

Criteria and methodology of determining the general flowchart for the calculation and evaluation of the aircraft balance

Jerko Rados

UNIVERSITY OF ZAGREB
FACULTY OF TRANSPORT AND TRAFFIC ENGINEERING

Mihaela Mise

ERICSSON DEPARTMENT OF SOFTWARE DESIGN, ZAGREB

Frane Jelusi

UNIVERSITY OF ZAGREB
FACULTY OF TRANSPORT AND TRAFFIC ENGINEERING

1. Introduction

1.1. In general

The development of aircraft and aircraft technology have recently been under the influence of contradictory requirements - on one hand, the aircraft should provide great efficiency and performance along with the least adverse impact on the environment (low levels of exhaust gases emission, noise and waste), and on the other hand, the reliability and safety would have to be increased. These improvements should be accompanied by low production and maintenance costs.

The parameter within this field, which can be improved by every airport is the technology of passenger handling, especially with regard to safety of the subsequent flight, which includes good balancing and technical equipping of the aircraft. Roughly, the technology at an airport can be divided into the technical part, dealing with equipping and servicing the aircraft and the part dealing with passenger and cargo handling. These activities are in fact, at the moment, separated, and are being carried out separately by single operation services at the airport. The recordings of these procedures are unified only in the official form used for balancing the aircraft which is filled in directly prior to the aircraft take-off, and which contains only those data that refer to changes in cargo, people and fuel, whereas the technical details regarding servicing and other operations performed on the aircraft are kept by the technical services.

This leads to the conclusion that this method of keeping the register (except in special cases) does not provide safe aircraft handling, since there are no data on the technical condition of the aircraft arriving into the airport, and therefore no guarantee for its technical condition on take off.

This paper deals with the criteria and requirements in developing general autonomous software related to handling the aircraft at the airport. It gives an overview of almost all the influencing factors which are relevant to "processing" an aircraft both upon arrival as well as on departure. It gives a brief description of the conventional balancing method which is being used, of the latest advancement in the field, and it offers a concrete suggestion for improving the reliability of criteria and results in aircraft handling.

The main idea of this initial work is to unify all the necessary activities and to register them by one computer, from landing until take-off, including the computer communication with other airports and companies. Currently, the programs of certain air companies are being used and they have produced individual software in co-operation with the manufacturers only for certain types of aircraft which are currently employed by them.

Since the range of aircraft types landing at airports is growing, there is the need to find a universal program which can calculate the balance chart for each aircraft, based, of course, on the manufacturer-supplied design data.

The performance card, in the form of a servicing card and other technical documentation is kept exclusively by the air company which owns the aircraft and provides the transportation service, in agreement with the manufacturer, according to set international regulations defined by law. In case of an accident the air company is responsible for failures.

The aim of this paper is to unify all the activities involving the aircraft during its stay at the airport and their registration by the computer network connected not only within one airport but to all other airports being in contact. The paper deals for the moment only with the new method of aircraft balancing. In this way, all the data about a certain aircraft would be available to every airport of its landing, with all the changes during its operation.

The data on the number of passengers, weight and distribution of cargo, and condition of the fuel tanks would be known before landing. Information would be available about the passengers in transit, those getting off, about baggage that has to proceed to next destination, and which baggage will reduce the load of the aircraft. Figure (1) presents the schematic function of such a system:

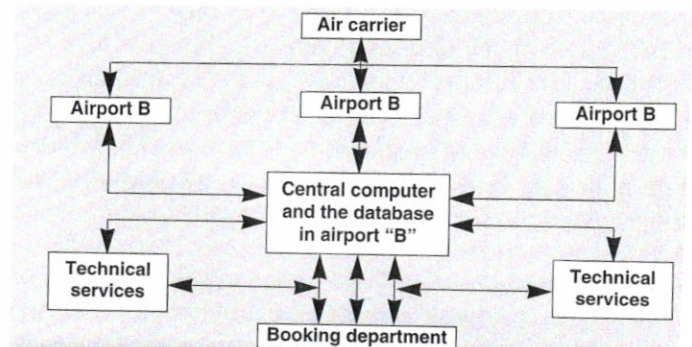


Figure 1 Schematic function "system of three airport"