New generation of Integrated Information Management System – the IIMS

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The article is mapping the actual status in the implementation of Complex Airport Information Systems - the KLIS. Appart from evaluating of the current status, the introductory part is devoted to the theory of an innovative Draft of an Integrated Information Management System with a fully implemented KLIS as well as the detailed description of the system modularity and the proposed subsystems. The contents is focused on defining the contribution of the suggested system starting from partial, individual advantages of each of its element as far as to the complex, overall advantages of innovative information oujtputs. The conclusion is about evaluation the unambiguous suitability of the system and the progress achieved by aviation companie following its implementation as drafted upon.

K e y w o r d s : KLIS – Complex Airport Information System; IIMS - Integrated Information Management System; Standards: ISO 9001(QMS), ISO 14001(EMS), ISO 18001(SMS).

1   Introduction

We live in the era of information boom, tah is continuously raising the requirements on the quelaity and quantity of information. In such a hectic period of current life, when an instance of lack of attention might result in fatal consequence, it is more than appropriate to consider   revisions to be performed on the day-to day basis, or the requirements set by the continuous developmen t of all that ahs been created only recently, and the day before zestarday having been regarded as taken from sci-fi novels.

It is very difficult and almost impossible to find more progressive areas of the society than the military, aerospace or aviation technology. To revealing   the   actually   working information procedures in the fields mentioned whike offering higher efficiency   of the already sophisticated processes is both a great challenge and an offer which cannot be resisted particularly in case when it is about   the KLIS – a highly sophisticated complex airport information system.

2   Actual status

Based on my own research and experiences, the topic of innovating the KLIS in Slovakia can be related only to two aviation companies, , i.e. to AIrport Košice, jsc and M.R. Štefánik Airport Bratislava, jsc. In view of the future and prospects of all aviation companies, performing a detailed of the KLIS and suggesting   new,   integrated modules is   of great importance not only for Slovakia but generally for other countries, within the EU as a minimum.

As stated by Jezný 0, the   KLIS can be defined as a logic-based control unit:

o   enabling downloading of flight plans(arrivals and departures) for further processing,

o   Processing input data   for ground-based control operations,

o   Processing input data to   obtain key statistical indicators,

o   Displaying information on passenger flights of the public,

o   Administering the extensive database of the system.

As its name implies, the complex information system should involve informational-communicational   subsystems.   Currently,   the situation is that the KLIS is only   partially compatible with one of the   communication systems an the system as it is still incomplete, only a partial one, i.e. one of the IMSs of the aviation company which, by standard, involve:

1)   AFTN (worldwide   system   of   fixed avieronautical   telecommunication circuits established among the AFTN communication centers with the aim to facilitate information

transfer – teleprinter network using the international telegraphic alphabet),

2) SITATEX (communication system used in aviation serving as a means of information distribution among airports and aiviation companies),

3) AMS (automatic monitoring system)

4) DCS (departure control system – system for passenger handling).

In the time when it was entering service, the KLIS was meant only a kind of additional assistance for air traffic controller and only real enthusiasts of informatics could call it an information system support. Since its introduction into service, only five yars have passed, and nowadays it became a more integrated part of the airport information system, a thing that turned out to be true only on having throughly implemented the communication module of SITATEX – KLIS transducers.

Even if this aiprot information system is called a „complex" one, by name, even today, itis operated on the periphery of information events within the structure of inegrated managmeent systems, se the illustrations in Graph 1 and explanation in Table 1.
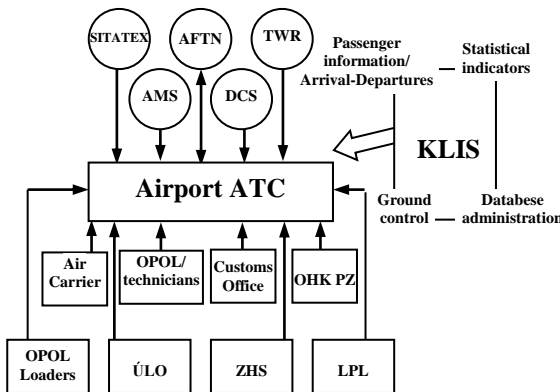

Figure 1: Graphical illustration of the IMS sturcture in an aviation company

Table 1: Explanation - legend of the abbreviations used in Figure 1

OHK PZ	Dept. of Slovak Police border control
OPOL	Dept of aircraft ground servicing
ÚLO	Section of airport protection
ZHS	Rescue and fire extinguishing service
LPL	Dept. of aviation fuel
TWR	Tower – Slovak Navigation Services
AMS	Automatic monitoring system
DCS	Passenger handling system
KLIS	Complex airport information system

3 Draft of a new IIMS

I tis generally known that the outside pressueres exerted on the processes within an aviation company are enormous. The passenger want to travel more comfortably, safely and cheaply, the founders of aviation companies are willing to continuoulsly increase rates of profitability in all areas while the supervising bodies and institutions are continuously ammending legal norms, decrees and regulations thereby adding to the level of sophistication of the wordwidesafest means of travel – to flying.

A common basis for all the novelties is set by the things tha have always worked, serving as a real ground for drawing conclusions from critical states. Also for this reason, the year of 2009 saw ammendment of the ISO 9001 standards, wherin the main role is played by the possibility to measure and thereby evaluate the quality of processes. The elementary requirement of this pillar of the integrated management of quality has brought us to draw up a new topology of integrated information management systems for aviation companies.

The diagram of such an integrated management system has become an inspiration for us to design an absolute integration of the KLIS into the informational-communicational structure of aviation company as seen in Diagram 2 and Table l completed by:

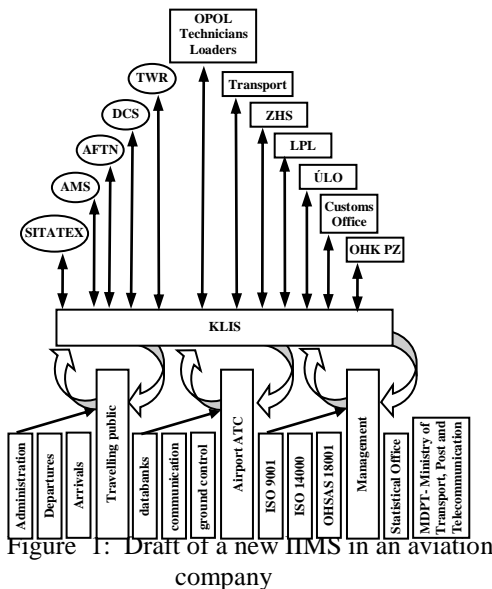1 – feeding the database

2 – providing the database

Figure 1: Draft of a new IIMS in an aviation company

4   System description

In the Integrated information management system of an aviation company, drawn up by us, the KLIS is playing a strategic role of a mmulti-modular system which , during the first stage of introduction, is only a modlue of archivation. By feedeing the database, for example with types of aircraft, types of ZHS to these types, selected groun movements of aircraft, times of the movements, types of selected aprons, amount of passengers and baggage, length of time for boarding aircraft and loading baggage; but also procedures at critical situations, colllisions etc. The second phase of KLIS implementation should result in a system featuring the following interactive modules:

SITATEX and AFTN

Communication systems should contribute to fully readable information for all the participants coupled with the IIMS in via the KLIS, to the level as enablet by their acces rights individivally preset by the system administrator. MOdular interconnection must be of two-way type, so that the participants to the system, competent to receivethe message and take measures, could be in position to be prepared to modify the contents,

or respond to it to ensure continuity of the processes among aviation companies mutually interlinked. In practica, it means that a simple monitor must enable reception and deciphering of a message followed by its transmission to further participants using a standard keyboard.

AMS

− Automatic monitoring system will bright the KLIS information which are then processed and evaluated on the basis of actual states but also on conclusions drawn from critical situations predefined into the system. Monitoring of energy feeding means that in the deirection of receivieg the message, oscillations of voltagea warnings ,to participants in that directions in via the appropriate modules. Monitoring of passengers within the KLIS module would pass through a cheks of sequential filterssuch as: body temperature indicating illness, comparison of biometric elements in the database of persons sought after, etc. This also should be a two-way system, as indication of matching in biometrical data would mean taking actionson the part of the KLIS resulting in measures taken by competent airport staff.

DSC

System for passenger handling that enters the KLIS through its data which are then processed mostly for further modules of the systems, i.e. components of the process of transportation. In direction from the DCS, the KLS is obtaining information particularly on the number of passengers and baggage, considered strategical for the modules o fair traffic controllers in terms of planning for aircraft loading, etc. But also for the aircrew which is receiving, in via the KLIS messages of the SITATEX and AFTN network.

TWR

Control tower of the airport entering the system by taking over control of an aircraft from ground control or vice versa. The importance of information porvided through the suggested IIM incorporating a fully integrated KLIS is possibly of not such direct strategical for the air navigation services, however, already at some indications of threats or incidents it could be worth of a life.

Airport ground servicing staff

When consulting our draft with the professional public, we have been conforonted with the doubts resulting from the integration of the ground control into the KLIS information system. In the topology suggested by us, the Department of airport ATC remains to be the main pillar, with the exclusive rights and responsibilitites for ground control.

The comfort at which the air traffic controller is obtaining hitherto unseen details of information is one of the strategic contributions of our draft. In the ATC modlue of the IIMS, by the draft, arre contained subsystems administering direct ground control in terms of all movement of aircraft, other vehicles and staff and also a communication module, which serves both as archivation and warning module in terms of verifying procedures by confirming them on the warning panels, or algoritms of ground control. The third and last subsystem of this module should have access to the use of databases, which, in direction opposite to data–feeding, is again entering the KLIS.

Travelling public

Processing of the data coming from the DCS through the KLIS, results in their presentation on the passenger information panels providing information on arrivals and departures and eventually in support of the administering the processing of data returning back to the KLIS, to be provided for further components including the DCS, which can thus continue or stop passenger boarding and lbaggage loading for a concrete flight.

Management

One of the three carrying pillars of the IIMS drafted by us is called management, which through such an implementation of management information systems is obtaining internal statistical outputs meeting the strictest requirements in terms of relevance and precision, width of spectral scope providing feedback. It is feedback, confirmation of the processes to be performed is a phenomenon of our IIMS system. The ida that management is being kept informed of the exact time of the processes being performed by the ground control, such as time when boarding of an aircraft started, time of the beginning and ending of refuelling on a specific aircraft, the duration of of ground movements with aircraft engines operating etc. fall within the realm of wishes to be fulfilled for every manager of an aviation company. Output of such details correlated with the rinciles of the integrated managmeent system by ISO standards are proofs of absolute precision in running the processes that take place within an aviation company. The Management module of the IIMS should have three subsystems interacting with the KLIS as laid down in the ISO 9001 norms – Quality management system and further those of th 14001 order– Environmental management system and the OHSAS 18001 – Occupational health and safety management system.

Appart from these three internal subsystems, in this very module, we propose a single external link provided only as a one-way communication in directed outside towards the legislative supervising bodies, i.e. the Ministry of Trasnportation, post and telecommunication of SR and the Statistical Office of the SR.

Advantages of the IIMS draft with the integrated KLIS

In our consideration, the greatest advantages of our draft are the absolute, internal interactivity of all the components participating on transportation within a concrete aviation company. By providing simple administration of the Access rights of partial modules into such system, the first time in the history, of infomation management systems, all participants could be offered the ffedback of verifying the correctness of their procedure and the reaction of other modules. Such system also ensures archivation of internal processes in terms of those strictest standards, thereby becoming a kind of flight data recorder or black-box of an aviation company. The scope of the statistical outputs has risen to hitherto unseen dimensions and, by their meaning, it is not considered completed, only when defined clearly, but also thorugh their subsequent use in the process of feeding the database resulting in the selection of suitable procedures to be appplied to different situations. Not neglibile are the contributions of the draft in terms of its

psychological effect to the staff through making them aware of consequent   control and the subsequent increase in the   profitiability of their efforts as a follow-up. Also of interest is the contribution of the system in its eliminating the stress   from   workload   by   delegating responsibility for the supervision of procedures to the segment of verification and warning of the KLIS separately for each of the   participating modules, all thet resulting from   well-fed partial databases. The descriptions of the partial modules have already   defined the contributions, such as improving operational and labour safety, reducing times of human actions and those of machines with regard to ecology, counting time with engines on and   noise-level   in terms of the Occupational health safety regulations, prevention of collisions both for ground staff and equipment and the like.

5 Conclusion

In   our   view,   the   suggested   integrated information system involving total implementation of the   KLIS   is to be considered as an iternal system of an aviation company and, last but not least, its   further advantage consists in its simple and   safe   standardization that, in principle, is capable of eliminating   the external security risks sucha s peenterating through or other computer network.

When viewed from outside, the financial requirements to be incurred with establishing such a system, a problem not dealt with this paper, could be brought up, mostly viewed from outside, as the main disadvantage of the draft. We are convinced   that the   no small amounts of investments   required to this project would be recovered, in mid- or even short-term aspects in terms of the   unambigous operational, non-financial,   benefits the system is capable of providing to all the participants of the   system.

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[2] Internet

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