SOVIET STRATEGIC AIR DEFENSE: THE STRUGGLE FOR COMPETENCE

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All militaries face the problem of training in peace to prepare for war. Peacetime desires for safety, comfort and the accommodation of inertia frequently permit a certain "formalism" to creep into peacetime training. "Formalism" or "pencil-whipping" the training schedules comes to prominence when the shams of peacetime operations are stripped away by real wars or war-like incidents. The Soviet Air Defense Force, hereafter PVO, has been especially unlucky in the variety of incidents that have highlighted training deficiencies.

In the Brezhnev period, incidents of incompetence could be resolved by simple punishment of the people involved and no wider implications were drawn. In a period of *glasnost* and political debate, wider implications are always drawn. PVO is working hard to overcome the widespread impression of PVO incompetence highlighted when Matthias Rust landed in Red Square. PVO must demonstrate its day-to-day competence and prudent expenditure of resources in order to assure its access to continued support for new systems and a good share of the best conscripts and officer cadets.

Regaining the Appearance of Competence

The Rust incident of May 1987 resulted in the firing of a number of high-ranking Soviet military officials, starting with the Minister of Defense and including the Commander-in-Chief of PVO, Marshal of Aviation Koldunov. Koldunov's replacement was General of the Army Ivan M. Tret'yak who was transferred from the post of Inspector General in the Ministry of Defense.[1] The Rust incident demonstrated incompetence

[1]General Tret'yak served with the infantry during the Great Patriotic War and was made a Hero of the Soviet Union in 1945. After the war, he attended both the Frunze and Voroshilov academies and rose through command ranks in military districts. His only known previous association with PVO is command of the Far Eastern Military District at the time of the KAL-007 shoot-down. The incident had no apparent effect on Tret'yak's career and he went on to command the Far Eastern TVD.

throughout PVO both in the command and in the ranks. The political leadership could demonstrate commitment to competence through the simple device of firing leaders, but PVO's new leadership could not demonstrate competence by providing a further chain of scapegoats. General Tret'yak and the PVO organization have instead consistently presented a public face of commitment to hard training and realistic assessment, an openness to press inspection of the daily training and work of the units, and a revitalized internal training regime.

One of the most obvious contrasts with the pre-Rust PVO is shown in the addresses and interviews associated with Air Defense Forces Day.[2] There is a real difference in the content and tone of pre-Rust addresses and those of today.

Only a few weeks before the Rust incident, Air Defense Forces Day produced a fine crop of generally self-satisfied addresses and interviews.[3] The themes of these interviews include the long history of the Air Defense Forces beginning with the Russian Civil War, the heroic efforts of the air defenders in the Great Patriotic War in which they engaged fascist infantry and tanks as well as aircraft, and that today vigilant alert forces stand on guard equipped with the highest products of Soviet science and engineering. There are a few explicit mentions of effort required to improve the training and practical skills of the personnel, but these mentions are few in comparison with those that praise the educational levels and efforts of the personnel. Problems are mentioned in the general tone "We know what they are, and we are working on them."[4]

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[2]Air Defense Forces Day is the second Sunday of April. It is not a widely celebrated public holiday, but it usually generates a number of speeches, a special order of the day, and a "festive meeting" of various military and party oficials.

[3] See the article and television interview of Chief Marshal of Aviation A. I. Koldunov, then Commander in Chief of the Air Defense Forces, "Guarding the Fatherland's Skies," *Trud*, 11 April 1987, p. 3, translated in FBIS-SOV, 21 April 1987, V3-V5 and Moscow Television Service interview, 12 April 1987, translated in FBIS-SOV, 16 April 1987, V2-V4. Also see the interview of Colonel General of Aviation I.M. Maltsev, then (and still) the Chief of Main Staff of the Air Defense Forces, "Sentries of the Air Borders," *Selskaya Zhizn*, 11 April 1987, p. 4, translated in JPRS-UMA-87-040, 18 August 1987, pp. 78-81.

[4]Maltsev interview, p. 81.

The 1988 Air Defense Forces Day produced a much different tone.[5] While there are mentions of high-performing individuals, as before, there is more attention to "a principled, uncompromising exactingness at all levels, and the truth about the state of affairs, be it ever so bitter."[6] The article goes on to mention expulsion of 226 activists from the party elective organs and transfer or release to the reserves for officers who fail to meet requirements.

The latest Air Defense Forces Day has produced further addresses that continue last year's tone.[7] The Rust incident is still referred to and the Air Defense Forces acknowledge "guilty start to finish," but the whole tone is not only that problems are recognized but that they are difficult to overcome. The key element is that performance will be evaluated "with all strictness and principledness." There is a certain truculent tone in the recent addresses because PVO must share in the general unilateral reduction of the Soviet Armed Forces. PVO will lose 50,000 men as its share (about ten percent of its current force). Nevertheless, the general tone is dedication to the mission of the Air Defense Forces. Maltsev points out that "quantitative changes dialectically move to a new and higher quality."[8]

The public component of this new relationship is best shown by the open house offered by the previously reclusive PVO for civilian journalists to view day-to-day training activities. As reported in *Literary Gazette*[9] and shown in television coverage, the training

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[5]See Interview with General of the Army I. Tret'yak, *Kommunist Vooruzhennykh Sil*, No 5, March 1988, pp. 64-68, translated in JPRS-UMA-88-018, 12 August 1988, pp. 19-23.

[6]*Ibid.*, p. 19.

[7]Interview with Colonel General of Aviation I.M. Maltsev, Chief of the Main Staff of the Air Defense Forces, Moscow Domestic Service, 9 April 1989, Air Defense Chief on Defensive Doctrine, Moscow International Service in Slovak, 8 April 1989, both translated in FBIS-SOV-89-068, 11 April 1989, p. 73.

[8] Maltsev interview, p. 74.

[9]V. Yanelis, "23 February - Soviet Army and Navy Day; It All Starts on the Ground," *Literary Gazette*,, 22 Feb 89, p. 1, p. 12, translated in JPRS-UMA-89-009, 20 April 1989, pp. 55-57. *Literary Gazette* has sponsored a number of articles by civilian reformers and critics of the military.

activities were not staged just for show. Moreover, there is a clear intent to get across the message that the command is doing the best it can whit what it has; for example, flight training is rigorous, but with only a third to a half of the flying hours available in the U.S. Air Force. Other strands of this argument have offered shortages of spare parts and critical specialists as reasons for less than satisfactory performance by the PVO troops.[10]

One clear innovation since the time of the Rust incident has been the use of a Volunteer Society for the Support of the Army, Air Force, and Navy (DOSAAF) Yak-52 light aircraft to simulate low and extremely low altitude, low radar cross section (RCS) targets. This is clearly a direct result of the Rust incident and provides a realistic and challenging tactical exercise.[11] Within these exercises, it is surprising to see how often the unit is described as failing--and failing because of individual failures within the unit rather than generalized incompetence. In some articles, senior officers are permitted to comment on the lesson of the failure and emphasize the personal responsibility of commanders and staff.[12]

Lower-level commanders are coming in for more criticism in accord with the idea that they have more responsibility for their units' performance. One of the major changes in the PVO training program has been an increase in the ability of lower-level commanders to set their own training schedules. This change implements resolutions of the 19th All-Union Party Conference. As implemented by PVO, the commanders no longer have to work to programs and schedules set at the highest levels.[13] Instead the lower-level commanders can set their own.

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[10]See, for example, Lt Col V. Burdin and Capt A. Galunov, "Rented Specialists: Why All-Star Teams, Not Regular Contingents, Go to the Firing Range," *Red Star*, 11 October 1988, pp. 1-2, translated in JPRS-UMA-88-027, 18 November 1988, pp. 16-18.

[11] Lt Col S. Levitskiy, "Why are the 'Invisibles' Flying," *Red Star*, 10 Feb 89, p. 2, translated in JPRS-UMA-89-010, 4 May 89, pp. 61-63. Lt Col O. Falichev, "A Test Target Approached...", *Red Star*, 7 Jul 88, p. 2, translated in JPRS-UMS-88-22, 15 Sept 88, pp. 20-22.

[12] For example, in the Levitskiy article, Maj Gen Ovyannikov, the Chief of Staff of the PVO Missile Troops, is given the final word on the importance of overcoming inertia and passivity.

[13]See interview with Maj Gen of Avn A. Borovov, PVO first deputy

The higher-level comment on such exercises and activities has underlined the need for constant effort to improve along with self-criticism and attention to duty.[14] Tret'yak has emphasized that exercises reveal the need for improvements and the imposition of more realistic conditions and independent decisionmaking.[15] All of this has taken place within an overall, cross-service context, emphasizing the critical importance of alert duty and its proper execution. As an example, an article in a Soviet Air Force publication which sets out the proper procedure for forcing an aircraft to land is juxtaposed with an article on the Soviet military law related to alert duty. The first article meets international expectations of the respect for life that must be shown in forcing aircraft to land; the second article makes clear that the criminal liability for permitting intrusion of a foreign aircraft into Soviet air space during peacetime is a prison sentence from three to ten years.[16] There is no advice on how to balance respect for human life and the Law of the State Border.

Perhaps because he faces difficulties and admits problems, Tret'yak has survived two light plane penetrations of Soviet air space in the high north. On the anniversary of the Matthias Rust incident, Andreas Sommer, another West German, crossed into Soviet territory while on a flight from Ivalo, Finland to Kirkenes, Norway. Sommer then retraced his route on the return flight. It is not clear whether the Soviets attempted to intercept the Sommer flight, which did not make a deep penetration beyond the border zone. However, since the time of the

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chief for combat training, in *Red Star*, 4 Jan 89, p. 2, translated in JPRS-UMA-89-006, 6 Mar 89, p. 33.

[14]For example, as shown in the interview with Lt Gen A. Kostin, the Chief of the Main Political Directorate of the Moscow Air Defense District in *Agitator of the Army and Fleet*, no 21, 1987, or Lt Col G. Belostotskiy, Moscow Air Defense District, "Wait ... Test Target," *Red Star*, Feb 88, pp. 1-2.

[15] Commentary by General of the Army Tret'yak, "Combat Training: Quality and Efficiency; 180 Seconds of Dueling Decided Who Would be the Best in the Air Defense Missile Troops," *Red Star*, 10 Nov 1988, p. 1, translated in JPRS-UMA-88-027, 18 November 1988, p. 16.

[16]The articles are in *Aviation and Cosmonautics*, No 1, 1988. The diagram illustrating how to force an intruding aircraft to land clearly shows the intruder as a B-1 bomber.

incident, the Soviets have moved a SAM battery near the Norwegian border close to where the incident occurred. The Norwegians interpret the battery as a clear warning that further incidents will not be tolerated.[17]

Admitting deficiencies and making visible moves with hard-nosed responses have improved PVO standing. Overall, PVO, and particularly General Tret'yak, are doing a good job of projecting an image of a hard-working service dedicated to ensuring the sanctity of the state border and rooting out vestiges of inefficiency and formalism. Both to its internal constituencies and its external audiences, PVO appears to be a more formidable force and largely for the reasons cited by Tret'yak, "command system...reorganized, ... better equipment, and better training..."[18] The The question remains whether this appearance can be sustained in the long run.

Manning and Educating to Sustain Competence

From the combat experience of Soviet-influenced air defenses and PVO experience, it is clear that PVO performance is dominated by the human skills of its personnel. While the current competence of the organization can be demonstrated, the future competence of the organization can only be ensured if it can guarantee high-quality intakes of conscripts and officer cadets. Once acquired, such intakes must be trained to function within an increasingly technological environment.

The need for improved human skills to deal with current military technology has raised the question of converting the Soviet Army into a professional force. The proponents of conversion are almost all civilian, as personified by Professor Vladimir Lapygin, chairman of the Committee on the Problems of Defense and State Security of USSR Supreme Soviet. No senior military officers have endorsed the concept and a number have opposed it, frequently on the grounds of cost. PVO is

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[17]Olav Trygge Storvik, "Soviet Missiles at the Border Will Prevent Violations," *Altenposten*, Oslo, 17 October 1988, p. 9.

[18]Air Defense Chief on Defensive Doctrine, *op. cit.*, p. 73.

deeply involved with high-technology military equipment and would be profoundly affected by any conversion to a professional force.

It is estimated that in 1986 the air defense forces contained 520,000 combat and support personnel.[19] PVO personnel amounted to 9.5 percent of all Soviet active duty military personnel. The composition of PVO is not totally clear. There is a large conscript component. Conscripts constitute about seventy percent of the entire Soviet military establishment with the fraction varying across services. PVO probably has a smaller fraction than the norm, but PVO's conscript fraction is still large. If conscripts comprise 70 percent of PVO, then the annual conscript intake would be about 182,000 men to maintain a force of 520,000. If Russian language skills are required for positions which call for fast response or technical training, then nearly all these conscripts must be taken from the Slavic population. If so, as shown in Table 1, PVO would require about one in every six Slavic conscripts to maintain its present size.[20]

With the reduction in PVO of 50,000 men, PVO could actually reduce its intake of Slavic recruits as a percentage of the number available. This calculation assumes that there are no dramatic changes in the availability of the Slavic cohort available for conscription.[21]

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[19]John M. Collins and Bernard C. Victory, *U.S. Soviet Military Balance 1977-1986*, Congressional Research Service, Report Number 87-745-S, September 1987, p. 3.

[20]The fraction assumes that roughly 84 percent of all inductees are accepted for military service. (See Steven Popper, *The Economic Consequences of Soviet Manpower Requirements*, The RAND Corporation, R-3659-AF, August 1988.) The Slav population cohort is from Edmund Brunner, Jr., *Soviet Demographic Trends and the Ethnic Composition of Draft Age Males, 1980-1995*, The RAND Corporation, N-1654/1, February 1981.

[21]One solution that has not yet been offered for PVO's manning problems is allowing large numbers of women to serve. During the Great Patriotic War, women made up entire air defense fighter aviation regiments and they also served in signals, barrage balloon crews, and antiaircraft guncrews. Such service is acknowledged frequently on Air Defense Forces Day. See, for example, Maj Gen G. Kalyakin in *Communist of Tadzhikstan*, 12 April 87, p. 3.

Table 1

PVO CONSCRIPT REQUIREMENTS

Year	PVO Strength (Thousands)	Slav male 18-year-olds (Millions)	PVO Intake as percent Of All Slav 18-year-olds	PVO Intake as percent Of Available Slav 18-year-olds
1979	654	1.627	14.1	16.7
1980	654	1.583	14.4	17.2
1985	494	1.357	12.7	15.2
1990	520	1.348	13.5	16.1
1995	520	1.411	12.9	15.3
1995	470	1.411	11.7	13.9

The particular manning problems of PVO are superimposed on a more general demographic problem of manning the Soviet military in a time of somewhat reduced draft pools of changing ethnic composition. The new political atmosphere has already undermined a simple continuation of this pattern of manpower allocation: College students are again being granted student deferments from military service and army units have been committed to quell ethnic problems. Because Slavic eighteen-year-olds are more likely to be prepared for higher education than other ethnic groups, the reintroduction of student deferments is likely to reduce Slavic presence in military service compared to other ethnic groups. At the same time, the political reliability of ethnic Russians makes it more important that such conscripts be made available to the ground combat units which can be used to maintain internal order.

If the number of Slavic conscripts available to PVO is reduced, PVO must either find a way of integrating a higher proportion of other nationalities into its force or accepting a reduction even beyond the 50,000 now scheduled. The consequences of a further reduction are not clear. It is known that a school that supplies officers for the SAM troops, the Ordzhonikidze Higher Anti-Aircraft School, will close as part of the reduction.[22] This should eventually result in a decrease in

[22]Interview with Maj Gen Yu Rodionov, Department Chief, Main Personnel Directorate, USSR Ministry of Defence, *Red Star*, 4 Aug 89, p. 2 translated in JPRS-UMA--89-021, 6 Sept 89, pp. 18-20.

the number of SAM firing units. The new missile systems such as the SA-10 have mechanized some previously manpower-intensive functions such as launcher reloading, but the concurrent addition of mobility to such units probably increases the personnel requirement--based on Western experience. If this pattern holds for PVO as well, the reduced personnel base may already constrain proliferation of SAM defenses as a response to new generation American systems.

The manning problem extends beyond the enlisted ranks. PVO may be faced with training a "successor generation" of officers while the experienced cadres fade away into retirement. Mass retirements flow from large buildups. There was a major buildup of the air defense forces undertaken in the early 1970s in which large numbers entered PVO officer ranks both as pilots and as technicians.[23] Today these officers are approaching twenty years' service and nearing retirement. Soviet officer promotion policies are not based on an "up or out" principle: It is possible for an officer of the aviation technical service to serve an entire career and rise no higher than senior lieutenant without being regarded as a failure.[24] Similarly, many of the old-looking regimental pilots in Soviet journals are, in fact, old. Thus, the officers now approaching retirement are not concentrated in the higher ranks but are distributed throughout all ranks and specialties.

The Soviet problems of officer recruitment and retention differs significantly from those of the United States or western powers. The Soviet officer corps is largely professional and produced by the professional military academies. A young man who graduates from a

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[23]Victor Belenko was part of this intake. During his first duty assignment as an instructor pilot in 1971, the requirement for pilots was so high that the student-to-instructor ratio was doubled in his training squadron. John Barron, *MiG Pilot: The Final Escape of Lieutenant Belenko*, McGraw-Hill, 1980, p. 79.

[24]Nevertheless, such career prospects do not help morale. For example, see Maj S. Levitskiy, "From a Journalist's Notebook," *Red Star*, 2 Oct 83, p. 2. Beyond career prospects, maintainers can feel their performances are not adequately recognized while their workloads are heavier than those of the aircrew. The difference between aircrew and maintenance workers is highlighted by a command quoted in the article: "Pilots to the athletic field, technicians to the airfield."

Soviet military academy incurs a service obligation of twenty-five years.[25] Once in the service, the officer can be released into the reserve either by request or for poor performance. Such requests are not impossible and involuntary releases have been mentioned frequently in the context of campaigns against alcoholism or lack of social responsibility, but they are definitely not the norm.[26] Therfore, the critical element in manning the Soviet officer corps is recruitment into the military academies. The decision to enter a military academy must usually be made when the young man is between seventeen and twenty-one and once taken effectively commits the graduate to a life in the military.

The officer career has been an honored one in the Soviet state. However, it is clear that if the Gorbachev line goes forward then the role of the military is in decline and the status of the officer can only decline with it. Moreover, it is clear that the career military are not likely to be the first beneficiaries of new economic policies and growth. At its best, the military personifies older, largely martial virtues. These virtues are increasingly irrelevant to a society that aspires to consumerism and finds it difficult to believe that it is still surrounded by the "dark forces." At its worst, the military constitutes one of the centers of old thinking and the ultimate reinsurance policy for the organs of state security.

How can the military expect to recruit young men willing to commit today to a lifetime career with a bulwark of the "old thinking"? It is not impossible, but it is becoming more difficult. It is too easy to equate young people with proponents of the new thinking. Even beyond simple political commitment or Soviet spirit, the military is a natural career choice for young Great Russian patriots. As in other countries,

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[25]This contrasts with the service obligation of a cadet from an American military academy such as West Point or The Air Force Academy. Completing the four year course obliges an American graduate to only five years of active service.

[26]Presumably the planned reduction of the forces will necessitate an involuntary trimming of some thousands of officers. Khrushchev's forcible separation of thousands of officers is a sore point with the military and mentioned frequently in recent military press articles.

cadets motivated by such idealism are most likely to choose the elite combat arms such as the paratroops. The problem will be recruiting those technical skills needed to modernize the civilian economy and for which, presumably, *perestroika* should provide expanded opportunities and rewards.

A recent article points out a difference in officer recruitment into the various military academies. There has been a decline across the board of 10 percent in the number of applicants. The Paratroop Academy continues to attract eighteen applicants for each available place while the average across all academies has fallen to two applicants for each available space. PVO academies have experienced a decrease in the number of applicants.[27] People motivated to fly high-performance aircraft are self-selecting and frequently untouched by other considerations. People who want to maintain high-performance aircraft or be involved with high technology may consider other opportunities within the economy before deciding on a military career. For officers down at the lower end of the motivation scale, the profession of officer is just a job. In the Russian connotation, such people are "careerists." The current PVO campaign of self-improvement and commitment to hard work probably does not appeal to those "careerists" in search of a quiet niche in the military. The skills such people might bring to PVO are not clear.

As noted by General Tret'yak himself, some students enter military schools because it is easier than getting into a university.[28] Training such people to carry out their technical duties and assume their larger responsibilities is a formidable task. This task falls on military schools that produce career officers. Officer pilots, engineers, technicians, and rear service personnel are put through three-, four-, or five-year schools that provide both academic credentials and commissions. In their schools, the officer cadets learn in great detail the characteristics of particular equipment (aircraft, radars, SAMs) which they may operate for their entire careers. One advantage of this

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[27]Rodionov interview, *op. cit.*

[28]Interview in *Moscow News*, 21 February 1988.

system has been that even if the training is relatively inefficient in that it requires four or five years, the long time in service of Soviet equipment with successive variants of the same basic design has permitted great economies in retraining because of the carry-forward of intellectual capital.

If the problem of replacing and training officers is difficult, it at least has the advantage of a long service commitment on the part of the officer cadets. The problem of training enlisted men for technical positions is much more difficult because of the limited conscript service period of two years and the unattractiveness of career enlisted service.

The personnel system can produce enlisted technicians through a variety of routes:

- Pre-service certification
- Assignment on the basis of civilian skills
- School service training such as in the schools for junior aviation specialists (ShMAS)
- On-the-job training within the regiments.

All of these routes produce some people who can do some jobs; the difficulty is to assure a sufficient supply of uniformly skilled people for particular high-technology tasks. The pre-service training provided by DOSAAF (Voluntary Society for Cooperations with the Army, Aviation and Fleet) centers has recently been criticized; even DOSAAF's ability to produce such limited skill certifications as truck driver or radio operator has been questioned. Because DOSAAF centers do not have sufficient high-technology training equipment or enough interested instructors, it is unlikely they can be used to provide the training required for skilled specialties such as radar technicians or operators.[29]

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[29]Various DOSAAF training horror stories are collected in Russell G. Breightner, "Air Defense Forces (VPVO)"; in David R. Jones (ed.), *Soviet Armed Forces Review Annual*, Vol. 10, 1985-1986, Academic International Press, 1987.

Conscript assignment on the basis of civilian skills really depends on the efficiency of the military commissariats that administer conscription. Letters in *Red Star* have highlighted misassignments of conscripts with aviation mechanic skills acquired in the technical schools for civil aviation.[30] The problem resides in the general inefficiency and indifference of conscription officials and the very real priorities that send conscripts with higher practical and physical qualities to the rocket troops, border troops and the navy rather than to the air forces.[31]

The use of in-service schools for enlisted personnel has been one of the weakest areas of Soviet technical military education. In schools such as those for junior aviation specialists (ShMAS), recent conscripts are given technical courses of up to six months leading to skill qualifications and junior non-commissioned rank. The level of skills taught appears to be relatively uncomplicated, with frequent type specialization and rote instruction. There is little of the general education that has permitted American enlistees to use military courses as vocational training for later civilian careers. The ShMAS themselves have been seen as backwaters meant to house less-than-adequate career officers and obsolescent training equipment. The net result has been revealed as less than satisfactory with complaints of inadequately trained graduates supplied to the forces. This is one of the most challenging areas for the future of PVO. Even with the inadequate instruction now provided, a six-month course consumes a quarter of a

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[30]"Problem Requires a Solution", *Red Star*, 11 Dec 87, p. 2.

[31]Some idea of where PVO stands in the hierarchy of human quality as seen from inside the Soviet military is conveyed in Victor Suvorov's bleakly comic view of his own motorized rifle company:

> ....It must be said that the remaining soldiers are very good, though perhaps not as perfect as for instance those in the State Security, the Frontier Troops of the KGB, the Internal Troops of the MVD, the Airborne Forces, the Strategic Rocket Troops, the Anti-Aircraft Defense, the Navy, the Group of Soviet Troops in Germany, the Central Group of Troops, the Northern Group of Troops or the Southern Group of Troops. They are, of course, first class, but not of quite the same calibre.

Victor Suvorov (pseud.), *The Liberators*, Hamish Hamilton, 1981, p. 151.

conscript's period of service. If PVO requires an increased skill base for future systems, the number of conscripts who must be trained in ShMAS-like settings can only increase. PVO must improve the efficiency of such training and increase the skills of its graduates--a problem already recognized.

Training in the units has been appropriate for the bulk of the manpower skills required by PVO. Like most large military organizations, PVO requires large numbers of guards, truck drivers, and heavy equipment operators who require skills that can be learned quite well through on-the-job training. The lack of career non-commissioned officers in PVO makes the task more difficult but not impossible. The relatively large number of junior commissioned officers and the increasing number of warrant officers provide a large enough cadre of instructors. Such training is, however, inherently limited in the skills set it can teach. As the skills required to operate and maintain new equipment grow more complicated, the burden of initial instruction in such skills must be shifted to in-service schools.

While the operators and maintainers of the aviation and SAM regiments figure prominently in the unclassified military literature, the problems of command post personnel appear much more infrequently. Recent innovations in the command and control system have introduced new technologies that also require a great deal of getting used to. It is clear that there is still a mix of grease-pencil and computer operation in the command posts and that many pilots are still more comfortable with voice control by radio than direct datalink.[32] The command post personnel are themselves a mix of highly trained tactical control officers and conscript plotters and scope operators. To the extent that conscripts must be brought into such a heavily computerized environment, PVO draws on the weakest areas of Soviet secondary education and demands the scarcest of skills.[33]

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[32]Lt Col A. Yelgin, "Computer Guidance to the Target," *Red Star*, 11 June 87, p. 2.

[33]A recent article on conscript personnel in the combat unit of a ship points out that only one had computer experience before joining the service. The article continues on the problems of carrying out such training on the job but ends on an upbeat note by recognizing a seaman

Once acquired and trained in the schools or the units, PVO still has the problem of matching people to jobs. In many areas, this is not a problem, but it does become a problem in those areas that require complicated skills. The problem of how the Soviet Air Force, and presumably also PVO, utilizes technically qualified personnel is exemplified in the problems of the utilization of engineers, technicians and enlisted specialists in servicing aircraft. Several articles and letters in Soviet military publications have complained of misassignment of highly qualified specialists. Because of the failures of the schools for junior aviation specialists, many of the tasks that properly belong to such enlisted men have been shifted onto the shoulders of the officer engineers and technicians. In turn, engineers have been forced into positions that should be occupied by the less prestigious technicians.[34] The The pattern of these actions leads to lost skills and stunted careers.

There are multiple factors at work in the misassignment of technical personnel. The academic credentialism rife in Soviet society may have led the services to increase the number of engineer graduates beyond that actually required for engineer positions. Similarly, a general disregard of enlisted skills that borders on a class prejudice has required officer supervision down to the lowest levels of servicing operations. The natural consequence of that prejudice is that, in the technical areas, commanders are more comfortable (and presumably safer) assigning people to jobs below their qualifications rather than promoting people above their formal credentials. Additionally, inflation of credentials may give the appearance of over-qualification even when the level of personal skill actually achieved may be no more than the position requires. Nevertheless, the total effect leads to

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who went on to a computer job in civilian life on the basis of his naval training. See Cpt 3d Rank V. Gudkov, "Perestroika: The Naval Link, The Seaman and the Computer," *Red Star*, 24 Feb 88, p. 2. The Soviet Navy has some advantage in a three-year commitment for service at sea.

[34]Sr Lt N. Lozitsky, Group of Soviet Forces in Germany, letter to the editor, *Red Star*, 14 Mar 89, 1, translated in JPRS-UMA-89-008, 3 Apr 89, p. 8.

wasted human skills and "untapped reserves" in the forces' handling of technical manpower. If the civilian leadership addresses the civilian implications of military technical manpower practices, it is very likely that Professor Lapygin's Committee on the Problems of Defense and State Security will become increasingly involved. In the long run, the services must economize in their use of skilled manpower and acknowledge civilian requirements for the same manpower pool.

Overall, PVO, and particularly General of the Army Tret'yak, has done a good job of improving the current image of a competent PVO. Tret'yak has achieved this image through constant reiteration in public statements and service training that PVO is an organization that recognizes that constant effort must be made to train and test, overcome inertia, and always resolve the problems revealed by realistic training. While Tret'yak can improve competence in the short term, the long-term competence of the organization requires not only a continued commitment to hard training and realistic assessment but also considerable allocations of qualified manpower.