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Development of a Continuing Professional Training System at Information Satellite Systems Joint-Stock Company and Some Related Problems

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The development of a continuing professional training system at INFORMATION SATELLITE SYSTEMS Joint-Stock Company (ISS JSC) and some specific problems that arise on its way from the planned to market economy are briefly outlined. Current personnel training at ISS JSC is schematically presented along with the Company's united educational sphere concept within its personnel policy. Some assignments of the unified functional center for personnel management are considered.

Keywords: professional training, continuing adult education, vocational guidance, personnel policy.

Introduction

INFORMATION SATELLITE SYSTEMS Joint-Stock Company (ISS JSC) named after M. F. Reshetnev is the inheritor of APPLIED MECHANICS RESEARCH-AND-PRODUCTION ASSOCIATION (NPO PM) and Russia's leading space enterprise specializing in the design, development and manufacture of high performance spacecraft and satellite systems. ISS JSC tries to retain the best NPO PM features that existed here in the times of great space achievements, and it seems it has all the capabilities to do that in all the fields of its current activity. It possesses all the necessary requirements: the developed, highly organized structure; adequately equipped experimental and production facilities; stable infrastructure;

reliable partnerships with leading national and foreign organizations and enterprises - license holders, customers, investors, subcontractors, etc. (ISS web-site). Yet, in addition to the above-mentioned, successful implementation of the new projects requires the creative staff capable to work in the situation of permanent technological innovations. It is a very serious challenge that all the national space industry enterprises encounter. The problem of engineering creativity should be specially underlined among the others, and ISS JSC is no exception in this context. The Company's continuing professional training system that was once introduced here, has been being developed for several decades, contributes significantly to training and retraining of the personnel at all levels and, correspondingly, professional skills

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development. However, because of its origin and particularity of its development, there are some intrinsic problems that hinder engineering creativity. We shall try to shed some light upon these issues in this article.

1. The growth of a continuing training system within | the planned economy framework

More than fifty years ago Michael Reshetnev, the NPO PM founder, brought a quite small but very creative group of engineers, designers and workers to the town of Krasnoyarsk-26 (nowadays Zheleznogorsk). The arms race required the extension of that core initial group, so in order to carry out the large-scale military projects such as producing satellites launched by “Cosmos-3” ballistic missiles, the first 138 employees from Krasnoyarsk Mechanical-Engineering Works were transferred to NPO PM in 1959, followed by 24 engineers from Sergey Korolev’s OKB-1 design bureau.

From the very start special attention concerning the competent staff recruitment was mainly paid to the graduates from the leading soviet technical high-schools who were also supposed to accrue the initial creative core. In the short run, Reshetnev’s team began to grow due to the alumni from Moscow Aviation Institute, Leningrad Mechanical Institute, Tomsk Institute of Electronic Control Systems, Moscow State Technical University n.a. N.E. Bauman (MSTU), etc. In 1974, a special department aimed at selection and technical training of young specialists - technical high-schools graduates was created.

In the years of the planned economy, high-schools often allocated students for their pre-diploma practice to the places, where the graduates were assigned to work later. This planned allocation helped along the staff selection and its subsequent development. The same

scheme worked perfectly well for the graduates from the top soviet technical high-schools: the competitive basis enabled only the best graduates to be selected to work in defense enterprises.

It is worth specially mentioning graduates from so called Krasnoyarsk zavod-vtuz (nowadays Siberian State Aerospace University - SibSAU), who have started to infill the NPO PM structure since the mid-1960s. In addition, close relationships with Krasnoyarsk zavod-vtuz and Krasnoyarsk Polytechnic Institute (nowadays a subdivision of Siberian Federal University - SFU) were established. As a result, such faculties as “Space vehicles”, “Space information systems”, “Space mechanical engineering”, etc., were formed one by one in these two institutions. Also, several branches of space-oriented faculties from these two universities were created in the 1970s and 1980s in Krasnoyarsk-26.

Since the 1970s, an additional assignment with reference to the association’s own employees’ training has been actively developed: 50-60 people were annually taught in Moscow, Leningrad, Kiev, Minsk and other Soviet scientific centers. Also, the branch system for the experts and managers’ professional skills development was launched, and certifying commissions for all of the professional categories were created at NPO PM. In view of future tasks, special attention started to be paid to the youth’s vocational guidance, and soon that activity turned from sporadic into stable.

As a result of the above-mentioned and some other achievements aimed at improving the employees’ quality, the association’s own continuing professional training system was designed (Kukushkin, 2010). For about a quarter of the century it was being developed steadily and consciously. However, within the planned economy framework, there appeared some intrinsic problems concerning its further development, in particular, how to provide engineering creativity. In many respects, that was related to the obscure

nature not only of the association but of all the soviet system in general. Also, one should not forget that in the planned economy times many continuing professional training systems were formed in the circumstances that did not support the growth on their own basis, that is, the situation characterized by closed-door research and development institutions – innumerable NIIs – research institutes, KBs – designing bureaus, and other secret so-called “post-office boxes”.

A more careful look would show that in spite of all the clamor about the soviet technological achievements in the past, and many still existing myths on that ground, such order cannot be recognized as knowledge-based while the problems of continuing training systems development can be correctly interpreted and successfully solved only within the general context of knowledge-based economy growth and development (Filatov, 2005). Moreover, permanent innovations presuppose continuing professional training, and the complete realization of the educational continuity principle is the only possible opportunity within the knowledge-based economy which not only permanently makes use of knowledge (perhaps, even though acquired from external sources) but creates all the diversity of knowledge in the form of high-tech production, advanced services, results of research and education.

Given that, one should be more scrptical with regard to technological innovations and engineering creativity in those closed-door soviet institutes and bureaus wherefrom not so much results of soviet experts’ own intellectual efforts emerged but rather the secret materials that entered along various channels from external sources, first of all from technologically more developed nations, were considered and developed. Such activity, though illegal and violating authors’ rights but quite ordinary in the cold-war times was usually carried out through

the deeply-rooted, wide-branched, and swiftly functioning enormous soviet industrial espionage system, when special service officers became the suppliers and leading soviet experts, scientific institutes’ heads, etc., became the consumers of necessary materials.

Those secret materials could be of any sort, from just information or abstract ideas still to be materialized in hardware, to schemes and blueprints, even to ready devices, so that what experts from those research institutes and bureaus had to do was disassemble devices and bring them together again with mother country parts. Nevertheless, even that kind of so-to-say “creative activity” gave evidence of a sufficiently high general level of soviet science, high-school and industry compared to the corresponding world level. Otherwise it would be impossible to produce even those soviet versions of western machinery – the phenomenon that nowadays we can see in almost all the Russian industrial branches with little exceptions. At the same time it is obvious that sooner or later any continuing professional training system with innovative activity based on the outlined above practice arrives to its deadlock.

2. On the way from planned to market economy

In spite of the inherent drawbacks, obvious prospects for the association’s continuing professional training system development were evident until the government started to loose interest to space flights and year upon year more and more limited its financing until almost stopped it in the late 1990s. The crash of the USSR and ultimate disappearance of planned economy led to catastrophic reduction of the industrial production actually in all the industrious areas except for those associated with raw material extraction and export. A real disaster shook all the Russian corporate foundations including those of

NPO PM and severely hindered development of its continuous training system. However, thanks to the great material and intellectual potential created and stored in the association for decades of relentless work, not only it survived itself in the situation of total economic disorder but reserved the basis for the further development of its continuing training system.

To counteract the growing destructive tendencies that threatened the existing continuing professional training system, some measures became possible to cure it within the framework of the planned economy. However, those remedy measures were often formulated in terms of the closed state situation as declarative and universal: "...increasing effectiveness of staff professional training in conditions of modern economy, introduction of the newest educational technologies, forming progressive concepts for high-tech industry branches, etc." (Fedorov and Baltjan, 2001). They could not actually reach the goals as the situation was getting worse.

On the other hand, within the competitive business environment, the association got the chance to access the global market of satellite services, take part in the international cooperation, and find new resources for solving the stockpiled problems rooted in the planned economy time on the basis of getting profit from its market activity. Therefore, despite the emergence of many new problems related to the existence under very peculiar Russian market conditions, the senior managers of the association known now as INFORMATION SATELLITE SYSTEMS Joint-Stock Company (ISS JSC) found certain prospects for its revival and development, however, trying to rely more on the principles that underlie educational systems of the countries with market economy.

There were no deliberate attempts to ruin the former continuing professional training system. On the contrary, personnel recruitment and in-

service training, retraining and development of the employees' professional skills are still considered as very important issues among the whole variety of the company's tasks. Yet, the modern labor market conditions, such as the absence of the graduates' planned allocation to work, etc., necessitated its substantial changes compared to the planed economy time, and general changes in the company's personnel policy as well. As a result, along with readjustment all the ISS JSC activity, the entire educational sphere concept was revised which assumed the continuing professional training system as the foundation for the company's innovative development.

Innovative development significantly changed its vector compared to the past. First, the young specialists' contingent – high school graduates who have been always called for to be the leaders of innovative development are taking a turn for the worse year by year. Not only goes down the number of those willing to get jobs in the space industry, but their quality long ago started to grow worse in many respects too. If a soviet engineer could basically be a carrier of the scientific-technological progress at least on the condition of being supplied with foreign necessary materials and ideas, now even if a young engineer gets schemes, blueprints and other materials, he is unlikely be able to make new devices due to a number of reasons.

First of all, the gap between the level of global scientific-technological achievements and national engineers' limited abilities to comprehend and master them grows rapidly. Secondly, the introduction of new technical ideas on native ground is hindered because national high-tech industry branches have been destroyed and the necessary material basis is practically absent. In particular, there's actually no element base necessary to build space electronic schemes. Thirdly, the motivation of engineers altered for the worse, and not only

in Russia but in the world-wide scale as well (Bonnard and Paul, 2009).

Furthermore, innovative development is impossible without integration of research and production, and the former ISS JSC's name – NPO – testifies itself to the fact that it has always taken place, but now the situation changed significantly (Kukushkin et al, 2010). It concerns not only the information and materials supplies which provided secure research and technological feed along illegal channels earlier. In addition, the links with some research organizations in the former USSR republics were actually tore apart, and national centers for applied science were practically destroyed, and those that still continue to work cannot accept the paradigm that essential materials for innovative projects are in top condition but illegally supplied.

Besides, illegal acquisition of information, machinery, technologies, etc. from abroad is becoming more and more senseless mainly due to diminishing compliance of national engineering with the global one, and also to its structural incompatibility. Two global revolutions – the scientific-technical revolution that started in the middle of the last century and the technological revolution that we can observe nowadays -- make our own machinery and technologies so hopelessly obsolete (Ilyshev and Putilina, 2007) that illegal practice became ineffective. Moreover, such practice does not seem reasonable since almost all the necessary materials for innovative projects can now be legally purchased.

Instead of the old cold-war practice, the modern market conditions presuppose quite another format of interaction with technologically developed nations – wide international cooperation can be profitable for each participant. ISS JSC cooperation with leading space industry enterprises started in the late 1990s. Its bright prospects brought hopes that the strengths of each partner within the international cooperation

could allow creating principally new products that surpass both Russian and western space machines. In this connection, ISS JSC-Alcatel Space cooperation should be mentioned.

No doubts, to fulfill innovative projects successfully, engineering education and staff training is of primary importance but one should not forget about all other groups of personnel, too. Labor market with its very tough competitive struggle for competent employees gives rise to changes in the ISS JSC human resources strategy. In an effort to strengthen positions in the global market of satellite services, the company undertook some steps to more progressive personnel management in order to be more consistent for modern market conditions. As a result, a unified functional center for personnel management was created.

3. Assignments of the unified functional center for personnel management

By reference to the purpose of maintaining skilled and motivated staff capable to provide competitiveness of the company in the market of satellite services, the unified functional center for personnel management was created. It carries out a number of functions including those intended to support and develop the continuing training system. Fig. 1 illustrates schematically its main assignments.

Initially, the unified functional center was mainly destined to solve strategic and current problems of personnel management. Now it also works along various directions in the sphere of professional training starting with vocational guidance for local teenagers. This contingent has always been considered as a substantial sector of eligible workforce and vocational guidance is paid special attention in ISS JSC, as well as in the other space industry organizations (Zelentsov and Petrikevich, 2006). Moreover,

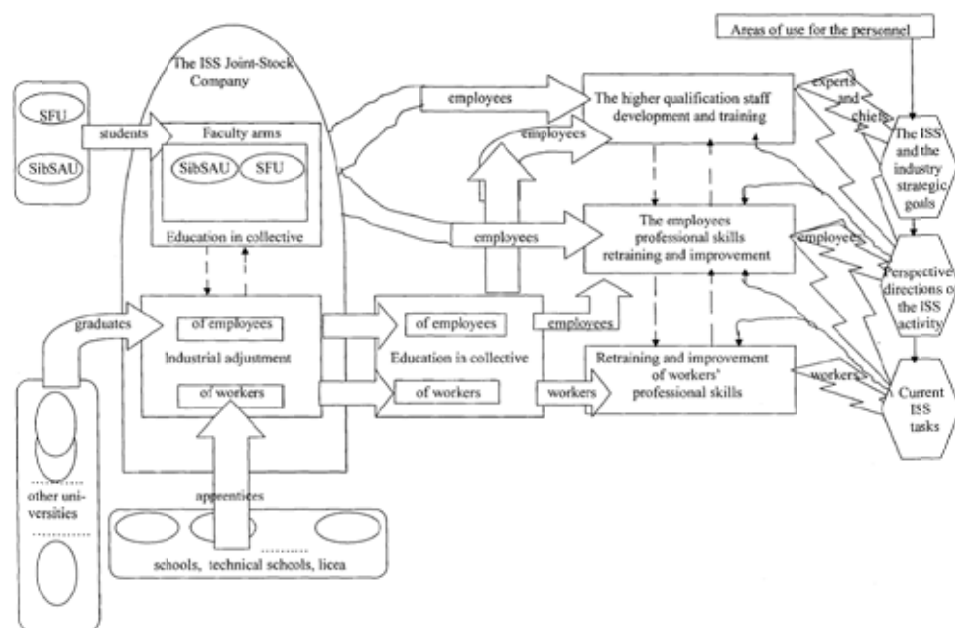


Fig. 1. Assignments of the ISS JSC unified functional center for personnel management

we believe that vocational guidance will play more important role because the labor market is developing and teenagers are getting more vocational opportunities, and the potential labor contingent now is not restricted by the limits that were inherent in the times of undisclosed towns and planned allocation of the graduates.

Within the vocational guidance framework many things are inherited: advanced learning of physics and mathematics at schools is encouraged, regular meetings of the company's experts with pupils, parents and teachers are provided; lectures, school subject olympiads and other competitions are organized, etc. The centers for vocational guidance are Lyceum №102 and «Astronautics School» – the Educational Center that works with gifted children and talented youth. Company's tight relations with preliminary vocational training institutions – Professional Lyceum №10 and Professional School №47 – allow carrying out schooling of young workers in line with our purposes. Our experts supervise target students in these two institutions, and with the approval

of the authorities, students' curricula include special courses consistent with their future work for the company. Lyceum students perform their works and do pre-diploma practices in the company's subdivisions. The same scheme works for SibSAU and SFU students who also carry out their diploma works on problems suggested by the company.

Within the first working year after graduating young specialists must pass compulsory coaching according to their individual plans. Besides, target classes are organized for them in order to get more acquainted both with the company's organizational structure as a whole and the problems that are typical for its particular subdivisions. After the first and the second years of their employment at ISS JSC young specialists must prove their final certification, the results of which allow the management board to make a decision whether acknowledge their professional skill improvements or not. In this way the company carries out necessary additional development of young specialists along both narrow-profile

technical directions and more general fields of business ethics and communication.

Professional training and skill improvement that the company's employees have to deal with are carried out in order to: (1) maintain the professional level and qualification of personnel in view of the current industry requirements and growth prospects for ISS JSC; (2) develop personal valuable qualities of employees and provide necessary conditions for their professional growth and self-realization; (3) raise professional competence of the employees; (4) provide their value to meet the industry needs and prospects of the company development; (5) improve their proficiency and skills necessary for effective work.

The structure of professional training and skill improvement includes: self-education which is carried out by self-study of special professional literature and by getting acquainted with the best world practices known in the sphere of trainees' professional interests; internal study in the form of permanent seminars and courses on the current technical problems and key directions of the company's activity; distance education as an opportunity to swiftly get knowledge in the most significant professional areas; target training both at high-schools focused on preparation of required specialists and in the courses or seminars aimed at professional skills development.

Personnel training and improving professional skills are carried out according to the internal company standards titled «System of Quality Assurance and Quality Control: Personnel Study, Professional Skill Development and Certification of Persons in Charge. Essential Regulations». The standards are designed by ISS JSC experts on the basis of the standard programs recommended by the Russian Ministry of Education and Science and includes the mandatory introduction of a special part describing the company specific performance. According to the standards, the

curricula and examination cards are reconsidered each five years to meet the changing requirements in professional training and corresponding professions' qualifying characteristics. They are then verified by the General Director's assistant (chief engineer).

The company's skilled experts, well-educated high-skilled employees with wide teaching experience and top working achievements are engaged as teachers in professional training, professional skills development and supervision of engineering practice. In order to increase the effectiveness of teaching annual upgrading qualification courses for teachers themselves are organized. Training and development of workers' professional skills are carried out either individually (training at a workplace) or in groups (in-service training courses). Training can also be taken in the specialized instructive center.

Training and professional skills development for persons in charge and experts are carried out in accordance with individual professional training programs both in the special in-service training courses (annual courses to improve qualification) and in external in-service training institutes for professional skills development or other organizations. The necessity to carry out individual professional training for persons in charge and experts, as well as forms of training, its place and terms are designed by the company's experts who work with personnel as agreed with those persons who are responsible for appropriate structural subdivisions or heads of appropriate departments.

4. The concept of united educational sphere within the company's personnel policy

Long-term experience of work with human resources allowed formulating the concept of united educational sphere (Kukushkin et al,

2009) that is put into practice at the unified functional center for personnel management. The concept says: Innovative orientation aimed at the company's economic growth is based on continuing professional training of the company's staff which in turn is based on profound integration of all the training stages under industry conditions; it makes use of the concentric principle for the organization of professional requirements' content and is based on differentiated approach to personnel training and development.

The concept of united educational sphere aims at developing competitiveness of space industry workforce – people who must be capable to respond to diverse current challenges of scientific and technological progress. Several main principles were put into the concept's basis, that is, the principles of continuity, consistency, consecutivity, completeness of professional training at each coaching stage, poly-synchronism (combining strategically perspective and current tasks), versatility, multi-gradualness, multi-functionality, interlinking of educational programs.

The crucial idea incorporated in the concept is the idea of social partnership. Theoretical regulations include the following issues:

1) Integration of all the training stages within industrial background is the best way to increase the professionalism of personnel. It allows establishing professional training directions essential for both working out strategic and perspective problems facing the company and solving its current tasks.

2) The concentric principle for alignment of the professional requirements' content allows describing the process of professional training in terms of the competence rise in the professional cycle directions which enables to achieve the higher level of skills at each schooling grade.

3) The differentiated learner-centered approach allows organizing certification of the personnel stage-by-stage at each phase of training.

Practical management is carried out within the framework of the personnel training and retraining system (staff strategy) basing on the existing system designed for educating engineers. It focuses on the following aims: to create a multilevel system of requirements to professional-public certification of personnel skills; to use up-to-date industrial and educational technologies for professional training; to develop a new series of instructive textbooks on contemporary space technologies, training and supervising programs for the system of the staff's professional skills improvement; to create an advanced system of branch inter- and intra-high-school centers on the company's basis; to support national and international integration of space industry enterprises and high-schools.

The following official documents were regarded as sources for the concept: The Concept of Russian Education Modernization up to 2010; The Federal Target Program for Education Development; The Law of Education; The Labor Code; The System of Experts' Certification in the Engineering Structure; The System of Social and Economic Stimuli Aimed at Professional Growth and the Status of Engineering Work Rise; The System of Continuous Professional Skill Improvement in In-Service Engineering Training.

Orientation of the personnel policy toward social partnership presupposes both the goal-aiming and rise of motivation within professional training. It demands new approaches with regard to information supply, pedagogical analysis, planning and organization, control and regulation of all the related activities. For these purposes special mechanisms are required, which include interacting with aerospace high schools and other

space industry organizations; inter-departmental coordination of personnel policy; forming of the system of professional-public certifications for employees; etc.

5. Conclusions

In spite of the fact that little by little Russia becomes nothing but a raw-materials resource for technologically more developed nations, Russian space industry goods and services are still of the few that match the level of the world space industry standards. The enormous material potential built for more than half a century due to the colossal government investments, as well as strong human resources created by several generations of researchers and engineers still make space industry stand second to none.

To keep this high level, very important measures should be taken in the sphere of personnel development. The essential element of any space enterprise's policy is continuing professional education that can train the staff capable to work in the situation of permanent technological innovations and, above all, support engineering creativity.

Much is being done to develop the ISS JSC own continuing professional training system. Since all the company's performance is reoriented toward the market, the ISS JSC management board sees some prospects of its further development in market-oriented type training system. However, the current training system inherited many significant features from the past, which should not be underestimated.

Although ISS JSC training system belongs mostly to technical education, it is learner-centered and its humanitarian component is strong. The company personnel policy declares that "individuals who are able to create the most progressive high-intellectual space machinery have always been the company's foremost value".

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Развитие системы непрерывного профессионального образования ОАО «Информационные спутниковые системы» и некоторые связанные с этим проблемы

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Приведены этапы и некоторые проблемы развития системы непрерывного профессионального образования ОАО «Информационные Спутниковые Системы» при переходе от плановой экономики к рыночной. Представлены схема обучения персонала ОАО ИСС и концепция единого образовательного пространства в рамках кадровой политики предприятия. Рассмотрены некоторые направления деятельности единого функционального центра по управлению персоналом.

Ключевые слова: профобразование, профориентация, непрерывное образование, кадровая политика.
