

Testimony for the House Armed Services Subcommittee on Cyber, Information Technologies, and Innovation, Rep Mike Gallagher (R-WI), Chairman

By

Arthur Herman, Senior Fellow, Hudson Institute and Director, Quantum Alliance Initiative; author of *Freedom's Forge: How American Business Produced Victory in World War Two*

Thank you for this opportunity to speak to you on one of the most important issues we face regarding our national defense, namely how to better incorporate the innovations taking place in our private sector, from AI and robotics to cyber and quantum, into our national defense strategy, specifically our defense industrial base.

Our defense industrial base is in crisis. This is certainly the conclusion that our first-ever National Defense Industrial Strategy report has just reached. According to its most recent draft, that industrial base “does not possess the capacity, capability, responsiveness, or resilience required to satisfy the full range of military production needs at speed and scale.”¹

What some of us have been warning about for a decade, is now apparent to everyone. One reason I wrote *Freedom's Forge* more than ten years ago, was to call attention to structural deficiencies in how we arm and equip our military with the latest and most decisive technologies and systems, compared to World War Two or the Cold War. Now, thanks to the war in Ukraine, this problem has been made obvious, and urgent.²

Reasons for this decline are various. One is the decline of the manufacturing sector in the U.S. in general, including its labor force, including a sharp decline after 2000.³ Another has been the shrinkage in the number of competitive defense

¹ “Pentagon: US arms industry struggling to keep up with China,” Politico, Dec. 2, 2023 <https://www.politico.com/news/2023/12/02/draft-pentagon-strategy-china-00129764>

² *Freedom's Forge: How American Business Produced Victory in World War II*; Random House, 2012; A. Herman, “By Arming Ukraine, We Arm Ourselves,” *The Dispatch* (December 23, 2022) <https://thedispatch.com/article/by-arming-ukraine-we-arm-ourselves/>.

³ J.R. Pierce, “The Surprisingly Swift Decline of U.S. Manufacturing Employment,” *Institute for International Economic Policy*, Feb. 3, 2013: <https://iiep.gwu.edu/2013/02/05/the-surprisingly-swift-decline-of-u-s-manufacturing-employment/>

contractors after the Cold War: from roughly a dozen major military contractors in 1990 to only four.⁴

But there has also been a general benign neglect of our defense industrial base for several decades, in large part because it has been so good, and performed so magnificently, in enabling us to dominate sea, air, land and space; that we came to take it for granted. Instead of being the subject of intense and serious study as part of a national security strategy or being addressed in broader strategic terms, it was treated as an afterthought (especially workforce), and relegated to the attention of separate agencies like the Industrial Base Policy office (inside the OUSD A &S) and the Industrial Base Analysis and Sustainment program.⁵ These are offices which have been traditionally underfunded and understaffed, and underappreciated, at least until now.

So what is the Defense Industrial Base?

First, it's production facilities and capacity from factories to shipyards to warehouses—which is how we usually picture it when we thought it at all.

Second, it's supply chains. This component has changed dramatically; during World War Two virtually everything it needed came from the 48 states. Now its supply chains are global and increasingly a matter of urgency, since we understand now how vulnerable those chains are—and how many terminate in China.⁶

It's also research and development; i.e. incorporating new technologies and systems, e.g. AI, quantum, hypersonics, UAV's, into our warfighting capabilities and sustaining those systems so they can be decisive in warfighting or deterrence.

It's innovation and design within those systems as part of the production process, i.e. making them better, faster, and cheaper—much as we did with nuclear weapons and ballistic missiles during the Cold War, and with munitions during World War Two.

It's security. This was barely a concern during the World War Two era, now we have to address security as a top priority in everything from cybersecurity and industrial plant security to IP and personnel security clearances. Zero-trust

⁴ Those being Boeing, General Dynamics, Northrop Grumman, and Lockheed Martin. Lockheed Martin alone was made of 17 different firms and divisions of defense companies.

⁵ See "Annual Industrial Capabilities Report to Congress," FY 2020-1.

⁶ E.g. A.B. Abrams, "Chinese Parts in the F-35 Highlight Concerning Trend in the US Defense Sector," September 17, 2022 <https://thediplomat.com/2022/09/chinese-parts-in-the-f-35-highlight-concerning-trend-in-the-us-defense-sector/>Note to F35 component.

initiatives now have to be baked into any national strategy for assessing our defense industrial base.⁷

Last but hardly least, it's workforce—from the factory floor and drivers and warehouse employees to engineers and managers. I'd have to say, this is the aspect of our defense industrial base that has been the most neglected of all, in terms of a national security strategy—and the most unforgiving.

We need a national action plan for incorporating innovation in all these areas, as part of a national security strategy—but workforce perhaps above all, since nothing moves or is made unless the people are there, who know how to do it—or operate the machines that execute it (including AI: I predict that the growth of AI/ML will actually increase the need for a larger secure workforce for defense industrial needs).

At the same time, the role of innovation is deeply misunderstood. It shouldn't be treated or studied as if it were a stand-alone category of input for the industrial base, but as an integral part of its production and productivity process. It's through making things that we learn what can be made better: which is why the most productive companies also tend to be the most innovative.

That's also why, in creating the Arsenal of Democracy during World War Two, Washington turned to the auto and electrical companies first, because they had the most engineers and therefore be counted on to do things and make things better, even if never made them before. A classic example is what happened when engineers at Pontiac turned their attention to producing the 20 mm. Oerlikon antiaircraft gun. In doing so they completely redesigned the product, to make it faster but also better. As a result, they managed to cut production time per gun from 3 ½ hours to 15 minutes.⁸

Or take the case of Saginaw Steering Gear Company, a GM subcontractor. When the time came to deliver on their contract to produce 280 30. Caliber machine guns based on the Browning design by March 1942—even though they had never made a firearm in their lives—they delivered 28,000 instead.⁹

In other words, innovation follows productivity, not the other way around.

⁷ "Executive Order on Improving the Nation's Cybersecurity," May 12, 2021 <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/05/12/executive-order-on-improving-the-nations-cybersecurity/>

⁸ Freedom's Arsenal: The Story of the Automotive Council for War Production (Detroit, 1950), 101.

⁹ Freedom's Forge, 147.

Another lesson of World War Two was that government needs to understand its proper role better. The usual linear model is that government, i.e. DoD, decides what's needed, contracts with industry to produce how much and when; then delivers the final product to the warfighter, on whose input government has relied in the first place.

The alternative is to change government's role into that of a broker, a middleman, between industry and the warfighter. This would have government start by saying to the private sector, show us what you have that could meet our needs, and the warfighter's. If we like it, then your task will be to tell us how you are going to meet our specific production needs and in what time frame—a time frame which our warfighters, not bureaucrats, have set.

It's an entirely different dynamic. Instead of a linear top-down process, the dynamic flows from one end to the other in a constantly renewing feedback loop, with government in the middle. That is what happened-had to happen-- in World War Two. Lacking any reliable defense industrial base to start with, Washington was entirely dependent on private industry, to demonstrate how it was going to make the weapons that were most urgently needed—tanks, planes, aircraft engines, ships, submarines, trucks, artillery and machine guns. Government's job was finding the raw materials to make them (i.e. supply chain management), and then distributing the finished products across two oceans in time to enable the warfighters to prevail.

That touches on a third principle of the Arsenal of Democracy model worth emphasizing; it was entirely threat-based, not capacity-based. The Germans and Japanese made it very plain to everyone in 1940-1 what was needed in terms of armaments; i.e. weapons that could beat the U-boat, the Japanese Zero and the Me 109, and the German panzer. Because of this need to deal with a specific threat, innovation was automatically built into the process, e.g. when the P-51 Mustang designers added a British Rolls Royce engine in order to raise its performance level above competing Axis aircraft.¹⁰ The race to build the first atomic bomb, in order to have a nuclear weapon before the Germans did, also illustrates the same process.

The same happened with the Army's so-called Big Five during the Cold War in the 1970's. Every component of the Big Five arsenal-the M1 Abrams tank, the Bradley Fighting Vehicle, the AH-64 Apache and UH 60 Blackhawk helicopters,

¹⁰ Freedom's Forge, 104-5.

and the Patriot missile battery, were all developed and produced to deal with specific Soviet threats in case of a war in Germany and Central Europe. As a result, the Army had the tools that would enable it to be the dominant military in the world for the next two decades, culminating in Desert Storm.¹¹

One of the problems we face today is that the focus has been on the capabilities of the high-end technologies themselves, i.e. AI and quantum, rather than the enemy they're supposed to deal with. One could argue hypersonics is an exception; but this is largely because we sense that we've fallen behind China and Russia; just as we were behind Germany and Japan when we entered World War Two.¹²

In short, by focusing on the threat first and foremost, we make for a clearer industrial base strategy.

Let me make two points in conclusion.

Given all the issues and problems confronting our defense industrial base today, people constantly ask me ever since *Freedom's Forge* was published; could we pull off the Arsenal of Democracy again.

My answer is yes—but not alone. Instead, in addition to reshoring our base whenever and wherever possible, we need to look to building a global defense industrial network with trusted allies, UK and Five Eyes, NATO members, Japan and South Korea; and particularly in the advanced technologies: AI, quantum, space, hypersonics, i.e. those technologies where supremacy provides a future decisive edge. But the same model should apply to traditional and conventional systems, such as naval shipbuilding and energetics, the next generation munitions where again China is busy surging ahead.¹³

I call this network the Arsenal of *Democracies*, for the 21st century. Like its 20th century predecessor, it can overwhelm its New Axis opponents with its output, in ways that will force them to reconsider their own strategies—which is exactly what an offset strategy is geared to do.

¹¹ David Trybula, "Big Five" Lessons for Today and Tomorrow," Institute for Defense Analyses, May 2012 . .

¹² Arthur Herman, "The U.S. Needs a Hypersonic Capability Now," Wall Street Journal, December 6, 2021 <https://www.wsj.com/articles/america-needs-a-hypersonic-capability-china-xi-beijing-missile-weapons-attack-defense-budget-11638827597>

¹³ Nadia Schadlow and Braydon Helwig, "Ukraine War Shows America Could be Outgunned Without Investing in Energetics," Breaking Defense, April 30, 2022 <https://www.hudson.org/national-security-defense/ukraine-war-shows-america-could-be-outgunned-without-investing-in-energetics>.

Because the fact is, economically and technologically the world's democracies have the New Axis surrounded.

Even as China is still poised to become the world's second-largest economy after the US, its New Axis Russia and Iran barely register on the list of world's economies in terms of GDP. By contrast, the US together with the other democratic nations in the top ten (Japan, Germany, UK, India, France, Italy, Canada, and South Korea) total more than twice China's GDP.¹⁴

We can push this point further. According to Global Finance magazine's 2022 estimates, the US and its fellow democracies occupy 18 of the top 20 slots of the world's most advanced tech countries. China meanwhile ranks 32nd on the list, while Russia and Iran don't even score.¹⁵

All this indicates that if the U.S. and other democracies band together, they can overpower China and its New Axis allies not only in terms of economic muscle, but with the kind of high-tech focus that will be the core of a winning Arsenal of Democracies.

There are several steps already in place, on which we can build to speed production and innovation forward. The National Technological Industrial Base (NTIB) which includes the U.K., Australia, and Canada is a good start; there are also existing Defense Trade Cooperation Treaties (DTCT's) which set aside ITAR requirements for trusted allies like UK and Australia, but which are under-utilized.¹⁶ But even more important than government to government agreements, however, will be company-to-company collaboration, in terms of incorporating innovation for achieving that decisive edge.

This leads me to a final thought. At a time when everyone is concerned about the US encouraging allies to share the defense burden, and about NATO and others paying their fair share, this Arsenal of Democracies model can be part of the answer. Instead of trying to squeeze out an additional ½ percent or ¼ percent above existing defense budgets, why not ask these allies to open up their advanced tech companies and defense contractors to work with their US counterparts, to

¹⁴ <https://www.worlddata.info/largest-economies.php>

¹⁵ <https://www.gfmag.com/global-data/non-economic-data/best-tech-countries>

¹⁶ Arthur Herman, "Breaking the Defense Trade Barrier: Defense Trade Cooperation Treaties and the Future of the U.S.-Japan Alliance." Hudson Institute, 2018.

develop and build the systems we will all need to defend freedom, now and in the future.

The future could well depend on well we ask that question.

Thank you for your attention, I'll be pleased to answer any questions you may have.
