



# Ukraine’s Long-Term Path to Success: Jumpstarting a Self-Sufficient Defense Industrial Base with US and EU Support

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**Ukraine is dramatically expanding its defense industrial capacity to develop the ability over time to satisfy its military requirements with significantly reduced foreign military assistance. Ukraine is pursuing three primary lines of effort to achieve this goal: increasing its domestic defense industrial base (DIB), building bilateral and multilateral partnerships with European states, and pursuing industrial joint ventures with the United States and other international enterprises to co-produce defense materials in Ukraine and elsewhere. Ukraine will require considerable Western military assistance for several years, and its ability to reduce its dependence on such assistance depends in part on whether it can liberate strategically vital areas currently occupied by Russian forces, among other factors. But Ukraine and its Western partners are executing a realistic plan to create a sustainable basis for Ukraine to be able to defend itself over the long term with dramatically reduced foreign military assistance.**

**Ukraine’s prospects for sustaining its military forces with limited assistance over the long term are excellent.** Ukraine is heavily industrialized with a highly educated and technically sophisticated population. It had a massive arms industry during the Soviet period and continued to be a significant arms exporter after independence. The Russian occupation of key industrial areas and destruction of important centers of weapons production, especially the Kharkiv tank factory, has degraded but not eliminated the solid base on which Ukraine can build a viable DIB to support its military forces in the future.

## Ukrainian Domestic Arms Production

**Ukraine has been expanding its DIB domestically and abroad since the start of the Russian full-scale invasion.** Ukraine’s domestic arms industry at the start of 2024 produces a higher volume of weapons than it did before Russia’s full-scale invasion of Ukraine in 2022, despite Russian efforts to cripple Ukraine’s DIB.<sup>1</sup> Kyiv intensified its efforts to expand its DIB in 2023. Ukrainian Prime Minister Denys Shmyhal stated in June 2023 that Ukraine could become the “center of modern weapons production in Europe” through cooperation with international industry to localize arms production in Ukraine.<sup>2</sup> Shmyhal stated in October 2023 that Ukraine understands that it must produce weapons in Ukraine to offset global ammunition and gunpowder shortages affecting all states’ weapons procurement.<sup>3</sup> Ukrainian President Volodymyr Zelensky announced in December 2023 that Ukraine’s task is to make itself “so strong and effective” that it can resist Russian aggression – a goal that Zelensky said Ukraine can only accomplish through the “sufficient production of domestic weapons.”<sup>4</sup> Ukrainian Defense Minister Rustem Umerov Stated in December 2023 that Ukraine has developed a strategy for domestic defense production and has launched programs to reduce the risk of shortages of ammunition, missiles, and other military equipment.<sup>5</sup> Umerov identified the goal of increasing Ukraine’s domestic production of weapons and military equipment as a priority for 2024.<sup>6</sup> This effort is advancing a short-term objective of immediately supplying Ukrainian troops on the battlefield and a long-term objective of ensuring that Ukraine can be more self-sufficient and less reliant on external security assistance in the future.

**Ukraine has been expanding its DIB capabilities domestically and abroad since the start of the Russian full-scale invasion to offset ammunition and weapon shortages, repair military equipment, and develop new weapons.** Ukraine's domestic arms industry in 2024 now produces a higher volume of weapons than it did before Russia's full-scale invasion of Ukraine in 2022, despite Russian efforts to cripple Ukraine's DIB.<sup>7</sup> Zelensky stated on December 27, 2023 that Ukraine produced three times as much equipment and weapons in 2023 as it did in 2022.<sup>8</sup> Ukroboronprom (Ukrainian Defense Industry) - the Ukrainian state-owned joint-stock company that holds Ukraine's defense industry companies - increased its production by 62 percent in 2023 compared with 2022.<sup>9</sup>

Ukraine's DIB is currently producing the following weapons and munitions (this list is partial):

- **Artillery and heavy munitions.** Ukrainian Minister of Strategic Industries Oleksandr Kamyshin stated on December 27 that Ukraine increased the production of mortar rounds by a factor of 42 and the production of artillery shells by a factor of 2.5 in 2023.<sup>10</sup>

Ukraine resumed production of its home-grown Vilkhva Multiple-Launch Rocket System (MLRS) missiles in 2022 or 2023. Vilkhva-M rockets have a longer range (130 km) and heavier payload than the GMLRS rockets fired by US-supplied M142 HIMARS, which have a range of 77 km.<sup>11</sup> *Ukrainian Forbes* reported on March 10, 2023, that Ukrainian forces used Vilkhva-M rockets to strike rear areas in occupied Ukraine, indicating that Ukrainian industry has resumed production of the missiles that had stopped after 2021.<sup>12</sup> *Ukrainian Forbes* noted that Ukraine is planning to produce a Vilhka rocket version with an increased range of up to 150 km.<sup>13</sup>

Ukraine began domestically producing 155mm shells in small volumes in Ukraine no later than September 2023.<sup>14</sup> These shells are a NATO-standard munition type used by Western-supplied 155 mm guns that Ukraine's BID had never produced before (the equivalent Soviet round is 152 mm).<sup>15</sup> Ukraine's domestic production of 155mm artillery will likely expand over the next three years. Ukrainian officials confirmed in December 2023 that Ukraine signed agreements with two unnamed US companies for the joint production of 155mm ammunition in Ukraine and that the implementation of these deals will take two-to-three years.<sup>16</sup> Ukraine now produces its own 155mm self-propelled howitzer as well, the 2S22 Bohdana.<sup>17</sup> The 2S22 Bohdana started development in 2018, entered full production in January 2023, and began confirmed field deployments no later than May 2023.<sup>18</sup> Ukraine produced six Bohdana howitzers per month as of December 2023.<sup>19</sup>

Ukrainian arms manufacturers established new serial production lines for Soviet-era 82mm and 120mm mortars, 122mm artillery shells, and 125mm tank ammunition for T-64, T-72, and T-80 tanks outside of Ukraine with NATO allies in 2022-2023.<sup>20</sup> European states with Soviet-style ammunition stores had largely run out of 122mm and 152mm shells before January 2023.<sup>21</sup> Ukrainian-made 152mm shells were first visually confirmed to have been used on the frontline in January 2023.<sup>22</sup> Ukraine's domestic production of Stuhna-P and RK-3 Corsar anti-tank missiles has also increased by unspecified amounts following Russia's full-scale invasion of Ukraine.<sup>23</sup>

- **Armored vehicles.** Ukraine's defense manufacturing vehicle output is increasing. Ukrainian officials reported in December 2023 that Ukraine's production of armored personal carriers (APC) increased 3.4 times between 2022 and 2023 and that Ukraine's APC production increased five times between spring 2023 and December 2023.<sup>24</sup> International aid has helped Ukraine resume the production of tank undercarriages, even though Ukraine can no longer produce complete tanks.<sup>25</sup> Ukraine repairs damaged tanks in Ukraine, however.<sup>26</sup> Ukrainian workers reportedly repaired over 3,000 armored vehicles in rear areas near the front in 2022.<sup>27</sup>

- **Drones.** Ukraine’s drone production has increased more than one-hundredfold between the start of Russia’s full-scale invasion and November 2023.<sup>28</sup> Only 35 Ukrainian companies manufactured drones in 2022.<sup>29</sup> Ukraine had over 200 companies (most of which are privately owned) producing various drones for the Ukrainian military as of October 2023.<sup>30</sup> Over 50 Ukrainian state and private companies currently manufacture drone munitions weighting between 300g and 10kg.<sup>31</sup> Ukraine manufactured 50,000 FPV drones in December 2023, and Ukrainian officials project that Ukraine’s drone industry will manufacture one million FPV drones in 2024 (or about 83,000 FPV drones per month).<sup>32</sup>
- **Ukraine is developing indigenous long-range strike capabilities.** Ukrainian officials announced that Ukraine tested a kamikaze strike drone with a range of 1,000 km in January 2023.<sup>33</sup> A Ukrainian official reported in November 2023 that this long-range drone entered production with international partners (likely based in Europe), and Ukrainian officials claim that Ukraine will produce 1,000 such drones by the end of 2024.<sup>34</sup> Ukraine is also working to upgrade its Neptune cruise missiles to extend their range from 300 km.<sup>35</sup> Ukrainian volunteers are developing an inexpensive “Trembita” surface-to-surface cruise missile with a range of 140km to mass produce to overwhelm Russian air defenses.<sup>36</sup>
- **Air defense.** Ukraine is working to launch production of its own indigenous anti-aircraft missile systems. Ukrainian officials reported in July 2023 that Ukraine is developing two new anti-aircraft missile systems (one possibly based on the design of Neptune missiles) and had already conducted missile test flights.<sup>37</sup>
- **Electronic warfare.** Ukraine has experience manufacturing electronic warfare systems (EW) dating back to 2014 and has been investing in further developing specialized EW systems since Russia’s full-scale invasion.<sup>38</sup> Ukraine currently produces several specialized EW systems – though not at scale – some of which are reportedly better than Russian EW systems.<sup>39</sup> Ukraine is developing specialized EW systems to protect Ukrainian forces against Russian drones.<sup>40</sup>
- **Tactical equipment.** Ukraine is increasingly self-sufficient in military body armor. The Ukrainian Ministry of Defense (MoD) stated in November 2023 that Ukrainian manufacturers produce “practically the entire volume of protective equipment” that the Ukrainian MoD procures, and that Ukraine strives to have all of Ukraine’s body armor, helmets, tactical equipment, clothing, and food rations manufactured domestically in Ukraine.<sup>41</sup>

**Ukraine seeks to expand its domestic DIB even further to scale up defense manufacturing production in the short and the long term.** Ukraine seeks to reinforce its progress in tripling defense output in 2023 to sextuple Ukraine’s domestic defense industry capacity in 2024.<sup>42</sup> Ukrainian defense manufacturers going into 2024 are prioritizing the manufacturing of ammunition, drones, and armored vehicles in that order, while also prioritizing the production of anti-tank missile and air defense systems.<sup>43</sup> Shmyhal announced on January 3, 2024, that Ukraine plans to spend more than 265 billion Ukrainian hryvnia (about \$7 billion or 3.5 percent of Ukraine’s pre-invasion GDP) in 2024 on arms production, repairs, and purchases alone.<sup>44</sup>

## **Ukrainian Efforts to Combat Corruption in the DIB**

**Corruption is endemic to rapid wartime industrial mobilization in any country, and its presence in Ukraine is neither anomalous nor surprising.** Kyiv has focused considerable energy on mitigating if not solving this problem rather than concealing it. It has harnessed Ukraine’s civil society and free press in this regard rather than stifling it.

**Ukraine is reinforcing its efforts to combat corruption in its defense industries and reestablish international confidence to support future investment.** Ukraine’s defense industry has faced several

corruption scandals over the course of the Russian full-scale invasion.<sup>45</sup> Three Ukrainian arms exporting firms (which turned into arms-importers at the start of Russia's full-scale invasion) were involved in a large-scale embezzlement scheme after the Ukrainian MoD granted these state-owned companies a "complete carte blanche" to find and supply the necessary weapons and supplies in spring-summer 2022.<sup>46</sup> These three companies were reportedly involved in various corrupt practices, the scale of which is still unknown. The development of Ukraine's DIB jointly with US and European firms based in Europe compels Ukrainian entities involved in such joint ventures to meet EU compliance regulations and will thus help increase transparency in Ukraine's defense industry. This phenomenon is mutually reinforcing with the broader efforts of the Ukrainian government and especially MoD to bring Ukraine up to NATO standards, which also impose significant compliance and transparency obligations on defense contractors.

The Ukrainian government is leveraging the robust and expansive Ukrainian NGO community to assist with its anti-corruption efforts. Corruption is a deeply rooted problem in Ukraine, but Ukrainian officials are actively and openly identifying and resolving corruption problems specifically related to Ukraine's DIB sector. Kamyshin stated in October 2023 that Ukroboronprom launched a new anti-corruption initiative as part of its interim strategy for 2023-2024, under which Ukroboronprom held its first open competition for a DIB factory CEO appointment with oversight from non-governmental organizations (NGOs) and embassies to combat the lack of transparency in the DIB leadership.<sup>47</sup> Kamyshin added that Ukroboronprom also established internal procurement procedures and is involving NGOs to oversee external procurement. Ukroboronprom is also reportedly instituting competitions and auctions to develop a transparent way to allocate assets. Ukraine dismissed several Ukroboronprom and MoD officials implicated in procurement corruption scandals, and even dismissed Ukroboronprom director Yuriy Husev after he reportedly failed to complete state orders.<sup>48</sup>

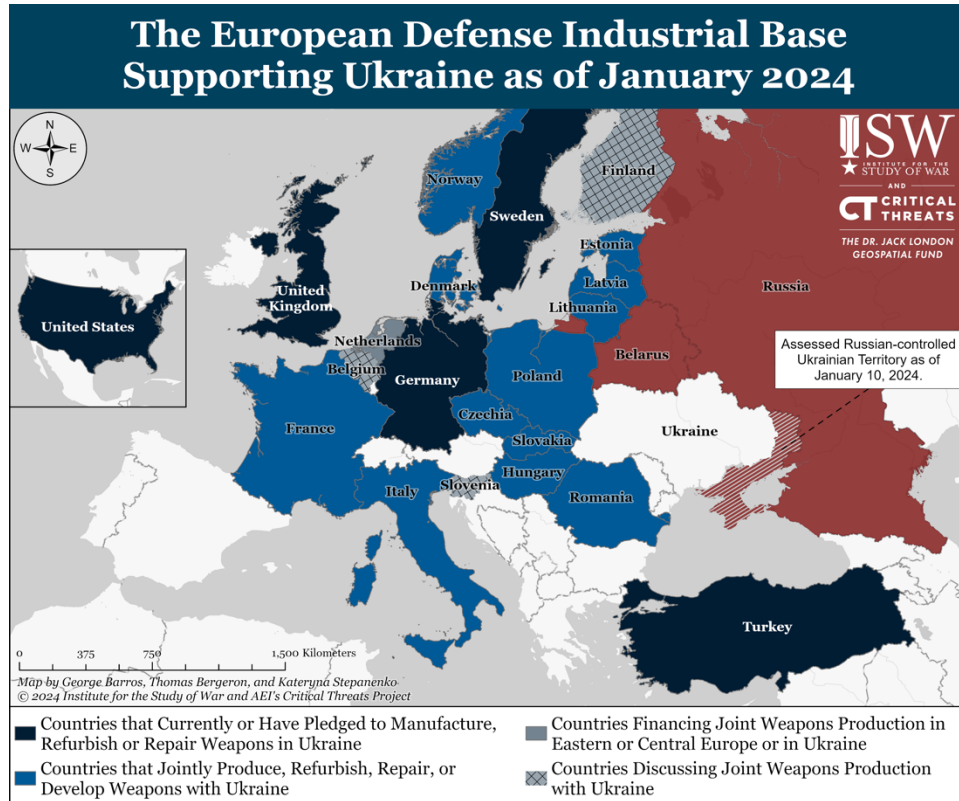
Ukrainian defense materiel is arriving at the frontlines despite the Ukrainian DIB's simultaneous growing pains and corruption. The documented deliveries of domestically and jointly produced military equipment to the frontlines in Ukraine indicate that Ukraine's DIB is getting equipment it reports that it produces to the frontlines. Open sources have confirmed the delivery and employment of several newly Ukrainian-made weapons to the battlefield, including Ukraine's first-ever domestically produced 152mm shells, 155mm self-propelled howitzers, and drones.<sup>49</sup> Ukraine's robust civil society and free press hold Ukrainian officials to account and regularly expose corruption schemes. Former Ukrainian Defense Minister Oleksiy Reznikov established a special commission to oversee the issues of overdue state procurement orders in October 2022 and later created a public Anti-Corruption Commission following a large-scale scandal that Ukrainian journalists exposed about the Ukrainian MoD graft in food procurement.<sup>50</sup>

## **Expanded Multilateral DIB**

**Ukraine's efforts to establish defense industrial self-reliance are also strengthening the European DIB as Ukraine works to integrate itself with European partners.** Ukraine established in late 2023 a Defense Industries Alliance, an association allowing international defense manufacturers to work with the Ukrainian DIB, and 38 companies from 19 countries joined the alliance by the end of the First International Defense Industries Forum in Kyiv on September 29, 2023.<sup>51</sup> Ukraine hosted over 250 defense companies from more than 30 countries during the forum to establish the joint production of weapons in Ukraine as well as Ukrainian production of weapons abroad.<sup>52</sup> Ukraine signed at least 20 agreements and memorandums with foreign partners on the manufacture of drones, repair of military equipment, and armored vehicles and ammunition joint production, technology exchanges, and components supplies.<sup>53</sup> Zelensky announced during the forum that Ukraine will reduce red tape to incentivize investment in Ukraine's defense industry and establish a defense fund that will be replenished through defense enterprises' dividends and the sale of confiscated Russian assets.<sup>54</sup>

**Ukraine is bringing together an international coalition to develop Ukraine's defense industrial base in Ukraine and in Eastern and Central Europe.** Ukraine has been establishing different partnerships

with international actors since the start of Russia’s full-scale invasion to attract foreign production or the refurbishment of weapons in Ukraine; establish joint production, research and development, and repairs of weapons abroad; and incentivize countries to finance joint production in Europe or Ukraine.<sup>55</sup> Ukraine’s joint production initiatives abroad involve Ukrainian technology transfers and deploying Ukrainian specialists to foreign facilities and allow Ukraine to produce equipment in locations safe from Russian attack.<sup>56</sup>



**European states and companies are taking the lead on developing Ukraine’s DIB and have been pledging and opening manufacturing plants in Ukraine to support Ukraine’s resistance to Russian aggression.** German arms manufacturer Rheinmetall and Ukroboronprom concluded a strategic agreement on May 13, 2023 for the maintenance and repairs of German-provided armored vehicles and registered a joint venture on October 18, 2023.<sup>57</sup> Rheinmetall announced in July 2023 that it is establishing a repair center in Ukraine for Leopard tanks and other German-provided equipment and was already training Ukrainian specialists in Germany to staff this center.<sup>58</sup> Rheinmetall also reportedly plans to launch production of German armored vehicles such as TPz Fuchs armored personnel carriers and Lynx armored fighting vehicles in Ukraine in 2024-2025.<sup>59</sup> Rheinmetall’s CEO Armin Papperger stated on February 10, 2023 that Rheinmetall is ready to build a tank factory in Ukraine.<sup>60</sup> Another German manufacturer, Flensburger Fahrzeugbau Gesellschaft, is building a repair hub for armored vehicles and Leopard 1 tanks in western Ukraine.<sup>61</sup>

Zelensky and United Kingdom Prime Minister Rishi Sunak signed a security cooperation agreement on January 12, 2024, which specifies that the UK will continue to provide support to Ukraine during a 10-year period.<sup>62</sup> The agreement specifies that the UK will work with Ukraine to reduce existing supply chain bottlenecks that prevent the development of both countries’ arms and ammunition production. The agreement will also encourage the UK’s DIB to work with Ukraine to support the localization of UK military equipment repairs, maintenance, and production in Ukraine.<sup>63</sup> British multinational arms, security, and aerospace company BAE Systems announced on August 31, 2023 that it had established a local office in Ukraine and signed agreements with Ukrainian officials

to facilitate the production of 105mm Light Guns in Ukraine.<sup>64</sup> Kamyshin stated on October 4 that Ukraine is working with an unnamed British company on the production of howitzers in 2024 in Ukraine.<sup>65</sup>

Ukraine and Sweden have declared their intent in August 2023 jointly to produce CV90 infantry fighting vehicles in Ukraine and have discussed the production, repair, and maintenance of VS90s in Ukraine.<sup>66</sup> NATO member Turkey is building a new drone production facility and service center in Ukraine. Turkey's leading drone maker, Baykar, announced in September 2023 that Turkey would open a drone production facility and service center for Bayraktar TB2 drones, which reportedly should become operational by early 2025.<sup>67</sup> Construction for this Ukraine-based plant was already underway as of September 2023.<sup>68</sup>

**At least 10 European countries have established joint production, weapons development, or military equipment repair partnerships with Ukraine.** Ukroboronprom announced in November 2023 that it will jointly produce and develop heavy weapons and military equipment with at least six NATO countries including France, Denmark, Poland, Czech Republic, and several other unspecified states.<sup>69</sup> Ukroboronprom also stated that it is creating joint defense enterprises, establishing production lines for closed-loop ammunition, jointly producing armored vehicles and rocket launchers, and jointly developing new high-tech capacities by using existing capacities and creating new measures.<sup>70</sup>

**Eastern and Central European countries are leveraging their existing heavy industry manufacturing bases and further investing in joint weapons production with Ukraine.** Ukroboronprom and Polish arms manufacturer Polska Grupa Zbrojeniowa agreed in April 2023 on the joint production of 125mm tank shells in Poland.<sup>71</sup> As of this writing Ukraine jointly produces 155mm artillery shells with Poland and at least one other unnamed NATO country.<sup>72</sup> Ukroboronprom also signed an agreement with Polish manufacturer Bumar Ladedy in April 2023 for refurbishing Ukrainian Leopard-A4 and T-64 tanks in Glywice, Poland.<sup>73</sup> Canada, Poland, the United Kingdom, and the United States reportedly plan to build a new NATO repair and logistics center in Rzeszow, Poland, for the repair of Ukrainian tanks and armored vehicles.<sup>74</sup>

Czech President Petr Pavel announced on April 28, 2023, that Czech companies Sellier & Bellot, SwAero Vodochody, Czechoslovak Group, and Vojensky opravarensky podnik are participating in six joint projects with Ukraine on the production of ammunition and small arms, the repair of T-64 and T-72 tanks, and joint production of F/A-259 Striker Light Attack Aircraft.<sup>75</sup> Czech weapons manufacturers CZUB and Sellier & Bellot signed an agreement in July 2023 to deepen DIB cooperation, and the Ukrainian Ministry of Strategic Industry and the Czech MoD signed a memorandum on July 7, 2023 to establish support for military-technical cooperation and joint weapons and ammunition production.<sup>76</sup> A joint Ukrainian-Czech company called "UAC" is producing Ukrainian Leleka LR drones at a factory in the Czech Republic.<sup>77</sup> Ukroboronprom also signed agreements with Czech military equipment manufacturer VOP CZ in February 2023 on the joint production, repair, and development of armored vehicles, and on the establishment of supply chains for parts and products.<sup>78</sup> Ukroboronprom also signed an agreement on November 10, 2022, with the Czech MoD's Intergovernmental Defense Cooperation Agency (AMOS) on the creation of a "joint defense cluster," which involves the production of military equipment, increasing ammunition production in a variety of calibers, technological cooperation, and maintenance and repair for air defense systems.<sup>79</sup>

The Ukrainian Kramatorsk Heavy Duty Machine Tool Building Plant signed an agreement in June 2023 with Slovak state company Konstrukta-Defense to jointly develop a new 155mm howitzer.<sup>80</sup> The Ukrainian, Czech, and Slovak MoDs also signed a memorandum of intent on June 15, 2023, to cooperate on the procurement and operation of CV90 infantry fighting vehicles.<sup>81</sup> A Rheinmetall factory in Hungary is already producing Lynx armored fighting vehicles at the Zalaegerszeg plant in Hungary and at unspecified plants in Germany in cooperation with Ukraine.<sup>82</sup> Rheinmetall restarted ammunition production of previously discontinued 35mm Gepard self-propelled anti-aircraft ammunition for Ukraine at a plant in Lower Saxony in early 2023.<sup>83</sup> Germany had not produced 35mm Gepard ammunition in several years since the Gepard was retired from Bundeswehr service around 2010. Ukraine and Romania signed a memorandum on October 18, 2023, on the expansion of

mutual military-technical cooperation between the two countries, and Romania announced its intent in March 2023 to build a new gunpowder plant in cooperation with the United States and South Korea.<sup>84</sup>

**The Baltic States are repairing Ukrainian military equipment, increasing their domestic ammunition production to support Ukraine, and working on joint research and development with Ukrainian companies.** Lithuania repairs Western-provided Leopard tanks and is reportedly Europe's sole country repairing Leopard 2 A6 and A5 tanks.<sup>85</sup> Estonian robotic vehicle manufacturer Milrem Robotics signed an agreement with Ukroboronprom during the First Defense Industries Forum in Kyiv to develop Ukraine's capabilities for manned and unmanned vehicles across multiple domains.<sup>86</sup> Estonian Defense Minister Hanno Pevkur announced on November 14, 2023, that Estonia will invest 30 percent of its defense budget to produce ammunition for Ukraine over the next four years (2024 to 2028).<sup>87</sup> Umerov announced on December 5 that Latvia and Ukraine will increase the production of drones and develop joint drone production projects.<sup>88</sup> The Ukrainian Ministry of Strategic Industry and the Estonian Defense and Aerospace Industry Association signed a memorandum of understanding aimed at supporting the development and production of drones and electronic warfare systems on January 11, 2024.<sup>89</sup>

**The Nordic States are ramping up the regional production of ammunition, and Norway has allowed Ukraine to directly purchase military equipment from its manufacturers.** Norway, Sweden, Finland, and Denmark signed an agreement on the joint procurement of ammunition to support Ukraine within the Nordic Defense Cooperation in October 2023 and signed the first contract for the Nordic Ammunition Company (Nammo) to produce 155mm artillery ammunition for Ukraine.<sup>90</sup> The Norwegian government adopted a policy change on January 1, 2024 allowing the direct sale of weapons and defense-related products from the Norwegian DIB to Ukraine.<sup>91</sup>

**Western European countries are similarly incentivizing arms sales to Ukraine and are developing joint production initiatives to support anticipated increased European defense manufacturing.** French Defense Minister Sebastien Lecornu stated in November 2023 that France is currently negotiating with Ukraine to have Kyiv order howitzers from French manufacturers, as opposed to France giving Ukraine materiel from existing stocks.<sup>92</sup> Lecornu also stated in October 2023 that France plans to triple the number of 155mm shells it sends to Ukraine from 1,000 to 3,000 shells per month.<sup>93</sup> These numbers are small - conservative estimates indicate that Ukraine fired 6,000 - 7,000 shells per day in summer 2023.<sup>94</sup> But they are part of the much larger effort Ukraine is making to produce shells and source them from many different suppliers. Lecornu also stated that France allocated €200 million (nearly \$220 million) for a special support fund for Ukraine.<sup>95</sup> French General Armaments Engineer Jean-Francois Doc stated in November 2023, that France is using its support fund to try to cover part of Ukraine's cost of purchasing some spare parts and weapons and noted that France will increase the supply of ammunition to satisfy Ukrainian needs in 2024.<sup>96</sup> French company Turgis & Gaillard Group signed a contract with Ukrainian aeronautics company Antonov in October 2023 to jointly produce a modern drone based on the French MALE-class AAROK drone, and both sides are discussing the possibility of localized production in Ukraine.<sup>97</sup> Ukraine signed a contract with French weapons company Cybergun for the delivery of small arms and grenade launchers.<sup>98</sup> Five Italian weapon and military equipment manufacturers (Leonardo SpA, Fincantieri, Elettronica, Iveco Defense Vehicles, and FAE Group SpA) joined the Ukrainian Defense Industries Alliance on November 16, 2023.<sup>99</sup>

**Denmark and the Netherlands – wealthy European countries without strong manufacturing bases – are financing weapons manufacturing in Central Europe to support the effort to develop the European DIB supporting Ukraine.** The US Department of Defense (DoD) announced in November 2022 that the US and the Netherlands would split costs to refurbish 90 Czech T-72B tanks for Ukraine.<sup>100</sup> The Czech Republic, Denmark and the Netherlands signed an agreement at Ramstein Air Base, Germany in September 2023 to supply further deliveries of mainly Czech-made weapons to Ukraine with the financial support of Denmark and the Netherlands.<sup>101</sup> Danish Defense Minister Troels Lund Poulsen stated in September 2023 that Denmark, in cooperation with partner countries, will purchase 45 tanks to transfer to Ukraine: 30

Leopard 1 tanks and 15 T-72s.<sup>102</sup> The Czech MoD announced in October 2023 that Czechia and Denmark will deliver almost 50 infantry fighting vehicles and combat tanks, heavy weapons, 2,500 pistols, 7,000 rifles, 500 light machine guns and 500 sniper rifles, EW and reconnaissance equipment, and other Czech-made equipment to the Ukrainian military.<sup>103</sup> The Danish MoD announced in October 2023 that Denmark will contribute 100 million Danish kroner (over \$14.7 million) to purchase ammunition for Ukraine to be delivered in 2024.<sup>104</sup> Czech officials announced in February 2023 that a Dutch fundraising effort raised money to finance the production of 100 Czech-made modified Toyota SUVs, refurbished with anti-aircraft guns, to be sent to Ukraine.<sup>105</sup>

**Several other European states are in discussions to join the international coalition manufacturing weapons with or in Ukraine.** Finnish media reported in August 2023 that Finland is exploring the possibility of manufacturing Finnish armored vehicles in Ukraine after Zelensky expressed interest in a joint Ukrainian-Finish production venture.<sup>106</sup> Belgian Defense Minister Ludivin Dedonder and Umerov discussed in December 2023 “Ukraine-Belgian defense industry cooperation” and the possibility of Ukraine hosting Belgian defense industry representatives in Ukraine in early 2024.<sup>107</sup> Slovenian Prime Minister Robert Golob stated in March 2023 that Slovenia wants to participate in joint ammunition production with Ukraine.<sup>108</sup>

**European states are also pursuing a strategic multi-year effort to expand European DIB manufacturing capacity and output to satisfy Ukrainian and Western demand for weapons and military equipment.** European actors are likely preparing their DIBs to support the long-term replacement of aging military systems, sustain support to Ukrainian resistance against Russian aggression, and rebuild NATO’s arsenals to enhance readiness. President of the European Council Charles Michel stated on November 30, 2023, that the European Union’s (EU) military spending in 2023 totaled about €270 billion (about \$296 billion), with €60 billion euro (about \$66 billion) allocated to defense investment. Michel stated that the EU can invest at least €600 billion (about \$657.5 billion) over the next 10 years to improve its DIB in an effort to boost European and transatlantic defense.<sup>109</sup> Michel stated that he is advocating for the European Union to create a “true defense single market” in part by increasing the predictability of public orders to help European industry access private financing and to “send a very clear message: produce and we will buy. We will ensure long-term contracts because our security and stability will require long-term investment.”<sup>110</sup>

Large European arms manufacturers are signaling readiness to scale up industrial output to support European defense. Rheinmetall assessed in January 2023 that it is ready to rapidly increase its production of tank and artillery munitions production to satisfy high Ukrainian and Western demands and has been advancing and completing numerous production orders for 155mm artillery shells, infantry fighting vehicles, anti-aircraft ammunition, and drone reconnaissance systems for Ukraine.<sup>111</sup> Rheinmetall also partnered with US-based manufacturer Lockheed Martin to develop a European-made GMARS system based on the American HIMARS in Germany, after signing a memorandum on April 20, 2023, and noted that the new weapons production would integrate existing German components.<sup>112</sup> Poland also signed a framework agreement with Lockheed Martin on September 11, 2023, for Homar-A Rocket Artillery System Program, which will allow Poland to integrate key HIMARS components with the Polish Jelcz 6x6 truck.<sup>113</sup>

## **Expanding US Industry Support to Ukrainian DIB**

**The United States is supporting the development of Ukraine’s DIB.** Zelensky announced in September 2023 that the US and Ukraine made a “historic decision” on the joint production of weapons, particularly air defense systems, and that Ukraine’s Ministry for Strategic Industries signed cooperation agreements with three US defense associations with over 2,000 members on future possible work in Ukraine.<sup>114</sup> Kamyshin later clarified in October 2023 that Ukraine and the US will jointly produce air defense systems and ammunition within Ukraine.<sup>115</sup> Zelensky announced on November 17, 2023, that Ukraine is actively moving with the US towards joint production of weapons and attended a meeting with top US defense manufacturing companies in Washington, D.C. on December 11, 2023, to discuss joint production, including establishing Ukraine as a “defense manufacturing hub in Europe.”<sup>116</sup> The US DoD announced that the US and Ukraine signed a statement of intent on December 6, 2023 regarding the “co-production of critical weapons and on prioritizing technical and



data exchange.”<sup>117</sup> A Senior Ukrainian official confirmed in December 2023 that two US companies signed agreements with Ukraine on the joint production of 155mm artillery ammunition in Ukraine and that the implementation of these deals will take two-to-three years.<sup>118</sup> A US DoD technology transfer enabled Ukraine to field FrankenSAMS - systems merging advanced Western air defense missiles with modified Soviet launchers or other missile launchers – in 2023.<sup>119</sup> The *Wall Street Journal* Reported on January 4, 2024, that the US Army is restarting production of the M777 howitzer because of the system’s use in Ukraine.<sup>120</sup> The *Wall Street Journal* reported that this effort is focused on producing new parts, manufactured by British BAE Systems, to repair and refurbish M777 howitzers deployed in Ukraine.<sup>121</sup> BAE Systems stated that it expects contracts for whole M777 guns.<sup>122</sup> Private US-Ukrainian cooperation in establishing joint manufacturing will likely reduce the cost of US security assistance for Ukraine.

**Continued Western investment in Ukraine’s DIB and joint production in Europe will allow Ukraine to become self-sufficient over time and integrate Ukraine into the broader Western security network.** Strategic investment in European states’ collective DIB will increase Europe’s ability to support Ukraine, internalize European defense requirement costs, and reduce European dependency on US defense assistance in the long term. Ukraine’s strategic effort to expand its DIB is de facto bringing Ukraine closer to NATO standards.<sup>123</sup> Ukraine is gradually modernizing its DIB and production lines to meet NATO interoperability standards necessary for Ukraine’s future security cooperation within the existing and growing production capacity being established in Ukraine and Europe. Ukraine’s effort to build its DIB will support not only Ukraine, but also the rest of the NATO alliance. Kamyshin told the Associated Press in November 2023 that he is focusing on making Ukraine the “arsenal of the free world,” suggesting that Ukraine seeks to use its planned large manufacturing base to support international allies.<sup>124</sup> Ukraine has also become a key binding agent bringing France, Germany, and the United Kingdom together on common goals to bolster European security by significantly increasing European defense spending and defensive industrial capacity.

## Conclusion

**The United States will not need to send large security assistance to Ukraine indefinitely if Ukraine manages to produce its weapons in Ukraine and through joint production in Europe—assuming Ukraine can liberate strategically vital areas currently occupied by Russian forces.** The Ukrainian strategy to reduce its dependency on Western security assistance in the long term depends on Ukraine liberating its southern territory and setting conditions for a more sustainable defense, as ISW has discussed at length elsewhere.<sup>125</sup> The current frontlines are not sustainable in the long term. Ukraine must therefore still get over an immediate hurdle: liberate strategically critical territory in Russian-occupied Kherson and Zaporizhia oblasts and ideally liberate much of occupied Donbas, where Ukraine’s resource extraction and related industrial facilities are located.<sup>126</sup> Ukraine will very likely remain dependent on high levels of Western security assistance so long as Russia occupies much of this territory.

Ukraine cannot liberate these strategically critical territories without increased Western support in the short term, especially while Ukraine is still actively defending against an improving Russian military. Insufficient and poorly timed equipment deliveries in 2022 and 2023 contributed to the disappointments of Ukraine’s 2023 counteroffensive. Ukraine must receive sufficient security assistance in higher volumes than it did in 2022 and 2023 to be able to retake its strategically critical territories and liberate its people before any discussion about reducing aid to Ukraine in the long term can responsibly begin.

Ukraine’s defense requirements to liberate its land and people are increasing with time as the Russian military is learning from its mistakes and becoming more capable. Russian forces have regained the initiative across the theater (except in Kherson Oblast) as of January 2024, and the Russian military is now able to conduct routine operational level rotations in Ukraine.<sup>127</sup> Russian drone and cruise missile production has surpassed their pre-2022 levels.<sup>128</sup> Russia has partially mitigated Western sanctions through evasion tactics.<sup>129</sup> Russian forces

conducted the largest series of missile and drone strikes against Ukraine since the start of the full-scale invasion on the morning of December 29, 2023.<sup>130</sup> The Russian military is amid a long-term force restructuring to significantly increase the size of Russia's military with 12 new maneuver divisions over several years.<sup>131</sup>

**The US will need to continue supporting Ukraine for several years as Ukraine's DIB in Ukraine and Europe spins up and Ukraine liberates key areas, but Ukraine's intensive efforts to expand its own DIB and establish deep and broad defense industrial partnerships will decrease international security assistance requirements for Ukraine in the long run.** Europe is taking the lead in investing in Ukraine's DIB and establishing joint production in Europe, but Europe cannot achieve these goals without US and international support. Europe is challenged to meet 155 mm shell production targets on time and is working to replace equipment given to Ukraine, let alone increase it substantially to enable Ukraine to retake critical territory<sup>132</sup> It will likely take significant time for European and Ukrainian firms to fully mobilize their industries. Mobilizing any country's defense industry for mass wartime production is a lengthy undertaking and Ukraine will continue to be vulnerable as it gets its DIB up and running. (It took American industry several years to fully mobilize its industry for wartime production in the Second World War between 1939-1943).<sup>133</sup> Ukraine needs more air defense systems and sufficient ammunition to protect Ukrainian cities, frontline forces, and new industrial facilities. Ukraine will continue to depend on foreign military assistance to procure more tanks.<sup>134</sup> Ukraine's DIB has many longstanding structural reforms it must tackle to unlock its full potential.<sup>135</sup>

**Ukraine's and Europe's defense industries will likely be able to significantly increase output and become more self-sufficient over several years if given proper US support now.** The Ukrainians know how to run a major arms industry as noted above. Ukraine had a thriving arms manufacturing and export industry before Russia invaded the country. Ukraine was the world's fourth largest arms exporter in 2012 and the ninth largest arms exporter by 2015 following Russia's invasion of Ukraine in 2014.<sup>136</sup> Ukraine was still the 12th largest global arms exporter by 2019 despite the degradation of its industrial capacity from five years of a protracted (partially frozen) war.<sup>137</sup> Ukraine has the intellectual capital to run an arms industry. Ukraine's defense industry as of 2023 employs 300,000 workers within about 500 different companies, of which almost 400 are private companies.<sup>138</sup> Ukraine's homegrown weapons manufacturing in 2024 is rife with innovation. Ukraine's defense industry is pioneering systems integration between NATO and Soviet-era equipment, electronic warfare weapons development, and all domains of drone warfare in unmanned aerial, naval, and ground vehicles.<sup>139</sup> **Ukraine has a chance to stand on its own two feet in the future if it is decisively empowered now.**

***Note for readers: ISW will launch a new section within the daily Russian Offensive Campaign Assessment to track the development of Ukraine's DIB and the international support for Ukraine's DIB efforts. ISW will be forming its assessments of Ukraine's and international DIB efforts based on public announcements, media reporting, and official statements. ISW will not report news about Ukraine's defense manufacturing not already discussed by open sources.***

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