

# Roles of Logistics in Air Transportation

## *Uloge logistike u zračnom prometu*

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DOI 10.17818/NM/2015/SI23

UDK 656..7:007

Review / Pregledni rad

Paper accepted / Rukopis primljen: 27. 4. 2015.

### Summary

Article discusses about the implementation of logistics principles into the airport operations, the activities of air carriers and organization of airport processes. The airport is under review comprehensively, as an integrated logistics system, using elements of partnership collaboration (/Collaborate Decision Making /CDM/) which is based on the common sharing of information by various elements of the system.

### KEY WORDS

Integrated logistics airport system  
logistics principles  
elements of CDM system

### Sažetak

*U ovom radu govori se o primjeni logističkih principa u radu zračnih luka, aktivnostima zračnih prijevoznika i organizaciji procesa u zračnim lukama. Revizija zračne luke, kao integriranog logističkog sustava, je sveobuhvatna i koriste se elementi partnerske suradnje (zajedničko odlučivanje /CDM/) koji se temelje na razmjeni podataka pomoću različitih elemenata sustava.*

### KLJUČNE RIJEČI

integrirani logistički sustav u zračnoj luci  
logistički principi  
elementi CDM sustava

## INTRODUCTION

Logistics as a new phenomenon of the 21st century has penetrated into various areas of our life, including air transportation. Implementation of logistics principles into airports operation and into air carriers has brought many changes in the organization of airport processes and also many changes in the area of coordination and cooperation of all elements of air transportation.

The requirement of comprehensive optimization of processes and services at the airport required a massive use of modern computer technology and specialized software utilizing sharing common information for the purpose of maximum exploitation of capacity possibilities of airports and air carriers. The airport is viewed comprehensively, as an integrated logistics system / INLOGSYS /, providing optimally ongoing processes necessary for air carriers, passengers and ground handling of airport. On the other hand, airport is just one of the elements in the whole logistics chain in air transportation. The latest system in aviation that affords better utilization of aircraft and airports, is A-CDM system / Airport Collaborate Decision Making/.

## AIRPORT AS INTEGRATED LOGISTIC SYSTEM

The main role of logistics at airports is to create an airport's integrated logistic system (Fig. No.1). This means to

perceive the airport comprehensively, as complex multi-system consisting of the plenty of subsystems (Fig. No.2). Simultaneously with the use of integrated logistic system we can achieve comprehensive optimization of activities not only of subsystems but also optimization of the entire system in a harmonious activity [1]. This indicates that it is a very difficult problem, which consists in:

- diversification of airport multisystem,
- assessment of all airport activities,
- optimizing processes in subsystems
- multi-criterial optimization of INLOGSYS participation.

The role of logistics is:

- integration of subsystems (merging and joining their elements and bonds)
- increasing consistency INLOGSYS (quantitative and qualitative harmonization),
- airport homogeneity improvement (removal of characteristics and parameters incompatibility).

The aim of logistics is to coordinate and comprehensive optimization of individual airport processes and airport services, as well as other cooperating airports with the maximally efficiency using of capacity of participating airports and air carriers through sharing of common information A-CDM and dynamic coordination of interaction while maximizing performance and profits [2].

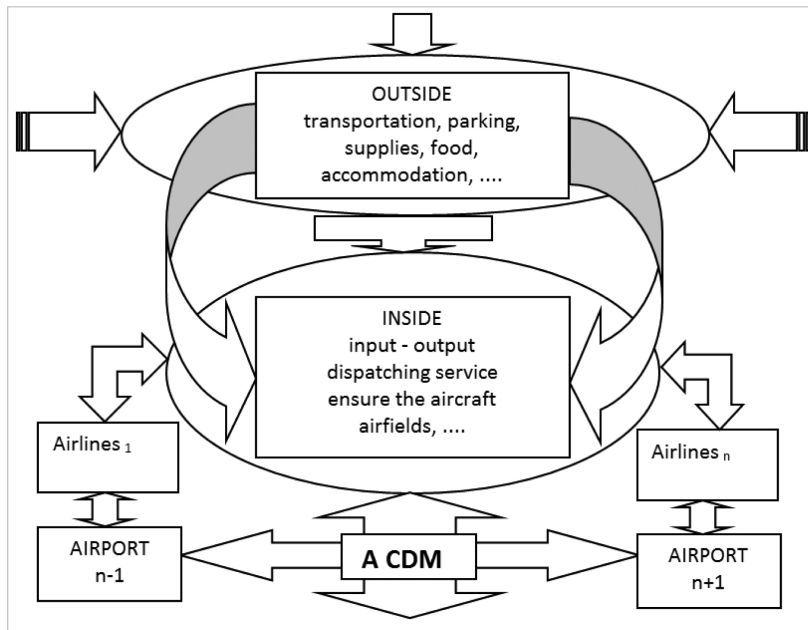


Figure 1 Basic classification of airport INLOGSYS and its interconnection within CDM

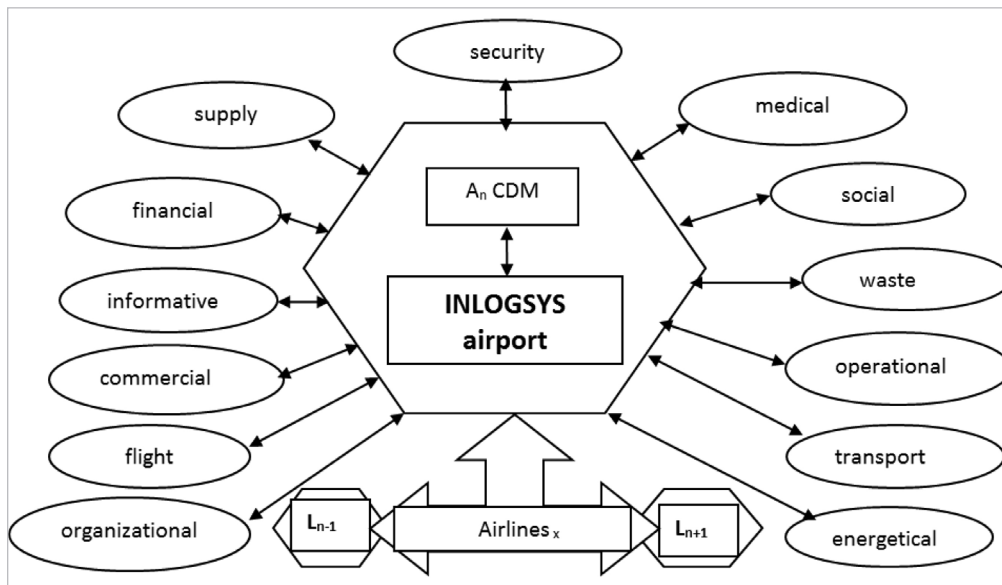


Figure 2 Subsystems INLOGSYS airport within CDM

## NEW SYSTEM OF COOPERATION IN AIR TRANSPORTATION

Comprehensive understanding of the processes and their optimization in aviation ensures maximum utilization of the potentials of airports and the airside capacity of air carriers. The role of the airport management is to ensure maximum utilization of airport capacity and the development of capacities in relation to the growth in demand. Increasing competition between airports and the application of different regulatory measures forcing airport management to use the airport logistics principles and approaches in the field of airport management to increase their competitiveness and optimization of airport processes, costs and revenues.

The need of logistics implementation into airport activities and air carriers has enforced a new system of cooperation in air

transport based on the idea of decision-making based on the sharing of common information, which are much more accurate, higher quality and have the exactly same meaning. Such a system CDM /Collaborative Decision Making/ was developed in the USA and in Europe was loaded by International Air Transport Association / IATA/ [3].

Logistics concept CDM is aimed at:

- improve operational efficiency at airports
- airport capacity management
- reduce delays
- improve the predictability of events during a flight
- optimize the utilization of resources

Mutual sharing of accurate and timely information between participants in air transport lead to the achievement of aforesaid aims. Participants in air transport are:

- airport operators,
- aircraft operators,
- ground handlers,
- the air navigation service provider and support services,
- Central Flow Management Unit – CFMU

Airport partners within the CDM are:

- airports
- airlines
- air traffic control,
- CFMU service and Aeronautical Information Services,
- air traffic manufacturers and entities providing ground handling.

CDM partnership network is typified in the following Fig. No.3.

Before collaboration within CDM, particular participants, as separate legal entities, had operated in almost complete isolation practically disregarding the activities of the other. Linking these partners in the CDM system relies on decision-making based on mutual information sharing and application of standard procedures. In the case that the above mentioned partners do not apply the CDM procedures, operative decision-making can often be due to lack of information or influence of different perception of important information inaccurate, contradictory or is not carried out at all. CDM therefore requires very close cooperation between all partners involved in the organization of flight. Besides the activities of the airport operators and aircraft operators, air traffic service providers, entities providing ground handling and service of Central Flow Management Unit (CFMU), can play an important role also internal influence. For example, blocking road access to the airport can cause check-in delays of lots of passengers etc. Therefore CDM partners have to be in timely and objectively informed about all such occurrences.

CDM system delivers for all participants:

- better use of resources and performance improvement,
- improved accuracy and predictability,
- reducing the cost of ground services,
- improvement of compliance ATF slots and reducing delays,
- flexible pre-flight planning,

- increase the use of POL resources, terminals, aircraft waiting, waiting room, etc.,
- reduced aprons and taxiway congestion

CDM concept is the basis for the effective functioning of air traffic control, airlines and airport operators and furthermore is basis for the logistics requirements for their effective cooperation on the operational level. CDM must be perceived as an important approach to the best utilization of limited resources, such as RWY, aircraft parking at the airport terminals and air traffic flow management (allocation of slots for take-off). In addition, the concept of cooperation aims to provide greater flexibility to aircraft operators to ensure its own effectiveness and to improve flight schedules compliance.

### THE A-CDM ELEMENTS AND POSSIBLE BENEFITS

The basic conceptual element (subsystem) of A-CDM airport system is the sharing of accurate and timely information between the Airport CDM Partners in order to achieve common situational awareness and to improve traffic predictability / Airport CDM Information Sharing/ [4]. This requirement is the core A-CDM Element and the foundation for the other Airport CDM Elements and, therefore, has to be established first. All information has to have prescribed structure, must be precise and unambiguous.

CDM in Adverse Conditions /CDM AC/ – this function improves a collaborative management of the capacity of a CDM-A during periods of a predicted or unpredicted reduction of capacity due to restricted circumstances.

Collaborative Pre-departure Sequence /CPS/ determines the order the aircraft are planned to depart from their stands taking into account partners' preferences and operating restrictions.

Collaborative Management of Flight Updates /CMFU/ improves the quality of reception and transmission of information and the coordination between Central Flow Management Unit /CFMU/ and A-CDM.

Variable Taxi Time Calculation /VTTC/– aims to improve the traffic predictability. Consists of calculating and distributing to the Airport CDM Partners accurate estimates of taxi-in and

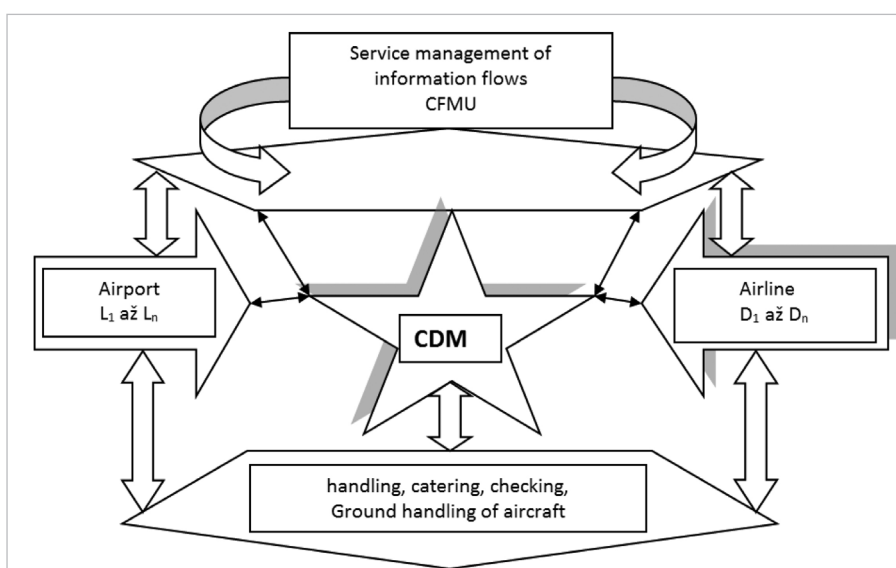


Figure 3 System of CDM partnership network

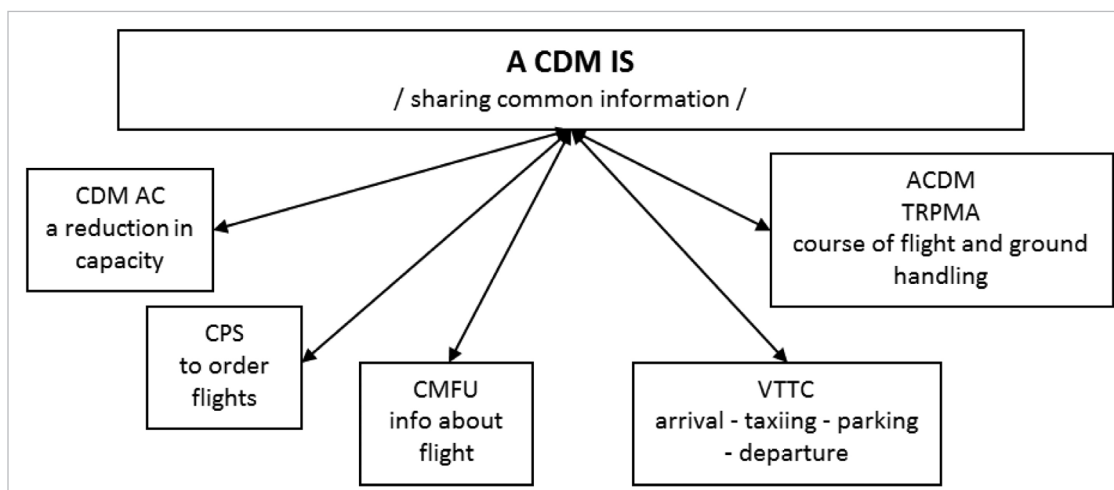


Figure 4 Cooperation of A-CDM elements

taxi-out times to improve the estimates of in-block and take off times, especially at airports with complicated operation.

CDM Turn-round Process /CDM TRP/- Milestones Approach describes the progress of a flight from the initial planning to the take off from a CDM-A by defining Milestones to enable close monitoring of significant events. The aim is to achieve a common situational awareness and to predict the forthcoming events for each flight.

CDM has a chance to generate high returns at relatively low cost. Before the implementation of the CDM concept any airport must be subjected to cost-benefit analysis. According to the analysis result is then appropriate to decide on the implementation of A-CDM. Documents published by EUROCONTROL provide a general model for such an analysis. This model is freely available to each partner of the airport operator, interested in an expected actual costs and benefits evaluation, arising from the introduction of A-CDM.

These logistics indicators reflect the uniqueness of the airport infrastructure and functioning of the airport integrated logistics system. Increase the efficiency of air transport can be achieved by better utilization of logistic potential of the airport and the air carrier, but especially by ground handling service optimization, which has a main purpose in improving the existing airport capacity through increasing their effectiveness.

## CONCLUSION

Airports are an essential element of the air transport system / carriage of passengers, baggage, cargo and mail in aircraft/. The role of logistics is to investigate and optimize the processes in individual subsystems of integrated logistics system of the airport and to harmonize the operations, not only at airports.

Cooperation with air carriers and cooperating airports should lead to increase of the transport system capacity as a whole. The problem is not only at the operational as well as at the strategic level in the creating of air transport policy, legislation, conceptual framework and also the problem is at realization of utilization the most current knowledge of logistics and modern technology in aviation. Therefore, we must seek and implement methods of progressive management and applied logistics into airport operations. Introduced CDM system significantly simplifies airport operations and air carriers. CDM System contributes to increasing throughput of system, improved economic efficiency and competitiveness growth of cooperating elements in the air transportation.

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