



7th International Conference on Engineering, Project, and Production Management

Modelling the Use of Alternative Technical Means for Services by Piloted Flying Platforms: Presentation of a Research Project

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Abstract

The paper presents general assumptions and preliminary results of the studies on theoretical and practical aspects of providing selected services with alternative technical means. The study focused on the areas of aircraft application in building and utilising linear objects. The purpose of the study was based on an analysis of process-focused approach towards air services. The specificity of the assumptions in the selected areas was illustrated on the basis of examples of completed undertakings. Additionally, the article contains a list of examined factors influencing the adaptation of Unmanned Aircraft Systems as components of the model of conversion of services that could have an impact on decision-making in terms of applications of alternative air platforms.

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Peer-review under responsibility of the organizing committee of EPPM2016

Keywords: service provision effectiveness; process management; air services; air-services; Unmanned Aircraft Services (UAV/RPAS)

1. Introduction

The market expectations related both with manufacturing processes and with service providing processes determine implementation of certain key postulates, regarding both the course of the processes themselves as well as their final results. Such postulates may have universal nature and directly connection with the product or service. Among the universal postulates in area of goods production and services, special attention is given to quality, productivity is definitely emphasised in the thoughts on manufacturing. The postulate of effectiveness, key for the contemporary thinking regarding services, can be treated in similar categories [1].

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The starting point for the previous studies is the thesis that one of the possible routes for improvement of effectiveness of provision of the selected category of services can be employment of alternative, in relation to the currently applied, technical means in activities [2]. This assumption determines the need of the existence of the model, effectively describing the service process. It is assumed that such model will be the effective tool in assistance of the management service process, particularly in the range of selection of the best technical sources. Finally, the model worked out within introduced research intention should include whole task set related to subject and application area. the conversion of services supplied by piloted platforms and RPAS.

The set of aviation services is the research are for the manned aerial vehicles (MAV) and unmanned aerial vehicles (UAV). The model constructed for them should allow for quantitative assessments enabling performance of effectiveness evaluation of the changes considered and proposed for implementation within the scope of service provision methods (of both technical and non-technical nature) as well as provide a possibility to support variant parallel analysis of different solutions.

2. Research description

One of the assumptions is treatment of the services as a special type of process which, to a great extent, has an impact on the set of methods and tools projected for use in the described research goal. The new technical solution generates the necessity to examine and determine conditions of application of alternative technical means in relation to MAV for the selected aviation services.

This status requires:

- evaluation of technical effectiveness of employment of UAV in patrolling of line objects, such as industrial and distribution power lines, transfer gas pipelines, heating network tightness monitoring, photogrammetric flights and lifting-installation flights
- assessments of non-technical aspects of conversion of services in the selected research area, determination of hazards and indication of action directions which should be taken into consideration when creative standards and regulations for the said conversions.

In the described research goal, the practical area is service supply, for which basic technical resource are aircrafts (flying platforms).

The aviation services are commonly used in various fields of the economy, both in the country and abroad. Currently, a significant group of recipients of aviation services are companies possessing or managing line facilities, important from the point of view of economic security. The decision on selection of the type of provided with application of aerial vehicles as the area of practical verification of the constructed service conversion model gives rise to the necessity to include essential non-technical conditions in the course of the study, especially: legal regulations. The practical research area is based on the set of aviation services performed with application of the manned aerial vehicles (MAV) and unmanned aerial vehicles (UAV). The expected result of the research is creation of a model supporting all tasks connected with conversion of services provided by means of manned aerial vehicles into those provided with unmanned aerial vehicles. Development and verification of a model supporting comparative evaluation of selected service provision processes with employment of alternative technical solutions should result in development of a tool (set of tools) supporting the decision-making process regarding employment of an alternative platform in aviation services. The expected result is service innovativeness, providing the recipient with reduction of costs, with concurrent maintenance of quality and safety standards. The basis for commencement of research in this subject scope includes, inter alia:

- the increasing tendency of UAV share in the aviation service market within a 10-years perspective
- promotion of research and optimisation of processes connected with these platforms by the European Commission
- market expectations of the previous recipients of aviation services
- increasing availability and common employment of unmanned platforms in relation to a lack of legal solutions inhibits their employment in enterprises involved in operation of strategic infrastructure
- the lack of criteria (including legal regulations) for UAV application poses a threat for the strategic infrastructure

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