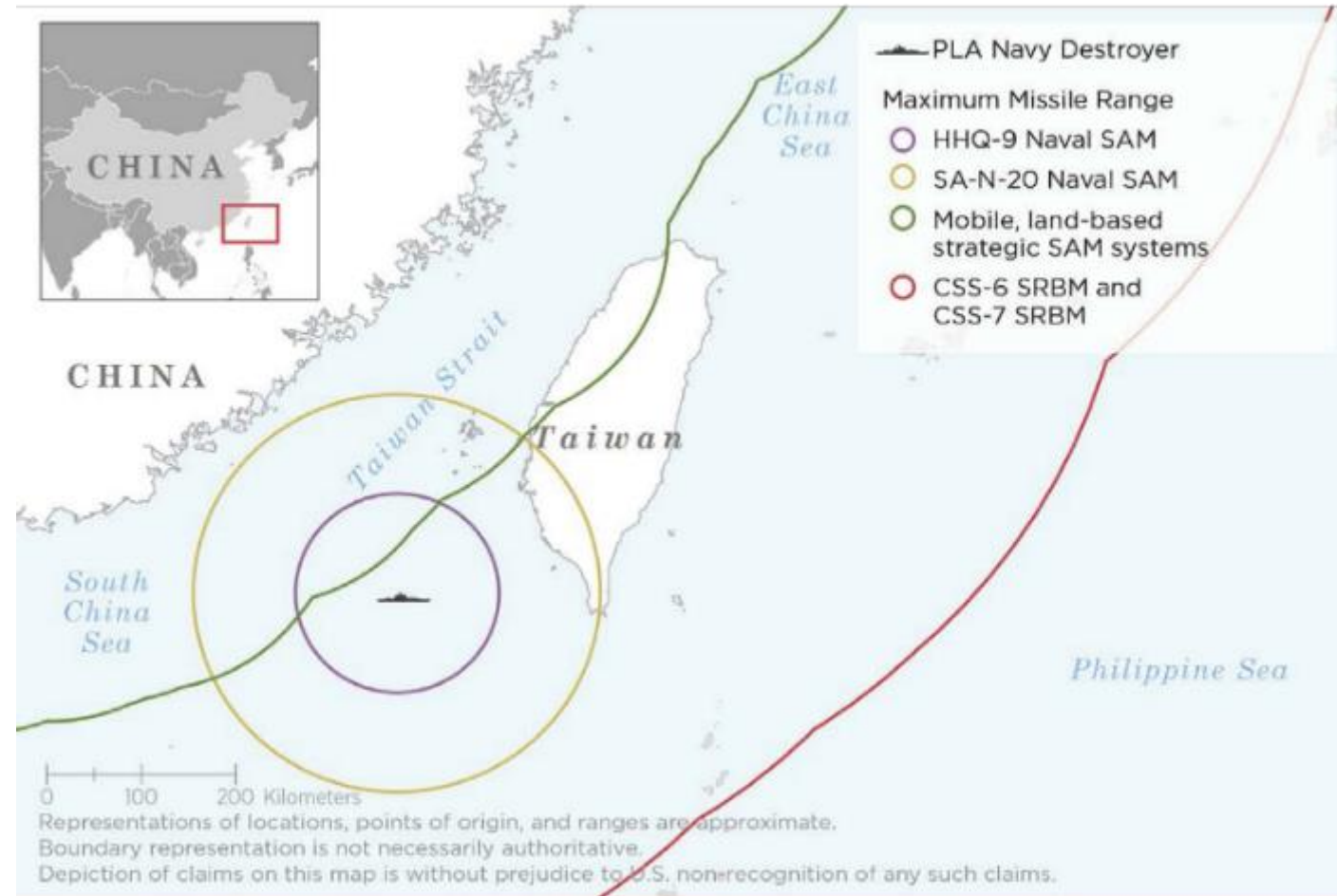
In 1996m had less than 100 that could reach Taiwan. Now have highly accurate systems that can reach beyond Guam

Source: RAND, *US Military Forces and Capabilities for a Dangerous World*, RR1782, 2017, p. 10

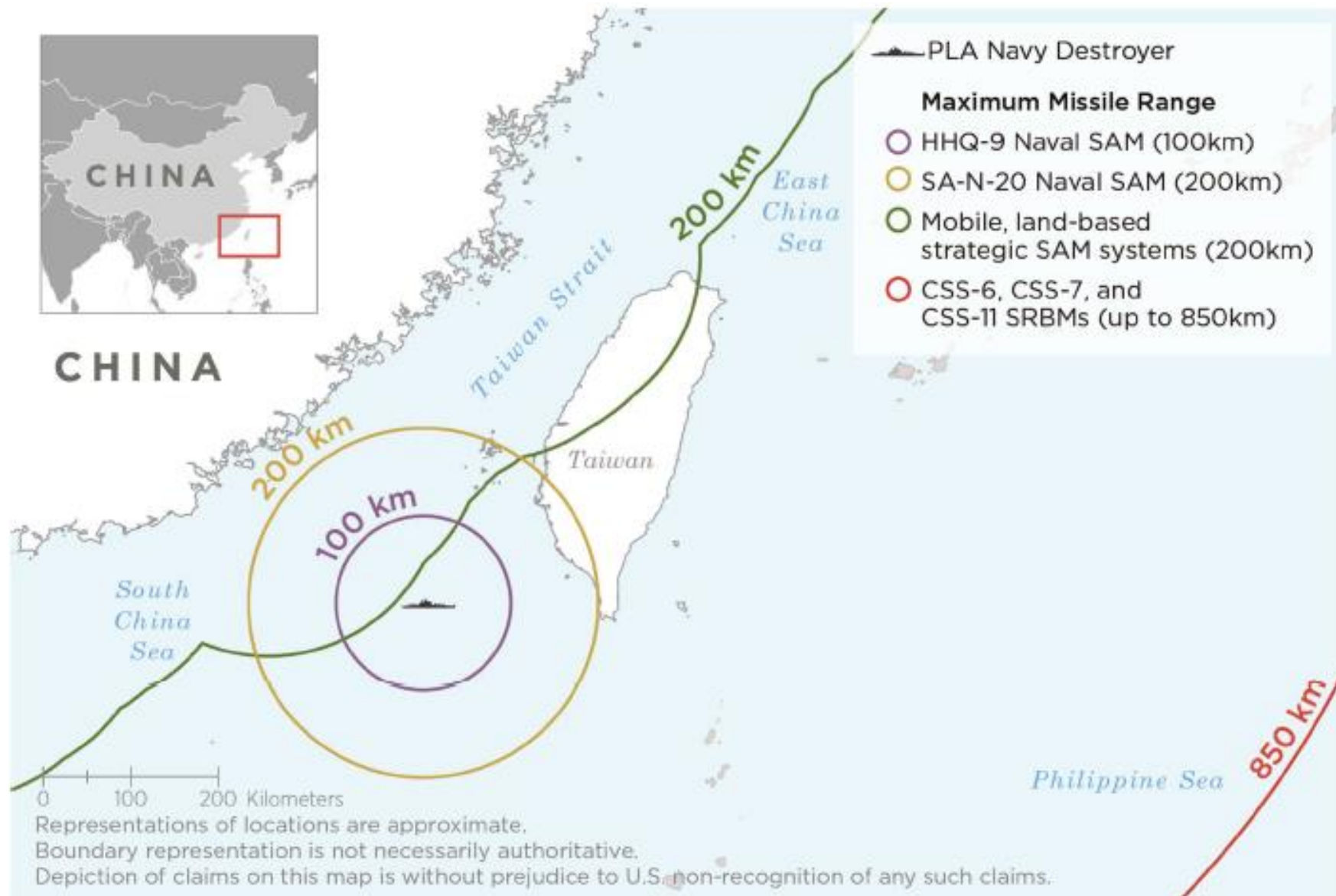


Shifting Balance of Capability in the Taiwan Straits

Taiwan Strait SAM and SRBM Coverage



Taiwan Strait SAM and SRBM Coverage



China's Changing Technology Base and Search for Parity and Leadership

Xi-Jinping's Innovation-Driven Strategy

In May 2016, nearly a decade after China's strategic push towards indigenous innovation, Xi Jinping re-emphasized the importance of S&T innovation at a National S&T Innovation Conference, stating, "if science and technology flourish, the nation will flourish, and if science and technology are strong, the country will be strong." Xi's speech extolled indigenous S&T innovation as key to modernizing China's military, ensuring its national security, and ushering in sustainable socioeconomic development. S&T advances in the commercial sector are increasingly influencing China's future military modernization, as Xi pushes greater military-civilian collaboration.

- > In early 2017, the Ministry of Science and Technology (MOST) and the Central Military Commission Science and Technology Commission jointly announced the "13th Five-Year Plan–Military–Civilian Fusion S&T Developmental Guide," a roadmap for military-civilian fusion efforts in the next five years.
- > In October 2017, Xi Jinping highlighted at the 19th Party Congress the importance of the strategy to revitalize the country through science, education and innovation-driven breakthroughs and the strategy of military-civilian integrated development – both key to complete building a well-off society with a great Chinese military and a modernized economic system.

The ultimate goal of S&T modernization is to rejuvenate China by 2050 as an S&T powerhouse. For the next 30 years, China's leaders have arranged its innovation-driven development strategy into the following four major milestones:

2020: Advance domestic competence for global innovation competition. The ability to rank side-by-side with other innovation-driven countries remains a top priority under Xi Jinping. These development goals center on upgrading the industrial economy (including modern agriculture, clean and efficient energy, and 5th generation mobile telecommunications networks), building science innovation parks, and attracting top-tier researchers. China intends these projects to further advance China's global ranking and to strengthen defense technology development between the military and civilian sectors.

2025: Reduce reliance on foreign technology. In October 2015, China's State Council published the *Made in China 2025* plan, outlining development trajectories to establish and promote China-made components, create well-known Chinese brands, and increase the domestic and international market share in 10 strategic industries. The plan aims to develop internationally competitive leading enterprises; improve technical, equipment, and quality standards to international levels; and create a long-term industrial supply chain and perfect mass production. To achieve core technology breakthroughs, the plan incentivizes accumulating patents, increasing Chinese intellectual property, and establishing engineering platforms and collaborative innovation centers for S&T. The 10 strategic industries are:

- 1) New generation information technology;

- 2) High-grade machine tooling and robotics;
- 3) Aerospace equipment;
- 4) Marine engineering equipment;
- 5) Advanced rail transportation equipment;
- 6) New-energy automobiles;
- 7) Electric power equipment;
- 8) Agricultural equipment;
- 9) New materials; and,
- 10) Biomedicine.

2030: Make milestone contributions to the global scientific community. Striving to take the lead on breakthroughs in important S&T areas, China's 13th Five-Year Program outlines major S&T Innovation Projects for 2030 to benefit both the Chinese economy and its military. Projects include AI 2.0, national cyberspace security, aircraft engines and combustion turbines, quantum computing and quantum communication, advanced manufacturing, clean and efficient energy production, green technologies and environmental solutions, agriculture advances, biology and health, resource management in both space and ocean, and deep-earth exploration.

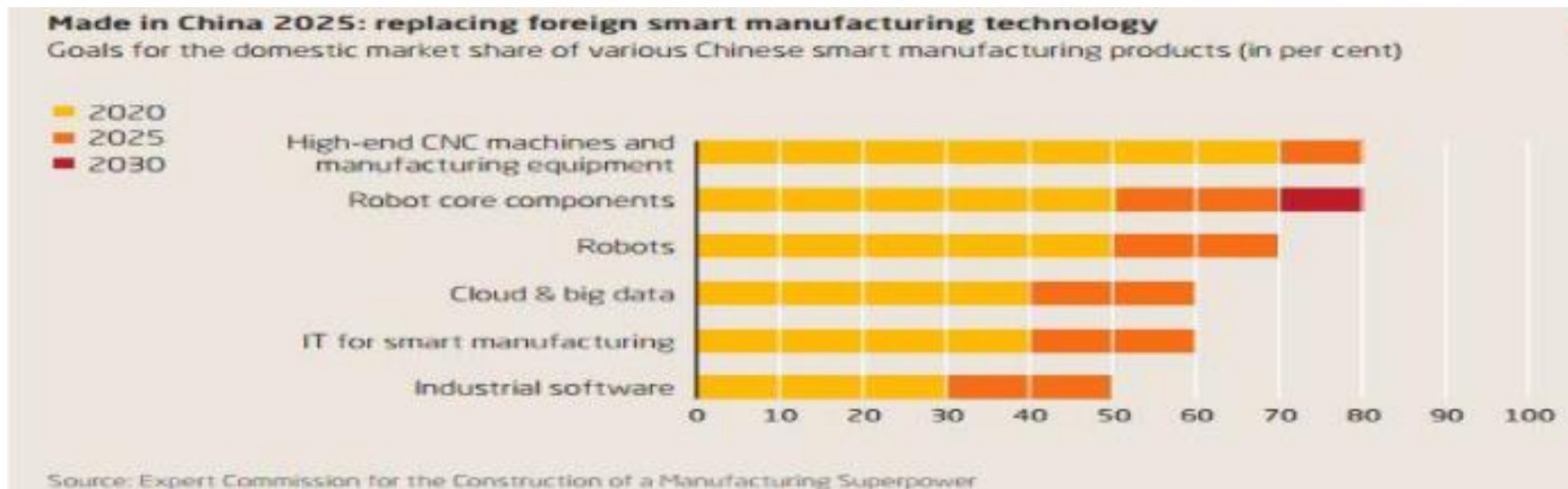
- > China's AI 2.0 project moves beyond its focus with AI 1.0, which centered solely on discovering AI, to focus on the networking and intelligentization of the entire industry chain. In July 2017, China published a national AI blueprint that lays out its R&D trajectory to achieve major breakthroughs in the AI field and become the world's primary AI innovation center by 2030.

2050: Lead and dominate as the S&T powerhouse. China's long-term objective remains to become the global leader in innovative scientific development. Major milestones focus on S&T popularization by training S&T personnel, fostering a favorable education environment for cultivating S&T talent, and strengthening intellectual property protection. As Xi stated, "without generally raising the scientific quality of all the people, it will be difficult to establish a huge high-quality innovation army."

China's push for leadership in global S&T development comes at a time in which dual-use technology advances, applicable for both commercial and military purposes, increasingly occur in the commercial sector. This means that efforts by China to cultivate a broad base of S&T talent, particularly given its stated focus on dual-use sectors, will be relevant to China's military power in coming decades. Specific examples include advanced computing, essential for weapons design and testing, industrial robotics, potentially useful for improving weapons manufacturing; new materials and electric power equipment, which could contribute to improved weapon systems; next generation information technology, which could enable improved C4ISR and cyber capabilities; commercial directed energy equipment, which could contribute to the development of directed energy weapons; and artificial intelligence, which could contribute to next-generation autonomous systems such as missiles, swarming technology, or cyber capabilities.

Chinese Technology Goals: 2020? 2025? 2030?

- 2018 - April 26: China's president urges China to speed up its semiconductor strategy in the face of foreign pressure and growing tech demands.
- 2017 – July, December: Ministry of Industry and Information Technology issues document on goals for development of artificial intelligence from 2018 to 2020, and the top leadership's vision for a new Chinese economy in the age of AI. China will be able to mass-produce neural-network processing chips.
- 2016 – March: Draft outline of the 13th Five-Year Plan (2016-2020) on national economy and social development presented on Saturday to the Fourth Session of the 12th National People's Congress with more than 21 goals for civilian and military development of technology. Made in China technology plan
- 1978 - March 18 to March 31, 6,000 scientific and technical workers from all over China took part in a National Science Conference in Peking.



Made in China 2025: Global Ambitions Built on Local Protections, U.S. Chamber of Commerce, Beijing,
https://www.uschamber.com/sites/default/files/final_made_in_china_2025_report_full.pdf

Chinese Technology Goals: 2020? 2025? 2030?

China now has the ability to develop [advanced fighters](#), [aircraft carriers](#), new-generation [intercontinental ballistic missiles](#), drones and other advanced platforms. Another [indicator](#) of this progress is China's booming [arms exports](#), which rose 74 per cent from a global share of 3.8 per cent in 2007–11 to 6.2 per cent in 2012–16. While China is still far behind the world's leading arms exporters (the United States and Russia), it is catching up fast.

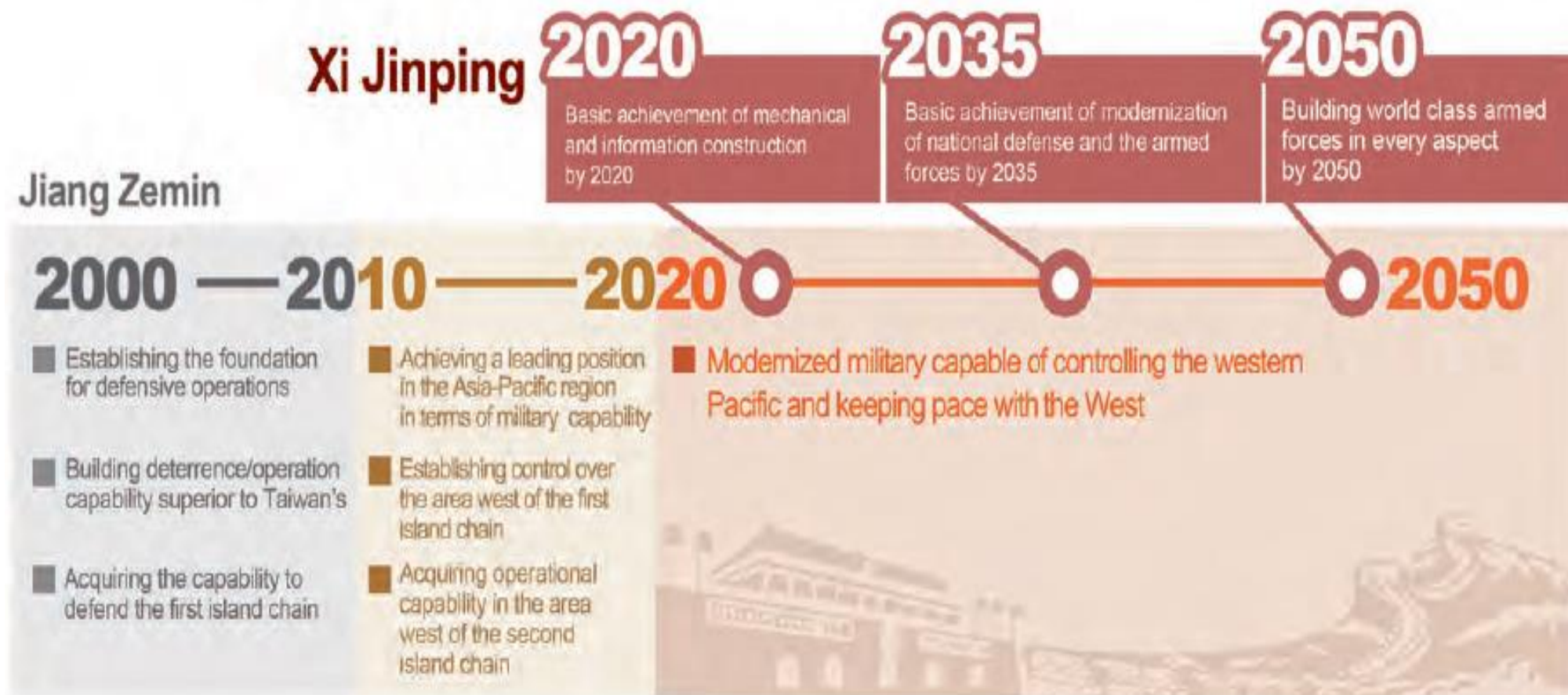
13th Defence Science and Technology and Industry Five-Year Plan (2016–2020). It calls for streamlining and targeting investment across core areas, accelerating weapons development, raising arms exports and promoting collaboration between military and civilian organizations.

Another key initiative is the *2025 Defence Science and Technology Industry Plan*, which calls for the upgrade of China's defence science and technology base. This is in line with the [Made in China 2025](#) strategy — a sweeping initiative to [overhaul China's manufacturing industry](#).

Moreover, China outlined a list of [sixteen megaprojects](#) in the *Medium- and Long-term Science and Technology Development Plan (2006-2020)*. These include advanced numeric-controlled machinery, high-end generic chips, integrated circuit manufacturing and techniques, high-definition earth observation systems, advanced nuclear reactors, manned aerospace and moon exploration, and large aircraft. These projects involve numerous companies and research institutions from China's sprawling defence industry. Technologies developed for every one of these megaprojects would have important military applications in addition to civilian uses.

But despite maturing rapidly over the last two decades, China's defence industry continues to be plagued by notable weaknesses such as outdated management models, weak governance, corruption, inflexibility and monopoly power. These weaknesses will need to be addressed if the industry is to better support PLA modernization in the years ahead.

Taiwan Diagram of Chinese Military Modernization Goals

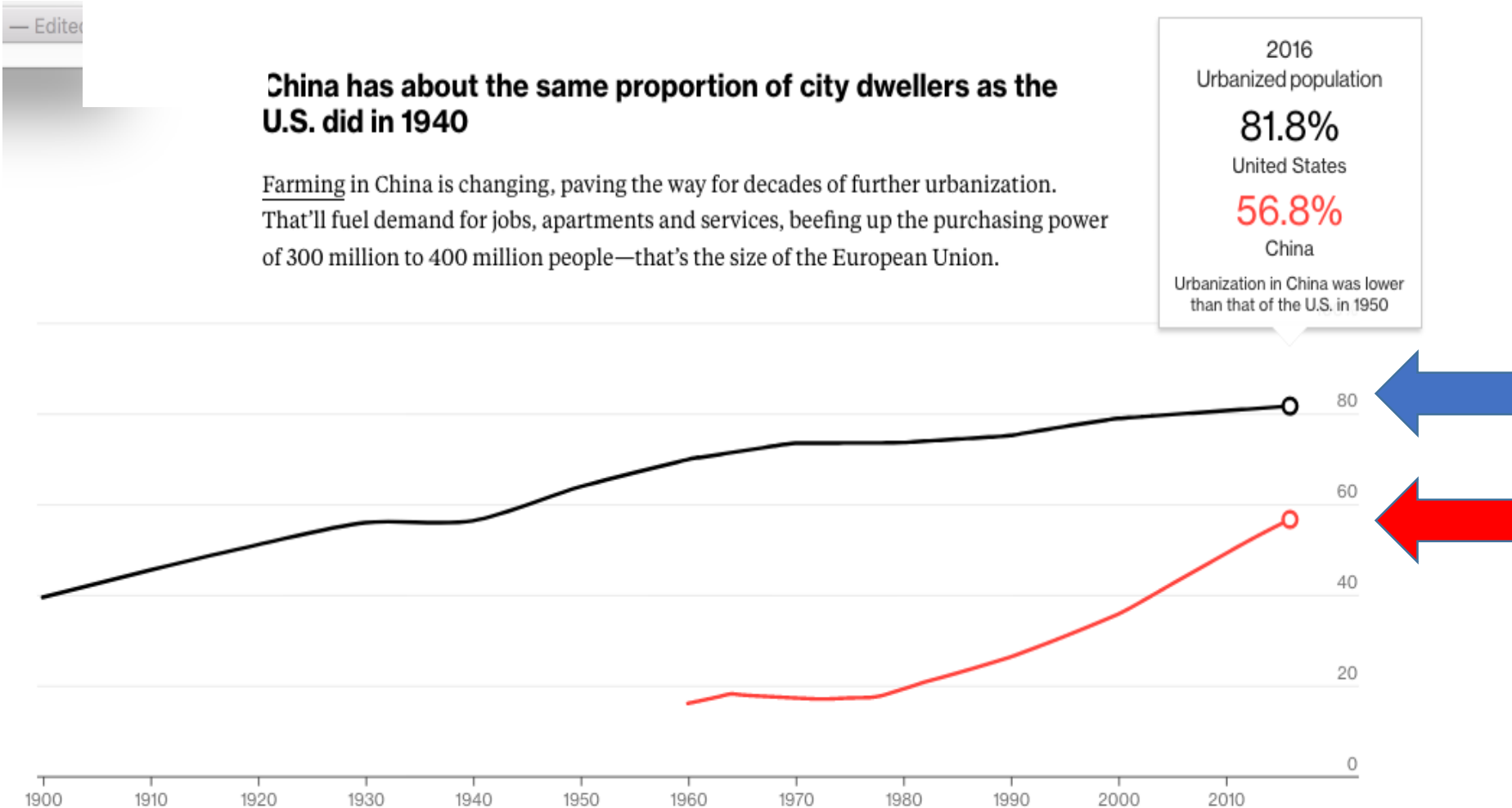


Gross Regional Shifts in R&D Spending

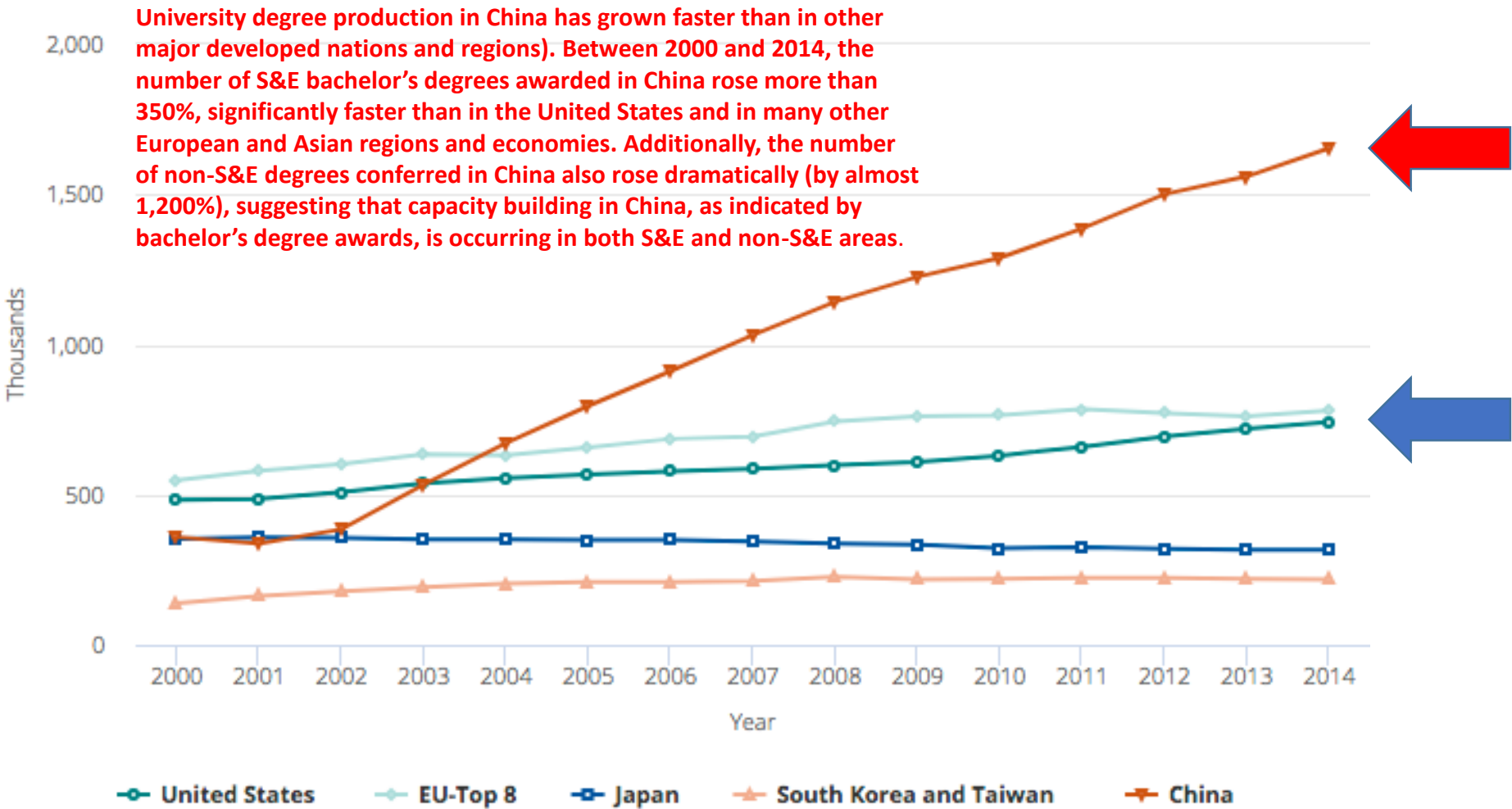


National Science Foundation, National Center for Science and Engineering Statistics estimates, August 2017. Based on data from the Organization for Economic Co-operation and Development, Main Science and Technology Indicators (2017/1), and the United Nations Educational, Scientific and Cultural Organization (UNESCO), Institute for Statistics database, data.uis.unesco.org.National science Board, Science& Engineering Indicators, 2018, <https://nsf.gov/statistics/2018/nsb20181/report/sections/overview/research-publications>.

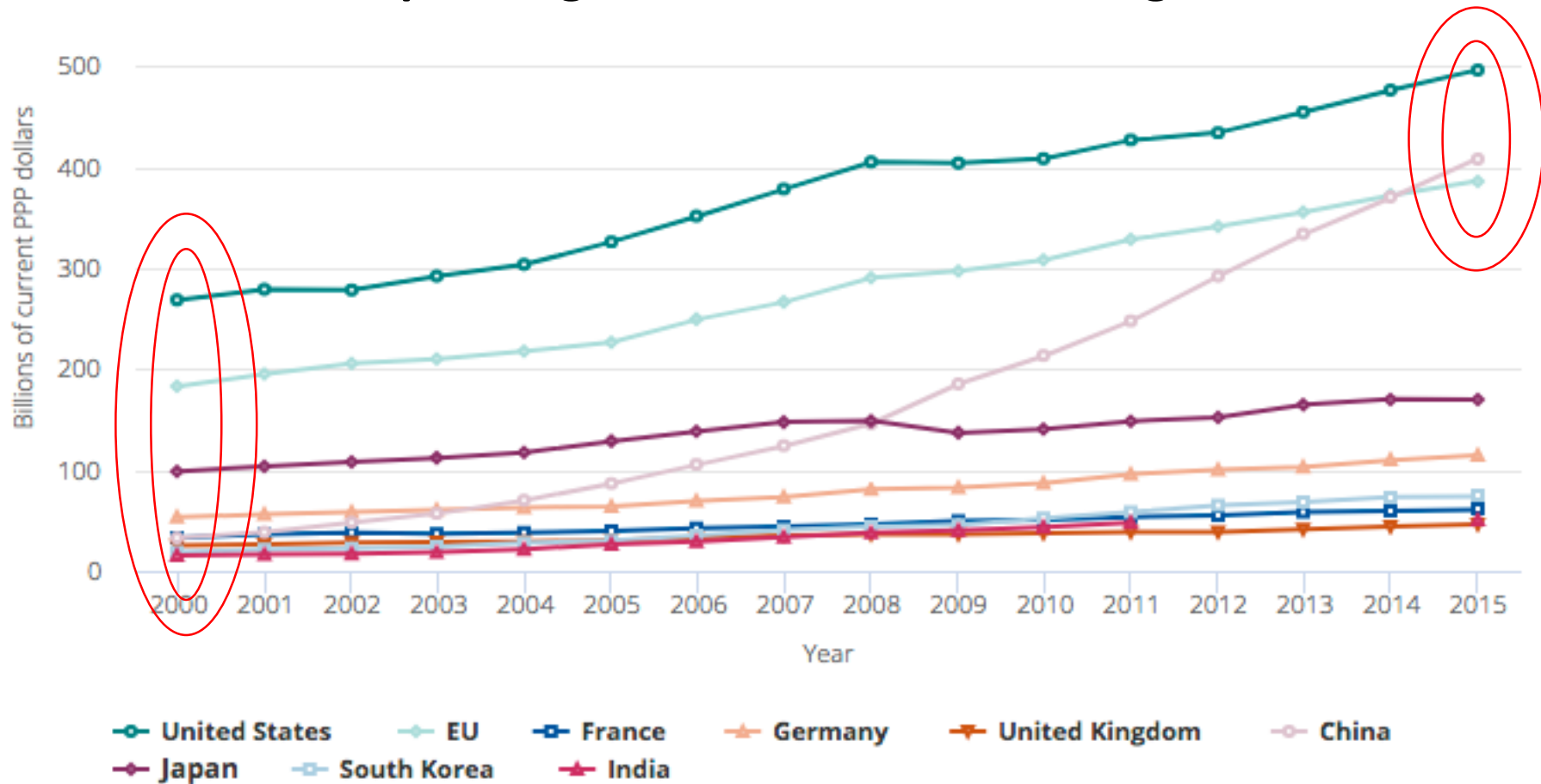
Shifts Towards Higher Technology Demographics: Chinese vs. US Urbanization: 1900-2005



Underlying Educational Base: Bachelor's degree awards in S&E fields, by selected region, country, or economy: 2000–14



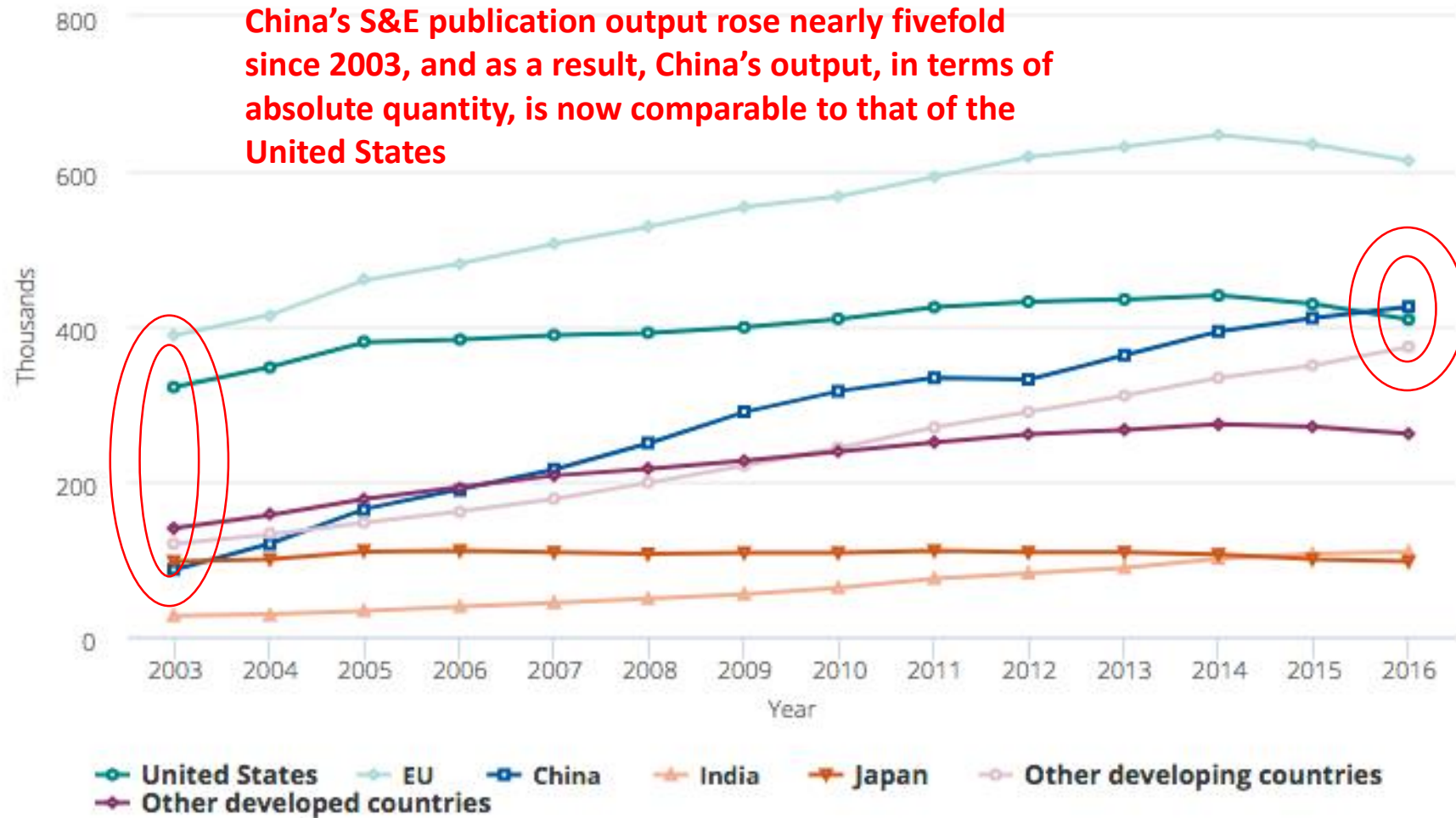
Chinese R&D Spending Rises Above EU, Challenges U.S.



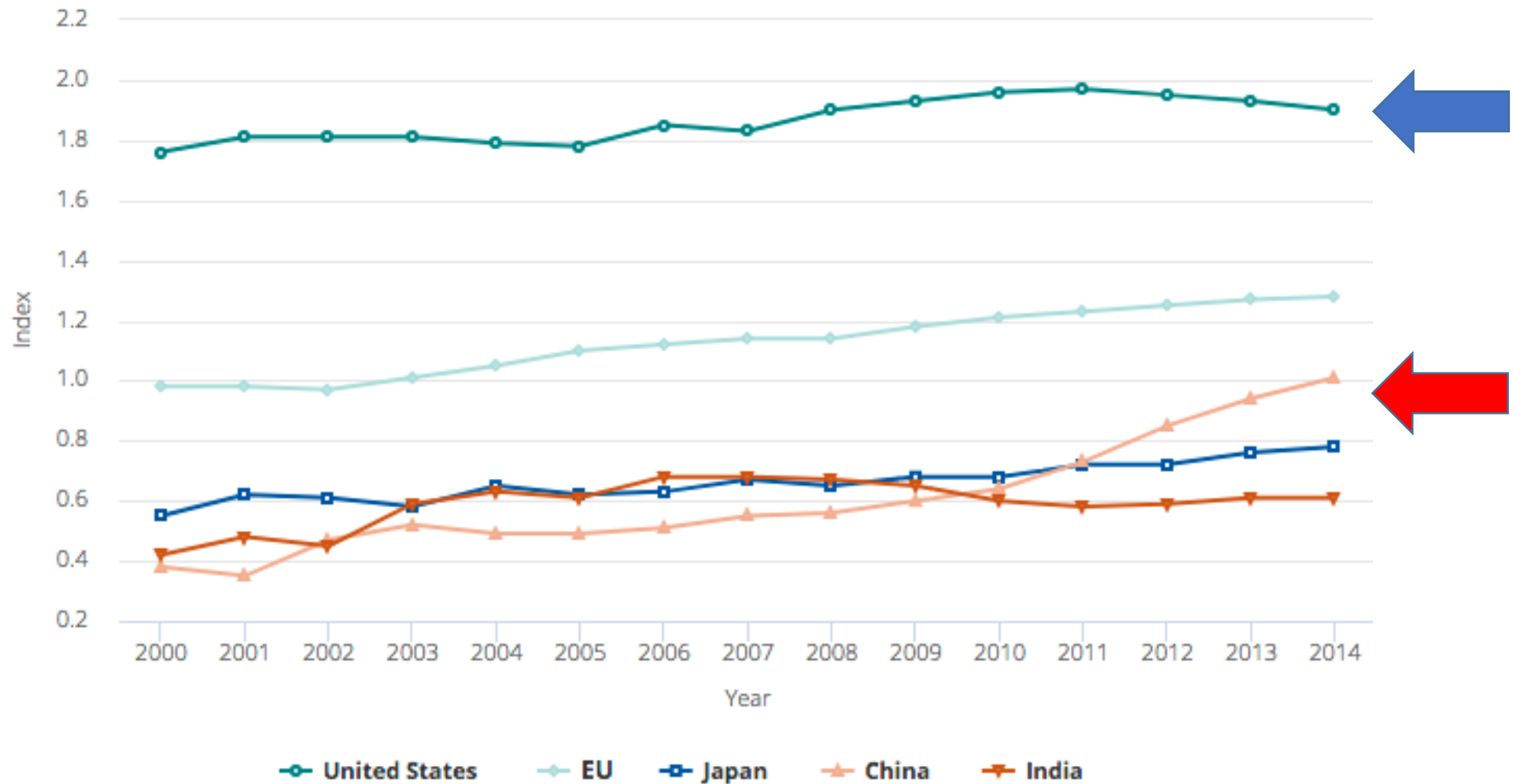
United States and Europe experienced substantial declines in their shares of global R&D (from 37% to 26% in the United States and from 27% to 22% in Europe between 2000 and 2015). During the same period, the economies of East and Southeast Asia—including China, Japan, Malaysia, Singapore, South Korea, Taiwan, and India—saw an increase in their combined global share from 25% to 40%, thus exceeding the respective U.S. and the European R&D shares in 2015.

National Science Foundation, National Center for Science and Engineering Statistics estimates, August 2017. Based on data from the Organization for Economic Co-operation and Development, Main Science and Technology Indicators (2017/1), and the United Nations Educational, Scientific and Cultural Organization (UNESCO), Institute for Statistics database, data.uis.unesco.org. National science Board, Science & Engineering Indicators, 2018, <https://nsf.gov/statistics/2018/nsb20181/report/sections/overview/research-publications>.

Chinese Refereed Science & Engineering Publications Overtake Those in the U.S. for First Time in 2016



But Quality Matters: S&E publication output in the top 1% of cited publications, by selected region, country, or economy: 2000–14



China's Evolving Precision Strike Capability

Short-Range Ballistic Missiles (300-1,000 km). The PLA Rocket Force has approximately 1,200 SRBMs. The force fields advanced variants with improved ranges and accuracy in addition to more sophisticated payloads, while gradually replacing earlier generations that do not possess true precision strike capability.

Medium-Range Ballistic Missiles (1,000-3,000 km). The PLA is fielding approximately 200-300 conventional MRBMs to increase the range at which it can conduct precision strikes against land targets and naval ships operating far from China's shores out to the first island chain.

Intermediate-Range Ballistic Missiles (3,000-5,500 km). The PLA is developing a nuclear and conventional road-mobile IRBM, which increases its capability for near-precision strike as far as the "second island chain." The PLAN also is improving its over-the-horizon (OTH) targeting capability with sky wave and surface wave OTH radars, which can be used in conjunction with reconnaissance satellites to locate targets at great distances from China, thereby supporting long-range precision strikes, including employment of ASBMs.

Land-Attack Cruise Missiles. The PLA continues to field approximately 200-300 air- and ground-launched LACMs for standoff precision strikes. Air-launched cruise missiles include the YJ-63, KD-88, and the CJ-20 (the air-launched version of the CJ-10 GLCM). China recently adapted the KD-88 LACM, which has an advertised range of more than 100 km, and may be testing a longer-range version. China also is developing the CM-802AKG LACM, an export system that can strike both land and ship targets from fighters or bombers.

Ground-Attack Munitions. The PLAAF has a small number of tactical air-to-surface missiles (ASM) as well as precision-guided munitions including all-weather, satellite-guided bombs, anti-radiation missiles, and laser-guided bombs. China is developing smaller-sized ASMs such as the AR-1, HJ-10 anti-tank, Blue Arrow 7 laser-guided, and KD-2 missiles in conjunction with its increasing development of UAVs. China is also adapting to UAV Global Positioning System-guided munitions such as the FT-5 and LS-6 that are similar to the U.S. Joint Direct Attack Munitions (JDAM).

Anti-Ship Cruise Missiles. China deploys a wide range of advanced ASCMs with the YJ-83 series as the most numerous, which are deployed on the majority of China's ships as well as multiple aircraft. China has also outfitted several ships with YJ-62 ASCMs and claims that the new LUYANG III class DDG and future Type 055 CG will be outfitted with a vertically launched variant of the YJ-18 ASCM. The YJ-18 is a long-range torpedo-tube-launched ASCM capable of supersonic terminal sprint which has likely replaced the older YJ-82 on SONG, YUAN, and SHANG class submarines. China has also developed the long range supersonic YJ-12 ASCM for the H-6 bomber. At China's military parade in September 2015, China displayed a ship-to-ship variant of the YJ-12 called the YJ-12A. China also carries the Russian SS-N-22 SUNBURN on four Russian built SOVREMENNY-class DDGs and the Russian SS-N-27b SIZZLER on eight Russian built KILO-class submarines.

Anti-Radiation Weapons. China is starting to integrate an indigenous version of the Russian Kh-31P (AS-17), known as the YJ-91, into its fighter-bomber force. The PLA imported Israeli-made HARPY UAVs and Russian-made anti-radiation missiles during the 1990s.

Artillery-Delivered High Precision Munitions. The PLA is developing and deploying artillery systems with the range to strike targets within or even across the Taiwan Strait, including the PHL-03 300 mm multiple-rocket launcher (MRL) (greater than 100 km range) and the longer-range AR-3 dual-caliber MRL (out to 220 km range).

Illustrative Areas of Advance: Modernization, Space, Anti- Space, and Cyber

Military Reform and Changing Contingency Capability

KEY TAKEAWAYS

- ✓ The PLA aims to increase its ability to conduct complex joint operations.
- ✓ Although ongoing reforms may decrease near-term readiness, in the long-term they should enable better planning and preparation for joint military operations across the Taiwan Strait.

One of the overarching goals of the structural reforms now reshaping the PLA is to construct a military capable of conducting complex joint operations, including those that would be involved in a Taiwan contingency. PLA reforms are aimed at clarifying command authorities, improving joint integration, and facilitating the transition from peace to war. The abolishment of military regions in favor of military theaters – in this case, the PLA's Eastern Theater – has also likely streamlined and improved the PLA's ability to conduct yearlong planning and preparation for joint military operations across the Taiwan Strait. In the near term, PLA combat units may experience decreased readiness and proficiency to conduct large-scale joint operations as they reorganize units, integrate new capabilities, and adjust to new command structures.

A significant addition to the overall structure of the PLA under current reforms is the establishment of the SSF and JLSF. During a Taiwan contingency, the JLSF, in conjunction with subordinate joint logistics support centers, would coordinate joint logistics and the delivery of materiel as well as oversee various civil-military support systems to sustain the campaign. The creation of the SSF probably improves the PLA's ability to execute and coordinate IO (especially cyber, EW, and counterspace) in a Taiwan contingency. It may also improve the PLA's ability to manage and provide space-based reconnaissance to the CMC and Eastern Theater, improving PLA command staffs' situational awareness of Taiwan military units and facilities. The PLA is likely still exploring how to reform its joint command processes to integrate IO and ISR capabilities more fully at the theater-level, but structural reforms have removed the biggest barriers to integrating these strategic capabilities at the theater-level.

Structural reforms within the military services also have implications on resources and operational capabilities available to the PLA for a future Taiwan contingency.

- > In 2017, the PLAN established a PLANMC headquarters and began expanding the PLANMC. However, the extent of PLANMC expansion and the roles that the PLANMC will be assigned remain unclear – the PLANMC may be assigned roles pertaining to overseas base defense or small island seizure, leaving large-scale amphibious operations under the purview of the PLAA's amphibious units.
- > The PLA Airborne Corps (formerly the PLAAF 15th Airborne Corps) also underwent major changes in 2017, reorganizing its previous units into airborne infantry brigades, a special operations brigade, an aviation brigade, and a support brigade. The goal of reorganization was to create a responsive and streamlined airborne corps capable of air-delivering modular combat units – including aerial drop of mechanized infantry forces.
- > The PLAA continues the expansion and transformation of rotary-wing aviation into its own combat arm capable of maneuver, precision strike, and three-dimensional transportation of forces. The PLAA intends to field at least one army aviation brigade per group army and military district as part of its on-going restructure and modernization. Furthermore, in 2017, the PLAA established its first two helicopter-based air assault infantry brigades, with subsequent plans to equip these brigades with both transport and assault helicopters.

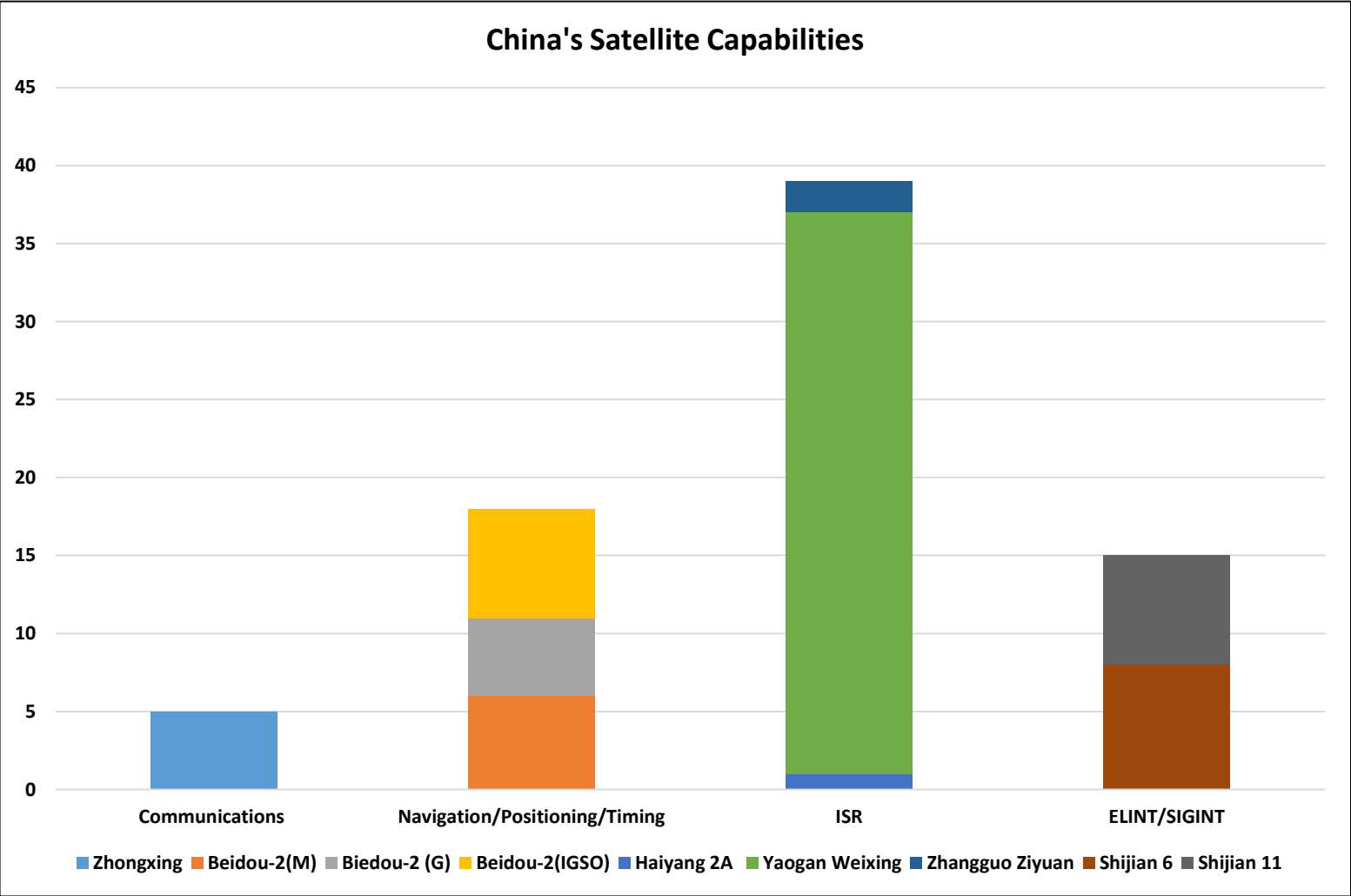
China's Joint Strategic Support Force (Est. 2015)

Space and Counterspace. PLA strategists regard the ability to use space-based systems—and to deny them to adversaries—as central to enabling modern informatized warfare. As a result, the PLA continues to strengthen its military space capabilities despite its public stance against the militarization of space. Although PLA doctrine does not appear to address space operations as a unique operational “campaign,” space operations will probably form an integral component of other PLA campaigns and serve a key role in enabling actions that counter third-party intervention. China is seeking to utilize space systems to establish a real-time and accurate surveillance, reconnaissance and warning system, and to enhance C2 in joint operations. These advancements include the Beidou navigation satellite system and space surveillance capabilities that can monitor objects across the globe and in space.

Information Operations (IO). China assesses that an essential element, if not a fundamental prerequisite, of its ability to counter third-party intervention is the ability to control the information spectrum in the modern battlespace. PLA authors often cite this capability—sometimes termed “information blockade” or “information dominance”—as necessary to seize the initiative and set the conditions needed to achieve air and sea superiority. China’s “information blockade” concept likely envisions the employment of military and non-military instruments of state power across the battlespace, including in cyberspace and space. China’s investments in advanced EW systems, counterspace weapons, and cyber operations—combined with more traditional forms of control such as propaganda and denial through opacity—reflect the priority the PLA places on information advantage.

Cyberoperations. Chinese cyberattack operations could support A2/AD by targeting critical nodes to disrupt adversary networks throughout the region. China believes its cyber capabilities and personnel lag behind the United States. To deal with these perceived deficiencies, China is improving training and domestic innovation to achieve its cyber capability development goals. PLA researchers advocate seizing “cyberspace superiority” by using offensive cyber operations to deter or degrade an adversary’s ability to conduct military operations against China.

China's Active Satellites



Source: IISS *Military Balance*, 2016. Adapted by Anthony H. Cordesman and Joseph Kendall at the Center for Strategic and International Studies

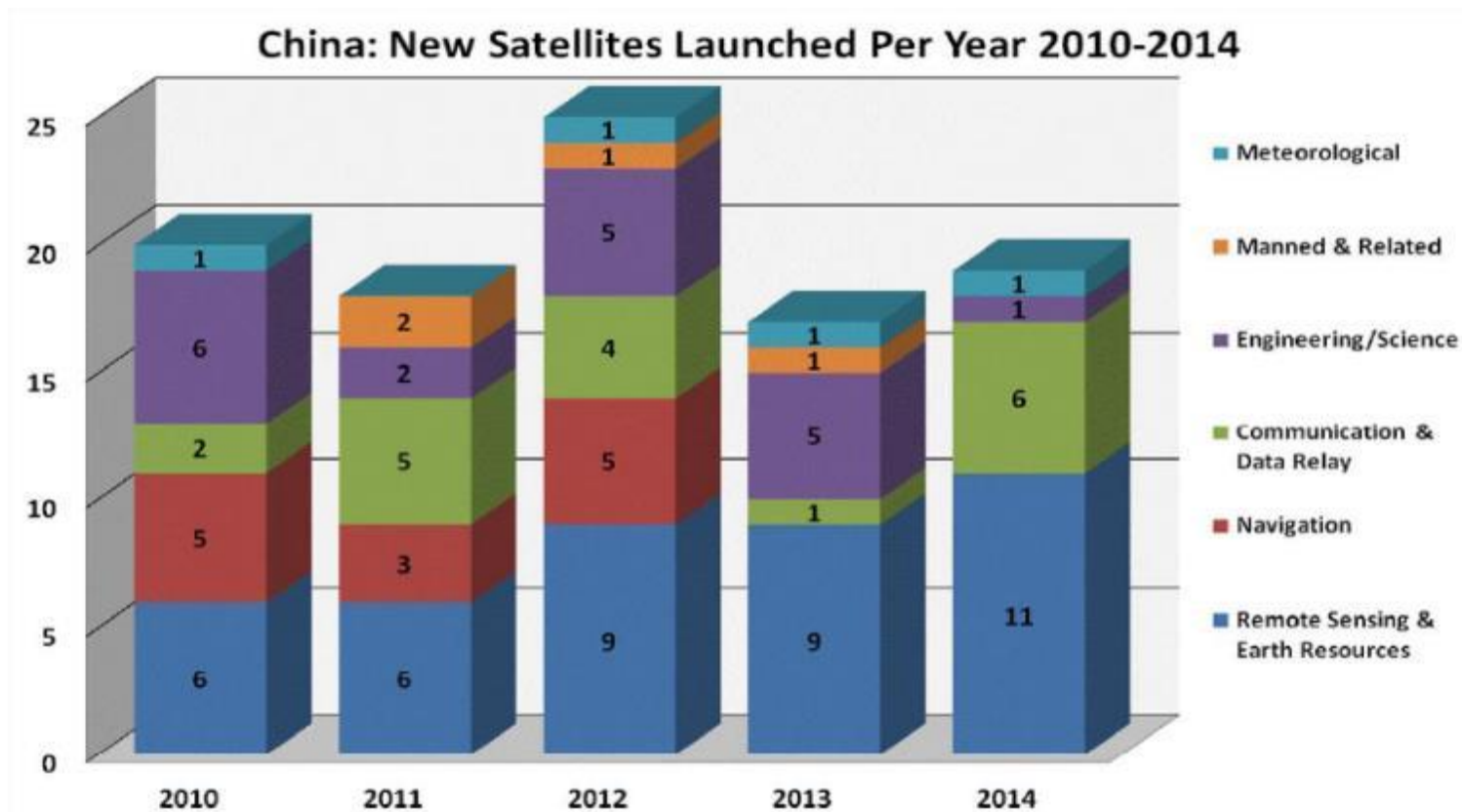


Table 2: Chinese versus U.S. Space Launches, 2010–2014

	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>
Chinese Launches (Satellites Deployed)	15 (20)	19 (18)	19 (25)	14 (17)	16 (19)
U.S. Launches (Satellites Deployed)	15 (41)	19 (39)	16 (35)	20 (85)	23 (110)

Source: DoD Annual Report to Congress: Military and Security Developments Involving the People's Republic of China, April 2015; Source: "China's Space and Counterspace Programs", 2015 Report to Congress, US-China Economic and Security Review Commission, November 2015, p. 294,
http://origin.www.uscc.gov/sites/default/files/annual_reports/2015%20Annual%20Report%20to%20Congress.PDF

China's Direct-Ascent ASAT Tests

Date	Orbital Debris	Missile	Notes
July 2005	No	SC-19	Rocket test
February 2006	No	SC-19	Failed intercept and destruction of an orbital target
January 2007	Yes	SC-19	Successful intercept and destruction of an orbital target
January 2010	No	SC-19	Successful intercept and destruction of a suborbital target
January 2013	No	SC-19	Successful intercept and destruction of a suborbital target
May 2013	No	DN-2	Rocket test
July 2014	No	SC-19	Successful intercept and destruction of a suborbital target

Source: "China's Space and Counterspace Programs", 2015 Report to Congress, US-China Economic and Security Review Commission, November 2015, p. 294, http://origin.www.uscc.gov/sites/default/files/annual_reports/2015%20Annual%20Report%20to%20Congress.PDF

Objective or Corridor?

**Military Build Up in South China Sea
as Part of Overall Change
In China's Strategic Posture**

China's Southern Theater- 2018

Office of the Secretary of Defense,
*Military and Security Developments
Involving the Republic of China, Annual
Report to Congress*, May 16, 2018,
Department of Defense. China Military
Power 2018, p.98.

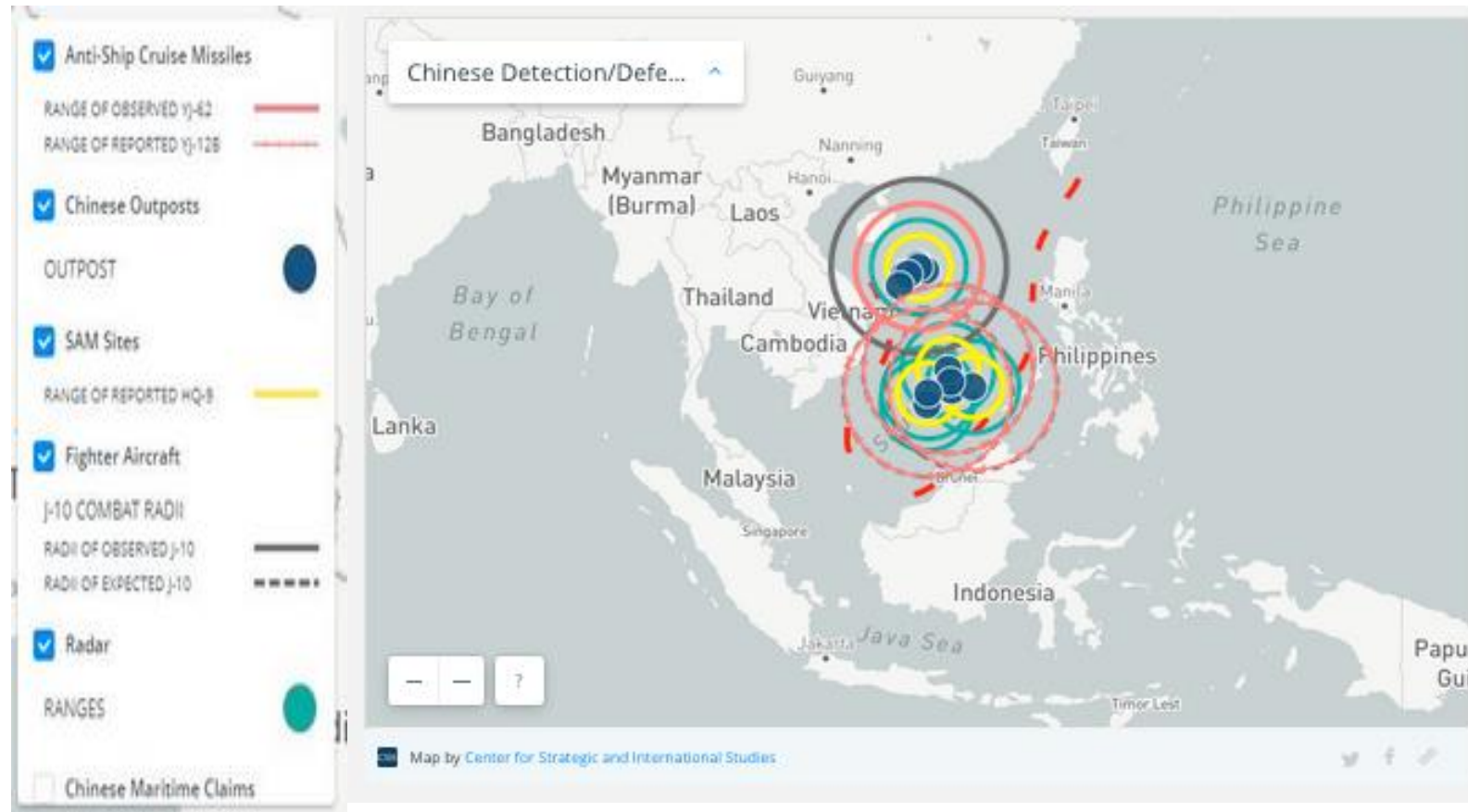


China's Forces in It's Southern Theater

Office of the Secretary of Defense,
ANNUAL REPORT TO CONGRESS Military
and Security Developments Involving the
People's Republic of China 2017, May 15,
2017,
https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF, p. 79

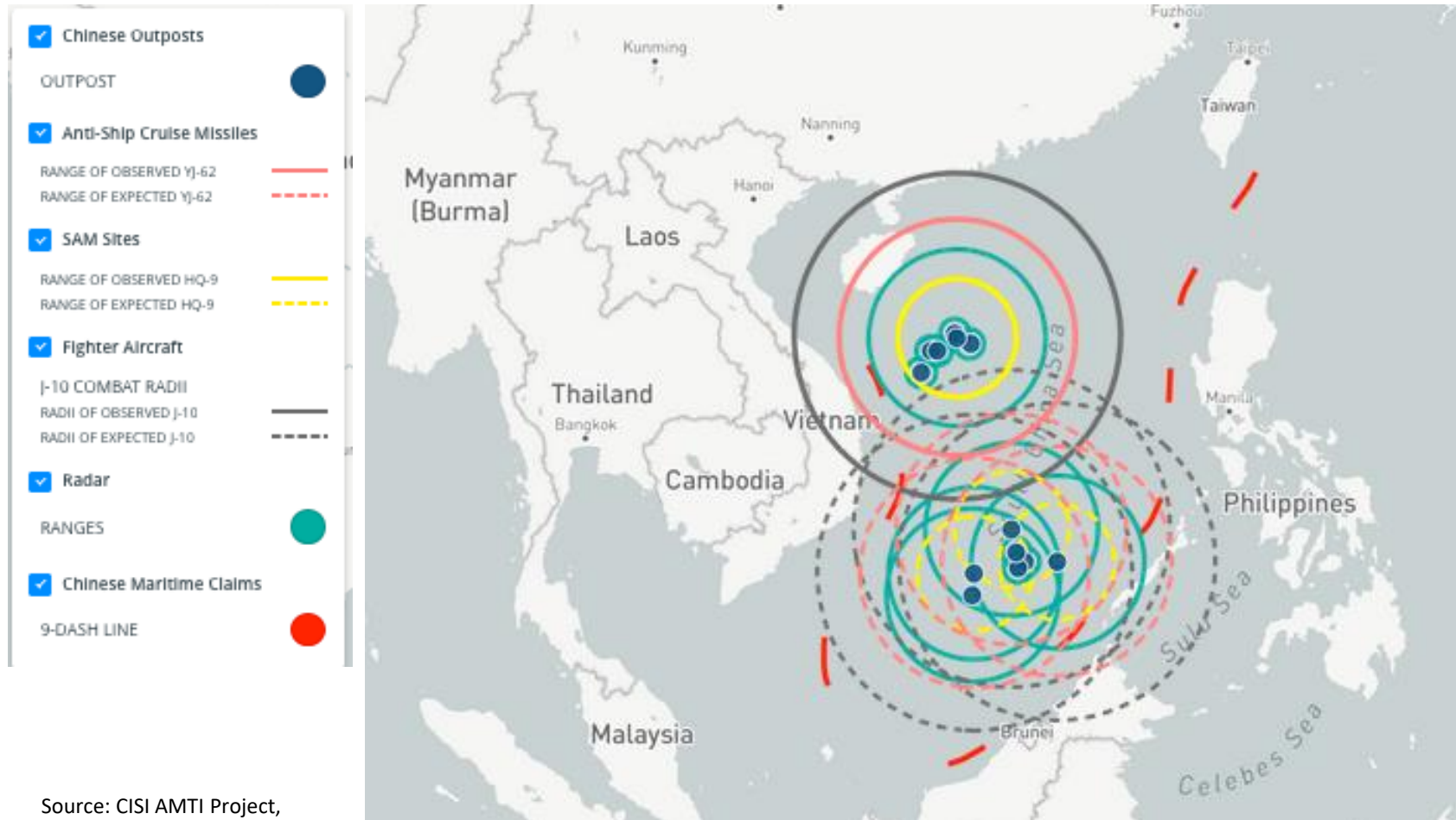


Impact of Current and Expected Chinese Deployments of Air and Missile Platforms in the Paracels and Spratlys: Early 2018 - I



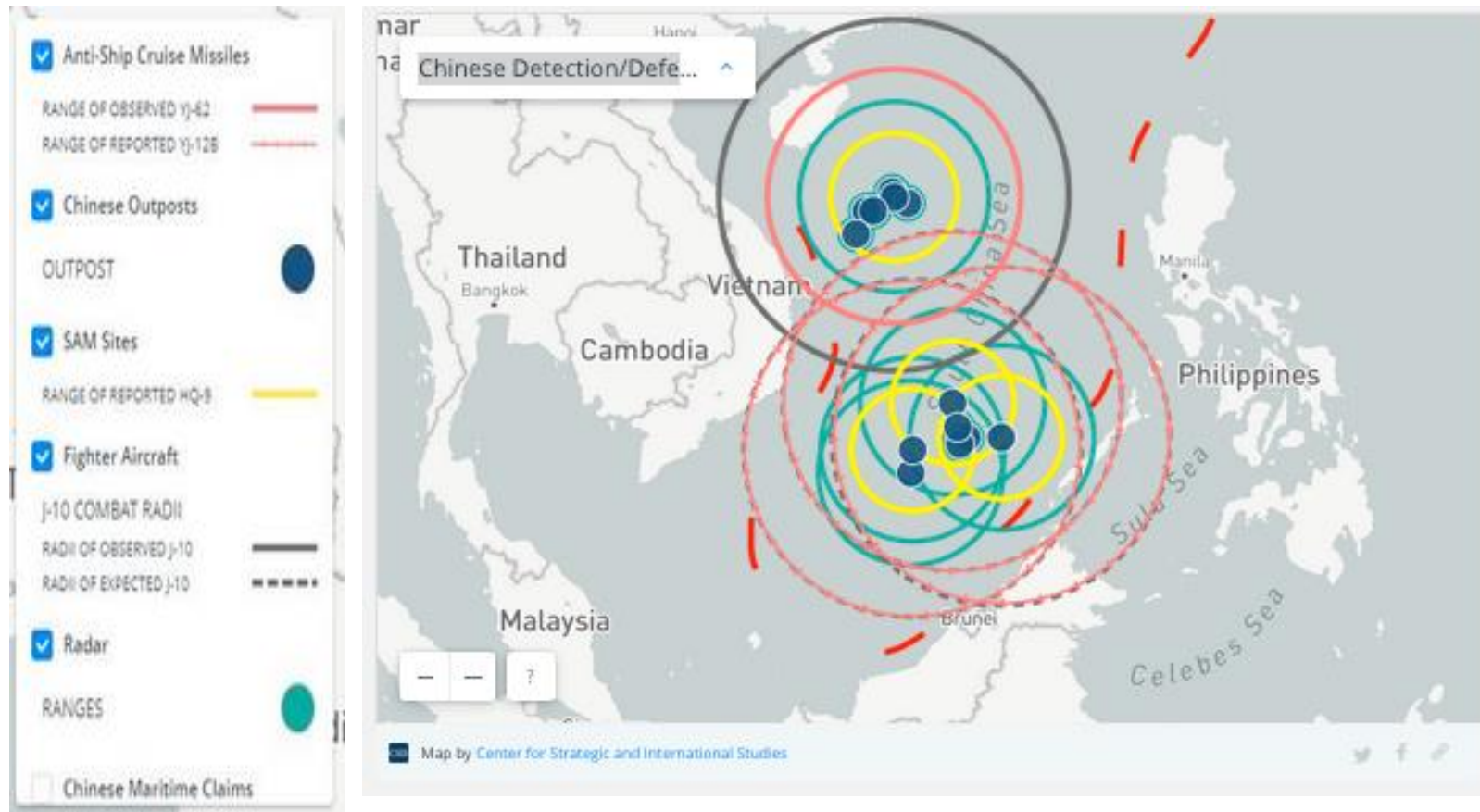
Source: CSIS AMTI Project, *An Accounting of Chinese Deployments to the Spratly Islands*, May 9, 2018 <https://amti.csis.org/chinese-power-projection/> and <https://mail.google.com/mail/u/0/#inbox/16347781d0432c32>

Chinese Military Capabilities in South China Sea- III: Early 2018



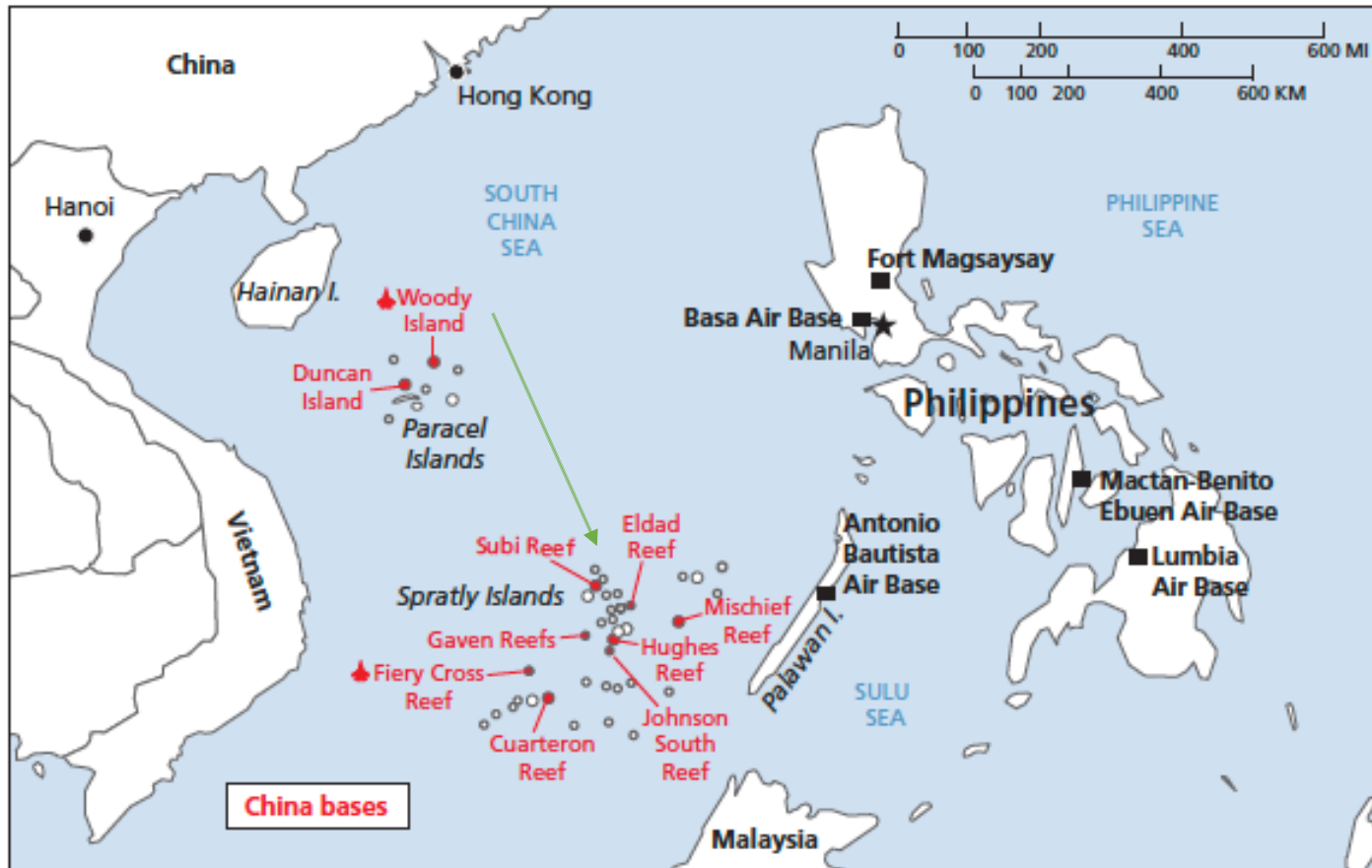
Source: CISI AMTI Project,
<https://amti.csis.org/chinese-power-projection/>

Impact of Current and Expected Chinese Deployments of Air and Missile Platforms in the Paracels and Spratlys: Early 2018 - II



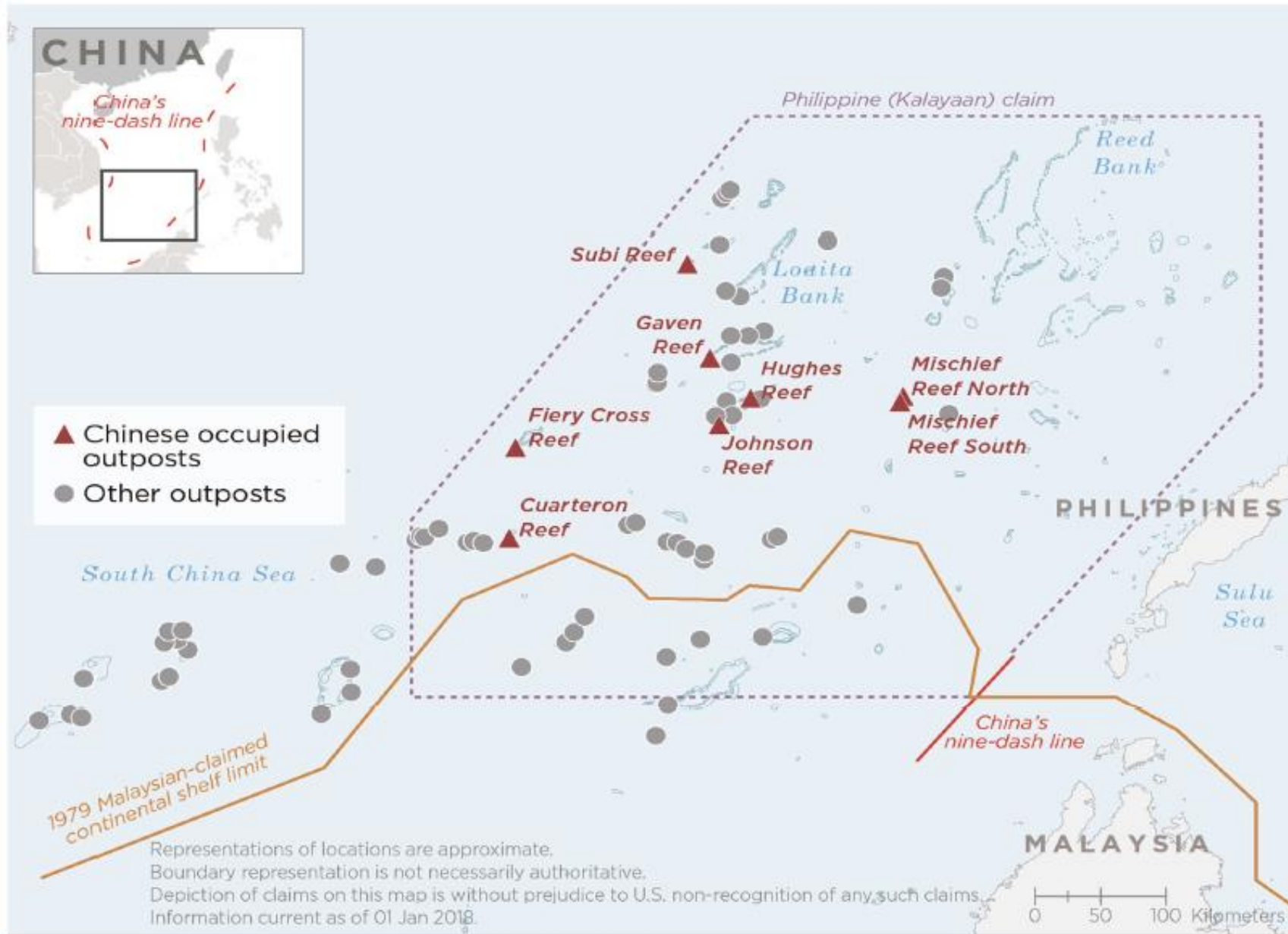
Source: CSIS AMTI Project, *An Accounting of Chinese Deployments to the Spratly Islands*, May 9, 2018 <https://amti.csis.org/chinese-power-projection/> and <https://mail.google.com/mail/u/0/#inbox/16347781d0432c32>

Chinese Island vs. Philippine Bases

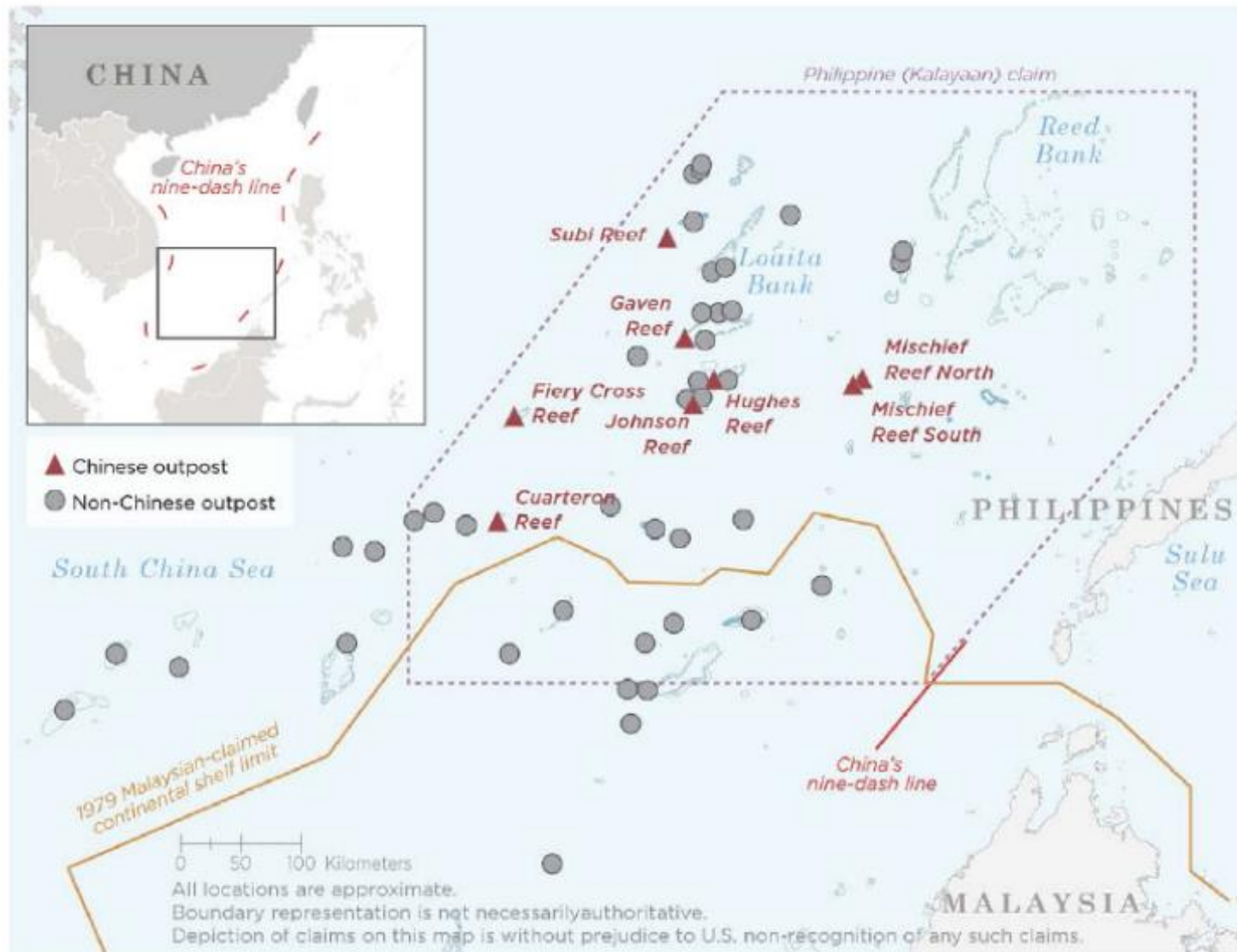


Source: RAND, *US Military Forces and Capabilities for a Dangerous World*, RR1782, 2017, p. 23

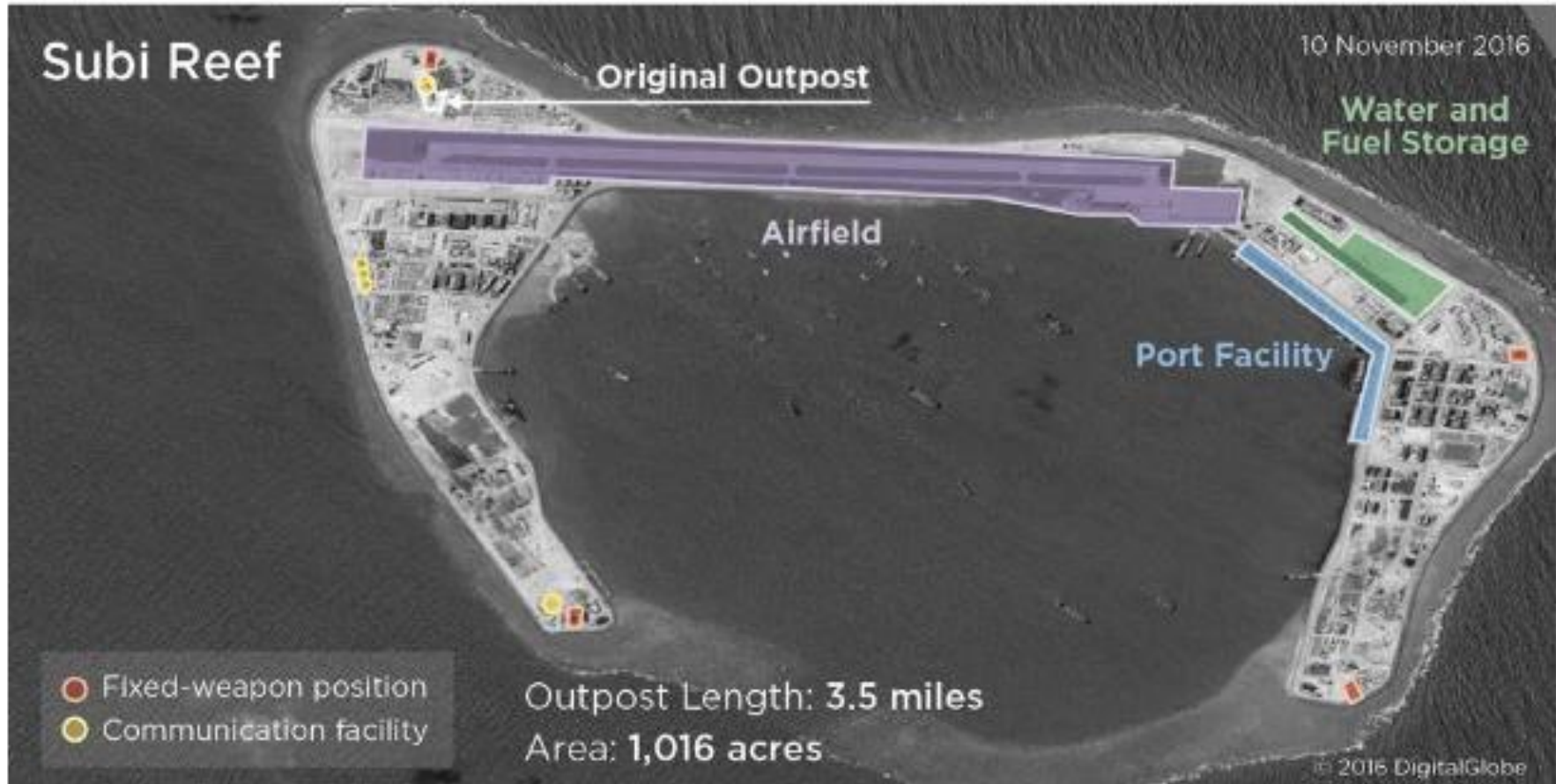
Outputs in the Spratly Islands



Chinese Outposts in the Spratlys



China's Outposts on the Subi Reef



Office of the Secretary of Defense, *ANNUAL REPORT TO CONGRESS Military and Security Developments Involving the People's Republic of China 2017*, May 15, 2017, https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF, p. 7

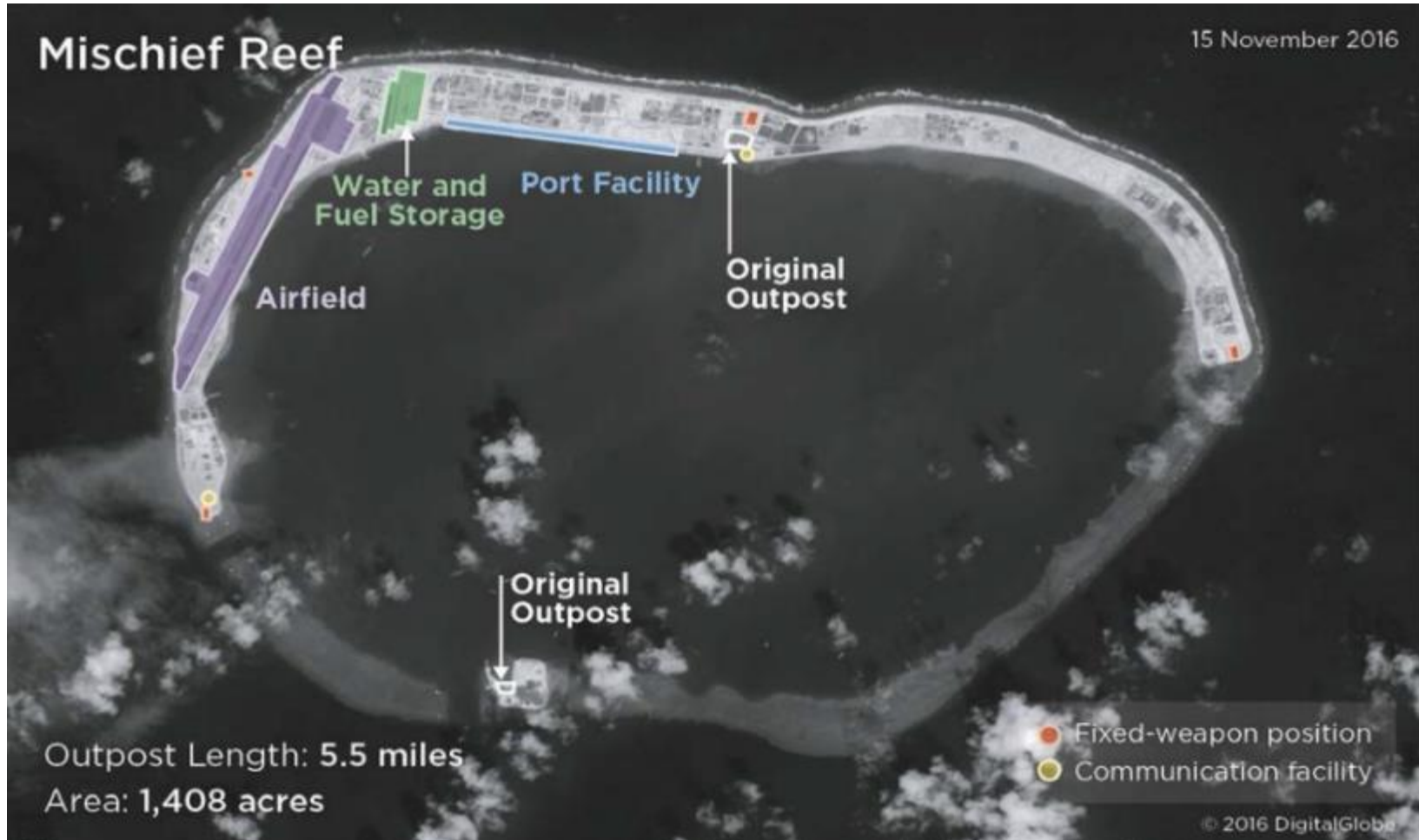
Making Woody Island a Base



NOTE: Woody Island is a substantial base on an artificial island containing an airfield with a length of more than 3,000 meters. The close-up image shows the deployment of a long-range SAM battery.

Source: RAND, *US Military Forces and Capabilities for a Dangerous World*, RR1782, 2017, p. 23

Building Island Bases: Mischief Reef



Possible Military facilities on New “Islands”



Source: BBC, <http://www.bbc.com/news/world-asia-china-39165080>.

Key Chinese Deployments and Activity in the Paracels and Spratlys: As of Early 2018

- Has deployed YJ-12B anti-ship cruise missiles and HQ-9B surface-to-air missile systems on each of the reefs, and built missile shelters.
- J-10 and J-11 fighter jets to Woody Island. China has built identical [hangars for combat aircraft](#) at Woody and on each of the Big Three, it is likely that J-10s or J-11s will soon deploy.
- Y-8 and Xian Y-7 military transport aircraft, and Y-8 maritime patrol or signals intelligence. Some at Subi Reef. Philippines, which has about 100 civilians and a small military garrison on Thitu Island just 12 nautical miles away
- Military jamming equipment mounted on three trucks
- Several varieties of the PLAN Type 053 frigate were seen at the Big Three, including what appear to be Type 053H1, Type 053H1G, and Type 053H3 frigates, plus Type 056 Jiangdao-class corvettes and Type 051B Luhai-class destroyer.
- Several different Type 072 landing ships, as well as a Type 073A landing ship, have been seen at the Big Three. The larger Type 072 landing ships are capable of transporting and landing tanks, heavy vehicles, and air-cushioned hovercraft in amphibious operations. The medium-sized Type 073A carries smaller tanks or troops for similar operations.
- Two AGI signals intelligence gathering ships, a Hai Yang and a Type 815G, and Type 639 oceanographic surveillance ship.
- Harbin Z-8 transport helicopters and a Harbin BZK-005 drone deployed to Woody Island. The BZK-005 is a high altitude, long endurance surveillance drone
- China Coast Guard ships seen at the outposts include several former PLAN Jianghu-class 053H1 frigates, redubbed Jianghu-1 WFF ships.

Source: CSIS AMTI Project, *An Accounting of Chinese Deployments to the Spratly Islands*, May 9, 2018 <https://amti.csis.org/chinese-power-projection/> and <https://mail.google.com/mail/u/0/#inbox/16347781d0432c32>

Chinese Ship Deployments in the Paracels and Spratlys at “Big Three” outposts at Fiery Cross, Mischief, and Subi Reefs.

Satellite images show that PLAN destroyers, frigates, and other combat ships and CCG patrol vessels regularly visit the artificial islands, along with many auxiliary and logistics vessels. Admittedly, relying on satellite imagery, which captures only those ships that happen to be in port (as opposed to out on patrol) at a specific moment in time, provides a limited picture of naval and coast guard deployments. But the ubiquity of PLAN and CCG ships in images of Fiery Cross, Mischief, and Subi Reefs since the start of 2017 suggests how robust the PLAN and CCG

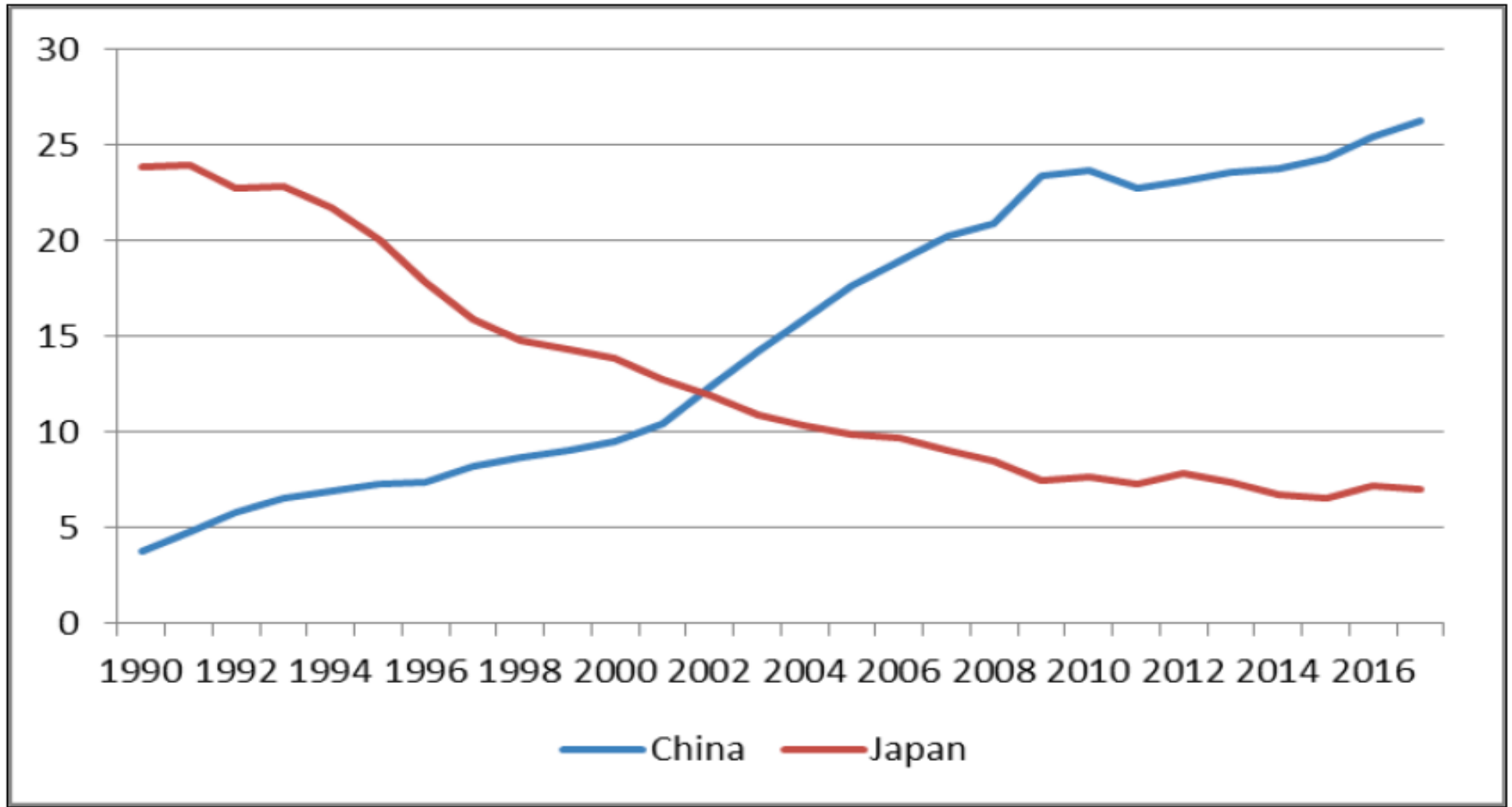


Source: CSIS AMTI Project, *An Accounting of Chinese Deployments to the Spratly Islands*, May 9, 2018 <https://amti.csis.org/chinese-power-projection/> and <https://mail.google.com/mail/u/0/#inbox/16347781d0432c32>

Corridor/Transit Route

The Critical Role of Chinese Trade in the South China Sea

U.S. Shift from Japan to China as % of Total U.S. Manufactured Imports: 1990-2017

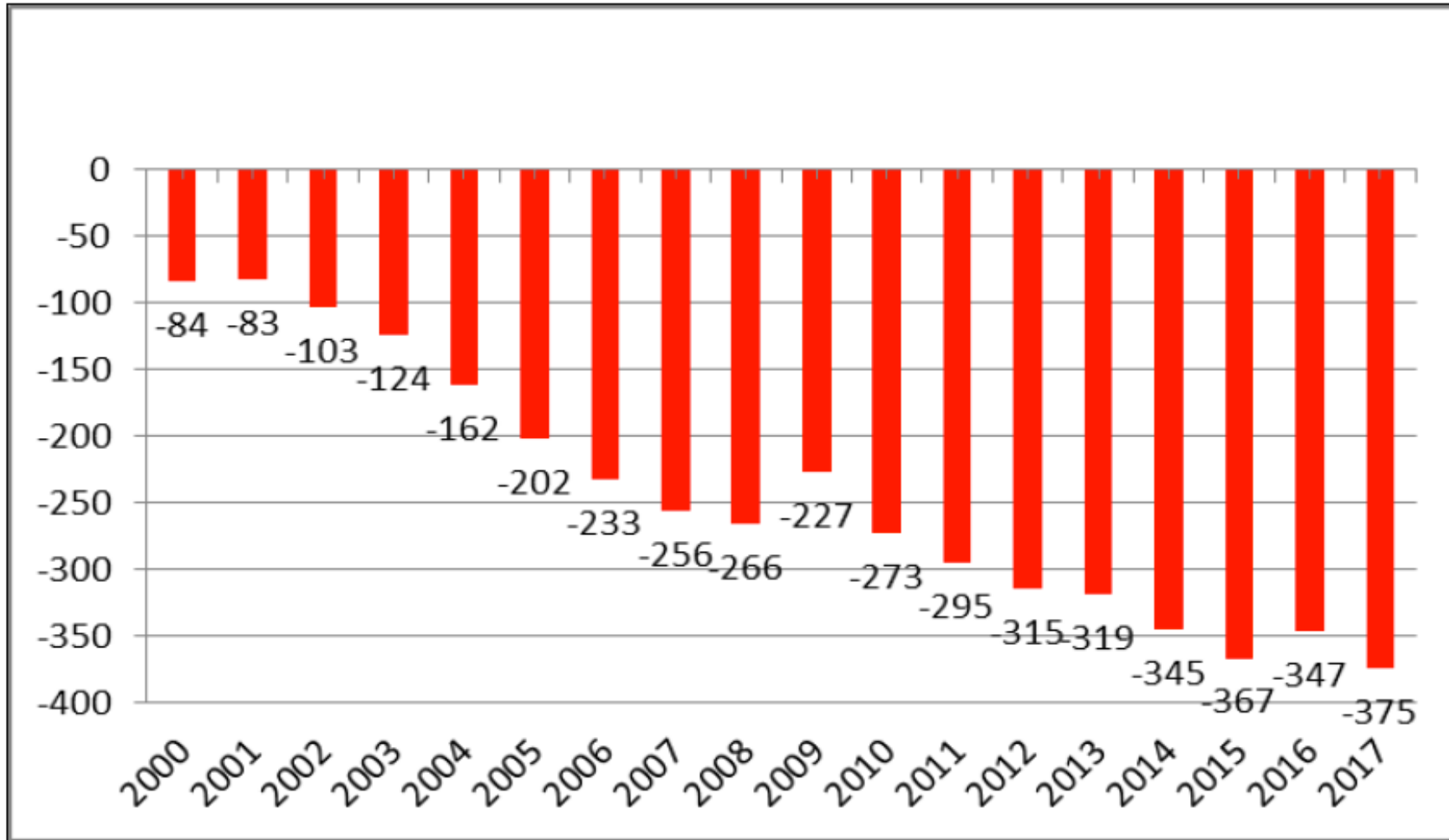


Source: USITC DataWeb.

Source: Wayne Morrison, *China-U.S. Trade Issues*, CRS, April 16, 2018, RL 33536, p. 13.

Growing Total U.S. Trade Imbalance with China – Imports from China Less Exports : 2000-2017

(In \$US Billions)

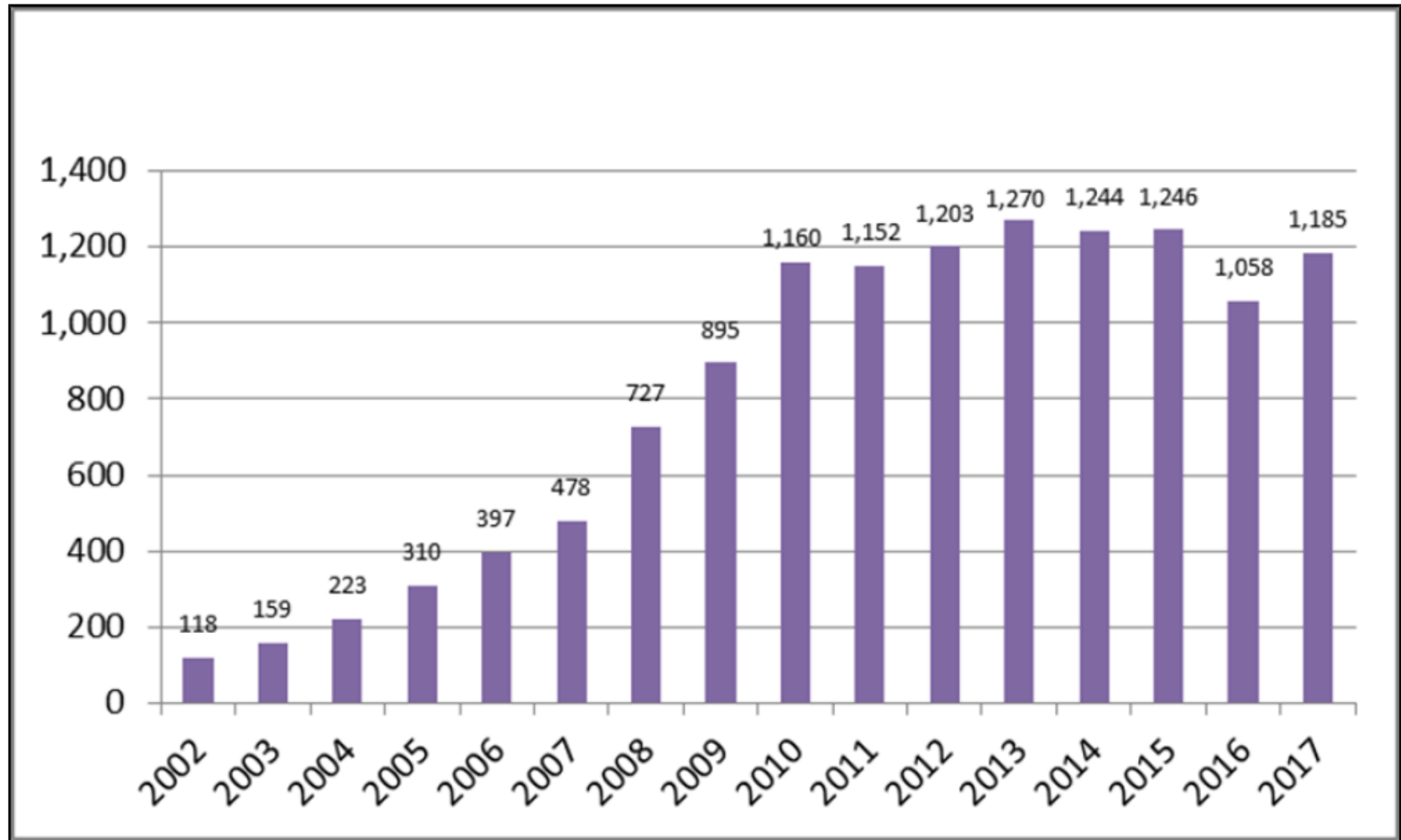


Source: USITC DataWeb.

Source: Wayne Morrison, *China-U.S. Trade Issues*, CRS, April 16, 2018, RL 33536, p. 11.

China's Holdings of U.S. Securities: 2002-2017

(In \$US Billions)



Source: U.S. Department of the Treasury.

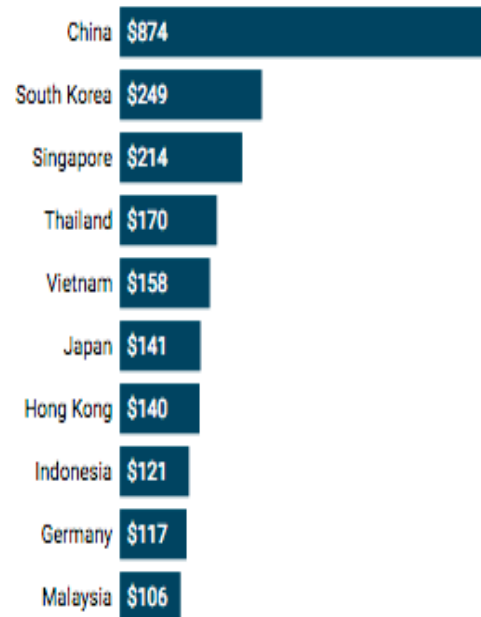
Notes: Data are year-end and exclude Hong Kong and Macau, which are treated separately.

Source: Wayne Morrison, *China-U.S. Trade Issues*, CRS, April 16, 2018, RL 33536, p. 22.

Total Traffic Through the South China Sea: \$3.37 Trillion in 2016

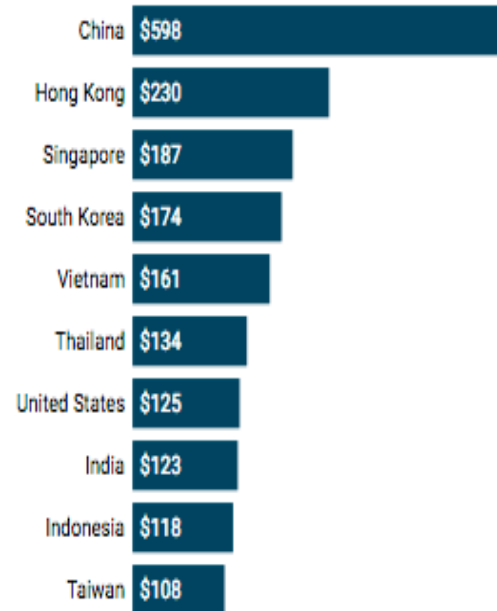
Exports Through the SCS (billions)

Top ten exporters



Imports Through the SCS (billions)

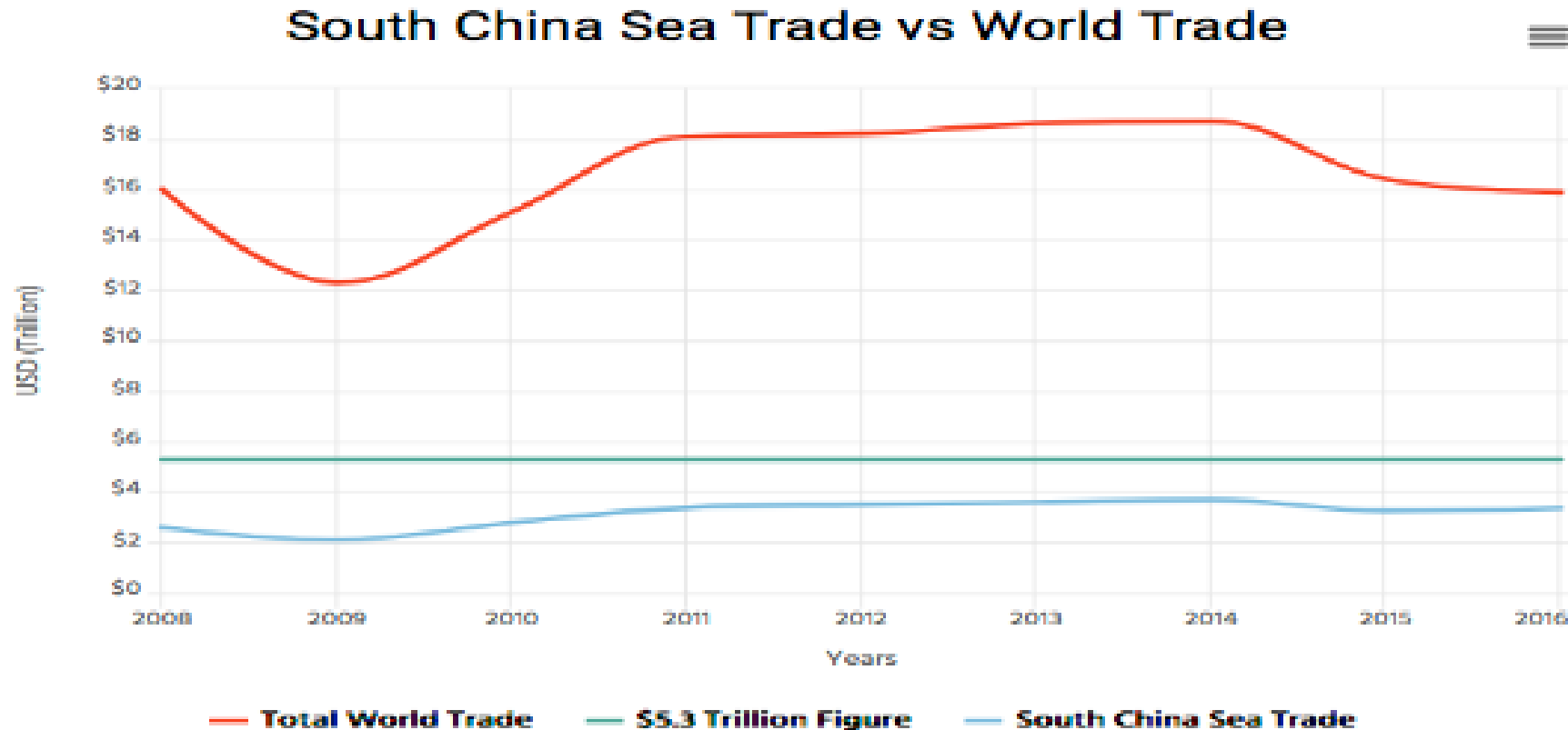
Top ten importers



Country	% Share of World GDP	Trade Value through South China Sea (USD billions)	South China Sea Trade As % of All Trade in Goods
United States	24.5	208	5.72
China	14.8	1470	39.5
Japan	6.53	240	19.1
Germany	4.58	215	9.00
United Kingdom	3.46	124	11.8
France	3.26	83.5	7.77
India	2.99	189	30.6
Italy	2.45	70.5	8.14
Brazil	2.37	77.3	23.4
Canada	2.02	21.8	2.67

CSIS ChinaPower Project | International Monetary Fund

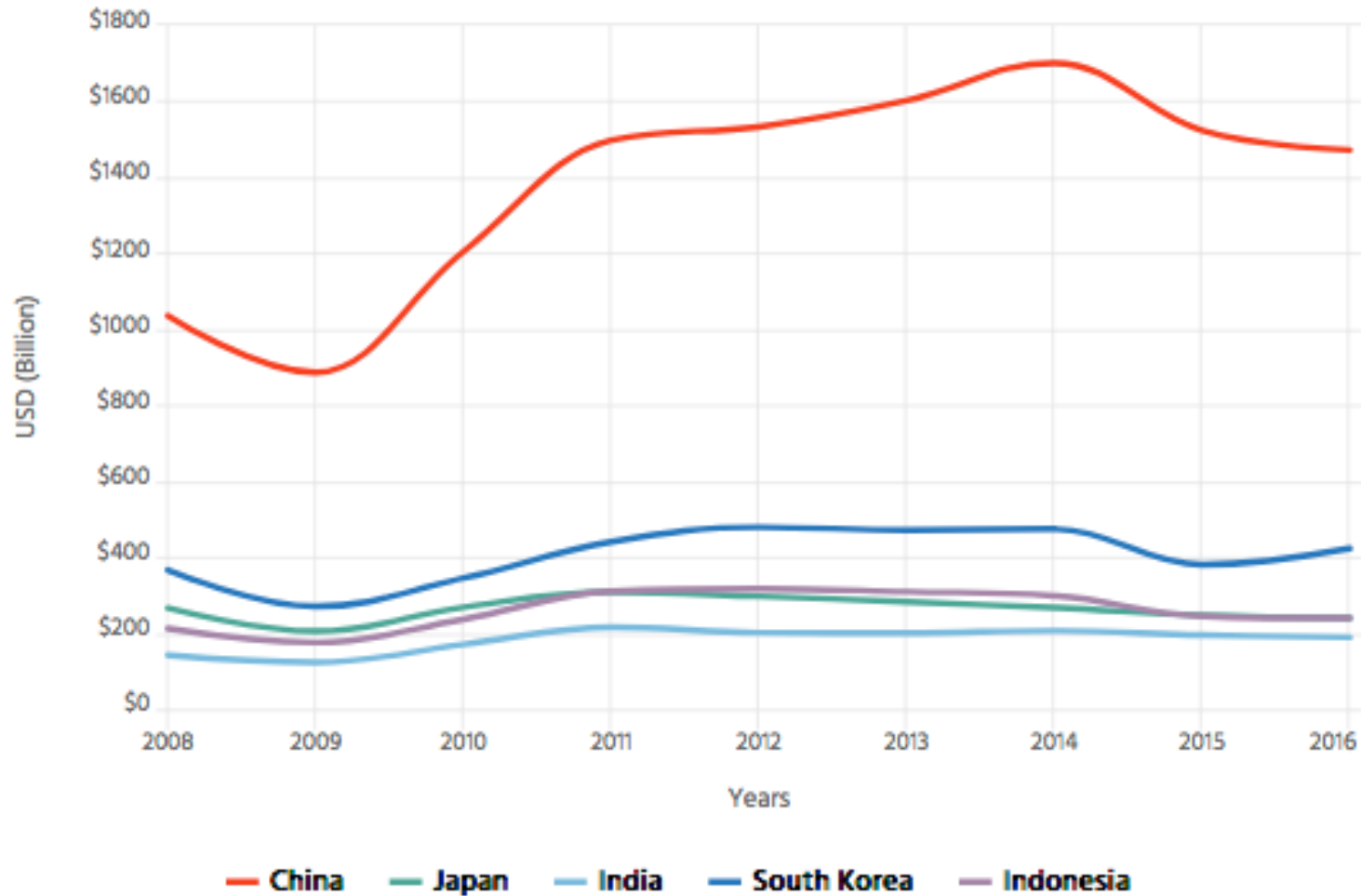
Global Trade vs. Trade Through the South China Sea – 2008-2016:



CSIS China Power Project | Source: International Monetary Fund, Direction of Trade Statistics; ChinaPower

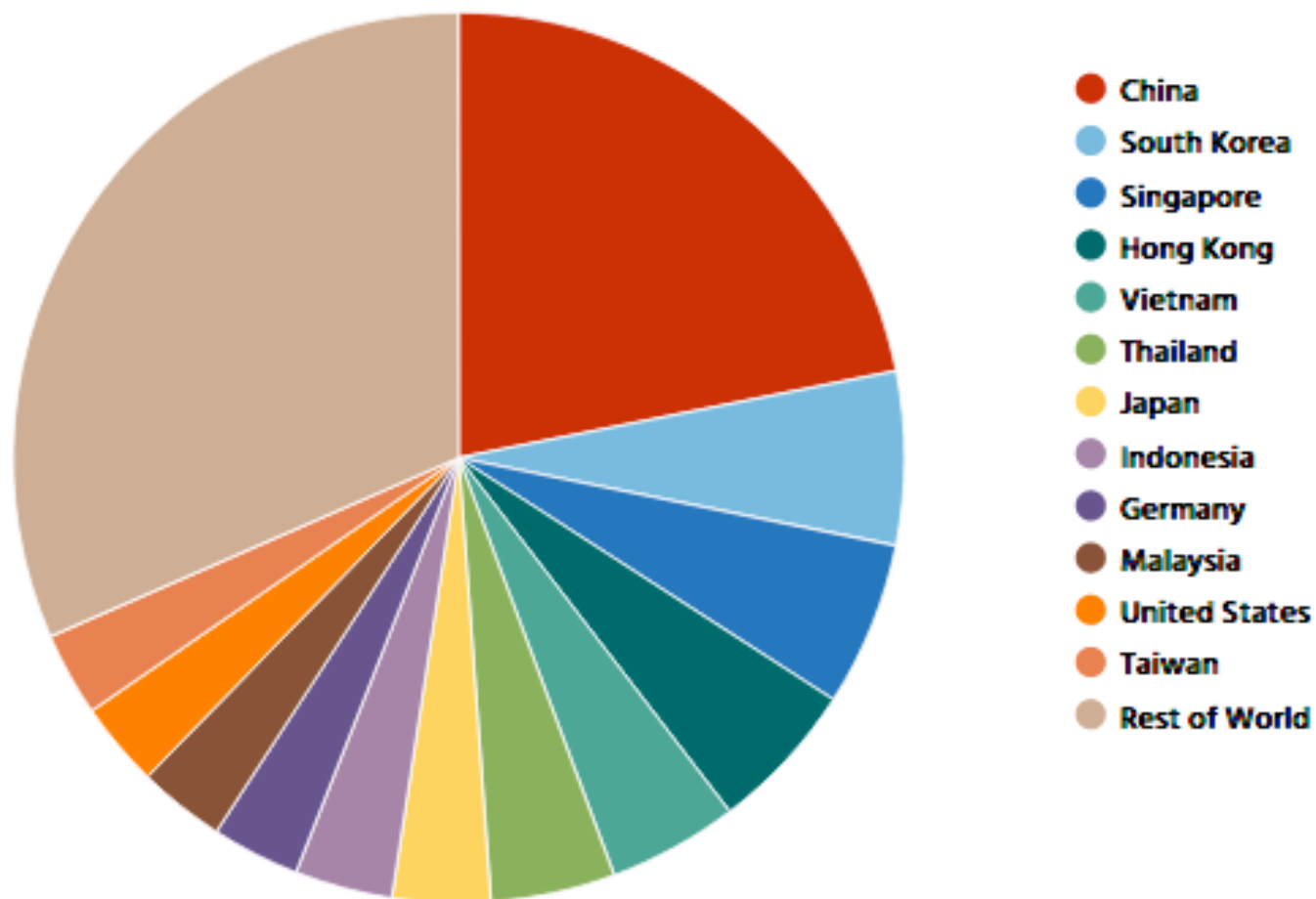
In pursuit of an accurate estimation, ChinaPower constructed a new dataset for South China Sea trade using common shipping routes, automatic identification system (AIS) data, and bilateral trade flows. This approach relied on calculating a summation of all bilateral trade flowing through the South China Sea. ChinaPower found that an estimated \$3.4 trillion in trade passed through the South China Sea in 2016. These estimates represent a sizeable proportion of international trade, constituting between 21 percent of global trade in 2016, but is nonetheless 36 percent smaller than the original \$5.3 trillion.

Trade of Key Countries Through the South China Sea – 2008-2016



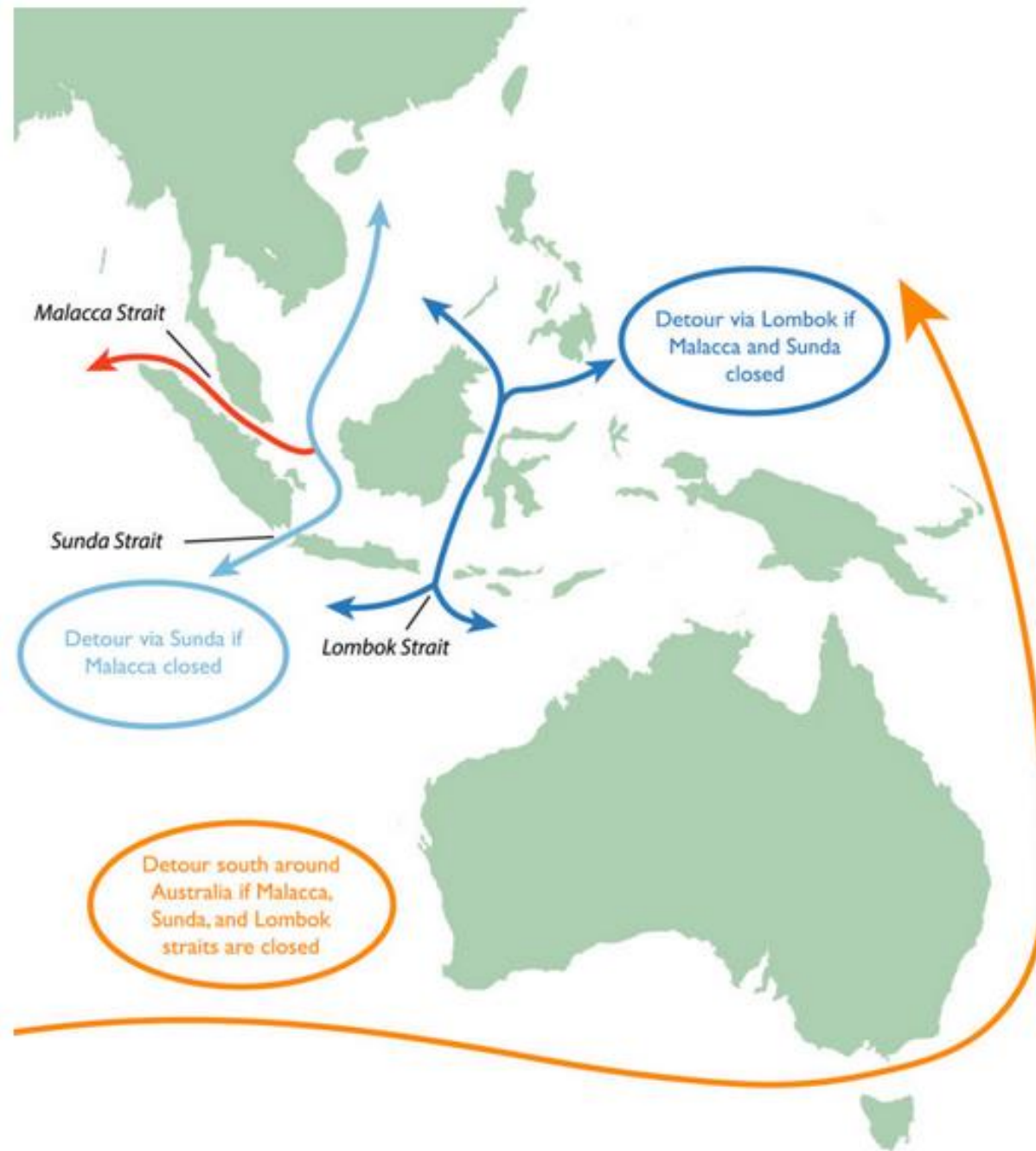
CSIS China Power Project | Source: ChinaPower

Percent of South China Sea Trade: 2016



CSIS China Power Project | Source: ChinaPower

Avoiding the Strait of Malacca Doesn't Help



Chinese Energy Transit and Resource Potential in the South China Sea

China's Energy Needs and Strategy - I

CHINA'S TOP CRUDE SUPPLIERS 2017

Country	Volume (1,000 barrels/day)	Percentage of Imported Crude Oil
Russia	1,198	14
Saudi Arabia	1,045	12
Angola	1,010	12
Iraq	738	9
Iran	624	7
Oman	621	7
Brazil	462	5
Venezuela	436	5
Kuwait	365	4
UAE	203	2
Others	1,776	21
Total	8,478	98

Numbers may not equal 100 as figures have been rounded.

- ✓ China's interest in ensuring reliable, cost-effective, and diverse energy sources to support its economic growth drive its overseas energy investments.
- ✓ China hopes to diversify energy suppliers and transport options.

China's engagement, investment, and foreign construction related to energy remained active in 2017. China invests in energy projects in more than 40 countries. This ambitious investment in energy assets is driven primarily by China's interest in ensuring reliable, cost-effective, diverse energy sources to support its economic growth. This need heightens its interest in areas such as Central Asia and the Strait of Malacca that are critical to the transport of natural gas and oil. A number of Chinese companies, often working in concert with China's economic development goals, are also interested in gaining access to advanced technologies to try to improve efficiency, obtain and deploy clean energy technologies, and increase profits.

China's Energy Needs and Strategy - II

China hopes to diversify energy suppliers, types of energy, and transport options to ensure energy security. As a net importer of oil and natural gas (as it is the world's second largest consumer of crude oil and the third largest country consumer of natural gas), China heavily relies on trade and seeks to maintain a supply chain that is less susceptible to external disruption.

In 2017, China imported oil to meet approximately 67 percent of its need. This figure is projected to grow to approximately 80 percent by 2035, according to the International Energy Agency (IEA). Also in 2017, 34 percent of China's natural gas demand was met with imports, and is projected to grow to 46 percent by 2035, according to the IEA. China continues to look primarily to the Persian Gulf, Africa, and Russia/Central Asia to satisfy its growing oil and gas demand.

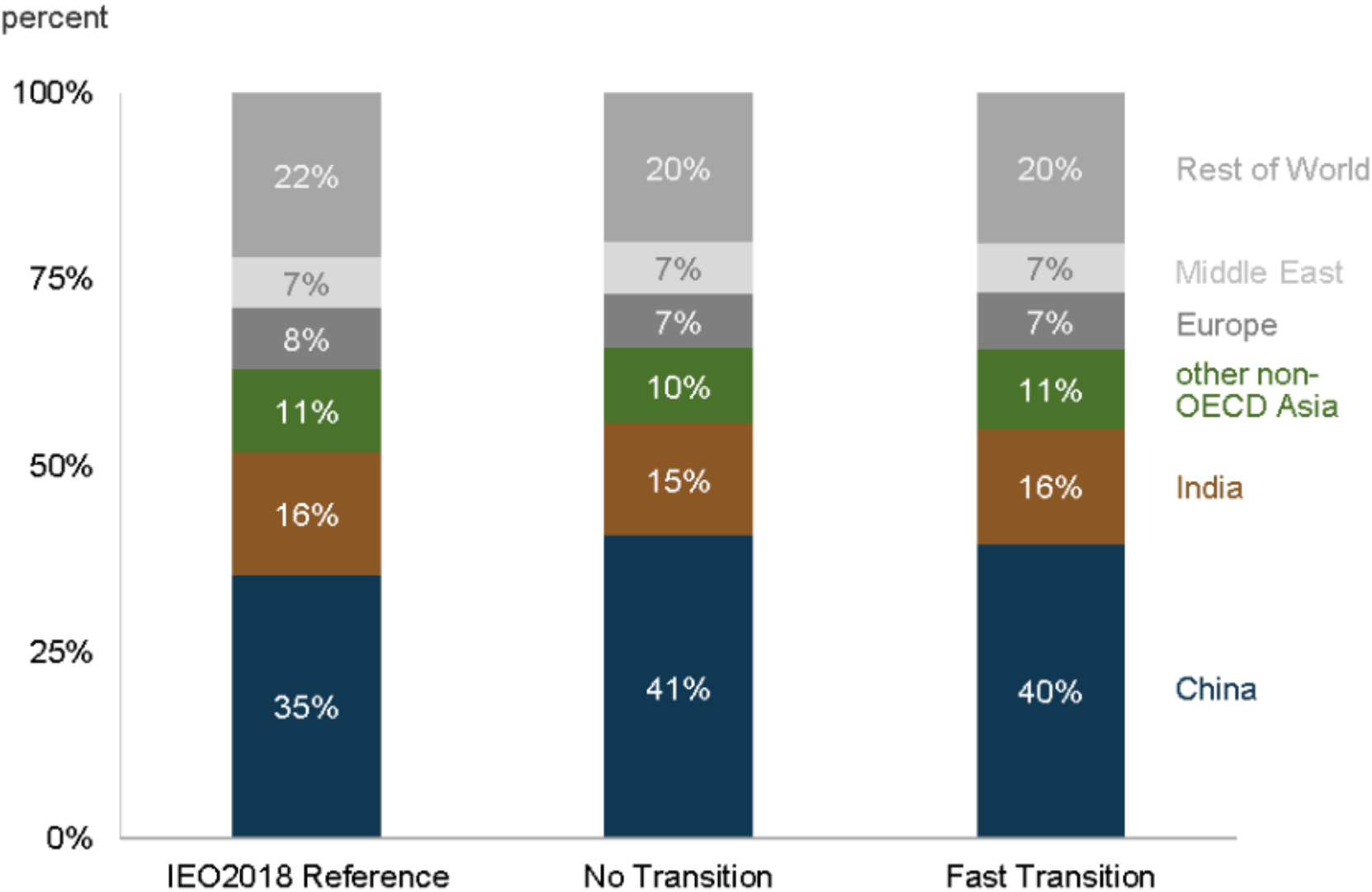
China is particularly reliant on unimpeded SLOCs like the South China Sea and Strait of Malacca to ensure hydrocarbon deliveries. In 2017, approximately 80 percent of China's oil imports and 13 percent of natural gas imports transited the South China Sea and Strait of Malacca. Despite China's efforts to diversify alternate supply routes, the sheer volume of oil and liquefied natural gas imported to China from the Middle East and Africa will continue to make strategic SLOCs important to China.

Separate crude oil pipelines from Russia and Kazakhstan to China illustrate efforts to increase overland supply. With completion of its expansion on January 1, 2018, China doubled the capacity of its pipeline to Russia from 300,000 to 600,000 barrels per day (b/d). In April 2017, the 440,000-b/d Burma–China oil pipeline was commissioned. This pipeline bypasses the Strait of Malacca by transporting crude oil from Kyaukpyu, Burma to Kunming, China. In June 2017, the pipeline successfully transported crude oil to its end node, the Kunming Refinery. Saudi Arabia and other Middle Eastern and African countries will supply the crude oil for the pipeline.

Approximately 40 percent of China's natural gas imports (37.9 billion cubic meters (bcm)) came from Turkmenistan by pipeline via Kazakhstan and Uzbekistan. This pipeline is designed to carry 55 bcm per year with plans to expand it to 80 bcm per year in 2020. A natural gas pipeline connecting China to Burma is designed to deliver 12 bcm per year, but only 3.4 bcm of gas shipped in 2017. The Russia–China natural gas pipeline is in the initial construction phase. The pipeline is expected to deliver up to 38 bcm of gas per year by 2035; initial flows are to start by 2019.

Energy Intensive Manufacturing Through 2040:

U.S. EIA Estimate of Share of world energy-intensive manufacturing gross output by region in 2040



Source: DOE/EIA, Energy implications of China’s transition toward consumption-led growth, July 2018.

Energy Strategy and Imports

CHINA'S ENERGY STRATEGY

KEY TAKEAWAYS

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- ✓ China hopes to diversify energy suppliers and transport options.

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CHINA'S TOP CRUDE SUPPLIERS 2017

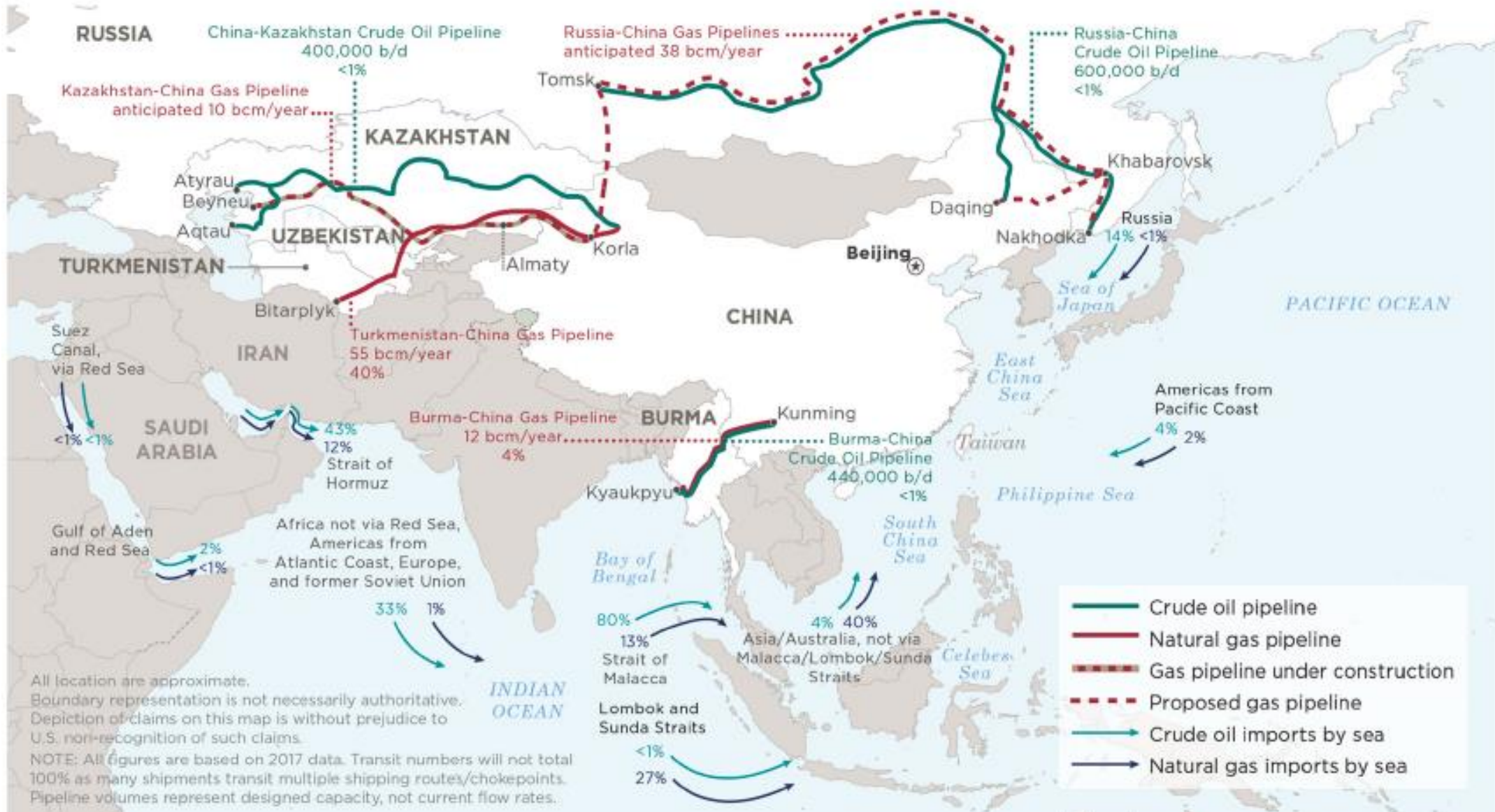
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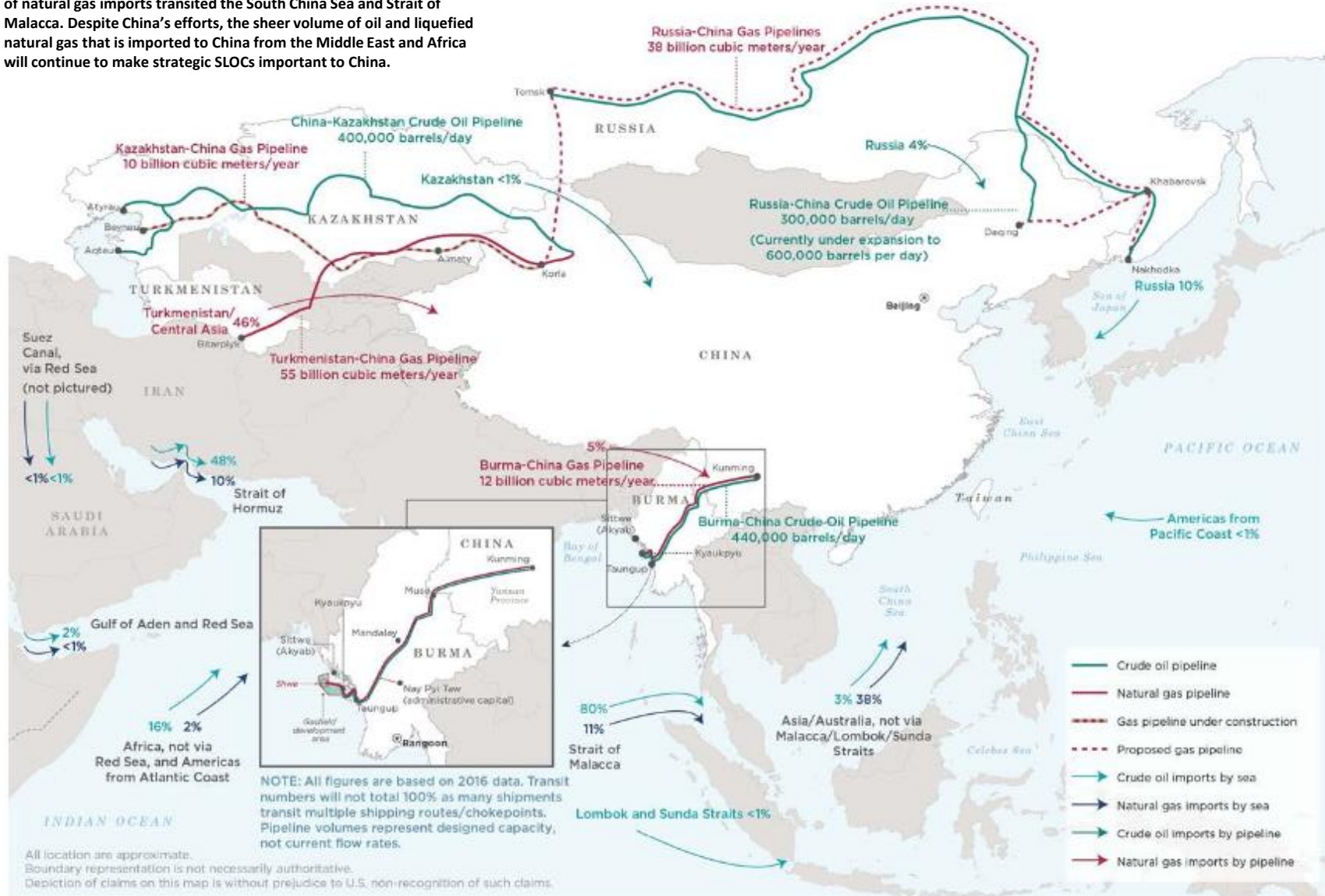
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Energy Import Transit Routes



China's Energy Import Transit Routes

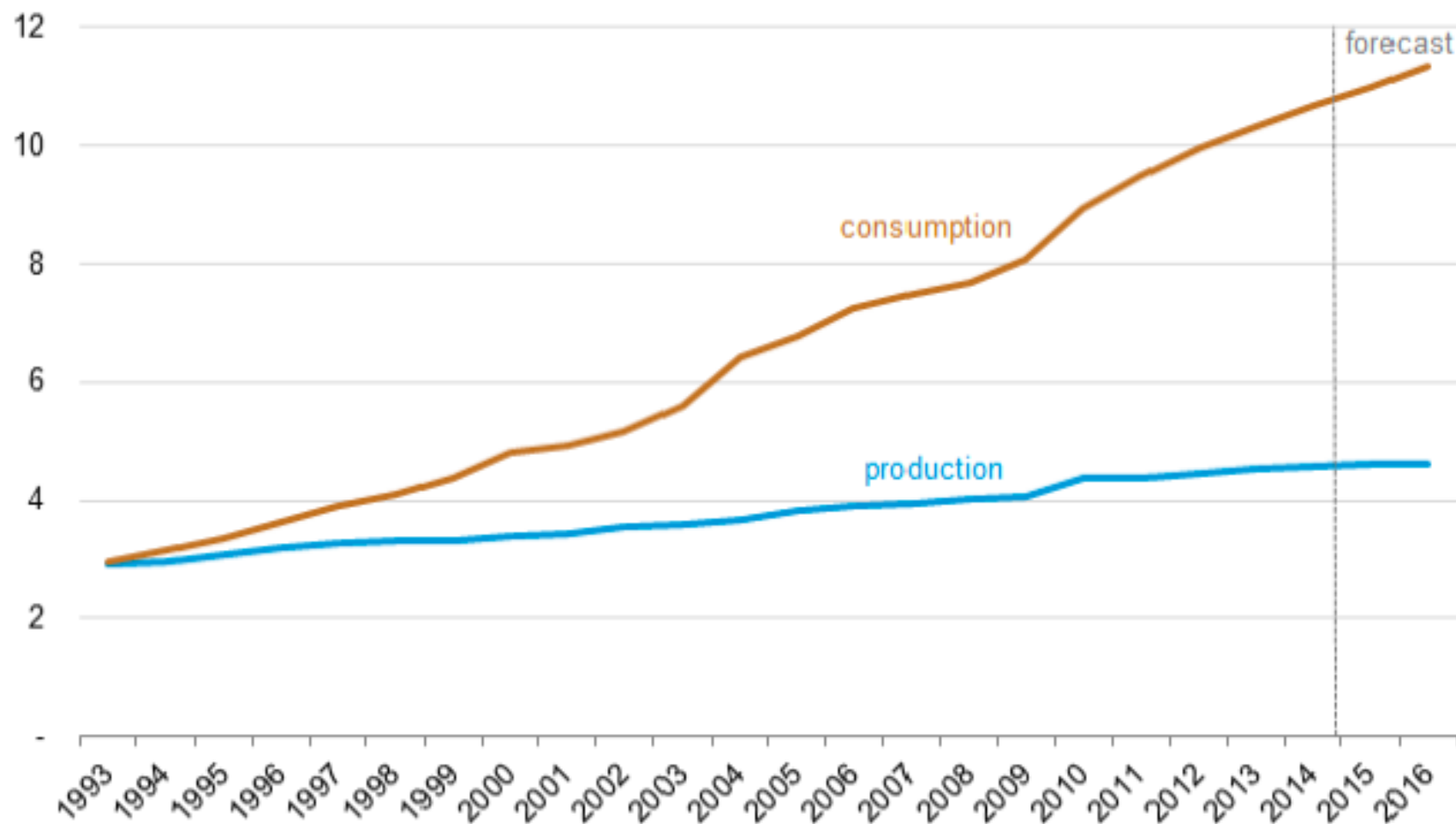
In 2016, approximately 80 percent of China's oil imports and 11 percent of natural gas imports transited the South China Sea and Strait of Malacca. Despite China's efforts, the sheer volume of oil and liquefied natural gas that is imported to China from the Middle East and Africa will continue to make strategic SLOCs important to China.



China's Energy Vulnerability - I

China's oil production and consumption, 1993-2016

million barrels per day

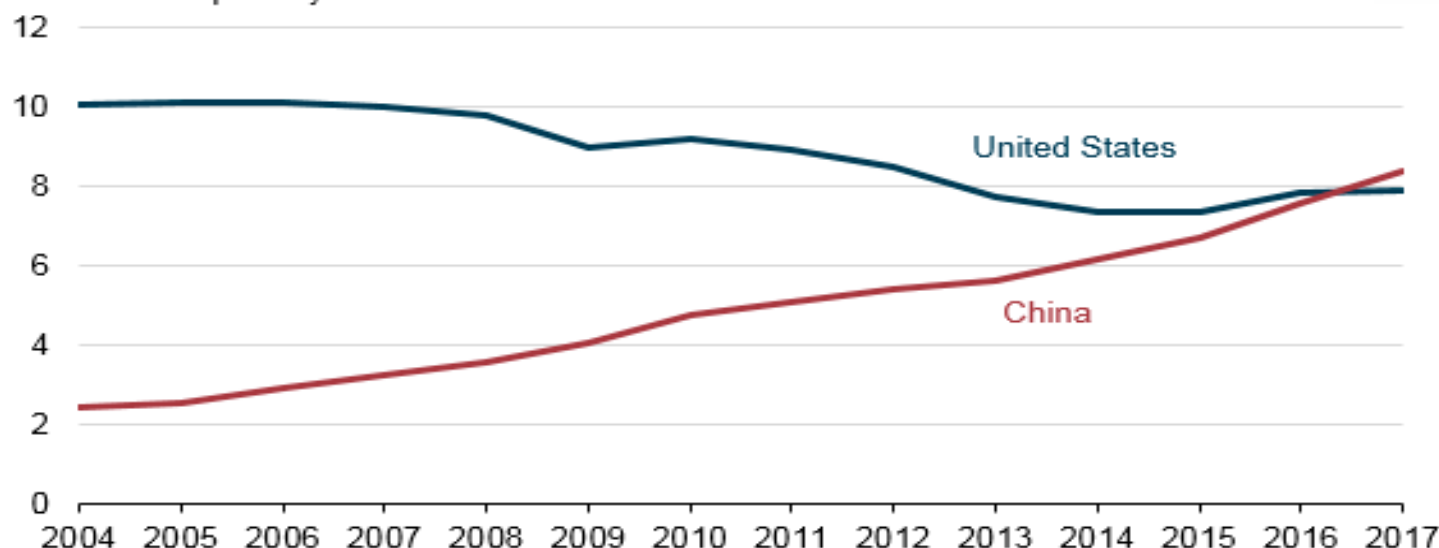


Source: Energy Information Administration and *Short-Term Energy Outlook*, May 2015

China's Energy Vulnerability - II

China surpassed the United States as the world's largest crude oil importer in 2017

Annual U.S. and China gross crude oil imports (2004-2017)
million barrels per day



Source: U.S. Energy Information Administration, *Petroleum Supply Monthly* and *Weekly Petroleum Status Report*, China General Administration of Customs, based on Bloomberg, L.P.

Note: December U.S. imports derived from weekly crude oil imports.

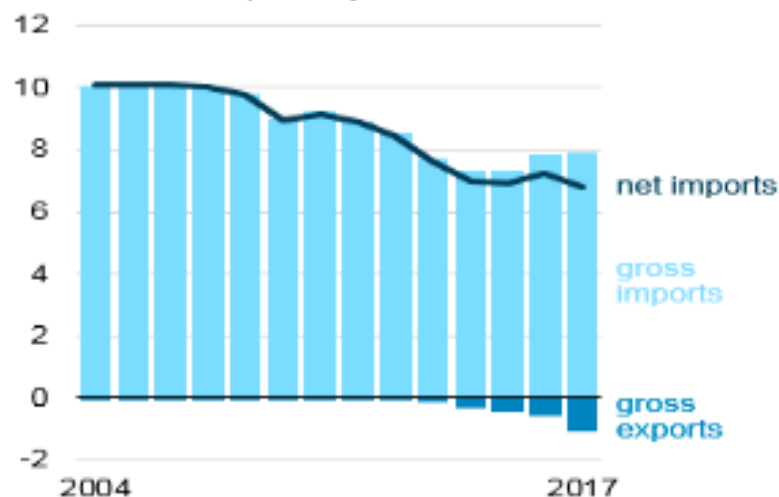
China surpassed the United States in annual gross crude oil imports in 2017, importing 8.4 million barrels per day (b/d) compared with 7.9 million b/d for the United States. China had become the world's largest net importer (imports minus exports) of total petroleum and other liquid fuels in 2013. New refinery capacity and strategic inventory stockpiling combined with declining domestic oil production were the major factors contributing to the recent increase in China's crude oil imports.

China's Energy Vulnerability - III

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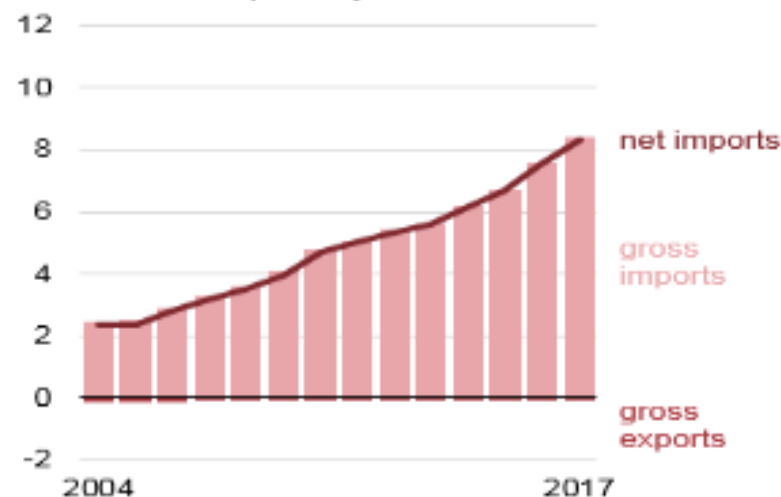
U.S. crude oil trade (2004-2017)

million barrels per day



China crude oil trade (2004-2017)

million barrels per day



Source: U.S. Energy Information Administration, *Petroleum Supply Monthly* and *Weekly Petroleum Status Report*, China General Administration of Customs, based on Bloomberg, L.P.

Note: December U.S. imports derived from weekly crude oil imports.

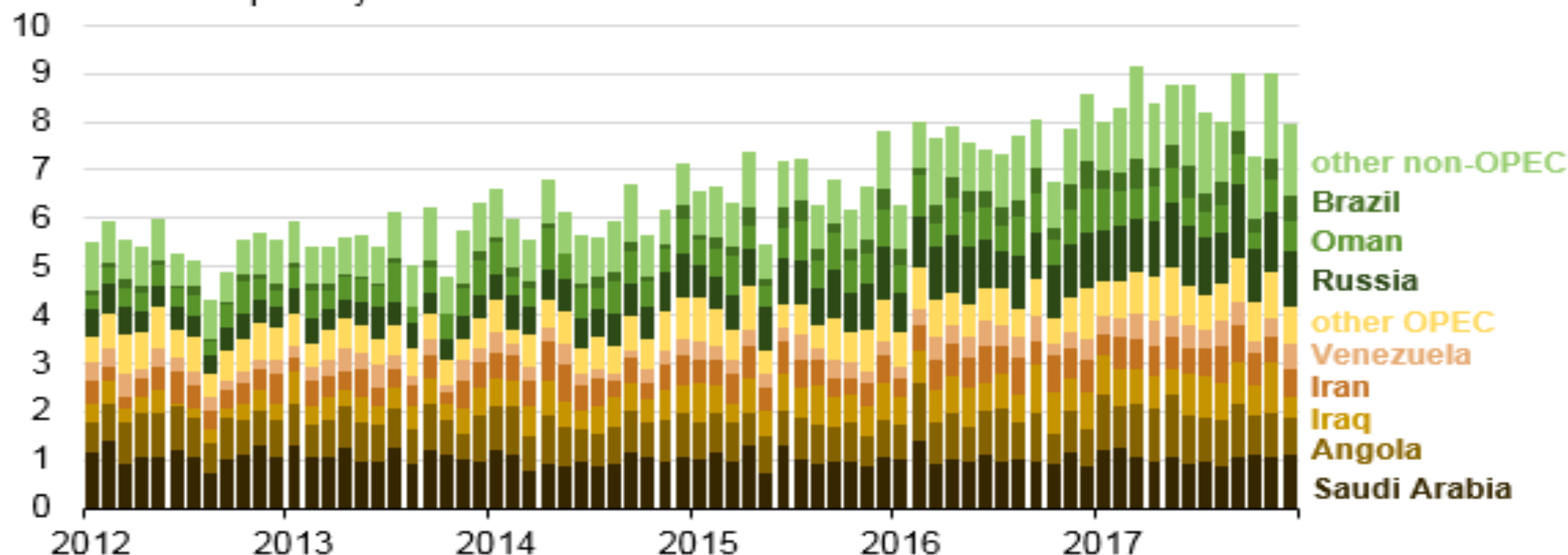
In 2017, 56% of China's crude oil imports came from countries within the Organization of the Petroleum Exporting Countries (OPEC), a decline from the peak of 67% in 2012. More so than other countries, Russia and Brazil increased their market shares of Chinese imports between those years from 9% to 14% and from 2% to 5%, respectively.

China's Energy Vulnerability - IV

Russia surpassed Saudi Arabia as China's largest source of foreign crude oil in 2016, exporting 1.2 million b/d to China in 2017 compared with Saudi Arabia's 1.0 million b/d. OPEC countries and some non-OPEC countries, including Russia, agreed to [reduce crude oil production through the end of 2018](#), which may have allowed other countries to increase their market shares in China in 2017.

China crude oil imports by source (2012-2017)

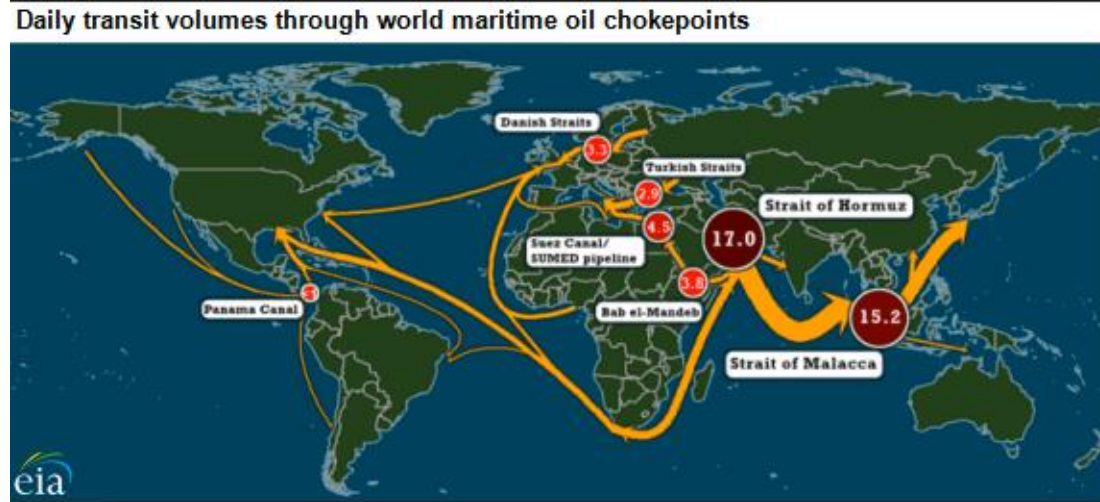
million barrels per day



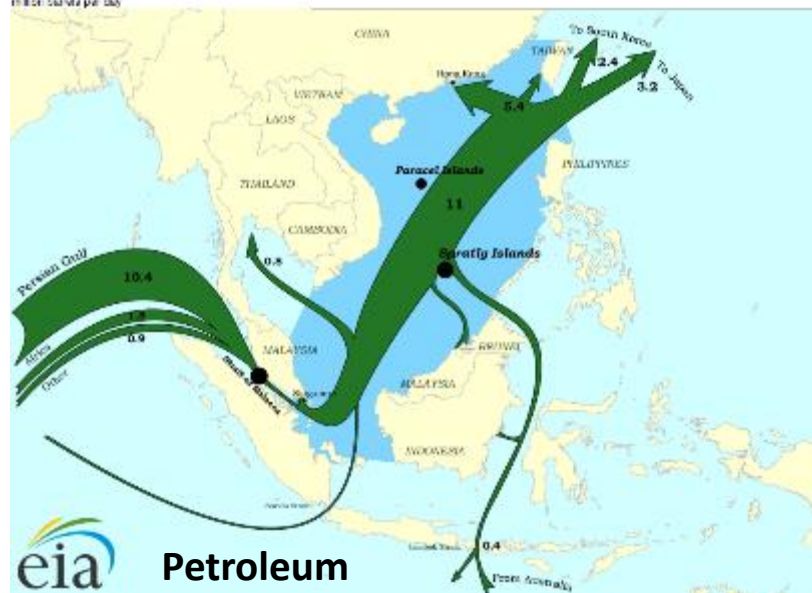
Source: China General Administration of Customs, based on Bloomberg, L.P

Several factors are driving the increase in China's crude oil imports. China had the largest decline in domestic petroleum and other liquids production among non-OPEC countries in 2016, and EIA estimates it will have had the second-largest decline in 2017. Total liquids production in China averaged 4.8 million b/d in 2017, a year-over-year decline of 0.1 million b/d (2%) from 2016, and further declines in both 2018 and 2019 are forecasted in EIA's January 2018 [Short-Term Energy Outlook](#) (STEO).

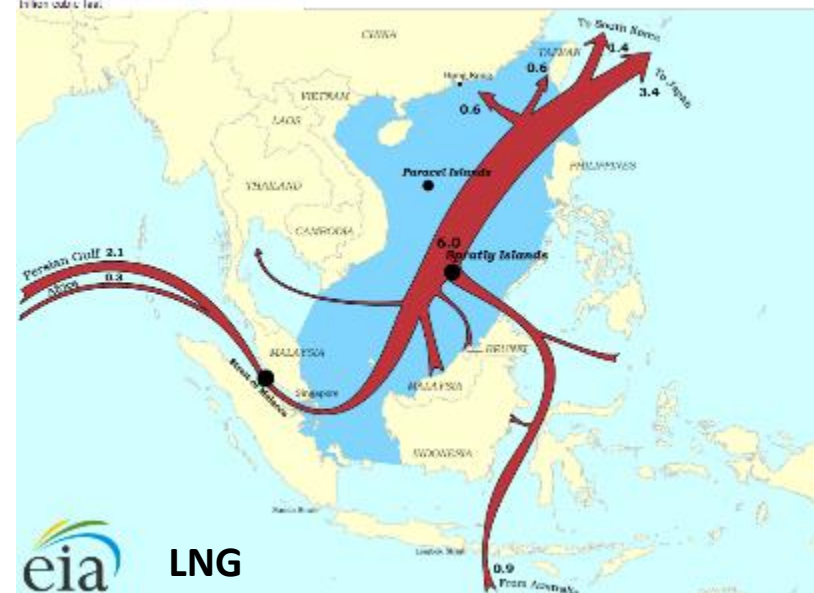
Chinese Dependence on the Flow of Petroleum Exports



Major crude oil trade flows in the South China Sea (2011)
in million barrels per day



Major LNG trade flows in the South China Sea (2011)
in million cubic feet



<https://www.eia.gov/todayinenergy/detail.php?id=10671>, and <https://www.eia.gov/beta/international/regions-topics.cfm?RegionTopicID=WOTC>

More Than 30% of Global Maritime Oil Trade Moves Through South China Sea

Major crude oil trade flows in the South China Sea (2016)

total 15.0 million barrels per day



The South China Sea is a major trade route for crude oil, and in 2016, more than 30% of global maritime crude oil trade, or about 15 million barrels per day (b/d), passed through the South China Sea.

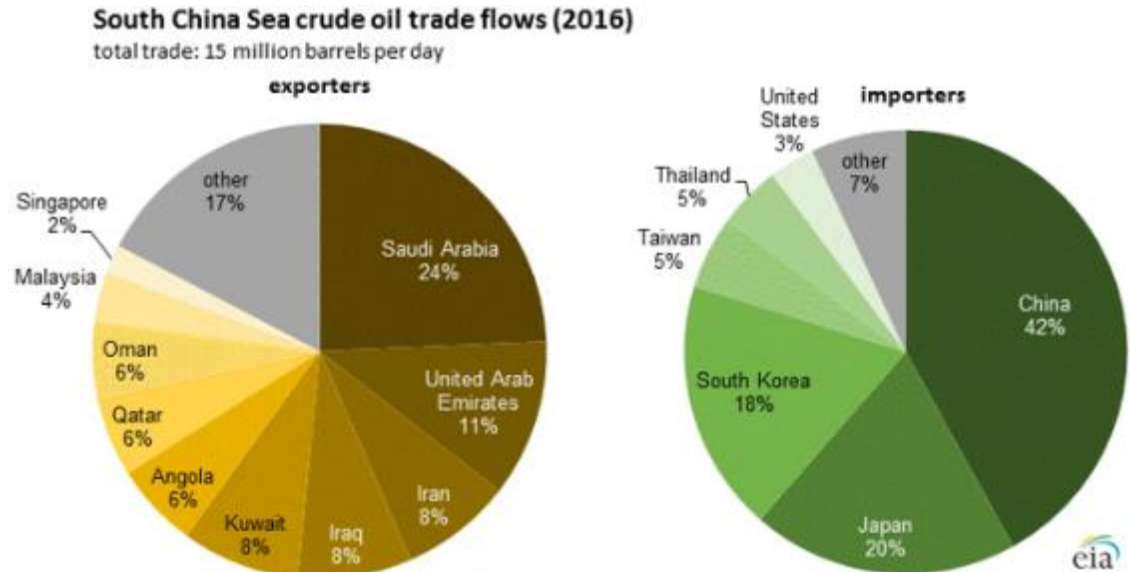
More than 90% of crude oil volumes flowing through the South China Sea in 2016 transited the Strait of Malacca, the shortest sea route between suppliers in Africa and the Persian Gulf and markets in Asia, making it one of the world's primary oil [transit chokepoints](#). In addition, a significant amount of crude oil (about 1.4 million b/d) passes through the strait on its way to Singapore and the west coast of Peninsular Malaysia, where it is refined before transiting the South China Sea in the form of petroleum products.

More Than 30% of Global Maritime Oil Trade Moves Through South China Sea

The South China Sea is a major trade route for the Middle East, which accounted for more than 70% of total South China Sea crude oil shipments in 2016. Saudi Arabia is the largest source of crude oil, making up almost one-fourth of crude oil volumes traversing the South China Sea. More than half of Saudi Arabia's global crude oil shipments traveled through the South China Sea in 2016.

Before the lifting of United Nations sanctions on Iran's crude oil exports in January 2016, Iran relied heavily on Asian markets for most of its exports. After the sanctions were lifted, Iran could once again export crude oil to Europe. However, the South China Sea route still accounted for 52% of Iran's crude oil exports in 2016.

Indonesia and Malaysia together accounted for 5% of crude oil loadings that passed through the South China Sea in



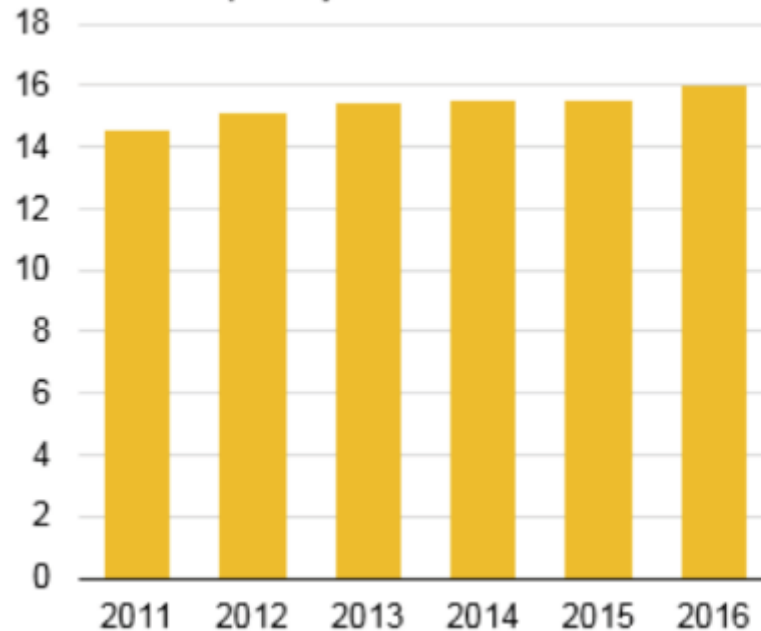
2016 and 2% of crude oil receipts. Most of the crude oil from these countries that passes through the South China Sea is exported to other countries. However, some intra-country trade also crosses the southern portion of the South China Sea as cargoes move between eastern and western ports within each country. Singapore accounted for 2% of crude oil loadings that passed through the South China Sea in 2016 and 1% of crude oil receipts. Although Singapore does not produce crude oil, it is a major hub for refining crude oil and for storing and transshipping crude oil and petroleum products. In 2016, 95% of Singapore's crude oil exports passed through the South China Sea. Most of these volumes originally came from the Middle East, and about half went to China.

The three crude oil importers with the largest volumes passing through the South China Sea—China, Japan, and South Korea—collectively accounted for 80% of total crude oil volumes transiting the South China Sea in 2016. About 90% of China's 2016 maritime crude oil shipments were transported through the South China Sea. China's crude oil imports have increased substantially over the past few years as a result of the country's robust energy demand growth and stagnant crude oil production, and the country recently surpassed the United States as the [world's largest crude oil importer](https://www.eia.gov/todayinenergy/detail.php?id=36952). A significant portion of these incremental volumes that are sent to northern China from eastern Russia by pipeline and by shipping vessels does not pass through the South China Sea.

About 90% of the crude oil imported by Japan and South Korea was shipped through the South China Sea in 2016. Most of Japan's and South Korea's imports are from Middle Eastern suppliers and are transported through the Strait of Malacca and then the South China Sea.

Oil Transit Through the Strait of Malacca

Crude oil and petroleum products transported through the Strait of Malacca
million barrels per day



Source: U.S. Energy Information Administration, [2017 World Oil Transit Chokepoints](#)

Note: Includes crude oil and petroleum liquids.

61% of all maritime petroleum and other liquids move through Strait of Malacca. 85% to 90% is crude oil.

Source: EIA, *The Strait of Malacca, A Key Oil Trade Chokepoint*, August 11, 2017

40% of Global LNG (4.7 TCF) Moves Through the South China Sea



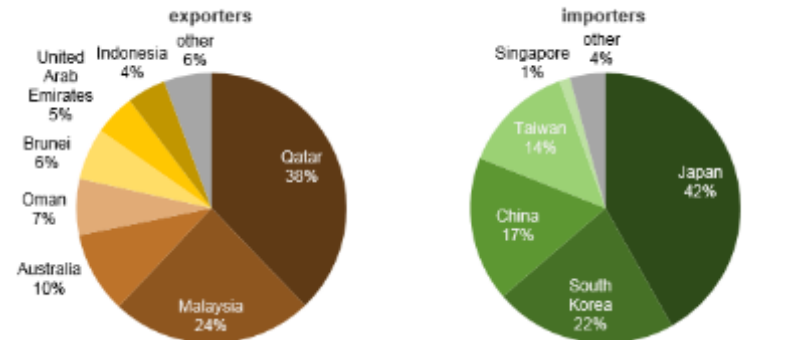
Major liquefied natural gas trade flows in the South China Sea (2016)

trillion cubic feet



LNG Trade Flows -2016

South China Sea liquefied natural gas trade flows (2016)
total trade: 4.7 trillion cubic feet



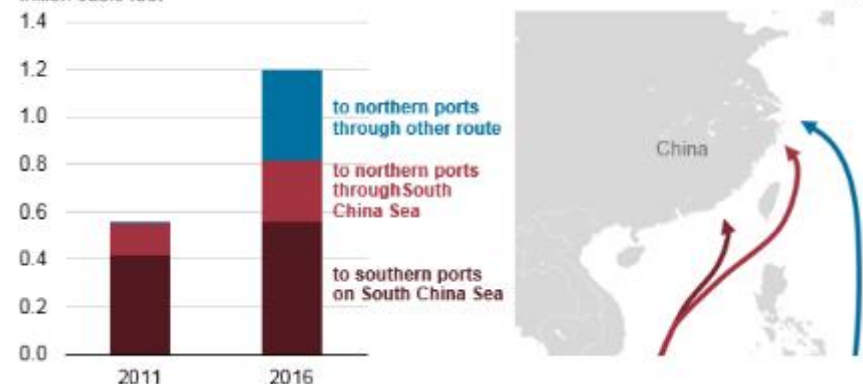
The South China Sea is a major route for liquefied natural gas (LNG) trade, and in 2016, almost 40% of global LNG trade, or about 4.7 trillion cubic feet (Tcf), passed through the South China Sea.

The South China Sea is an important trade route for Malaysia and Qatar. The two LNG exporters collectively accounted for more than 60% of total South China Sea LNG volumes in 2016. Almost half of Qatar's global LNG shipments traveled through the South China Sea in 2016. All of Malaysia's LNG exports pass through the South China Sea, as the country's one LNG export complex lies on the South China Sea coast.

Several other LNG exporters also use South China Sea trade routes to reach LNG importers. In 2016, Oman, Brunei, and the United Arab Emirates shipped between 84% and 100% of their total LNG exports through the South China Sea.

Other LNG exporters in the region, such as Australia and Indonesia, make more use of other trade routes to reach LNG markets. In 2016, about 23% of total Australian LNG exports and about 29% of Indonesian LNG exports were shipped by way of the South China Sea. Much of the remainder of Australia's and Indonesia's LNG exports passed to the east of the Philippines and Taiwan, avoiding the South China Sea on the way to customers in Japan, South Korea, and northern China.

China liquefied natural gas imports
trillion cubic feet

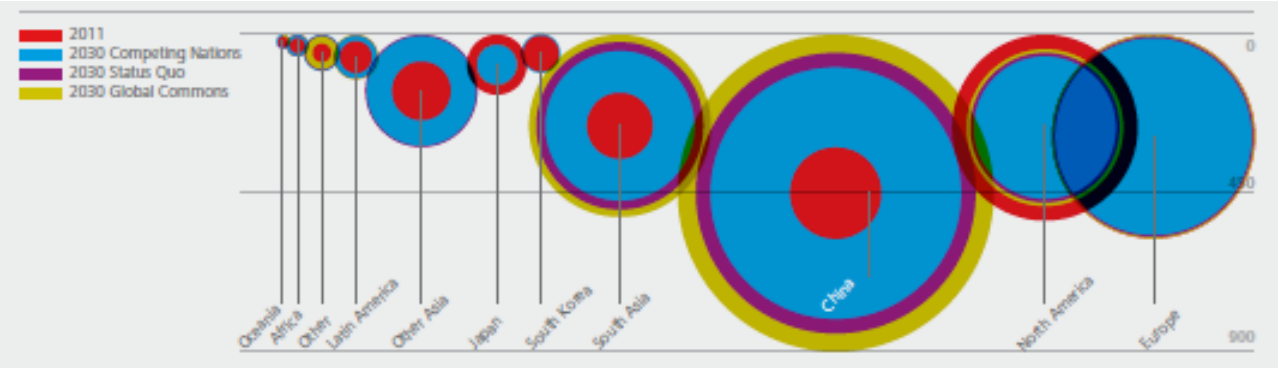


The four LNG importers with the largest volumes passing through the South China Sea are Japan, South Korea, China, and Taiwan, collectively accounting for 94% of total LNG volumes going through the South China Sea in 2016. Japan is the world's largest LNG importer, and slightly more than half of all of Japan's LNG imports in 2016 were shipped by way of the South China Sea. Similarly, about two-thirds of the LNG imported by South Korea—the world's second-largest LNG importer—was shipped through the South China Sea that year.

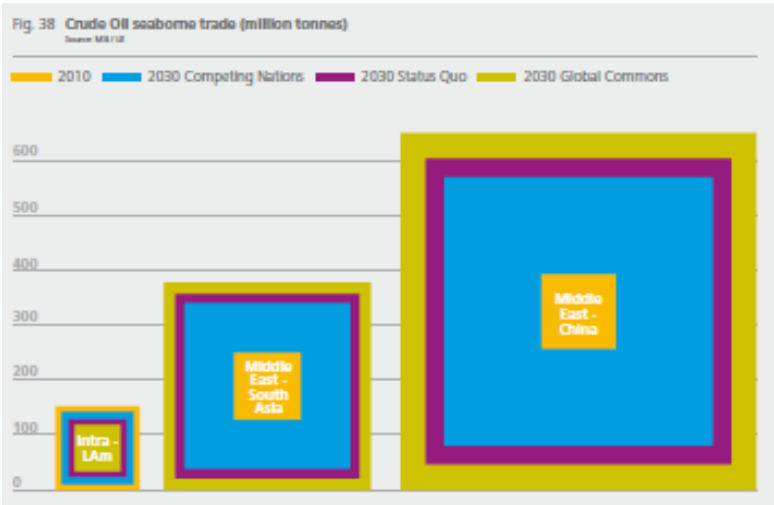
More than two-thirds of China's LNG imports and more than 90% of Taiwan's LNG imports passed through the South China Sea in 2016. Total imports of LNG to China have more than doubled over the previous five years, from 0.56 Tcf in 2011 to 1.20 Tcf in 2016. However, more than half of the growth in China's LNG imports were volumes that went to northern ports without transiting the South China Sea. Based on projections in the [International Energy Outlook 2017](#), EIA projects that [China will surpass South Korea](#) as the world's second-largest LNG importer by 2018 and nearly match Japan's level of LNG imports by 2040.

Guesstimate of increase in Crude Oil Flows and Seaborne Trade in Tons: 2010 vs. 2030

Crude Oil Imports in Million Tons

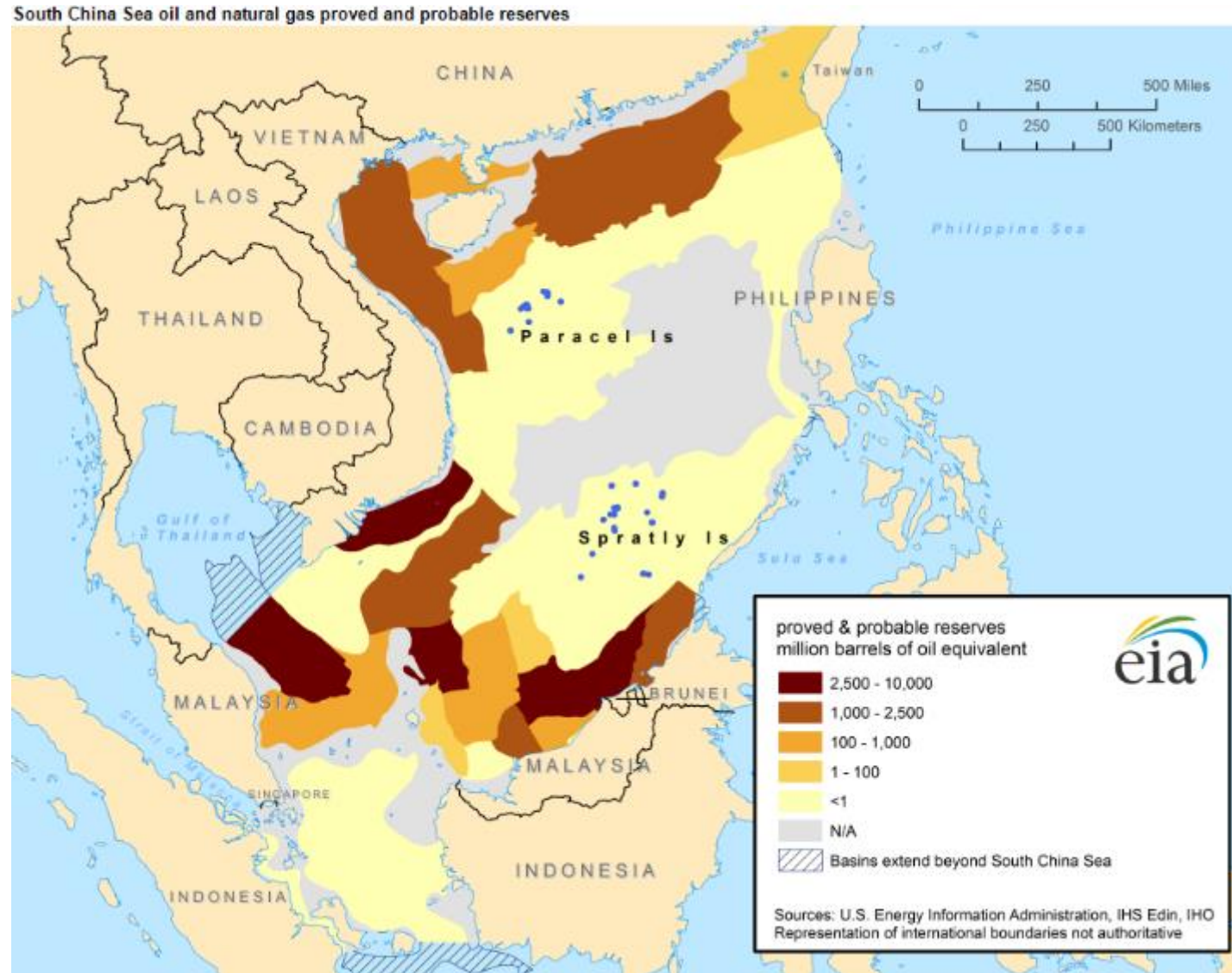


Crude Oil Seaborne trade in Million Tons



South China Sea Energy Reserves (EIA)

EIA, [Contested areas of South China Sea likely have few conventional oil and gas resources](https://www.eia.gov/todayinenergy/detail.php?id=10651), April 3, 2012, <https://www.eia.gov/todayinenergy/detail.php?id=10651>



South China Sea

Limited

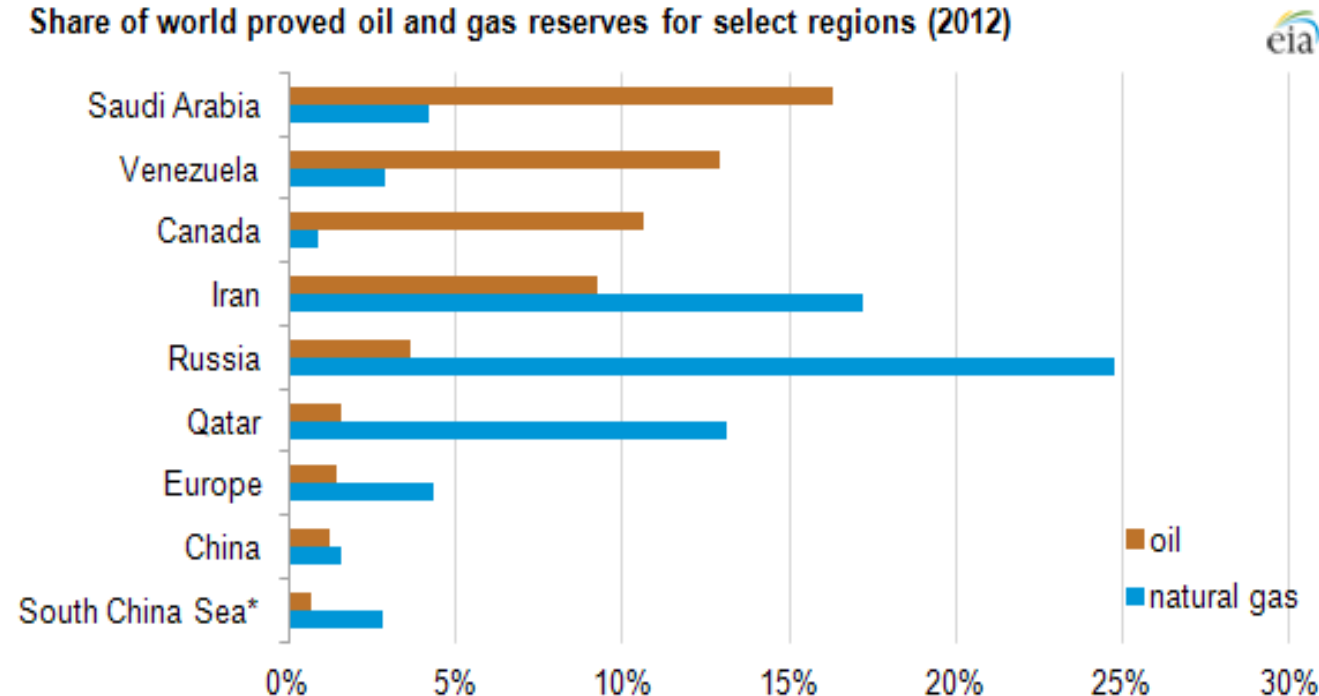
Proven Oil & Gas Reserves (EIA)

EIA, [Contested areas of South China Sea likely have few conventional oil and gas resources](https://www.eia.gov/todayinenergy/detail.php?id=10651), April 3, 2012, <https://www.eia.gov/todayinenergy/detail.php?id=10651>

EIA's analysis shows that most fields containing discovered oil and natural gas are clustered in uncontested parts of the South China Sea, close to shorelines of the coastal countries, and not near the contested islands. Industry sources suggest almost no oil and less than 100 billion cubic feet of natural gas in [proved](#) and [probable](#) reserves exist in fields near the Spratly Islands. The Paracel Island territory has even less natural gas and no oil.

In total, the South China Sea has about 11 billion barrels of oil and 190 trillion cubic feet of natural gas rated as proved or probable reserves. These levels are similar to the amount of proved oil reserves in [Mexico](#) and about two-thirds of the proved natural gas reserves in Europe, not including Russia (see figure below).

Share of world proved oil and gas reserves for select regions (2012)



Source: U.S. Energy Information Administration, International Energy Statistics, South China Sea Regional Analysis Brief.

*Note: South China Sea includes proved and probable reserves.

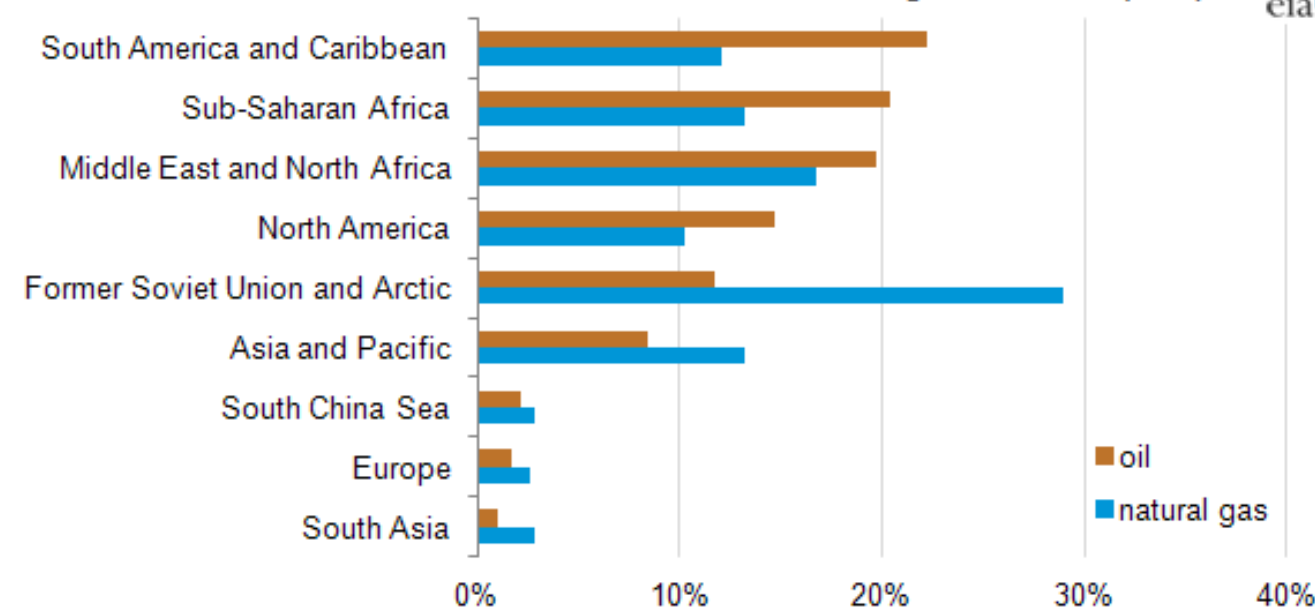
South China Sea

Little Discovery Potential for Oil & Gas Reserves (EIA)

EIA, [Contested areas of South China Sea likely have few conventional oil and gas resources](https://www.eia.gov/todayinenergy/detail.php?id=10651), April 3, 2012, <https://www.eia.gov/todayinenergy/detail.php?id=10651>

In addition to proved and probable reserves, the South China Sea may have additional hydrocarbons in underexplored areas. The U.S. Geological Survey (USGS) estimated in 2012 that about 12 billion barrels of oil and 160 trillion cubic feet of natural gas might exist as undiscovered resources in the South China Sea, excluding the Gulf of Thailand and other adjacent areas. About one fifth of these resources may be found in contested areas, particularly in the Reed Bank at the northeast end of the Spratly Islands, which is claimed by China, Taiwan, and Vietnam. These additional resources are not considered commercial reserves at this time; extracting them may not be economically feasible.

Share of estimated world undiscovered conventional oil and gas resources (2012)

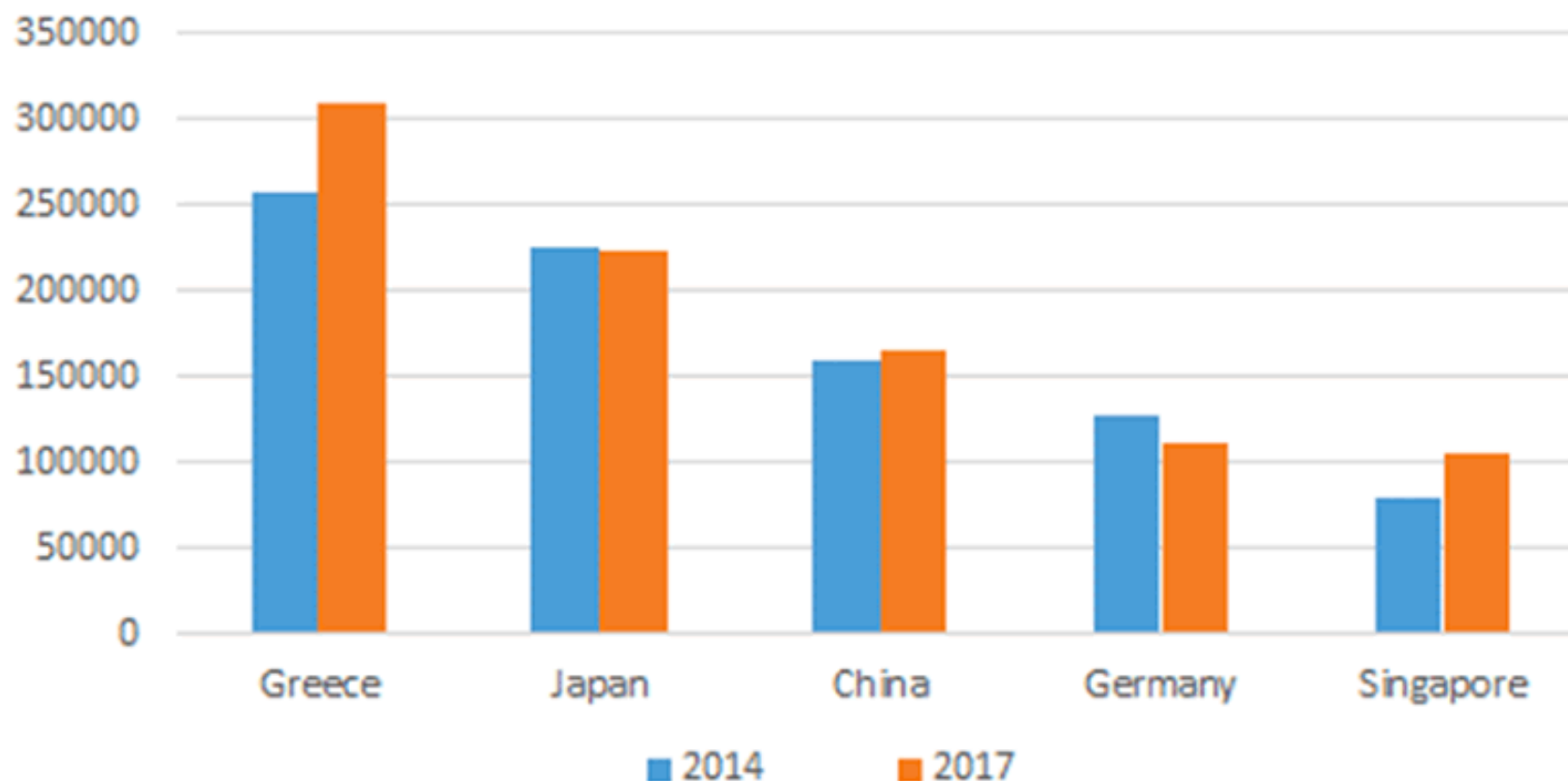


Source: U.S. Energy Information Administration, International Energy Statistics, South China Sea Regional Analysis Brief, and U.S. Geological Survey, Estimate of Undiscovered Conventional Oil and Gas Resources of the World, 2012.

The Paracel Island area may also contain significant [natural gas hydrate resources](#). While test drills are promising, commercial development of natural gas hydrates in the South China Sea is many years away given technological challenges and current natural gas prices.

Top 5 merchant fleet owning economies

Fleet in thousands of DWTs (dead weight tons)
2014 and 2017



Source: UNCTAD secretariat [maritime statistics](#), based on data provided by Clarksons Research