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Articles

Corporate Governance Space Vehicle

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Abstract

The article explores technologies for corporate management of spacecraft. It includes their ground training in flight control and the accumulation of control experience. The difference between corporate and collegial management is shown. Three types of corporate governance are described. Corporate spacecraft management is treated as an integrated technology that includes organizational, technological and cognitive components. This technology requires the use of space geoinformatics methods. Corporate management of spacecraft is organizational and technical. It introduces an additional management cycle: balancing or coordination of decisions. The cognitive factor is an important and necessary element of spacecraft control. Corporate management of spacecraft requires an additional management cycle – balancing. Another additional cycle of corporate governance is the management of spacecraft complementarity. These two additional cycles increase management time but are necessary components of corporate governance. Examples of corporate governance in land-based mobile objects are given. The connection between subsidiary management and corporate management of moving objects is shown. Socially sustainable corporate governance is described. The article describes the content and principles of corporate governance. A system model of corporate governance principles is given. The system components of corporate governance are described. Corporate spacecraft management is a new management and space technology. Spacecraft management can only be corporate, since this is the only way to reduce management complexity.

Keywords: space research, management, corporate governance, spacecraft, space geoinformatics.

1. Introduction

The control of spacecraft is characterized by an increase in the complexity of control situations and an increase in the control mechanism. It is necessary to take into account the factors of situational complexity and managerial complexity. Complexity is one of the components of big data (Levin, Tsvetkov, 2017). It can be argued that modern spacecraft control is associated with the need to solve the problem of "big data". The problem of the complexity of transport management and mobile objects are currently being solved through the use of intelligent transport systems

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(Tsvetkov, Rosenberg, 2012), transport cyber-physical systems and the use of group control methods (Bronnikov, 2022). Logistics systems are used to manage flows.

Spacecraft control (CSCR) is a special type of control that does not occur in terrestrial conditions. CSCR can be thought of as a system and technology. CSCR as a system is COTS, which includes GIS. The latter is due to the fact that geoinformation technologies and GIS are a tool for decision support (Tsvetkov, 2001). In addition, CSCR is related to spatial management. Spatial management is solved using geoinformatics methods. CSCR as a technology is an integrated technology that includes organizational, technological and cognitive components. The cognitive components of management are a distinctive feature of the CSCR. CSCR technology requires the use of space geoinformatics methods (Bondur, Tsvetkov, 2015).

2. Results and discussion

Features of corporate governance

Corporate governance is a new concept. In the works (Considine, 1988, Petrin, 2019), intuitive definitions of corporate governance are given. A precise definition of corporate governance and the systematics of corporate governance are given in (Tsvetkov, 2023). Corporate governance is divided into collegial management of a complex object in a difficult situation and management of a group of objects.

Initially, corporate governance as collegial management was seen as a type of management by the top management of the campaign using a special unit called "headquarters". In the USSR, it was used by incompetent leaders to insure the decisions made. It was seen as a transition from one-man management to collegial management and, accordingly, to collegial responsibility. Corporate governance was initially used in campaigns to improve the sustainability of operations. Figure 1 shows the first version of corporate governance.

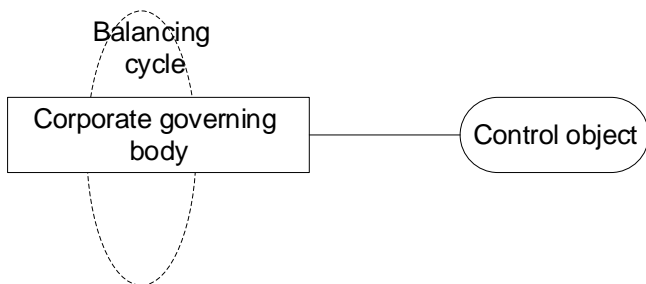


Fig. 1. Corporate governance option

In this embodiment, corporate governance is characterized by collegiality. This reduces subject errors and makes management more resilient. This is a positive characteristic of corporate governance. However, such management introduces an additional management cycle: balancing or reconciling decisions. The decisions of different experts may differ in details, but be coordinated in the main thing. For such coordination, additional technology is needed to coordinate or balance all participants in the corporate governance process. Figure 1 shows the "balancing cycle" (BC), which is necessary for the coordination of collegial decisions. This loop requires additional costs and is not required for centralized unified initial management. Coordination of actions in the management body (balancing) is a distinction between corporate governance. This is a lack of corporate governance. In the model in Figure 1 there is one management object and a corporate management body.

At the next stage, corporate governance was associated with the emergence of a multitude of management objects, the actions of which must be coordinated, since they solve a common strategic task. The second type of corporate governance uses the relationship "centralized management system – a set of management objects" (Figure 2). For example, in a city, a fleet of buses or taxis can be managed by a commercial company. All buses have clear routes and schedules. The presence of unforeseen circumstances (traffic jams, congestion, accidents) disrupts the traffic schedule and reduces passenger traffic. The goal of the campaign is to optimize traffic in the event of traffic disruption.

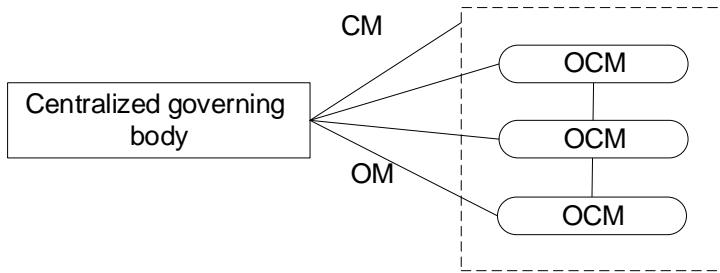


Fig. 2. The second option of corporate governance

Figure 2 shows this situation. There are many Enterprise Management Objects (OCMs) and there is a control center. Corporate governance technology uses two technologies: object management technology (OM) and complementarity management technology (CM) or object coordination technology. Coordination of actions of objects (balancing of actions) is a difference in corporate governance.

When managing a fleet of taxis, there is a more complicated situation. There are no clear schedules for this case. The taxi driver chooses the route according to the order. In fact, this is subsidiary management, if not for the presence of a control center. The main strategy is to load the machines. The control center (control room) performs the functions of regulation and optimization of orders. This is done manually, at the cognitive level. The more experience the dispatcher has, the more efficient the taxi network is.

A set of situations in this case sets a variety of conditions for movement and control. The key indicators of situations in this case are: the schedule of movement of many objects, the state of traffic flows, the volume of traffic flows. The dominant feature of management is the transportation of passengers and the complementarity of traffic.

The third type of corporate governance sets the relationship "corporate management system – a set of management objects". For example, any ministry has property and real estate located in different parts of the country. The Ministry of Transport carries out transportation within cities, between cities, on different modes of transport (multimodal transportation). The Ministry of Education has many universities that need to be managed in a coordinated manner, taking into account their property and human resources. The Ministry has many services, the internal actions of which need to be coordinated. The Ministry has many objects of management, the external actions of which must also be coordinated. Management in this case is multiple and multi-purpose. Figure 3 shows the corporate governance scheme for this option.

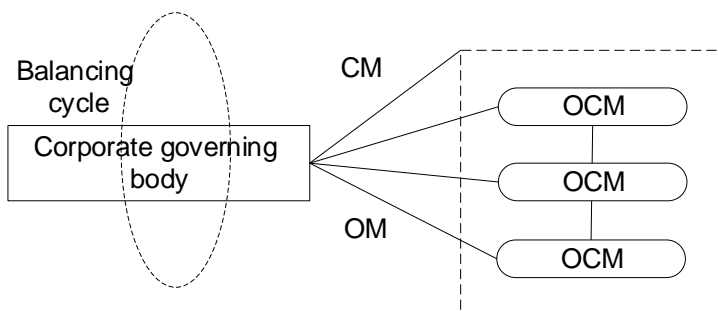


Fig. 3. The third scheme of corporate governance

In fact, there is a compilation of schemes in Figure 1 and schemes in Figure 2. But this is part of the differences, the main difference is in scale. Figures 1 and 2 describe the management of the campaign. Figure 3 describes sectoral corporate governance. This complicates both the balancing cycle (BC) and complementarity management (CM).

Thus, the difference between centralized management and corporate governance lies in the availability of technology for balancing management flows and the availability of additional technology for managing the complementarity of corporate objects.

With the accumulation of experience, the corporate governance structure of campaigns has become the basis for the transformation of public administration (Considine, 1998). Corporate governance in commercial firms used four basic principles: product format, instrumentalism, integration, and goal-orientedness. For public corporate governance, political and social factors must be taken into account. The concept of socially sustainable corporate governance has emerged «social responsibility of corporate management» (Coelho et al., 2003).

Corporate governance has been associated with such factors as: corporate social responsibility, corporate perimeter of the campaign, corporate informatization program, levels of corporate governance, corporate relations, corporate governance system, corporate data warehouse, corporate information system, corporate cyberspace, etc models of information situations in which the objects of corporate governance are located.

Content and principles of corporate governance

The number of principles of corporate governance (Corporate governance, CG) can be different. The well-known principles of governance can be combined into a model. System Model of Corporate Governance Principles (Corporate governance, 2023) (Principles of Corporate Governance, PCG) has the form

$$PCG = \langle Fa, Tr, RM, Res, Acc \rangle \quad (1)$$

In expression (1) Fa – Fairness, Tr – Transparency, RM – risk management, Res – Responsibility, Acc – Accountability.

Fairness. The Board of Directors has a duty to treat shareholders and communities fairly and with equal consideration.

Transparency. The board of directors should provide open information about various things and facts that affect the state of the campaign. These are: financial indicators, the presence of conflicts of interest, the presence of risks for shareholders and other parties.

Risk management. The Board of Directors must identify possible risks and ways to control and minimize them. For this purpose, agreed recommendations for risk management should be developed (Tsvetkov, 2014). The Board of Directors shall act in accordance with these recommendations. The Board of Directors shall inform all relevant parties of the existence and status of risks.

Responsibilities The Board of Directors is responsible for overseeing corporate affairs and management activities. He must be informed and support the work of the company. Responsibilities include the appointment of a CEO. The CEO must act in the best interests of the company and its investors.

Accountability. The board of directors should explain the company's goals and report on the results of its activities. The board of directors and management of the company are responsible for assessing the capabilities, potential and effectiveness of the company. The board of directors must communicate important issues to shareholders.

There are three main models of corporate governance: Anglo-American (AAM), continental (CM), Japanese model (JM). AAM can take many forms, depending on the dominant factor. For example, the shareholder model, the stakeholder model and the political model. However, the shareholder model is the basic model in all forms

The shareholder model is designed in such a way that the board of directors and shareholders are in control of the situation. Stakeholders such as suppliers and employees, although recognized, have no control. The model allows shareholders to relinquish management if they are dissatisfied. This increases management efficiency.

The Board of Directors consists of insiders and independent members. The Chairman of the Board of Directors and the General Director may be one person. This model assumes that these duties are performed by two different people. U.S. regulators tend to support shareholders rather than boards.

The continental model is characterized by two groups: the supervisory board and the board. The board is made up of company insiders, such as its executives. The Supervisory Board is made up of third parties, such as shareholders and trade union representatives. Banks with stakes in the company could also have representatives on the supervisory board. The size of the supervisory

board is determined by the legislation of the country. It cannot be changed by shareholders. National interests have a strong influence on this model of corporate governance.

The key players in the Japanese corporate governance model are banks, affiliates, major shareholders named Keiretsu (who can be invested in ordinary companies or have trading relationships), management, and government. Smaller, independent, individual shareholders have no role or voting rights. Key players carry out corporate governance. This model is focused on selected professionals and is the least transparent due to the concentration of power and the inequality of opportunities of different shareholders.

There are institutional criteria for assessing corporate governance. They are also called Positive management criteria (PMCs). They include the following factors:

$$\text{PMC} = \langle \text{DP, MRM, SCB, RMM, MPCIR, OCB, CSOC, RS, MRSC, EIEA} \rangle \quad (2)$$

Expression (2) includes the following parameters:

- DP – Board Disclosure Practices
- MRM – Methodology of remuneration of managers
- SCB – system of checks and balances
- RMM – Risk management methodology
- MPCIR – Methodology and procedures for conflict of interest regulation
- OCB- Operating conditions of the Board of Directors (their share of profits or conflict of interest)
- CSOC – Contractual and social obligations of the company
- RS – Relations with suppliers
- MRSC – Mechanism of reaction to shareholder complaints
- FIEA – Frequency of internal and external audits

Negative assessments of corporate governance include:

Companies that do not cooperate sufficiently with auditors or do not select auditors with the appropriate scale, which leads to the publication of false or non-compliant financial documents. Poor compensation packages for executives that don't create optimal incentives for corporate employees. Poorly structured boards of directors that make it too difficult for shareholders to displace inefficient incumbent operators.

Corrective and preventive action (CAPA) plays an important role in corporate and non-corporate governance (Westcott, 2005). This is a mechanism or rules for resolving internal and external conflict situations. A key concept in this mechanism is the identification of inconsistencies or undesirable situations. A non-conformity is: a complaint, a complaint, a failure of equipment, a decrease in quality, or a misinterpretation of the instructions. Corrective and preventive actions are developed by a team that includes quality assurance personnel and personnel involved in the actual monitoring of non-conformity. All of the principles discussed are applicable to the corporate governance of spacecraft.

3. Conclusion

Corporate management of spacecraft is organizational and technical. Corporate flight management is technical. The flight-only corporate board was described in (Bronnikov, 2022). This work dealt only with flight control and did not consider the organizational aspects of control and the methodology for controlling spacecraft. However, it did not cover all aspects of management. The proposed publication is a development and addition to the previously published publication. Corporate spacecraft management is a new management and space technology. Space Management devices can only be corporate, since this is the only way to reduce the complexity of management. Corporate spacecraft governance uses heuristics and meta-heuristics to analyze complex situations. This is the advantage of the method over intelligent control. A special feature of corporate spacecraft management is the use of information units. Corporate management of spacecraft, including organizational and cognitive factors. Corporate governance of spacecraft implicitly uses meta-heuristics methods. Space geoinformatics serves as the basis for decision support in the corporate management of spacecraft. A group of operators in the technology of corporate management of spacecraft is a self-organizing system. This increases the reliability of the corporate Management.

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