DEFENSE.info

The German Defense Reset: Building out Lift Capabilities to Support Forward Defense

By Dr. Robbin F. Laird

September 15, 2022

Meeting the Challenges of Re-crafting German Defense and Security Policy

On February 27, 2022, the German Chancellor announced a major re-set of German defense and security policy.

On that date, German Chancellor Olaf Scholz pledged a €100 billion increase for defense procurement spending.

This commitment was certainly welcomed by Germany's allies, but the challenge of turning enhanced investment into relevant defense capability is a challenging one, and certainly not just for Germany.

When West Germany crafted a strong defense capability in the 1970s and 1980s, it was built around territorial defense and being able to prevail in the war that might come through the inner-German border. The German Bundeswehr was built around conscription and tightly integrated with allied ground and air forces deployed on German soil.

This template is not relevant to what Germany and NATO need to do in the new circumstances. Clearly, German investment in credible defense of German territory is clearly needed, not the least of which being that Germany is hosting the major NATO logistics base in Central Europe.

But as new NATO nations join — Finland and Sweden — and focus shifts to forward defense of the areas most under threat of direct Russian assault, combing both World War II tactics with more modern innovations — Germany needs to sort through what it needs to shape in terms of power projection to the perimeter of Germany itself, including enhanced engagement with the Baltic region, meaning, Denmark, Finland, Sweden, and the Baltic states.

This requires capabilities to move relevant assets to the key choke points which might appear in case of Russian aggression. And choke points in the evolving conflict situation in Europe requires both non-lethal and lethal means of engagement.

In this series, I am going to address the question of the challenges facing German in shaping a relevant and credible defense capability as NATO reworks what that in fact means for Germany's allies as well. The Germans will be working the re-design and re-direction of their forces as their allies do as well.

What templates for the development of German military capabilities will make the most sense?

How can innovation be enhanced to allow for cross-national capability development?

Clearly, Germany faces key challenges to generate a process to re-set defense in a credible direction.

In a May 26, 2022 piece by Alexandr Burilkov published by RUSI, the author underscored how difficult the core challenge is for Germany today:

"Finance Minister Christian Lindner boasted that Germany would build the most powerful military in Europe. Scholz, as well as German commentators, characterised this as a Zeitenwende (turning point),

which would not only shed Germany's reluctance to fund its armed forces, but also dramatically revise long-standing assumptions and practices in Germany's approach towards Russia, essentially abandoning the Ostpolitik that had been standard since Willy Brandt."

Burilkov then added: "Beyond the question of money, there is little indication yet that the Zeitenwende will change the political culture around defence and strategy in Germany, which remains the most prominent obstacle in increasing the readiness of the Bundeswehr. For the Zeitenwende to take hold, German politicians would have to develop sufficient appetite for risk to make the case to broader German society of why the use of force is a legitimate foreign policy tool, and why scepticism of technological progress inhibits badly needed military innovation."

Then in an article published on July 20, 2022 by Michael Meyer-Resende published by *EUObserver,* the author highlighted the underlying cultural challenges to shaping the kind of strategic culture in Germany necessary to have a Zeitenwende:

"For most Germans the army had become a distant institution, especially since the abolition of military service in 2011. Soldiers were viewed as akin to toilet cleaners, doing a necessary job about which you would not want to talk too much.

"Discussion about geo-strategy and military matters has been largely absent from political life and hardly figured in policy or think tank debates. And the pacifist attitude has not gone away…"

The German Defense Rebuild in the New Strategic Context

In my co-authored book on the return of direct defense in Europe published prior to the Russo-Ukrainian war, we highlighted how we saw the German situation and its potential role in shaping a more effective European defense capability.

"The Nordics are the most active coalition partners of Germany, and they are focused significantly on direct defense as a core issue and seeing a combination of defense modernization and social mobilization as necessary to deal with the new Russia. What will be the common German and Nordic convergences in meeting the direct defense challenge?

"There clearly are some in play, such as the purchase of common submarines for Norway built in Germany with the Germans committing to the same buy as well….

"What exactly constitutes direct defense of Germany that is focused on Poland, Central Europe, and Ukraine? What mix of forces would be most useful here? Again, this not a question of simply increasing defense spending; it is a question of spending it on what capabilities and with whom to work to provide for enhanced direct defense."

Or I could put it another way: What do the NATO allies in the perimeter of German defense expect Germany to be able to do for a more credible forward defense of the region?

This means specifically, the Nordics and notably with the addition of Finland and Sweden this means how to turn the Baltic Sea into a NATO-lake?

It also means coming to terms with Poland, a state at odds on "European values" with Germany.

It also means projecting power to the front-line Baltic states as well as to Romania.

And given the presence of Kaliningrad as a threat within Europe itself, Germany has to be prepared with its closest neighbors to destroy Russian military forces in Kaliningrad as part of any escalating crisis management scenario.

In other words, simply sketching the new context means that unlike the Cold War where West Germany built its defense to provide a bulwark for shock absorbing a direct hit, Germany now most find ways to credibly defend against direct strikes by Russian air and missile forces as well as project power to the defense perimeter at distance.

Put in other words, reversing the decline in defense spending is not enough.

There is a need for a clear defense policy and strategy which shapes tools which Germany needs to work not only to defend its territory against air and missile attacks but also which allow it to work effectively to work with its partners on the perimeter of Germany to shape integrated defense capabilities.

Clearly, Germany faces many challenges to be able to do so, but I think it is crucial to highlight the target goals to reach in terms of real force and crisis management capabilities which dovetail with core allies whose territory would most likely be where the battle would be generated by Russian actions.

In other words, credible defense resets on the capability of Germany and core European allies to deploy forces and work closely together in a crisis. It is not about simply hosting U.S. forces, which are increasingly stretched and going through their own very challenging transition from the land wars.

With the initial influx of monies, the initial challenge will be simply to take Germany from not having a combat ready force to one with much higher levels of readiness. The second challenge is to fill the obvious gap in combat fighters which will be done with an F-35 buy and adding more modern Eurofighters. The third challenge is to enhance the ISR capabilities of the forces, which is being done in part by buying P-8s.

That is a major effort all by itself, but that really only gets us part of the way to project power. For that to become a core reality, the maritime forces need to be strengthened, integrated with various aspects of airpower, a modernization of the ground forces, notably with enhanced firepower moved rapidly across the battlespace, and integrated air and missile defense.

But I would add a cautionary note to all of this. The United States is stretched thin and in significant political change. If there was ever a time for enhanced European defense, it is now. The United States needs to reshape, rebuild and re-enforce its integrated air and maritime capabilities with appropriate levels of ground forces.

The answer is not for the United States to build an American-dominated European defense structure. It is time for the United States to assist in the rebuild of the direct defense of Europe by engaging in defense innovation and creative force redesign whereby European nations clearly can shape more

effective integrated defense capabilities. The presence of a significant European F-35 force, for example, can be used as one pillar to do so.

For Germany, this means a defense rebuild that looks for Germany to shape a backbone for the core Central European defense structure, one in which not only can Germany operate as a base projecting power forward but able to credibly defend itself against air and missile attack reinforced by core allies, including the United States.

Germany can contribute significantly to the new NATO Force Model. What has been clearly recognized is that NATO has had only trip wire forces in the frontline states like the Baltic states. This simply is not a credible warfighting or deterrent posture. So now NATO is shaping a new NATO Force Model, clearly it is early days to know what this really will amount to, but what Germany actually crafts in this domain will be a key part of what the new NATO Force Model will actually look like.

Linas Kojala and Justinas Kulys highlighted the new NATO approach in a recent July 5, 2022 Polish article:

"This is briefly mentioned in the Madrid summit declaration, but without entering into detail. According to Jens Stoltenberg, NATO will increase the size of its higher readiness forces from the current 40,000 within the NATO Response Force (NRF) to over 300,000 troops in the new Force Model. These forces will be pre-assigned to specific NATO defence plans, will have specific tasks and areas of responsibility and will be subordinated to SACEUR. They will have an increased level of readiness of up to ten days (100,000 troops), around 10–30 days (200,000 troops) and up to 30–180 days (500,000 troops). The plans for the new NATO Force Model are to be completed next year.

"The first country to publicly declare units for the new Force Model was Germany. Berlin wants to assign 15,000 troops, including an armoured division with two brigades, 65 combat and transport aircraft, 20 warships and special forces units."

The coming of Sweden and Finland into NATO will also decisively affect the demand side on German security and defense policy.

Linas Kojala and Justinas Kulys highlight this development as follows: "The Baltic Sea should become a NATO fortress. This would require more enhanced cooperation followed by the prompt membership of Finland and Sweden. Securing Gotland Island is a vital interest for Lithuania in the Baltic Sea.

"A possible attack on it could leave the Baltic States fully covered by hostile air and sea defence systems. Swedish and Finnish membership of NATO would result in two regional military powers making official security commitments to each other, making it possible for NATO to create a more integrated security system in the Baltic Sea region. Regional maritime command, defensive plans and the assignment of necessary forces could also be considered useful tools in strengthening resilience in the Baltic Sea."

There is probably no area where change in the German approach to Russia would be more evident than in the Baltic sea region. As November 2020 study on Germany's approach to Baltic sea security or what they called BSC noted: "Although Germany is taking on more responsibility in the Baltic Sea region, the world is changing faster than Germany is changing its approach. The country's policies accordingly lack strategic direction and vision – and above all, action."

The featured graphic at the beginning of this article comes from the BSR study and provides a good mapping of the areas to which Germany needs to build capabilities to project power on a sustained basis. All of the countries highlighted in blue plus Sweden and Finland should be states where Germany can project power to reinforce coalition capabilities dependent on the crisis.

As mentioned above, Kaliningrad provides a significant threat as well as opportunity for Germany and its allies to deal with Russia. The earlier article by Linas Kojala and Justinas Kulys provides a good characterization of threat from the Suwalki Gap seen from the perspective of the Baltic States: "The Suwalki Gap, an approximately 100-kilometre-wide land border between Lithuania and Poland, is the only land connection between the Baltic States and their NATO Allies, surrounded by the heavily militarised Russian Kaliningrad Oblast and by Belarus.

"As Lithuania is discussing the possible fortification of its border next to the Suwalki Gap, the NATO Allies could also contribute to strengthening the Alliance's Achilles heel in the region. As Lithuania can complete the military fortification processes by itself, there is a need for closer NATO-EU cooperation in improving civil infrastructure (railways, roads, etc) that could also be used by NATO Allies if needed. Also, with the Russian military build-up seen in Belarus, creative military solutions such as a multinational battalion focused on defending the Suwalki gap could be considered."

But clearly, Germany has a long way to go. As a July 10, 2022 DW article put it:

"In this rush toward progress, some also believe the Bundeswehr must see a change in mentality. One of the foundations of German security policy after the Second World War was military restraint, a consensus common to both German politics and society. During peacetime, the German military become comfortable. Many processes have become overly bureaucratic and decision making is slow.

"This is now taking its toll. Now that worst case scenario seems much closer, the Bundeswehr has to transform itself into a fighting force that can withstand tough battles. "Times are changing yet again," said Frank Sauer of the Bundeswehr University in Munich, alluding to Chancellor Scholz' speech when the Russian invasion began. "In principle, the NATO contingents that had been on the eastern flank in the Baltics were only meant to be a kind of trip wire," the military researcher told DW. The idea was merely to slow down a potential Russian invasion of NATO territory so that the alliance would gain time to organize.

"But in the face of Russian aggression in Ukraine, they are now saying: We can't just put up a trip wire," Sauer said. "We have to be capable of defending from the start. That's why this massive increase was decided." For the Bundeswehr, he said, this is extremely significant in that it is not only helping to ramp up forces to defend, say, Lithuania, "but because Germany is expected to be the logistical hub through which everything will be handled." This, he said, is a major strategic realignment in Europe with lasting effects for the Bundeswehr.

As Sauer put it, "if the question is: can it be done? I would say 'yes.' But whether we'll be able to do it, I don't know, because it's such a challenge."

Some Considerations in Accentuating and Accelerating Germany's Contribution to Forward Defense

Alternatively, this piece could be entitled considerations with regard to being able to project relevant military capabilities for Germany's perimeter defense.

In any case, I would argue that we need to start from where we are in terms of what German leaders and allies anticipate currently and match that against what needs to be done.

I would start simply with what the German Chancellor identified in his February speech that Germany had done to respond to the forward defense challenge posed by the Russian invasion of Ukraine.

This is what he said in his February 27, 2022 speech:

President Putin should not underestimate our resolve to defend every square metre of NATO territory together with our allies!

We are absolutely serious about this. When we welcome a country into NATO, we commit to defending that country as a partner and ally. Just as we would defend ourselves!

The Bundeswehr has already bolstered its support for our eastern allies – and will continue to do so.

I thank the Federal Defence Minister for this important gesture!

We have deployed additional troops in Lithuania, where we lead the NATO battlegroup.

We have extended and enhanced our participation in air policing in Romania.

We want to contribute to the establishment of a new NATO unit in Slovakia.

Our navy is helping to secure the North Sea and the Baltic as well as the Mediterranean with additional vessels.

And we are also prepared to contribute to the defence of our allies' air space in Eastern Europe using anti-aircraft missiles.

What was identified was an ability to move ground force forward; an ability to move air systems into relevant locations; an ability to move air defense to relevant locations and to operate naval systems to provide for air maritime security.

We can take those as some key indicators of capabilities a chancellor quickly went to to try to contribute to forward defense and as such tells us something about what a chancellor in a crisis management setting might want to have available in a crisis.

There is also a key question with regard to the speed with which Germany can do any of this.

When I was in Norway discussing Trident Juncture 2018, one of the key takeaways from the exercise from my point of view was how slow German forces were in terms of moving into positions useful for defense operations being exercised in TJ18. This was a major test of the new approach to Total Defense by the Norwegians, but it was also a test of which allied capabilities could move rapidly enough into engagement zones actually to be useful in the crisis.

And in my discussions with Norwegians, they expressed serious concern with regard to the readiness of German forces and their ability to show up in a timely manner.

Another vantage point from which to consider the way ahead for German force modernization to support forward defense clearly will be implications drawn from the Russian-Ukraine war.

In my view it is too early to draw definitive lessons learned but certainly observations can be made. And one very relevant to Germany and its way ahead is with regard to the ground forces and the evolving role of the ground artillery and their role in combat operations against the Russians.

With the mix of weapons, drones, and the test of artillery and combined arms, there is little doubt that rethinking how to best use artillery and ground rocket forces will be a key consideration of what Germany needs to develop, deploy and operate going forward.

This is especially true with regard to how Germany would contribute to the Kaliningrad challenge. Artillery and ground fire can provide an absolutely key element by Poland and Germany in destroying Russian positions in that enclave in time of conflict. How best to do so? And how would that fit into an overall defense posture for Germany?

And I would add a final consideration from the Russo-Ukrainian war.

That is the role of ISR and C2. I have argued for some time that Western forces to both enhance survivability and lethality have been working new ways for both force dispersion but enhanced integrability to deliver the lethality needed for the maneuver force.

This is where the ISR/C2 “revolution” becomes central. The ISR force now is about rapid determination of where an adversary is operating and delivering that assessment to the relevant force able to do something about it. How will the Germans build their evolving ISR/C2 capabilities to be able to shape an effective distributed/integrated force?

Reinforcing Polish Defense: A Key Element for any Way Ahead for German Defense

Projecting power forward for the perimeter defense of Germany is a key part of any credible renovation of German defense. It is not simply contributing some units to forward defense exercises by NATO, it is an ability to deliver significant and relevant sustainable force to forward defense.

A recent article in the Polish website Defence24 highlighted a recent German proposal which highlights German rethinking on forward defense.

According to Jakub Palowski in an article published on August 1, 2022, German MoD is proposing to plus up Polish tank capabilities either by a joint acquisition of new tanks or a transfer of older tanks to Poland.

Christine Lambrecht, head of the German MoD, sent a letter to her Polish counterpart, Mariusz Błaszczak, on delivery of equipment taking place to fill in the gaps left, after military aid was provided to Ukraine by Warsaw.

The letter written by Christine Lambrecht, mentioned by "Sueddeutsche Zeitung", was sent in reaction to the public declarations made by Poland. Warsaw has not been satisfied with German proposals regarding the process of filling in the inventory gaps, following Poland's decision to deliver more than 200 T-72 main battle tanks to Ukraine.

"The documents state that the Germans have reviewed all paths possible when it comes to supporting Poland, and there's no option to deliver equipment coming out of the Bundeswehr's stockpile, given the fact that the German Armed Forces are also struggling with the gaps in the inventory it has. The Germans have however offered Poland an opportunity to jointly procure a modern variant of the Leopard 2 MBT. This would happen later than any transfer of second-hand MBTs, with Poland having a right to receive the new variant of tanks first."

The author goes on to note that such an offer clearly could not provide a quick response to Polish needs. I would add that it does show changing German MoD thinking however.

The author then goes on to note the following which reflects upon the critical inventory state of the Bundeswehr limiting options when dealing with support to Ukraine or NATO allies in the current war:

"The "SZ" reports that Poland was offered a transfer of 100 Leopard 1A5 MBTs, or Marder IFVs. The former are legacy MBTs with 105 mm guns, coming out of the industrial stockpile. The Bundeswehr got rid of its Leopard 1 MBTs back in 2003. The first MBTs of the type entered service back in the 1960s. Any introduction of those into the Polish Army, along with a new caliber of tank munitions, would be completely irrational. Interestingly, Berlin is not willing to hand off the very same MBTs to Ukraine, being worried about the potential escalation of the war in Ukraine.

"The report published by "Sueddeutsche Zeitung" indirectly confirms why Slovak and Slovenian equipment exchange initiatives were unsuccessful, even though Germany and the aforelisted states are closer, politically (all are using Euro as their currency). The Slovak MoD supposedly was offered 15 German MBTs, for 30 T-72 transferred to Ukraine. Possibly, the obstacle here is not the lack of will, but an actual lack of main battle tanks available, in a proper condition.

"The offer involving a transfer of the Marder IFV seems to be a bit more interesting though. The Germans have already made arrangements with Greece, agreeing to exchange some of those for ex-East-German BMP-1 vehicles, that would then be handed off to Ukraine. Maybe Marder vehicles could be an interesting proposal for the neighbours of Poland, including the Czech Republic or Slovakia, waiting for newly procured CV-90s. If Marder is used in a role of a transitional vehicle, not only could Ukraine receive the BMP-1, but also the far more modern BMP-2 (BVP-2) platform, also operated by the aforesaid nations."

Germany and Forward Defense

In 1985, when I set up a working group at the Institute for Defense Analysis on Germany with a focus on possible unification, one of the participants in this effort was my friend the late Ronald Asmus. Throughout his life, we frequently discussed Germany and European defense, then interpreted by the Clinton Administration of which he was part as shaping a w ay ahead for NATO expansion.

But his key point was when the capital of Germany would shift from Bonn to Berlin, inevitably Germany would shift its focus from its inclusion as a state in the West, to becoming a part once again of Central Europe and the future evolution of the region.

This certainly has happened with regard to the European Union and Germany's leading role in the European Union; but it has not happened really with regard to defense.

Because if it had, then Germany would have built a resilient defense structure within Germany to support their ability along with allies to project power forward into the Central European and Baltic regions.

And with allowing their defense capabilities to atrophy, any rebuild needs now to return to the focus which German unification opened up but saw little or real commitment to shaping a defense capability to marry with its broader foreign and economic policies in Central Europe.

What essentially does this entail?

It starts with shaping a more resilient Germany from a security and defense point of view.

This means energy resilience, an ability to supply energy for forward deployed Alliance and German forces; this means resilient defense of logistic supplies and ability to move those supplies forward; NATO has already identified this as a key role for Germany.

As Frank Sauer of the Bundeswehr University in Munich has put it:

In principle, the NATO contingents that had been on the eastern flank in the Baltics were only meant to be a kind of trip wire," the military researcher told DW. The idea was merely to slow down a potential Russian invasion of NATO territory so that the alliance would gain time to organize. "But in the face of Russian aggression in Ukraine, they are now saying: We can't just put up a trip wire," Sauer said. "We have to be capable of defending from the start. That's why this massive increase was decided."

For the Bundeswehr, he said, this is extremely significant in that it is not only helping to ramp up forces to defend, say, Lithuania, "but because Germany is expected to be the logistical hub through which everything will be handled." This, he said, is a major strategic realignment in Europe with lasting effects for the Bundeswehr.

To do this will require enhancing air and missile defense, something the Chancellor has already highlighted.

When Ed Timperlake and I visited Fort Sill several years ago, we learned that the U.S. Army warfighters in active defense considered the Germans to be really first rate in terms of Patriot operations. So, building from this forward, how best to enhance active defense?

Clearly, adding the F-35 to the Luftwaffe provides an important stimulus; but also working more closely with the Poles who have really prioritized active defense, including being the only NATO ally to adopt an integrated approach being offered through the IBCS system.

With effective air and missile defense, the challenge then is to move forward the kind of combined arms packages required for specific areas of operations.

I would argue that indeed we will and are seeing innovation in this area of combined arms packages. This involves innovation with regard to what kind of assault forces, combined with what kind of ground maneuver defense forces and what kind of integrated kill web strike capabilities can be leveraged across the national and allied forces. And then how to effectively deploy such forces to a specific defense or combat area.

And as one analyst has highlighted about the defense rethink in Germany, capitalizing on innovation if a key requirement and opportunity. As noted in an April 11, 2022 article by Torben Schutz, Joseph Verbovsky and Heiko Borchert:

"The Bundestag should become more vocal in demanding and advocating defense innovation that enables daring and reflects the current geostrategic challenges. The defense spending increase should thus be used to create a new long-term budget line dedicated to funding defense innovation and experimentation.

"The 2021 defense budget already earmarks spending on concept development and experimentation to support the Bundeswehr's transformation. Building on this idea, the new defense innovation and experimentation budget should cover national demonstration projects and provide matching funds to support multinational projects under the European Defense Fund and incentivize cooperation with NATO's innovation framework.

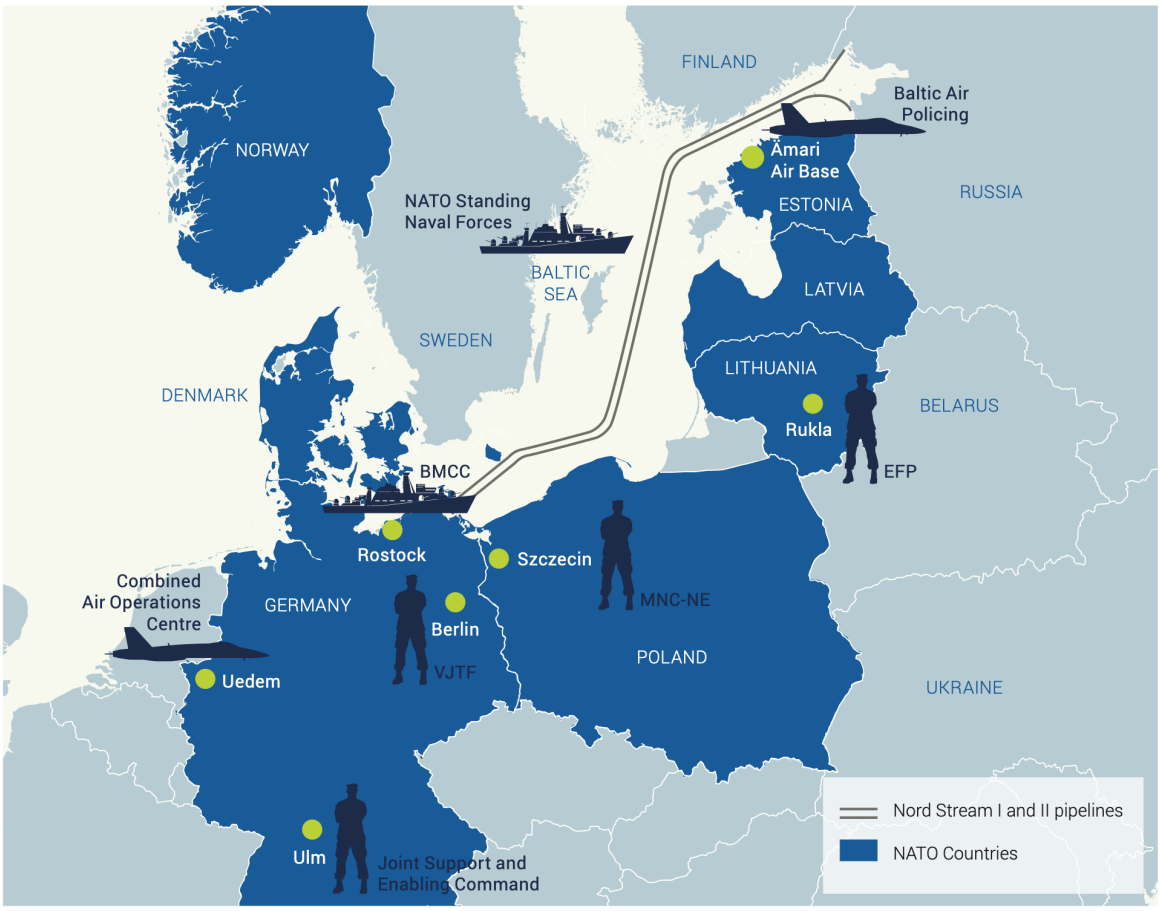
"The Bundestag should also appoint one of its members as a Defense Innovation and Experimentation Ambassador to oversee output and outcome-driven spending of the respective funds, serve as a patron for innovation and experimentation exercises and demonstrations, and host hearings and conferences on topics related to the advancement of Bundeswehr innovation."

That approach to innovation can shape ways to build a more resilient Germany in support of defense of both Germany and its forward defense capabilities.

This means both in terms of how to build active defenses for its territory and to project power forward, to shape new combinations of combined armed forces for forward defense and closing any gaps opened from Russian pressure on Northern, Baltic, or Central European allies; and in terms of how to sustain force forward.

We might focus on the map which was created for the report on Germany and contributing to Baltic Sea Region security, and we can identify some of the areas where German military support and capabilities need to be able to flow.

Germany's contributions to NATO deterrence and defence in the BSR



It would make sense to think of Poland and Germany as a single defense area.

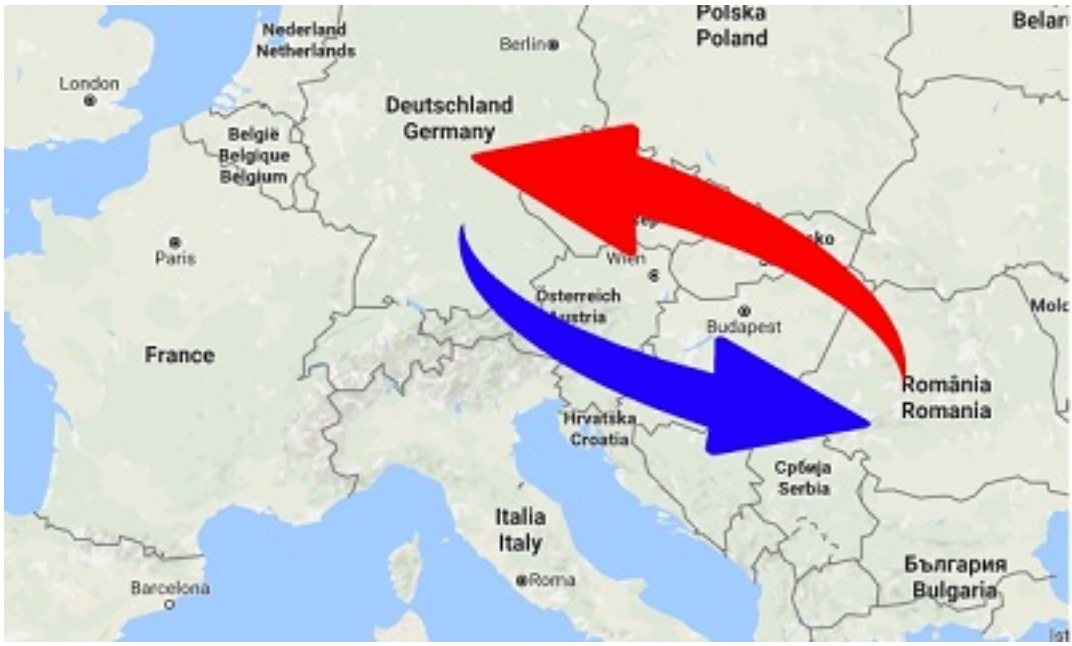
This has been difficult because of relations between the two states and their roles in the European Union, but from a defense standpoint I really think there is no other conclusion.

Second, there is the need to project power to the Baltic states and to provide for their defense and to provide for NATo defense in depth.

Third, there is the newly expanded defense perimeter of Northern Europe and the Baltic region.

This means both that Germany has new responsibilities but new opportunities as well to work with a more integrated Nordic defense. And this area highlights the opportunity to work integration across sea, air and land, which certainly has not been a strong point for Germany but is an inherent capability within the new ISR and C2 technologies being deployed and developed by Germany's allies.

Fourth, there is what is not seen on this map, namely, the need to deal with the Central European states to the south and east of Germany. The map below done to illustrate transport from Germany to Romania provides an insight into the broader defense challenge of movement to the relevant region in a crisis.



Engagement in this area rapidly takes Germany to the Black Sea region, but one could argue that they are not the primary player here, but a contributor.

But that gets at the broader point: where should Germany concentrate its innovations?

Where should it focus on its re-set of capabilities?

And how to structure a relativistic strategy in light with its evolving capacities and requirements?

A key challenge facing any credible defense strategy is to correlate ends with means; and to ensure that core priorities are met. I have indicated what in my view this priorities might be, and will turn to the question of how to move evolving capabilities across the relevant European chessboard for Germany.

And here I am getting at a key point which can be easily missed in a defense rebuild: which platforms allow for the kinds of deployment flexibility required by the new warfighting approaches?

Put another way, Germany is not simply a repository of self-defense capabilities; it needs to be a launch pad for forward defense capabilities. And it is a challenging path to go from a low combat readiness force of limited means to shaping a kill web enabled mobile force capability to support forward defense and seam warfare.

Note: After my last visit to Poland last Fall, I focused on the challenge for Poland of engaging in "<u>seam warfare</u>"

Obviously this even more significantly applies to Germany, and is a key part of what operationally forward defense means against the Russians in the evolving approach to the direct defense of Europe.

This is how I defined the challenge in that article:

In working the direct defense of Europe under the impact of the diverse tools sets of the global authoritarian powers, Russia and China, what is required is crafting effective defense and security forces integrated with core allies across the spectrum of conflict.

For Europeans, the challenge is to have the kind of secure and robust infrastructure combined with viable conventional forces to deter the authoritarians from being tempted for a broader scale attack, but even more likely, the pursuit of seam warfare.

Effective crisis management requires escalation control ranging from HADR operations through gray zone conflict to higher levels of lethal combat.

A core challenge to be met is what one might call the ability to conduct effective seam warfare, namely through working with partners and allies to reduce the seams left open in European defense which the authoritarian powers can exploit.

Force integratability and mobility are key elements in the ability for a country's forces to collaborate with allies at the point where the adversary is working a seam to enhance their ability to maximize their political or military advantage.

The Russians focus on what the West calls hybrid war but in my view is better understood as working the seams in their geography to expand their influence and to recover strategic space lost in the collapse of the Soviet Union and the decline of Russia.

For Poland, in addition to providing for their own territorial defense, the Russians are working the seams in the Polish political space, notably, with regard to the Nordic and Baltic regions, the Black Sea region, Romania and Ukraine.

This a region which remains contested from the Russian point of view, and for the defense of Polish interests, an ability not only to enhance the defense of Polish territory, but the ability to move force packages to close seams which the Russians pressure is crucial as well.

With the Nordics, the building of new frigates for the Polish Navy open up opportunities to work with the Nordics on maritime security and defense in the region. With the acquisition of the F-35, the Poles will work with the Nordics, the Americans, the British, the Dutch and the Belgians in training for integrated air operations in the region, with a significant capability to operate throughout the region and to close gaps.

With the Russians mobilizing "migrants" as a battering ram through Belarus against the Balts, the Poles and more broadly the Europeans, the security capabilities are being enhanced, but again, security can become a defense challenge very rapidly as the authoritarians mingle their defense forces with "migrants" for hybrid actions.

The mobilization of force by the Russians against Ukraine or the Black Sea allies is an ongoing challenge by which the Russians manage brinkmanship and prepare for escalation dominance when they will exploit the seams within European defense.

This means that Poland needs force mobility as well defense in depth to deal with the Russian challenge. And by having mobile forces that can be integrated for defense in depth, they are better

positioned than simply having a more classic territorial defense force which begins to look like a 21st century version of the Maginot Line.

Key Elements in Crafting and Building Out a Forward Defense for Germany

I have argued for some time that new technologies and new approaches to concepts of operations can allow U.S. and allied forces to work force integration across an extended battlespace to provide for a more lethal and survivable force.

It is also a question of affordability as the approach needs to ensure most effective use out of the force we have and leveraging effectively force transformation as we reshape our forces to ensure that they are at the key point of impact for combat, deterrence, and crisis management.

For Germany, this means reshaping and building out a force that can operate across the relevant regional battlespace which Germany needs to ensure protects its interests and contributes to enhanced allied defense in the region.

There are a number of key elements in shaping such an approach.

The first is really foundational is not focused on the defense platforms designed to deliver the lethal element for the combat force.

As I wrote with my co-author in our book on *The Return of Direct Defense in Europe*, shaping a sustainable security and defense capability is really about infrastructure, a domain in which the European Union can play a much more central role. It is about enhanced cyber capabilities, rebuilding road and rail networks to enable rapid movement of forces and supplies, shaping active and passive defenses within Germany so that the logistics supplies necessary to move forward are protected against direct attack, whether by longer range strike or terrorist attacks, a credible energy policy which responds to 21st century geo-politics rather than being mired in the green energy labelling debate, and stockpiling the parts and weapons which the active defense needs to sustain combat capabilities in case of conflict.

The second is to determine where Germany will forward position capabilities, such as in the case of the Baltic brigade, and to have ready forces able to reinforce these forward positioned capabilities. Associated with this is a more agile force able to be move forward to areas where Germany will not pre-position force, this means having integratable force able to seamless work with the relevant nations with whom Germany is supporting. This will be a function of ongoing exercises, shaping weapons commonality, and an ability to work with disparate national systems.

The third is to shape common ISR sharing capabilities not only across the German joint force but within the relevant coalition forces. I have written earlier about the changing nature of the ISR challenge which revolves around having the relevant information at the point of interest to take timely decisions.

As I wrote in a 2020 piece:

“Russia today is not the Soviet Union. It poses a different military set of threats including hybrid warfare, gray zone activities, increased reliance on the threat to use limited nuclear strikes, and shaping a maneuver air-ground force backed by long range strike systems, notably land, air and sea-based missiles.

“In this environment, gaining ISR dominance is a key part of ensuring that crisis management is effectively pursued, and in a very timely fashion.

“It is clear from the interviews I have done in Europe, the United States and Australia, that the return of high-end warfare is occurring in the context of new approaches to ISR-enabled C2 for mobile engagement forces.

“As one senior US Navy Admiral has put it: “The next war will be won or lost by the purple shirts. You need to take ISR enablement seriously, because the next fight is an ISR fight.”

The fourth is determining how to shape effective joint force German packages to be projected forward. How to shape evolving joint air-ground-maritime multi-domain forces? In this sense what German force rebuilding is facing is more akin to how the Marines project power than does the U.S. Army.

The fifth is how to sustain the force forward and to ensure that the force has a continuous flow of parts to the combat force to ensure high combat readiness as well as the fuel and weapons that it will need in a dynamic combat situation.

I am going to focus for the rest of this series on this fifth point.

How can Germany leverage its lift capabilities more effectively to deliver the kind of sustainment to a forward deployed force within Europe, and one which needs to be able to have mobile agile force capability as well?

This challenge is certainly not unique to Germany but it revolves around how to get full value out of it’s A-400M force, its C-130J force and adding a rotorcraft lift capability which extends both the capabilities of what Germany already has acquired and shapes an innovative way forward to support a forward deployed, agile and mobile combined arms force.

The Luftwaffe and Working Forward Defense

Shaping German defense forces which can support defense in depth in Europe, both in terms of the defense of allied and German forces operating from Germany and forward for Germany’s allies within the German, Central and Northern European defense perimeters, is a critical requirement.

As the very experienced Bundeswehr General (Retired) Egon Ramms put it during my visit to Germany in 2019: “We have to have forces which are able to conduct enduring defense operations. From 2011, the German Government focused completely on global deployments, stabilization operations and providing a contribution along those lines.

“That meant giving up the kind of capability we had in the 1970s and 1980s for common defense, home defense, enduring defense operations and Host Nation Support.

"It is clear that such an approach has led to a military much less capable of providing for the kind of direct defense requirements we now face."

And during that same visit in a meeting with Lt. General (Retired) Klaus-Peter Stieglitz, former Chief of the German Air Force, the General underscored that rebuilding of the core force structure was a pressing concern and to do so in ways that could reinforce the proximate allies of Germany which had been added to the NATO via the enlargement process.

"We are no longer talking about defense at the inner-German border or supporting out-of-area operations; we are talking about providing an umbrella for new allies who wish to see that NATO has a credible defense strategy and deterrence capability.

"Germany needs to focus on this challenge and build the appropriate force."

Following that 2019 visit to interview senior retired Bundeswehr and Ministry of Defence officials in Germany, I reached this conclusion: "What exactly constitutes direct defense of Germany that is focused on Poland, Central Europe, and Ukraine?

"What mix of forces would be most useful here?

"Again, this not a question of simply increasing defense spending; it is a question of spending it on what capabilities and with whom to work to provide for enhanced direct defense."

Now with the decision of the Chancellor of Germany to ramp up defense spending, providing answers to these questions then comes to the fore.

Part of the answer is to reverse an earlier decision NOT to buy the F-35.

Later in 2019, I returned to Berlin to attend the International Fighter Conference.

A key element of that conference was a vigorous debate about F-35 and Germany.

The Eurofighter and Airbus participants argued for a new fighter program versus Germany buying the F-35.

Indeed, a head of Luftwaffe had been recently fired for advocating buying the F-35 vice simply waiting for a new fighter in the 2040s.

The co-host of that fighter conference was Lt. General (Retired) Klaus-Peter Stieglitz who had earlier that year co-authored a piece with that recently fired head of Luftwaffe arguing for moving ahead with a F-35 buy.

In that piece, they argued that the F-35 was a key part of any German defense rebuild.

This is what they argued:

The political decision to exclude the F-35 from further consideration in Germany is thus a victory for the German armaments lobby, it weighs heavily for the Bundeswehr.

Which security policy consequences arise from this?

First, the Ministry of Defense continues to explore two ways to succeed the tornadoes. However, without a specific timetable. Given the political environment, no one believes that the grand coalition will decide yet. The decision is therefore postponed indefinitely.

At the same time, however, this means for the Bundeswehr that it must continue to fulfill its mission with the decrepit tornadoes indefinitely. In addition to incalculable high costs and risks for availability, this also brings with it growing risks in operation.

As a successor are theoretically still the Eurofighter or the US F-18 for election. However, both options have the serious disadvantage of being less effective and less efficient than the F-35, despite higher costs and development risks. Order fulfillment is not possible with any of these options without significant limitations.

For both the F-18 and more of the Eurofighter are lagging not only because of the lack of stealth cap, but also their sensors and management systems at least one generation of aircraft behind the F-35.

In concrete terms, they have little chance of achieving their goals and fulfilling their mission in an action against an enemy with a decent air defense. For the pilots this would be like a hardly survivable Ascension squad.

The desired deterrent effect would remain.

The threshold to an armed conflict would be lowered. And all in times of the termination of parts of the European contract-based security order, such as by Russia with the illegal international occupation of the Crimea or INF-contracted missile armor.

Neither in an armed international conflict nor for conventional and nuclear deterrence in the context of Alliance and national defense Germany will be able to contribute significantly to European or NATO air forces without fifth-generation combat aircraft.

The pledge to NATO to be able to lead one of the future multinational Air Force Groupings can also not be fulfilled.

The same applies to the EU.

The loss of credibility that Germany is suffering with the decisions taken so far also weighs heavily.

For years, Germany has spoken of its willingness to take on more responsibility for peace and a just order in the world – as documented in the 2016 White Paper on Security Policy. It also manifests itself in the right to a permanent seat on the United Nations Security Council.

However, the assurances and claims quickly reach their limits when it comes to the concrete creation of military capabilities with which they can be exercised in the first place. For the Tornado fleet is the only major German contribution to NATO for deterrence and peacekeeping in Europe.

Deterrence, however, only works if it is credible.

It does not live by symbolism, but by concrete skills.

However, due to its age, the German contribution to the Tornado has already lost credibility. The discrepancy will be even greater as the F-35s become operational in Italy, the UK, the Netherlands, Belgium and Turkey within a few years.

If the German contribution continues to be untrustworthy or can no longer be provided, this would also have negative effects on the strategically indispensable US guarantee and the nuclear disposition of NATO because of the resulting imbalance in the risk and burden sharing in NATO.

A termination of the NATO-Russia Basic Act and the stationing of nuclear weapons in Eastern Europe could be the result. When deciding on the successor to the Bundeswehr's Tornado fighter plane, it is not just an important military decision with a European political and industrial significance, but a strategic decision with an impact on the European security order as a whole and Germany's role as a leading nation.

If Germany sticks with the path it has now taken, it will leave the circle of security leadership nations in the EU and NATO, degrading itself to become a secondary support force.

It is necessary and corresponds to responsible policy for our country to deal with the issue of succession to the tornado of the Bundeswehr once again objectively and with the necessary strategic vision and to revise the decisions taken so far.

They argued that the F-35 acquisition would be part of shaping a way ahead for building a credible German defense force.

Clearly, this is a necessary but not sufficient condition for such a rebuild.

But shaping ways to fight forward in the support of allies is also a key part of this effort, notably with regard to airpower and its ability to move and support combat capabilities in support of allies.

It is therefore no surprise that the Luftwaffe has taken advantage of the new defense spirit in Germany to leverage an RAAF invitation to participate in Pitch Black to highlight one key airpower package necessary to fight forward – fighter, tanker, and airlifter moving combat capability forward.

Moving a force to Australia to engage in an exercise is rather dramatic, but actually underscores what is necessary to move force forward – kinetic force, lift and tanking.

This is how the Australians announced the visit in an article by Flight Lieutenants Jessica Aldred and Steve Reutter published by the Australian Department of Defence on August 15, 2022.

The German Air Force, known as the Luftwaffe, will participate in Exercise Pitch Black for the first time.

Travelling to Australia as part of the Rapid Pacific deployment, the Luftwaffe will arrive in mid-August with more than 200 personnel, six Eurofighter Typhoons, three A330 Multi-Role Tanker Transports and an A400M transport aircraft.

Chief of the German Air Force Lieutenant General Ingo Gerhartz said this is the first time the German and Australian air forces have trained together.

"The Indo-Pacific is of great importance to Germany. We share the same values with many partners in this region," Lieutenant General Gerhartz said.

"Defending those values in case of a war emergency and being able to support our partners is something that needs to be practised."

The German Eurofighter is a multi-role aircraft employed in air-to-air as well as air-to-ground combat – both at close range and from a long distance.

The German Air Force with its Eurofighters also assumes responsibility in Europe and within NATO for securing the airspace – this includes the quick reaction alert element in Estonia, and working closely with Italian and UK air forces in Romania.

The German government has recently agreed to procure F-35 aircraft to replace the Tornado weapon system, with Pitch Black providing an opportunity to integrate more closely with Australia's F-35A.

"The F-35 aircraft will further expand the broad spectrum of our capabilities. Since the Royal Australian Air Force is already flying this combat aircraft, we will be able to learn from them as well," Lieutenant General Gerhartz said.

Following Exercise Pitch Black, the Luftwaffe will participate in Exercise Kakadu before continuing their Rapid Pacific deployment to Japan and the Republic of Korea.

Lieutenant General Gerhartz will fly himself in a Eurofighter during Exercises Pitch Black and Kakadu, through to Japan following the exercises.

And part of the function of participating in Pitch Black is to work Eurofighter integration with F-35s.

As an article by Adam Thorn published by *Australian Aviation* on August 17, 2022 underscored:

It is hoped that Exercise Pitch Black will enable the Luftwaffe to integrate with Australia's F-35A capabilities.

"The F-35 aircraft will further expand the broad spectrum of our capabilities. Since the Royal Australian Air Force is already flying this combat aircraft, we will be able to learn from them as well," LTGEN Gerhartz said.

While the Eurofighter is a multi-role aircraft, the German government has confirmed that it will also acquire F-35 systems to replace its ageing Tornados.

Exercise Pitch Black will also mark the first time the RAAF's own F-35s have taken part in the training program.

"Exercise Pitch Black is the largest Australian-based international exercise 81 Wing has participated in since transitioning to the F-35A and we're excited by the opportunity to integrate the jet's advanced capabilities with so many of our international partners," Commanding Officer of No. 3 Squadron, Wing Commander Adrian Kiely said.

"Across the exercise, we aim to improve our collective air combat capabilities in a complex and contested environment.

"Our focus for Pitch Black is on strengthened international integration, which is paramount to further improving our ability to come together as a highly effective and interoperable force."

Such integration will not only be important for the Luftwaffe in terms of working its own future force structure but working forward defense in its immediate defense perimeter as three Nordic nations have or are acquiring F-35s along with Poland and the Czech Republic.

Of course, the United States, the United Kingdom, Belgium, the Netherlands, Italy and Switzerland are also flying F-35s as well. And that force package of fighter, tanker and lift will be part of that future as well.

In other words, the projection of airpower as far as Australia is really an exercise with regard to the projection of airpower for the forward defense of Germany and its evolving defense role within the direct defense of Europe as well.

Leveraging an Enhanced Fixed Wing Lift Force Within the German Armed Forces

Let me start with the A400M component of the lift force.

I have followed the A400M from the time that it was the FLA or the Future Large Aircraft.

It went through many design iterations, but from the outset was designed to be a lift aircraft between the size of the C-17 and the C-130.

EADS was the prime contractor and then when the name was changed to Airbus Defence and Space, it became an Airbus product.

The project faced several delays, in terms of design the biggest delay was due to conflict among the partners with regard to the engine.

Rather than picking a Pratt and Whitney Canada engine which was already available, the partner nations focused on building a European engine which did not yet exist and which took some time to develop.

Tom Enders, a former German military officer whom I first met in the 1980s when a student in Bonn, and then later became CEO of Airbus, noted in 2016 that some of the "massive problems" of the A400M were due to the engine selection issue.

"We underestimated the engine problems…Airbus had let itself be persuaded by some well-known European leaders into using an engine made by an inexperienced consortium." He also noted that Airbus had taken full responsibility for delivering the engine, which he also considered to be a mistake.

The Germans had originally ordered 53 of the aircraft but then the government announced that after accepting the first 40 aircraft they would sell the remaining 13 on order.

But then in 2019, the government reversed course and announced that the remaining 13 aircraft would be used to form a multinational airlift wing to be based in Germany.

The Luftwaffe used the A400M for the first time in combat in 2018 in Afghanistan.

And it played an important role in the evacuation from Afghanistan when President Biden decided on a precipitous withdrawal last year.

I have flown on the aircraft a couple of times and have spent time with the French Air Force at their A400 M base in France as well.

The aircraft has several impressive capabilities.

Modern aerospace technology on the aircraft makes it clearly a 21st century aircraft, and its three-man crew can operate an aircraft carrying an impressive load as well.

The engines allow for rapid lift from a variety of airfields, including very rough landing strips.

But the power of the turboprop engines has created a problem for one function which was desired for the aircraft, namely, rapid refueling of helicopters.

In fact, difficulties in this domain have led the French and the Germans to establish a joint C-130J force, a subject I will turn to in the next piece.

But it is really simply since around 2017 that the A400M has been making its presence known to the USAF and allied air forces, and the aircraft is clearly making an important contribution to the lift mission for the nations operating the aircraft and for their allies.

Part of the 21st century character of that aircraft provide a baseline for whatever else Germany would add to its lift fleet.

In a 2016 interview, I discussed the digital side of the aircraft with the head of Airbus Military Aircraft and with the chief engineer of the A400M.

They emphasized:

"Onboard the aircraft are sensors which can provide real time data on the performance of the aircraft and this data can clearly provide key information to shape both an understanding of its operation but provide data for more effective maintenance.

“The sensors are there, but the system to exploit the data generated by the sensors is a work in progress. We can shape a lifetime maintenance system. We can process on the ground by the maintenance system which can process this data which can shape a customized maintenance system.

“You can maintain the aircraft based on real need rather than having predetermined maintenance points. When a set of conditions has been met, then the maintenance can be performed.

“In effect, demand side maintenance can be provided rather than milestone maintenance.

“We need to develop the algorithms which can translate the sensor driven data to shape the new maintenance regime which the aircraft can clearly deliver to our customers.”

In other words, the digital nature of the aircraft provides for inherent upgradeability of the aircraft and new approach to modernization.

And the data generated by the sensors provides the basis for big data management for more effective and realistic maintenance approaches.

The aircraft has been used for its primary mission of lift, but it also been used for tanking of fixed wing aircraft as well as for medevac operations.

And notably, the French, the British and Germans, all A400M users, have worked enhanced collaboration with regard to the use and sustainment of the aircraft as well.

This can prove to be very significant as Germany looks to forward defense because their aircraft can operate from other bases which also sustain and operate the A400M throughout the region as well.

And in a 2017 interview which my colleague Murielle Delaporte had with Captain Cyril who at the time was in charge of operations within the 61st Wing at Orléans Air Base, this A400M commander highlighted the advantages who saw to this new generation airlifter:

Question: As an operational transport pilot, how would you compare tactical approaches when flying a Transall or when flying an A400M?

Captain Cyril: This plane is a like big toy: it is extremely maneuvering and powerful.

It is very reactive to commands.

The general feeling is rather different than flying a Transall, because the flight commands are electrical.

The generation gap is visible even in the way we do maneuver.

When you are in a “degraded situation” [threatened environment], it is not so simple to fly 130 tons with accuracy.

Piloting aids are really very precise and non-intrusive.

And because the plane self-compensates, if I put it in a certain position, it will hold it even without automatic pilot.

The same goes when diving: if I make sure, I place the plane in the right descending angle at the right moment, then it will also holds it with barely any correction.

That was never the case with former generation transport aircrafts, which needed more adjustments.

This shift from the Transall experience to the A400M one is suggestive of the shift which the Germans armed forces might consider when looking at its decision on lift to be provided by a new rotorcraft platform as well.

The Transall's were initially delivered in the 1960s which is similar to the initial delivery of the Chinooks as well.

If you have moved on from the Transall, why would you by its generational equivalent in rotor lift?

Acquiring C-130Js for the FAF and the Luftwaffe: Building Out Lift Capabilities for a Forward Deployed Force

The French and the Germans have built a joint C-130J squadron.

The decision to acquire the aircraft was to provide for a core capability which the A400M did not fill, but was a recognition that a wide-range of lift capability was needed to support forward deployed operations.

In an article which we published on February 8, 2018, we underscored the initial decision and its logic.

In a deal made prior to President Macron becoming President, France and Germany agreed to join forces and share costs of the new squadron.

There will be 4 C130Js on the French side to be acquired by 2019 and 6 on the German side after the Bundestag's expected green light in 2019.

The IOC (Initial operational Capability) is planned for 2021 and the FOC (Full Operational Capability) by 2024.

In a recent piece by Murielle Delaporte published on Breaking Defense, the acquisition of the aircraft and its importance is highlighted.

"To some French observers, purchasing American military transport aircrafts seems like heresy.

"It's an admission of failure of the A400M European adventure, many argue.

"But this nascent fleet of C130Js is really the stepping stone towards a new Franco-German bilateral unit (some refers to it as a squadron) to be based in 2021 at FAB Evreux and symbolizes the drive towards the dream of a true European defense both French President Macron and German Chancellor Merkel aspire to.

"It also marks one of the fastest major military acquisitions in French history.

"Barely two years passed between approval of the actual FMS contract in January 2016 and the delivery of the first C-130J-30 to France last December at the Lockheed Martin facility in Marietta, Ga.

"The contract includes support, spares and a two-year maintenance program, as well as training in the U.S. centers consisting in 10-month periods for pilots ad loadmasters, and two to three month periods for non-flying staff.

"The training for loadmasters is especially important, as, the same way than on A400M, that profession is changing while taking over more responsibilities in flight.

"This move was decided with the signing of a pooling and sharing agreement by former French minister of defense Jean-Yves Le Drian and his German counterpart Ursula von der Leyen in April 2016 (hence before Emmanuel Macron became president last June); it was then reinforced with a bilateral cooperation agreement signed between Maj. Gen. Philippe Coindreau and Vice Chief of Defence Vice Adm. Joachim Ruhle in October 2017.

"Concretely, the deal is for both nations to join forces and share costs, i.e. respectively 4 C130Js on the French side to be acquired by 2019 and 6 on the German side consequently to the Bundestag's expected green light in 2019.

"The IOC (Initial Operational Capability) is planned for 2021 and the FOC (Full Operational Capability) for 2024….

"Having several assets with different strong points is actually a bonus in military planning as it offers more options at a time when allied armed forces are especially in demand on very harsh territories.

"For the French Air Force, which has been operating for several years in the Sahara-Sahelien region (with the Barkhane Operation) and over Syria and Irak against terrorist groups (with the Chammal Operation), the A400M, which can carry 30 tons in 6 hours on a flight between Orléans and N'Djamena in Chad, the C-130H-30, which can carry 7 tons in 8 hours, and the C-130J-30, which can carry 10.5 tons in 7 hours, are all complementary.

"They offer self-deployable and self-sustainable assets which France can use on its own or within a coalition of allies, such as Germany and the United States."

Germany received its first of six C-130Js in 2018.

This was less than three years after the German defense procurement agency and the USAF signed the first agreement.

As a *Defense Brief* article published on February 2, 2022, underscored:

Germany and France intend to operate a joint fleet of C-130Js, which would consist of five C-130J-30 airframes and five KC-130Js. The latter provide an aerial refueling capability. Germany will be contributing to the fleet with three aircraft of each variant.

The binational fleet will fly from Évreux in Normandy, which is home to the French Air Force's 62nd Transport Squadron. This is also where a joint training center is being established by Rheinmetall and Thales under a contract from March 2021.

With more than 40 different versions of the C-130J developed to date, and over 2,500 aircraft in use by 69 countries, the C-130J is the longest-produced aircraft in the world.

Compared to its predecessors, the C-130J reduces manpower requirements, lowers operating and support costs, and provides life-cycle cost savings. Compared to older C-130s, the "J" model climbs faster and higher, flies farther at a higher cruise speed, and takes off and lands in a shorter distance.

Many of the articles discussing the joint acquisition highlight that the J was being purchased to fill the gap which the retirement of the Transall opened up.

But the A400M was procured to fill this gap as well.

So the broader point is that lift is so important with its capability to support a multi-domain force, that you cannot fill the need with simply one platform.

And indeed, the J does things which the A400M cannot do, notably with regard to a wider range of helicopter refueling and an ability to fly into a wider range of landing locations.

And the bi-national squadron has indeed already operated to support forward defense in Europe, which is what I am arguing is the strategic thrust of any German defense reset.

One of the best overviews of the joint decision by France and Germany to acquire the C-130J and to operate as an integrated squadron has been provided by Babak Taghvaee in an April 15, 2022, article published by *Aviation News Magazine*.

As the author underscored: "Despite currently having just five Super Hercules on strength, this small bi-national squadron has already played a vital role supporting counterterrorism operations across Africa, humanitarian efforts in Afghanistan and now NATO's efforts to enhance the defence of its eastern flank amid the ongoing Russia-Ukraine war."

Taghvaee provided a very accurate assessment of why the aircraft was acquired by both France and Germany.

"Designed primarily as a tactical airlifter, the Airbus A400M is capable of performing a number of secondary roles, including air-to-air refuelling (AAR) using the probeand-drogue method. While the type has already been proven in this role with the GAF by supporting the air arm's Eurofighter Typhoon fleet, the aircraft has remained an unsuitable AAR platform for helicopters.

"This was one of the key factors behind both Germany and France's selection and procurement of the KC-130J, the extendedrange tanker variant of the indomitable C-130 Hercules.

"In 2015, France and Germany chose the Super Hercules as a complementary medium transport asset for its A400Ms, as well as to bridge a capability gap triggered by lengthy delays and numerous overrun costs in the European airlifter's problem plagued programme. However, to reduce the cost of operation and maintenance, it was decided to form a binational squadron."

The author provided details on the aircraft procured by the Luftwaffe.

"The procurement also included eight Link-16 MIDS (multifunctional information distribution system) terminals (one per aircraft, plus two spares), eight AN/ALE 47 electronic countermeasure dispensers (one per aircraft, plus two spares), eight AN/ AAR-47A(V)2 missile warning systems (one per aircraft, plus two spares), eight AN/ ALR-56M radar warning receivers (one per aircraft, plus two spares) and eight MX-20 electro-optical/infrared imaging systems (one per aircraft, plus two spares).

"With Germany opting for the AN/APX-114/119 Identification Friend or Foe Mode 5 for its aircraft, it also requested a joint mission planning system, secure communications, precision navigation and cryptographic equipment, as well as night vision devices, support and test equipment….

"The German Super Hercules are configured with slightly different equipment compared to their French counterparts. The key difference is the installation of an inflight refuelling probe enabling them to receive fuel from the AAE's KC-130Js, Boeing C-135FR Stratotankers and Airbus A330-243MRTT Phénix tankers."

And the author also underscored the role of the newly acquired C-130Js in Germany's engagement in European forward defense.

"This need (for airlift) has been reinforced by the ongoing threat of Russia occupying the southern Ukrainian province of Odessa in an attempt to cut off Ukraine's access to the Black Sea. If Russia were successful, this would effectively landlock Ukraine and cut it off from overseas trade.

"The threat of such an occupation of the Odessa Oblast by Russian Armed Forces resulted in the launch of a programme to boost the defence of NATO's eastern flank, particularly in Romania which shares a 618km border (both land and maritime) with Ukraine. In the event of an occupation of this border, and the potential Russian invasion of the Balkan nation, the vastly outnumbered Romanian Armed Forces would need the full support of other NATO members to strengthen its defence and capabilities.

"In response, the French Army was tasked with deploying troops and equipment to Romania as part of NATO's Rapid Response Force to strengthen the country's border with Ukraine. With pair of Antonov An-124-100s from Ukraine's Antonov Airlines were chartered to transfer heavy equipment such as Renault GBC 180 all-terrain trucks, Panhard VBL light armoured vehicles, AMX-10 RC reconnaissance wheeled vehicles and VAB armoured personnel carriers to Romania's Mihail Kogălniceanu International Airport in Constanta, the Franco-German C-130J squadron was tasked with airlifting lighter cargo, including troops, weapons and ammunition.

"The first such flight was allocated to KC-130J 5874//61-PQ. Leaving Évreux at 0830hrs (local time) on March 8, the aircraft – crewed by a French pilot and German co-pilot – flew south to Avord to

upload 15 tons of ammunition, before departing to Constanta. After transporting the cargo to Romania, the aircraft landed back home at 2120hrs (local time)….

"According to the information available from military aircraft flight tracking websites, 5874/61-PQ also logged a flight to Rzeszów in Poland, just 55 miles west of the Ukrainian border, on March 6, 2022. It is believed that the aircraft was carrying MILAN light anti-tank infantry missiles that had been donated to Ukraine by France.

"The C-130J-30s and KC-130Js of the Franco-German Joint Tactical Airlift Squadron have already proven their value during operations such as Barkhane, APAGAN and in Eastern Europe. With the type already undertaking missions that were previously flown by the C-160s, the squadron has logged more than 6,000 flying hours since 2018."

In short, given a focus on forward defense air lift and tanking in all its variants is crucial.

But it is also to ensure complete integration across the lift and tanking force as well. Clearly, taking a joint squadron approach towards the C-130J by the French and the Germans supports that objective.

The German Defense Re-Set and Implications for the German Vertical Lift Decision

Prior to addressing the platform options for the German defense force in terms of either a medium or heavy lift rotorcraft platform, I would like to summarize some considerations identified from the previous analyses of the German defense re-set.

First, the shift for a German defense reset is from a primary focus on territorial defense during the Cold War to forward defense of the perimeter of the wider German defense zone.

Or as Lt. General (Retired) Klaus-Peter Stieglitz, former Chief of the German Air Force, underscored during my 2019 visit to Germany: "We are no longer talking about defense at the inner-German border or supporting out-of-area operations; we are talking about providing an umbrella for new allies who wish to see that NATO has a credible defense strategy and deterrence capability. Germany needs to focus on this challenge and build the appropriate force."

This means that any rotorcraft addition to the lift fleet must move at distance with air refuelability a key requirement for sure.

Second, as logistics supply and an ability to move supplies to the operational force is at the heart of an effective sustainable deterrent and combat force, the role of an ability to move supplies is crucial.

This is why working ground assets for such supplies, notably by rail is a key part of the way ahead.

And certainly, this makes the lift element even more important to support German forces forward or allied forces which German platforms are moving from rear to forward areas.

This is also means that an ability to integrate the lift fleet is crucial.

In the maritime shipping world building standard ISO container sizes has been a key part of enhance efficiency in operating freighters at sea and moving cargo ashore to rail and truck platforms for transport.

For the military, it has been the focus on standardized pallets.

The HCU-6/E or 463L Master Pallet is a standardized pallet used for transporting military air cargo. It is the main air-cargo pallet of the United States Air Force, designed to be loaded and offloaded on today's military airlifters as well as many civilian Civil Reserve Air Fleet (CRAF) cargo aircraft.

This means that any rotorcraft lift to be added to the German forces should be able to handle 463L pallets.

Third, the entire lift force along with the ground transport elements needs to be exercised and developed to be able to move supplies to a combat force which operate from flexible or mobile basing.

In order to enhance the survivability of the force, moving supplies around an extended combat space is a key requirement.

Adding a rotorcraft element to the lift force has as its primary focus an ability to support a distributed combat force, able to operate from a wide variety of mobile bases.

The rotorcraft element has at its requirement an ability to move rapidly the maximum load out which a distributed force will need to have the level of lethality required.

Fourth, there is significant defense innovation underway, which will empower the evolving combat force and to which the new lift asset will need to contribute.

There are significant changes underway to enable unmanned systems, C2 and ISR distribution and integration and evolving mixes of unmanned systems with weaponization approaches.

The new rotorcraft will need to have the capability to be a key enabler and participant in the evolving roles of the lift force as new technologies are added to the force, notably in terms an ability to work the evolving digital integration of a deployed distributed integrated force.

In other words, a platform decision going forward for the German armed forces should where possible be made to add capability which positions itself to work with the evolving force, rather than simply fitting into the inherited legacy force.

This certainly has been the case with adding the F-35 to the Luftwaffe, which will enable it to build out the overall defense forces multi-domain capabilities and to accelerate many of the concepts inherent in the Future Combat System approach launched by the French and the Germans, ironically designed initially to derail the Luftwaffe from procuring the F-35, but really now an approach which can leverage the F-35 to build out a more integrated German and European force.

Clearly, the F-35 acquisition affects FCAS and how the choice of a new heavy lift — versus medium lift — helicopter either slows down an FCAS enabled German force or helps accelerate it.

The Future Combat Air System (FCAS) is built around shaping a networked force, one which can operate as a kill web enabled force.

At the same time, the focus of the partners in FCAS, Germany, France and Spain, is upon platforms as well, notably building a new fighter which would be IOCd in the late 2030s.

But there is an inherent tension between the network enablement piece and the platform piece.

Shaping a 21st century kill enabled network force is built around C2 and ISR systems which are both sovereign from a national point of view and integrable from a coalition point of view.

Platforms which can enable such capabilities are a clear priority, whether built in Europe or bought from allies. And such an approach affects platform choices, such as the vertical lift decision.

I will now turn to that decision and how the potential choices either reinforce the strategic direction of the German defense reset or they don't.

Adding Rotorcraft Lift to the German Defense Forces: The Case for the CH-53K

When measured against the key elements for reshaping German defense, the CH-53K entering the USMC today has some significant advantages compared with the Chinook.

A base line consideration when making this decision recalls the question of comparing Super Hornets to F-35s.

The Super Hornets were designed many years ago and built around legacy upgrade concepts; the F-35 was not.

This means that upgrades are addressed very differently and building on the foundation of a digital aircraft built on a digital foundation from the ground up provides very different upgrade approaches and opportunities than a a legacy aircraft.

The same is true of the Chinook versus the Ch-53K.

It is designed and built from the ground up as a digital aircraft.

An interview which I did last year with Colonel Jack Perrin, Program Manager, PMA-261, H-53 Heavy Lift Helicopters, Naval Air Systems Command at Patuxent River, Maryland, highlighted ways in which an aircraft built from the ground up in the digital age is very different from a legacy aircraft designed in the 1960s and upgraded over time.

As with the F-35, the CH-53K has significant advantages of being built from the ground up on a digital age foundation.

The discussion with Perrin in June 2021 was as follows:

Talking to the digital part of the 53K, we are using a really a leading-edge integrated maintenance device. It's basically a computer, but instead of just having PDFs of the maintenance manuals on it, it provides an interactive maintenance manual designed for and supportive of being able to do that maintenance.

And that system has really driven a lot of efficiencies into executing maintenance, because the maintainer can take it and have that digital environment right there with him.

We also have an onboard mission computer, what we call the integrated vehicle maintenance system.

And that integrated vehicle maintenance allows us to record data on the aircraft, not only the performance data, how the engines are doing, how the gearbox is doing, what the status of the aircraft is, where the pilots put it, what environment it was flying in, but also records the vibrations of the aircraft.

It's integrated into the maintenance system.

And that system has a data center that takes the data that we've gotten off the aircraft and reviews it automatically.

We run algorithms on it that can show you a new predictive maintenance procedure for the aircraft.

I don't really know of any other platform that's at that level of integration already.

We're going to get to a full condition-based maintenance aircraft, because it is digital, because we do collect all the data on it and we're able to gather that data, store that data, and able to run algorithms and programs on it so that you can manipulate that data and better do predictive analysis of how that aircraft is performing, and where your bad actors are.

It also helps us reduce the Operations and Support costs of this platform, even compared to the CH-53E.

So that's another big bonus for us and the Marine Corps, as we move forward, trying to make the aircraft not only affordable in production, of which we certainly are doing.

We're seeing the cost of the aircraft coming down as we've just recently got a handshake and within the next month or so, we'll be awarding lot five with an option for lot six for a total of 18 more aircraft that we're putting out in the production line to deliver to the fleet.

But we're also focused on reducing the cost to operate and maintain this aircraft.

To do this we are shaping a fleet common operating environment to manage the fleet.

Question: I would like to return to the digital point for a moment.

The CH-53K is a digital aircraft as you have said and working digital data as part of the operational and sustainment efforts is a key foundation as the force works towards adding autonomous systems – which are completely software driven to the force.

How would you characterize the impact of the manned digital system preparing the way for unmanned systems?

Col. Perrin: The digital character of the aircraft reduces the workload of the pilots and the crew so much that they can have that spare capacity to do those additional tasks that they will see in that digital battlefield, whether it's communicating or operating with other symbiotic platforms that are going be out there.

Because I agree with you, the future really is about the unmanned world and that force multiplier that they can provide to some of those manned systems, but to get there you have to start by understanding, working with and mastering digital backbone manned systems.

And to be clear although have capabilities for futuristic development, the CH-53K is ready now and not a developmental project.

One of the mis-statements made about the CH-53K in the German competition is that the CH-53K is a developmental project, by which is meant that it is not ready for operational use.

This claim is simply untrue, and confuses upgradeability capabilities built into a platform with it being an unfinished product.

The case of all platforms built on a digital foundation is that they are inherently "unfinished" in the sense that they will grow capability through software development and integration with various other multi-domain systems.

But this does not mean that they are not operationally superior to legacy systems which have no such promise.

Ironically, Airbus partnered with Boeing to offer support to the Bundeswehr buying a legacy helicopter.

This in spite of Airbus Defence and Space highlighting and spearheading the Future Combat System project with France and Spain.

The CH-53K is clearly a better platform participant in any FCAS in comparison with Chinook.

Earlier this year, I focused on the impact of FCAS on the rotorcraft lift decision and will close this article by focusing on this key dimension of this platform choice.

For the reworking of German defense, which can be enabled by the F-35 acquisition, adding the CH-53K which is being integrated into the next phase of USMC transformation makes a great deal of sense.

Why would the German Luftwaffe wish to operate a legacy lift helicopter – a variant of the CH-47 — whose future is behind it?

Even more interesting to me is the question of how the F-35 acquisition affects FCAS and how the choice of a new heavy lift — versus medium lift — helicopter either slows down an FCAS enabled German force or helps accelerate it.

The Future Combat Air System (FCAS) is built around shaping a networked force, one which can operate as a kill web enabled force. At the same time, the focus of the partners in FCAS, Germany, France and Spain, is upon platforms as well, notably building a new fighter which would be IOCd in the late 2030s.

But there is an inherent tension between the network enablement piece and the platform piece. Shaping a 21st century kill enabled network force is built around C2 and ISR systems which are both sovereign from a national point of view and integrable from a coalition point of view. Platforms which can enable such capabilities are a clear priority, whether built in Europe or bought from allies.

So why is Airbus Germany which has underscored the importance of FCAS, supporting Boeing in supporting a legacy system which does really nothing to carry forward the FCAS aspirational approach whereas clearly an F-35-CH-53K tandem does?

For the Marines, the F-35 capabilities are crucial to enable the ground insertion force and to enable their ability to distribute the ground force but to provided integrative C^2 and ISR "tissue" to enable the 360-degree warfighting capabilities of the ground maneuver force. One reason the Marines are adding a new combat heavy lift capability to their force is precisely because they needed a new lift capability which is fully integratable with their F-35 enabled ground insertion force.

Put simply, the CH-53E is too old of an aircraft in terms of how the C^2 and sensor systems have been built for legacy systems to take advantage of the digital revolution of which the F-35 is a key driver for a joint force. It is designed from the ground up to be a digital aircraft, and to work on the digital battlefield, for which the F-35 is a key element. The aircraft brings new capabilities to the force which are in no way the same as the CH-53E. Much like the F-35 is built the ground up differently from legacy aircraft which enables them to anchor a digitally enabled warfighting force, the CH-53K is built from the ground up to operate in this context. Neither the CH-53E or the legacy U.S. Army medium-lift helicopters are.

One of those capabilities is the new cockpit in the aircraft and how digital interoperability and integration with the evolution of the Marine combat elements more broadly is facilitated by the operation of a 21st century cockpit. The cockpits are very different and fit in with a general trend for 21st century aircraft of having digital cockpits with combat flexibility management built in.

Because the flight crew is operating a digital aircraft, many of the functions which have to be done manually in the E, are done by the aircraft itself. This allows the cockpit crew to focus on combat management and force insertion tasks. And the systems within the cockpit allow for the crew to play this function.

This means that the K and its onboard Marines and cargo can be integrated into a digitally interoperable force. This means as well that the K could provide a lead role for the insertion package,

or provide for a variety of support roles beyond simply bringing Marines and cargo to the fight. They are bringing information as well which can be distributed to the combat force in the area of interest.

We have focused on the shaping of a future combat system in Europe for several years. And last year published a report which provide an overview on its evolution.

The Future Combat Air System (FCAS) is a core initiative of the Macron Administration for both defense modernization and building out defense cooperation with its core Airbus allies, Germany and Spain. The Administration is committed to the modernization of their core combat fighter aircraft, the Rafale, for the next thirty years. But FCAS is designed to deliver a next generation fighter aircraft.

This project is designed to replace both the Rafale and the Eurofighter with a "combat cloud" ready aircraft, that is one designed to work interactively with other air assets in delivering the desired combat effects.

It is a clear response to what the Macron Administration views as the F-35 challenge to European sovereignty. And indeed, European sovereignty is a key part of the Macron version of Gaullism, much like the General launched the independent nuclear deterrent.

At its core, the goal is for Germany and France to work closely together in shaping this new collaborative venture. But the significant disconnect between defense inn Germany and France poses a core challenge to the project. And different approaches to arms exports also affects the program and its future.

Even more significant is the pressure of time. Europe is being challenged by Putin significantly. Does Europe have time to wait for enhanced sovereignty in exchange for enhanced defense capabilities in the near to mid- term?

The F-35 is already a significant player in European defense and will steadily enhance its role in the mutli- domain defense being shaped by NATO. The interoperability efforts of NATO are a key part of the Macron Administration's approach to defense as well, so FCAS will be designed to work with core allies as the program evolves.

But there is a major challenge facing networking in defense, as several initiatives are underway to shape secure communications for the combat force, and some of those clearly are designed to leverage new civilian technologies like 5G.

Additional CH-53K Operational Capabilities Which Fit Right In with German Forward Defense

If this was the Cold War, where the primary focus was really upon moving support around Germany to reinforce the direct defense of Germany, then there might be a compelling case for the legacy Chinook.

But that is not what Germany is facing in terms of the return of direct defense in Europe.

Germany faces the challenge of reinforcing their Baltic brigade, moving rapidly to reinforce Poland, and to move force where appropriate to its Southern Flank.

In the 2018 Trident Juncture exercise, German forces moved far too slowly to be effective in a real crisis, and it is clear that augmenting rapid insertion of force with lift is a key requirement for Germany to play an effective role.

This is where the CH-53K as a next generation heavy lift helicopter fits very nicely into German defense needs and evolving concepts of operations.

The CH-53K operates standard 463L pallets which means it can move quickly equipment and supply pallets from the German A400Ms or C-130Js to the CH-53K or vice versa.

This is not just a nice to have capability but has a significant impact in terms of time to combat support capability; and it is widely understood that time to the operational area against the kind of threat facing Germany and its allies is a crucial requirement.

With an integrated fleet of C-130Js, A400Ms and CH-53Ks, the task force would have the ability to deploy 100s of miles while aerial refueling the CH-53K from the C-130J.

Upon landing at an austere airfield, cargo on a 463L pallet from a A400M or C-130J can trans-load directly into a CH-53K on the same pallet providing for a quick turnaround and allowing the CH-53K to deliver the combat resupply, humanitarian assistance supplies or disaster relief material to smaller land zones dispersed across the operating area.

And supporting the kind of distributed force which Germany and its allies are working to enhance survivability. but through shared C2 and ISR gaining the kind of integratability to deliver the lethality needed for a deterrent and combat force.

Similarly, after aerial refueling from a C-130J, the CH-53K using its single, dual and triple external cargo hook capability could transfer three independent external loads to three separate supported units in three separate landing zones in one single sortie without having to return to the airfield or logistical hub.

The external system can be rapidly reconfigured between dual point, single point loads, and triple hook configurations, to internal cargo carrying configuration, or troop lift configuration in order to best support the ground scheme of maneuver.

If the German Baltic brigade needs enhanced capability, it is not a time you want to discover that your lift fleet really cannot count on your heavy lift helicopter showing up as part of an integrated combat team, fully capable of range, speed, payload and integration with the digital force being built out by the German military.

It should be noted that the CH-53K is air refuelable; the Chinook is not. And the CH-53 K's air refuelable capability is built in for either day or night scenarios.

A 2019 exercise highlighted the challenge if using the Chinooks to move capability into the corridor. In the Green Dagger exercise held in Germany, the goal was to move a German brigade over a long

distance to support an allied engagement. The Dutch Chinooks were used by the German Army to do the job. But it took them six waves of support to get the job done.

Obviously, this is simply too long to get the job done when dealing with an adversary who intends to use time to his advantage. In contrast, if the CH-53K was operating within the German Army, we are talking one or two insertion waves.

And the distributed approach which is inherent in dealing with peer competitors will require distributed basing and an ability to shape airfields in austere locations to provide for distributed strike and reduce the vulnerabilities of operating from a small number of known airbases.

Here the CH-53K becomes combat air's best friend. In setting up Forward Operating Bases (FOBs), the CH-53K can distribute fuel and ordnance and forward fueling and rearming points for the fighter aircraft operating from the FOBs.

Being a new generation helicopter it fits into the future, not the past of what the Bundeswehr has done in the Cold War. It is not a legacy Cold War relic, but a down payment on the transformation of the Bundeswehr itself into a more reactive, and rapid deployment force to the areas of interest which Germany needs to be engaged to protect its interests and contribute to the operational needs of their European allies.

From an operational standpoint, the K versus the E or the Chinook for that matter, offers new capabilities for the combat force. And from this perspective, the perspective of the two platforms can be looked at somewhat differently than from the perspective presented in the Thompson article.

Next generation air platforms encompass several changes as compared to the predecessors which are at least thirty years old or older, notably in terms of design. Next generation air platforms are designed from the ground up with the digital age as a key reality.

This means that such systems are focused on connectivity with other platforms, upgradeability built in through software enablement and anticipated code rewriting as operational experience is gained, cockpits built to work with new digital ISR and C2 systems onboard or integratable within the cockpit of the platform, materials technology which leverages the composite revolution, and management systems designed to work with big data to provide for more rapid and cost effective upgradeability and maintainability.

Such is the case with the CH-53K compared to its legacy ancestor, the CH-53E or with the venerable legacy Chinook medium lift helicopter.

Comparing the legacy with the next generation is really about comparing historically designed aircraft to 21st century designed and manufactured aircraft. As elegant as the automobiles of the 1950s clearly are, from a systems point of view, they pale in comparison to 2020s automobiles in terms of sustainability and effective performance parameters.

To take two considerations into account, the question of customization of the German and Israeli variants and the question of sustainability both need to be considered with next generation in mind.

With regard to customization and modernization, digital aircraft provide a totally different growth path than do a legacy aircraft like the CH-53E or the CH-47.

Software modifications, and reconfigurations can provide for distinctive variants of aircrafts in a way that legacy systems would have to do with hardware mods.

And with regard to security levels of information flows, software defined systems have significant advantages over legacy systems as well.

With regard to sustainability, NAVAIR and the USMC have taken unprecedented steps to deliver a sustainable aircraft at the outset.

With the data generated by the CH-53K, the "smart" aircraft becomes a participant in providing inputs to a more effective situational awareness to the real performance of the aircraft in operational conditions, and that data then flows into the management system to provide a much more realistic understanding of parts performance.

This then allows the maintenance technicians and managers to provide higher levels of performance and readiness than without the data flowing from the aircraft itself.

Put in other terms, the data which the aircraft generates makes the aircraft itself an "intellectual" participant in the sustainment eco system.

This is certainly not the case with legacy aircraft which were not birthed in the digital software upgradeable world.

The next generation system which the CH-53K represents brings capabilities to the challenges which Germany faces in terms of getting force rapidly to the point of attack or defense required by the Bundeswehr.

It is no longer about defending against breakthroughs in the Fulda Gap; it is about moving force rapidly to make a difference in a time urgent combat setting on Germany's periphery and flanks.

Simply buying legacy systems and leaving networked capabilities to show up in a future FCAS really misses the point; integratability has to be built in which it clearly is with the CH-53K.

It is a down payment on building out the kind of networked force Germany has committed itself too with its FCAS commitment.

Put in other terms, platform choices should be considered as well from the vantage point of whether or not that platform choice advances the integratable force able to move rapidly to the point of attack or defense or not.

From this standpoint the choice is clear: The Chinook represents the Cold War past; the CH-53K the future of the integratable force.

With the shaping of a new force structure within the context of the current and projected security context for Germany, it makes sense that each new platform or program be made with regard to where Germany is headed in terms of its 21st century strategic situation, and not be limited by the thinking of the inner-German defense period.

German Forward Defense, Basing Mobility and How the CH-53K Can Help

It is fair to say that no ground combat force is working harder on mobile basing and force distribution than the USMC.

In my view, indeed, some of USMC thinking is far more relevant to the future of the German ground forces than traditional U.S, Army thinking.

Indeed, while in the Cold War the U.S. and German Armies worked force integration, the need to shift to forward defense for an integrated, multi-domain German force is far more similar to the USMC and its focus on operating from mobile bases.

How the CH-53K fits into USMC thinking clearly has relevance to German decisions on heavy lift going forward, notably with the need for integrated lift from the A400M through to the C-130J to its rotorcraft lift force.

In an interview I did with Marines at MAWTS-1 earlier this year, USMC thinking about the K and force mobility was highlighted and along with it clear potential lessons for German armed forces which would operate forward but need to work force distribution for survivability as well.

That interview was conducted during the first week of April 2022 and I published the interview on May 20, 2022.

During my recent visit to MAWTS-1, I had a chance to talk with two Marine Corps officers with significant experience in working force distribution and sustainment issues with USMC heavy lift assets. With the coming of the CH-53K, the capability of the USMC to work distributed operations, from the sea, from the land, or in support of the joint force is significantly enhanced.

I met with Maj Sean Charvet and Capt Vihlen who spearhead the work of MAWTS-1 on heavy lift training and mission planning for using the unique heavy lift helicopter capability which the USMC has and is in the process of introducing the CH-53K, ramping up their capabilities as well.

The CH-53E and the CH-53K are both heavy lift helicopters unlike the Army's Chinook series, which are medium lift helicopter. And both the E and the K are air refuellable helicopters, whereas the Chinook has some versions which are and most that are not. As one of the participants put it: "When discussing lift capacities of a helicopter, it is very dependent on environmental conditions. With the K we will see a consistent significant lift capacity at the higher end. So if you have to lift 20,000- 25,000 pounds, you might start taking things off the plane to make it lighter, which now may reduce the capability, its defensive capability, and your ability to carry troops. What the K provides is a stated capability to do heavy lift and it can do that on any given day. And that is the hardest concept for people to grasp about why the K is so significant for the USMC."

They discussed how distance is a logistics problem. And the air refueling capability as well as the lift capacity of the K provides ways to deal with the distance problem. One way is simply the fact that it can fly further because it is air refuellable. Another way is by the load outs which the aircraft carries mean it can support a wider range of basing locations and support a more widely distributed force.

This is especially important when comparing what the K can do compared to a fixed wing aircraft like the C-130J. As one participant put it, there are a limited number of airfields to which the C-130J can go. The adversary can plan in advance with regard to where the Marines might go given that logistical support requirement driven by fixed wing sustainment. With the K, there is no such limitation. Force distribution can be determined by need and impact and the K can insert and support and exit with that insertion force.

The officers made the point that the K was coming at the "right time" in terms of the focus on mobile and expeditionary basing but in terms of technological development as well. Because of the automation built into the aircraft, the crew can focus on mission management. And as a fully digital aircraft with slots for new digital capabilities, the aircraft can be part of a C2 mesh network and facilitate integration of a distributed force.

We discussed the role as well of seabases as mobile assets and how these seabases can operate as "mother ships" to insert, support and withdraw insertion forces. They made the point that a rotorcraft has a significant advantage over a small ship like the LCAC in doing so. As one participant put it: "If you can track an asset, you can target it. The advantage we have in our helicopters is our capability to manage our paths to deploy and support force. We do not need to go from a fixed point to a second fixed point; we can operate with variable tracks and as the ship we launch from is moving as well. An asset like the LCAC while very valuable is not a very flexible deployment asset."

Throughout the discussion, the officers highlighted in a variety of ways why they believed the K was coming at the right time. One aspect was that although the systems which allow automation on the K were new to heavy lift, they are not new to military or commercial aviation. That just simply had not been applied to heavy helicopter lift before.

They have both worked the fuel delivery side of USMC operations for many years. And in discussing the contribution of the K to the projected need to operate distributed bases, they emphasized that the lift capacity and flexibility of the K would be crucial to enabling effective sustained distributed force operations. This is how one participant put it: "Whether its an organic USMC or joint force asset, we can refuel multiple assets based on what a K can do, because it just carries more. It just has more capacity to carry the things that you need."

For the Marines, the air element supports the ground combat element. So force integration is not a nice to have capability, it is a driver of the kind of training and operations which the Marines do. That particularly goes to the point of information sharing and integration between the air and ground combat elements. Working expanded and effective networks are a key part of the way ahead for the USMC, notably as it works towards greater integration with the joint force. Here the coming of the K as an all-digital aircraft can be part of the digital transformation of the USMC as it goes down the path of enhanced methods and approaches to force distribution.

Indeed, the K is coming at the right time to the USMC.

Leveraging the Integrated German Lift Force for Enhanced Multi-Domain Operations

The lift fleet is a key enabler for German forward defense.

An ability to deliver integrated operational capability from that fleet will be a key element for supporting forward deployed or reinforcement forces, and an ability to operate in a distributed manner across an extended battlespace.

My colleague John Conway, who is also a Research Fellow at the Williams Foundation in Canberra, Australia, as am I, highlighted the key challenge facing force structure development going forward.

As the ADF moves forward, Conway has underscored the "triangle of tradeoffs" for development of the force, namely, lethality, survivability, and affordability. It is not about investing in balanced force development for its own sake; rather investments need to be directed to those elements of the ADF which can deliver lethality and survivability at the most affordable cost.

For a distributed but forward operating force this requires sustainability and an ability to deliver ongoing support to such a force.

And here the role of a lift force is crucial.

And the affordability piece means that enhanced integratability of that force is not just a nice to have but key element for force structure development.

A key element for enhanced lethality, survivability and affordability is to shape a fleet where future capabilities can be anticipated and enabled by that fleet.

For example, enhanced lethality for the German forces and their allies can be delivered from the A400M operating as an arsenal aircraft.

Given the flight stability of the aircraft and the evolving weapons capabilities built around a weapon in the box and loitering weapons, it is clearly possible for the A400M operating at a distance to provide weapons to the kill web enabled force in which a target can be identified by a forward deployed element and weapons fired at distance can be guided to that target.

The KC-130J has already been modified in the Harvest Hawk version for weapons release.

As one article noted: "Dropping bombs out of cargo planes has been a common measure of desperation for under-equipped air forces and opportunistic mercenaries throughout the history of aviation. However, in 2009 the U.S. Marine Corps found a way to make a virtue out of flexibility by developing Harvest Hawk, a kit which allowed their new KC-130J refueling tankers to double as missile-toting gunships and creepy aerial spying platforms that would put the Eye of Mordor to shame."

The point is rather simple: lift aircraft can operate as key elements of a multi-domain force and can more than simply lift assets if so configured.

In an interview I did with a Marine Corps "Harvest Hawk" officer in 2014, this officer highlighted the importance of this element in understanding the lift force.

"The USMC Captain is of the new generation of USMC pilots who have flown the KC-130J from the beginning and so the Harvest Hawk experience seems a "normal" evolution and simply preparing for

the next transition, whereby the "mother ship" can handle data, C^2 or ordinance dependent on the evolution of USMC concepts of operations.

"This is how Captain Jordan put it: "The entire Harvest Hawk experience highlights the utility of a "mother ship" in an air dominance environment. There is no reason that we cannot take data from UAVs or the F-35s or the Harrier litening pods and be able to contribute to combat management or support to the ground commanders."

And with adding an aircraft built for the digital age from the ground up, it can be anticipated that future innovations can be enabled by this aircraft to extend the capability of the force.

Or put another way, the affordability piece of the equation is delivered by the platform's ability to evolve and support survivability and lethality of the force.

In a 2020 interview with Colonel Jack Perrin, Program Manager, PMA-261 H53 Heavy Lift Helicopters, US Naval Air Systems Command at Pax River Naval Air Station, I discussed one aspect of such future development.

As Col. Perrin noted in our conversation: "The USMC has done many studies of distributed operations and throughout the analyses it is clear that heavy lift is an essential piece of the ability to do such operations." And not just any heavy lift – but heavy lift built around a digital architecture.

Clearly, the CH-53E being more than 30 years old is not built in such a manner; but the CH-53K is. What this means is that the CH-53K "can operate and fight on the digital battlefield."

And because the flight crew are enabled by the digital systems onboard, they can focus on the mission rather than focusing primarily on the mechanics of flying the aircraft. This will be crucial as the Marines shift to using unmanned systems more broadly than they do now.

For example, it is clearly a conceivable future that CH-53Ks would be flying a heavy lift operation with unmanned "mules" accompanying them. Such manned-unmanned teaming requires a lot of digital capability and bandwidth, a capability built into the CH-53K.

If one envisages the operational environment in distributed terms, this means that various types of sea bases, ranging from large deck carriers to various types of Maritime Sealift Command ships, along with expeditionary bases, or FARPs or FOBS, will need to be connected into a combined combat force.

To establish expeditionary bases, it is crucial to be able to set them up, operate and to leave such a base rapidly or in an expeditionary manner (sorry for the pun). This will be virtually impossible to do without heavy lift, and vertical heavy lift, specifically.

Put in other terms, the new strategic environment requires new operating concepts; and in those operating concepts, the CH-53K provides significant requisite capabilities.

The ability to evolve into the future is why I highlighted the core point of how very different the CH-53K is with its legacy predecessor.

That is why I raised the point that perhaps it would have been better to call this a CH-55 rather than a CH-53.

This is the conclusion I reached when making the CH-55 argument.

“The CH-53K sets the standard and is the 1st and only true 21st Century Heavy Lift Helicopter.

To be more specific, the current heavy / upper medium lift cargo helicopters that the CH-53K replaces—legacy Chinook, CH-53 A/D/G Sea Stallion, CH-53E Super Stallion and their engines—were literally designed in the mid-20th century.

“In the more than half century that has elapsed between the design of these legacy aircraft and the first flight of the CH-53K in 2015, there have been significant advancements in helicopter design and manufacturing. The CH-53K is superior to its predecessors, not by engineering miracles, but by over a half century of steady engineering and technology progress that was designed and incorporated into the CH-53K from the ground up.

“The King Stallion is a totally new helicopter that leapfrogs the CH-53E design to improve operational capability, interoperability, reliability, maintainability, survivability, and cost of ownership.”

AS Germany considers its vertical lift options, the CH-53K offers real advantages to provide a platform as part of the future evolution of a force which needs to be designed to fight forward.

With the shaping of a new force structure within the context of the current and projected security context for Germany, it makes sense that each new platform or program be made regarding where Germany is headed in terms of its 21st century strategic situation, and not be limited by the thinking of the inner-German defense period.