

Managing Interdisciplinary Teams

Prof. Alexander SHARAVIN, Russia

Key words: Interdisciplinary teams, organizations in geodesy, cartography, photogrammetry, land cadastre, GIS, management tasks.

ABSTRACT

The task of managing interdisciplinary teams is international. The spatial allocation of such teams in one place brings, first of all, the organizational problem. In the countries with market economy a sufficient advancement in this direction has been made.

The problem of managing large organizations with interdisciplinary teams becomes complicated in such countries as Russia by such general issues as insufficiency of precise legislative base, barbarian taxation and little experience of private business.

What are large organizations with interdisciplinary teams necessary for? The fact is that within the realization of large integrated projects in the field of geodesy, photogrammetry, cartography and cadastre the customer wants to purchase goods and services from one source.

Taking in account the tough market competition, large organizations with interdisciplinary teams are usually the general contractors for such projects. The National Cartographic Corporation is one of such organizations. We implement for our customers the various integrated projects, ranging from aerial photography, photogrammetric and cartographic services and finishing with creation of multi-purpose geographic information systems (GIS). In accordance with this our employees work as topographers, land surveyors, cartographers, photogrammetrists, geographers and perfectly utilize computer technologies and foreign languages. The General Director, for example, is a land-surveyor, his first Deputy is a photogrammetrist, chiefs of the departments have complimentary professions.

Strategic directions of corporation's activity are discussed at general organizational meetings with participation of the representatives of the whole interdisciplinary team. On these meetings the preliminary decisions are made, the final decision is made personally by the General Director.

The global process of merger of firms into large corporations results in the increase of the number and importance of interdisciplinary teams that become the significant factor of decision-making in many spheres of activity internationally.

CONTACT

Prof. Alexander Sharavin, Dr. Eng. Sc.,
Director General of National Cartographic Corporation
National Cartographic Corporation
General Director
20, Kuznetsky most
Moscow, 103031
RUSSIA
Tel. + 7 095 924 8961
Fax + 7 095 924 8961
E-mail: mail@patris.ru

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1. INTRODUCTION

The increasingly interdisciplinary nature of management process in various organizations brings new challenges for both team management and the team members. In this paper I will examine some of the issues of interdisciplinary management using our experience at the National Cartographic Corporation as a case study.

To study the organizational issues involved in managing cross-disciplinary teams a greater precision is required. It is necessary to distinguish and keep analytically separate the nature of the task (cross-disciplinary) and the organizational structure in which the task is carried out (multidisciplinary and interdisciplinary). Epton et al describe the situation as follows: “There are tasks that require for their objective completion contributions from more than one discipline. Such tasks are defined as cross-disciplinary. Cross-disciplinary tasks can be carried out using either of two different organizational forms: the “pure” multidisciplinary form – in which portions of the task are carried out by organizationally separate units each of which includes practitioners of only one discipline and the “pure” interdisciplinary” form – in which the elements of the task are carried out within a single unit that: (a) Includes practitioners of all the disciplines necessary for the completion of the task. (b) Has an internal structure such that transactions between members can take the form described as consulting.

The task of managing interdisciplinary teams is international. An interdisciplinary approach is now common for industry, government and university sectors, and in some cases across sectors. Both the organizational context and the disciplinary composition of the team will define the ways in which the team can be organized – each setting providing both unique advantages and constraints.

Recently, a trend of integration and association of firms into transnational corporations has become prominent in the world. There is a lot of examples: association of large automobile concerns (Daimler-Chrysler), manufacturers of geodesic equipment (Trimble-Spectra Precision-Carl Zeiss) etc. The number of employees usually increases, and so does the interdisciplinarity of working teams.

The spatial allocation of such teams creates first of all the organizational problem. New intricate administrative structures appear. The traditional hierarchical structure becomes more intricate through setting up a lot of departments and sections with criss-cross functions, some of which now are directly under the general director (CEO).

The problem of management of large organizations with interdisciplinary teams becomes complicated in such countries as Russia by such general issues as insufficiency of precise legislative base, barbarian taxation and little experience of private business.

2. PRACTICAL IMPLEMENTATION

What are large organizations with interdisciplinary teams necessary for? The fact is that within the realization of large integrated projects in the field of geodesy, photogrammetry, cartography and cadastre the customer wants to purchase goods and services from one source. Taking in account the tough market competition, large organizations with interdisciplinary teams are usually the prime contractors for such projects. The National Cartographic Corporation (NCC) is one of such organizations. The NCC was created in Moscow almost 3 years ago as a result of merger of several Russian companies in the field of cartography, photogrammetry, land surveying and GIS technology and is a logical continuation of their long-term co-operation. So far it's a unique example of successful partnership of science and industry in Russia. The process of merger has been legible and fast, without financial, client and personnel losses.

The National Cartographic Corporation has the following main subdivisions: cartography and photogrammetry, geodesy and cadastre, special and thematic maps of Moscow and also a geodetic equipment division. The Science and Technology Committee included in the structure of the Corporation as well as assistant and adviser of the General Director are subjects of direct subordination to him. Within the division of cartography and photogrammetry are: cartographic department, department for historical and political mapping, department for geographic mapping and a photogrammetry department. The division of geodesy and cadastre includes the geodetic department, department for cadastre mapping and the metrology lab. The division of special and thematic maps of Moscow consists of departments for special and thematic maps. The division of surveying devices and equipment consists of department for transport equipment and tools, department for electronic-satellite equipment, and also service department. The department dealing with economic matters is a subject of subordination to General Director through the financial director. Departments for information and technology as well as for science and research are subjects of direct subordination to the 1-st deputy of the director general for commercial and scientific-research tasks, and the technical control section - directly to general director.

Our clients are: state structures dealing with geodesy, cartography and phototopography, land cadastre, land consolidation and land monitoring, as well as authorities and organizations of power structures of Russia (military, defence) as well as commercial companies in petroleum and gas industries (concern «LUKoil») and iron and steel industry (joint-stock company «Northern Steel», Norilsk Metallurgical Combine) etc. Our sales orders are distributed approximately evenly between state and commercial organizations.

We implement the various integrated projects, ranging from aerial photography, photogrammetric and cartographic works and creation of multipurpose geographic information systems (GIS). How does such an integrated project look like from the point of managing of interdisciplinary teams? Let's consider it as a separate stage on preparation and implementation of field cadastre measurements.

The cadastre works carried out by our Corporation are usually for determination and reconstruction of the boundaries of land parcels. Cadastre works begin in accordance with

receipt of the applications. Usually the customer comes to the future contractor personally. The agreement is completed and the customer usually provides a 30% - 50% upfront payment.

The project is recorded on the corporate computer network and its implementation starts. The leader of the project is assigned. He creates field and office teams taking into account their qualification and specialization as well as project objectives. Project leader co-ordinates the activities of both teams.

The office team prepares the information for implementation of field works: it collects and analyzes available materials (outcomes of former cadastre works, drafts, schemes, maps, plans, coordinate catalogues). On base of these works technology of implementation of field works and office processing is chosen.

Then the office team informs landowners on time of initial personal meeting with them and time of implementation of cadastre works. Meanwhile the chief of the field team loads all necessary information to the field computer. Next stage is implementation of field geodetic works: joint meeting with the people involved in the project, inspection of the boundaries, determination and possible marking of the boundaries as well as signing of the agreement protocol between neighbours. After returning in the office the leader of a field team transfers the assembled information from the field computer to the project folder and creates new drafts of land parcels' boundaries. The "processing" team updates cadastre data and assigns new information for its approval in the regional Chamber of land cadastre.

The above described works were a part of the project implemented by the National Cartographic Corporation within the order from one the largest metallurgic plants in Russia – joint stock company «Northern Steel».

During 1998-2000 works on land inventory, which were executed under the technological scheme consisting of creation of a digital map as well as cadastre divisions, creation of data base and the land information system, were carried out on the territory of joint stock company «Northern Steel». For the subsequent creation (updating) of cadastre plans in scale 1:2000 materials of aerial photography with aerial camera LMK-30 on an airplane of a type AN-2 were used. Orthophoto plans were created with the photogrammetric software bundle «Talka». More than 400 photos were processed for the industrial territory of joint stock company «Severstal» with the total area of 58 sq. km. The errors on control points have not exceeded 0,1 m within the use of method of modular phototriangulation. The GIS «Map-2000» was applied for creation of a digital map in a vector format. The reached precision was unique meaning that the initial photography was in scale 1:12 000.

Further the works were extended. Cartographic materials of scale 1:2000 were made for the whole territory of the city. The geoinformation system of city for the purposes of management of municipal services was implemented on base of these materials.

In particular the application was created for the city land committee permitting realization of registration of land users, right-determining documents, quantitative and qualitative land

registration, for creating of necessary documents within registration of rights for land parcels with the help of the records of service introduced by current legislation.

I explicitly mentioned only one project of our Corporation, which was not very complicated. Our employees work as topographers, land surveyors, cartographers, photogrammetrists, geographers and perfectly utilize computer technologies and foreign languages. The majority of our experts graduated from higher educational institutes, such as Moscow University of Geodesy and Cartography, Moscow State University of Land Consolidation, Geographical Institute of Moscow State University MGU and other High Schools with specialization in geodesy, cartography, surveying and information technologies. Some of the experts know foreign languages. Before working in the NCC many of our experts were employed in leading research institutes and aerogeodetic enterprises. The nucleus of the Corporation is formed by former military topographers having big practical experience in management. The General Director, for example, is a land-surveyor, his first Deputy is a photogrammetrist, chiefs of divisions have complimentary professions.

In its activity the Corporation co-operates closely with higher educational institutes. Annually 15-20 students have internships with the NCC. The best students come to work at the Corporation afterwards.

Strategic directions of corporation's activity are discussed at the board of directors. The complicated scientific and technical matters are discussed within the sessions of Science and Technology Committee, which structure includes 11 Doctors of Sciences. The problems of current activity and technical matters are discussed at general organizational meetings with participation of the representatives of the whole interdisciplinary team. Such meetings with mandatory presence of chiefs of the divisions and departments are carried out not less than once per one quarter.

Quarterly, chiefs of divisions and departments prepare reports on executed works that first are considered by the deputy of director general.

The activity of the National Cartographic Corporation is regularly described in the magazine "SURVEYOR", which is established by NCC and published 6 times a year with a circulation of 5,000 copies in Russian language. In the nearest future we plan to publish this journal in English as well. About 2,500 copies of the magazine go to the Land Committees of various levels, the remaining copies are distributed among geodetic and cartographic organizations in Russia and NIS countries.

The articles of outstanding Russian scientists and experts are published in the magazine. A lot of attention in the magazine is given to advertising of geodetic, cartographic and photogrammetric equipment and devices, including well-known foreign manufacturers of the geodetic equipment, of software and technologies as well as management tasks of geodetic and cartographic enterprises.

3. CONCLUSION

Interdisciplinary research creates new challenges for management especially in a corporative environment where the department structure reinforces the disciplinary status system of rewards and power.

The global process of merger of firms into large corporations results in the increase of the amount and importance of interdisciplinary teams that become internationally the significant factor of decision-making in many spheres of activity.

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