Rizika související s rozvojem budoucí obranyschopnosti

The Risks of Future Defence Capability Development

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Abstract

In the post-Cold War era the main purpose behind developing defence capabilities in NATO countries has been to achieve a technological advantage over the potential enemy. While it is reasonable in its own right, the complexity and the cost of newly developed military equipment are becoming an issue at both strategic and operational levels. Taking into account all the potential threats in the near future, I will argue that this struggle for ultimate technological superiority might actually decrease the overall effectiveness of the modern armed forces. To analyse this notion, I will describe and assess the current trends in developing armament and, based on the outcome, try to predict the long term effects.

Keywords

Military technology; capability development; future warfare; NATO; EU.
INTRODUCTION

Over the last twenty years the dominating trend was to create highly sophisticated military equipment, which stemmed from the astonishing pace of development of computer technologies. Notably, this resulted in the focus on stealth technology, precision guided munitions, drones, and, broadly speaking, digital battlefield concept.\(^1\) Those and similar technologies constitute an obvious advantage on the modern battlefield, which was first demonstrated, albeit to a limited degree, in the Desert Storm operation in 1991.\(^2\) Nevertheless, having such superiority over the enemy capabilities comes at a price: very high procurement cost, lower reliability, more complicated and expensive maintenance and personnel training. Most importantly, it results in smaller amount of such equipment on the field. Therefore, it is reasonable to assume that at a given point this technological “advantage” may turn into a “disadvantage”. “If”, “why” and “when” are the issues I will tackle in this article.

The scientific problem that emerges from this thought is whether or not the “disadvantage” described above may have a serious negative impact on the overall future defence capabilities of the western militaries.\(^3\) However complex this issue is, there are certain fundamental factors the can be analysed to give an acceptable, if not sufficient answer. The hypothesis here, unsurprisingly, is that despite the drawback of using highly sophisticated military equipment, its advantages will eventually prove more important than the strength in numbers. The experience based on the outcome of recent conflicts (especially those involving the United States) has proven it repeatedly.

The direction in which the future military capabilities are developed is a relevant issue especially in the times of current financial crisis. Shrinking defence budgets, rising cost of armament development and a shift in focus of politicians to social issues are going to seriously handicap military spending. Therefore cutting the cost of developing defence capabilities should be an observed trend – surprisingly it is not.

In my article I will refer to two entities to exemplify my arguments:

- The United States;
- The European Union (as a whole and as individual states).

Reasons for choosing the United States as point of reference in a discussion on future military technologies are obvious. This country has the most powerful military, the highest defence budget and (arguably) the most advanced defence technology in the world. It also dictates trends for others to follow (a sudden demand for stealth features in many forms of newly procured armament being a prime example). Besides, the idea of “following military trends” is in itself an interesting phenomenon that deserves a separate article.

The EU, on the other hand, is an interesting area due to its complexity. Defence programmes within the EU have been on a national, multinational and EU-wide\(^4\) levels. Those levels add depth to the discussion on the future developments of military capabilities. Although most of the examples presented in this article come from the US, the main idea behind my arguments is more relevant to the EU. This is because the US Armed Forces possess more redundancy: even if several of their (even major) defence programmes fail, they still have backup in the form of relatively “up to date”


\(^3\) as they are the ones who seem to be most dedicated to follow this path of development.

capabilities. The EU does not enjoy such a luxury – new equipment is usually being developed and procured when the old one is reaching the end of its service lifetime (or is past that point). Therefore, choosing an “erroneous path” in developing defence capabilities may have a long-lasting, negative impact on the EU Member States. Of course, perceiving the EU as a monolithic structure is simplistic at best. But it can be argued that there is an EU-wide “mentality” of developing capabilities that differs significantly from the US approach. Due to the fragmented defence industry, national interests and other factors, the EU countries, despite having a comparative (although still lower) collective potential, are paying much more for much less when it comes to capability development. So while no single EU country can be compared to the US, their combined military potential is a force with a great global impact. The issue of common development of capabilities can be quite well illustrated on the example of countries like the Czech Republic or Poland, which need to be very careful with how they spend their military budgets.

Although in my article I often use the terms “quality” and “quantity”, I am aware that the issue I am tackling is far from being a simple contrast between the two extremes. However, for the purpose of simplicity, I will refer to the matter discussed as “quality over quantity”. For the purpose of this article, I will assume the following definitions of those terms:

- **Quality** – very advanced and expensive capabilities, available in relatively low numbers (e.g. F-22, Seawolf SSN, Merkava);
- **Quantity** – widespread, up-to date, but still relatively cheap capabilities (e.g. F-16, T-72).

At this point it is important to note that the word “capability” (in the sense used in the present article) primarily refers to armament and equipment, rather than the traditional elements associated with this term: doctrine, organization, training, material, leadership and education, personnel, facilities and interoperability.⁵

I will mostly refer to the examples of air force and navy capabilities, as they better exemplify my argument than the army capabilities. The main reason for this is that the latter are less technology-driven and, taking as an example the current US and EU main battle tank programmes, their development is more focused on evolutionary rather than revolutionary approach.⁶

A significant inconvenience in discussing the direction of developing future military capabilities is that explaining this strategic level problem requires, to some extent, operational (or even tactical) level analysis. The author considering himself an expert on the former rather than the latter will aim not to abuse the operational area of considerations.

**THE POSSIBILITY OF FAILURE**

“The costs of new generations of capabilities are continuously increasing. As a Chief of Defence I used the rule-of-thumb that new generations of capabilities double in price every 15-20 years. Rise in quality has partly been able to compensate for losses in quantity, but numbers are now so many times lower, that the whole structures have become extremely fragile. Looking a few years into the future it is simple mathematics to predict that many Member States will be unable to sustain essential parts of their national forces, air forces being the prime example.”⁷

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The above quote by general Håkan SYRÉN, the former chairman of the European Union Military Committee, reveals that the quality – quantity factor of developing defence capabilities is already considered as an emerging threat by military planners. It is worth noting, however, that in his speech general SYRÉN did not question the need for quality in procured defence capabilities. He just contested the EU member states’ ability to provide those quality capabilities in sufficient numbers. This shows that currently the problem is not regarded as choosing quality over quantity (or vice versa). The military planners still believe that it is purely a financial problem, with governments failing to compensate for the ever-increasing cost of armaments. However, how can they be asked to compensate if the financial condition of most western countries does not allow them to rise their military spending in any significant way in the foreseeable future?

It needs to be seriously taken into account that in the future 10-20 years the defence budgets will not be increased significantly. If so, the question of quality over quantity as a capability development strategy becomes more relevant. Of course, this dilemma should never be regarded as two-sided. The defence capability pool does not consist of “state of the art, extremely expensive capabilities” and “obsolete, cheap capabilities”. There are many in-betweens and I will argue that the current trend is to choose the extreme on the side of quality. Of course, this “extreme” is also relative. In the US, the extreme example would be the F-22. In the case of Europe, it would be the Eurofighter or the Rafale which, taking into account the price factor, are more comparable with the US F-35 – a “cheap” alternative to F-22.  

As I have briefly stated in the introduction, in the US the development of defence capabilities, from the discussed perspective, is significantly different than in the EU countries. Having an extremely high (when compared with the EU) defence budget combined with both political and public support for maintaining a powerful military allows the US to develop several defence programmes for the same capability. One example of this was already mentioned above with F-35 being a cheaper alternative to F-22 (183 F-22s are currently in service while a total of 2,443 F-35s are planned to be procured), that is expected to supplement the latter in terms of quality. A similar example is the discontinuation of Seawolf SSN programme in favour of the more affordable Virginia class. Only three Seawolf submarines have been constructed, while 18 Virginia SSNs are expected to enter service. This however does not mean that the US has abandoned the “path of the quality”, as the F-35 and Virginia are both very expensive, complicated pieces of armament. They are just not as “extremely” expensive and complicated as their sister programmes. Moreover, the US maintains a large number of “quantity” capabilities and more importantly – the ability to produce and upgrade them (the continuous productions of F-16 for export is a good example of this).

In the EU, the defence capability development is much more complicated for two main reasons:

- The EU member states, unlike the US, cannot afford to develop one capability through several defence programmes, nor can they choose to abandon a programme that has become too expensive (i.e. Airbus M400) and start a new one with lower requirements (as it was the case with Virginia class SSN);
- Individual EU member states (the wealthier ones) are forced to develop core capabilities nationally (or in small groups of countries) due to political and industrial reasons.

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Since, for the time being, the Europe has failed to create a unified defence industry,\textsuperscript{13} the EU as a whole actually does develop one capability through several defence programmes. Not as a quantity alternative for quality capabilities, but rather as several simultaneous programmes for quality capabilities. The best exemplification of this would again be a multirole fighter aircraft. Eurofighter, Rafale and (to a lesser extent) JAS 39 Gripen programmes essentially achieve the same result, while tripling the cost of development and significantly rising the cost of procurement (the price being largely dependent on the number of armament purchased). Therefore, France, Sweden, and countries participating in the creation of Eurofighter have paid for three R&D programmes, three assembly lines, and three maintenance and logistic support efforts. But the outcome is the same (or even less) than in the case of a single US programme, while the number of procured equipment is much lower. As mentioned before, the Czech Republic and Poland can also serve as good examples of this. Both countries in the last decade have conducted two major procurement programmes: multirole jet fighter and infantry fighting vehicle. Czech Republic has chosen JAS 39 and Pandur 2 while Poland decided to buy F-16 an Patria AMV. The question is how much more could be procured if those two countries decided to run a single programme? And how much more could be procured if all (or most) EU countries could buy armament within a single contract. Of course, there are obvious reasons that prevent this scenario from happening (national economic interests mainly). But if it does not happen, then what are we left with? Imagine that in 2030 the Czech Republic and Poland are planning to procure a new jet fighter. Taking into account the expected price of F-35 (about three times as much as F-16), how many of those (or its equivalents) would be procured? A single squadron? Or would the Czech Republic and Poland decide to relay on NATO Air Policing and resign from their air force altogether? The amusing scenario emerges when no single EU country is left to provide the assets for Air Policing... An additional problem is that some countries choose to procure the US armament over the European one. In summary, the EU, in comparison to the US, is paying much more for much less. This is the main reason for my initial statement, implying that the EU (as a whole and not as individual countries) is more affected by the “quality trend” then the US. It simply does not have a comparable capability redundancy. The only advantage of the EU from the discussed perspective is that it does not aim at simultaneously sustaining several major operations and tends to apply diplomatic approach to resolve conflicts.\textsuperscript{14} Therefore, in the near future, if we exclude the possibility of a large-scale conflict, the EU does not need as many forces as the US with its global-wide military presence.

In summary, the possibility of capability shortage (for whatever reason) is emergent and should not be dismissed lightly. As described above, the high cost and level of complication of armament is considered a threat by military planners, which results in withholding or suspending some of the most expensive programmes. Despite this, the “trend” for technological supremacy has not diminished and there are still programmes (like DDG 1000, which will be discussed later) where the approach of high-cost, high-technology, low-quantity is applied. The question that I will try to answer in the next section is why the armed forces continue on this path\textsuperscript{15} despite knowing the risks.

THE RATIONALE BEHIND TECHNOLOGY FOCUS AND ASSOCIATED RISKS

The development of highly advanced military capabilities is more than just an armed forces' strategy for conducting future warfare. It is strictly connected to how the politicians and society view current conflicts, what kind of results they expect to achieve and how much risk they are willing to take. Judging from the post-Cold War era conflict history, it is safe to assume that both politicians

\textsuperscript{13}I will avoid elaborating on this subject as it greatly exceeds the topic of this article and is mostly related to the problems of implementing Common Security and Defence Policy.


and society are expecting quick, decisive victories with minimal own loses. The reasons for this constitute a complex issue, however, for the purpose of this article, I will assume that it is mainly connected to the fact that all of the modern conflicts for the US and the EU were conducted outside their territory. Therefore, without a sense of threat (the 9/11 attack being exception to this), the public opinion will not support prolonged conflict, nor will it justify even moderate own losses. From this perspective, military planners are forced to devise means to meet those expectations. Hence they pursue technological supremacy, as it allows achieving high effectiveness and low causalities at the same time. This approach, as recent operations in Afghanistan and Iraq have shown, is proving to be successful. However, it may not be the case when faced with a global conflict and adversary with comparable potential. Adding to that, in the case of the EU, recent operations have also shown that some capabilities are already at critical levels of availability (e.g. the lack of air to air refuelling capability in Libya). In this regard the quality – quantity problem starts to become more apparent.

When considering the use of highly advanced capabilities, two of their fundamental properties need to be taken into account:

- The effectiveness of carrying out operational (tactical) tasks with the use of advanced, high-technology “quality” capability in relation to carrying out the same tasks with much less advanced, “quantity” capability (essentially the offensive aspect of the capability);
- The cost-effectiveness of enemy defences specialised in dealing with certain capability, whether it is a “quality” capability or not (the defensive aspect of the capability).

The assumption is that the above elements derive from the self-explanatory need for maximum power combined with the best survivability. As this requirement for military equipment could be dated back to the times of “sword and shield”, a more detailed, modern perspective is required. In the 21st century the rationale for developing and procuring “state of the art” weaponry, above all else, results from the following needs:

- To completely negate enemy defences, striking precisely at designated targets, thus avoiding prolonged conflict, excessive use of ammunition, collateral damage, etc.;
- To provide maximum protection for military personnel and equipment, ensuring minimal loses for continued public support and avoiding damage to expensive armament.

The above statements essentially describe the US and the EU armed forces’ answer to public opinion’s demands discussed earlier. As already stated, the disadvantage in numbers does not seriously affect the operational outcome on today’s battlefield. Can this change in time if the “quality” trend persists?

As it is initially indicated in the previous section, the technological superiority of line (battlefield) equipment provides local tactical advantage over the enemy, allowing to inflict maximum damage while sustaining minimal loses. The key words here are “local tactical advantage”. It means that when a military unit committed to carry out a certain tactical task encounters an enemy force suited to contest achieving that task, this unit is expected to overpower the enemy. This statement may be simplistic from the operational level perspective, but for the purpose of the strategic level analysis I consider it sufficient. Nevertheless, when this local tactical advantage is derived from technological superiority, I am assuming that it implies the following:

- A superior weapon type will defeat an inferior weapon type;
- The side with technological superiority will be inferior in terms of quantity of forces;
- To a certain degree, technological superiority will overpower the numerical superiority.

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To better illustrate this assumption, let me consider the F-22 Raptor 5th generation air superiority fighter. According to the official US government data, a flight of F-22s is expected to be able to overpower a numerically superior enemy force. For the purpose of this paper it does not really matter what the exact figures look like (neither the producer, nor the US Department of Defence provide such estimates anyway). What matters is that this type of equipment is expected to achieve a local tactical advantage over an enemy superior in numbers. To this point developing technologically superior equipment seems to be obvious. But then again we were only considering the “tactical level”. On the operational level the situation changes. An operational situation is based on a number of tactical situations (risking an oversimplification). So achieving a tactical advantage in all those situations will transform into an operational advantage. Is that correct? Yes, as long as you have enough forces to engage the enemy in all tactical situations.

The question that derives from the above statement is as follows: “can the enemy have such superiority in numbers, that despite achieving tactical advantage in several tactical situations (due to the technological superiority) the enemy will be able to achieve an operational advantage by attacking where our forces are simply not present?” This is especially relevant to the F-22 programme because initially, in the fiscal year 1991, 684 aircrafts were planned, while only 183 were finally approved by the Congress. Of course, back in 1991 the JSF programme (the F-35), which now is expected to provide “the numbers” for the Air Force, was not on the table, but then again, F-22 was not expected to replace all the fighter aircraft types the F-35 will replace (A-10, F-16, F/A-18, AV-8B). The air force is the most mobile and easy to redeploy asset of any armed forces. What about submarines or carriers? There are already countries in the world who posses only one aircraft carrier (Russia, France). What is the value of a single item of armament in the event of an armed conflict?

Today, the answer to the above question is most likely “no”. The US and (to a lesser extent) the EU have still large numbers of previous generation armaments. Despite the fact that that 5th generation fighters (F-22, Rafale, Eurofighter) are in line for some time now, all the Air Forces using those aircrafts still largely rely on 4th generation fighters for operations. But can we imagine a situation in 20-30 years where 6th generation fighters will not have that kind of support? When asking this question I am not assuming that current 4th generation planes will still be in use – I am assuming that some countries may chose not to develop the 5th and 6th generation aircrafts, but instead focus on improving the current 4th generation models (4th+ generation: represented e.g. by the F-15 Silent Eagle prototype). The most extreme example of such possibility are the US strategic bombers currently in service. The figures are: 85 B-52, 66 B-1B, 20 B-2. But B-52s have over 60 years and B-1Bs over 20. What will happen when those two types of planes end their service? Will the US military produce a successor? If so, how much more advanced will it be and how much more will it cost? Finally, how many of those future bombers will be produced, considering the constant drop in demand? The last example is the new DDG 1000 destroyer programme. Eight to twelve planned

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18 GERTLER, ref. 17, pp. 11-12
20 There is a discussion between F-22, Rafale and Eurofighter producers on those aircraft belonging to the 5th generation. This should be considered a sales pitch as all those aircraft, despite differences, are the most technologically advanced fighters currently in service.
ships were reduced to 3 due to the budgetary constraints.\textsuperscript{26} Compared to 56 Arleigh Burke class destroyers in service,\textsuperscript{27} that is not enough even to carry out their most important task – providing defence for the aircraft carriers (US Navy has a legal obligation to maintain 11 carriers at all times).\textsuperscript{28} The situation with the EU navies is even more dire, as there are no up-to-date older generation ships that could supplement the newly acquired armament. France has replaced its 2 Clemenceau class carriers with a single Charles de Gaulle, while the Royal Navy Queen Elisabeth was close to being a victim of budget cuts.\textsuperscript{29} The number of procured Rafale and Eurofighter aircraft is also lower than their 4\textsuperscript{th} generation counterparts. All of the above examples show that the numbers are dropping. This is all without considering such elements as rising maintenance and training cost, as well as technical reliability. To once again quote F-22 as an example, according to congressional reports, this index (referred to as “mission capable rate”) is at 60\%, which is deemed unacceptable by the US Air Force standards.\textsuperscript{30} Such situation translates into a further drop from the already low number of aircrafts in service, when almost a half will be undergoing maintenance at any given time.

As can be concluded from the above examples, the focus on “quality” capabilities is proving to be problematic, but not to a critical degree. So are we reaching a point where the enemy has such superiority in numbers that it will overpower us despite our advanced technologies? In the case of the US Armed Forces the answer is most likely “no”. The US can afford to maintain “quality” capabilities along with “quantity” ones, at least in the foreseeable future. As for the EU, I would hesitate on saying “yes” and would instead lean towards answering “maybe”. It is hard to dispute that Europe has a shortage of key capabilities, but due to its peace-oriented policy (at least more peace-oriented then in the case of the US) and lack of a well-defined enemy this shortage is not proving to be critical from the strategic perspective.

Finally, the last factor to consider is the time. The quality trend may not be called an “erroneous path” in capability development today, but how will it affect the future armed forces, beyond the current planning horizon?

**“QUALITY” CAPABILITY DEVELOPMENT BEYOND 2030**

Most of the NATO and EU unclassified, long-term strategic planning documents (i.e. the NATO Multiple Futures Project\textsuperscript{31} or the EU Long Term Vision\textsuperscript{32}\textsuperscript{35} do not exceed the 2030 timeframe.\textsuperscript{34} Consequently, the future capability development to this date, at least to some degree, has already been


\textsuperscript{30}GERTLER, ref. 17, p. 18


\textsuperscript{33}Both should be regarded as ACT and EDA “suggestions” rather than documents adopted by Member States, but that seems to be the general nature of long-term planning in both EU and NATO.

\textsuperscript{34}NATO Defence Planning Process and EU Capabilities Development Process, which are the most crucial multinational capability delivery tools, are concentrated more on mitigating current capability shortfalls than seeking long-term solutions. See The NATO Defence Planning Process, NATO official website [online]. 2012 [cit. 2014-05-22]. Available from: http://www.nato.int/cps/en/natolive/topics_49202.htm
set by military planners. Of course it can be changed, but as modern capability development programmes (the major ones) take more than a decade to complete, the whole process should be considered largely inert. In scientific research, as a rule, any long term projections reaching beyond 25 years should contain variants. Nevertheless, I will avoid this path because, while it is easy to construct those variants for the discussed topic, I consider it impossible to predict the probability of each variant (as the number of factors involved is immense and it would require a separate study just to list them). The variants themselves would be built around two main factors: the chosen path of developing future defence capabilities (“quality”, “quantity”, or something in-between) and type of operations that they will be required for (essentially two extremes – low scale and intensity asymmetrical operations or full scale conflict between major powers – will make the difference). Considering the above, instead of comparing those factors, crosschecking them and building variants around their analysis, I will try to describe conditions in which concentrating on highly advanced capabilities may prove to decrease the overall effectiveness of the modern armed forces.

Beyond the year 2030 the global situation can be expected to change in a way that new powers may arise that will be able to contest the economic and military supremacy of the US and the EU. China and India are the most often listed candidates in scientific and political analyses. If a conflict between those major powers erupts, than the “quality” capabilities (providing that this path of capability development is continued) would be used in different conditions than those in which they operate now. The potential adversary would have larger, better equipped and much more efficiently commanded forces than the militaries or militias the US and the EU face in today’s asymmetrical or low intensity conflicts. Also, there would no longer be a “safe infrastructure” for maintaining armament, as the enemy would most likely possess intercontinental strike capability. From this perspective, the use of highly advanced, low number capabilities would be much more difficult than today. Certainly the technological edge would still prove tactically advantageous, but the downsides of the “quality” capabilities could have equal or greater effect.

The second factor that could influence the use of “quality” capabilities is the available support of the older type “quantity” capabilities. According to some planning documents, a critical period may arise just after 2030, when the currently used 20th century armament will reach the end of its lifetime with no possibility for further upgrade or refit. This will produce a significant shortage in available equipment that could create a “snowball” effect with the disadvantages of relying on highly advanced armament. When faced with a global conflict, the combination of those factors could be considered threatening from the strategic perspective.

The last element I would like to mention is the cost-effectiveness of some of the most technologically advanced capabilities. In their article on “Challenges of a Multi-Polar Nuclear World” Yehoshua Socol, Moshe Yanovskiy and Michael Bronshtein discussed the advantages and disadvantages of active missile defence systems.

They argue that, even assuming high effectiveness of this asset, the enemy can defeat it by simply increasing the number of missiles, which are cheaper and easier to produce than the antimissiles (coupled with the need for extremely expensive early warning and C2 systems). When such capabilities (other examples would include supersonic bombers, railgun technology, anti-missile lasers etc.)

are a primary if not the only type of armament available, then their technological superiority becomes a disadvantage.

If three factors discussed in this section occurred together, reliance on technologically highly advanced capabilities could be considered as significantly increasing the possibility of an operational failure.

CONCLUSION

Choosing the path for development of future defence capabilities depends not only on armed forces plans and strategies. It is also dependent on political goals, public support and the global context in which the modern and future military operations are carried out. Taking all of those factors into account, the current capability development trend in the US and in the EU armed forces can be considered justified and highly rewarding. New technologies allow to quickly and successfully conduct operations and, more importantly, save soldiers’ lives. However, in some conditions, like those described in the previous sections, the technology-focused capabilities may prove inadequate. Therefore a shift in the current capability development trend should be considered by military planners, especially in the current financial situation. The element that seems to be missing is the right balance between “quality” and “quantity”.

So did the initial hypothesis proved to be correct? Considering the fact that there is a limited value in long term assessments I incline to conclude that it did not. The prime example, the United States, are able to “get away” with “quality approach” because they can support it with the huge number of “quantity capabilities” that are comparable, if not better than “quantity capabilities” of potential foes. The other countries (the assumption is that it means the EU states) don’t have that luxury. Their choice is to go either for “quality” or “quantity” and when they make a wrong step in their selection then they will be left with nothing to rely on. A closer observation also reveals that there is also a different approach in tactical employment of “quality capabilities”: whereas the US can use them as elite force dedicated to the task of achieving tactical advantage in critical areas of operation, the other states will have to use them in tactical situations where their technological superiority may not be required. To put it simply, the lack of “quantity capabilities” may force those courtiers to misuse their valuable “quality” assets. The last thing to consider is the actual number of highly advanced equipment. In the case of EU states they are approaching a point where numbers are so low that any form of employing them becomes problematic.

Taking into account all of the above, it is clear that a synthesis of strategic, operational and technical analysis on the discussed subject should be conducted in order to give a definite answer on the “best path” for future capability development. The current “trend”, for countries other than the US, is a risky one at best.