

31 May 2003

Katherine Perfetti FAA AFS-200, Air Transportation Division 800 Independence Ave. SW Washington DC 20591	Docket Management System U.S. Department of Transportation 400 7 th Street, SW Room PLaza 401 Washington, DC 20590-0001
--	--

Regarding:

Docket Number FAA-2002-13923

Brad Halloran (ARC Training Committee member) submits the following comments to the docket for consideration by the ARC.

14 CFR Parts 125 and 135 Regulatory Review

First of all, I concur with the ADF's docket submittal (FAA-2002-13923-21) on their issue that relates to training/certification of dispatchers (being held to the same standards as part 121). The human factors training (CRM/DRM/MRM) issue of elevating this training to "rule" versus "guidance" that I propose, is a specific piece of the ADF's issue. Specifically, I submit AC-120-51D (in whole or parts) should be elevated to regulatory status.

If we use the same rationalization for CRM/DRM as we were given for drug testing and "safety sensitive" personnel, then there seems to be no way to escape this inevitable requirement for human factors training. Additionally, it supports ALPA's position of "One level of Safety" campaign that was initiated several years ago (reference ALPA docket submission for involvement).

A recent tragedy should focus this issue:

"BA Weekly: NTSB Cites Faulty Crew Coordination In Aspen Crash"

By David Collogan/The Weekly of Business Aviation

19-Jun-2002 4:15 PM U.S. EDT

Faulty coordination between the pilots and the continuation of an unstabilized approach past the missed approach point, were cited by the National Transportation Safety Board as critical factors in the March 29, 2001 crash of a Gulfstream III at Aspen-Pitkin County Airport Sardy Field (ASE) in Aspen, Colo. (BA, April 2, 2001/156).

NTSB said the probable cause of the accident, which claimed all three crewmembers and 15 passengers, was "the flight crew's operation of the airplane below the minimum descent altitude without visual reference to the runway."

Contributing to the accident was "FAA's unclear wording of a Notice to Airmen regarding the nighttime restriction on the VOR/DME-C approach to the airport" and the inability of the crew to adequately see the mountainous terrain because of the darkness and weather conditions, pressure from the charter customers for the captain to land at Aspen and the delayed departure of the aircraft from California.

The aircraft was being operated under Part 135 of the FARs by Avjet Corp., a California firm.

Noting the importance of crew resource management (CRM) training, NTSB issued a recommendation to FAA last week calling for Part 135 on-demand charter operators to establish an FAA-approved CRM program for their flight crews in accordance with Part 121 Subparts N and O.

The safety board said evidence from its investigation "has shown that the accident flight crew exercised poor CRM in the following ways: the captain did not brief the instrument and missed approach procedures or any other required information; the flight crew did not make required instrument approach callouts; the captain did not include the first officer in the aeronautical decision-making process; and, the first officer did not question or challenge the captain or intervene when he placed the airplane in a potentially unsafe flying condition."

NTSB said it is "concerned that Part 135 on-demand charter operators, such as Avjet, and other operators that conduct operations with aircraft requiring two or more pilots do not meet the CRM training requirements outlined for Part 135 commuter operators."

I share the NTSB's concerns on the latter highlighted issue, and it is the basis of my recommendation.

With regards to runway incursions (a chronic problem), the FAA will specifically include taxi operations and ATC instructions in AC 120-35C and will modify language in AC-120-51D, Crew Resource Management training, to provide guidance for clear delineation of Captain training on command oversight and First Officer responsibilities for monitoring during airport surface movements (to be completed in November 2003). **Source Airline Pilot May 2003.**

Again, in my opinion, placement of this highly, safety-oriented human factors training (AC-120-51D in whole or parts) should be placed into "rule" as opposed to advisory "guidelines".

Cost Discussion:

Flexibility in training as mentioned in the AC-120-51D, even if placed into rule (121.404) for parts 135, and 125, etc...could be done effectively and efficiently without placing undo economic burden on small operators.

A low-cost computer-based training program (AC-120-51D training option), or with today's technology, a low-cost, yet effective, web-based learning program

can have minimal costs with respect to scheduling operations personnel (pilots, flight attendants/cabin service managers, dispatchers, maintenance) so that they can receive initial or recurrent training. Normally, such a venue can be accomplished at approximately 100\$ per web-based course (e.g. 20-pilot organizations can accomplish human factors annually for \$2000 total). Flexibility in the number of courses taken annually can be managed economically by the management, yet continue to keep the "hot items", with regard to human factors, constantly in front of their flight operations personnel.

Arguably, face-to-face human factors instruction is the most effective, but can be cost prohibitive for small operators, normally priced at 180\$/day per attendee. This price does not include the impact of down time for scheduling attendance. Costs can be as high as \$3600 per day based on 20 attendees plus cost of down time, flying members from off site, plus other expenses. These extra costs could easily double the cost of training for face-to-face.

Interactive web-based learning has come along way with minor losses in training effectiveness. This point should be considered when addressing the issue of elevating this human factors training from "guidance" criteria to "rule". There is quite a lot of interest by smaller operators (Part 135) to accomplish this training in a web-based venue. It can be "focused" specifically for the customer to address issues they have discovered in their operations (unstable approaches, runway incursions, runway excursions, etc...).

The dynamics of the aviation industry, with respect to more flying being accomplished by smaller carriers in various venues, has already changed. Training standards and emphasis should be "elevated" with the same proportion. Safety and human factors training "rules" should be held to the same standard regardless of Part.

With regards to maintenance personnel and human factors training (MRM), proof that such training pays off is provided by the U.S. Coast Guard's aviation units. Before incorporating soft skills into its "safety stand-down" program, the USCG said maintenance accounted for more than one-fifth of all its aviation mishaps, costing over \$5.2 million in a three-year period. But the first year after the skills began to be taught, their accidents and incidents dropped 68 percent. MRM has become the title under which soft skills are now grouped. **Source: Business and Commercial Aviation April 2003 "Maintenance Resource Management Training-It Matters" p. 48-50**

"Incidents/Accidents are the ultimate inefficiency!"

(Excerpts below taken from AC-120-51D, 121.404, and Part 65 Appendix A, provide a refresher of the importance of this training issue)

Supporting Information

AC No: 120-51D

Subject: CREW RESOURCE MANAGEMENT TRAINING

Date: 2/8/01

Initiated By: AFS-210

Change:

1. **PURPOSE.** This advisory circular (AC) presents guidelines for developing, implementing, reinforcing, and assessing Crew Resource Management (CRM) training programs for flight crewmembers and other personnel essential to flight safety. These programs are designed to become an integral part of training and operations. Guidelines are primarily for those operators subject to Title 14 of the Code of Federal Regulations (14 CFR) part 121. All part 121 operators are required by regulations to provide CRM training for pilots and flight attendants, and dispatch resource management (DRM) training for aircraft dispatchers. These guidelines are also for use by those 14 CFR part 135 operators electing to train in accordance with part 121 requirements. Certificate holders and individuals operating apart from air carrier operations, under other operating rules, such as 14 CFR parts 91, 125, and others, should find these guidelines useful in addressing human performance issues. This AC presents one way, but not necessarily the only way, that CRM training may be addressed. CRM training focuses on situation awareness, communication skills, teamwork, task allocation, and decision-making within a comprehensive framework of standard operating procedures (SOP's).

Taken out of order from the AC-120-51D:

7. **BACKGROUND.** Investigations into the causes of air carrier accidents have shown that human error is a contributing factor in 60 to 80 percent of all air carrier incidents and accidents. Long term NASA research has demonstrated that these events share common characteristics. Many problems encountered by flight crews have very little to do with the technical aspects of operating in a multi-person cockpit. Instead, problems are associated with poor group decision-making, ineffective communication, inadequate leadership, and poor task or resource management. Pilot training programs historically focused almost exclusively on the technical aspects of flying and on an individual pilot's performance; they did not effectively address crew management issues that are also fundamental to safe flight.

a. The National Transportation Safety Board (NTSB), the FAA, and many other parties have identified SOP's as a persistent element in these problems, which sometimes have led to accidents. SOP's define the shared mental model upon which good crew performance depends. Too often well-established SOP's have been unconsciously ignored by pilots and others; in other cases they have been consciously ignored. In still other cases SOP's have been inadequately developed by the operator for use by its pilots, flight attendants, or aircraft dispatchers, or a significant SOP has been omitted altogether from an operator's training program. The Commercial Aviation Safety Team (CAST), a coalition of industry and government organizations, including the FAA, chartered by the White House in 1997, has undertaken to reduce the air carrier accident rate by 80% by

the year 2007. Initiatives to improve SOP's and adherence to those SOP's are among the top-priority safety initiatives now being implemented by CAST.

b. Industry and government have come to consensus that training programs should place emphasis on the factors that influence crew coordination and the management of crew resources. The need for additional training in communication between cockpit crewmembers and flight attendants has been specifically identified.

c. Coordinated efforts by representatives from the aviation community have produced valuable recommendations for CRM training programs. This collaborative process has occurred under the auspices of the Aviation Rulemaking Advisory Committee (ARAC). ARAC comprises representatives from a broad array of aviation organizations, including pilots' and flight attendants' associations, aircraft manufacturers, government offices, and others. ARAC is chaired by the Director of the FAA's Office of Rulemaking and is subdivided into working groups. One of those working groups is the Training and Qualifications Working Group. This AC is one product that has come from that working group and represents the sum of many parts. While compliance with this AC is not mandatory, the recommendations which it contains provide a useful reference for understanding and applying the critical elements of CRM training.

d. Continuing NASA and FAA measurements of the impact of CRM training show that after initial indoctrination, significant improvement in attitudes occur regarding crew coordination and flight deck management. In programs that also provide recurrent training and practice in CRM concepts, significant changes have been recorded in flight crew performance during Line Oriented Flight Training (LOFT) and during actual flight. CRM-trained crews operate more effectively as teams and cope more effectively with nonroutine situations.

e. Research also shows that when there is no effective reinforcement of CRM concepts by way of recurrent training, improvements in attitudes observed after initial indoctrination tend to disappear, and individuals' attitudes tend to revert to former levels.

Taken out of order from the AC-120-51D:

b. Crew Resource Management (CRM) Training. The application of team management concepts in the flight deck environment was initially known as Cockpit Resource Management. As CRM training programs evolved to include flight attendants, maintenance personnel and others, the phrase Crew Resource Management has been adopted.

(1) As used in this AC, CRM refers to the effective use of all available resources: human resources, hardware, and information. Other groups routinely working with the cockpit crew, who are involved in decisions required to operate a flight safely, are also essential participants in an effective CRM process. These groups include but are not limited to:

- (a) Aircraft dispatchers.
- (b) Flight attendants.
- (c) Maintenance personnel.
- (d) Air traffic controllers.

(2) CRM training is one way of addressing the challenge of optimizing the human/machine interface and accompanying interpersonal activities. These activities include team building and maintenance, information transfer, problem solving, decision-making, maintaining situation awareness, and dealing with automated systems. CRM

training is comprised of three components: initial indoctrination/awareness, recurrent practice and feedback, and continual reinforcement.

Taken out of order from the AC-120-51D:

3. APPROPRIATE TRAINING INTERVENTIONS.

a. The most effective CRM training involves active participation of all crewmembers. LOFT sessions give each crewmember opportunities to practice CRM skills through interactions with other crewmembers. If the training is videotaped, feedback based on crewmembers' actual behavior, during the LOFT, provides valuable documentation for the LOFT debrief.

b. CRM training can be presented using a combination of the following training interventions:

- (1) Operator in-house courses.
- (2) Training center courses.
- (3) Special Purpose Operational Training.
- (4) LOFT sessions.
- (5) Computer Based Training courses.

The above mentioned AC-120-51D issues stand as guidance and are not regulatory compared to compliance set forth in 121.404.

Governing Regulations and Advisory Circular References for CRM/DRM and training facilities

§121.404 Compliance dates: Crew and dispatcher resource management training.

After March 19, 1998, no certificate holder may use a person as a flight crewmember, and after March 19, 1999, no certificate holder may use a person as a flight attendant or aircraft dispatcher unless that person has completed approved crew resource management (CRM) or dispatcher resource management (DRM) initial training, as applicable, with that certificate holder or with another certificate holder.

[Doc. No. 28154, 61 FR 30435, June 14, 1996]

§121.406 Credit for previous CRM/DRM training.

(a) For flightcrew members, the Administrator may credit CRM training received before March 19, 1998 toward all or part of the initial ground CRM training required by §121.419.

(b) For flight attendants, the Administrator may credit CRM training received before March 19, 1999 toward all or part of the initial ground CRM training required by §121.421.

(c) For aircraft dispatchers, the Administrator may credit CRM training received before March 19, 1999 toward all or part of the initial ground CRM training required by §121.422.

(d) In granting credit for initial ground CRM or DRM training, the Administrator considers training aids, devices, methods, and procedures used by the certificate holder in a voluntary CRM or DRM program or in an AQP program that effectively meets the quality of an approved CRM or DRM initial ground training program under section 121.419, 121.421, or 121.422 as appropriate.

[Doc. No. 27993, 60 FR 65949, Dec. 20, 1995]

§121.419 Pilots and flight engineers: Initial, transition, and upgrade ground training.

(a) Initial, transition, and upgrade ground training for pilots and flight engineers must include instruction in at least the following as applicable to their assigned duties:

(1) General subjects --

(i) The certificate holder's dispatch or flight release procedures;

(ii) Principles and methods for determining weight and balance, and runway limitations for takeoff and landing;

(iii) Enough meteorology to insure a practical knowledge of weather phenomena, including the principles of frontal systems, icing, fog, thunderstorms, and high altitude weather situations;

(iv) Air traffic control systems, procedures, and phraseology;

(v) Navigation and the use of navigation aids, including instrument approach procedures;

(vi) Normal and emergency communication procedures;

(vii) Visual cues prior to and during descent below DH or MDA;

(viii) Approved crew resource management initial training; and

(ix) Other instructions as necessary to ensure his competence.

Human factors training content specifics for dispatchers is addressed:

Appendix A to Part 65 -- Aircraft Dispatcher Courses

Overview

This appendix sets forth the areas of knowledge necessary to perform dispatcher functions. The items listed below indicate the minimum set of topics that must be covered in a training course for aircraft dispatcher certification. The order of coverage is at the discretion of the approved school. For the latest technological advancements refer to the Practical Test Standards as published by the FAA.

VIII. Practical Dispatch Applications

A. Human Factors.

(1) Decision making:

(a) Situation Assessment.

(b) Generation and Evaluation of Alternatives.

(i) Tradeoffs and Prioritization.

(ii) Contingency Planning.

(c) Support Tools and Technologies.

(2) Human Error:

(a) Causes.

(i) Individual and Organizational Factors.

(ii) Technology-Induced Error.

(b) Prevention.

(c) Detection and Recovery.

(3) Teamwork:

(a) Communication and Information Exchange.

(b) Cooperative and Distributed Problem-Solving.

(c) Resource Management.

(i) Air Traffic Control (ATC) activities and workload.

(ii) Flight crew activities and workload.

(iii) Maintenance activities and workload.

(iv) Operations Control Staff activities and workload.

Bradley D. Halloran
HPTI
6825 South Galena Street
Englewood, CO 80112
303-792-8314
cell 303-263-9911