



*Changing Character of War Centre
Pembroke College, University of Oxford
With Axel and Margaret Ax:son Johnson Foundation*

‘From Concept to Capability’: the Russian Approach to Capability Development

Carl Scott¹
September 2018

The Russian approach to the development of military capability has evolved significantly since 2008, when a major review process was initiated across Defence. Many years of attempted reform had been stifled by the objections of the Armed Forces and precepts of Marxist-Leninism, which held on to the notion of mass conscription. Significant failings exposed by the conflict in Georgia in August 2008 precipitated a crisis which allowed President Putin to appoint an outsider to defence, Anatoly Serdyukov,² to oversee significant and unpopular change. The subsequent transformation programme sought to redress the loss of competitive edge during the years of stagnation that had marked the closing years of the Soviet Union and the chaos of political transition following its collapse.

Widespread conceptual, material and organisational changes were introduced, with particular focus on seeking opportunities to respond to the evolving capability of competitors through emerging technologies. Global coverage of US use of precision and networked weapon systems in its campaigns in the Middle-East was in stark contrast to the inefficiencies exposed in Russian operations in the Transcaucasian region. The loss of the mass available to Soviet planners, who could draw on a conscript army generated through a national mobilisation process during the transition to war, meant that modernisation was the only credible alternative to irrelevance – and vulnerability. Forces were henceforth intended to be held at high readiness, equipped with a full spectrum of contemporary capability and manned by professional operators.

The system of military research and development that emerged during this process retained the traditional General Staff approach to measuring capability and advocating military dominance at all levels of war, while introducing substantial investment in new structures whose shape and connectivity were drawn from competitors’ experience of exploiting technological advances. It is, essentially, a two-pillared approach, with the General Staff overseeing the military requirement through a process of forecasting and anticipating the required balance of forces to win any likely exchange, and a novel cooperative scientific community, called the Advanced Research Foundation (ARF), scanning the horizon for emergent technologies with military application. To some extent, this aspect of the process was intended to reflect the phrase, frequently (and probably erroneously) attributed to Lenin: ‘technology shapes the tactics’.

¹ Carl Scott served as the UK Defence Attaché in Moscow from 2011-2016, during which time he was awarded the CBE for his contribution to UK Defence Policy on Russia. Since departing the Armed Forces in December 2016, he has established a consultancy providing advice and insight into the former Soviet Space. © 2018 Changing Character of War Centre. All rights reserved. Material in this publication is copyrighted under UK law. Individual authors reserve all rights to their work and material should not be reproduced without their prior permission. The views and opinions expressed in this article are those of the author and do not necessarily represent the views of the Changing Character of War Centre, or the University of Oxford.

² A summary of his background and role in defence transformation can be found here:
<https://www.globalsecurity.org/military/world/russia/serdyukov.htm> .

The General Staff process for the assessment of required military capability is, in doctrinal terms, one of 'forecasting' (anticipating future developments), determining the 'correlation of forces and means' (the balance of forces, regionally and at each level of war, including the strategic requirement), and the optimum 'forms and methods' – the organisation, tactics and procedures for their delivery. The research and development foundation draws on government institutions, the military-industrial complex and its associated design bureaus, academic and intelligence resources. It is intended to understand, identify, resource and develop projects which could enhance military capability in response to the military threat and balance assessment. It is worth noting that this forum addresses not only the military requirement, but seeks to amplify and modernize capability across the spectrum of power, including avenues exploited by other parts of the state, by civilian agencies, the security and intelligence services or the interior ministry. It is open to examining broader capability fields than physical military equipment, such as behavioural, genetic and biomedical issues to further its goals.

There is cause for caution in determining the relevance of Russian structures and processes and their applicability to UK. The first is one of translation, not merely in literary terms, but in the broader sense. We may not mean the same thing when we discuss apparently similar concepts. For example, we speak of Anti Access Area Denial systems (A2/AD), a field in which Russia appears to prosper. But the concept would be alien to a Russian soldier, who is more likely to think of the prevalence of 'intervention operations' conducted by NATO and the necessary exploitation of distinctive Russian national capability advantage, missile development, to provide a ready counter to the perceived threat. The emergent capability is less conceptual and more circumstantial in origin than might be assumed.

The second consideration is that any idealised process is inherently flawed in execution, and we fail in distinct ways. Russian processes may be unhinged by corruption or false quality reporting, the UK by systemic protection of existing defining capabilities; war-ships, fighter aircraft or armoured vehicles, over novel systems. Thus, our frictions and inefficiencies differ. In the democratic countries, exposure to public criticism results in considerable sensitivity to the fourth estate. Where the media may be controlled, where the popular narrative is more effectively managed by government, it is possible to maintain a long-term vision, an expensive developmental programme over decades, rather than constantly adapting to the next crisis. In the UK, where financial constraints have been the background to the defence budget for decades, the management of decline tends to focus planners and institutions on capabilities which define their unique contribution to defence, thus sustaining the organisation through gradual contraction, 'salami-slicing', rather than managing the introduction of novel or unproven technologies which do not support existing interest groups.

In a period of lavish growth, or pressing national necessity, the capacity to consider new processes, concepts and capabilities can be afforded far greater space and resource to develop at the cost of the evidently redundant. In recent times, Russia has conducted a sustained investment in military and security capability growth over two decades, whilst the United Kingdom has embraced an equivalent period of austerity and economic contraction. Until such time as UK anticipates an existential threat, it could not consider expending the proportion of national wealth currently directed to Defence in the Russian Federation. It could, however, maintain the established levels, with greater procurement flexibility, if institutional inertia were to be reduced.

The Russian Capability Management Process

The Military Contribution, Forecasting and Correlation of Forces:

‘Institutes should make a determination of the optimum Correlation of Forces and Means of the Armed Forces of the Russian Federation, their qualitative and quantitative make-up, and the forms and methods of their combat employment’.³ As the Chief of the General Staff, General of the Army Valery Gerasimov so astutely summarises, the core elements of the military aspects of this process are “forecasting”, or anticipating requirements, “assessing the correlation of forces”, understanding the balance of capabilities and determining “forms and methods”, the structure and methodology for their employment. The task of assessment of correlation of forces sits, primarily, within the General Staff: institutionally it resides in the General Staff Centre for Military and Strategic Studies and the Centre for the Study of Military Potential of Foreign Countries, which are tasked with understanding competitor capability and the Russian requirement to match it. Clearly the intelligence services, as well as military academic and strategic fora, also play a role in this assessment.

Forecasting future requirements, as new technologies change the balance of power, or intentions change in the shifting geopolitical sphere, is tasked to the Military Scientific Committee of the Armed Forces. This organisation traces its roots to the creation of the General Staff on 30 January 1763, but its current format was established on 08 September 2009. It is currently led by a Lieutenant General, currently Igor Makushev, who also plays a role in the collegiate body that directs research. The mission statement for the Committee is: ‘To anticipate developments in theory, training and uses of the Armed Forces, developments of arms and equipment’.

The efforts of these bodies within the General Staff and the Ministry of Defence, are drawn together under the auspices of the “System of Forward Looking Military Research and Development” which is directed by a dedicated Deputy Defence Minister, Yuri Borisov. The mission statement for the organisation is broad:⁴

- To organise research and development in the sphere of Defence.
- To monitor and analyse international science to prevent threat.
- To take advantage of national scientific resources and potential of foreign states for the benefit of national defence.
- To set the stage for competition in promoting and exploiting the development of scientific ideas.
- To organise and finance research projects.
- Create a bank of ideas, innovations and forward-looking technologies and development which can be used to ensure security of the state.
- To organise, monitor and train potential staff in innovation and high technology.

This “system” includes several other subordinate organisations, including:

- The Main directorate of Scientific Research and Engineering Support of Advanced Technologies (Innovative Research) of the Ministry of Defence
- The Main Directorate of Information and Telecommunications Technology of the Ministry of Defence
- The Main Scientific Research and Test Centre of the Ministry of Defence.

This is also the point where it interfaces with the scientific community. The minister has responsibility for defence procurement and serves as a Trustee of the Advanced Research Foundation, the capstone of the broader governmental process to identify and exploit novel technologies and concepts. The profusion of

³ Gerasimov, V. ‘The Role of the General Staff in the Organisation of the Country’s Defence in Accordance with the New Statute on the General Staff.’ *Bulletin of the Academy of Military Science*, 1/2014.

⁴ Extensive material is available on the Russian MoD website, www.mil.ru. The English language version (in this case, <http://eng.mil.ru/en/science/committee.htm>) is useful, but it should be noted that in many areas of the site this is an edited version of the original.

associated institutions contributing to the field is remarkable and may suggest retention of redundancy, or considerable scope for efficiencies. Gerasimov stated in his article in 2012, that there are currently:

- 27 Research Institutions looking at Command Control and Communications
- 46 Research Institutions looking at Weapons
- 18 Research Institutions looking at Foreign States and Intelligence issues
- 25 Research Institutions looking at Logistics

Horizon Scanning: The Foundation for Advanced Research Projects:

'The Foundation's projects are called upon to play a decisive role in the development of key elements of weapons, military and specialist equipment of the new generation. They should become the basis of the domestic armaments system at the turn of 2025-2030, for the Army and Navy, as well as for a number of other branches of production and for other power structures.'

Vladimir Putin⁵

The scientific research and development element of the system for developing 'concept to capability' in the Russian Federation is a novel structure, particularly in the light of the pre-existent stagnation and lack of funding in this area, and was formed for the purpose in 2012. It draws together aspects of the state which previously competed rather than cooperated, enjoys generous funding, high level patronage and a degree of oversight intended to negate the corruption implicit in all governmental activity in the Federation.

It was borne of necessity, delivering a keen sense of purpose, and is the product of considerable research into the equivalent processes utilised by competitor states. The foundation is led by Andrey Grigoriev, General Director of the ARF, who is a reserve Lieutenant-General, a Doctor of Technical Sciences, and Honorary Professor of MIPT.⁶ Dmitry Rogozin, who has served since late 2011 as Deputy Prime Minister for the Military Industrial Complex, oversees the institution as well as holding considerable responsibilities for the formulation of the defence order, delivery of the defence equipment programme, and the health of the military industrial complex, summarised the aim at the foundation of the organisation: *'the sole purpose of this foundation is to close the gap in advanced research with our Western partners after 20 years of stagnation in Russian military science and the defence industry overall.'*⁷

The process began when Russian scientific production and procurement teams were dispatched to explore approaches to the exploitation of emergent technologies in other states over the period 2010-2012, including visiting the UK to research DSTL, before finally writing an assessment and a set of recommendations⁸ which drew on the five leading global examples. These were deemed to be:

- DARPA (USA)
- MAFAT (Israel)
- DRDO (India)
- DGA (France)
- SASTINO (China)

⁵ See the organisation's website: http://fpi.gov.ru/about/obshtaya_informatsiya

⁶ Andrey Ivanovich Grigoriev, General Director of the Foundation for Advanced Studies, Reserve Lieutenant-General, Doctor of Technical Sciences, Honorary Professor of MIPT. Born on January 30, 1963, he graduated in 1986 from the Faculty of Aero-physics and Space Research of the Moscow Institute of Physics and Technology. Since 1988, after graduating from the Military Academy of Chemical Defence, he served in the research institutions of the Ministry of Defence. From 1995 to 1999 he occupied executive positions in the Department of Ecology and Special Means of Defence of the Ministry of Defence of Russia. From 1999 to 2012, he worked in the structures of the Federal Service for Technical and Export Control. In November 2012, he was appointed a member of the Military Industrial Commission under the Government of the Russian Federation, and since February 2013 he has been head of the Foundation for Advanced Studies. http://fpi.gov.ru/about/obshtaya_informatsiya.

⁷ http://fpi.gov.ru/about/obshtaya_informatsiya

⁸ These can be viewed at:

https://www.researchgate.net/publication/313844404_Fond_perspektivnyh_issledovanij_v_sisteme_oboronnyh_innovacij_The_Advanced_Research_Foundation_in_Defense_Innovations_System

The research concluded that Russia had been inhibited not only by a lack of investment, characteristic of all aspects of Russian society and infrastructure in the preceding twenty years, but also by systemic failures which could be rectified, including:

- Failures of inter-departmental coordination.
- Restrictions caused by form and content of contracts, agreements and existing competitive procedures.
- Restrictions on who can take on State contracts, the nature of legal entities.
- Restrictions on the creation of new formations, legislation inhibiting public and commercial interface, cooperation with academia and non-profit organisations.
- Lack of a mechanism for monitoring and managing development during complex and vulnerable stage of scientific developments.

The design of the resultant ARF, intended to address these shortfalls, was brought into Federal law in October 2012. It was mandated to be:

- Under the direct supervision of the Deputy Prime Minister for the Military Industrial Complex.
- It would have a Board of Trustees (15) representing all interested parties, academic, industrial and governmental, under a General Director. The board would include the Deputy Defence Minister for Procurement.
- It would also have a Scientific Research Council, including the Deputy Chief of the Defence Staff, who is Chairman of the Military Scientific Committee of the Armed Forces and the Head of Research and Special Projects of the MOD and his counterparts in other power ministries.
- It was allocated a budget for 2013 of \$73m, rising to \$100m in 2014. It is understood to have increased significantly since.

Its role was further defined in the same Federal law. It is:

- To offer scientific views on possible threats and responses.
- To determine the main research avenues to develop production of specialised military and dual-purpose products.
- To organise research, approbation and support of innovative scientific and technical solutions in the development and production of high technology specialised military and dual-purpose products.
- To select and fund solutions.

The initial scientific research areas the ARF would investigate were also indicated in the founding document:

- Human Technology – including genome management, artificial blood, bio-engineering.
- Robotic technologies – including deep-water autonomous robots, exoskeletal armour, multi rotor helicopters and high-altitude UAVs.
- Network Technologies – including neurological patterns, human/AI interface, intelligent management networks.
- Energy – including intellectual energy, hydrogen energy, ‘micropower’ sources, lasers, wireless transmission.
- Transport – including hypersonic flight, an electromagnetic catapult and reusable super-heavy space vessels.

Whilst the current projects it is supporting are classified, there are regular competitions for submissions which indicate areas of interest. The media also enjoys considerable conjecture, and possibly some misleading reporting by officials, on current areas of research. These include:

- Quantum Computing – in partnership with Vnesheconombank.
- Liquid Respirational Technology, where water-breathing dogs have caused interest in the media.

- Integrated Protective Soldier Systems – nanotechnologies, exoskeletons for soldiers, magnetorheological fluid-based armour.
- Invisibility Membranes – also inhibit viruses, aerosols, toxins and allergens.
- Augmented Reality – ‘Superhuman vision’ for pilot helmets and for training systems.
- Radar – An airship-based radar for missile defence, utilizing radio-photonic phased array.
- Combat automation and robots. A perennial favourite in Russia, where the participation of ‘killer robots’ is anxiously awaited at every May Day Parade.
- Automated Underwater Defence System. Believed to be in deployment for the Northern maritime approaches to the Eurasian continent.
- Quadrocopter, controlled by thought (neurobotics).

Though due caution should be exercised in accepting all this at face value, all these examples are drawn from Russian press reports.⁹

⁹ These are conveniently summarised in <http://idstch.com/home5/international-defence-security-and-technology/industry/russia-s-advanced-research-foundation-advancing-as-an-answer-to-us-darpa/>

Summary

In 2008, after a series of stalled attempts to enact systemic reform in its defence institutions, which had evolved for mass mobilization to meet the demands of large-scale armoured warfare, Russia acknowledged and addressed what it recognised to be significant failings.

The transformation, driven and sustained by the very highest levels of government, has introduced a series of measures intended to rectify that deficit in structural, organizational, material and doctrinal terms. Since then it has evolved a generously resourced system for the exploitation of technological and conceptual developments, founded on analysing and understanding the experience of competitor states.

The solution allocates the task of understanding the balance of military power to the armed forces and the technological “horizon scanning” and scientific research to a newly instituted body, the ARF, though a significant institutional capability remains directly under Ministry of Defence control. The whole process is overseen at the highest practical levels and effectively integrates government, academic, commercial and military perspectives to explore, assess and exploit global capability and emergent potential in the interests of the Russian Federation. Its funding has been sustained, and even expanded, throughout an era of considerable economic constraint, acknowledging the very high priority assigned to this endeavour by the Presidential administration.

It is, however, inherently reactive, reliant on intelligence to divine other nations’ solutions and import them, wasteful in the number of parallel structures and research facilities it retains,¹⁰ and prone to significant levels of corruption.¹¹ Whilst technology transfer and industrial espionage have been entirely valid approaches to closing the gap between Western economies and Russia, it does not deliver the ability to overtake. Where Russia could be said to have excelled has been in the application of imported technologies, in the information sphere in particular, which the West has been reluctant to weaponise. The correlation of forces approach is also inherently reactive. Thus, Russian military technological thought is more likely to be led by realisation of opportunity, than novel conceptualisation. It frequently resorts to misinformation to convince opponents it has greater potential than it does,¹² and to convince the Russian public the national budget is being appropriately consumed on defence. It is not a model we would seek to reproduce, nor one that is likely to outperform established Western defence industries in conventional capabilities. It has, however, proven capable of producing major surprises and ought not to be under-estimated.

¹⁰ See Gerasimov’s summary of research institutions above, as stated in an article in *The Journal of Military Science* in 2012.

Twenty-five logistics institutions could potentially be rationalised.

¹¹ ‘Huge money is being stolen – practically every fifth rouble and the troops are still getting poor quality equipment and arms,’ chief military prosecutor Sergei Fridinsky told *Rossiiskaya Gazeta*. ‘Every year more and more money is set aside for defence but the successes are not great’, he said, adding that kickbacks and fictitious contracts were being used to defraud the state.

<https://af.reuters.com/article/oddlyEnoughNews/idAFTRE74N22120110524>, 24 May 2011. Regardless of occasional efforts to

penalise individual offenders, the systemic corruption problem in the Russian State continues. See

<https://russiamil.wordpress.com/tag/corruption/> for insight into corruption hampering the Baltic Fleet in 2016;

https://transparency.org.ru/projects/TI_Defence_Press_Eng.pdf provides a comprehensive report into Defence Sector corruption in Russia in 2017; <https://www.business-anti-corruption.com/country-profiles/russia> offers an oversight of corruption throughout Russia, including in public procurement.

¹² “Quantum Stealth: Russian Scientists Developing Best Ever Invisibility Cloak”, *Sputnik*, 9 February 2017,

<https://sputniknews.com/russia/201702091050502620-russia-invisibility-cloak/>