

# Evolving Flight Operations Data Standards

## Is There a Need of Early Identification of Specifications?

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### Abstract

There are attempts by organizations and industry research groups to highlight the need for common information standards within air carriers. Each of these targets the air carriers themselves, and yet often misses the concept of industry wide standards in which information should flow more seamlessly. In a variety of aeronautics support groups, common data standards are espoused but often overlooked. In today's information rich environment, industry data standards have become essential. Common terminology, data standards and cross-functional information libraries are required in order to catalogue, analyze and prepare flight operations information systems for the future.

### Introduction

The progression from paper documents to electronic access of data is at its peak in every facet of information delivery today. Are we keeping up in the area of managing flight operations information and support data? Is there enough energy to advance a data standard on an industry scale?

From the early 1990's, the idea of common information across fleet types within air carriers was advanced (Degani & Wiener 1994). The methodology was based upon the idiomatic expression of "The 4 P's". These were Philosophy, Policy, Procedures and Practices. They are as valued today within individual corporate entities as they were when they were written. However, they are not applied beyond individual corporate entities. The aviation industry as a whole has never applied the "4 P's" concept to a flight operations information delivery standard.

Other organizations have promoted document standards for individual corporations. The International Civil Aviation Organization, (ICAO), the Joint Airworthiness

Authority (JAA) of Europe, the Federal Aviation Authority (FAA) of the United States, and the National Aeronautics and Space Agency (NASA) combined FAA funded workshops have all identified the need for corporate level standardization. In practice, only corporate entities (operators) have been addressed, leaving the industry somewhat void of widely applicable data standards. As we look at the promotion that has taken place regarding information standards required at the flight operations corporate level, can we apply the recommendations to a data standard for the industry as a whole?

### ICAO

ICAO regulations apply internationally to 187 member states. From an ICAO perspective, specific manuals must be available to air crews as defined in ANNEX 6 (Part 1 Ch 4 with Rev 2001). The list is a little more exhaustive however the following will suffice for the argument. These include:

- a) policy and administration manual;
- b) aircraft operating manual;
- c) minimum equipment list (MEL) and configuration deviation list (CDL);
- e) training manual;
- f) aircraft performance manual.

Additionally, ICAO makes this very compelling recommendation based upon a human factors perception of information recovery:

An operator's documents system should ensure standardization across flight document types, including formatting, writing standards, standard writing style, terminology, use of graphics and symbols and formatting across documents. This includes a consistent location of specific types of information, consistent use of units of measurement and consistent use of codes.

## JAA

From a regulatory perspective, the JAA has issued the following definitive recommendation from JAR-OPS 1 for document structures: (IEM OPS 1.1045 para 3)

Since it is believed that a high degree of standardization of Operations Manuals within the JAA will lead to improved overall flight safety, it is strongly recommended that the structure described in this IEM (*Interpretive Explanation Material*) should be used by operators as far as possible.

It should be pointed out that this recommendation if it is to be met, is not supported by any industry common data. It is incumbent upon the 'operator' to manipulate widely dissimilar industry source data at their expense.

## FAA

The Federal Aviation Authority (FAA) recognizes the need for standards attested to by the following statement:

Standardized procedures promote understanding and effective communications between crewmembers ... Crewmembers of most large operators operate numerous different aircraft during their career. Standardized procedures enhance a crewmember's transfer of learning...complete standardization of procedures is not possible when there are significant differences between manufacturers and installed equipment. A high degree of standardization, however, is possible. (8400.10 Ch 5 2169)

From an audit perspective, the FAA requires each of their inspectors to ensure that corporate standards are applied in compliance with the above statement thus:

Principle Operations Inspectors (POI's) should ensure that operators standardize their operating procedures both within and across aircraft types to the greatest extent possible. (8400.10 Ch 5 2169)

Once again, the requirement to manipulate disparate information is imposed upon the operator at their expense.

## NASA/FAA Operating Documents Project

Recently the NASA/FAA Operating Documents Project has issued its own study of flight operations information management. It concluded:

Across fleet standardization should be established at several levels, from operational philosophy through procedures, to the use of common formats and terms in the different fleets. Operators should establish formal working groups and processes to ensure standard procedures across fleets.

Not only has this important work identified the need for corporate standards, but it also took aim at the lack of industry standards in support of the corporate requirements. (Developing Operating Documents, 2000)

## ATA Specifications

The Air Transport Association (ATA) implemented a specification for aircraft systems over 40 years ago. Today, the basis of the specification supports engineering, maintenance and component identification functions for every facet of the world's commercial aviation fleet. The flight operations function of the industry has never applied any such standard for information or procedure identification. While maintenance is able to apply the latest data manipulation initiatives to both legacy and modern information, there is no such data support in the flight operations area.

The basis of the ATA System number spec now supports links between maintenance tasks, maintenance training, illustration catalogues, part numbers, trouble shooting, engineering programs and minimum equipment lists. Not only does the specification support these functions, but it is also widely applied amongst manufacturers, operators, suppliers and third party vendors. In fact there is such wide compliance that the introduction of any other aircraft system identification schema would be looked upon with suspicion across the industry.

## Current Initiative

One current initiative that is promoted for data transfer between manufacturers and operators is the work that is done at the Flight Operations Working Group (FOWG) of the ATA. Support of this initiative has resulted in identification of simple specifications to be promoted in the short term. In the longer term, wider application of these specifications will support common manipulation and recovery of similar topical information across numerous enterprises, including FOQA, LOSA, CRM and AQP. Current focus of the FOWG is the transfer, manipulation and recovery of flight operations data between aircraft manufacturers and operators. Support disciplines in the area of safety, audit, human factors and training enterprises emulating some of these emerging data standards should reap the benefits of electronic linking to flight operations source data in the future.

Unfortunately, wide disparities of legacy information structures and definitions have hindered the promotion of such standards. Even within each of the support disciplines, agreement cannot be reached in regard to common information identification or common data tagging.

Whilst this mix of information and support disciplines are in the process of evolving, the ATA FOWG has identified and is promoting a standard for which data identification can begin. Wide agreement for the need of common data transfer amongst member airlines, manufacturers and third party vendors has prevailed. It is by no means in a mature state, however the initial identification of data elements upheld by approved specifications is complete.

Easing of regulatory perspectives in the use of hardware (laptops) in the cockpit and the support for electronic signatures has opened the floodgate for electronic storage and delivery of flight operations information. Individual operators are now in the process of manipulating volumes of

material into usable proprietary electronic files at their own expense.

## Conclusion

It is time that the industry recognizes the inappropriate costs associated with time and manpower in manipulating disparate data amongst individual corporate entities and support groups. It is essential for the future well being of the aeronautics industry that common data identification begins, and non-proprietary specifications link information across flight operations corporate and support domains.

## Panel Members

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Richard Blomberg is President of Dunlap and Associates, Inc., one of the oldest human factors research firms in the world. At Dunlap, he has directed or been involved in the application of human engineering and systems analytic principles to aircraft design and certification, aerospace research, highway safety, product safety and the design and evaluation of human-computer interfaces. From 1987 until April 1, 2002, Mr. Blomberg served as a consultant, member and human factors specialist on the Aerospace Safety Advisory Panel of the National Aeronautics and Space Administration. He was the chair of the Panel for the last four years of his term. He is a member of the Transportation Research Board (TRB), The Human Factors and Ergonomics Society, Society of Automotive Engineers, the Operations Research Society of America, the Association for Consumer Research, the Association of Aviation Psychologists and the American Institute of Aeronautics

### Asaf Degani

Asaf Degani received a M.S degree in Ergonomics from the University of Miami and a Ph.D. in Industrial and Systems Engineering from Georgia Institute of Technology, Atlanta. He holds a private pilot license and a maritime Captain ticket (international). Since 1989 he has worked as a research scientist at the Human Factors Division at NASA Ames. Primary research topics are in human interaction with automation, modeling and formal methods for verification and design, procedures development and cockpit displays.

### Barbara Kanki

Dr. Barbara Kanki, a research psychologist at the NASA Ames Research Center for over 16 years, received a Ph.D. in Behavioral Sciences from the University of Chicago. She conducts crew factors research in both aviation and space systems, specializing in the analysis of communication and coordination processes in domains that include flight operations, ground control, aircraft maintenance, and space shuttle processing. She manages maintenance human fac-

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Jean-Philippe Ramu is an engineer graduated from the "Ecole d'Ingénieurs de Genève (CH)" and received a "Mastère spécialisé en Techniques Aéronautique et Spatiale" from the "Ecole Nationale Supérieure de l'Aéronautique et de l'Espace" in Toulouse. He holds a military pilot license on F-5 E/F Tiger II, and is active in the Swiss Air Force as a reservist pilot. He has more than 800 hours of flight, with more than half of it on military jets. He has achieved his end study project at EURISCO on electronic operational documentation for the A380 project. He is currently working as a researcher for EURISCO International.

### Jean-Jacques Speyer

Jean-Jacques Speyer graduated in Engineering from the Polytechnic School of Brussels, Belgium, holds an MS degree in Aeronautics & Astronautics from the Massachusetts Institute of Technology, USA and a degree in Human Factors at the Université Rene Descartes in Paris. After some 3000 hours as a Boeing 707 Flight Engineer he joined Airbus Industrie in 1979. He was initially responsible for Minimum Crew Certification of the various models that were to be developed, i.e., A300FF, A310, A320, A330, A340. In this capacity he developed a variety of methods in the field of human and operational factors aiming at evaluating the impact of new technology. He is currently Director Operational Evaluation, Human Factors and Communication in the Flight Operations Support Division of Airbus Customer Services

A member of the Airbus Industrie Human Factors Operational Group, he is also a CRM facilitator. The author of many papers in his field, he received the Wright Brothers Award from the Society of Automotive Engineers in 1982, the Grand Prix de l'Académie de l'Air et de l'Espace in 1987 and obtained a patent relative to workload measurement in 1992.

### Rick W. Travers

Rick Travers has been an active pilot with Air Canada for the past 24 years. Since 1991, his experience has included ground and flight instructor functions, CRM and LOFT facilitator roles, lead writer for aircraft training and flight operating manuals and most recently, Manager of Technical Writing and AOM Support for Flight Operations Standards. With past type ratings on the DC9 and B767, he continues active flying duties as a Check Airman on the Airbus 319/320/321 series. With the sponsorship of Air Canada, Rick has chaired the Flight Operations Working Group of the Air Transport Association (ATA) for the past three years. He has promoted the ATA Flight Operations Working Group initiatives through numerous industry articles and presentations addressing flight operations documentation, training and human factors support disciplines.