

## Munitions mobilized; next, doing drones

On getting the Pentagon and other NATO war ministries more deeply into battlefield robotic weapons.



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I disagree with Josh Rogin's editorial, in yesterday's *Washington Post*, that "Ukraine aid is hanging by a thread." In contrast, I agree with Byron Callan of Capital Alpha Partners for his observation, in a research note of yesterday, that money and munitions will continue flowing to support the war in the east, "because a majority in DC recognizes the consequences of a Ukrainian defeat for Asia and Europe." Whatever the fulminations of what Congressman Don Bacon of Nebraska has termed "the dysfunction caucus", there are far better costs to cut, including in the Defense Department's budget. Thus, as Callan continues in a research note of earlier today, the current war will remain contest of industries, at which the Russians will struggle in the long run. As Pavel Baev wrote this week, "the old Soviet stocks are exhausted, and current production rates are insufficient."

I will continue with a further thought. The next big war may be yet more a contest of militaries, and before it starts. Mobilizing old-school munitions production may not suffice. Forces across and beyond NATO need to get more comfortable with unmanned systems, and the marketing arms of the arms industry have a role to play in that.

### Shells and missiles: lots of progress, but historically unexceptionable.

Over 30 years ago, at the end of the previous Cold War, many war ministries in industrialized countries presumed that future wars would be short, splendid, and inexpensive. At least a few of those turned out to be long, annoying, and quite expensive—except in their consumption of ammunition. Whether in the drive-by-shootings or the quagmires of the Post-Cold-War era, cannons were not so frequently fired at filled trenches or fleeting insurgents.

So, munitions factories mostly stood down, reducing staffs and idling equipment. Come early 2022, Pentagon planners began to fret that they had not enough short-range munitions to fight the Russians. After all, throughout that year, the Ukrainians were firing well more rounds every month than NATO's entire production capacity. So, late that year, American military bureaucrats and industrialists formulated big plans—to double production of GMLRS rockets by 2025, to double that of Javelin missiles by 2026, and to increase six-fold production of 155 mm rounds by 2028, to about 80,000 monthly. As Under Secretary of Defense Bill LaPlante updated us all

last week, this month's figure for shells is 28,000 (already doubling output), and American production should attain 100,000 rounds monthly by next summer (see reporting by Noah Robertson).

This sounds impressive, but it is actually historically unexceptionable. In 2022, resuming production required recruiting new people, but much of the equipment was in place. In comparison to the American increase in production for the First World War, in a time of similar labor constraint over a century ago, the mobilization was not so swift. The chart below shows the comparison (for data, see Ayres, p. 76). Note that the industry and its products remain similar technologically, apart from the electronic guidance and fuzing, and larger size, of today's 155 mm rounds.

### American production of artillery shells, 1918 and 2023

Month of War	Month and Year	World War I	Month and Year	Russo-Ukr. (2022)
10	January 1918	375,000	February 2023	
11	February 1918	586,000	March 2023	14,000
12	March 1918	842,000	April 2023	
13	April 1918	1,130,000	May 2023	
14	May 1918	1,194,000	June 2023	
15	June 1918	1,341,000	July 2023	
16	July 1918	1,085,000	August 2023	
17	August 1918	2,091,000	September 2023	28,000

I imagine that much more is possible. But is it necessary? As a Ukraine military official noted at a conference in Virginia this past spring, "we use a few times less (sic) rounds than Russians." He spoke most favorably of Excaliburs, as one round thereof achieves the same effect as "20 to 50 rounds" of unguided 155 mm. Precision rounds have been in short supply, so as he put it, "what we have now is this hybrid of World War One shelling and precision warfare." If enough of those shells have precision guidance, even the inertial guidance of Northrop Grumman's "precision guidance kit" (PGK) for 155 mm shells, 100,000 rounds monthly would be devastating.

So, in shells, American industry is already on track to achieve the necessary. Moreover, the uptick will likely stick, because the consequences could be severe, should a decade hence a resurgent Russia attempt another smash-and-grab. If failure does not often motivate bureaucrats, embarrassment generally does.

## Drones: *sturm und drang*, but few *strumtruppen*.

For the Pentagon, the focus on cannon shells and existing guided missile programs should have been predictable. Its current contractors had underutilized factories, and considered mass hiring of clearable employees a core competence of the corporation. Drones are another matter, though they have been at least as important in the fighting! Note simply the observation last week by the Polish Army chief that over half of Ukrainian artillery losses have been to Russian drones, not counter-battery artillery fire.

The Pentagon's Replicator initiative also sounds impressive. It aims to produce tens of thousands of drones within two years, and it has the personal supervision of the deputy secretary of defense herself. Yet all that may not be enough. Tom Mahnken of the Center for Strategic and Budgetary Assessments has a framework for thinking about whether military innovation has proceeded through phases of speculation and experimentation into actual implementation. (See Manken, p. 304; and Mahnken *et alia*, p. 15.) Look for five signs, to start:

### Mahnken's Indicators of Implementation of Military Innovations

■	Establishment of new units to exploit or counter innovative mission areas
■	Revision of doctrine to include new missions
■	Establishment of new branches and career paths
■	Changes in the curriculum of professional military educational institutions.
■	Field training exercises to practice and refine concepts.

My observations check maybe the last of those. Consider how few NATO troops are actually devoted to the employment of short-range drones—any drones really, but particularly short-range. After all, how many USAF generals hail primarily from the drone side of the service, 30 years in? There probably exist some maniples of drone-masters in special forces and other troops of the commando type. Otherwise not so much—as Sam Skove wrote for Defense One yesterday, Estonia may be first in standing up a dedicated loitering munitions unit. And while Estonia is impressive with these things, it is a small market. At the RUSI Land Warfare Conference in July, Ukrainians, according to retired Australian Major General Mick Ryan, noted that have formed 60 drone squadrons (companies)—almost one per brigade. Troopers within these units specialize by role in reconnaissance, strike, and even in recovering and refurbishing downed Russian drones. At another event this past summer, I heard that the Ukrainians are churning through about 1,000 small drones monthly—and are replacing them all from the nearly 100 small factories building them around the country. Ukraine is truly a center of progress in robotic battlefield technology.

## What's next? Making and marketing loitering lethality.

Despite the enthusiasm and newsworthiness, success is not guaranteed. I write this because the entire episode feels like the MRAP all over again. For years after the end of American boots-on-the-ground counter-insurgency in Afghanistan and Iraq, I was hearing from retired senior officials that the Mine-Resistant, Ambush Protected (MRAP) vehicle was a one-off-wonder, not to be used again. That assertion should founder on the fact that the US Army and Marine Corps have already ordered over 20,000 Joint Light Tactical Vehicles (JLTVs), probably best termed Sons of MRAPs. It has now been scuttled by reports (see David Axe in *Forbes* this week) of Ukrainian MRAPs speeding down roads around Zaporizhia, covered by T-80 tanks, sometimes through Russian lines. (Just don't take them into mud, which is never a problem in... oh, never mind.) That the Ukrainians are said to have lost 200 of the 1,200 supplied actually indicates that they are using them hard, and that the troops rely on them. Their occupants tend to walk away from the mine-strikes. And there is nowhere more mined than southern Ukraine.

Selling the MRAP in the US and the UK was hard, but ultimately facilitated by the substitutability of the product: apart from the off-roading challenges, it was an obvious swap for paratroopers' Humvees and Land Rovers, if a slightly harder sell to the mechanized boys in their Bradleys and Warriors. Wartime trainability was easy, but should have been easier, if the Americans and British had looked over and noticed Australians in Bushmaster and Canadians in RG-31 (both early models of what came to be called MRAPs), years before the bigger armies decided to buy theirs. The chauvinism of military bureaucrats was at work: if it wasn't invented here (or for the British, at least in America), then it mustn't have been worth inventing. The MRAP, after all, came from South Africa—what political scientists would call a peripheral state, and plenty of people would call a sketchy example politically.

As one MRAP marketer told me (see my book), South African provenance was problematic, but the example was still ground truth. The first iteration of military innovation perhaps ought to be emulation—watch what works, wherever it is found, and do that. In this case, the Ukrainians are fighting the Russians, and who is a more challenging enemy—on land? Thus, as former Ukrainian Defense Minister Oleksiy Reznikov put it this past summer, the war is the “ideal testing ground” for western weapons (see reporting by Roman Olearchyk). To turn Heidi Klum's phrase about Edna Mode, the Ukrainians are mad for drones, so we should all be mad for drones.

All of this stands apart from the US Navy's progress—notable this week in the western Pacific—with unmanned ships (see reporting by Megan Eckstein and Sam LaGrone), and the various services progress with long-range flying drones. So what to do for the ground arms, to equip them more splendidly with robots and drones? Get kit into their hands, and glean the feedback. Then, pay attention to your own economics of scale, scope, and learning in product development and production. Military forces which dedicate units to sustained experimentation with drones, and which are willing to scrap quickly what works less well, will make better initial customers for firms with scope economies and faster learning between programs. I may be thinking here of enterprises like Anduril, building big robotic submarines for the Royal Australian Navy. Military forces which plan big programs early, as if stockpiling for the next war,

will make better customers for firms with scale economies and faster learning within programs. I am likely thinking here of enterprises like Northrop Grumman and General Dynamics, which have already demonstrated the ability to scale up their munitions production.

*Watch what works, wherever it is found, and do that.* Maybe remember that as a marketing mantra to share with customers open to the not-invented here. Also, remember—drones do not get stuck in mud. And get yourselves to Kyiv for the Defense Industries Forum next month!

## References and Further Reading

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