Development of a supplier assessment model

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Abstract. Supervisory activity in any sphere of the economy is special, requiring the involvement of highly qualified specialists and strict regulation of this process. The article reveals the current state of regulation of the process of consumer control over suppliers in the aircraft industry and presents proposals for its improvement.

1 Introduction

Currently, the production of aviation products to a certain extent depends on the materials used in production and components.

In practice, relations between manufacturers of aircraft and helicopters and enterprises supplying raw materials, supplies and components are regulated by current legislation and regulatory and technical documents (GOSTs, technical regulations, federal aviation regulations, etc.).

One of such documents regulating the above relations is GOST R 58175-2018 “Aviation equipment. Supplier management in the creation of aviation equipment. General requirements" (hereinafter referred to as the Standard).

The standard establishes general requirements for the management of service providers for the performance of research work, development work, maintenance and repair, services for performing technological operations in the creation of aircraft equipment, materials, semi-finished products and components, and its requirements apply to the lead developers (developers), lead manufacturers (manufacturers) of aviation equipment, as well as suppliers of services for performing research work, development work, maintenance and repair, services for performing technological operations, raw materials, supplies and components, consisting of cooperative and technological ties for the purpose of development, production and maintenance of aviation equipment [1].

The standard also establishes provisions on the consumer's responsibility to supervise the supplier to ensure that the supplier meets its requirements. The scope of inspections as part of the supplier supervision process should depend on the results of audits, identified deviations, supplier performance indicators, and supplier risk assessment [2].

Based on the above standards, consumer supervisory activities regarding the supplier include, but are not limited to:

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- monitoring performance indicators on quality and deadlines;
- assessment of the supplier's rating;
- product audit;
- audit of the production process;
- QMS audit;
- monitoring the supplier's ability to ensure the established production rates.

An analysis of clause 10 of the Standard regarding the content of "supervisory activities of the consumer in relation to the supplier includes, but is not limited to" showed the presence of corruption factors in them. In this case, corruption factors include:

selective change in the scope of rights;

corruption factors containing uncertain requirements for organizations.

The law enforcement practice of applying clause 10 of the Standard at enterprises in the aircraft manufacturing industry reflects the following set of requirements in the areas of supervisory activities for suppliers[3].

2 Materials and Methods

Thus, when monitoring performance indicators in terms of quality and timing, the following criteria are applied:

- assessing the possibility of delays in delivery;
- ability to manage product safety throughout the entire life cycle;
- the ability to provide the Consumer, upon his requests, with records confirming the planning and implementation of processes related to the safety of products supplied under his order;
- ability to manage processes to prevent the supply of counterfeit products.

When assessing a supplier's rating, the following criteria are established:

- availability of a supplier in a unified supplier database;
- whether the supplier is part of the enterprises of State Corporations or not;
- experience in supplying enterprises in the aircraft manufacturing industry;
- whether the supplier is a product monopolist;
- the presence of independent control by VP MO or RT-Tehpriemka.

According to the financial risk factor, the following elements are assessed:

- date of foundation of the enterprise;
- major shareholders;
- contractual connections (holding, merger);
- development/capital structure;
- capital turnover;
- capital/turnover ratio;
- results of financial activities (income before interest and taxes, investments, self-financing opportunities, percentage of turnover going to R&D, financial debts);
- dependence on customers [4,5].

When auditing products, the following criteria are defined:

- availability of technical documentation for manufactured products in accordance with customer requirements (a set of design documentation for a component part of an aircraft sample, electronic models of the component part and its components);
- production license or developer license;
- QMS certificate;
- certificate of suitability of the product (report on the results of bench, qualification, statistical, resource, ground or flight tests);
- certificate of production approval (for GAT);
- letter of approval from the Aviation Register (for GAT);

- installation approval;
- certificate of aviation authorities of the country of the Developer (country of the Manufacturer);
- quality certificate;
- availability of VP MO or RT-Technical acceptance.

When auditing a production process, special requirements are established as criteria:

- when auditing this indicator, the element of differentiation of suppliers into product manufacturer and intermediary is taken into account;
- production control of suppliers is carried out according to the decision and instructions of the chief designer for the project;
- production control at suppliers is intended to verify and document documented evidence of compliance of the supplier's production with the requirements for the supply of products under the project [6].

When auditing the QMS, suppliers are assessed according to the following criteria:

- facts of the presence or absence of deviations of the supplied products from the requirements of regulatory documentation;
- availability of a QMS conformity certificate (GOST RV 15.002, GOST R ISO 9001, 9100).

When monitoring the supplier's ability to meet established production rates, the results of periodic supplier assessments are assessed.

Having familiarized ourselves with the above approach to supervision of suppliers, we are faced with facts of duplication of requirements for supervision. These facts are shown in the figure.

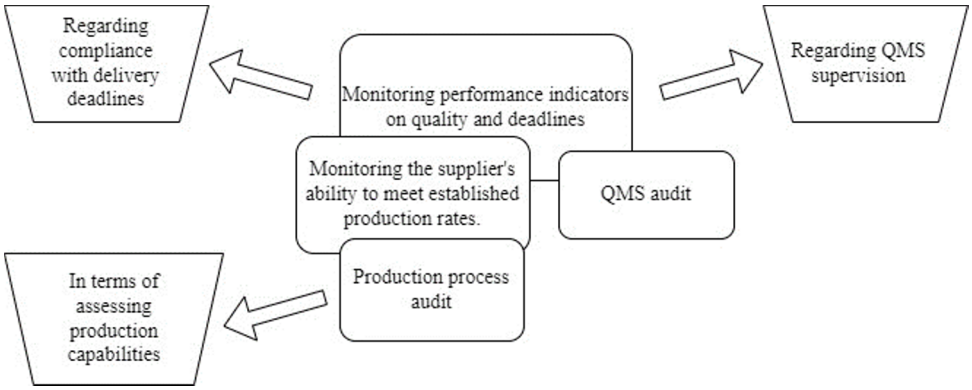

Fig. 1 – Factors of duplication of requirements

The current practice of supplier management in organizations in the aviation industry does not provide for the existence of a unified database of supplier supervision results.

There is no link to a unified information base for recording auditors admitted to the audit and the audit results [7].

Also, supervision over the activities of suppliers does not involve the involvement of third-party auditors (for example, auditors JSC "RT-Tekhpriemka") and the possibility of outsourcing this function.

In the current situation, it is possible to involve representatives of Consumers in audits without proper theoretical training and practical experience in auditing. Accordingly, there is no system for accreditation of supplier supervision auditors [8].

3 Research and results

Taking into account these features of supervisory activities over suppliers in the aircraft manufacturing industry, it is proposed to change the approach to this process, and therefore the content of clause 10 of the Standard is stated in the following edition.

Supplier supervision

The consumer must supervise the supplier in order to obtain objective information about the supplier's ability to supply products in the required volumes, terms and proper quality. The procedure and scope of inspections are carried out in accordance with standard quality requirements and the standard procedure for conducting a supplier audit. Additional requirements for supervision of suppliers may be established by the consumer in agreement with the federal executive authorities regulating the implementation of antimonopoly legislation[9-11].

Supplier supervision is carried out using existing automated information systems in the aviation industry.

Supervision of suppliers is carried out by experts (auditors) who meet the standard requirements for expert (auditors) auditors of aviation industry suppliers and are registered in the unified register of auditors of aviation industry suppliers.

As part of fulfilling the requirements of the proposed edition of Article 10 of the Standard, the format for the admission of auditors should be carried out in the image and likeness of the requirements reflected in the Decree of the Government of the Russian Federation of June 23, 2021 No. 970 "On approval of requirements for technical experts, a list of areas of specialization of technical experts, requirements for expert organizations on accreditation and the list of areas of certification of accreditation experts."

By forming a unified approach to organizing the activities of supplier auditors, it is proposed to formulate standard requirements for experts (auditors) of aviation industry suppliers and the procedure for their selection. These requirements should be formalized as an annex to the Standard. Below is a draft of requirements for auditors [12].

Standard uniform requirements for experts (auditors) of aviation industry suppliers and the procedure for their selection

1. An expert (auditor) of aviation industry suppliers must meet the following requirements:

a) have a higher education in training programs not lower than a specialty and areas of higher education "Mathematical and natural sciences" and "Engineering, technology and technical sciences";

b) have additional professional education in the areas of procurement, quality management and conformity assessment;

c) have at least 5 years of work experience in organizations engaged in the development, production, testing, installation, installation, maintenance, repair of aircraft equipment, including components, raw materials and materials;

d) annually improve qualifications in the field of improving methods and procedures for assessing (confirming) conformity in relation to products and processes, quality management systems;

e) be independent of any commercial, financial or administrative influence that has or may influence decisions;

f) have access to information constituting a state secret in accordance with the legislation of the Russian Federation on state secrets (if the performance of accreditation work involves the use of information constituting a state secret);

g) have knowledge of the legislation of the Russian Federation in the areas of procurement and conformity assessment, quality management, national, interstate and state military standards in the relevant field.

H) have the skills to analyze the applicant's documents and other documentary evidence for the purpose of assessing the supplier and documenting the results of assessing the supplier's compliance with the compliance criteria in the form of documentary examination and on-site assessment;

i) have the skills to identify inconsistencies among suppliers, taking into account the declared range of product supplies, respectively;

2. Information about experts (auditors) of aviation industry suppliers is entered into the unified register of auditors of aviation industry suppliers.

3. The organization maintaining a unified register of auditors of aviation industry suppliers is obliged to organize activities for the selection of persons for compliance with the requirements for experts (auditors) of aviation industry suppliers.

4. Measures for selecting persons for inclusion in the unified register of auditors of aviation industry suppliers include:

4.1.Collection of the following documents:

a) an application for certification of an expert (auditor) in the established form, which indicates the last name, first name and patronymic (if any) of the applicant, his place of residence, details of his identity document, telephone number and email address (if available);

b) copies of documents confirming the applicant's compliance with the qualification requirements provided for in clause 1 of these Requirements.

4.2. Checking the completeness and completeness of documents received from the applicant.

4.3. Based on the results of checking the application for certification of the expert and the documents attached to it, he makes one of the following decisions:

a) refuse to certify the applicant as an expert if, during the verification of the application for certification of the expert and the accompanying documents received from the applicant, it is revealed that it does not comply with the established requirements;

b) admit the applicant to the qualification examination;

4.4 certify the applicant as an expert without conducting a qualification exam if, based on the results of checking the application for certification of an accreditation expert and the documents attached to it, as well as the interview, it is confirmed that the applicant has passed:

certification in the national accreditation system as an expert;

certification as an accreditation expert of one of the voluntary certification systems, the objects of assessment (voluntary confirmation) of conformity in which are products, processes and (or) quality management systems [13-15].

4.5. Allow the applicant to conduct the qualification exam and send the applicant a notice of admission to the qualification exam (indicating the time and place of its holding) in the form of an electronic document signed with an enhanced qualified electronic signature.

The qualification exam is conducted by the certification commission of the organization maintaining the unified register of supplier auditors, acting on the basis of the regulations. The certification commission includes representatives of educational and scientific institutions and expert organizations.

4.6 The qualification exam is conducted in accordance with the procedure for assessing the competence of individuals applying for the status of an expert in assessing suppliers of the aircraft manufacturing industry.

The qualification exam assesses the applicant's compliance with the established requirements in the declared area of certification and his competence.

4.7. Based on the results of the qualification exam, the certification commission makes one of the following decisions:

a) certify the applicant as an expert (auditor) for assessing suppliers if, based on the results of the qualification exam, a decision is made that the applicant meets the established requirements;

b) refuse to certify the applicant as an accreditation expert.

4.8 The grounds for refusal to certify an applicant as an accreditation expert are:

a) the applicant's non-compliance with the requirements established by paragraph 1 of these Requirements, identified based on the results of the qualification exam;

b) failure of the applicant to appear for the qualifying examination.

4.9. The result of the applicant's qualifying examination is documented in the protocol of the certification commission, which is signed by its chairman and secretary.

4.10. The results of the qualification exam are reflected in the unified register of auditors of aviation industry suppliers.

a) hands the person certified as an accreditation expert a certificate of certification in the prescribed form in person or sends it by registered mail with return receipt requested;

5. The validity period of the certificate of certification of an expert (auditor) of aviation industry suppliers is established for 5 years.

6. If the consumer does not have certified experts (auditors) on its staff, or there are not enough available auditors to conduct an audit of suppliers, the consumer has the right to engage on a contractual basis auditors from among the aviation industry suppliers registered in the unified register of auditors

When organizing supervision, it is also necessary to normatively establish the procedure for conducting an audit of a supplier. This procedure will allow the supervisory parties to more effectively use resources to solve the assigned tasks[16].

Standard procedure for conducting a supplier audit

The system of uniform requirements (CET) for suppliers when creating aviation equipment includes a list of criteria, if the supplier meets it, gets the opportunity to participate in procedures for supplying products for the needs of organizations in the aviation industry when creating aviation equipment.

Procedures for the supply of products for the needs of organizations in the aviation industry when creating aircraft are regulated by legislative and regulatory acts in the field of procurement activities.

SET includes an exhaustive list of requirements for suppliers reflected in expert analytical forms (checklist).

The checklist is drawn up in both paper and electronic versions and is posted in the information and reference segment of the aviation industry that provides procurement processes.

Reflection of information about the positive assessment of the supplier in the information and reference segment of the aviation industry is the main criterion for the admission of suppliers to supply products to consumers when creating aviation equipment and applies to all consumers when creating aviation equipment.

The aviation supplier information and reference system should include the ability to automatically rate suppliers based on the results of their assessment.

The supplier's conformity assessment procedure is carried out in the form of a documentary examination and an on-site audit.

The decision to conduct a supplier conformity assessment procedure in the form of a documentary examination and on-site assessment is made by the consumer within 3 working days after completion of the document verification[17].

The total period for assessing the supplier's compliance with the established criteria cannot exceed 40 working days from the date of registration of the application in the information and reference system.

The assessment of the applicant's compliance with the compliance criteria in the form of a documentary examination is carried out by an expert group. The formation and approval of the composition of the expert group is carried out by the consumer from among the auditors included in the unified register of auditors of aviation industry suppliers.

Information about the composition of the expert group is reflected in the information and reference system and sent by the consumer to the applicant in the form of an electronic document signed with an enhanced qualified electronic signature[18].

The applicant, within 3 working days from the date of receipt of information about the composition of the expert group, has the right to provide the consumer with documented information about the non-compliance of the expert (auditor) included in the expert group with the established requirements.

The specified documented information received by the consumer is subject to consideration within 5 working days from the date of their registration.

If the consumer establishes the fact that the expert (auditor) does not meet the established requirements, the consumer, within 3 working days from the date of establishing such a fact, makes a decision to replace these experts. Information about the decision made by the consumer within 3 working days from the date of its adoption is sent to the applicant in the form of an electronic document signed with an enhanced qualified electronic signature and posted in the information and reference system.

If the consumer establishes the unreliability of the fact that the expert (auditor) does not meet the established requirements, the consumer within 3 working days informs the applicant about the results of consideration of his application in the form of an electronic document signed with an enhanced qualified electronic signature.

Documentary examination is carried out within a period not exceeding 20 working days.

The results of the documentary examination are formalized by an expert opinion in the established form (hereinafter referred to as the expert opinion).

The expert opinion is signed by members of the expert group on the day the documentary examination is completed and is posted in the information and reference system.

The expert opinion must contain the following information:

a) name of the applicant;

b) date and place of drawing up the expert opinion;

c) the date and number of the consumer's decision to assess the applicant's compliance with the compliance criteria, on the basis of which the documentary examination was carried out;

d) last names, first names and patronymics (if any) of experts (auditors), indicating the head of the expert group, numbers of certificates of certification of experts (auditors);

e) criteria for compliance with which documentary examination is carried out;

f) a list of reviewed documents submitted by the applicant;

g) the results of assessing the compliance of the documents submitted by the applicant with the suppliers' compliance criteria, including a description of non-compliance with these criteria (if any);

h) conclusion about the applicant's compliance (non-compliance) with the suppliers' compliance criteria based on the results of the documentary examination.

If, during a documentary examination, the applicant's non-compliance with the suppliers' compliance criteria is identified, the consumer makes a decision to terminate the audit procedure, indicating the reasons that served as the basis for such a decision, details of the expert opinion, posts information about this decision in the information and reference system and sends the applicant a notice of elimination non-compliance with the eligibility criteria.

The decision to terminate the audit procedure and notification of the elimination of the applicant's non-compliance with the compliance criteria are sent to the applicant in the form of an electronic document signed with an enhanced qualified electronic signature within 3 business days from the date of detection of non-compliance with the compliance criteria.

Based on the results of the documentary examination, the consumer makes a decision:

a) on conducting an on-site assessment of the applicant if the applicant's documents meet the applicant's compliance criteria, of which he notifies the applicant and places information about this decision in the information and reference system;

b) refusal to certify suppliers if the applicant does not meet the compliance criteria.

If a decision is made to refuse certification, the consumer, within 3 working days from the date of adoption of this decision, gives the applicant a copy of the decision indicating the reasons for the refusal and details of the expert opinion or sends it by registered mail with return receipt requested or in the form of an electronic document signed by an enhanced qualified electronic signature[19].

An on-site audit is carried out at the applicant's place(s) of activity in accordance with the plan.

The duration of the on-site audit is set by the consumer but cannot exceed 10 working days.

To conduct an on-site audit, an expert group is formed and approved by the consumer.

The expert group includes experts (auditors) registered in the unified register of auditors of aviation industry suppliers.

The head of the expert group is appointed by the consumer from among the experts (auditors) included in the expert group.

The head of the expert group provides:

- development of an on-site assessment audit plan, its approval by the consumer's manager, as well as its sending to the applicant;
- notifying the applicant about the timing of the on-site audit;
- distribution of responsibilities among members of the expert group;
- presenting to the applicant a certificate of admission in accordance with the legislation of the Russian Federation on state secrets of experts (auditors) to information constituting a state secret, if the performance of work assessing the conformity of the supplier is associated with the use of information constituting a state secret;
- implementation of the on-site audit plan by members of the expert group in accordance with the distribution of responsibilities;
- interaction with the applicant's manager or his representative regarding the implementation of the audit plan, as well as clarifying the work schedule of the expert group and the applicant if it is necessary to deviate from the working (office) hours established by the applicant;
- carrying out by experts (auditors) an assessment of the applicant's compliance with the compliance criteria in the place (locations) of the applicant's activities;
- analysis of objective evidence collected by the expert group of the applicant's compliance or non-compliance with the compliance criteria and execution of an on-site audit report;
- familiarization with the on-site audit report of those participating in the on-site audit;
- approval by the consumer's manager of the on-site audit report;
- placement of audit results in the information and reference system.

The expert (auditor) included in the expert group performs the following functions:

- ensures the implementation of the on-site assessment plan in accordance with the distribution of responsibilities in the expert group;

- collects and documents objective evidence related to the implementation of the goals and objectives of the on-site audit, through analysis of the applicant's documents, interviews and observation of its personnel during the on-site audit;
- informs the head of the expert group about the case(s) of failure (if any) by the applicant to fulfill obligations to ensure the working conditions of the expert group.

Information on the composition of the expert group within 3 working days from the date of approval of the composition of the expert group is sent by the consumer to the applicant in the form of an electronic document signed with an enhanced qualified electronic signature.

The applicant is obliged to provide persons participating in the on-site audit with:

- the opportunity to get acquainted with documents related to the implementation of the goals, objectives and subject of the on-site audit, as well as other evidence that provides the opportunity to assess the applicant's compliance with the supplier's compliance criteria;
- access to the territory, to the buildings, structures, premises used by the applicant, as well as to the equipment, substances and materials used;
- the opportunity to use workstations allocated to the expert group with access to the Internet in a separate isolated (if available) office space (rooms), ensuring the safety of documents, which is equipped with furniture and other organizational and technical means necessary for work, including communications equipment and personal computers with provided access to the necessary information systems, printing and scanning devices.

Failure by the applicant to fulfill his obligations to ensure the work of the expert group is the basis for the consumer to decide to refuse to recognize the applicant as a supplier.

Persons participating in the on-site audit work in accordance with the working (office) hours established by the internal labor (office) regulations of the applicant, and if deviations from it are necessary, they coordinate such deviations with the head of the expert group and with the applicant.

Based on the results of the on-site assessment, an on-site assessment report is drawn up, taking into account the restrictions established by the legislation of the Russian Federation on state and other secrets protected by law.

The on-site audit report (checklist) is drawn up in the prescribed form (in paper and electronic format).

The on-site audit report (checklist) indicates:

- name of the applicant;
- date, time and place of drawing up the on-site audit report (checklist);
- date and number of the consumer's decision to conduct an on-site audit, on the basis of which the on-site audit was conducted;
- surnames, first names and patronymics (if any) of experts (auditors) indicating the head of the expert group, as well as details of certificates of certification of experts (auditors);
- information about the applicant's representative who was present during the on-site audit;
- date, time and place(s) of the on-site audit;
- results of on-site audit;
- list and description of inconsistencies (if any) of the applicant with the compliance criteria;
- a conclusion about the applicant's compliance (non-compliance) with the supplier's compliance criteria, indicating such criteria and the grounds for the corresponding conclusions;
- information about familiarization or refusal to familiarize with the report of the applicant's representative, observers and other persons present during the on-site audit.

The on-site audit report is signed by the head of the expert group, members of the expert group, as well as the applicant's representative, unless the applicant's representative refused to sign this act.

A member of the expert group, in case of disagreement with the on-site audit act as a whole or with its individual provisions, has the right to attach a special opinion to the on-site audit act, about which a corresponding entry is made in the act.

The on-site audit report is approved by the consumer within 5 working days from the date of its signing by members of the expert group.

One copy of the on-site audit report is handed over to the head of the applicant or to a person who, by virtue of a federal law, other legal act or constituent documents of a legal entity, acts on his behalf, against signature or sent by registered mail with return receipt requested. The second copy of the expert opinion is kept by the consumer.

Information about the audit results is posted in the information and reference system.

If, during an on-site audit, the applicant does not comply with the supplier's compliance criteria, the consumer makes a decision to terminate the conformity assessment procedure, indicating the reasons that served as the basis for such a decision, and sends the applicant a corresponding notification[20].

The decision to terminate the conformity assessment procedure is sent to the applicant in the form of an electronic document signed with an enhanced qualified electronic signature within 3 working days from the date of detection of non-compliance with the compliance criteria.

93. If the applicant meets the accreditation criteria in the field of accreditation declared by him, the accreditation body makes a decision on accreditation of the applicant in the field of accreditation declared by him and issues an accreditation certificate and an annex to the accreditation certificate in the prescribed form.

The consumer, within 5 working days from the date of the decision on the applicant's compliance with the supplier's criteria, enters information about the applicant into the register of aviation industry suppliers.

The applicant is duly assigned a unique record number indicating compliance with the aviation industry supplier criteria.

The procedure for assigning the specified unique number is determined by the rules for creating and maintaining a register of suppliers.

4 Conclusion

With the proposed approach to supervision of suppliers, a unified approach will be formed on a systematic basis, reducing the costs of this activity both on the part of the consumer and the supplier himself.

At the same time, the segment of the presence of corruption factors will be eliminated.

Also, this approach will allow developing the institution of independent auditors endowed with the necessary knowledge and experience.

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