

PILOT FLIGHT AND DUTY TIME RULE

(111-135)

HEARING
BEFORE THE
SUBCOMMITTEE ON
AVIATION
OF THE
COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES
ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

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September 13, 2010

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SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Aviation
FROM: Subcommittee on Aviation Staff
SUBJECT: Hearing on "Pilot Flight and Duty Time Rule"

PURPOSE OF HEARING

The Subcommittee on Aviation will meet on Thursday, September 16, 2010, at 11:00 a.m., in room 2167 of the Rayburn House Office Building to receive testimony regarding the need for a new pilot flight and duty time rule. The hearing will explore the history of regulation of pilot flight and duty time,¹ the work of the Federal Aviation Administration's (FAA) aviation rulemaking committee (ARC) convened to address the issue, and the future of the FAA's rulemaking activities.

BACKGROUND

The FAA has had regulations limiting pilot flight and duty time, and requiring minimum rest periods, since the 1940s. The National Transportation Safety Board (NTSB) issued three recommendations in 1989 to the Secretary of Transportation calling for research, education, and revisions to existing regulations. These recommendations were added to the NTSB's Most Wanted List of Transportation Safety Improvements in 1990, and the issue of fatigue has remained on the Most Wanted List since then.² The FAA first proposed to revise its regulations on pilot flight and duty time in 1995; however, the regulations were never revised.³

According to the NTSB, over the past 15 years, fatigue has been linked to more than 250 fatalities in air carrier accidents. There are currently several open aviation recommendations

¹ Duty time is the time a flight crewmember is on the job available to fly, though he/she may not be piloting the aircraft.

² NTSB, *Most Wanted List - Aviation* (Feb. 2010), http://www.ntsb.gov/recs/mostwanted/aviation_reduce_acc_inc_humanfatig.htm.

³ See reference to Notice of Proposed Rulemaking in 1995.

concerning pilot fatigue. The NTSB has recommended that FAA: (1) revise current flight and duty limitations to take into consideration the latest research findings in fatigue and sleep issues, as well as length of duty day, starting time, workload, and other factors; (2) prohibit pilots from exceeding flight and duty time limits when operating non-revenue flights without passengers or cargo on board (usually on repositioning flights conducted under part 91 of the Federal Aviation Regulations);⁴ and (3) develop and use a methodology that will continually assess the effectiveness of fatigue management systems implemented by operators.

The February 12, 2009, crash of Colgan Air Flight 3407 (operated on behalf of Continental Airlines as Continental Connection), near Buffalo, New York, raised questions regarding the adequacy of the FAA's current pilot flight and duty time rules. Although pilot fatigue was not cited as the probable cause of the accident, the NTSB raised fatigue as an area of concern in the accident and reiterated its fatigue recommendations to the FAA, focusing on the need to address pilot fatigue risks associated with commuting. On June 15, 2009, FAA Administrator J. Randolph Babbitt announced an industry-wide Airline Safety and Pilot Training "Call to Action" to reduce risk at regional airlines while promoting best practices from major airlines and seeking industry voluntary compliance with a number of safety initiatives. On June 24, 2009, Administrator Babbitt announced that the FAA would undertake an expedited review of flight and duty time rules by establishing an ARC charged with developing recommendations for a new pilot flight and duty time rule.

The ARC, which began its work in July 2009, consisted of representatives from FAA, industry, and labor organizations and was charged with producing recommendations for a science-based approach to fatigue management by September 1, 2009. The ARC met its deadline and provided the FAA with a broad framework for drafting the basis for a Notice of Proposed Rulemaking (NPRM). The FAA announced the release of the NPRM on September 10, 2010.

I. Pilot Flight and Duty Time NPRM

On September 10, 2010, Administrator Babbitt announced a proposed rule to address airline pilot fatigue by updating existing standards in a number of respects. First, under the proposal, pilots and airlines would share responsibility for ensuring pilots are not fatigued when they report for duty; a fatigued pilot must be deemed unfit to fly. The proposal also alters existing practice by stating it is unreasonable to assume that a pilot is resting while commuting, and it prohibits pilots and airlines from considering, as rest, the time a pilot spends commuting between his or her home and pilot base. Though the proposed rule applies to airline operations conducted under 14 C.F.R. part 121, it does not apply to commuter and on-demand operations conducted under 14 C.F.R. part 135.

Specifically, the proposed rule does the following, among other things:

- Increases, from the eight hours required under current regulations to nine hours, the minimum amount of rest a pilot must take before beginning flying-related duties.
- Permits airlines to apply scientific data to create individualized fatigue risk management systems that airlines may utilize, upon FAA approval, instead of strictly adhering to the requirements of the proposed rule. Creation of these risk management systems would be consistent with the relevant provision of H.R. 5900, the recently enacted Airline Safety and

⁴ See NTSB Most Wanted List, *supra* note 2.

Federal Aviation Administration Extension Act of 2010 (P.L. 111-216), which requires airlines to develop fatigue risk management plans.

- Increases, by 25 percent, the minimum number of consecutive hours per week during which pilots must be free from all duty.
- Decreases, from 30 to 28, the number of days during which pilots may not record more than 100 total hours of flight time.
- Creates a sliding limit on a pilot's daily flight duty time, based on the time the pilot reports for duty and the number of flight segments operated, and provides that in no case may a pilot be on duty for more than 13 hours. (Current regulations do not explicitly address the amount of time a pilot may be on duty. Instead, the rules address flight time limitations and required rest periods. However, under current rules, the maximum duty day possible is 16 hours.)
- Extends these rules to all part 121 flights (operated by passenger and cargo airlines) including domestic, flag (international), or supplemental (unscheduled) operations. Currently, there are different requirements for each of these types of operations.
- Maintains the current flight time limit of eight hours.

II. Current Standards

Under current FAA flight and duty time rules, pilots and airlines are responsible for ensuring that pilot flight time limitations are not exceeded. FAA regulations impose an eight-hour limit on pilot flight time during a 24-hour period, provided the pilot has had at least eight continuous hours of rest during that same 24-hour period. This limit may be extended if the pilot receives additional rest at the end of the flight. If a pilot's actual rest is less than nine hours in the 24-hour period, the next rest period must be lengthened to provide for the appropriate compensatory rest. Pilots must be relieved of duty for at least 24 consecutive hours during any period of seven consecutive days. The rules do not address the matter of extended duty time or flight time that results from operational delays.⁵ The FAA has recommended that air carriers include fatigue training as part of its crew resource management training programs. A breakdown of current limitations on pilot flight and duty time is as follows:

- Pilots flying domestic part 121 (commercial air carrier) operations may fly up to 30 hours in any seven consecutive days (actual flight time), 100 hours per calendar month (actual flight time), and 1,000 hours per calendar year (actual flight time).
- Pilots flying domestic part 135 (commuter and on-demand) operations may fly up to 34 hours in any seven consecutive days (actual flight time), 120 hours per calendar month (actual flight time), and 1,200 hours per calendar year (actual flight time).⁶

Flight time and rest rules for pilots operating U.S. air carrier international flights are different from the rules for domestic flights. International flights can involve more than the standard two-pilot crew and are more complex due to the scope of the operations. For international flights that require more than 12 hours of flight time, air carriers must establish rest periods and provide adequate sleeping facilities outside of the cockpit for in-flight rest. Unscheduled part 121 operations (charter flights) currently adhere to a unique set of restrictions under subpart S of part 121 that allow pilot flight and duty times to be tailored to the unique characteristics of these operations.

⁵ Airline rules may be stricter than FAA regulations, for example, as part of a collective bargaining agreement.

⁶ 14 C.F.R. part 121, subpart Q; *id.* at part 135, subpart F.

III. 1995 Rulemaking Effort

In 1995, the FAA proposed to amend existing regulations to establish new duty period and flight time limitations, and rest requirements for flight crewmembers in part 121 and part 135. This proposal was based on recommendations from an ARC. Highlights of the 1995 proposal included:

- Reducing the maximum number of duty hours from the current 16 hours to 14 hours for two-pilot crews. This would have allowed the maximum number of flight hours to increase from the current eight hours up to 10 flight hours within the 14 duty hours.
- Additional duty hours would be permitted only for unexpected operational problems, such as flight delays. In no event could such delays add more than two hours to the pilot's duty day.
- To ensure that pilots have an adequate opportunity to rest and take into account transit to and from hotels and meal time, off-duty time would be increased from eight hours to 10 hours under the proposal.
- Pilots would have to be given at least one 36-hour off-duty period every seven days. Current rules call for a 24-hour period.

The FAA received more than 2,000 comments from the aviation community and the public. Most of those comments did not favor the rule as proposed, and there was no clear consensus on what the final rule should include. According to the FAA, the comments fell into two areas: pilots commented that increasing from eight to 10 hours of flight time was too long, and operators believed 14 hours of duty time was too short. The agency did not take further action on the 1995 NPRM in subsequent years, and on November 23, 2009, officially withdrew the NPRM "because it [was] outdated and because it raised many significant issues that the agency needed to consider before proceeding with a final rule."⁷

IV. Current Actions – Legislation & ARC

On June 15, 2009, the FAA announced plans to establish an ARC charged with developing recommendations for a new FAA rule on pilot flight and duty time to incorporate recent scientific research about the factors that lead to fatigue. By July 15, FAA chartered an ARC consisting of representatives from FAA, industry, and labor organizations. The ARC's meetings were not open to the public. The ARC had until September 1, 2009, to draft recommendations to the FAA, which would inform a new, science-based NPRM on pilot flight and duty time.

According to the ARC charter, its goal was to provide a forum for the U.S. aviation community to discuss current approaches to mitigate fatigue, such as those found in international standards,⁸ and make specific recommendations on how the United States should modify its existing requirements. The charter also directed the ARC to "consider and address: a single approach to addressing fatigue that consolidates and replaces existing regulatory requirements for parts 121/135;

⁷ *Flight Crewmember Duty Period Limitation, Flight Time Limitations and Rest Requirements; Withdrawal*, 74 Fed. Reg. 61068 (Nov. 23, 2009).

⁸ For example, the International Civil Aviation Organization (ICAO) standard, the United Kingdom Civil Aviation Publication (CAP) 371 and European Aviation Safety Agency (EASA) Notice of Proposed Amendment.

current fatigue science and information on fatigue . . . and incorporation of fatigue risk management systems.”⁹

While the ARC’s report is not public, according to the *Wall Street Journal*, the ARC presented the Administrator with a flight time proposal that “envisions a sliding scale of between seven and eleven scheduled flight hours for pilots per day.”¹⁰ A pilot’s duty time would be adjusted, but how is not yet clear. The *Wall Street Journal* article implied that pilots who perform multiple takeoffs and landings a day would fly fewer hours than they do today, but pilots flying a transcontinental route would be able to fly a return trip the same day.¹¹ The ARC discussed the issue of pilot commuting, as well as the larger issue of fitness to fly. The FAA’s new NPRM, discussed in section I, addresses pilot commuting.

The ARC met its September 1, 2009, deadline and provided the FAA with a broad framework for drafting a NPRM that the agency planned to publish by December 31, 2009. The NPRM was published on September 13, 2010. As of the date of this memo, the Federal Government has not yet determined the estimated cost of implementing the proposed rule.

V. Other Actions

A. Legislative Action

On August 1, 2010, President Obama signed into law the Airline Safety and Federal Aviation Administration Extension Act of 2010, which requires the FAA to update and implement new pilot flight and duty time rules within one year to more adequately track scientific research in the field of fatigue. The law directs the FAA to require air carriers, within 90 days, to create fatigue risk management systems¹² approved by FAA to proactively mitigate pilot fatigue. The law also requires the FAA to contract with the National Academy of Science to study the impact of pilot commuting on fatigue and provide preliminary results to the FAA to be considered as part of the flight and duty time rulemaking.

B. 2008 FAA Fatigue Symposium

The FAA sponsored a symposium on fatigue in June 2008. According to the FAA, the symposium sought to promote the voluntary management of fatigue issues within the aviation community. World researchers on fatigue, the Institutes for Behavior Resources, Inc., NTSB, and the aviation community participated in the symposium. The latest fatigue mitigation initiatives and best practices were presented as well as the current scientific information on fatigue from aviation industry experts and scientists.

⁹ In addition to the flight and duty time NPRM, the FAA notes that it is also working with the ICAO to develop a Fatigue Risk Management System (FRMS). FRMS represents a voluntary risk based approach to improve flight crew alertness whereby airlines would manage fatigue with input from all company personnel, including management, flight crewmembers, maintenance personnel, schedulers, and dispatchers.

¹⁰ Andy Pasztor, “Pilots, Airlines Urge New Fatigue Rules”, *the Wall Street Journal* (Sep. 10, 2009), at A3.

¹¹ According to the FAA, it is possible under existing regulations to fly cross-country and return the same day, depending on variables such as type of operation, crew augmentation, and amount of flight hours.

¹² Defined in note 9, *supra*, see also FAA, Advisory Circular 120-103, *Fatigue Risk Management System for Aviation Safety* (Aug. 3, 2010), at 3.

C. Ultra-Long-Range Flights

In 2006, the FAA and Delta Air Lines worked to develop and approve a fatigue mitigation strategy for flights between John F. Kennedy International Airport and Mumbai, India. The FAA approved a plan to manage rest and mitigate the risk posed by fatigue for flights operated for more than 16 hours with four pilots. The fatigue mitigation strategy, approved as an Operations Specification, was exclusive for the New York-Mumbai city pair. Although that specific route is no longer flown by Delta, the FAA viewed the fatigue mitigation strategy process as a model program.

As a result of Delta's efforts, the FAA proposed, in November 2008, to amend Operations Specifications to incorporate fatigue mitigation plans for ultra-long-range flights. Based on comments received from the air carriers involved, the FAA withdrew the proposed amendments on March 12, 2009. According to the FAA, it is continuing to work with airlines to gather data that will help the agency enhance the safety requirements for ultra-long-range flights.

D. 2000 FAA Letter, a.k.a. the "Whitlow Letter"

On November 20, 2000, the FAA responded to a letter from the Allied Pilots Association requesting clarification of the current pilot flight and duty time rules. The FAA's response, known as the "Whitlow Letter" because it was signed by James Whitlow, the FAA's Deputy Chief Counsel, reiterated current practices for pilot flight and duty time consistent with the agency's long-standing interpretation of the current rules. The letter explains that each flight crewmember must have a minimum of eight hours of rest in any 24-hour period, which includes flight time. Scheduled flight time must be calculated using the actual circumstances on the day of departure regardless of whether the length of the flight is longer or shorter than the originally scheduled flight time. The FAA also reiterated this interpretation in a May 17, 2001, *Federal Register* notice,¹³ and notified airlines and flight crews of the FAA's intent to enforce its rules in accordance with the Whitlow Letter. The Air Transport Association and the Regional Airline Association requested a stay of all agency action by the FAA and petitioned the U.S. Court of Appeals for review. The FAA denied the request, and, in 2002, the U.S. Court of Appeals for the District of Columbia denied the trade groups' petition for review, ruling in favor of the FAA.¹⁴

¹³ Flight Crewmember Flight Time Limitations and Rest Requirements, 66 Fed. Reg. 27,548 (May 17, 2001).

¹⁴ *Air Transp. Assn. of Am., Inc., v. Fed. Av. Admin.*, 291 F.3d 49 (D.C. Cir. 2002).

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PILOT FLIGHT AND DUTY TIME RULE

Thursday, September 16, 2010

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON AVIATION,
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
Washington, DC.

The Subcommittee met, pursuant to call, at 11:00 a.m., in room 2167, Rayburn House Office Building, Hon. Jerry F. Costello [Chairman of the Subcommittee] presiding.

Mr. COSTELLO. The Subcommittee will come to order. The Chair will ask that all Members, staff and everyone turn electronic devices off or on vibrate.

The Subcommittee is meeting today to receive testimony regarding the new pilot flight and duty time rule. The Chair will give a brief opening statement, will call on the Ranking Member, Mr. Petri, to give his opening statement, and then we will go to our witnesses.

Let me say that timing is everything around here, and we anticipate we will have at least one vote about 11:15. So, hopefully, we will get through our opening statements and get to the witnesses before we have our first vote.

I welcome everyone to the Aviation Subcommittee hearing on the pilot flight and duty time rule. Since the 1940's, there have been regulations limiting pilot flight and duty time and requiring minimum rest periods.

In 1989, the NTSB issued three recommendations to the Secretary of Transportation calling for research, education and revisions to existing regulations. These recommendations were added to the NTSB's most wanted list of transportation safety improvements in 1990. The FAA tried to revise its regulations in 1995.

Despite fatigue being linked to more than 250 fatalities in air carrier accidents, a consensus could not be reached between the stakeholders on how the FAA should revise its regulations.

Last year, the tragic accident of Continental Connection flight 3407 revealed that pilot fatigue very likely had an effect on pilot performance, and at the time, the airline was not addressing fatigue for pilots who commute from other cities, as the captain and first officer did in this tragic accident. In addition, the accident raised questions regarding the adequacy of the FAA's current pilot flight and duty time rules.

I am pleased that after we held a hearing, this Subcommittee held a hearing on aviation safety, and a roundtable on pilot workforce issues and promised to introduce legislation requiring the FAA to act, the Secretary of Transportation, Secretary LaHood, and

Administrator Babbitt identified pilot fatigue as a top priority during the agency's call to action to enhance airline safety.

At the time, I applauded Administrator Babbitt for undertaking an expedited review of flight and duty time rules. I am pleased he has followed through on his commitment to bring the stakeholders together and update the FAA's flight and duty time regulations, taking into account fatigue science and other factors that can affect pilot alertness, judgment and performance.

While the FAA was working through its process, the House passed bipartisan legislation which requires the FAA to update and implement new flight and duty time rules for pilots within 1 year.

The Airline Safety and Federal Aviation Administration Extension Act of 2010 was signed into law on August 1, 2010. This is the strongest aviation safety bill in decades. We can all be proud of this significant accomplishment, and I want to acknowledge the unwavering support of the families of Continental Connection flight 3407, some of which are here with us today, who continue to engage and be proactive on this issue.

The law we passed in August requires the FAA to update and implement new pilot flight and duty time rules within one year, taking into account scientific research. Further, it directs the FAA to require air carriers within 90 days to create fatigue risk management systems to proactively mitigate pilot fatigue.

To address the issue of commuting, we required the FAA to contract with the National Academy of Science to study its impact on safety so the FAA can utilize the findings in its final rulemaking.

On September 14, the FAA issued a notice of proposed rulemaking on flight crew member duty and rest requirements consistent with the law. I commend the FAA for taking this important first step. I am also encouraged that the proposed rule recognizes that the time spent commuting to work is not rest, that it is in fact time spent commuting.

I look forward to hearing the agency's plan for staying on track to finalize the rule by August 1, 2011, as Congress directed, and receiving testimony from other witnesses as well.

Before I recognize Mr. Petri for his opening statement, I ask unanimous consent to allow 2 weeks for all Members to revise and extend their remarks and to permit the submission of additional statements and materials by Members and witnesses.

Without objection, so ordered.

The Chair at this time recognizes the Ranking Member, Mr. Petri.

Mr. PETRI. Thank you very much, Mr. Chairman.

And before I give my formal opening statement, I just thought I would spend a minute or two to mark the end of the Costello era on this Committee. It may well be that this could be the last Subcommittee hearing of this Congress, if rumors floating around are true that we will adjourn October 1st rather than the 8th. If there is a Science Committee, each Congress has its own situation, you may well be the Chairman of that, rather than of this particular Subcommittee.

I just want to take a minute to say how much I have enjoyed working with you over the last several Congresses. And while we have obviously come to things with different perspectives, we have

tried to make that add to the value of our work product rather than impede us from getting something done.

It has been at the Subcommittee a productive period, two FAA bills in the 110th and 111th Congress, and they are still in process in other places; over 50 hearings and a series of roundtable discussions under your Chairmanship; active aggressive oversight of the Next-Gen process, which has been much needed; a pilot safety bill raising mandatory pilot retirement to age 65; and moving the National Transportation Safety Board reauthorization through our Committee.

So you can be proud. You have earned your keep, and it certainly has been my pleasure to have the opportunity to serve as your Ranking Member.

Mr. COSTELLO. Let me, if the gentleman would yield, let me thank you for your kind words.

And the accomplishments that we have had in this Subcommittee would not have been possible without the bipartisan cooperation of you, Mr. Petri. And I have enjoyed working with you.

Let me say that the rumors of my demise are premature. I intend to be very active in this Subcommittee, regardless of what I may or may not be doing with the Science Committee. But I have always enjoyed working with you.

This Committee has a reputation, as everyone knows, of being bipartisan, and I don't think that there are any two Members on either side of the aisle that have worked better together or more closely together than Mr. Petri and I. I have enjoyed working with you, and I am going to continue to work with you for hopefully many years in the future.

Mr. PETRI. The feeling is mutual.

Thank you for calling this important hearing on proposed rule-making on airline pilot flight and duty time regulations. As you pointed out in your statement, on February 12th, 2009, 50 people tragically lost their lives when Colgan Air flight 3407 doing business as Continental Connect, crashed outside of Buffalo, New York.

Although the National Transportation Safety Board investigation report did not attribute the cause of accident to pilot fatigue, the investigation uncovered disturbing commuting practices, sometimes employed within the industry and reignited interest about the impact of fatigue on aviation safety.

In the aftermath of the accident, this Subcommittee acted in a bipartisan fashion to draft legislation to address safety issues arising out of the accident of flight 3407. And, of course, we and the Senate were assisted in our work by the citizens who are the families of Continental flight 3407, several of whom are continuing their active participation in this process. And we thank them for their accepting and doing something about this problem.

The House and Senate passed the safety legislation. In July, it was signed into law. The FAA is now implementing the provisions of the bill, including provisions consistent with the FAA's ongoing effort to update airline pilot flight and duty time regulations.

It has been far too long since the agency has updated the airline flight and duty regulations, and I applaud the agency's efforts to address this important issue. The challenge before the agency will

be to strike the right balance in achieving a true safety benefit for a dynamic aviation industry.

The goal of this rulemaking is to improve safety, and that must be achieved by careful consideration of all known factors, including the cause of fatigue.

Before the flight 3407 accident, pilot commuting was a practice in the airline industry that went largely unnoticed by the public. The vast majority of pilots responsibly managed their commuting to work. Clearly, commuting is a part of lifestyle choice for airline pilots and for those in many other professions. It is a part of two-job families and something that all of us are familiar with.

However, if we agree that irresponsible commuting is a causal factor in fatigue, then the practice of commuting deserves a look. I am interested to hear from the FAA and the other witnesses the extent to which the aviation rulemaking committee came to any meaningful recommendations on commuting practices within the industry. In addition, I am interested to hear from the FAA how the proposed rule specifically addresses risks posed by irresponsible commuting.

While it is far too soon to have a comprehensive analysis of the proposed rule—it was published only 2 days ago—I am interested in hearing from the witnesses their initial reactions to the agency's proposals and would like to hear from the witnesses ideas for how to improve the rule and effectively address fatigue issues.

Thank you all for being here today and for participating. I look forward to your testimony.

Mr. COSTELLO. I thank the Ranking Member for his opening statement and remarks.

Now the Chair will recognize the gentlelady from Texas, Ms. Johnson, for an opening statement or remarks that she may have.

Ms. JOHNSON OF TEXAS. Thank you very much, Mr. Chairman.

And let me say that it certainly has been my pleasure for both of you to be the leaders of this Committee. It has been a rather delightful experience to have both of you. And I know that aviation safety oversight is one of the core responsibilities of this Subcommittee, and I commend you for your focus on ensuring that the FAA, the airlines, the pilots and inspectors all do their part to meet and maintain high safety standards.

Today's hearing focuses on a specific and critical safety issue, the flight and duty time for pilots. As we all know, this issue has been debated for many years and has been on the National Transportation Safety Board's most-wanted list of transportation safety improvements since 1990.

I share concerns with pilots in my district in particular that while the preamble of the rulemaking acknowledges that time on task is a major factor of fatigue, the rulemaking allows for an increase of time on task in a majority of scenarios. I look forward to hearing what our witnesses have to say on the proposal and any suggestions they might have for us.

So I thank you, Mr. Chairman and our Ranking Member, and I look forward to continuing to work with both of you, especially on this critical transportation safety initiative.

I yield back.

Mr. COSTELLO. The Chair thanks the gentelady for her kind comments and for her service and contribution that she makes to this Subcommittee.

The Chair at this time will recognize our witnesses. I will introduce the panel. The honorable Margaret Gilligan, who is the Associate Administrator for Aviation Safety with the FAA; Dr. Gregory Belenky, who is a research professor and director of the Sleep and Performance Research Center at Washington State University; Captain John Prater is the president of the Airlines Pilots Association, International; Mr. Stephen Alterman, who is president of the Cargo Airline Association; Mr. A. Oakley Brooks, president of the National Air Carrier Association; and Mr. Thomas Hendricks, vice president of operations and safety, for the Air Transport Association of America.

TESTIMONY OF THE HONORABLE MARGARET GILLIGAN, ASSOCIATE ADMINISTRATOR FOR AVIATION SAFETY, FEDERAL AVIATION ADMINISTRATION; GREGORY BELENKY, M.D., RESEARCH PROFESSOR AND DIRECTOR, SLEEP AND PERFORMANCE RESEARCH CENTER, WASHINGTON STATE UNIVERSITY; CAPTAIN JOHN PRATER, PRESIDENT, AIR LINE PILOTS ASSOCIATION, INTERNATIONAL; STEPHEN A. ALTERMAN, PRESIDENT, CARGO AIRLINE ASSOCIATION; A. OAKLEY BROOKS, PRESIDENT, NATIONAL AIR CARRIER ASSOCIATION; AND THOMAS L. HENDRICKS, VICE PRESIDENT, OPERATIONS AND SAFETY, AIR TRANSPORT ASSOCIATION OF AMERICA, INC.

Mr. COSTELLO. I would advise our witnesses, your entire statement will be entered into the record. We would ask you to summarize your testimony so that we allow enough time for questions. As I said, we expect to be interrupted here very shortly, but I hope to get to some of the witnesses.

First, before I call on the honorable Margaret Gilligan, the Associate Administrator for the FAA for Aviation Safety, let me say that I want to commend you in the job that you are doing at the agency and, as I said in my opening statement, the Administrator and the Secretary for acting.

I will note that, and I have said many times in this Subcommittee, that oftentimes the FAA acts only after this Subcommittee holds hearings, roundtables and brings issues to the forefront. And as I mentioned in my opening statement, we have held safety hearings. We have held roundtables on the issue of fatigue, and the rulemaking has been pending for too long. So I commend the agency for acting and look forward to hearing your testimony.

The Chair now recognizes Ms. Gilligan.

Ms. GILLIGAN. Thank you, Chairman Costello and Congressman Petri and Members of the Subcommittee. Thank you for inviting me to appear before you this morning to discuss the FAA's efforts to mitigate the impacts of pilot fatigue in order to enhance aviation safety.

Fatigue-related issues have been the highest priority for Secretary LaHood and Administrator Babbitt. And with their strong support as well as input from the aviation and scientific commu-

nities, last week FAA published a notice of proposed rulemaking that changes the current flight and duty regulations. The proposal would establish a single scientifically-based regulatory approach for all Part 121 operators.

Unlike the existing requirements, which limit flight hours and require set rest periods across-the-board, the proposed regulations vary the requirements, depending on the nature of the operations conducted during the flight and duty periods.

As this chart illustrates, which we have up on the wall, the hours of duty permitted will depend on a number of factors, including the number of segments operated and at what time of day they are operated. It just makes sense that a pilot would become more fatigued conducting multiple takeoffs and landings.

Additionally, if the operation crosses multiple time zones, the resulting fatigue could be compounded, so that should be a limiting factor. Finally, if the operation was conducted at night rather than during the day, the duty period should be shortened to compensate for increased fatigue.

We think this varied approach is more tailored than the current one-size-fits-all regulation and adjusts appropriately based on the scientific factors we know can impact fatigue.

We also think it is important that pilots and airlines better understand those scientific factors, because it may often be the case that pilots don't even recognize that they are fatigued. The proposal would require that all Part 121 pilots, as well as individuals who schedule and manage those pilots, receive initial training and annual recurrent training on fatigue. This training would focus on how to recognize the symptoms of fatigue and how to mitigate them.

The proposal clarifies that fatigue, just like being sick or taking certain over-the-counter medications, is related to the pilot's fitness for duty, and it establishes that the responsibility for determining whether a pilot is fit is a shared responsibility.

First, we propose that pilots be given additional time for rest, at least 9 hours after arriving at the rest location, and then be able to report fit for duty.

Before the flight departs, we propose that each flight crew member will have to sign the flight release attesting to his or her fitness for that flight.

We propose to make it a company responsibility to know how the crew members get to work and consider that in assigning schedules.

And finally, we propose to make it incumbent on individuals working with the pilot to inform the airline if they believe the pilot is fatigued or otherwise unfit for that flight.

It is FAA's responsibility to develop and implement a regulatory framework that ensures adequate rest for pilots. It is the airline's responsibility to schedule its pilots in accordance with that framework, and it is the pilot's responsibility to report for duty in a fit condition.

To better ensure that all parties are accepting and performing those responsibilities, the proposal contains an oversight provision. We propose to require the carrier to compare its schedule to actual flight times every two months and report those results to the FAA.

Based on this data, if we see that a pilot is assigned a flight that is scheduled to last, for example, for 5 hours, but the flight routinely lasts longer, the airline must adjust its assignments to reflect the actual flight time for that flight. In this way, pilots cannot be working within the regulatory limits on paper but not in reality.

The airline scheduling reliability must be at 95 percent overall and 80 percent for specific flight pairings, or adjustments will have to be made. We think this feature of the propose is a good incentive for all the parties to live up to their shared responsibility.

Aviation would not enjoy the safety record it has if the hard-working professionals in both government and industry did not take our jobs very seriously. I want to commend everyone who helped us shape this proposal. Many are members of this panel today, and I appreciate that they did not give up just because this was very hard to do.

I look forward to what I am sure will be robust debate on the proposal that we have made, and I am happy to take questions at this time.

Mr. COSTELLO. The Chair thanks you and now recognizes Dr. Belenky.

Dr. BELENKY. Chairman Costello, Ranking Member Petri, Members of the Committee, thank you for the opportunity to testify.

I am reprising the presentation that I gave to the aviation rule-making council (ARC) last summer to set the stage for everybody on the ARC having equal knowledge about sleep science.

Sleep sustains performance and well-being. We know that. We experience it every day. Sleep is consolidated in the late evening hours and the early morning hours, and that consolidation is because of the circadian rhythm in body temperature, performance, and sleep propensity.

As body temperature from around midnight falls through six in the morning, sleep propensity grows, the ability to fall asleep and stay asleep, and performance deteriorates. Around 6 in the morning, body temperature begins to rise, rises across the day, peaks in mid to late evening, and performance rides up along with it.

This is very important in considering hours of service regulations, because in the past, these have not considered the circadian rhythm in performance, sleep propensity and temperature.

If you want to see what happens to normal people, a normal person, when sleep deprived, you can bring them into the laboratory and sleep deprive them for long periods of time. In this case, it was 85 hours of sleep deprivation, which is a long time.

And you can see with the red line, there is a linear decrease in performance over that 72 hours in the ability to do useful mental work. But you can also see riding along that linear decline is the circadian rhythm, which modulates this performance decrement.

One of the things that is very useful in conducting scientific work is operational definitions. "Fatigue" we define subjectively and objectively. Subjective people report, "I am fatigued; I am tired." Or we measure an objective decrement in performance. Without an objective decrement in performance, we would be hard put to say fatigue was present under any circumstance.

Fatigue is not the result of sleep loss alone. It is a combination of multiple factors. It is three factors in particular: Sleep-wake his-

tory, that is time awake and sleep loss; the circadian rhythm, which I just discussed, time of day; and, very important, workload, which is time on task, task complexity, task intensity, workload. So these three things singularly and in combination cause fatigue.

In the next slide, and my last slide, is experimental data showing the interaction of these three fatigue-producing factors. This is a study of 50 normal volunteers brought into the laboratory and deprived of sleep for 40 hours. You can see overall, from day one to day two, there is a downward trend in performance. You can also see that during the window circadian low, during the minimum of the circadian rhythm, that performance degrades even more than it does simply because of time awake with some subsequent recovery.

The test of performance is a 10 minute test, and you can actually measure performance each minute, and you can see time-on-task effect over 10 minutes even in the well-rested condition. And the time on-task effect is amplified by extended wakefulness and by being in the circadian low.

It is this complex interaction between time awake, time of day, and workload, that we are trying to manage to reduce fatigue risk, to reduce the risk of error, incident and accident. And this is the focus of the current NPRM and the accompanying advisory circular on fatigue risk management.

Thank you all very much. I would be happy to entertain any comments and questions.

Mr. COSTELLO. The Chair thanks you and now recognizes Captain Prater.

Mr. PRATER. Thank you for giving me the opportunity to be here today to present the views of the Air Line Pilots Association, International.

It is difficult to overstate the importance of combating pilot fatigue to ALPA's nearly 53,000 members who fly for 38 airlines in the United States and Canada.

Airline pilots owe a debt of gratitude to this Committee, to you, Mr. Chairman, and to Chairman Oberstar and the Ranking Members Mica and Petri, and to every Member of this Subcommittee. You have championed desperately needed improvements to our country's outdated and ineffective flight and duty time limits and minimum rest requirements.

Your efforts came to fruition on August 1st when the President signed your bill, H.R. 5900, into law. This law played an essential law in last week's release of a notice of proposed rulemaking.

In addition, ALPA applaud Secretary of Transportation Ray LaHood and FAA Administrator Babbitt. This proposal would not exist without their leadership and commitment.

Our union has long pursued modern, science-based flight and duty time and minimum rest regulations that would apply to all airline pilots, regardless of the size of the equipment they fly or whether they carry cargo or passengers.

In 2007, we created a blue-ribbon panel on pilot fatigue to review the science of fatigue and recommend an action plan for the union. In 2009, ALPA adopted a landmark pilot fatigue policy. Last year we co-chaired and were represented by seven pilots on the FAA's

flight and duty time limitations and rest requirement arc. ALPA is very pleased that the FAA has released a regulatory proposal.

Guided by ALPA's policy, our union's flight time and duty time committee is carefully reviewing the NPRM and advisory circulars. The committee includes ALPA pilot safety experts from the range of pilots of Part 121 flying, including regional, domestic, international and cargo operations.

While ALPA looks forward to submitting our full comments to the FAA, I would like to offer some initial observations about this proposal. We are very encouraged by many aspects.

First, the proposal appears to apply scientific principles and recognizes human physiological limitations with increased minimum rest periods and more reasonable duty days, and it does recognize the effects of circadian rhythms on fatigue. The proposal applies to all FAR Part 121 flying, and would eliminate carve-outs for supplemental operations.

It incorporates FAR Part 91 tag-on or ferry flights within flight and duty time limitations.

The proposed rule requires fatigue education and training on a recurring basis at all airlines and provides for implementation of a fatigue risk management system.

The NPRM mandates that all flight crew members report rested and fit for duty and establishes that fitness for duty is a joint responsibility of the flight crew member and the airline.

The proposal requires airlines to accurately record and set scheduled flight and duty time periods based on actual operations and to make adjustments if unreliable scheduling is used. It makes the decision to extend the duty period a joint responsibility of the pilot in command and the airline, and it further limits the number of times the duty period may be extended for a flight crew.

The proposal also requires positioning of crew members or deadheading to be counted as duty. And, finally, the NPRM specifically recognizes reserve or standby duty.

All these factors mark important progress. Our union has, however, found several areas in our preliminary analysis in which the NPRM does not adequately reflect the ARC's recommendations.

One, the NPRM does not ensure that the length and quality of rest after a long-range flight across multiple time zones will be sufficient before the next flight and duty period.

Two, we have concerns that the application of the augmented flight and duty period table will not adequately address the circadian disruption that the flight crew member may experience during certain types of long-range flying.

And three, the proposal does not assess the effects of increasing the amount of flight time in a duty period up to 10 hours.

After many attempts and many years and staunch advocacy by ALPA and others, the FAA has developed a proposed rule that has the potential to make significant improvements in flight and duty regulations and to create a safer system for passengers, shippers and all who depend on air transportation.

The law now requires the FAA to publish new pilot flight and duty time rules no later than July 31st of next year. We know that this Committee will be watching the agency closely to ensure that it meets the deadlines, and we guarantee, so will we.

Thank you.

Mr. COSTELLO. The Chair thanks you, Captain Prater, and now recognizes Mr. Alterman.

Mr. ALTERMAN. Thank you, Chairman Costello, Ranking Member Petri, Members of the Committee.

My name is Steve Alterman, and I am the president of the Cargo Airline Association. The members of our association are the United States All Cargo Carriers, providing both express and traditional heavy freight service to shippers around the world.

Both individually and as an association, members of our industry agree that pilot fatigue is a legitimate safety issue and important safety issue and that the reexamination by the FAA is both necessary and appropriate and overdue.

The notice of proposed rulemaking issued by the FAA and published in the Federal Register on September 14th provides the vehicle for the ongoing effort to craft a rule that increases safety while at the same time ensuring that the airline industry can continue to serve its customer base. We appreciate the opportunity to address these issues today.

At first blush, the NPRM appears to raise the relevant issues and actively solicits industry input. However, since this exceedingly complex rule was only published earlier this week, we are not yet prepared to comment in detail on its provisions. We will, however, offer some comments on the approach to addressing pilot fatigue.

First, although an integral member of the aviation community, our unique segment of the industry is substantially different from other participants in the air transportation marketplace. Unlike passenger carriers, all cargo carriers regularly operate long-haul international flights, traveling across multiple time zones during nighttime hours.

All cargo carriers also operate around the world in all directions and don't traditionally run turnaround service to international destinations. Service is often provided to remote, often hostile destinations, often for mission-critical flights on behalf of the military.

Because of the industry's unique operations, all cargo crews have longer and better opportunities for rest during a duty period. Indeed, companies have invested millions of dollars to provide lie-flat sleeping facilities at domestic hubs to provide flight crews sleep and to mitigate fatigue at those hubs. Similarly, industry members have substantial investments in high-quality rest facilities aboard long-range aircraft.

All cargo flight crew matters, as a matter of fact, make fewer annual takeoffs and landings and fly substantially fewer hours now than their passenger counterparts.

Why are these and other distinctions important? Simply because they demonstrate that the United States air transportation industry is not a unified whole, but rather consists of separate segments with different operational needs.

In turn, while everybody in the industry, both companies and employees, strive for the highest level of safety, the means for achieving this safety level should be tailored to the unique operations of the industry components.

As FAA Administrator Randy Babbitt has noted at an ALPA safety forum, "In rulemaking, not only does one size not fit all, but

it is unsafe to think that it can.” This principle is especially important if in the context of pilot fatigue. In crafting a new regulatory scheme to address the legitimate safety concerns, the FAA should recognize these differences inherent in the all-cargo operations and craft a scheme that is consistent with those differences.

I want to comment just briefly on the process thus far, and I think it goes to some of the comments made in the opening remarks, and that is that the ARC process which the cargo airline participated in fully concentrated almost entirely on the hour and service issue and very little on the commuting issue.

It seems to us that when you are trying to figure out how to craft new rules, the first thing that should be done is find out what the cause of the problem is and then craft the rules to address those problems. And we felt fairly strongly that there was an over-commitment to the flight and duty time aspect and not enough time spent on the commuting issue, and we felt that that was one of the problems with the ARC as it was constituted.

Finally, I would like to comment just briefly, because our industry took this process very seriously. We didn’t ignore the flight and duty time issue. We actually put in to the ARC, and it was submitted to the FAA later, a comprehensive proposal dealing with flight and duty time. That proposal recognized the differences between international and domestic operations, established limits where no limits currently exist, accounted for time-of-day operations, addressed the crossing of multiple time zones, reduced the flight duty periods for domestic and international operations from those in current regulations, and increased the required rest periods for domestic and international operations.

I mention that because, in spite of the fact that we felt there was too much concentration on the flight and duty time and not enough on commuting, we did take our responsibility seriously and did put that proposal in. A copy of the summary of that proposal is attached to our written testimony.

Thank you very much. I would be happy to answer any questions.

Mr. COSTELLO. The Chair thanks you and announces to Members, we have less than 2 minutes to get over to the floor for three votes. So the Committee will stand in recess until 12:15. We would ask that the witnesses be in their chairs at 12:15.

The Committee stands in recess.

[Recess.]

Mr. COSTELLO. The hearing will come back to order. And we will recognize Mr. Brooks.

Mr. BROOKS. Good afternoon, Chairman Costello, Ranking Member Petri, and Members of the Subcommittee. National Air Carrier Association appreciates the opportunity to testify before the Committee on Transportation and Infrastructure’s Subcommittee on Aviation. All NACA members are certificated to fly under part 121 of the Federal Regulations.

Our nonscheduled passenger and all-cargo airlines, which are the bulk of NACA members, fly when their customers demand, to all points of the globe. Notice that prospective flights is usually measured in days or weeks. NACA carriers fly 95 percent of all military passengers and 40 percent of all military cargo under the Civil Re-

serve Air Fleet Program administered by the Air Force's Air Mobility Command. Notice for these flights to Afghanistan, Iraq, Kuwait, and other points is usually 3 weeks or less.

NACA has participated in every flight and duty time review over the last 20 years. We were a member of the Aviation Rulemaking Committee in 2009, and submitted comments and recommendations. We believe changes should be made.

FAA released its notice of proposed rulemaking this past Friday. It is too early for a detailed analysis of the NPRM, but there is one proposal in the notice we want to highlight today.

Nonscheduled airlines currently operate under Subpart S of Part 121, which is specifically referrals to nonscheduled operations. Subpart S already has many fatigue mitigation principles incorporated to permit often unpredictable flights and longer flight duty periods. For example, in the same domestic environment as scheduled operations, if nonscheduled fly a pilot more than 8 hours in a 24-hour period, we must give the pilot 16 hours of rest compared to only 11 hours' rest for scheduled carriers. These rules were put in place to recognize the distinct differences between scheduled and nonscheduled airlines and the nonregular services nonscheduled airlines provide.

It is an interesting fact that nonscheduled airlines regularly allow for even greater sleep opportunities, both before and after flight duty, than required in Subpart S for the NPRM. This is to provide an extra layer of safety for their crews. And we are offering to adjust future regulations based on these facts and formal scientifically supported fatigue mitigation programs. But nonscheduled carriers need the flexibility in the regulations to allow longer flight-duty periods.

NACA's comments in the rulemaking committee last fall recommended continuation of Subpart S or equivalent. The just-released NPRM rejected that recommendation, choosing a one-size-fits-all rule, despite Administrator's Babbitt's insistence to a recent ALPA safety forum that one-size-fits-all in a regulatory environment can be unsafe.

The NPRM justifies eliminating Subpart S by saying nonscheduled and scheduled carriers are becoming similar. I respectfully disagree. The two types of carriers are not becoming similar. Scheduled carriers offer scheduled service, and nonscheduled carriers offer nonscheduled service. NACA will be making this and other arguments to FAA in its comments. We believe it represents safety at its highest level and it is in the public interest.

Thank you for allowing me to testify, and I look forward to taking any questions.

Mr. COSTELLO. We thank you for your testimony.

And now the Chair recognizes Mr. Hendricks.

Mr. HENDRICKS. Good afternoon, Chairman Costello, Ranking Member Petri, and Members of the Subcommittee. My name is Tom Hendricks. I recently became the vice president of operations and safety at the Air Transport Association of America.

Pilot duty limit and rest requirements are of the utmost importance. As a captain and professional pilot for nearly 23 years at a major U.S. Airline, I understand the critical importance of safe air-

line operations and the dependencies on crew members who are alert and can respond to the demands of flying commercial aircraft.

Pilots, airlines, and the Federal Aviation Administration each have indispensable roles in achieving our common objective of ensuring adequate rest for crew members. How that objective is achieved is also vital. Appropriate duty limit and rest requirements must be the product of scientific research and operational experience, be effective, and reflect the specific operational environment of each carrier. We must smartly combine data-driven and evidence-based approaches in devising any new regulatory initiatives.

Because ATA and its members recognize the significance of these considerations, we were very active participants in the Federal Aviation Administration Flight and Duty Time Aviation Rulemaking Committee. The FAA chartered the ARC on July 15, 2009 to recommend revisions to the agency's flight and duty time rule. The ARC met this very compressed September 1, 2009 deadline. That achievement was the result of the collaboration and professionalism of those on the committee.

While the ARC was active, ATA, the Cargo Airline Association, and the Regional Airline Association submitted joint recommendations to the FAA for its consideration in the development of the expected Notice of Proposed Rulemaking. These recommendations reflected the diverse operations and experience of mainline, all-cargo, and regional airlines. We express in those recommendations support for a duty-day regulation that appropriately responds to fatigue risks, including circadian cycles, time awake, time on task, and acclimation to time zones. Consequently, our recommendations were generally more restrictive than many duty limit and rest regulations around the world. They will mitigate fatigue risk by reducing the duty time of pilots and expanding the amount of time for scheduled rest opportunities to assure adequate rest.

Last Friday, the FAA released its Flight and Duty Time NPRM. We want to compliment Administrator Babbitt and Associate Administrator Gilligan in shepherding the proposed rule. ATA and its members have not finished reviewing that lengthy and comprehensive document. We will fully respond to the NPRM in the comments that we file in the docket.

In the meantime, however, the concepts that we outlined last year in our joint recommendation indicate the principles that we believe should be embodied in any change to the FAA regulation. In essence, they are as follows:

The new regulation should require each air carrier to adopt an FAA-approved fatigue mitigation program that contains the carrier's fatigue mitigation policies and training programs. Means of compliance are now outlined in the recently released FAA advisory circular 120-123, which offers more detail and explanatory background than could be included in the proposed regulation. This process will provide flexibility for updating and modifying airline fatigue mitigation programs as needed. In addition, the regulation should recognize the wide array of air carrier operating environments.

While the goal for all of us is one level of safety, this does not mean that it is not accomplished by one form of regulation. Any new regulation must account for a wide variety of operations, just

as it does today. Nothing in fatigue and sleep research suggests the need for a one-size-fits-all regulation. Indeed, science recognizes that individual differences and operational contexts affect performance. Science-based guidelines, judiciously blended with decades of operational experience, will allow the various air carrier models to continue to operate with the highest degree of safety for crew members and passengers.

The regulation should clearly state that the crew member is responsible for properly preparing for flight during the prescribed opportunity for rest. Expressly stating this responsibility will help address pilot commuting issues and will establish a framework from which a carrier can develop fatigue policies.

Finally, any new regulation must confine itself to demonstrably necessary safety-related requirements and avoid issues appropriately left to resolution in the collective bargaining process.

ATA and its member carriers recognize the importance of this issue. We look forward to participating in the rule making proceeding.

Mr. COSTELLO. The Chair thanks you, Mr. Hendricks.

Let me begin with a question for all of our witnesses. Does anyone on the panel disagree that pilot commuting time should not be considered or should be considered? So, in other words, do you all agree that it should be considered, the commuting time in the rule? Anyone disagree with that? OK.

Ms. Gilligan, you state that there was consensus on many issues, but there were a handful of issues that the ARC did not reach a consensus on. I wonder if you might elaborate on the issues that there was not a consensus.

Ms. GILLIGAN. Yes, Mr. Chairman. Fundamentally, the ARC agreed on the set of issues that needed to be addressed. They understood, based on Dr. Belenky and other scientists who worked in this area, that there were factors to be considered. They agreed to the concept of a sliding scale, much like the chart that I shared early on, but they didn't reach agreement specifically on how many hours of flight time and duty time and rest time should actually be proposed. And so that came back to the FAA to take into account all the various proposals that you have heard many testify about here, and taking that into account, given the science, to actually draw up the charts that you see in the rule to set specific times for those three elements of the rule.

Mr. COSTELLO. Captain Prater, on page 6 of your testimony, you offered it in your oral testimony today, that there were three issues in particular that you identified, a few areas in which the NPRM does not adequately capture the ARC's recommendations. And one is ensuring the length and quality of rest. I wonder if you might elaborate on all three points.

Mr. PRATER. Certainly. The first major change is the proposal to go from 8 flight hours to 10 flight hours during the daytime. So, on its surface, that is something you have to look at very closely. Obviously, combined with reducing the duty day from 16 to 13 hours certainly mitigates that. But that is an area that we believe will warrant further concern. Our recommendation had been to go to 9 hours. Then there is some of the specific issues on the long-haul or ultra long-haul that we believe bear closer scrutiny. How

much rest do you require after a 16-hour flight that crosses 10 to 12 time zones? And we believe that that is an area that will require further work.

Mr. COSTELLO. You also state that there is no rational basis for cargo or charter pilots to have different or more liberal fatigue rules than scheduled passenger operations. I wonder if you might explain that point.

Mr. PRATER. Yes, sir. I would certainly be more than happy to turn to my right here and ask the doctor if there is any difference between human beings that get hired by an employer that flies cargo with airplanes versus one that flies passengers. I have done all. And I can tell you that the human beings that are pilots makes no difference to your fatigue level on what your mission is, whether you are flying cargo or whether you are flying passengers. And the fact that over 40 years there have been carve-outs because of economic reasons, that is what we ask to end today, and we believe that this proposal does a good start on that.

Mr. COSTELLO. Dr. Belenky, would you agree with Captain Prater?

Dr. BELENKY. Mr. Chairman, yes, I would.

Mr. COSTELLO. Very good. The Chair now recognizes the Ranking Member for any questions that he might have.

Mr. PETRI. Thank you very much, Mr. Chairman. I maybe would ask the associate administrator, Margaret Gilligan, a little bit about the implications of the rule or how to kind of think about it.

I understand that the briefings and so on, as people were discussing the proposal, the rule would make it longer, take longer—when implemented—to accomplish the same number of flights. Do you have any estimate as to how many more pilots would be required for the industry as a whole under the new rule as opposed to currently?

Ms. GILLIGAN. Yes, sir. In our economic analysis, we do address those issues. We believe the flight time will be covered in two ways: It is likely that current pilots will end up flying more days to fly the same number of flight hours. And, as I think you know, their pay is linked to flight time as well as to time on duty. So some of it, the schedules will have to be moved out a little bit to fit the same number of flights for the pilot to fly the same number of flight hours. But right now, the estimate is about 2,300 pilots would need to be added to cover the current schedules.

Now, of course, there will be optimization of scheduling and those kinds of things that may affect that, but that would be a fairly large increase. It is about a 3 percent increase in the pilot ranks. But that would happen very early on, right after the effective time of the rule, so it is a fairly condensed time for that additional cost.

Mr. PETRI. And as part of your analysis, did you make kind of a—I don't know if it would be a back-of-the-envelope or more sophisticated—some sort of an estimate as to the cost to the society of these changes?

Ms. GILLIGAN. Yes, sir. Again, we have done a detailed cost-benefit analysis as is required by the rulemaking process. And the cost estimates for what we call present value, which is an easier comparable number, is about \$800 million in cost. And, depending on how economists value the lives that would be saved by reducing

those risks, the benefits are I believe between \$400 million and \$600 million. So the benefits, we believe, justify the cost in this rule, and that is why we have gone forward with the proposal.

Mr. PETRI. Now, you can tell from the other people testifying on the panel and from the comments that have been made about the rule, there is some tension about how the rule applies to different segments of the aviation industry, scheduled and nonscheduled and charter and so on, human flight and packaged flights.

Did you consider, or what is the reason for having kind of an overall framework rather than a differentiated approach, depending on the requirements of that industry? And do the costs fall disproportionately on different segments of the industry?

Ms. GILLIGAN. I think, as you have heard Dr. Belenky explain so well, the dilemma that we face in developing this framework is that, at the end of the day, all pilots are humans and all humans react to fatigue the same way. So the fact that I might have a job that is an overnight job doesn't change the way I physically react to fatigue. And what we have tried to balance here is what we know about what it is that contributes to fatigue against the hours that someone can be available to operate.

There are two specific elements in the proposal, however, I think, to go to some measure to address the concerns of Mr. Alterman and Mr. Brooks. We have permitted what we call split duty. That is, as Mr. Alterman described, there are many cargo operators who run a hub operation; and once the pilots arrive, they then provide them very comfortable accommodations to rest during the time that the packages are being moved through the hub facility, and we have credited that additional rest and allowed them then to extend some operational time based on that rest.

We have also specifically exempted, to Mr. Brooks' concern, those flights that support critical U.S. missions around the world that may have a crew end up in a very unsafe location where we would permit them to move to a safe location. Now, we want reporting on that, we want to monitor it and make sure it is not being abused, but we are very mindful of the concerns as that might affect those military missions.

And, again, it is a proposal. We are looking for comments on the elements we have included. We will certainly consider other elements that meet the safety and scientific needs, but that can help us adjust the proposal.

Mr. PETRI. I realize my time is up. I wonder if I could just ask if Mr. Brooks or Mr. Alterman have any comments to make on how this rule might possibly be modified to take into account the particular nature of the segments of the aviation that you are representing.

Mr. ALTERMAN. Thank you. First of all, I think and I did mention earlier, that I think the structure of the rule is the way to go. I think the FAA has recognized all the elements. The question is how to apply those elements to different segments.

And I certainly couldn't disagree with the answer to Captain Prater's question about whether a pilot cares whether he is flying cargo or passengers. That, I would suggest, is not the right question, however. The question is, if you are hired to fly nighttime rotations for an overnight cargo carrier as opposed to flying an occa-

sional overnight segment or a red-eye for a passenger carrier, why does the scientific matter? Does that do—is there a difference? Can you become acclimated to flying basically nighttime schedules all the time? And I am not sure that I have seen any scientific studies that deal with that issue.

So what we are urging is, before we jump in and start limiting nighttime flying drastically—and we have suggested limiting nighttime flying and recognize the validity of circadian rhythms—that we get more information on that and find out whether, for instance, a FedEx or a UPS pilot can acclimate himself because they are flying that one rotation.

And I do applaud the FAA and Ms. Gilligan's comments that they have tried to recognize distinct operations in certain areas, and split duty is certainly something that we appreciate, because of all of our members provide, when a cargo carrier gets to a hub, facilities to get rest while the cargo is being sorted and before he goes out again. So I think that was a very good provision.

Mr. BROOKS. Mr. Petri, let me make a couple comments to start. The nonscheduled carriers, generally the crews operate about 50 hours a month, which is far fewer hours than scheduled carriers operate. And they also operate on very short notice, as I mentioned, to distant parts of the globe, which it is very difficult to set up crew bases—almost impossible to set up crew bases and other situations such as that that scheduled carriers have.

We also applaud the FAA and the whole process for bringing in the additional science, considering circadian law, numbers of stops, nighttime flying, and we agree that those are very important elements that should and will be introduced into the whole process of setting hours.

I would tell you, and I am repeating what I had in my testimony, and it coordinates with the number of hours that our pilots fly, that in order to make up for the long flights that nonscheduled carriers often have to fly, our airlines regularly schedule longer sleep opportunities, both before and after flying, than are either required in the regulations or are normal for scheduled carriers.

And our review with Dr. Graeber, who assisted us on this analysis, is that if you are able to combine long flying with long sleep periods in a responsible way, that provides the rest and the sleep necessary for the crews to become ready for duty again. And that is a critical element which we emphasize over and over again.

And finally, just to pick up Ms. Gilligan's point about flying into unsafe areas, we certainly recognize that and the move that the FAA made and the NPRM to address that. What we need more discussion about is how it would work in practice. Are these going to be one-off trips? There is a reporting requirement at the end?

And so these are the sorts of things that we need to get into more. But we do recognize that mitigation opportunity that the FAA discussed in the NPRM, and we look forward to getting into that more. Thank you.

Mr. COSTELLO. The Chair thanks you and thanks the Ranking Member, and now recognizes the gentleman from Ohio, Mr. Bocchieri.

Mr. BOCCIERI. Thank you, Mr. Chairman. And first let me applaud Mr. Babbitt and the FAA for finally taking this up. I know

the NTSB has been at the heels for some time to develop a program of such. I just have a few quick questions.

And, Mr. Chairman, I would like to submit for the record—I have copies of the Air Force crew rest periods and crew duty times, and we can submit that for the record. It is referenced in Air Force Volume 202, Volume 3—11-202, Volume 3. And they describe crew rest. When you are done, the propellers stop turning, you walk out the door, 45 minutes after that is when your crew rest begins. Now, that gives you 12 hours of crew rest period where you have time to go get a meal, where you have time—there have been delays. I have been on the back end of a clock where there are problems with the hotel, the ride may not show up on time. So right now the FAA has been prescribing that that be raised from 8 to 9 hours.

[The information follows:]

BY ORDER OF THE
SECRETARY OF THE AIR FORCE



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C-130 AIRCREW TRAINING

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This volume implements AFPD 11-2, *Aircraft Rules and Procedures*. It establishes the aircrew training policy for C-130 aircrews to safely and successfully accomplish their worldwide mobility missions. Capability requirements for the vast majority of C-130 platforms include: airland or airdrop personnel, equipment, and supplies; medical evacuation of casualties; assault airland operations to 3000' unimproved landing zones; employ in visual, instrument, and night-vision goggle (NVG) combat environments from low, medium, or high altitude in formation or single ship using tactics, techniques and procedures as defined in AFTTP 3-1.25, *Tactical Employment, C-130E/H*, AFTTP 3-3.25, *Combat Aircraft Fundamentals - C-130*, and AFI 11-2C-130 Volume 3, *C-130 Operations Procedures*. The C-130 is a diverse aircraft (includes C-130E, C-130H, C-130H1, C-130H2, C-130H3, LC-130 and WC-130) tasked with performing a variety of missions. It demands a robust and flexible training program allowing commanders to train to capability requirements while meeting operational demands. This AFI provides the foundation for building a C-130 combat capable aircrew. Ultimately it is the responsibility of the Operations Group Commander to ensure that training profiles are relevant to meeting the needs of the combat environment. (Note: Aeromedical Evacuation Crewmembers see AFI 11-2AE, Volume 1, *Aeromedical Evacuation Aircrew Training*). Submit suggested improvements to this instruction on AF IMT 847, **Recommendation for Change of Publication**, through training channels to HQ AMC/A3T, 402 Scott Drive, Unit 3A1, Scott AFB, IL, 62225-5302.

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SUMMARY OF CHANGES

This interim change clarifies Continuation and Mobility Training Requirements, including moving Small Arms Training from Table 4.1. to Table 4.2., provides further guidance for certain crewmembers who are NMR for Hazardous Cargo or NVG Ground Refresher Training, realigns and implements additional Qualification and Certification (Q) Training Events, and updates the OPR for this AFI. Changed items are indicated by a bar (|).

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Chapter 1

GENERAL

1.1. Training Objective. This instruction prescribes basic policy and guidance for training United States Air Force C-130 crewmembers according to AFI 11-202 Volume 1, *Aircrew Training*. The overall objective of the aircrew training program is to develop and maintain a high state of mission readiness for the immediate and effective employment in exercises, peacekeeping operations, contingencies, and war. If a conflict is identified for a training requirement other than ancillary training, comply with the requirements of this AFI and notify the OPR (see paragraph 1.3.1.). If a conflict is identified for an ancillary training requirement, comply with the guidance in AFI 11-202 Volume 1.

1.2. Key Words Explained.

1.2.1. "Will" and "shall" indicate a mandatory requirement.

1.2.2. "Should" is normally used to indicate a preferred, but not mandatory, method of accomplishment.

1.2.3. "May" indicates an acceptable or suggested means of accomplishment.

1.2.4. "Note" indicates operating procedures, techniques, etc., which are considered essential to emphasize.

1.3. Administration.

1.3.1. Supplements. This AFI is a basic directive. Each MAJCOM or operational theater may supplement this AFI. MAJCOM supplements may be more, but not less restrictive than this instruction. MAJCOMs may set training requirements lower than specified in this instruction when the statement "or as specified in MAJCOM supplement" is indicated as applicable to that item or event. MAJCOM supplements will be coordinated/approved by HQ AMC/A3T and HQ AF/A3OT before publication. Send one copy to HQ AMC/A3T and one copy to HQ AF/A3OT (after publication). Air National Guard (ANG) is considered a MAJCOM for purposes of this instruction (Ref AFI 11-202 Vol 1.)

1.3.2. Local Training Procedures. Wings or groups may publish local training guidance; however, units may not change AFI guidance except where noted. Units will send one copy of their local training procedures to the parent MAJCOM Training OPR.

1.4. Responsibilities. AFI 11-202, Volume 1 outlines responsibilities for aircrew training.

1.4.1. Lead Command. Air Mobility Command (AMC) is designated lead command for the C-130 Mission Design Series (MDS) combat delivery aircraft according to AFPD 10-9, *Lead Operating Command Weapon System Management*, AFPD 11-2, and AFPD 10-21, *Air Mobility Lead Command Roles and Responsibilities*. Lead command is responsible for establishing and standardizing aircrew flying training requirements in coordination with user commands. HQ AMC/A3 delegates to HQ AMC/A3T the authority to manage all training course requirements and training tasks. AMC/A3T, in coordination with user commands, approves/fields continuation training requirements or adjustments, and fields short-notice specialized local upgrade courses (e.g., NVG Assault, etc.). AMC/A3T is OPR for this AFI.

1.4.1.1. Courses. AMC/A3T, in coordination with Training and User commands, approves continuation training and locally taught upgrade courses.

1.4.1.2. Realistic Training Review Board (RTRB). HQ AMC/A3T will host a RTRB biennially, or more frequently, as required. The RTRB reviews all training programs for currency, applicability, compliance, and effectiveness. Attendees should include representatives from AMC, ACC, AETC, AFMC, AFRC, AFSOC, ANG, PACAF, USAFE, and ATS instructors, as applicable.

1.4.1.3. AMC/A3T Detachment 3 AMCAOS (AMC Air Operations Squadron) is located at Little Rock AFB, AR. It provides the government oversight of the C-130 Aircrew Training System (ATS) contract and consists of three divisions: Simulator Certification, Curriculum Management, and Quality Assurance.

1.4.1.3.1. Detachment 3 conducts Simulator Certification (SIMCERT) on all aircrew training devices (ATDs) according to AFI 36-2251, *Management of Aircrew Training Systems*, or when necessary, ATD Modification and Configuration Change guidance. SIMCERT includes testing, inventory inspections, Quality Assurance Issues (QAI) and contract compliance evaluations.

1.4.1.3.2. Through close coordination with the ATS Program Manager and responsible contracting officer, Detachment 3 Subject Matter Experts (SMEs) provide C-130 ATS contractor oversight through courseware audits, instructor evaluations, and courseware quality assurance. Det 3 Curriculum Management ensures services provided by the C-130 ATS contractor comply with contractual requirements and guidelines. Det 3 Curriculum Management ensures courseware improvement through regular involvement in the Courseware Configuration Working Group (CCWG) and ensures formal school and continuation training instructional quality through regular site audits. This function is in the process of transferring to 314 OSS at Little Rock.

1.4.1.3.3. Detachment 3 provides day-to-day C-130 ATS contract administration and oversees Configuration Management (CM), Logistics, and Engineering practices. It ensures continued Government control of all baselines and provides product acceptance recommendations for the Government to the Program Manager (PM). Detachment 3 develops and maintains the Quality Assurance Surveillance Plan (QASP) and is the central collection point for Quality Assurance (QA) data. It conducts formal technical reviews, including Functional Configuration Audits (FCA) and Physical Configuration Audits (PCA), and reviews Engineering Change Proposals (ECP) and Contractor Plans. The 314 OSS/OSTQ provides program level quality assurance for curriculum.

1.4.2. Training Command. AETC/A3 is responsible for formal school syllabus and is the approval authority for changes in coordination with lead and user commands according to AFI 11-202 Volume 1. AETC/A3 designates AETC/A3F to oversee formal school courses and syllabus management in coordination with the lead command and ATS contractor. Formal school syllabi are available at AETC bookstore: <http://trss3.randolph.af.mil/bookstore/>. AETC/A3R develops and publishes the PFT in accordance with the HQ AF/A3OT Flying Training CONOPS (see paragraph 1.14.2.) and allocates and manages training quotas within the formal school capacity.

1.4.2.1. Progress Review (PR). See AFI 11-202, Volume 1. AETC will notify the student's gaining unit of PR action. If the PR recommends a Flying Evaluation Board, AETC will notify the student's gaining MAJCOM.

1.4.2.2. AETC maintains a list of formal school courses in the Education and Training Course Announcement (ETCA). The site address is: <https://etca.randolph.af.mil/>.

1.4.3. User Commands.

1.4.3.1. Student Management. MAJCOM training staff will manage student training according to paragraph 1.14.2.1..

1.4.3.2. Recall Procedures. Requests to recall students from a formal school course will be sent from the student's MAJCOM to the appropriate training unit, 19 AF/DOM, and HQ AETC/A3R. Emergency recall during non-duty hours may be coordinated directly with the training unit with notification to HQ AETC/A3R on the next duty day.

1.4.4. Wing Commander. WG/CC will ensure unit/local level agencies and facilities support aircrew ground training programs. Host and/or co-located units will develop local agreements to consolidate aircrew training support base-wide.

1.4.5. Operations Groups.

1.4.5.1. The OG/CC (or equivalent) will convene a training review panel (TRP) to be chaired by the OG/CC or a designated representative. Panel members should include representatives from squadron training, formal training unit (FTU), tactics, operations, safety and other areas as determined by the commander (i.e. ATS contractors, HARM and SARM).

1.4.5.1.1. TRP – Requirements. Convene the TRP per calendar semi-annual period and maintain minutes for a period of two years (commanders may increase this frequency as required). Squadrons and detachments not collocated with their OG may conduct their own panel or provide representation to the unit's TRP. Panel minutes from non-collocated squadron and detachment TRPs will be forwarded to the unit for inclusion in the unit's TRP.

1.4.5.1.2. TRP Format. The TRP should review staff and crewmember management actions necessary to complete squadron flight and ground training programs. Suggested TRP topics include, but are not limited to current and forecast Ground/Flight Training Levels, (FTL/GTL), Upgrade and Continuation Training status, Semi-annual requirement completion rates, crew position gains/losses, Aircraft Commander, Instructor and Evaluator upgrades. Units should also review all unit defined training "X" events for relevancy.

1.4.5.2. OG/CC may develop additional training requirements and/or programs as necessary to meet unit mission requirements. Units may include these requirements in a local supplement to this AFI.

1.4.5.3. OG/CC is responsible for establishing and maintaining the academic training program for non-ATS courses (may be delegated to squadron level). The OG (or squadron OPR) will:

1.4.5.3.1. Appoint primary and alternate instructors for each non-ATS course to be taught.

1.4.5.3.2. Publish a ground training schedule (ARC, as required) to include date, time, location, instructor and designated crewmembers for each course (both ATS and non-ATS). OG/CC may specify extra training periods as required.

1.4.5.3.3. Use MAJCOM, ATS, or unit-developed training products and/or syllabus for all courses, as applicable. Units will reproduce courseware as applicable.

1.4.5.3.4. Develop a procedure to monitor the academic training program for course content, currency of materials, instructor availability, and status of training aids. Squadrons should recommend to the commander changes to existing courses or additional academic training courses required, based on crewmember feedback.

1.4.5.3.5. Send recommendations for changes, additions, and deletions of courses through appropriate channels to appropriate MAJCOM with an information copy to HQ AMC/A3T.

1.4.6. Squadrons, Sq/CC or designated representative will:

1.4.6.1. Ensure crewmembers complete in-unit mission, ground, and continuation training programs. Failure to reasonably progress may require action for removal.

1.4.6.2. Before each semi-annual training period, assign Flying Training Levels (FTL), Ground Training Levels (GTL), and levels of qualification (evaluator, instructor, etc.) to assigned and attached crewmembers (see paragraph 4.3.). Assign training levels based on experience and aircraft proficiency.

1.4.6.3. Ensure supervisors complete AETC web-based formal school post-graduate questionnaires. The ATS contractor sends out a notification message via email to the training office POC of the unit, who forwards the email to the appropriate supervisor. The notification message is sent out approximately 90 days after the student graduates. To change the unit POC or gain access to the system, contact the ATS contractor at gradeval@c130ats.net.

1.4.6.4. Ensure adequate training continuity and supervision of assigned and attached crewmembers. Unit commanders may assign additional requirements based on individual crewmember's experience and proficiency.

1.4.6.5. Review training and evaluation records of newly assigned or attached crewmembers and those completing formal training, to determine the training required to certify the individual as Basic Aircraft Qualified (BAQ), Basic Mission Capable (BMC), or Mission Ready (MR).

1.4.6.6. Review qualifications and monitor training requirements for unit-assigned or attached flight surgeons.

1.4.6.7. Execute unit-level aircrew certifications described in this instruction.

1.4.6.8. Ensure flight commanders or designated squadron representative monitor quality of training being accomplished and identify training deficiencies. Advise Sq/CC of additional training needs.

1.4.7. Training Site with ATS Contractor. The C-130 ATS contractor is responsible for academic and aircrew training device (ATD) instruction at the formal schools and specialized training at all USAF C-130 training sites. This responsibility includes developing, updating and publishing courseware and the formal school syllabus in accordance with the ATS contract (see **Chapter 6**).

1.5. Waiver Authority.

1.5.1. Do not deviate from the policies and requirements in this instruction. Report deviations or exceptions without waiver through channels to MAJCOM/A3T (or equivalent) who, in turn, should notify the OPR for follow-on action, if necessary.

1.5.2. Unless specified in this instruction, MAJCOM/A3 or equivalent level is the designated waiver authority for specific crewmember training requirements in this instruction not governed by AFI 11-202 Volume 1 or another AFI. OG/CC's (or equivalent) are designated as the waiver authority for flying continuation training requirements mandated in **Chapter 4** of this AFI. Waivers for training or currency events missed in consecutive training periods will require MAJCOM approval.

1.5.3. OG/CC is designated waiver authority for minimum flying-hour prerequisites for entry into formal upgrade courses (see **Table 5.1.**).

1.5.4. When a student is entered into a formal course, HQ AETC/A3 designates HQ AETC/A3F as waiver authority for AETC flying training syllabus and formal school prerequisites (exceptions see paragraph 1.5.3. and paragraph 1.5.5.). All requests for a syllabus waiver will include supporting rationale. User command training staff should submit prerequisite waiver requests direct to HQ AETC/A3F. All waivers shall be approved before the crewmember departs for formal training. File a copy of all waivers in the trainee's training folder and hand-carry a copy to formal school course.

1.5.4.1. Prerequisites. For formal school course prerequisite waiver requests, see the appropriate formal course in the ETCA.

1.5.4.2. Formal School Training. The formal school OG/CC is designated waiver authority for completion of specific formal school events with the concurrence of the gaining unit's OG/CC.

1.5.4.2.1. If required for squadron's designated mission, accomplish events waived or not accomplished at the formal schools in-unit before assigning mission-ready (MR) status.

1.5.5. In-Unit Training Waiver. MAJCOM/A3T is approval/waiver authority for in-unit training. Provide information copies of any waivers to AETC/A3F and AMC/A3T. Before approval, review the appropriate syllabus and consider availability of ATS formal instruction and ATD requirements.

1.5.6. Senior Officer Course (SOC) Waiver. SOC and syllabus waiver authority is AETC/A3 with concurrence of gaining MAJCOM/A3.

1.5.7. Continuation Training Waiver. The OG/CC (or equivalent) is designated waiver authority for ground and flying continuation training requirements in **Chapter 4** for assigned or attached crewmembers on a case-by-case basis (see paragraph 4.9.). Waivers for training events missed in consecutive training periods will require MAJCOM approval.

1.5.8. Waiver Format. For AMC waivers, use on-line waiver request service on AMC/A3T web site (see paragraph 1.15.). If necessary, submit a written request through OG/CC or equivalent in the format at **Figure 1.1.**, to the appropriate MAJCOM OPR. Units will submit waiver requests according to **Table 1.1.** Place a copy of approved waivers in the individual's training folder. For waivers not requiring a training folder (such as currency), either file in the permanent training folder or OG/CC (or designated unit) will maintain a file copy for two years. For AETC waivers, use AETC IMT 6, **Waiver Request**.

Figure 1.1. Sample Waiver Request Format.

<p>MEMORANDUM FOR (<i>Waiver Authority</i>)</p> <p>FROM: (<i>Requester</i>)</p> <p>SUBJECT: <i>Waiver Request – (Individual), (Type of Waiver)</i></p> <ol style="list-style-type: none"> 1. <i>Name, grade, and Social Security number.</i> 2. <i>Flying organization (assigned or attached).</i> 3. <i>Present qualification (include special qualifications/certifications if appropriate).</i> 4. <i>Total flying time; primary aircraft inventory (PAI) time (include instructor or evaluator time, if applicable).</i> 5. <i>Waiver request specifics e.g., cite requirement and requested deviation.</i> 6. <i>Rationale or justification for waiver request.</i> 7. <i>Crew qualification to which person is qualifying or upgrading.</i> 8. <i>Previous attendance at any formal instructor course (include course identifier and graduation date).</i> 9. <i>Training start date.</i> 10. <i>If waiver request for time limit, specify mandatory upgrade or qualification date.</i> 11. <i>Date event last accomplished and normal eligibility period.</i> 12. <i>Remarks (include formal school courseware that is required if the waiver request is approved (e.g. local training).</i> 13. <i>Unit point-of-contact (include name, rank, telephone number, and functional address symbol, and Email address).</i> 14. <i>Unit address (if requesting formal school courseware)</i> <p style="text-align: right;"><i>(Signature of Requester)</i></p> <p style="text-align: right;"><i>(Title)</i></p>
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Table 1.1. Processing Waivers to AFI 11-2C-130 Volume 1.

If Waiver is Requested by:	Send Waiver Request To	Approval Or Disapproval Will Be Sent To:	With Information Copies To:
Active Duty AMC Airlift Wing or Group	OG Training Office To HQ AMC/A3T	OG Training Office	
USAFE Airlift Wing	OG Training Office To USAFE/A3	OG Training Office	NAF Training Office
Active Duty PACAF Airlift Wing	OG/CC to PACAF/A3T	OG/CC	
AETC FTU (including AFRC/ANG) (Note 3)	OG Training Office To HQ AETC/A3F	OG/CC	19 AF/DOM 22 AF/DOT HQ AFRC/A3TA NGB/A3T AMC/A3T
AFRC Unit (except AETC FTU)	Through 22 AF/DOT To HQ AFRC/A3TA	AFRC Unit	22 AF/DOT
ANG Unit (except AETC FTU)	NGB/A3T	ANG Unit	Gaining MAJCOM/A3T

NOTES:

1. For formal training waiver requests, to include the secondary method, units will submit requests through MAJCOM channels. MAJCOMs will coordinate with AMCAOS Det 3 to arrange courseware delivery to the unit for secondary method training.
2. References to operations groups and wings may be applied to airlift groups; references to operations group training offices may apply to wing-level training offices.
3. AFRC units will send request through 22AF and AFRC/A3TA. AFRC/A3TA will determine if waiver needs AETC/A3F review. ANG units will send waiver to NGB/A3T. NGB/A3T will determine if waiver needs AETC/A3F review.

1.6. Use of Flying Hours.

1.6.1. Structure unit flying training missions to achieve optimum training. Any by-product airlift opportunity resulting from training will not degrade the intended training and will comply with applicable Department of Defense (DoD) Regulation 4515.13R, *Air Transportation Eligibility*, AFI 11-401, *Aviation Management*, and AFI 11-202 Volume 1.

1.6.1.1. It is essential that personnel at every level prevent the misuse of air mobility resources as well as the perception of their misuse when planning and executing training missions.

1.6.1.2. See AFI 11-2C-130 Volume 3 for off-station training flight requirements.

1.6.2. Training on Operational Missions. Unless specifically prohibited or restricted by weapon system operating procedures or specific theater operations order (OPORD), the OG/CC exercising operational control may approve upgrade, qualification or special qualification training on operational missions. Commanders will ensure the training will not impact mission effectiveness and the crewmember receiving training is under the supervision of an instructor of like specialty. See passenger-carrying restrictions in AFI 11-401.

1.7. **In-Unit Training Time Limitations.** Comply with the time limitations in Table 1.2. Crewmembers entered in an in-unit training program leading to qualification (or re-qualification) will be dedicated to that training program on a full-time basis.

Table 1.2. In-Unit Training Time Limitations.

Training	Time Limit	Time Limit ARC
Initial Qualification	120 days	240 days
Difference Training	45 days	90 days
Re-qualification	90 days	180 days
Mission Certification Includes in-unit training leading to MR status following initial, difference, or requalification training (Note 1).	90 days	180 days
Local Orientation / Theater Indoctrination	45 days	90 days
Instructor Upgrade	60 days	120 days
AWADS (Note 2)	90 days	180 days
Lead Upgrade	90 days	180 days

NOTES:

1. Time limit for cross-flow pilots is 120-days (240 days ARC).
2. Adverse Weather Aerial Delivery System. Normally, includes lead or element lead training (see paragraph 5.6.).

1.7.1. Training time start date is the date when the first significant training event (a training event directly contributing to qualification, certification, or upgrade) has begun, e.g., Computer-Based Training (CBT) lesson, Part Task Trainer (PTT), Weapon System Trainer (WST), ground training, flight, etc.; or 45-days (90-days ARC) after being attached or assigned to the unit after completion of the formal school; whichever occurs first. Training time ends with the successful completion of the last training requirement prior to evaluation or certification.

1.7.2. Units will notify the appropriate MAJCOM/A3T in writing before the crewmember exceeds upgrade training time limits in Table 1.2. (AMC units should use the AMC website). Sq/CC may extend listed training times up to 60 days (120 days ARC) provided appropriate documentation is included in the training folder. In such cases, notification to MAJCOM/A3T is not required.

1.7.2.1. Extensions exceeding 60 days (120 days ARC) require MAJCOM/A3T approval.

1.7.2.2. Use the waiver request format specified in paragraph 1.5.8.. Include training difficulty, unit corrective action to resolve and prevent recurrence, and estimated completion date.

1.8. Training Documentation.

1.8.1. Units will use the AF IMT 4324, **Aviation Resource Management System (ARMS) Upgrade Worksheet**, to update aircrew certifications in ARMS. Blocks 1 – 5 and 11 – 13 will be used to document award of specific ARMS “Q” code identifiers. Specifically, block 11 will contain the following minimum information: “Q” code (i.e. QXXX), Certification Name (i.e. Phoenix Banner), and date of certification.

1.8.2. See **Chapter 7** for specific Q codes. See **Attachment 2** for additional training documentation requirements.

1.9. Flight Examiner Usage. Use flight examiners as instructors for any phase of training to capitalize on their expertise and experience. If an examiner is the primary instructor to train an individual, the same examiner should not administer the associated evaluation.

1.10. Instructor Training and Supervision Requirements.

1.10.1. All instructors should be MR (wing level and below).

1.10.2. When performing crewmember duties, the following personnel will be under direct supervision of an instructor of like specialty:

1.10.2.1. All NMR crewmembers while performing the specific event(s) (See paragraph 4.9.).

1.10.2.2. All crewmembers in initial, upgrade or re-qualification flying training unless syllabus states direct supervision is not required. Upgrade students may fly without an instructor when performing duties not related to the upgrade, unless otherwise restricted. *Note:* For students completing AWADS airdrop upgrade who are MR in SKE formation and SKE airdrop, an instructor pilot does not have to be in the seat. For pilots upgrading to NVG airdrop, formation lead or element lead who are MR in formation and airdrop events required by the appropriate syllabus, the instructor pilot does not have to be in the seat.

1.10.2.3. For SKE or Visual formation (as required) and visual airdrop MR pilots who are NMR for NVG airdrop, SKE airdrop or AWADS airdrop and are trying to regain MR status, the instructor pilot does not have to occupy one of the pilot seats.

1.10.2.4. Any other personnel designated by the wing, OQ, or Sq/CC.

1.11. Distribution. Units will establish hard copy distribution requirements of this AFI.

1.12. Transfer of Aircrews.

1.12.1. Validated training completed prior to transfer will be honored by the gaining organization and will be used to determine the appropriate training phase and training level where the newly assigned crewmember is placed. Aircrew personnel qualified in the same mission-design-series (MDS) are considered qualified in that equipment throughout the force when used for the same mission. Difference training is required for a change in aircraft series between C-130E and C-130H (to include H,

H1, H2 and H3) aircraft. For intracommand and intercommand transfers and exchange officers, instructor training and qualifications may be accepted at the discretion of the gaining unit commander.

1.12.1.1. Foreign exchange officers should arrive at the duty station qualified in the C-130 with a current physical and current physiological training. Mission qualification training should also have been completed. Exchange officers arriving from the formal school will complete local proficiency flying, tactical orientation and the following ground training events: Life Support Equipment, Aeromedical Rigging, Combat Offload, Initial Crew Resource Management (CRM), marshalling exam, tactics, and theater indoctrination. Those who arrive qualified from their country will complete the instrument refresher course (IRC), instrument written examination, simulator refresher, qualification open and closed-book examinations, flight evaluations, self-contained navigation system (SCNS) training, difference training, and local proficiency and tactical flying orientation. They will also complete physiological training, ground egress training, local area survival, and a flight physical if proper documentation cannot be produced.

1.12.1.2. Partially mission qualified crewmembers (e.g., visual formation but not SKE) may be fully qualified in-unit, with appropriate ATS courseware. Request waiver from MAJCOM/A3T.

1.13. Aircrew Training While DNIF. Crewmembers whose status is duty not involving flying (DNIF) may log ground training events, including simulator training, if the member's physical condition allows. Consult the flight surgeon initiating AF IMT 1042, **Medical Recommendation for Flying or Special Operational Duty**, action if the DNIF status includes ground training limitations.

1.14. Aircrew Rated Management Overview.

1.14.1. Program Requirements Document (PRD). According to AFI 11-412, *Aircrew Management*, USAF/A3OT projects C-130 long-range training requirements annually in a process called the PRD. Lead and user commands contribute to the PRD, which becomes a key long-range planning tool for training requirements.

1.14.2. Programmed Flying Training (PFT). AETC/A3R manages the training command's role in the HQ USAF/A3OT Flying Training CONOPS. A key product of this process is the PFT. The PFT balances available training quotas, ATS throughput, schoolhouse capacities and course requirements on a Fiscal Year basis. Annually, units will send projected PFT requirements to their respective MAJCOM training staff, who in turn forward projections to HQ USAF/A3OT.

1.14.2.1. HQ USAF/A3OT sponsors an annual PFT conference for attendees to consider training capacity, MAJCOM training requests, and pipeline UPT/SUNT/BFE/BLM students. AETC/A3R allocates approved quotas to lead and each user command, which in-turn allocate training quotas to each unit. HQ AETC/A3R will publish the annual PFT quota workbook on web site: <https://www.aetc.af.mil/do/dor/download/pft.htm>.

1.14.2.2. Throughout the training year, MAJCOM training staff and AETC PFT managers use assigned/allocated training quotas to assign individual crewmembers into the C-130 formal schools. Daily student quota adjustments to the annual PFT are made on quota management documents. HQ AETC/A3R will publish the quota management documents on web site: <https://www.aetc.af.mil/do/dor/download/quotas.htm>.

1.15. Information Management. HQ AMC Aircrew Training Division (HQ AMC/A3T) hosts crewmember training information on web site: <https://private.amc.af.mil/a3/a37t/dot/dot.cfm>. ANG hosts crewmember training information on web site: <https://afkm.wpafb.af.mil/ASPs/CoP/Open-CoP.asp?Filter=OO-OP-AN-31>.

1.16. Failure to Progress or Complete Training. If a student fails to progress or complete training according to syllabus requirements, the command accomplishing the training will conduct a Progress Review Board (PRB). The PRB can recommend continuation in training or AFI 11-402, *Aviation and Parachutist Service, Aeronautical Ratings and Badges*, action to the individual's unit commander. The ATS contractor will identify students who fail to progress according to the ATS contract (see **Chapter 6**).

1.16.1. IAW AFI 11-402, convene an FEB when a rated officer fails to meet academic or flying standards while enrolled in a USAF formal flying training course. Convene an Aircrew Evaluation Board (AEB) when a Career Enlisted Aviator (CEA), non-rated officer aircrew member, or non-CEA enlisted aircrew member fails to meet academic or flying standards while enrolled in a USAF or MAJ-COM formal flying training course.

1.16.2. If a crewmember fails to complete a formal course for reasons other than syllabus requirements, the formal school will send a recommendation to the individual's unit. The recommendation will state whether he or she should complete training in-unit, return to the formal school to complete training, or be referred to the AF personnel system for reassignment.

1.17. Career Enlisted Aviator (CEA). CEAs are not tied to AFMAN 36-2108, *Airman Classification*, skill level upgrade. All enlisted aircrew qualifications are separate and distinct from skill level qualification. When AF IMT 8, **Certificate of Aircrew Qualification**, is completed for the applicable flight evaluation, then that crewmember is qualified to perform all duties assigned to that crew qualification regardless of skill level. Aircrew instructor and flight examiner qualifications are also separate and distinct from OJT trainer or certifier designation and are reflected in AFSC by use of K prefix (aircrew instructor) and Q prefix (standardization and evaluation flight examiner).

Chapter 2

INITIAL QUALIFICATION TRAINING

2.1. General Requirements. AFI 11-202, Volume 1 defines initial qualification training. This chapter specifies minimum training requirements for initial qualification, requalification, senior officer courses, conversion and difference training. The primary method of initial qualification is to attend and complete the appropriate formal training course in the ETCA. When attendance is not practical or a quota is not available, units will request a waiver to conduct in-unit qualification training using formal school courseware (see paragraph 1.5.).

2.2. Initial Qualification Training (IQT) Prerequisites : Complete initial qualification prerequisites in accordance with AFI 11-202, Volume 1 and the ETCA.

2.3. Ground Training Requirements. Complete syllabus and ancillary ground training requirements for initial qualification in accordance with AFI 11-202, Volume 1.

2.3.1. Initial Qualification Ground Training Events. Students entered into formal undergraduate and graduate training programs leading to aircrew qualification will accomplish the events listed in Table 2.1. These events will be accomplished during Undergraduate Pilot Training (UPT), Basic Training, Enlisted Aircrew Undergraduate Training Course (EAUC), Basic Loadmaster School (BLM), survival training and C-130 initial qualification courses. The FTU will provide the gaining unit with documentation indicating completion of items in Table 2.1. The FTU will document events not accomplished during formal school training in the individuals training record prior to graduation from the C-130 initial qualification course. Gaining units will ensure all initial qualification events are completed prior to completing mission certification. If in-unit initial or requalification training is accomplished in lieu of formal school attendance, the unit is responsible for ensuring all requirements are completed.

2.3.1.1. Ground and flying training events accomplished during formal training will use the course completion date (successful evaluation date) to establish the due dates for all subsequent currency and requirements. Completion of Initial Combat Survival Training (SS20), Initial Water Survival Training (SS31), and initial life support equipment training during formal school establishes the due date (based on date of first completed course) for recurring Combat Survival (SS02), Conduct After Capture (SS03), Water Survival (SS05) and Emergency Parachuting Training (SS06). Completion of Initial Combat Survival Training (SS20) establishes the due date for recurring Law of Armed Conflict (G100) and Level I Antiterrorism Awareness Training (G110).

2.3.1.2. Training missions may be flown before completing all items listed, provided physiological training, physical, egress training, life support familiarization training and marshalling exam are accomplished.

Table 2.1. Initial Qualification Ground Training Requirements.

Code	Event	Crew Position	Notes
E030	Passport	All	
E100	Information Assurance (IA) Awareness Program	All	
G002	Aircraft Marshalling Training and Examination	All	
G005	Flight Physical	All	1
G006	Physiological Training	All	1
G010	Chemical-Biological Warfare Defense Training	All	
G055	ENAF	All	2, 3
G060	Tactics Training	All	3
G070	Aircrew Intelligence	All	3
G080	Communications Procedures	P, N	3
G090	Anti-Hijacking	All	
G100	Laws of Armed Conflict (LOAC)	All	
G110	Level I Antiterrorism (AT) Awareness Training	All	
G120	ISOPREP Review	All	3
G130	Instrument Refresher Course (IRC)	P, N	
G150	Approach Plate Familiarization Course	E	
G182	Hazardous Cargo	AC, L	
G231	Initial Crew Resource Management (CRM) Training	All	
G280	Small Arms Training	All	
G310	Weather Avoidance Radar	P, E	
LL01	Aircrew Life Support Familiarization Training	All	
LL03	Egress Training, Non-Ejection	All	1
LL04	Aircrew Chemical Defense Training (ACDT)	All	3
LL05	Egress Training with ACDE	All	3
LL06	Life Support Equipment Training	All	
SS20	Combat Survival Training (S-V80-A)	All	
SS31	Water Survival Training, Parachuting (S-V86-A)	All	
VT01	VTRAT Initial Training	All	3, 4
VT02	VTRAT Advanced Training	All	3, 4
VV01	Initial NVG Training	All	5

NOTES:

Previously certified and qualified mission ready crewmembers transferring between units or in a cross-flow program (between flying units) only need LL01, G002 and any applicable events in which they

have lost currency. In addition, cross-flow crewmembers require G060.

1. Mandatory grounding item; individual will not fly until required training is accomplished. Flight physical expires on the last day of the birth month.
2. Active Duty only.
3. Not required for BAQ crewmembers (includes senior officers and staff officers maintaining BAQ).
4. All crewmembers will complete VT01 and VT02; however, events only affect mission ready status for units co-located with a VTRAT device.
5. For crewmembers requiring NVG certification.

2.4. Flying Training Requirements. Complete flying training requirements for initial qualification in accordance with AFI 11-202, Volume 1 and this instruction.

2.5. Conversion/Difference Training Requirements.

2.5.1. Conversion Training. Conversion training that results in a new aircraft qualification is normally the same or a slightly modified version of initial qualification training. If converting an entire unit, qualified personnel in other units will normally provide the initial cadre. In some instances, it will be necessary for units to form an initial cadre of aircrew personnel for whom certain training qualification requirements may be waived. The following conditions will apply to the management of initial cadre aircrew qualification:

2.5.1.1. Form a nucleus of instructor and flight examiner personnel (initial cadre) to begin aircrew conversion. Converting units may request initial cadre waiver of PAI time requirement. Send waivers through appropriate MAJCOM channels and include the information specified in paragraph 1.5. Additionally, include the most recent aircraft flown and total time in that aircraft in the remarks section of the waiver.

2.5.1.2. Initial cadre will not be designated in a crew position higher than currently held, e.g. C-141 mission pilot (MP) to C-130 evaluator pilot (EP) unless previously qualified in the new aircraft.

2.5.1.3. After final approval, publish a unit letter to identify initial cadre of instructors and flight examiners by crew qualification.

2.5.2. Difference Training. Complete difference training to certify crewmembers in a different series C-130 aircraft. For purposes of determining continuation training requirements, qualification in more than one series C-130E/H is not considered dual or multiple qualifications (see paragraph 4.5.2.4.). When mission ready (MR), basic aircraft qualification (BAQ), or basic mission capable (BMC) crewmembers need to complete difference training for a C-130 having the same mission as their former C-130 model, there may be additional mission qualification training depending on the crewmember's experience and aircraft equipment. Sq/CC will determine mission training required. Instructor and Flight Examiner crewmembers converting from one model C-130 to another may remain instructors or flight evaluators at the discretion of the gaining unit commander (or appropriate ARC Air Operations Officer). Send recommendations through MAJCOM channels to HQ AMC/A3T when additional difference training requirements are identified. Prior to flying, ensure the minimum ground training requirements in paragraph 3.3.1. are met.

2.5.2.1. Pilot and Flight Engineer Difference Requirements. Units may conduct flying training in an aircraft or Level C or better simulator at the discretion of the unit commander. Specific Difference Training courseware is available from AMC/A3T Detachment 3.

2.5.2.1.1. Difference from C-130E to C-130H (Super E — see **Attachment 1**) and vice versa. Complete academics and flying training.

2.5.2.1.2. Difference from C-130E, C-130H, C-130H2 or C-130H3 to C-130H1 and vice versa. Complete academics and flying training. If units have C-130H and C-130H1 aircraft, crewmembers currently qualified on C-130E aircraft need only complete C-130E to C-130H1 difference training.

2.5.2.1.3. Difference from C-130E, C-130H, C-130H1 or C-130H3 to C-130H2 and vice versa. Complete academics and flying training. Differences between C-130H2s due to technical order modifications will be comprehensively briefed, but no flying is required.

2.5.2.1.4. Difference from C-130E, C-130H, C-130H1, or C-130H2 to C-130H3 and vice versa. Complete academics and flying training.

2.5.2.2. Navigator Requirements for Difference Training. The Sq/CC determines academics and flight training requirements. The academic training will include performance data and navigation equipment as a minimum. Flying training may be conducted in a simulator with identical navigation equipment.

2.5.2.3. Loadmaster requirements for Difference Training. Ground Training shall be determined on an individual basis by the unit commander based upon the crewmember's proficiency (hands on desired). As a minimum, conduct training on emergency equipment location and operation. Airdrop-qualified loadmasters converting from MC-130P or HC-130H/P/N to C-130E/H will attend Loadmaster Aerial Delivery Training (G602) in addition to difference training.

2.5.2.4. Difference training to the C-130J is not applicable. Training between the C-130J and other C-130 MDS (and vice versa) is conversion training.

2.6. Multiple Qualifications. Crewmembers will attend a formal initial qualification course for multiple qualifications in different MDS aircraft (i.e., C-130 and C-21). Crewmembers will, as a minimum, maintain FTL A currency requirements in each aircraft (N/A for senior officers).

2.7. Senior Officer Qualification Training Requirements. AFI 11-202, Volume 1 identifies senior officer qualification requirements. See paragraph **1.5.6.** for Senior Officer Course (SOC) waiver authority.

2.7.1. Senior officer qualification is reserved for senior rated officer positions requiring operational flying (Aircrew Position Indicator codes 6 and 8, see AFI 11-401). This includes O-6 selects and above, and in some cases, O-5s permanently filling an O-6 position. Senior officers will attend the Senior Officer Course (pilot or navigator). The SOC-A and SOC-B courses do not lead to unsupervised qualification; these senior officers will fly with an instructor and maintain FTL E continuation training requirements. See paragraph **4.3.2.5.** Senior officers who need to fly unsupervised, as determined by the OG/CC, may also complete the SOC-C or an in-unit course of instruction leading to unsupervised qualification. The SOC-C provides basic aircraft qualification (no mission qualification). The OSS/OST office is responsible for determining recommended training requirements for initial qualification and mission qualification based on the senior officer's flying experience and

familiarity with the weapons system. After OG/CC review, MAJCOM/A3T will approve the proposed training plan prior to execution.

2.8. Flight Surgeons. AFI 11-202, Volume 1 establishes flight surgeon initial qualification requirements.

2.9. Requalification Training. AFI 11-202, Volume 1 specifies requalification training limits and requirements. The secondary method of requalification is applicable if the formal course is required, but not practical, or quotas are not available. Units will request a waiver from their parent MAJCOM. Unless specified otherwise in AFI 11-202, Volume 1, a crewmember is unqualified upon expiration of his or her qualification evaluation or loss of aircraft currency exceeding 6 months, and will meet the requalification requirements as specified in AFI 11-202 Volume 1. The AFI 11-202, Volume 1 requalification training limits and requirements also apply to loss of mission qualification or certification as specified in paragraph 4.9.

Chapter 3

MISSION QUALIFICATION AND CERTIFICATION TRAINING

3.1. Description. This chapter establishes minimum criteria and training requirements for mission qualification and certification training. All crewmembers will complete initial qualification and mission qualification training leading to mission certification. Primary method of mission qualification training is by attending the formal school and completing the appropriate ETCA course. Except where specifically stated, units conducting training may arrange mission sequence or sequence training events as necessary to use flying training hours effectively and accomplish the training mission.

3.2. Time Periods for Mission Qualification and Certification Training. See Table 1.2. A crewmember will be mission ready (MR) after completion of all ground training and flying training requirements and certification by Sq/CC or Review and Certification (R& C) Board for aircraft commander (AC) according to AFI 11-2C-130, Volume 2, *Evaluation Criteria*.

3.2.1. MPD and Pilot Cross-Flow Graduates. Prior to aircraft commander certification, a MR MPD or cross-flow graduate (see Attachment 3) will be counted as a MR pilot (FPQ or FPL) for SORTS and TRP purposes and may fly as a qualified pilot on any crew including operational missions. MPD and pilot cross-flow graduates may not fly as a pilot-in-command until certified as an aircraft commander. See paragraph 5.3..

3.2.1.1. AFI 11-2C-130 Volume 3 defines C-130 takeoff and landing policy for C-130 pilots. Prior to aircraft commander certification, these pilots can only accomplish left-seat assault landings and takeoffs when under direct instructor supervision (see paragraph 5.2.). MPD and pilot cross-flow graduates may perform right-seat pilot not flying duties during assault operations with an aircraft commander.

3.2.2. Aircraft Commander Certification. Maximum time period for pilots completing an aircraft commander qualification course (PRA/B) to be certified as an aircraft commander is 90 days (120 days for PXA-C cross-flow graduates). ARC units use 180 days and 240 days. If individuals are unable to complete certification within these limits, their units will notify MAJCOM/A3T, (or as specified in MAJCOM supplement), with a description of the difficulty and expected certification date. The time period starts when the individual performs the first event leading to aircraft commander certification following their return from FTU or completion of the aircraft commander upgrade course if accomplished locally.

3.2.3. ARMS Tracking. Pilot graduates from formal training below instructor will initially be coded per paragraph 5.2.3. for ARMS tracking.

3.3. Ground Training Requirements. Complete all syllabus and ancillary ground training events in Table 2.1. and Table 3.1. before certification as mission ready. Training may be accomplished concurrently with other training.

3.3.1. Training missions may be flown before completing all items listed, provided physiological training, physical, egress training, life support familiarization training and marshalling exam are accomplished. See paragraph 3.4.2..

3.3.2. Ground and flying training events accomplished during formal training will use the course completion date (successful final evaluation date) to establish the due dates for all subsequent currency and requirements. Completion of Initial Combat Survival Training (SS20), Initial Water Survival Training (SS31), and initial life support equipment training during formal school establishes the due date (based on date of first completed course) for recurring Combat Survival (SS02), Conduct After Capture (SS03), Water Survival (SS05) and Emergency Parachuting Training (SS06). Completion of Initial Combat Survival Training (SS20) establishes the due date for recurring Law of Armed Conflict Training (G100) and Level I Antiterrorism (AT) Awareness Training (G110).

3.3.3. Formal School OG/CCs and the Commandant, USAF Mobility Weapons School (USAFMWS) may determine, obtain MAJCOM approval, and publish (local supplement) ground training requirements for their units.

Table 3.1. Mission Qualification Ground Training Requirements.

Code	Event	Crew Position	Notes
G002	Aircraft Marshalling Training and Examination	All	1
LL01	Life Support Familiarization Training	All	1
M060	Theater Indoctrination Training	All	2
SS01	Local Area Survival	All	1

NOTES:

Previously certified and qualified mission ready crewmembers transferring between units or in a cross-flow program (between flying units) only need any applicable events in which they have lost currency.

1. Accomplish upon arrival after each permanent change of station. See event description in Chapter 7.
2. Required for theater-assigned and deploying crewmembers. See event description in Chapter 7 for additional details.

3.4. Flying Training Requirements.

3.4.1. After arrival at duty station, all crewmembers will receive a local area briefing and supervised local orientation flight (not applicable for in-unit initial, re-qualification or upgrade training). The lack of a local briefing and local flight does not preclude the crewmember from deploying as MR.

3.4.2. Newly assigned crewmembers who are initially qualifying or requalifying in the unit mission will be counted as basic qualified (FP for pilots, FN for navigators, FF for flight engineers, FL for loadmasters) for ARMS and TRP purposes. This is for ARMS tracking only and does not affect the crewmember's aircraft qualification on the AF IMT 8. These crewmembers will fly under the direct supervision of a like position instructor until completion of Unit Indoctrination, Local Orientation, and Difference Training (as required). After completing all flying training events and prior to completing all ground training events, Sq/CCs may allow crewmembers to fly unsupervised on training missions provided the remaining ground training items do not affect mission accomplishment for that mission. See paragraph 3.4.7. for Joint Training restrictions. Upon completion of all ground and fly-

ing training requirements, units will certify the crewmembers as mission ready and change the ARMS codes to reflect mission qualified.

3.4.3. Navigators. High altitude low opening (HALO) and high altitude high opening (HAHO) aerial delivery are special certifications and are not required for MR status. See paragraph 5.10.

3.4.4. Loadmasters. High winds or non-availability of parachutists may cause loadmasters to complete the FTU mission qualification course without obtaining actual personnel airdrop qualification. In these cases, use standard airdrop training bundles (SATB) for loadmaster training and evaluation during flight training. Document the substitution according to Attachment 2 and AFI 11-2C-130, Volume 2. Accomplish final certification for personnel airdrop in-unit under the supervision of an instructor loadmaster or flight examiner loadmaster on an actual static line personnel airdrop.

3.4.5. Assault Landing Training. Conduct assault takeoff and landing initial qualification training on a landing zone (or painted landing zone) of 3,000 feet or longer. Maximum effort takeoffs should be performed from the main runway when it is available (i.e., safe and practical to taxi from an assault landing zone). Takeoffs from the assault zone are authorized IAW AFI 11-2C-130, Volume 3 and during formal mission qualification training conducted either at the formal school or via the secondary method.

3.4.6. Units North of the 60° Parallel. Crewmembers in units north of the 60° N parallel who are scheduled to complete secondary method (in-unit) mission qualification training during the summer months (May through August), have until 31 August to complete the required night training events. The mission qualification evaluation for these crewmembers may be administered before completing night training events.

3.4.7. Joint Airborne and Air Transportability Training (JA/ATT) Missions. When participating in JA/ATT missions, unqualified and non-current crewmembers may be utilized in their respective crew positions provided they are supervised by an instructor or flight examiner (see paragraph 1.10.). Comply with direct supervision requirements of AFI 11-401 when carrying passengers (including paratroopers).

3.4.8. AWADS Airdrop Training. AWADS is an avionics and radar system designed to allow aircrews to perform aerial delivery missions during Instrument Meteorological Conditions (IMC). See AFTTP 3-3.25 and/or AFI 11-2C-130 Volume 3 for additional guidance. Accomplish training according to ATS courseware and local training guides.

3.4.9. Formal School OG/CCs and the Commandant, USAF Mobility Weapons School (USAFMWS) may determine, obtain MAJCOM approval, and publish (local supplement) flying training requirements for their units.

3.4.10. Aircraft Defensive Systems (ADS). ADS Training does not need to be tracked as a separate certification but will be included in local orientation or difference training. Training will include academic and flight training for all crewmembers. See AFTTP 3-3.25, Attachment 5 for an unclassified defensive systems training guide.

3.4.10.1. Ground Training. Academic training will cover as a minimum, threat systems, basic principles of Infrared (IR) and flares, how ADS works, how to operate the system, use of checklists, malfunctions, emergency procedures, and defensive maneuvers during takeoff, high-altitude, low-level, airdrop, and landings.

3.4.10.2. Flight Training. Flight training will cover preflight actions, aircraft walk-around, system turn-on, and a flight profile that should include defensive maneuvers from high/medium altitude, during a low-level, after slowdown and before a simulated airdrop, and a simulated approach to landing. Calls for in-flight reactions (simulated ADS inputs or simulated visual sightings) should come either from the ADS instructor directly or as a result of the ADS instructor's input to an aircrew member.

Chapter 4

CONTINUATION TRAINING

4.1. Description. This chapter establishes the minimum flying and related ground training requirements to maintain Mission Ready (MR) status. The unit commander will ensure each crewmember receives sufficient training to maintain individual proficiency.

4.2. Aircrew Status. C-130 crewmembers are assigned to the following status:

4.2.1. **Mission Ready.** For Status of Resources and Training System (SORTS), operational tasking, and deployments, a MR crewmember is defined as one who is available and qualified in the squadron's mission (completed mission certification for the applicable crew position).

4.2.2. **Non-Mission Ready (NMR).** A crewmember that is unqualified, non-current or incomplete in required continuation training. See paragraph 4.9. for specific guidance on crewmembers who are non-current or incomplete in required continuation training.

4.2.3. **Basic Mission Capable (BMC).** A NMR crewmember assigned to MAJCOM headquarters, NAF, EMTF, TACC, AMWC, TALCF, AMOG, FTU, or direct reporting unit who has satisfactorily completed mission qualification training and does not maintain MR status, but maintains familiarization in the command or unit's operational mission.

4.2.3.1. The crewmember may maintain qualification in some aspects of the unit mission and is able to attain full qualification in the unit mission within 45-days.

4.2.3.2. Formal School BMC crewmembers are qualified to conduct all aspects of the formal training mission. Formal school instructors will be qualified and certified in the training/unit mission before performing instructor duties. Formal school crewmembers may fly TACC-directed missions, but they will comply with any MR requirements required for that mission.

4.2.3.3. BMC crewmembers may log instructor or evaluator time for the portion of the mission for which they are current and qualified.

4.2.4. **Basic Aircraft Qualification (BAQ).** A crewmember who has satisfactorily completed initial qualification training and is qualified to perform basic qualification aircrew duties in the unit aircraft.

4.2.5. MR, BMC, and BAQ crewmembers will accomplish and/or maintain the requirements in AFI 11-202 Volume 1 (for their respective status) and the appropriate events in the ground and semi-annual flying continuation tables.

4.3. Training Levels (TL).

4.3.1. The Sq/CC determines the TL before each semi-annual period. Assign new unit crewmembers a TL during in-processing. Base TL on experience and aircraft proficiency. Crewmembers may have a different flying training level (FTL) for different flying qualifications, i.e. a crewmember may be a FTL A – aircraft commander, but a FTL C – airdrop copilot. Crewmembers may be assigned a ground training level (GTL) that is more restrictive, but never less restrictive, than the requirements in paragraph 4.3.3..

4.3.2. **Flying Training Levels.**

4.3.2.1. FTL A— Highly Experienced Crewmembers. Sq/CC may assign highly experienced MR line crewmembers to this level. In addition, this may include MR or NMR MAJCOM headquarters, TACC personnel, AETC instructors, NAF personnel, AMWC instructors, wing, OG, and Sq/CCs, operations officers, personnel assigned to OG evaluation positions, and any instructors assigned primarily to staff duties. *NOTE:* NMR crewmembers assigned to MAJCOM headquarters, NAF, EMTF, TACC, AMWC, TALCE, AMOG, FTU, or direct reporting unit may be categorized as BMC and assigned to FTL A and GTL 4. In addition to GTL 4 requirements, these individuals will accomplish annual CRM training requirements. These individuals may fly unsupervised on any mission provided they are current and qualified for that mission.

4.3.2.2. FTL B – Experienced MR Crewmember.

4.3.2.3. FTL C – MR Crewmember. MPD pilots and copilots should be assigned to FTL C. If desired, Sq/CCs may assign highly proficient MPD pilots and copilots to FTL A or FTL B.

4.3.2.4. FTL D – BAQ Crewmember. Primarily for individuals pursuing MR status after initial qualification training.

4.3.2.5. FTL E—BAQ or BMC non-instructor staff. May include senior officers, MAJCOM, NAF, and TACC staff who are not maintaining MR or instructor status. FTL E requirements are insufficient for MR status and crewmembers assigned to this FTL will fly with an instructor of like specialty at all times. For pilots, an instructor will be at a set of controls during critical phases of flight. In addition, FTL E pilots will be current in takeoffs, landings, and instrument approaches before carrying passengers.

4.3.3. Ground Training Levels (GTL).

4.3.3.1. GTL 1— Highly experienced crewmembers with 10 or more years of operational flying.

4.3.3.2. GTL 2— Experienced crewmembers with between 5 and 10-years of operational flying.

4.3.3.3. GTL 3— Inexperienced crewmembers with less than 5-years of operational flying.

4.3.3.4. GTL 4— Senior officers, staff officers, and crewmembers who do not maintain MR status.

4.3.4. Change of FTL or GTL. Once the semi-annual period begins, do not move a crewmember to a level requiring fewer events. Place BAQ crewmembers into a different FTL any time after attaining MR status. Prorate events upon changing training levels.

4.3.4.1. BAQ crewmembers pursuing MR status will accomplish FTL D continuation training requirements. Upon completion of mission qualification and certification, the Sq/CC should adjust the crewmember's training levels as appropriate and prorate continuation training requirements based on the date MR was gained. Based on number of events accomplished in FTL D compared to number of prorated events required in new FTL, units may leave the crewmember in FTL D until the end of the six-month period.

4.4. **Training Events/Tables.** Standardized ARMS training event identifiers and description are located in Chapter 7. Designate unit defined events as X event (i.e. X020). Units will include a description in their local training procedures.

4.4.1. **Crediting Event Accomplishment.** Credit events accomplished on training, operational missions and satisfactory evaluations or certifications toward currency requirements and establish a subsequent due date. Use date of final evaluation as the date of accomplishment for all ground and flying

training events that were trained during a formal course. *NOTE:* Events accomplished during upgrade training prior to the evaluation are credited towards the requirements for the current crew position. Events accomplished on the evaluation are credited toward the new crew position.

4.4.1.1. Units may develop local mission accomplishment reports and/or training accomplishment reports to document continuation training for processing into ARMS. See AFI 11-202 Volume 1 for additional guidance.

4.4.2. For an unsatisfactory flight evaluation, do not log continuation training requirements for those events graded Q-3 (according to AFI 11-2C-130 Volume 2) until re-qualified. Sq/CC will determine which events of paragraph 4.4.1. will be allowed for credit based on AF IMT 8 evaluation description.

4.4.3. Make-up training (ground or flying) is creditable towards the new training period.

4.4.4. Instructor training requirements and responsibilities. Instructors and flight examiners may credit 50 percent of their total requirements while instructing or evaluating. *EXCEPTION:* Instructor and flight examiner pilots may not credit any takeoffs or landings flown by another pilot.

4.4.5. Aircraft commanders may credit some mission events while performing copilot duties. See specific event descriptions in **Chapter 7** for additional details.

4.4.6. Formal school OG/CCs and the Commandant, USAFMWS may determine, obtain MAJCOM approval, and publish ground continuation training requirements in local training procedures.

4.4.7. Formal school OG/CCs and the Commandant, USAFMWS may determine, obtain MAJCOM approval, and publish flying continuation training requirements in local training procedures.

4.4.8. Documenting Aircrew Training.

4.4.8.1. All training events will be recorded in ARMS.

4.4.8.1.1. Training events conducted during block training or phase training may be consolidated under one ARMS entry.

4.4.8.1.2. Combined training events may have only one ARMS entry.

4.4.8.1.3. Input all one-time events and events required for permanent change-of-station (PCS) in the ARMS database. Units may maintain one-time events on the crewmember's currency report.

4.5. Continuation Training Requirements.

4.5.1. Ground Training Events. Crewmembers will comply with requirements of **Table 4.1.** and **Table 4.2.**

4.5.1.1. Failure to accomplish events in **Table 4.1.** leads to non-mission ready status. See paragraph 4.9. for regaining mission ready status.

4.5.1.2. Failure to complete mobility training requirements in **Table 4.2.** does not lead to non-mission ready status but may restrict crewmember from certain missions.

4.5.1.3. Some additional ancillary training events have no impact on mission accomplishment. See paragraph 4.7..

4.5.1.4. Crewmembers (i.e., NAF, MAJCOM, AMWC, etc.) attached to units may accomplish ground training events at locations other than their unit of attachment. The crewmember is responsible for reporting accomplished training events to their unit of attachment (ARMS office).

4.5.1.5. Crewmembers performing extended alert duty (more than 24 hours) may accomplish ground training that does not degrade required response time or mission accomplishment. Specify additional requirements and or restrictions in MAJCOM supplement or local training procedures.

Table 4.1. Ground Continuation Training Requirements

Code	Event	Position	GTL 1	GTL 2	GTL 3	GTL 4	Notes
G002	Aircraft Marshalling Training & Exam	All	OT	OT	OT	OT	11
G005	Flight Physical	All	A	A	A	A	1
G006	Physiological Training	All	QQ	QQ	QQ	QQ	1, 7
G060	Tactics	All	S	S	S		6,10, 13
G070	Aircrew Intelligence	All	A	A	A		6, 13
G080	Communications Procedures	P, N	365d	365d	365d		6, 9
G090	Anti-hijacking	All	T	T	T	T	13
G130	Instrument Refresher Course	P, N	12m	12m	12m	12m	2
G150	Approach Plate Familiarization Course	E	T	B	A		13
G182	Hazardous Cargo Training	AC	T	T	T		13
G182	Hazardous Cargo Training	L	24m	24m	24m		14
G220	Flight Engineer Systems Refresher	E	A	A	A		3, 13
G230	CRM Refresher	All	A	A	A	A	4, 13
G250	Refresher Simulator	P, E	A	A	A	A	13
G600	Navigator Refresher Training	N	A	A	A	A	13
G602	Aerial Delivery Training	L	A	A	A		3, 6, 13
LL03	Egress Training, Non-Ejection	All	T	T	B	B	1
LL06	Aircrew Life Support Equipment	All	A/R	A/R	A/R		12, 13
NV03	NVG Ground Refresher Training	All	A	A	A		5, 15
SS02	Combat Survival Training	All	T	T	T		6, 13
SS05	Water Survival Training	All	T	T	T		13
SS06	Emergency Parachuting Training	All	T	T	T		6, 13
VT03	VTRAT Refresher Training	All	A	A	A		6, 8, 13

A-Annual, B-Biennial, C-Check Cycle, S-Semi-Annual, T-Triennial, OT-One Time, QQ-5 years

A/R-As required by Theater, d-due in number of days, m-due in number of months

NOTES:

1. Mandatory grounding item on expiration date; individual will not fly until required training is accomplished. Flight physical expires on the last day of the birth month.

2. Log IRC upon completion of the complete course to include instructor-led Hot Topics. Pilots on active flying status will complete the IRC every fourth quarter after completion IAW AFMAN 11-210, *Instrument Refresher Course (IRC) Program*.
3. Wing level and below. G220 incorporates hostile environment repair and G602 incorporates Loadmaster Refresher Training (LRT) and Loadmaster Aerial delivery (LAD).
4. Crewmembers completing refresher simulator can take credit for G230, CRM Refresher.
5. For NVG-certified crewmembers.
6. Not required for BAQ crewmembers.
7. Expires 5 years after the last day of the month in which previously accomplished.
8. VT03 is mandatory only for units co-located with a VTRAT device.
9. OG/CCs may approve an extension of up to six months for aircrews.
10. Units should conduct tactics training semiannually with emphasis on current tactics changes and techniques. OG/CCs may specify an alternate frequency for Tactics Training, but not less than annual, provided unit aircrew members receive all G060 blocks of training annually.
11. Accomplish training upon PCS (see event identifier in Chapter 7). MAJCOM/A3s may specify a recurring frequency for Aircraft Marshalling Training and Exam.
12. Life Support Equipment Training (LL06) should be accomplished in conjunction with SS02, LL03, and SS05. See event description in Chapter 7.
13. The OG/CC or equivalent is the waiver authority for this event. See paragraph 4.9.3.3.
14. With SQ/CC (or designated representative) approval, crewmembers who are NMR for failure to complete Hazardous Cargo Training (G182) may fly unsupervised on local missions not requiring the overdue event.
15. With SQ/CC (or designated representative) approval, crewmembers who are NMR for failure to complete NVG Ground Refresher Training (NV03) may fly unsupervised on missions not requiring NVG use.

Table 4.2. Mobility Training Requirements

Code	Event	Position	GTL 1	GTL 2	GTL 3	GTL 4	Notes
C040	Mobility Folder Review	All					1
E030	Passport	All	QQ	QQ	QQ	QQ	
E035	Secondary Passport	All					2
G010	Chem-Bio Warfare Defense Tng	All	B	B	B		
G050	PNAF	All	B	B	A		3, 7
G100	Laws of Armed Conflict	All	A	A	A		
G110	Level I AT Awareness Training	All	A	A	A		4
G120	ISOPREP Review	All	180d	180d	180d		5
G280	Small Arms Training	All	24m	24m	24m		8
G284	Explosive Ordnance Reconnaissance Training	All	B	B	B		
LL04	Aircrew Chemical Defense Training	All	B	B	B		7
M060	Theater Indoctrination Training	All	A/R	A/R	A/R		6,7
SS03	Conduct After Capture (CAC)	All	T	T	T		7
SS07	Contingency SERE Indoctrination	All	A/R	A/R	A/R		6

A-Annual, B-Biennial, C-Check Cycle, S-Semi-Annual, T-Triennial, OT-One Time, QQ-5 years
A/R-As required by Theater, d-due in number of days, m-due in number of months

NOTES:

1. Units will determine frequency.
 2. As required for unit mission; Frequency will be 2 or 4 years.
 3. For PNAF-qualified crewmembers only.
 4. Time between last accomplishment and AEF or contingency deployment cannot exceed 6 months. Training may be combined with G070, Intelligence Training.
 5. Review ISOPREP card within 90 days prior to AEF or contingency.
 6. As required by Combatant Commander. See event descriptions in Chapter 7.
 7. The OG/CC or equivalent is the waiver authority for this event. See paragraph 4.9.3.3.
 8. AFRC and ANG crewmembers will comply with AFI 36-2226 requirements.
- 4.5.2. Flying Continuation Training Requirements. Table 4.3. and Table 4.4. list flying continuation training requirements.
- 4.5.2.1. Dual-Seat Qualification. Copilots may not fly in the left seat unless under direct IP supervision and designated by the Sq/CC or appropriate ARC Air Operations Officer as an AC candi-

date. MPD pilots and above will be dual-seat qualified and may fly in either seat. See paragraph 3.2.1.1.

4.5.2.2. Simulator Credit for Training Requirements. Crewmembers may credit flight training events in the simulator per Table 4.3. and Table 4.4. For ARMS tracking, simulator events may be coded with a S prefix or within ARMS use the Restrictions tab under Profile Task Information.

4.5.2.3. Continuation Training Flying. Each MAJCOM provides flying hours to each wing as training, test, and ferry hours or operations and maintenance (O & M) hours. The hours, based on FTL C, are designed to provide all crew positions with sufficient hours to accomplish all continuation flying training requirements.

4.5.2.4. Multiple Series C-130 Certifications. Crewmembers having multiple certifications that only require difference training (i.e., C-130E and C-130H3) will have a quarterly sortie currency in each aircraft. Use appropriate ARMS codes in Chapter 7 (M130, M131, M132, M133). These codes are optional if maintaining a single certification. The total FTL requirements for their applicable qualification-level semiannual continuation flying training requirements may be accomplished in either aircraft. Loss of the quarterly currency requires a sortie with an instructor. Loss of semi-annual currency requires a sortie in either aircraft. *EXCEPTIONS:* Sq/CC will determine currency requirements for navigators and loadmasters based on aircraft equipment. If there is little or no difference between aircraft, Sq/CCs may allow navigators and loadmasters to maintain certification in both aircraft without quarterly currency sorties in each aircraft. For all crewmembers, C-130H and C-130H1 are considered the same series and only require initial difference training.

4.5.2.5. Airdrop Proficiency and Currency Requirements. Pilots may take credit concurrently for an airdrop and other events as defined by event descriptions in Chapter 7. Loadmasters may take credit when an actual load or personnel are loaded, all checklists through the slowdown checklist are accomplished, and there is not a no-drop condition due to either loadmaster.

4.5.2.6. Units North of the 60° Parallel. OG/CCs are authorized to waive all night continuation training events (including currency events) from 1 May through 31 August. Training events will be prorated for each semi-annual period (see paragraph 4.8.).

4.5.2.6.1. Any crewmember who is current for night training events as of 1 May will remain current through 31 August. Any crewmember non-current for these events prior to 1 May will remain non-current until accomplishing the event with an instructor.

Table 4.3. Pilot and Navigator Semi-Annual Continuation Flying Requirements.

Code	Event	Aircraft Commander					MPD Pilot / Copilot				Navigator					Notes			
		A	B	C	D	E	CUR	A	B	C	D	CUR	A	B	C		D	E	CUR
	Proficiency/Basic Events																		
M010	Basic Sortie												4	6	6	8	3	45d	1, 5, 7, 9, 10
P020	Takeoff	8	10	12	16	6	M	8	12	12	16	M							1, 9, 10
NV47	NVG Takeoff	2	4	6	6			2	4	6	6								8, 14
P190	Landing	8	10	12	16	6	M	8	12	12	16	M							1, 9, 10
NV05	NVG Airtand Event												2	4	6	6			8
NV48	NVG Landing	2	4	6	6		Q	2	4	6	6	Q							8, 14
P192	Unaided Night Landing	2	2	2	4		Q	2	2	2	4	Q							9, 10, 11, 14
P030	Left-Seat Landing							6	6	6	6	Q							3
NV52	Left-Seat NVG Landing							2	2	2	2								3, 8
M030	Left-Seat Tactical Sortie							3	3	3	3								3
B011	Local Proficiency Sortie	1	1	1	1			1	2	2	2								
P070	Instrument Approaches	6	10	12	16	6	M	8	10	12	16	M							1, 9, 10
NV80	NVG Instrument Approaches	1	1	2	2			1	1	2	2								7, 9, 10
P100	Precision	3	5	6	8	2		4	5	6	8								7, 9, 10
P110	Non-precision	3	5	6	8	2		4	5	6	8								7, 9, 10
P116	NDB / VOR	1	1	1	1	1		2	2	2	3								7, 9, 10
P130	Circling	2	2	2	2	1		2	2	2	3								9
N120	Airborne Radar Approach (ARA)												2	2	4	4			7, 9
B014	Category I Navigation Sortie																		2, 7, 12
GD09	Grid												1	1	1				7, 12
	Assault Events	A	B	C	D	E	CUR	A	B	C	D	CUR	A	B	C	D	E	CUR	
AS09	Assault Takeoff	6	8	10	12			2	4	4	6								8
AS11	Assault Landing	8	10	12	15			2	4	4	6								8
AS12	Unaided Night Assault Landing	2	2	4	6		Q	1	2	2	2								8, 14
NV50	NVG Assault Takeoff	1	2	2	2			1	2	2	2								8
NV49	NVG Assault Landing	2	2	4	6		Q	1	2	2	2								8, 14
AS21	Heavyweight Assault Landing	2	2	4	6														8
	Tactical Arrival/Departure Events	A	B	C	D	E	CUR	A	B	C	D	CUR	A	B	C	D	E	CUR	
RS06	High-Altitude Tactical Arrival	1	1	1	1			1	1	1	1		1	1	1	1			8
RS16	Low-Altitude Tactical Arrival	1	3	3	3			1	3	3	3		1	3	3	3			8
RS26	High-Altitude Tactical Departure	1	1	1	1			1	1	1	1		1	1	1	1			8
RS36	Low-Altitude Tactical Departure	1	3	3	3			1	3	3	3		1	3	3	3			8

Code	Event	Aircraft Commander					MPD Pilot / Copilot				Navigator					Notes			
		A	B	C	D	E	CUR	A	B	C	D	CUR	A	B	C		D	E	CUR
	Proficiency/Basic Events	A	B	C	D	E	CUR	A	B	C	D	CUR	A	B	C	D	E	CUR	
RS46	Penetration/Rapid Descent	1	1	1	1			1	1	1	1		1	1	1	1			7
	Visual Low-Level (VLL) Events	A	B	C	D	E	CUR	A	B	C	D	CUR	A	B	C	D	E	CUR	
VL01	VLL Day Event	2	2	2	4			2	2	2	4		2	2	2	4			8
VL11	VLL Formation Day Event	1	1	1	2			1	1	1	2		1	1	1	2			8
VL21	VLL Formation Lead Event	1	1	1	2			1	1	1	2		1	1	1	2			8
VL30	High to Low Alt Transition	1	1	1	1			1	1	1	1		1	1	1	1			7
NV00	VLL NVG Event	2	2	4	4			2	2	4	4		2	2	4	4			8
NV08	VLL NVG Formation Event	1	1	2	2			1	1	2	2		1	1	2	2			
	SKE Events	A	B	C	D	E	CUR	A	B	C	D	CUR	A	B	C	D	E	CUR	
SK07	SKE Wing Event	1	2	3	3			1	3	5	5		1	2	3	3			8
SK10	SKE Element Lead Event	1	2	3	3			1	1	1	1		1	2	3	3			8
SK17	SKE Formation Lead Event	1	2	3	3			1	1	1	1		1	2	3	3			8
	Airdrop Events	A	B	C	D	E	CUR	A	B	C	D	CUR	A	B	C	D	E	CUR	
AD03	Equipment Airdrop	1	2	2	3			1	2	2	3		1	1	1	1			6,8
AD04	CDS Airdrop	1	2	2	3			1	2	2	3		1	1	1	1			6,8
AD05	Personnel Airdrop	1	2	2	3			1	2	2	3		1	1	1	1			4,8
AD06	Visual Airdrop	2	2	3	4			2	2	3	4		2	2	3	4			8
AD07	SKE Airdrop	2	2	3	4			2	2	3	4		2	2	3	4			8
AD08	AWADS Airdrop	2	2	3	4			2	2	3	4		2	2	3	4			8
NV18	NVG Airdrop	2	2	2	2			2	2	2	2		2	2	2	2			8
AD09	Medium/High Altitude Airdrop																		2,7
	Formation Departure/Recovery Events	A	B	C	D	E	CUR	A	B	C	D	CUR	A	B	C	D	E	CUR	
FR06	Formation Visual Departure	2	2	3	4			2	2	3	4								8
FR16	Formation Visual Recovery	2	2	3	4			2	2	3	4								8
FR26	SKE Departure	2	2	3	4			2	2	3	4								8
FR36	SKE Recovery	2	2	3	4			2	2	3	4								8
	Miscellaneous Events	A	B	C	D	E	CUR	A	B	C	D	CUR	A	B	C	D	E	CUR	
FE09	Optical Threat Event	2	2	2	2			2	2	2	2		2	2	2	2			7
FE19	IR Threat Event	2	2	2	2			2	2	2	2		2	2	2	2			7
FE29	Radar Threat Event	2	2	2	2			2	2	2	2		2	2	2	2			7
P260	Have Quick Event	1	2	2	4			1	2	2	4								7
P270	Secure Voice Event	1	2	2	4			1	2	2	4								7
P280	ACDTQT																		7, 13

NOTES:

M-monthly, Q-quarterly, d-due in number of days.

1. Unqualified in the aircraft if non-current in excess of 6 months.
2. One event due annually. Not required for FTL E crewmembers.
3. MPD pilots only.
4. Navigators require one actual airdrop annually; during the other 6-month period, they may credit a SATB personnel drop. Use AD05A for actual personnel.
5. Currency will expire at the end of the calendar month.
6. Airdrop event; SATB or actual for pilots; Actual drop for navigators.
7. May log 50% (100% if requirement is 1) in any Weapon System Trainer or Satellite Navigation Station (as applicable). WST does not have to be Level C or better. See paragraph 4.5.2.2. for ARMS tracking guidance.
8. May log 50% (100% if requirement is 1) in a Level C or better Weapon System Trainer or Satellite Navigation Station (as applicable). See paragraph 4.5.2.2. for ARMS tracking guidance.
9. May log 100% in a Level C or better Weapon System Trainer or Satellite Navigation Station (as applicable). See paragraph 4.5.2.2. for ARMS tracking guidance.
10. Can maintain and regain currency in a Level C or better Weapon System Trainer.
11. USAFE pilots: Unaided Night Landing – 180-day currency.
12. Training requirement determined by MAJCOM/A3
13. P280 is Triennial for FTL A, Biennial for FTL B, and Annual for FTL C and D. Not required for FTL E crewmembers.
14. PACAF assigned and gained units in Alaska may substitute "180d" for "Q" for P192, AS12, NV48, NV49 and any future night currency events. See paragraph 4.5.2.6.

Table 4.4. Engineer and Loadmaster Semi-Annual Continuation Flying Requirements.

Code	Event	Flight Engineer					Loadmaster					Notes
		A	B	C	D	CUR	A	B	C	D	CUR	
	Basic/Proficiency Events											
M010	Basic Sortie	4	6	6	8	45d	4	6	6	8	45d	1, 6, 9
M050	Tactical Mission	3	4	6	8		3	4	6	8		7
	Tactical Arrival/Departure Events	A	B	C	D	CUR	A	B	C	D	CUR	
RS46	Penetration/Rapid Descent	1	1	1	1							7
	Airdrop Events	A	B	C	D	CUR	A	B	C	D	CUR	
AD00	Basic Airdrop Event	3	3	3	3							7
AD03	Equipment						1	1	2	2		4, 5
AD04	CDS						1	1	2	2		4, 5
AD05A	Personnel						1	1	1	1		3, 4, 5
AD09	Medium/High Altitude Airdrop											2, 6
	Miscellaneous Events	A	B	C	D	CUR	A	B	C	D	CUR	
FE09	Optical Threat Event	1	2	2	2		1	2	2	2		4, 6
FE19	IR Threat Event	1	2	2	2		1	2	2	2		4, 6
FE29	Radar Threat Event	1	2	2	2							4, 6
P280	ACDTQT											6, 8
	NVG Events	A	B	C	D	CUR	A	B	C	D	CUR	
NV02	NVG Sortie	1	1	2	2		1	1	2	2		7
NV05	NVG Airland Event	2	2	4	4							7
NV57	NVG Backing						1	1	1	1		4
NV58	NVG Combat Offload											2
NV59	NVG Engine-Running On-load/Off-load											2

NOTES:

Q-Quarterly, d-due in listed number of days.

1. Unqualified in the aircraft if non-current in excess of 6 months
2. One event due annually.
3. ARC loadmasters require only one annually. For personnel airdrop, ARC loadmasters disregard Note 4.
4. For FTL A crewmembers, training requirement is one event due annually.
5. Actual load required (not SATB). Loadmasters log AD05A for Personnel Airdrop.
6. Flight engineers may log 50% (100% if requirement is 1) in any Weapon System Trainer. WST does not have to be Level C or better. See paragraph 4.5.2.2. for ARMS tracking guidance.
7. Flight engineers may log 50% (100% if requirement is 1) in a Level C or better Weapon System Trainer. See paragraph 4.5.2.2. for ARMS tracking guidance.

8. P280 is Triennial for FTL A, Biennial for FTL B, and Annual for FTL C and D.
9. Currency will expire at the end of the calendar month.

4.6. Flight Surgeon Continuation Training Requirements. AFI 11-202, Volume 1 establishes flight surgeon continuation ground and flying training requirements. Prior to participating on any deployments or contingency missions, flight surgeons will coordinate with their attached unit for any additional mission or theater-specific training requirements.

4.7. Additional Ancillary Training. Some ancillary training does not impact mission ready status or mobility status. Due to the dynamic nature of these training events, this training is listed on the HQ AMC/A3T website at <https://private.amc.af.mil/a3/a37t/dot/dot.cfm>. If units wish to track the additional training in ARMS, the website provides recommended codes. If there are any conflicts between the website and this AFI, use the codes in Chapter 7 of this AFI.

4.8. Proration of Training. AFI 11-202, Volume 1 describes proration of training requirements for crewmembers not available for flying duties. In addition, prorate training for non-availability due to contingency alerts and contingency flying TDYs when the contingency precludes training for certain mission events (PACAF and USAFE; also contingency operations from home station). This authority will be used judiciously, especially when prorating the same crewmember for consecutive semi-annual training periods.

4.8.1. Use this formula to determine training requirements: number of months available times the event volume divided by the number of months in the training period. Round down to the nearest whole number, but not less than 1 (e.g. 5.6 rounds to 5).

4.8.1.1. Use Table 4.5. to determine the number of months available. Prorate only if absence is at least 15 cumulative days.

4.8.1.2. When an individual permanently changes station (PCS) during the training cycle to a unit flying the same MDS aircraft and enters the same FTL or lower, credit training accomplished at the previous base. Prorate training requirements based on the time available (e.g., time at former base, plus time at new base, minus number of days not available) during the training period. Time available starts 7-days after sign-in for CONUS and 14-days after sign-in for OCONUS or on the date of actual accomplishment of the first training event, whichever occurs first. Subtract previous accomplishments from the prorated total to determine remaining requirements.

4.8.2. Units may also prorate requirements for individuals changing training levels. If requirements are prorated do not credit events accomplished while in the former FTL.

Table 4.5. Individual Availability.

Days Available	Months Available
0-15	0
16-45	1
46-75	2
76-105	3
106-135	4
136-165	5
>166	6

4.9. Failure to Complete Training Requirements.

4.9.1. Loss of Currency. Flight currency is associated with those events denoted in the flying continuation training tables accomplished in a specific period of time (monthly, quarterly, semi-annual, or annual as listed in the CUR column).

4.9.1.1. Place individuals delinquent in one or more currency events in supervised training status for that event and declare them NMR in unit missions requiring the event. Loss of currency prohibits an individual from accomplishing unsupervised in-flight duties in the non-current event(s).

4.9.1.2. Crewmembers are non-current the day after event currency expires (i.e., a crewmember that accomplished an event with monthly currency on 1 May becomes non-current on 1 July).

4.9.1.3. Sq/CC will direct training necessary for the individual to regain MR status (see paragraph 4.9.4.2.) or request an OG/CC waiver for the requirement (see paragraph 1.5.7.). Base the decision to approve a waiver on the individual crewmember's experience and proficiency level. Do not approve a waiver request for the same flying training event deficiency affecting consecutive training periods (if a waiver is desired for consecutive training periods, forward request for MAJCOM approval).

4.9.2. Failure to Complete Semi-annual Flying Training Events. At the end of each training period, the Sq/CC will review ARMS products for crewmembers that fail to accomplish all required flying continuation training.

4.9.2.1. Place individuals delinquent in one or more events in supervised training status for that event and declare them NMR in unit missions requiring the event. Loss of MR status prohibits an individual from accomplishing unsupervised in-flight duties in the specific event(s).

4.9.2.2. Sq/CC will direct training necessary for the individual to regain MR status using the same process as regaining currency (see paragraph 4.9.4.2.) or request an OG/CC waiver for the requirement (see paragraph 1.5.7.). Base the decision to approve a waiver on the individual crewmember's experience and proficiency level. Do not approve a waiver request for the same flying training event deficiency affecting consecutive training periods (if a waiver is desired for consecutive training periods, forward request for MAJCOM approval).

4.9.3. Failure to Complete Ground Training Events.

So I am saying to you that—what happens in those circumstances when the pilots or the air crew have a delay, they don't get to the hotel? Does their 8 hours of uninterrupted sleep begin when they are actually laying in their bed with the remote control on their lap?

Ms. GILLIGAN. Actually, sir, we have changed when the rest period begins. It is now 9 hours' rest period that begins after arriving at the rest facility, whether that is at the hotel or at your home, with an eye toward providing an actual 8 hours of sleep opportunity within that 9 hours. So that is a fairly dramatic change from the current, which is not unlike what you described right now: The end of the duty period is after leaving the aircraft. So we have made that change.

Mr. BOCCIERI. If it is 12 hours for the Air Force, why can it not be 12 hours under the FAA's designation?

Ms. GILLIGAN. Again, having worked through this issue with the rulemaking committee and having looked at the science involved, we believe that a reasonable balance that allows for sufficient rest will be a 9-hour rest period.

But I would point out that at the maximum 13 hours and a rest period of 9 hours, there is still 2 hours in that 24-hour day. So there is more time in that 24-hour period than we have assigned to either rest or to duty time.

Mr. BOCCIERI. My concern is on the back end of that clock, especially on international flights, where you are flying through multiple time zones and you are laying in your hotel and you are trying to go to sleep, but it is light out and there is not sufficient time there.

Even under the best circumstances, pilots may not realize an 8-hour sleep opportunity, given even the scientific studies that are being presented here today. And my concern especially is on the international flights. How were these best practices incorporated into that rule, especially on the international flights?

Ms. GILLIGAN. When you have an opportunity to review the rule, I think you will see we have several charts that describe what we call the sliding scale. So depending on the hour of the day at which you start work, the flight-duty time period is reduced. So if you are flying late night flights, you are available to your company for less time for actually being on duty. And, again, that will free up hours to be used for rest.

So it is a balance of trying to acknowledge that there are certain hours during the day and certain numbers of segments, both of which contribute to fatigue and reduce the amount of time the pilot is available to be on duty.

Mr. BOCCIERI. I also have a bit of concern about the decrease from 30 to 28, the number of days during which a pilot may not record more than 100 hours of flying time. Was there any thought that that is going to be compressed down? Instead of having 30 days to complete 100 hours, they are going to be 28 days, which means they are going to be flying a lot more hours versus of spreading that over 2 more days?

Ms. GILLIGAN. Again, we believe that the entire proposal provides a sufficient balance among all of the various elements that have to be considered, and that is why it really is a package that

you have to look at as a whole. But these are the specific areas where we have asked for comment. We actually list in the Preamble comments that we have asked people to provide data. Does this change, raise risk or not? Do you have data that supports that? So, as we go into the final rule, we will be better informed.

Mr. BOCCIERI. Thank you. One last question. What does the proposed rule for reduction of these rest periods, what would occur on extra long days where, for instance, that were caused by delays? Was that factored into the decision-making in the ARC?

Ms. GILLIGAN. Yes. Right now, the proposal would permit the extension of the flight-duty period a single time in a 7-day period for 1 hour, with agreement by both the crew and the company. And, again, that is with the expectation there was something completely—that the company could not have anticipated. So whether another phenomena that should be anticipated in building schedules would not be a basis for extending that.

Mr. BOCCIERI. In the CRM reports, the Crew Resource Management forms that they are supposed to come up with here, is there a nonretribution provision in there that says that air crew are not going to be penalized if they show up and say, “I just can’t perform my duties today, I am tired”?

Ms. GILLIGAN. The rule requires that no airman may accept an assignment if they are not fit for duty, and the air carrier may not use or give an assignment to a crew member who is not fit for duty. It would be a regulatory violation to use that pilot in that way.

Mr. BOCCIERI. Very good.

Thank you, Mr. Chairman.

Mr. COSTELLO. The Chair thanks the gentleman. And not only thanks the gentleman for his thoughtful questions, but for the contributions that he made in helping us craft a safety bill that we think is one of the best that has been done in decades. So I thank you.

The Chair at this time now recognizes the distinguished Chairman of the Full Committee, Chairman Oberstar.

Mr. OBERSTAR. Thank you, Mr. Chairman. And I appreciate the work that you put into preparing for this hearing, and the staff, and also greatly appreciate the participation and support from Mr. Petri and staff on the Republican side, and the comments of Mr. Boccieri. He has really become our resident aviation authority on the Committee, and I greatly appreciate the contribution he brings.

I have just mention for the record, I have said it in other venues, but we were walking off the House floor after the health care vote, and a gaggle of reporters asked, “Was that a tough vote for you?” And he said, “Compared to flying C-130’s out of Iraq? No.” So he brings a steady hand to these issues.

Mr. Brooks, you had a rather sleight-of-hand comment about the one-size-fits-all, and that is not a right thing to do. And I just excised from your statement that the crews on nonscheduled carriers fly longer flight segments and therefore have longer sleep opportunities.

Without saying what those longer segments are, how long are the segments?

Mr. BROOKS. Mr. Chairman, I would be reluctant to use an actual number. But those segments, in terms of flight days, can get

out to 16 or 18 hours. Again, depending on what we call augmentation on the airplane, sometimes there are one additional crew member, sometimes there are two additional crew members. And that is covered in the regulations now and, again, it is considered in the proposal. So those are some.

Mr. OBERSTAR. Eight hours, 10 hours, 12 hours, 16 hours?

Mr. BROOKS. Yes, sir. Depending on the augmentation, the level of augmentation and the crew.

Mr. OBERSTAR. Sixteen hours at controls?

Mr. BROOKS. Well, not one crew member, sir. But with augmentation and crews taking over. In other words, crews sleeping on the airplane in bunks.

Mr. OBERSTAR. In one of the paper mills in my district, the management and labor got together on an idea that is going to save management some money and might help the workers. They have longer weekends. They can do more hunting, fishing, snowmobiling in the winter and so on. Four 12-hour days. So I went to the plant to see how this is working out, and I talked to one of the old-timers. What do you think about it? You have worked in that mill for 30 years. He said, "Jim, I won't stand by one of these guys that has put in a 12-hour shift. He might turn around and bump me into that vat down there."

These guys aren't rested after 12 hours, no more working in a paper mill than behind the stick on the flight deck. Have you worked shift work yourself?

Mr. BROOKS. No, I have not. Aside from my time on the railroad, which I suppose is shift work, that is my experience.

Mr. OBERSTAR. I did. I watched my father do it, too, in the underground mine for 26 years and in the open pit for another 14 years. I worked the night shift, 11 to 7, they called it the graveyard shift. On one of those, I was sampling ore on an ore car. You criss-cross the car with a little scoop in your hand and take samples of the ore, put it in a bag, toss it off the car, jump to the next car. About two, three in the morning you get a little woozy. I was just a kid. I was 19 years old, a lot of energy, indefatigable. In the rain one night, a rainstorm, I stepped on the edge of that car. There was a lump of ore. I didn't see it, a little loose piece of ore. I cut my foot on it, flipped right off the car 15 feet down right between two railroad tracks, two railroad ties. Three inches either way, I wouldn't be here today. That is fatigue.

I was working the shift on the dumps. You bring the ore cars, the gondolas that are bringing rock, overburdened, to dump. They had a switch and three tracks, and I had to keep track of who was on which of those tracks so I wouldn't send a car up and smack into somebody who was already on that track. And even when I marked it down, which place and where they were, at two or three in the morning, in a rainstorm and under adverse conditions, I wasn't sure I had done the right thing.

Now, all of you, I think, on this panel are aware of the work this Committee did 3 years ago on railroad safety. I know you are going to wonder, well, what does railroad safety have to do with aviation? Well, this is an intermodal Committee, and the Rail Safety Act passed in 1907 had been amended once in 100 years. We were de-

terminated to turn that around to update railroad safety, and one of the targets was limbo time.

Limbo time is just like something you were describing here and this panel was discussing in response to various questions. The 10-hour, 100-mile rule. If you as a locomotive engineer run that engine and that train 10 hours, that is the end of your shift. If in 8 hours you run 100 miles, that is the end of your shift. But not quite. You are still on duty. And they have got a little shack at the edge of the track where the railroad had built a shack for the crew to rest in. Or, sometimes they would put them up in a motel, but you can't leave the motel when you are there. You are not on duty, you are not off duty. It is limbo time.

One railroad, I will name them, it was Union Pacific, in 2006, had 96,000 shifts of limbo time. I say I will name them because I named them in that hearing and it was documented in our hearing. You are on duty all the time. Not paid for it, but you are not off duty because you can't go and do anything you want. You are supposed to be resting. And then you can be called up for the next shift.

At the markup in Committee, I think Mr. Costello might remember, I said, "If it is good enough for the Pope to eliminate limbo time, it is going to be good enough for this Committee." All the Catholics in the audience laughed. But we did it over a 3-year period.

Dr. Belenky, I am leading up to you. The Rosekind Study for many years was considered the gold standard in fatigue, fatigue management, and we have had Dr. Rosekind before this Committee several times when I Chaired both the Investigations Oversight and the Aviation Subcommittee during the years we were in the minority. He has documented time-and-again the effects of fatigue on pilots, flight attendants, and air traffic controllers.

There were 27 studies of controller fatigue, Ms. Gilligan, when you were just a young attorney at the FAA, 26 of them had been rejected by FAA. Every one of them showed fatigue. Too many hours at controls, no break in between, too little rest time away from controls, fatigue setting in. Finally, the Rosekind study was one FAA could not reject, and they began dealing seriously with the fatigue. But by then, there was the strike. So it started all over again.

Now, there is "fatigue" and "fatigue." If you are flying 6 hours, 7, 8 hours in one time zone, north to south, south to north, there is one effect on the body's circadian rhythm. If you are flying against the clock, there is another effect. If you are flying with the clock over multiple time zones, there is a third effect. I want you to tell me the difference between 16, 12, 10, 8 hours in those modes.

Dr. BELENKY. Mr. Chairman, I am afraid I can't do that in the sense that you would really have to do some experimental work to look at specifics directionality, north, south.

When you talk about 12, 18 hours at the controls, I think obviously those are—that is a very long time. One of the ways this becomes feasible is with augmented crews and in-flight rest facilities and in-flight sleep. And pilots do get in-flight sleep. And from my perspective, it is total sleep in 24 hours that determines perform-

ance. So if they are getting decent amounts of sleep—an empirical question—in each 24 hour period they should be good to go, taking into account that if they are flying through their window of circadian low, performance may be degraded even in the situation where they are well rested.

But it is very hard to come up with a specific rule and a specific number given start times, different start times, different end times, given the effects of early starts, extended work hours, and then the issue of resynchronization. I mean, if you are exposed to light in different time zones, your body will start to resynchronize. But that slow process resynchronizes by approximately an hour a day. So if you do a rapid turnaround, you may not have all that much change in time zones.

Mr. OBERSTAR. And that is that one phrase, an hour a day, for each hour of time zone change.

Dr. BELENKY. That is a rough estimate.

Mr. OBERSTAR. I appreciate that you are being scientifically responsible and not wanting to generalize, but there is an enormous body of research done on all of these factors. And I don't think we need to wait until the last study is done, as was done with the air traffic controllers—the 26th, 27th study was done—and finally something began to happen.

Like applying new technology, I don't think we have to wait until a Cerritos, California occurs where two planes crash in the air before we put traffic collision avoidance systems, TCAS, on aircraft. I don't think we have to wait for another fog on an airport runway and aircraft to run into each other on the ground before we implement precision runway monitoring. That is the way safety has been done. New regulations are written in blood. Those who have died scream out for change.

Twelve hours of sleep, and then say, Well, you can go fly for 12 hours. About that 8th or 9th hour—you say there are crew rests and you can nap on board. You take a nap, you come back, it takes a little while. You are still groggy, your body is not functioning properly. I don't think that is a substitute. I mean, you go back and look at the R.R. Rosa study on napping and alert—napping at home and alertness on the job. That is a very compelling argument against short cycles of sleep. I will leave it there.

Mr. COSTELLO. The Chair thanks the Chairman of the Full Committee, and would ask are there other Members who have additional questions?

Mr. PETRI. I had one question. I would wonder if the panel could quickly respond. I don't think you would have to elaborate much. There is a 60-day comment period on this. We have had this hearing, and it is something if we are going to address it, I think it may worthwhile to do what is necessary to get it as right as possible. And so I am just asking whether the 60 days do you feel is adequate? I am not looking for a delay for the sake of delay, but if that is adequate, or if you feel that some different time period for the comments and so on would make more sense. Does anyone on the panel?

Mr. PRATER. Certainly. The Airline Pilots Association believes that the 60 days is adequate, and we will respond to the FAA within that 60 days.

Mr. ALTERMAN. If I may, it actually creates a problem. There is significant modeling to be done, and we are in the process of starting that. The whole process has become somewhat complicated because of the Safety Act that was passed and requires carriers by October 31 to submit a fatigue risk management plan to the FAA. And we are in the process of—our carriers are in the process of developing those plans.

The problem we have with a 60-day response period is the same people who are working all day trying to put together that plan to be submitted by October 31 are the exact same people that we need to have that are available to us to respond to this. So we are in a little bit of a bind. I think 60 days is not going to be sufficient for our purposes. If that is what the time is, we will submit something in 60 days, but it really isn't sufficient.

Mr. COSTELLO. What would be?

Mr. ALTERMAN. Well, I would like to say 120 days. That gets us over the Christmas holidays, and I am not sure we will get much production over that. I think another 30 days will be sufficient just so we can get passed the fatigue risk management plan. But we will do whatever is necessary and whatever is required.

Mr. BROOKS. Mr. Petri, I put in my written testimony comments about 120 days. So that is what we submitted. As you may be aware, I think there is some 50, 5-0, areas in which the agency has asked for comment in the document, and it is very, very full. And our carriers are in some cases very much like the cargo carriers in terms of the ability to have resources to work on them. We have no interest in delay. We just want to make the process as robust as possible and make sure we can put in comments to the docket that are responsive. So, I back up our written testimony which asks for 120 days.

Mr. COSTELLO. I thank Mr. Petri for the question. And let me say that, frankly, we have no tolerance for any more than 60 days. This is not an issue that came up overnight. This is an issue that has been discussed for 20 years. In fact, Mr. Alterman, if your team is doing one thing and then has to move over and address this, I suggest that you go out and get some outside expertise to help you so that you can comply within the 60-day period. I would be extremely disappointed and see no reason why we should have to go over 60 days. This is an issue that everyone at this table and everyone in the industry has discussed, thought about, and we know who in fact is attempting to address this quickly and we know that there are reasons why others do not want it addressed.

I would just suggest to you that we stick to the 60 days, and I believe that that is adequate time. If you calculate how many hours there are in a day and take that times 60, I think that is adequate time to comment on the 50 items that were made reference to.

Mr. OBERSTAR. Would you yield, Mr. Chairman?

Mr. COSTELLO. I would yield to the Chairman of the Committee.

Mr. OBERSTAR. Some years ago, quite a few years ago, Mr. DeFazio and I introduced a bill, waited for the appropriate time, H.R. 14. That was the number of years that flight attendants had been waiting for a decision on flight and duty time for flight attendants. It was also the number of hours that flight attendants,

on average, were asked to be on duty with flight time included in that period.

Our Committee staff just pulled out the hearing, 1993, the hearing on the legislation to provide for the duty-time limitations of flight attendants, 17 years.

I have no tolerance for "We need another 30 days or 60 days, or whatever time. You know what needs to be done. Get your people together and do it. Safety of the public is at stake. Safety of your pilots is at stake. There is no excuse and no tolerance for delay. You have had this on your agenda, as Mr. Costello said, for 20 years. Longer than that even. Let's get it done.

Mr. COSTELLO. The Chair thanks Chairman Oberstar, and now recognizes the gentleman from California, Mr. Garamendi.

Mr. GARAMENDI. Mr. Chairman, I didn't get my full 8 hours of sleep last night and my coffee hasn't kicked in, so I have asked Mr. Boccieri if he could ask my question.

Mr. BOCCIERI. Thank you.

I just wanted to know, and actually both of us were speaking here and we just wanted to know if there was any objection from the companies, from the air carriers themselves, of raising the crew rest period from between 10 and 12 hours to make it consistent with some other aviation, namely, the military?

Mr. HENDRICKS. Congressman, I will speak to that. We have started our analysis of the rule, and we will be happy to specifically address that question and respond on the record once we complete some of that analysis.

Mr. BOCCIERI. I would like a comment for the record. I mean, just to quote the Air Force regulation as well. It says: A minimum of 12 hours of crew rest period before the flight-duty period begins is to ensure that the air crew member is adequately rested before performing flight or flight-related duties. Crew rest is free time, which includes time for meals, transportation, and rest, and must include 8 hours of uninterrupted sleep.

Mr. HENDRICKS. Thank you. We will be happy to provide a response, as I said. And I would also like to add that, as a former airline pilot for nearly 23 years, I had many of those nights that did not accomplish 12 hours of uninterrupted rest, and was able to operate safely and without having perceived myself to be fatigued.

Mr. BOCCIERI. That is true. And there are times where there has been delay, and I think that cushion was put in there so that there would be adequate time in those circumstances.

Captain Prater, if you can tell me, when does a flight duty actually end? The minute you walk off the airplane?

Mr. PRATER. Under the current rules, 15 minutes after you set the parking brake. That is why we are advocating for the proposal that the FAA has laid out there that the rest time would start after you got to your rest facility.

As to your first issue, sir, we would say that while more is better in a lot of things like retirement and wages, there are unintended consequences that could creep into it. If an airman had to spend another 3 or 4 days on the road during their schedule, that 12 hours might not look as good. It has to be an entire scheme, and I think that is where the FAA has gone. Saying that, you know, a shorter time once in a while is OK, but it can't be night after

night after night. So that is why we believe that the 9 hours behind the door is a good place to start, because we think—remember, that is the minimum. We will try to get the full 11 or 12, and in many cases it will.

Mr. BOCCIERI. Does ALPA and the rest of the other unions accept the commuting rules?

Mr. PRATER. The issue of commuting that has been raised here, I will just say real quickly, first of all, with all due respect for all the work that has been done on this issue, commuting did not start nor will it end with these hearings. It is a fact of the transportation life.

It is incumbent upon the pilot and his employer to ensure that the pilot is rested, regardless of what his transportation mode was to get to work. I believe that there has been some almost soul-searching, if you will, when you look for the reason of the most recent fatal accidents. And we do that each and every time. But we have to look at the big, big picture, and it is not just commuting.

But pilot fatigue is caused by too many hours behind the stick and too, too few hours in the hotel. We believe that the issue of commuting must be addressed and will be addressed under the rule in the advisory circular adequately, and I think with a tripartite, if you will, between the certificated airmen, the company, and the FAA. Thank you.

Mr. COSTELLO. The Chair thanks the gentleman. And I thank our witnesses for testifying today. Unless there are other questions or comments, Chairman Oberstar?

Mr. OBERSTAR. Just a retrospective. I held up the Committee hearing from 1993 on H.R. 14. I will just quote from my opening statement.

“The effort to establish flight attendant duty-time limitation goes back many years, as far as 1978, when the FAA promised to have a regulation out by the end of the year. It is a good thing no one was holding their breath. As this hearing opens, we are still waiting for the 1978 rule.”

I go on to talk about the petitions of flight attendants filed and the action undertaken. And I would just like to quote from Congressman Klinger’s comment. He was the Ranking Member, the gentleman from Pennsylvania.

“Flight attendants deserve duty-time limitation. Without a doubt, their job requires more physical exertion than almost any other class of employees in the aviation industry that I can think of. It is unfortunate that they have been denied the protections afforded by reasonable workplace standards, and that the traveling public has been denied the assurance that flight attendants are alert and prepared to cope with emergencies that may arise.”

I cited 38,000 air carrier passengers over a 14-year period involving evacuations, severely ill, need oxygen administered, passing blood on board the aircraft. Flight attendants needed to address those needs.”

And then there is a very telling comment by the gentleman from Illinois, Mr. Costello.

“The legislation calls for duty-time limits on actual time served. Other parties have called for duty limitation placed on scheduled time. My concern is for the safety of our commercial airline system.

Under scheduled duty limits, I fear flight attendants would be working under greatly fatigued circumstances due to unforeseen delays, weather, mechanical problems, and would be incapable of adequately responding to an emergency.”

Mr. Chairman thank you for your prescience, for your consistency, for sticking to your last—and continuing that service. That underscores the need to proceed without delay and get this rule-making accomplished and have a single standard of safety in the skies.

Mr. COSTELLO. I think with that, Ms. Gilligan, in particular, that you have a clear message to take back to the administrator that there is zero tolerance for any extension of this 60 days, as suggested by Mr. Alterman or Mr. Brooks, or anyone else. And I can assure everyone, including the families of the Colgan flight who are here and who consistently at their own expense continue to do what they believe is best and what is in the best interest of the flying public when it comes to safety.

We appreciate you being here. We appreciate your vigilance and all of your input. And we will continue to monitor this issue and to make certain that the law that we just passed and was signed into law on August 1 of this year is in fact followed. And we look forward to seeing a rule that we believe and look forward to making a major difference when it comes to safety and fatigue in the industry. So we thank all of the witnesses for being here today.

And, with that, the Committee stands adjourned.

[Whereupon, at 1:17 p.m., the Subcommittee was adjourned.]

OPENING STATEMENT OF REP. STEVE COHEN

The Subcommittee on Aviation

"Pilot Flight and Duty Time Rule"

September 16, 2010

I am pleased to be here today to receive testimony from representatives of the Federal Aviation Administration, Air Line Pilots Association, the National Air Carrier Association, and other distinguished institutions.

As the Congressman of Memphis, Tennessee, I have the great privilege of representing the Memphis International Airport, a Delta hub that provides world-class passenger service to more than seven million passengers a year. The airport is also the home of the FedEx SuperHub and is the largest cargo operations by volume airport in the world for the last seventeen years. With annual total aircraft operations of nearly 250,000 flights a year, airline safety and exemplary pilot training are very important issues for my district.

Flying at 30,000 feet at 500 miles per hour is a risky venture. However, thanks to the great work of the Federal Aviation Administration, the National Transportation Safety Board, and Congress we have drastically reduced the danger of this inherently risky operation. However, much work still needs to be done to continue reducing the risk of flying, and one key area to address is pilot fatigue. In the past 15 years, 250 fatalities in air carrier accidents have been attributed to pilot fatigue. This number is far too high. Pilot fatigue is preventable. These 250 deaths were preventable. I strongly encourage that FAA and Congress do everything necessary to ensure that pilot fatigue is no longer a reason for any deaths in this country.

I look forward to hearing the testimonies of our witnesses.

A handwritten signature in black ink, appearing to read "Steve Cohen". The signature is written in a cursive, flowing style.



STATEMENT OF
THE HONORABLE JERRY F. COSTELLO
SUBCOMMITTEE ON AVIATION
HEARING ON "PILOT FLIGHT AND DUTY TIME RULE"
SEPTEMBER 16, 2010

- I welcome everyone to the Aviation Subcommittee hearing on the pilot flight and duty time rule.

- Since the 1940s, there have been regulations limiting pilot flight and duty time, and requiring minimum rest periods. In 1989, the National Transportation Safety Board (NTSB) issued three recommendations to the Secretary of Transportation calling for research, education, and revisions to existing regulations. These recommendations were added to the NTSB's Most Wanted List of Transportation Safety Improvements in 1990. The FAA tried to revise its regulations in 1995. Despite fatigue being linked to more than 250 fatalities in air carrier accidents, a consensus could not be reached between stakeholders on how the FAA should revise its regulations.

- Last year, tragedy of Continental Connection Flight 3407 revealed that pilot fatigue likely had an effect on pilot performance and at the time, the airline was not proactively addressing fatigue for pilots who commute from other cities, as the Captain and First Officer did. In addition, the accident raised questions regarding the adequacy of the FAA's current pilot flight and duty time rules.

- I am pleased that after we held a hearing on aviation safety, a roundtable on pilot workforce issues, and promised to introduce legislation requiring the FAA to act, Secretary LaHood and Administrator Babbitt identified pilot fatigue as a top priority during the agency's "Call to Action to Enhance Airline Safety." At the time, I applauded Administrator Babbitt for undertaking an expedited review of flight and duty time rules. I am pleased he has followed through on his commitment to bring the

stakeholders together and update the FAA's flight and duty time regulations, taking into account fatigue science and other factors that can affect pilot alertness, judgment, and performance.

- While the FAA was working through its process, the House passed bipartisan legislation which requires FAA to update and implement new flight and duty time rules for pilots within one year. The *Airline Safety and Federal Aviation Administration Extension Act of 2010* (P.L. 111-216), was signed into law August 1, 2010. This is the strongest aviation safety bill in decades. I am proud of this significant accomplishment and want to acknowledge the unwavering support of the families of Continental Connection Flight 3407, who continue to be engaged and proactive on this issue.

- The law we passed in August requires the FAA to update and implement new pilot flight and duty time rules within one year taking into account scientific research. Further, it directs the FAA to require air carriers, within 90 days, to create fatigue risk management systems to proactively mitigate pilot fatigue. To address the issue of commuting, we required the FAA to contract with the National Academy of Science to study its impact on safety so the FAA can utilize the findings in the final rulemaking.

- On September 14, 2010, the FAA issued a Notice of Proposed Rulemaking (NPRM) on “Flightcrew Member Duty and Rest Requirements,” consistent with the law. I commend the FAA for taking this important first step. I am also encouraged that the proposed rule recognizes that time spent commuting to work is not rest. I look forward to hearing the agency’s plan for

staying on track to finalize a rule by August 1, 2011, as Congress directed; and receiving testimony from our other witnesses.

- Before I recognize Mr. Petri for his opening statement, I ask unanimous consent to allow 2 weeks for all Members to revise and extend their remarks and to permit the submission of additional statements and materials by Members and witnesses. Without objection, so ordered.



Statement of Rep. Harry Mitchell
House Transportation and Infrastructure Committee
Subcommittee on Aviation
9/16/10

--Thank you Mr. Chairman.

--Pilot fatigue is a safety issue that has been with us for literally decades. The National Transportation Safety Board (NTSB) has sought revisions to existing regulations since 1990, placing it on its Most Wanted List.

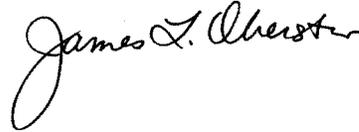
--According to NTSB, over the past 15 years, fatigue has been linked to more than 250 fatalities in air carrier accidents.

--Last week, Federal Aviation Administrator J. Randolph Babbitt announced a proposed rule to revise existing standards to prevent pilot fatigue.

--Among other things, the proposed rule would increase from eight to nine hours the minimum amount of rest a pilot must take before flying, and would alter the existing practice of assuming that a pilot is resting while commuting between his or her home or pilot base.

--I look forward to hearing from our witnesses today about this proposed rule, as well as the underlying issue it seeks to address.

--At this time, I yield back.



STATEMENT OF
THE HONORABLE JAMES L. OBERSTAR
SUBCOMMITTEE ON AVIATION
HEARING ON
THE PILOT FLIGHT AND DUTY TIME RULE
SEPTEMBER 16, 2010

I thank Chairman Costello and Ranking Member Petri for holding this hearing on the long-awaited pilot flight and duty time rule. I look forward to hearing more about the Federal Aviation Administration's (FAA) notice of proposed rulemaking (NPRM) on "Flightcrew Member Duty and Rest Requirements," released earlier this week. I welcome our witnesses, and look forward to hearing their testimony.

Fatigue is one of the most critical issues facing pilots today, especially in this economic downturn, and with the airlines' emphasis on increasing productivity and driving down labor costs. Working long hours on an irregular schedule can have a detrimental effect on a pilot's decision-making and performance. Well-rested pilots are critical to aviation safety. As I have repeatedly said: "Fatigue" does not show up in autopsies! Our nation's pilots must be provided adequate rest to perform their critical safety functions.

In 1999, then Aviation Subcommittee held two hearings on pilot fatigue where we heard powerful testimony that FAA's current flight and duty rules for pilots were not only outdated and abused by the airlines, but also that the agency had failed

repeatedly to adequately address the situation. Unfortunately, it took the tragic events in Little Rock¹ that year to again turn the spotlight to this issue. In Little Rock, the National Transportation Safety Board (NTSB) determined that fatigue contributed to the cause of the accident because it impaired the flight crew's performance, which led to the failure to discontinue the approach when severe thunderstorms moved into the airport area, and led to other omissions by the crew.

Again eleven years later, it has taken another crash to shine the spotlight on pilot fatigue and on the same fatigue rules that applied in 1999 and before. The NTSB investigation of the crash of Colgan Air Flight 3407 in Buffalo, New York, which killed 50 people, rocked the airline industry, stunned the American public, and identified the need to closely examine the regulations governing pilot training and rest requirements. The NTSB did not make fatigue a causal factor of the accident, though it did find that the evidence suggested that both pilots were likely experiencing some degree of fatigue at the time of the accident, which may have contributed to the errors and decisions made by the pilots.

In response to the Colgan tragedy, the Subcommittee on Aviation held a series of hearings, receiving testimony from the FAA, the NTSB, the Department of

¹ American Airlines Flight 1420, which crashed at the Little Rock Airport in June 1999.

Transportation Inspector General, pilots' unions, airline representatives, and the representatives of the Colgan Air Flight 3407 Families.

Based on these hearings and several longstanding NTSB recommendations, this Subcommittee drafted comprehensive safety legislation – H.R. 3371, the “Airline Safety and Pilot Training Improvement Act of 2009”, which passed the House last October by 409 to 11. This legislation was rolled into H.R. 5900, the *Airline Safety and Federal Aviation Administration Extension Act of 2010* (P.L. 111-216), the most recent FAA extension legislation, and signed into law August 1, 2010. The law includes airline safety and pilot training provisions that we negotiated with the Senate, including a requirement that the FAA update and implement new flight and duty time rules for pilots within one year, to more adequately address the results of scientific research in the field of fatigue.

In 1995, the FAA proposed a fatigue rule based on the recommendations of an Aviation Rulemaking Committee (ARC). Last year, the FAA withdrew the 1995 NPRM, formed another ARC, and planned to publish another fatigue proposal by the end of 2009. I am glad that the FAA is moving forward, although I would note that the FAA's last proposed flight and duty time rule languished for over 15 years due to industry opposition. With this week's publication in the Federal Register of a

completely new proposed rule, I am optimistic that the FAA will publish a final rule that will prevent future tragedies. The law now requires it, and this Subcommittee will maintain vigilant oversight to ensure that the rule is completed on time.

I also have concerns about whether pilots who work second jobs or live long distances from their work stations are adequately rested when they start their work schedule. Current FAA regulations only govern hours worked as a pilot, and leave off-duty activities to pilots' good judgment. Accordingly, the *Airline Safety and Federal Aviation Administration Extension Act of 2010* we enacted in August, directs the National Academy of Sciences to study the impact of pilot commuting on fatigue and provide preliminary results to the FAA after 120 days to be considered as part of the flight and duty time rulemaking. I am pleased that a section of the FAA's proposed rule makes pilots and airlines equally accountable for responsible commuting practices; however, the rule's further discussion of commuting contains hortatory language that does not impose specific requirements, and we must carefully consider if this will be effective.

Administrator Babbitt continues to cite deteriorating professionalism as a factor negatively affecting safety, and has called upon aviation industry workers to raise their level of professionalism. This is an important point, and it appears to have been a factor in the Flight 3407 tragedy. However, I would add to this point that

I have often observed that airline safety begins in the company boardroom. If regulations are paid lip service in the boardroom in an effort to increase the bottom line, we all fail. Each airline must have a strong safety culture and must commit to ensuring that the highest levels of safety are maintained.

We must keep the FAA on task in resolving these very significant and complex pilot flight and duty time rule issues. We cannot and will not wait longer.

I look forward to hearing from our witnesses.

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Congress of the United States
House of Representatives
Washington, DC 20515

Committee on Transportation and Infrastructure
Subcommittees on Aviation
Highways, Transit and Pipelines
Coast Guard and Maritime Transportation
Railroads, Pipelines and Hazardous Materials

Committee on Homeland Security
Subcommittees on Energy Threats, Cybersecurity and Science and Technology
Emergency Communications, Preparedness, and Response

Congresswoman Laura Richardson (CA-37)

Subcommittee on Aviation

Hearing: "Pilot Flight and Duty Time Rule"

Thursday, September 16, 2010

11:00 AM

2167 Rayburn

Mr. Chairman, thank you for convening this hearing on pilot flight and duty times rules. I would also like to thank our distinguished witnesses for taking the time to appear before this committee.

Anytime that Americans fly—to visit family, for business, to go on vacation—they rely upon the airline industry, the NTSB, and the FAA, but most importantly the pilots that fly commercial airliners to keep them safe. We have an obligation to ensure that any pilot operating an aircraft is fit to fly. A major part of fulfilling this obligation is setting regulations ensuring that pilots are fully alert while flying and have enough rest between flights. I understand that the airline industry is highly competitive. Companies are

constantly in search of ways to run more flights, serve more customers, and outwork competitors. This can put a stress on pilots by creating expectations of long hours with limited rest. Competition is essential to the industry; but it cannot come at the cost of industry safety.

Unfortunately, the airline industry's safety record as it relates to pilot rest has been unsatisfactory. Over the last 15 years, fatigue has been linked to over 250 fatalities in airline accidents. This poor record is of particular concern to me because my district is served by three airports. Two of these airports, the Compton and Long Beach Airports are located in my district; the Los Angeles International Airport (LAX), located just outside my district, is a destination or point of departure for hundreds of flights every day. Such heavy airline traffic in and around my district means that the safety of my constituents depends upon safe practices on the part of airline companies and pilots.

In addition, as someone who frequently takes the five-hour red-eye between Washington, DC and Long Beach, CA, I am particularly aware of the need for regulations to ensure that pilots operating long-range flights are properly rested. Long-range, cross country flights and ultra-long-range,

international flights put additional stresses on pilots, making a fully rested flight team even more important. The safety of the flying public relies on effective fatigue mitigation plans for these and all other types of flights.

I look forward to hearing from the witnesses on these important issues. Thank you again, Mr. Chairman, for convening this hearing.

**BEFORE THE
SUBCOMMITTEE ON AVIATION
COMMITTEE ON TRANSPORTATION AND
INFRASTRUCTURE
UNITED STATES HOUSE OF REPRESENTATIVES
WASHINGTON, D.C.**

**Pilot Flight and Duty Time Rule
September 16, 2010**

**Testimony of Stephen A. Alterman
President, Cargo Airline Association
1620 L Street, NW, Suite 610
Washington, DC 20036
202-293-1030**

INTRODUCTION

Mr. Chairman and Members of the Committee. Good morning. My name is Steve Alterman and I am President of the Cargo Airline Association (CAA or “the Association”). Our members are United States all-cargo air carriers providing both express and traditional heavy freight services to shippers around the globe.¹ All-cargo carriers flew 28.7 billion Revenue Ton Miles in 2008, 71.3% of the RTMs flown by U.S. carriers.² In the same time frame, the air cargo industry contributed more than \$37 billion to the U.S. economy.³ Both individually and as an Association, members of our industry agree that pilot fatigue is a legitimate safety issue and that a re-examination by the FAA is both necessary and appropriate. The Notice of Proposed Rulemaking (NPRM) issued by the FAA on September 14 provides the vehicle for the ongoing effort

¹ Association air carrier members include ABX Air, Atlas Air, Capital Cargo, FedEx Express, Kalitta Air and UPS Airlines.

² FAA Aerospace Forecast, Fiscal Years 2009-2025 (March 2009), at 78.

³ Aviation Safety: Better Data and Targeted FAA Efforts Needed to Identify and Address Safety Issues of Small All-Cargo Carriers, GAO 09-614, at 1 (June 2009).

to craft a rule that increases safety while, at the same time, ensuring that the airline industry can continue to serve its customer base. We appreciate the opportunity to address these issues today. At first blush, the NPRM appears to raise the relevant issues and actively solicits industry input. However, since this exceedingly complex rule was only published in the Federal Register earlier this week, we are not yet prepared to comment in detail on its provisions. We will, however, offer some comments on the overall approach to addressing pilot fatigue.

THE ALL-CARGO AIR CARRIER INDUSTRY

Although an integral member of the aviation community, our unique segment of the industry is substantially different from other participants in the air transportation marketplace. For example:

- Unlike passenger carriers, all-cargo carriers regularly operate long-haul international flights, traveling across multiple time zones during nighttime hours;
- All-cargo carriers also operate around-the-world in all directions, not turnaround service to international destinations;
- Service is provided to remote, often hostile, destinations, often for mission-critical flights on behalf of the U.S. military, with no opportunity to pre-position reserve crews;
- Because of the industry's unique operations, all-cargo crews have longer and better opportunities for rest during a duty period. Indeed, companies have invested millions of dollars to provide lie-flat sleeping

room facilities at domestic hubs to provide flight crews sleep and to mitigate fatigue at domestic hubs;

- Similarly, industry members have substantial investments in high-quality rest facilities aboard long range aircraft;
- All-cargo flight crewmembers make fewer annual take-offs and landings and fly fewer annual hours than passenger airline counterparts.

Why are these (and other) distinctions vitally important in the context of the issue of pilot fatigue? Simply because they clearly demonstrate that the United States air transportation industry is **not** a unified whole, but rather consists of separate segments with different operational needs requiring different regulatory approaches. In turn, while everyone in the industry, both companies and employees, strives for the highest level of safety, the means for achieving this safety level should be tailored to the unique operations of the various industry components. As FAA Administrator Randy Babbitt has noted, “In rulemaking, not only does one size **not** fit all, but **it’s unsafe to think that it can.**”⁴ This principle is especially important in the context of pilot fatigue. In crafting a new regulatory scheme to address the legitimate safety concern of fatigue, the FAA should recognize the differences inherent in all-cargo operations and craft a scheme that is consistent with these differences. Unfortunately, the NPRM does not appear to take these distinctions into account.

⁴ *We Can’t Regulate Professionalism*, Speech of FAA Administrative J. Randolph Babbitt to the ALPA Air Safety Forum, August 5, 2009 (emphasis added).

THE PROCESS THUS FAR

In order to address the issue of pilot fatigue, in the Summer of 2009, the FAA convened an Aviation Rulemaking Committee (ARC) designed to develop a consensus position on pilot fatigue before the issuance of a formal Notice of Proposed Rulemaking (NPRM). In spite of concern about the focus of the ARC, the Cargo Airline Association participated fully in the ARC and submitted a detailed proposal for a new regulatory treatment of the all-cargo industry. (A copy of an outline of the CAA proposal is attached hereto and made a part hereof).

The major CAA concern with the ARC process was the overwhelming focus on “flight and duty time” issues and the exclusion of virtually all other possible causes of pilot fatigue. It is our position that the first job of any body studying the effects of pilot fatigue on aviation safety should be to study and isolate the causes. After establishing such causes, the body should examine various actions that could be taken to mitigate the established causes. The final regulatory action should reflect this process.

The ARC did not follow this path. Rather, the discussions within the ARC were essentially discussions on hours of service and negotiations over reductions to current regulatory limitations on hours of duty and flight time which might, or might not, correctly address the primary causes of fatigue in the aviation environment. Pushed to the side were the other significant elements that might create unsafe conditions – elements such as pre-duty activities and conditions, *i.e.*, excessive commuting, working second jobs, excessive pre-duty recreational activity and the possible identification of any medical sleep disorders. While the NPRM does discuss these issues, the overwhelming majority of the NPRM, following the ARC lead, deals with “hours of service” issues.

There is a danger in focusing primarily on flight and duty time. For example, taken to its extreme, a regime could be established that required pilots to be on duty only 12 hours a month. However, if a pilot arrived for this 12 hour duty period already in a tired or unfit condition, safety could still be compromised.

THE CARGO AIRLINE ASSOCIATION PROPOSAL

In spite of its concern with the ARC process, members of the all-cargo industry spent the entire Summer of 2009 developing a proposal designed to address legitimate flight and duty concerns, while at the same time ensuring that the industry can continue to adequately serve its worldwide customer base. The final proposal, if adopted, would impose significant cost, scheduling and operational burdens on the industry, but is justified based on the potential safety benefits. At its core, the CAA proposal for all-cargo operations recognizes that adequate rest for flight crews is a central element in any revised regulation. Accordingly, the proposal:

- Recognizes the distinctions between international and domestic operations;
- Establishes limits where no limits currently exist;
- For the first time, accounts for time of day operations (Window of Circadian Low or WOCL);
- Addresses the crossing of multiple time zones (“acclimatization”);
- Reduces the flight duty periods for domestic and international operations from those in current regulations; and
- Increases the required rest periods for domestic and international operations from those in current regulations.

In short, this comprehensive proposal enhances safety based on the current state of science, as well as aero medical and operational knowledge, while still accounting for the essential characteristics of the all-cargo operating environment.

CONCLUSION

The Association is currently in the process of analyzing the FAA proposal and looks forward to submitting its comments to the Agency. Thank you again for the opportunity to testify today. I would be happy to answer any questions.

Table 1

Comparisons Between Current FAR and CAA Proposal		
Flight Duty Period (Hours)		
	Current	CAA Proposal
Domestic	16	9-13
3 Crew Domestic	16	9-13
International	16	11:30-14
3 Crew International	Unlimited	14:30-16:30

Flight Time (Hours)		
	Current	CAA Proposal
Domestic	8	7-11
3 Crew Domestic	8	7-11
International	8	8-10
3 Crew International	12	12

Rest (Hours)		
	Current	CAA Proposal
Domestic	8	10
3 Crew Domestic	8	10
International	8	12
3 Crew International	8	12

**Cargo Airline Association (CAA)
Presentation to the Aviation Rulemaking Committee
Flight and Duty Time Limitations and Rest
Requirements**



August 25, 2009



1220 19th Street, NW, Suite 400, Washington, DC 20036
tel: 202 293 1030 • fax: 202 293 4377

Why are we here?

"We must find the right balance of safety, science, cost and operational efficiency regarding amendments to our current rules."

Gregory Kirkland, FAA,
Presentation on Crewmember Flight, Duty and Rest Requirements, at
the FAA Fatigue Management Symposium, June 17-19, 2008.



What is most important?

"Eight hours of sleep opportunity is much more important than time on task, duty time, etc. for assuring safe levels of alertness."

R. Curtis Graeber, Ph.D.
August 2009

Why CAA's all-cargo proposal needs to be adopted?

"In rulemaking, not only does one size not fit all,
but it's unsafe to think it can."

Administrator Randy Babbitt
Speech to the ALPA Air Safety Forum
August 5, 2009.

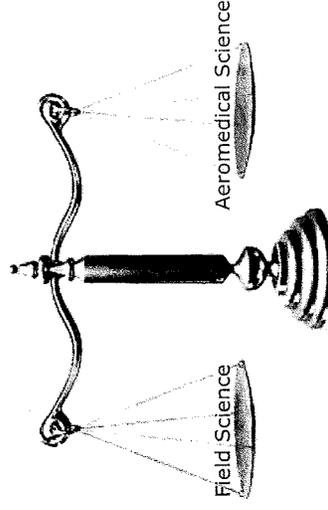
Safety Risks Of Not Getting It Right

- ♣ Unintended consequences can jeopardize safety.
 - ♣ No one knows the fatigue tradeoff between:
 - ♣ Longer duty periods with fewer nights worked
 - ♣ Shorter duty periods with more nights worked
- ♣ We need to better understand the cumulative fatigue effect of increased night work/day-life transitions.
- ♣ While current scientific models can support Fatigue Risk Management (FRM) with validation, they are too immature to support prescriptive rules.

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Guiding Principles

- ♣ Responsibility to “get it right”.
- ♣ Acceptance that fatigue is a legitimate flight safety concern.
- ♣ Need to apply science, recognizing the limits of current aeromedical knowledge and lack of scientific validation in the aviation environment.
- ♣ Need to apply field science (operational experience), particularly that of international long-haul and domestic cargo carriers.
- ♣ Need to maintain and enhance safety while allowing U.S. carriers to remain competitive, recognizing the different business models and distinct operating environments of the aviation industry segments.

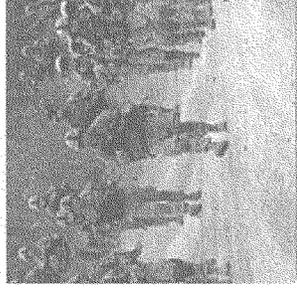


Global All-Cargo Operating Environment

- ♣ Backside of the clock is the norm, and our crews come prepared...We know how to do it right!
- ♣ Around the world in all directions is the norm.
- ♣ Traditional crew base model does not always apply.
- ♣ Length and number of rest opportunities are greater in cargo operations.
- ♣ Less hassle factor and no distractions from passengers and flight attendants.
- ♣ Point-to-point operations outside of the United States.
- ♣ Remote locations require turnaround capability.
- ♣ Fewer annual landings and lower annual flight time per pilot.
- ♣ Customer driven schedule, which is often unpredictable.

Competitive & Economic Risks Of Not Getting It Right

- ♣ Loss of U.S. carrier competitiveness.
 - ♣ Highly competitive global market where foreign competitors are not subject to similar restrictions.



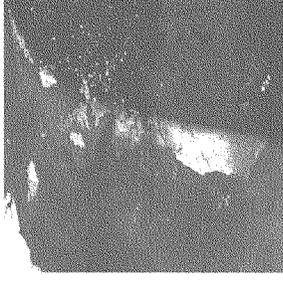
- ♣ Adverse effects on national defense.
- ♣ Adverse effects on international humanitarian interests.
- ♣ Increased operational costs will result in service reductions for individuals, businesses, and communities.

Objectives Of CAA's Recommendations

- ♣ Enhance safety based on current scientific knowledge and our members' and our crews' extensive operational experience.
- ♣ Recognize the operating environment and business models of all-cargo carriers.
- ♣ CAA's proposal harmonizes the flight, duty, and rest rules with our global cargo operations, without discounting current science as the older rules have done.

Principles Underlying CAA's Recommendations

- ♣ Protecting sleep is essential – CAA's proposal increases minimum daily and cumulative rest opportunities.
- ♣ CAA has established limits in areas where currently there are no limits.
- ♣ CAA's proposal takes into account time of day.
- ♣ CAA's proposal takes into account crossing multiple time zones.
- ♣ Through increased training, CAA members have improved crew understanding and ability to deal with sleep-performance issues.
- ♣ It is essential to distinguish between domestic and international Flight Duty Periods (FDP).



CAA's Domestic All-Cargo Proposal

Time of Start (Designated Base)	Flight Duty Period			Domestic Rest	
	1 to 4 Sectors	5 + Sectors	Extensions for Operational Irregularities	Minimum	In 168 look back
0000-0459	11	9	+ 2 *		
0500-1459	13	11	+ 2 *		
1500-1659	12	10	+ 2 *		
1700-2359	11	9	+ 2 *	10**	24***

(In Hours)

* Extensions for Operational Irregularities include conditions and requirements unforeseen or beyond the control of the certificate holder, including but not limited to weather conditions, aircraft equipment, air traffic control, acts of God, hostilities, etc.

** Reducible to 9 at certificate holder's discretion (can only occur once in any 168 hour look back)

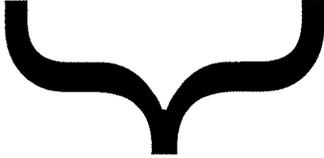
*** Applies when report to a FDP

CAA's International Fatigue Mitigation Countermeasures

Domestic → International

- Increased Rest (Currently 8 Hours)
10 → 12
- Increased Cumulative Rest
24 → 30
- Reduced Flight Time
11 → 8 (Within the WOCL)
- New lower FDP limits
- Cumulative Duty Limit protections
- Time of Day/WOCL protection
- Acclimatization Penalty

CAA's FDP Recommendations



Fatigue Mitigation:

CAA's International All-Cargo Proposal

	2 Pilot (or 2 Pilot and Flight Engineer)				
	International 2 Pilot/2 Pilot and Flight Engineer 1 to 4 sectors	Flight Duty Period International 2 Pilot/2 Pilot and Flight Engineer 5+ sectors	Extensions for Operational Irregularities	Flight Time 2 Pilot Engineer	International Rest Minimum look back
Unacclimatized**/WOCL*****	12:30	11:30	+ 2 *	8	12***
Unacclimatized**/Non-WOCL	13:00	12:00	+ 2 *	10	12***
Acclimatized/WOCL*****	13:30	12:30	+ 2 *	8	12***
Acclimatized/Non-WOCL	14:00	13:00	+ 2 *	10	12***

(In Hours)

* Extensions for Operational Irregularities include conditions and requirements unforeseen or beyond the control of the certificate holder, including but not limited to weather conditions, aircraft equipment, air traffic control, acts of God, hostilities, etc.

** Crews become unacclimatized after duties that exceed 4 time zones -- 30 hours free from duty to become acclimatized. Continental U.S. is considered one time zone for acclimatization purposes.

*** Reducible to 11 at certificate holder's discretion (can only occur once in any 168 hour look back)

**** Applies when report for a FDP

***** If any portion of the FDP occurs between 0200-0559, time computed at crewmember's acclimatized location.

CAA's International All-Cargo Augmentation Proposal

3 Pilot Augmentation (or 3 Pilot 2 Flight Engineer)
(In Hours)

International		Flight Duty Period		Flight Time	International Rest
International 3 Pilot with horizontal sleep opportunity 1 to 2 sectors 16:30	International 3 Pilot with horizontal sleep opportunity 3 to 4 sectors 15:45	International 3 Pilot seat 1 to 2 sectors 14:45	International 3 Pilot seat 3 to 4 sectors 14:30	12	Minimum look back 12**
			Extensions for Operational Irregularities + 2 *		In 168 look back 30***

International		Flight Duty Period		International Rest
International 4 Pilot with horizontal sleep opportunity 1 to 2 sectors 19:30	International 4 Pilot with horizontal sleep opportunity 3 to 4 sectors 18:45	Extensions for Operational Irregularities + 2 *	Minimum look back 12**	In 168 look back 30***

* Extensions for Operational Irregularities include conditions and requirements unforeseen or beyond the control of the certificate holder, including but not limited to weather conditions, aircraft equipment, air traffic control, acts of God, hostilities, etc.

** Reducible to 11 at certificate holder's discretion (can only occur once in any 168 hour look back)

*** Applies when report to a FDP

Math Behind the Numbers

3 Pilot Augmentation

	1-2 Sectors	3-4 Sectors
Horizontal 3 Pilot	16:30 Hours	15:45 Hours
Seat 3 Pilot	14:45 Hours	14:30 Hours

14:00 Hours (Max 2 Pilot FDP)

- 4 Hours (2¹/₂ show & 1¹/₂ 2nd sector)

10:00 Flight Hours

÷ 3 (Crew Complement)

3.33

x .75 Horizontal Sleep Factor

2.5 Sleep Credit

+ 14:00 Hours (Max 2 Pilot FDP)

16.5 (16:30) Hours (Max FDP)

Math Behind the Numbers

3 Pilot Augmentation

	1-2 Sectors	3-4 Sectors
Horizontal 3 Pilot	16:30 Hours	15:45 Hours
Seat 3 Pilot	14:45 Hours	14:30 Hours

14:00 Hours (Max 2 Pilot FDP)
 - 4 Hours (2 1/2 show & 1 1/2 2nd sector)

103

 10:00 Flight Hours
 ÷ 3 (Crew Complement)

 3.33

x .25 Seat Factor

 .833 Sleep Credit
 + 14:00 Hours (Max 2 Pilot FDP)

 14.83 (14:45) Hours (Max FDP)

Math Behind the Numbers

4 Pilot Augmentation

	1-2 Sectors
Horizontal 4 Pilot	19:30 Hours
Seat 4 Pilot	N/A

$$\begin{array}{r}
 19:30 \text{ Hours (Max 4 Pilot FDP)} \\
 - 4 \text{ hours (2\frac{1}{2} \text{ show \& 1\frac{1}{2} 2^{nd} \text{ sector})} \\
 \hline
 15:30 \text{ Flight hours (Rest Opportunity)} \\
 \div 2 \text{ (2 crews)} \\
 \hline
 7.75 \\
 \times .75 \text{ Horizontal Sleep Factor} \\
 \hline
 5.81 \text{ Sleep credit} \\
 + 14:00 \text{ (Max 2 Pilot FDP)} \\
 \hline
 19.81 \text{ (19:30) Hours (Max FDP)}
 \end{array}$$

Math Behind the Numbers

4 Pilot Augmentation

3-4 Sectors	
Horizontal 4 Pilot	18:45 Hours
Seat 4 Pilot	N/A

19:30 Hours (Max 4 Pilot FDP)
 - 7 hours (Preflight and Sector Penalty)

 105

12:30 Flight hours (Rest Opportunity)
 ÷ 2 (2 crews)

 6.25
 x .75 Horizontal Sleep Factor

 4.68 Sleep credit
 + 14:00 (Max 2 Pilot FDP)

 18.68 (18:45) Hours (Max FDP)

Cumulative Time Limits

- ♣ Cumulative duty limits (to be determined at the point the crewmember reports for a flight duty period):
 - ♣ 24 hour (domestic) - 30 hour (international) free of duty in a 168 hour look back
 - ♣ 75 hour duty limit in 168 hour look back
 - ♣ 215 hour duty limit in 672 hour look back
 - ♣ 100 block hours (in 28 day look back)
 - ♣ 1,200 block hours annual (in 365 day look back)
- ♣ **Deadheading:**
 - ♣ Front-end: To an operating leg counts in calculation of FDP

Comparisons Between Current FAR and CAA Proposal

Flight Duty Period (Hours)		
	Current	CAA Proposal
Domestic	16	9-13
3 Crew Domestic	16	9-13
International	16	11:30-14
3 Crew International	Unlimited	14:30-16:30

Flight Time (Hours)		
	Current	CAA Proposal
Domestic	8	7-11
3 Crew Domestic	8	7-11
International	8	8-10
3 Crew International	12	12

Rest (Hours)		
	Current	CAA Proposal
Domestic	8	10
3 Crew Domestic	8	10
International	8	12
3 Crew International	8	12

Summary of CAA's Recommendations

- ♣ **Flight Duty Period (2 Pilots):**
 - ♣ Domestic: 9-13 hours depending upon time of day and number of sectors.
 - ♣ International: 11:30 to 14 hours depending on:
 - ♣ Number of sectors
 - ♣ Whether or not acclimatized
 - ♣ WOCL

- ♣ **Extension for Operational Irregularities: 2 hours**

- ♣ **Flight Time (2 Pilots):**
 - ♣ Domestic: 7-11 hours depending upon time of day and number of sectors.
 - ♣ International: 8-10 hours

Summary of CAA's Recommendations

- ♣ Rest:
 - ♣ Domestic: 10 Hours, reducible to 9 (only one reduction in any 168 hour period).
 - ♣ International: 12 Hours, reducible to 11 (only one reduction in any 168 hour period).
 - ♣ Cumulative: 24 Hours in 168 hour period (Domestic)
30 Hours in 168 hour period (International)

- ♣ Augmentation:
 - ♣ 3 Pilot Augmentation
 - ♣ Flight Duty Period - 14:30-16:30 hours depending upon level of rest accommodation and number of sectors.
 - ♣ Flight Time - 12 hours
 - ♣ 4 Pilot Augmentation –
 - ♣ Flight Duty Period - 18:45-19:30 hours depending upon number of sectors.

The FAA Must Address Pre-Duty Required Rest

- ♣ Flight/duty/rest requirements alone do not address fatigue without also addressing pre-duty required rest.
- ♣ Pre-duty activity including recreation, working in another capacity, and commuting to duty must be considered.
- ♣ Pilots must report fully rested and fit for duty.
- ♣ The obligation to report fit and rested for duty is solely the responsibility of the individual crew member.
- ♣ The FAA must promulgate regulatory limitations.

CAA Strongly Supports The Development Of Fatigue Risk Management System (FRMS)

- ♣ Collection of data – FAA Scientific Steering Committee.
- ♣ Validation of fatigue science to aviation operations which considers:
 - ♣ Effects of multiple time-zones and acclimatization
 - ♣ Effects of the backside of the clock
 - ♣ Augmentation and on-board sleep
- ♣ CAA members will adjust fatigue mitigation programs as scientific evidence matures.

Conclusion

- ♣ CAA recognizes that improved safety requires rule changes.
- ♣ CAA accepts that rule changes will impose significant operational changes and costs on all-cargo operators.
- ♣ The attributes of the all-cargo industry must be reflected in flight-duty rules adopted by the FAA.

Sleep Science and Fatigue Risk Management:

Testimony to the Committee on Transportation and Infrastructure's Aviation Sub-Committee
regarding the Pilot Flight and Duty Time Rule

Thursday, September 16, 2010

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Abstract

Fatigue risk management applies 1) the science of sleep, frequently as instantiated into mathematical modeling, 2) the tactics, techniques, and procedures of sleep and performance measurement in the operational environment, complemented by 3) the clinical practice of sleep medicine to reduce the risks of poor performance, lost productivity, and error, incident and accident in the workplace. As envisioned here, fatigue risk management in aviation will in the short-term improve performance, productivity and safety and in the longer term improve flight crew and other commercial aviation operational personnel health and well being.

Introduction to Fatigue Risk Management

Fatigue risk accrues from the extended work hours, early starts, and the shift work necessary to staff 24x7 operations. This is visibly apparent in Figure 1, a composite image of the earth at night.



Figure 1: A composite image of the earth at night graphically illustrating the extent of 24x7 operations and the reality driving the need for extended work hours, early starts, and shift work. *Courtesy of NASA*

Fatigue risk management applies sleep science and the clinical practice of sleep medicine to reduce fatigue and improve performance, productivity, safety, health, and well-being in the workplace (Belenky and Akerstedt, in press). By mitigating the “fog of fatigue”, it enables the management of fatigue risk (Moore-Ede, 1995). Error, incident, and accident causation in any particular case is multi-factorial, complex, and tightly-coupled (involving multiple, interdependent, linked processes) (Perrow, 1999). With respect to any particular accident, ascribing a causal role to fatigue is difficult (Hersman, 2010), nevertheless an increase in fatigue appears to shift the performance distribution toward increased risk, making error, incident, and accident more probable and decreasing the likelihood of recovery even if the error is detected (Thomas, et al., 2007; Van Dongen, et al., 2010).

Applying the science of sleep enables fatigue-friendly rostering and scheduling and other fatigue-related “anti-fogmatics”, otherwise known as fatigue countermeasures, that blunt the adverse effect of extended work hours, shift work, and cumulative fatigue on performance, productivity, health, and well being. Applying the clinical practice of sleep medicine in the occupational setting enables the assessment of sleep disorders and their effects on alertness, performance, productivity, and safety in the workplace and their detection, treatment, and evaluation of treatment outcome.

Fatigue risk management has both short and long-term horizons. The short-term horizon is framed in terms of reducing the immediate risk of error, incident, and accident (Gander et al., in press). The long-term horizon is framed in terms of improving health and well being across a person’s working life, particularly in reducing obesity, insulin resistance, metabolic syndrome, type II diabetes, hypertension, cardiovascular disease, and cognitive decline (Van Cauter, et al., 2008; Mullington, et al., 2009).

One way of applying the science of sleep to create fatigue-friendly rosters and schedules involves integrating sleep and fatigue-related experimental findings, technologies, and metrics as components of personal biomedical status monitoring. In the not too distant future, personal biomedical status monitoring will be available to measure and integrate a plethora of parameters, including metabolic indices (e.g., blood glucose, caloric expenditure); cardiovascular parameters (e.g., blood pressure, EKG, and arterial intima function); inflammatory markers (e.g., leukocytes, IL-6, and high sensitivity C-reactive protein); behavioral metrics (e.g., sleep/wake history, circadian rhythm phase and amplitude); metrics of cognitive performance (e.g. reaction times, memory); and workload (e.g., time on task and metrics of task intensity). Personal biomedical status monitoring will form the basis of open- and closed-loop systems to monitor and intervene when necessary, in order to sustain human health, well-being, and operational performance. With respect to operational performance,

biomedical status monitoring will provide diagnostics and prognostics for the person in the operational loop by supplying inputs (e.g., sleep/wake history, circadian phase, and workload) to mathematical models to predict individual performance in real-time. These predictions will be benchmarked against, and individually adjusted to predict, actual performance (Olofsen, et al., 2004), and used as the evidence-base for real-time fatigue risk management.

To make a military analogy, sleep can be viewed as an item of logistic resupply with respect to sustaining operational performance. In managing fuel consumption, a battalion logistics officer can measure how much fuel the battalion has on hand, apply a simple mathematical model taking as input miles to be driven and estimated mileage by vehicle type to estimate how long this fuel will last, and with this estimate in hand plan for timely resupply. Similarly in managing sleep-loss related fatigue, one can measure sleep/wake history in operational personnel using actigraphy, and use this sleep/wake history as input to a mathematical model predicting how long this sleep will sustain individual performance. In light of these predictions, one can adjust operations to ensure timely resupply of sleep, by arranging a sleep opportunities of adequate length and sleep-conducive circadian placement. Eventually, models will integrate individual performance predictions to predict work group performance.

Components of fatigue and relation to fatigue risk management

Fatigue is a function of the interaction of multiple factors including sleep/wake history, circadian rhythm phase, and workload, and is modulated by individual differences in response to these factors (Wesensten et al., 2004; Van Dongen, et al., 2005). A fatigue-inducing factor is one that shifts the fatigue-risk distribution in the direction of increasing risk of error, incident, or accident. Figure 2 shows experimental data capturing the interaction of

sleep/wake history (in this instance, of total sleep deprivation), circadian rhythm phase, and time on task (a component of work load) on cognitive performance (Wesensten et al., 2004). Individuals vary one from another in their sensitivity to these factors (Van Dongen, et al., 2005). This relative variability in sensitivity to sleep loss appears to be an enduring individual trait (Van Dongen, et al., 2005). Thus, the ability of an individual to perform in the workplace varies over time as a function of, at a minimum, sleep/wake history, circadian rhythm phase, workload, and the trait-like individual variability in sensitivity to these factors. Measuring/estimating these parameters and integrating their effects on performance through mathematical modeling can provide the basis for effective fatigue risk management systems (FRMS).

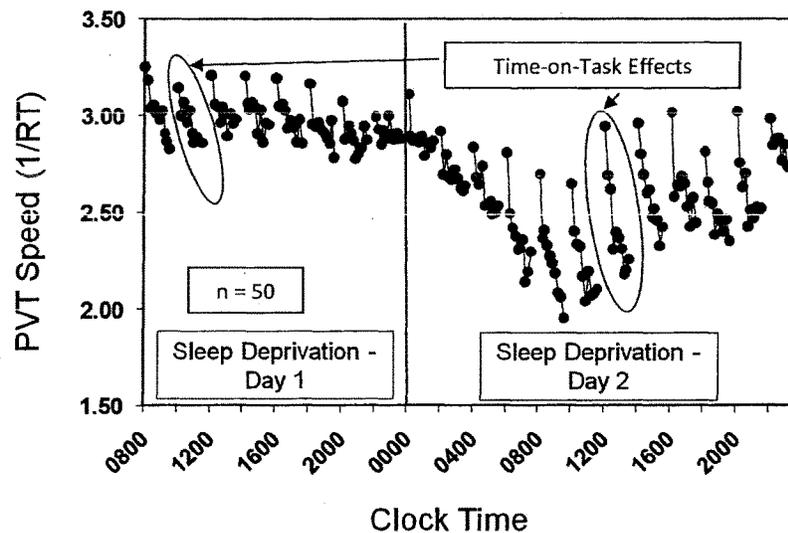


Figure 2: The effect of fatigue (a combination of time awake, time of day, and time on task) on psychomotor vigilance task (PVT) performance (expressed as the inverse of reaction time (1/RT)) in 50 healthy participants (13 women) (age range 18-30 years; mean = 22.4) deprived of sleep for 40 consecutive hours. Time awake and time on task degraded performance and this degradation was modulated by the circadian rhythm (time of day). Note the amplification of the time on task effect (red ellipses) by time awake and time of day. *Adapted from Wesensten, et al., 2004.*

Measuring fatigue

Fatigue is operationally defined subjectively by self-report and objectively by degraded alertness and task performance (McDonald et al., in press). Self-report of fatigue consist of a verbal response (e.g., the subject says “I am tired”) or a written response (e.g., by marking the Samn-Pirelli Fatigue Scale) (Samn and Perelli, 1982). Degraded operational task performance can be measured by a variety of tasks, some more sensitive than others (Balkin et al., 2004). The psychomotor vigilance task (PVT) is particularly sensitive to attentional lapses and has other desirable psychometric properties (Dinges and Powell, 1985; Balkin et al., 2004; Dorrian et al., 2005). There are neurophysiological correlates of fatigue as well, such as polysomnographically measured sleep latency (Carskadon, et al., 1986). Tasks such as the PVT are not intrinsic to workplace performance but are added metrics that to acquire takes a person away from the actual work the person is doing (McDonald, et al., in press). In contrast, embedded metrics are metrics that are taken from actual workplace performance, are seamless and invisible, and therefore do not interrupt the normal flow of work (McDonald, et al., in press). An example of such an embedded metric is lane deviation as an indicator of driver performance in the commercial trucking industry. Lane deviation can be measured effectively in both simulation and in real world, over-the-road operations (Philip, et al., 2005). Another embedded metric, fuel economy, may also be modulated by fatigue (Van Dongen, et al., 2010). Other systems, such as flight operational quality assurance (FOQA) in commercial aviation, may provide useful information about performance. We humans increasingly find ourselves embedded in robotic and automated systems, especially in the workplace – “... all watched over by machines of loving grace” in the words of the poet, Richard Brautigan (<http://www.redhousebooks.com/galleries/freePoems/allWatchedOver.htm>) – and as a result

embedded performance metrics will be increasingly available across a variety of workplaces and operational platforms.

Sleep, Circadian Rhythm, Workload, the Operational Environment, and Operational Performance

Sleep, sleep loss, and measuring sleep/wake history

Total sleep deprivation and chronic partial sleep restriction (collectively, sleep loss) leads to fatigue. Fatigue from sleep loss yields degraded efficiency and productivity at work and leads to increased errors, incident, accidents, and economic loss. These economic losses accrue to employers, employees, and to society (Folkard, et al., 2005). In the longer term, there is increasing evidence that sleep loss is associated with adverse effects on mental and physical health, such as weight gain and obesity (Knutson, et al., 2007), hypertension and cardiovascular problems (Meir-Ewert, et al., 2004) gastrointestinal disease, chronic fatigue, substance/alcohol abuse, family problems, and mood difficulties (Costa, et al., 2004). Thus, the adverse effects of sleep loss include both immediate and longer term effects.

In laboratory studies both acute, total sleep deprivation and chronic, partial sleep restriction lead to decrements in task performance, well-being, and health. Acute, total sleep deprivation degrades cognitive performance linearly over days, modulated within days by the circadian rhythm, with an average over the each day loss of capacity useful task performance of 17-25% per day (Thorne, et al., 1983; Thomas, et al., 2000). Mild, moderate, and severe sleep restriction (7, 5, or 3 hours time in bed/night for 7 days, respectively) leads to sleep-dose-dependent decreases in performance over time in comparison to baseline or to sleep augmentation (9 hours time in bed/night) (Belenky, et al., 2003) (see Figure 3). For 7 and 5 hours time in bed/night, performance appears to stabilize at lower levels after 3-4 days while for the 3 hours time in bed/night performance continues to degrade across the 7 day

experimental period. In a complementary study of chronic sleep restriction, 6 and 4 hours time in bed/night for 14 days led to sleep-dose-dependent degraded task performance (Van Dongen, et al., 2003). Of clear operational importance is the finding that even mild sleep restriction (7 hours time in bed/night) degrades performance over time (Belenky, et al., 2003). In the first mentioned study (Belenky, et al., 2003), at the end of the 7 day sleep restriction period participants were allowed 8 hours time in bed/night recovery sleep for 3 nights. In contrast to acute total sleep deprivation, where recovery is complete in 1-2 days, performance in the 7, 5, and 3 hour time in bed groups did not recover to baseline task performance over the 3 day recovery period. This is of operational importance as chronic sleep restriction is common, not to say ubiquitous, and total sleep deprivation is rare. In a follow on study to the sleep restriction and recovery study described above, it was found that preloading/augmenting sleep prior to the sleep restriction yielded more rapid recovery (Rupp, et al., 2008).

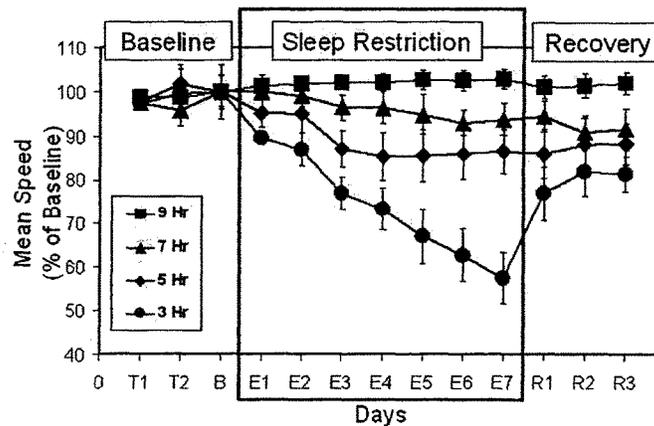


Figure 3: The effect of three levels (conditions) of sleep restriction (3, 5, or 7 hours time in bed/night) and one level (condition) of sleep augmentation (9 hours time in bed/night) over seven days (F1-F7) and compared to baseline (8 hours time in bed/night; B) and recovery (again 8 hours time in bed/night; R1-R3) on psychomotor vigilance task (PVT) performance (expressed as the inverse of reaction time (1/RT)) in 68 healthy adults (16 women) (age range 24-62 years; mean age = 37.3; 16-18 participants per sleep condition). *Adapted from Belenky, et al., 2003.*

The laboratory standard for measuring sleep/wake history is polysomnography (PSG), which uses the combination of electroencephalogram (EEG), electrooculogram (EOG), and electromyogram (EMG) to score total sleep time, sleep efficiency (% of sleep opportunity spent asleep), and the stages of sleep (N1, N2, N3, and REM). While PSG has been applied to recording and scoring sleep/wake history in the field, its dependence on an electrode array makes it impractical in most field settings. In field studies of sleep and performance, sleep diaries have been used but do not reliably measure total sleep time or sleep efficiency. In contrast to PSG and sleep diaries, the actigraph (a wrist-worn device containing an accelerometer, signal processing hardware and software, and memory) is comparable to PSG in measuring total sleep time and sleep efficiency (Ancoli-Israel, et al., 2003). The actigraph is a device about the size of a sports watch. Using its accelerometer, the actigraph measures arm movements and sums and records them typically in one-minute bins. From this activity record, using a validated against PSG sleep-scoring algorithm, a sleep/wake history for 30 consecutive days can usually be obtained before the device needs to be downloaded. Battery life and memory capacity are the limiting factors in the length and temporal resolution of the actigraph in collecting sleep/wake history. The actigraph is a useful tool for conducting field measurements over extended periods (days, weeks, months) and may have utility when combined with mathematical modeling when applied to fatigue risk management.

The circadian rhythm and measuring circadian rhythm phase

The circadian rhythm, a sinusoidal, 24-hour rhythm in core body temperature, sleep, and task performance, is set by the suprachiasmatic nucleus (SCN) of the hypothalamus, the endogenous biological clock in the brain (Moore, et al., 2002) (see Figure 4). The SCN itself receives direct input from the retina of the eye and responds to blue light with a distinctive phase response curve (Wright, et al., 2005). Core body temperature peaks around 2000 hrs and reaches its nadir between 0400-0600 hours. The circadian rhythms in task performance and sleep propensity parallel the circadian rhythm in core body temperature. Task performance peaks in mid-evening just subsequent to the peak in the circadian temperature rhythm and troughs in the early morning just subsequent to the trough in circadian temperature rhythm. Sleep propensity follows the circadian rhythm in core body temperature making it difficult to fall asleep and to stay asleep when core body temperature is rising or high and easy to fall asleep and to stay asleep when core body temperature is falling or low. The circadian rhythm modulates the risk of injury, a correlate of degraded performance. Risk of injury increases depending on the shift worked, with the lowest rates of injury risk on morning shifts and highest rates on night shifts (Folkard and Tucker, 2003). Thus, injury rates on the job are highest during the late night/early morning circadian low (Folkard and Tucker, 2003). Mild to moderate sleep loss, common for night shift workers who typically experience restricted sleep during the day (Akerstedt, 2003), leads to decrements in performance (Belenky, et al., 2003). Sleep/wake history and the circadian rhythm interact to affect alertness, sleep propensity, and performance.

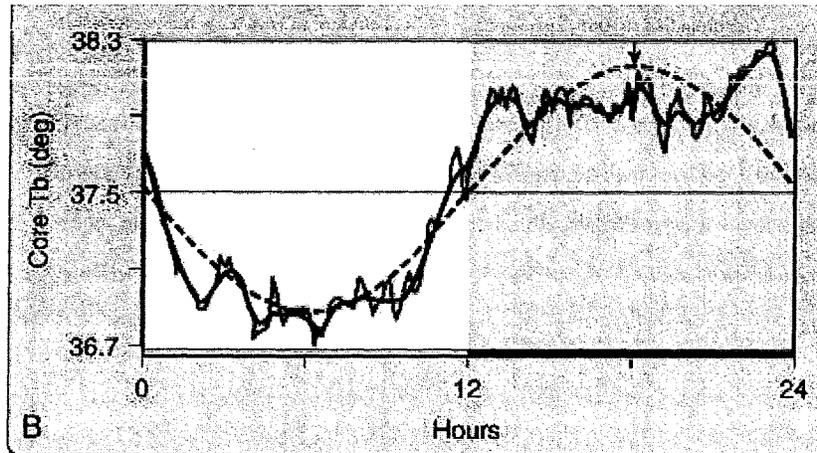


Figure 4: The circadian rhythm in core body temperature. Performance follows the temperature curve, peaking just after the peak in temperature. Sleep propensity follows the inverse of the temperature curve, peaking when body temperature is lowest. *From Kryger, Roth and Dement, 2005.*

The laboratory standard for measuring circadian rhythm phase is dim light melatonin onset (DLMO) (Lewy and Sack, 1989). Measuring DLMO requires laboratory control and dim light and is not suitable for field measurement. An alternative metric to DLMO is core body temperature measured by swallowable temperature pill or rectal probe (Edwards, et al., 2002). Because of masking effects of movement, core body temperature measurements require laboratory control and constant routine and are also not suitable for field measurement. In a person habituated to a particular time zone, circadian phase can be estimated in the field by self report on the basis of the local time zone alone. However, in crossing time zones any predictability by self report is destroyed because of the sensitivity of the SCN to light exposure in the early morning and late afternoon/early evening hours. The cross over point of the phase response curve of the SCN in a person habituated to a local time zone is in the temporal vicinity of 0300 hours, the midpoint of subjective night (Moore, 1997). In an individual habituated/synchronized to a time zone, exposure to light before the

crossover point of the phase response curve is seen by the SCN as a late sunset and stimulating a circadian phase delay, while exposure to light after the crossover point is seen by the SCN as an early dawn stimulating a circadian phase advance. The maximum phase response (shift in circadian phase) to light exposure is at dawn and dusk. This variability in the phase response curve makes the prediction of shifting phase angle by self-report when crossing multiple time zones difficult without exact knowledge of initial circadian phase and light exposure at the level and position of the eye. In theory, and perhaps in practice, accurate measurement of light exposure at the level and position of the eye combined with accurate mathematical models describing the SCN phase response curve to light may enable the accurate prediction of circadian phase with shifting time zones (Bierman, et al., 2005).

Workload

Workload is not satisfactorily operationally defined and therefore not easily measured in either laboratory or field. Some studies have equated workload with time on task, a component of workload. Fatigue as a result of time on task has been shown to be relieved by breaks within shift (Knutson, et al., 2007). Thus, fatigue from time on task recovers with simple rest, a break from task performance, and does not require sleep to recover. In contrast, fatigue and performance decrements related to time awake are only reversed by sleep (Dawson and McCulloch, 2005). Fatigue resulting from working long hours or overtime shifts increases the risk of accident (Dembe, et al., 2005). Workload, time of day, and sleep loss all interact to affect task performance.

The operational environment

The operational environment is defined as a work setting in which human task performance is critical and if human performance degrades the system will fail. In the operational environment, the human-in-the-operational-loop has limited time to decide and act (Wesensten, et al., 2005). There are a large variety of operational settings. These include

military operations, maritime operations, medicine, the modes of land transportation, aviation, security work, energy generation, resource extraction (mining and drilling), financial markets, and industrial production. In brief, any 24x7 operation and any operation involving extended work hours or shift work is an operational setting. In these settings, the operational characteristics described previously (i.e., shift timing and duration, work intensity, and difficulty and complexity of the work tasks) degrade performance directly through the effects of workload and/or working through the circadian low and indirectly by reducing the amount of time available for sleep or placing the sleep opportunity at a non-propitious time for sleep, thus reducing total sleep time, a primary determinant of alertness and performance (Wesensten, et al., 2005). The effects of fatigue on real-world or realistically-simulated operational performance can be complex. In an aviation simulation study, after completing a multi-day international run (fatigued) versus coming into the simulation after a few days at home (rested), Boeing 747 2-pilot crews were better able to detect errors but less able to manage them successfully (Petrilli, et al., 2007).

Operational task performance

This finding of degradation in complex task performance seen in simulator studies is complemented by evidence from laboratory studies in which some forms of complex task performance are degraded more than simple task performance (Harrison and Horne, 2000; Nilsson et al., 2005). There is however counter-evidence suggesting further subtleties (Tucker et al., 2010). Evidence from imaging studies suggests total sleep deprivation selectively deactivates the prefrontal cortex as indicated by a larger decrease in glucose uptake (regional cerebral metabolic rate glucose (rCMRglu) than the rest of the brain as measured by positron emission tomography using 18-fluoro-2-deoxyglucose as tracer (Thomas et al., 2000). This decrease in rCMRglu reflects a general decrease in neuronal firing as the brain depends on just in time delivery of glucose and, then, oxygen (Magistretti,

et al., 1995). As the prefrontal cortex is responsible for complex task performance, including judgment, planning, situational awareness and the integration of reason with emotion, this physiological evidence supports the behavioral findings under conditions of sleep loss (Harrison and Horne, 2000).

In complementary fashion, evidence from other imaging studies suggests that the prefrontal cortex is selectively targeted for recuperation during sleep, as the prefrontal cortex remains deactivated during both non-rapid eye movement (NREM) sleep and rapid eye movement (REM) sleep, while the rest of the brain returns to approximately waking levels of activation during REM sleep.

A case example in which complex task performance degraded more than simple task performance comes from the debriefings conducted by one of the authors (GB) of friendly fire incidents during the 1990-1991 Gulf War (Operation Desert Storm). In one such incident, sleep restriction contributed to Bradley Fighting Vehicle crews losing their orientation to the battlefield (a complex task) and therefore causing them to mistake friend for foe while maintaining their ability to lay cross hairs on the target and shoot accurately (a simple task) resulting in the destruction of a friendly Bradley (Belenky et al., 1996).

Consolidated sleep, split sleep, and sleep fragmentation

Split sleep, in the form of biphasic sleep, occurs naturally in cultures in which people regularly take siestas (Webb and Dinges, 1989). Recent studies have demonstrated that performance is a function of total sleep time in 24 hours, regardless of whether the sleep is consolidated or split (Belenky, et al., 2008) and irrespective of sleep stages (e.g., NREM and its stages or REM sleep). Thus, it does not appear to matter whether sleep is obtained in a single, consolidated sleep bout or distributed in 2 or 3 bouts over 24 hours (split sleep). Given equal total sleep time, split sleep appears to sustain performance as well as sleep

consolidated into a single sleep bout (Belenky, et al., 2008). Thus, total sleep time measured by actigraphy can be used to predict performance in operational settings (Ancoli-Israel, et al., 2003).

Similarly, in some work settings involving night shift work and/or early starts, splitting sleep into main sleep period and supplementary naps is common. In a field study of physicians in training, assessing sleep and performance and comparing when working night float versus day shift, physicians averaged about 7 hours of total sleep time by actigraphy per 24 hours in both night float and day shifts (McDonald, et al., 2009). However, they obtained this sleep quite differently depending on which type of shift they were working. If working the day shift, the physicians obtained their 7 hours of sleep at night in a consolidated main sleep. If working night float, the physicians split their sleep and obtained their 7 hours of sleep in a main morning sleep of approximately 4 hours, supplemented with night time naps totaling 3 hours. Performance on the PVT, taken at approximately the same clock times going on and going off shift, was the same on night float and day shift.

Split sleep (2-3 multi-hour sleep bouts across a 24 hour period) should be clearly distinguished from fragmented sleep (sleep interrupted every few minutes). Sleep fragmented with even subliminal arousals (change in sleep stage in response to a stimulus) at a frequency of every 2-3 minutes can lose all recuperative value (Bonnet and Arand, 2003). In contrast, it appears that sleep bouts greater than 20 minutes in length have minute by minute recuperative value equivalent to consolidated sleep (Bonnet and Arand, 2003).

[L1] Individual differences in response to factors causing fatigue

There are substantial differences between individuals in degree of performance degradation resulting from sleep loss (Van Dongen, et al., 2005). These differences appear to be enduring characteristic that is present on subsequent retest, and therefore trait-like. Recent

work has associated this trait-like difference with genetic markers (Viola, et al., 2007). There are also cohort differences associated with age. Older individuals perform less well than younger individuals when both are rested but perform better than younger individuals when sleep-restricted (Bliese, et al., 2006). There are individual differences in phase angle and amplitude of circadian rhythm which are likely to affect fatigue as measured by self-report and objective performance measures.

Predicting performance from the components of fatigue

In the 1980s, one of the authors (GB) was directing the U.S. Army's research program in sleep and performance, measuring sleep in the field environment by actigraphy. Actigraphy was a young, developing technology. When presented with early field actigraph studies, U.S. Army General Maxwell Thurman (General "Max") harrumphed and said, "I don't care how much they sleep, I want to know how well they perform." An actigraphically recorded sleep/wake history is a marvel of applied information technology, but in and of itself an actigraphically-derived sleep/wake history does not speak directly to the actigraph wearer's performance. Keeping General Max's response in mind, we developed a mathematical model taking sleep/wake history and estimated circadian phase as its inputs and yielding a minute-by-minute prediction of performance as its output. Our model and other similar models have become commercial products with application in the developing field of fatigue risk management (Wesensten, et al., 2005; Mallis, et al., 2004). General Max would be pleased – with actigraphy we will know how much people sleep and applying mathematical models to the actigraphic data we will be able to predict how well they will perform.

Systems of fatigue risk management

Outline of a fatigue risk management system (FRMS)

The traditional technique for managing fatigue risk in the workplace has been and still to a large extent is hours of service regulations. Hours of service rules were first promulgated in early 19th century Britain in response to the industrial revolution (Cornish and Clark, 1989). Such regulations typically specify the number of permissible hours on duty in 24 hours and sometimes weekly or other longer term limits as well. They take into account homeostatic sleep drive but not the effects of the circadian rhythm on performance and sleep propensity. Such rules are prescriptive and hence rigid and, as a defense against fatigue risk, are brittle. As there is a negative correlation between work hours and hours of sleep, i.e., longer work hours predict less sleep (Basner, et al., 2007; McDonald et al., 2008), this approach, as a broad first cut, has merit for normal day shift work where the person works during the day and sleeps at night. It is worth noting that employees who work afternoon shifts sleep more than employees working standard day shifts (Lauderdale, et al., 2006). When work and sleep are in harmony with the circadian rhythm in sleep propensity and performance, hours of service regulations are a reasonable approach. Where prescriptive rules breakdown are when the work schedule involves extended work hours, early morning starts, or night shifts as these simple prescriptive rules do not take into account the circadian rhythms in performance and sleep propensity.

The National Transportation Safety Board (NTSB) has taken an active role in working to reduce errors, incidents, and accidents in aviation by recommending a move away from simple prescriptive rules toward a system for managing fatigue risk that takes into account not just the effects of time awake but seeks to “set working hour limits for flight crews, aviation mechanics, and air traffic controllers based on fatigue research, circadian rhythms, and sleep and rest requirements” (http://www.nts.gov/recs/mostwanted/aviation_reduce_acc_inc_humanfatig.htm). More recently, The Honorable Deborah Hersman, the Chairman of the NTSB, has expressed

support for moving beyond working hour limits to full-on fatigue risk management (<http://www.nts.gov/speeches/hersman/daph100305.html>).

In contrast to prescriptive hours of service regulation, evolving fatigue risk management systems are a flexible, multi-layer defense in depth against fatigue risk. In one conceptualization (Dawson and McCulloch, 2005), an organizational FRMS would include tactics, techniques, and procedures to ensure that employees have an adequate sleep opportunity both in terms of total sleep opportunity duration over 24 hours and in terms of placement relative to the circadian rhythm in sleep propensity. Further, it would measure (e.g., by sleep diary or wrist-worn actigraph) the use made by employees of the sleep opportunity that was available to them. Finally, given the sleep opportunity and the use made of it, an FRMS would evaluate (e.g., by self- or co-worker report, or with added or embedded performance metrics, or model-based performance predictions) how well employees are performing in the workplace while on duty.

Creating and implementing fatigue-friendly rosters and schedules

An FRMS can be implemented in a variety of forms from the technologically simple to the technologically complex. FRMS in Air New Zealand has been in use for around 15 years, overseen by a collaborative group with a combination management, crew member, and scientific/medical membership. The process originally consisted of soliciting and reviewing voluntary fatigue reports from pilots and flight attendants, and undertaking specific studies on highly reported trips or duties; these studies used a combination of subjective ratings such as the Samn-Perelli fatigue scale (Samn and Perelli, 1982), along with reaction time based performance tests. More recently, studies have asked pilots to complete a Samn-Perelli assessment just prior to descent (at top of descent), on a routine basis, and on some fleets this is being inputted directly into aircraft flight management computers. In FRMS such as the one used by Air New Zealand, the fatigue data collected is typically used to refine specific

flights and schedules within the framework of existing prescriptive hours of service regulations (Petrie, et al., 2004; Powell, et al., 2008). easyJet has evolved a more complex system involving a detailed fatigue report form, as well as actigraphically-measured sleep/wake history, and FOQA data that is used to obtain specific exceptions to prescriptive hours of service regulations (http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs200/media/aviation_fatigue_symposium/StewartComplete.pdf). Most recently, Boeing has entered the FRMS field by integrating mathematical modeling predicting fatigue risk from sleep/wake history and circadian rhythm phase into commercial rostering and scheduling software produce what potentially could be a turnkey fatigue risk management system (Romig and Klemets, 2009). In FRMS such as being developed by Boeing, the model has the potential to become the rule, replacing prescriptive hours of service regulations.

Whether operating within prescriptive rules, used to obtain relief from specific aspects of prescriptive rules, or replacing prescriptive rules, implementation of an FRMS occurs within a complex context, e.g., regulatory environment, labor/management agreements, economic imperatives, and organizational structure. There are synergies if FRMS is implemented in the context of broader safety and operational risk management. The aim of FRMS is to maximize on shift performance and total sleep time in 24 hours within existing operational constraints.

Screening, diagnosing, and treating sleep disorders

A common cause of degraded performance and excessive day time sleepiness is inadequate sleep. Inadequate sleep can result from a number of factors including sleep disorders - in particular, obstructive sleep apnea (OSA). OSA is a respiratory impairment characterized by severely disturbed breathing during sleep due to the blockage of airflow in

the upper airway (Carskadon and Dement, 1981). This results in frequent arousals triggered by the drive to breathe, causing fragmentation of sleep which degrades its recuperative value, and leads to performance impairments and excessive day time sleepiness (Adams et al., 2001; Lavie, 1983). For instance, patients suffering OSA experience often report falling asleep briefly when stopped at traffic lights or while sitting quietly on the couch in the afternoon (Johns, 1993; Johns & Hocking, 1997). An increased risk of OSA is associated with male gender, increasing age, and being overweight. A middle aged, overweight male who snores loudly, has been witnessed by others choking, gasping, or having apneas (cessation of respiratory movement) during sleep and complains of excessive daytime sleepiness or insomnia likely has sleep apnea. It has been reported that commercial vehicle drivers have a higher incidence of OSA when compared to the general population (Horne & Reyner, 1995; Howard et al., 2001). Individuals who suffer from this disorder are statistically more likely to be involved in car crashes (George, Boudreau & Smiley, 1997; Young et al., 1997; Stoohs et al., 1994) and are potentially at a higher risk of other occupational accidents (Rodenstein, 2009). Notably, treatment of the OSA has been shown to reduce in motor vehicle accidents (Mazza, et al., 2006), highlighting the importance of early diagnosis and effective treatment of the disorder.

Age, gender, body mass index and neck circumference have been identified as independent predictors of sleep disordered breathing (Young et al., 2002). The Multivariable Apnea Prediction Scale (MAPS) (Maislin et al., 1995) is one screening tool that incorporates age, gender, body mass index and responses to three questions into a predictive equation for sleep disordered breathing. The questions relate to frequency of snorting or gasping; loud snoring; and episodes of choking, breathing stopping or struggling for breath at night. This questionnaire predicts sleep apnea risk using a score between zero and one (low to high probability of sleep disordered breathing), with relatively high sensitivity. In a clinical

sample, the MAPS has been found to have a 95% sensitivity for detecting sleep disordered breathing (98% sensitivity for severe disease), with a specificity of 68%, as compared to PSG (Gurubhagavatula, et al., 2001).

Identification and treatment of OSA is an important part of reducing excessive sleepiness in workers, thereby reducing accident risk and increasing productivity in the workplace. Incorporated into an FRMS should be a mechanism for screening for those at-risk for OSA and other sleep disorders in order that the at-risk population can be formally evaluated with an overnight sleep study and, if diagnosed, treated. A two step screening process could involve an initial screening questionnaire such as the MAPS and, depending on available funding, those who were found to be at a higher risk for OSA could undergo nocturnal oximetry or overnight PSG recordings as further evaluation and/or formal diagnosis. Screening could be 1) routine as a part of a yearly physical exam, and/or 2) triggered by evidence of drowsiness or poor performance (by observation or added or embedded performance metrics) given adequate sleep opportunity and good use made of it. Similar recommendations have been made by the National Transportation Safety Board (NTSB) (http://www.nts.gov/recs/letters/2009/H09_15_16.pdf). Application of sleep apnea screening by Schneider Trucking according to Deborah Hersman, Chairman of the NTSB, “reduced preventable crashes by 30%, reduced the median cost of crashes by 48%, improved fleet retention rate by 60% over fleet average, and achieved health care savings of \$539 per driver per month” (<http://www.nts.gov/speeches/hersman/daph100526.html>).

Evaluating effect of fatigue risk management implementations on error, incident, and accident, performance, and productivity

A fatigue risk management system is data driven. It operates on the principle of the process of iterative improvement dubbed “test, operate, test, exit (TOTE)” (Miller, et al.,

1960), and the similar to the “observe, orient, decide, act (OODA) loop” posited by John Boyd (Coram, 2002; Wesensten, et al., 2005; [http://en.wikipedia.org/wiki/John_Boyd_\(military_strategist\)](http://en.wikipedia.org/wiki/John_Boyd_(military_strategist))). For fatigue risk management “test” involves monitoring of added or embedded measures of performance together with observation of error, incident, or accident; and/or loss of productivity and making absolute or relative comparisons to previous performance or some standard of performance, and thus detecting a drift away from nominal. “Operate” involves changing something in the system, e.g., the work schedule that operational experience suggests will correct the observed drift away from nominal performance. This is followed by another “test” to determine the effectiveness of “operate”. This is an iterative process, repeating as many times as necessary until “test” yields nominal values, at which point the process exits. The iterative FRMS approach is qualitatively different from the promulgation of hours of service rules.

Error, incident, and accident reporting are fundamental to corporate safety management systems into which FRMS is logically folded. There is evidence that fatigue causes a decrease in productivity perhaps preceding an increase in error, incident, and accident, making loss of productivity a leading indicator (in the economic sense of early indicator) of fatigue (Thomas et al., 1997; Van Dongen, et al., 2010). Evaluating productivity and performance in the workplace is a critical component of fatigue risk management.

Summary of current practice and future promise of fatigue risk management

The current practice of fatigue risk management includes applying sleep science to reduce the risk of error, incident, or accident 1) within the context of the existing hours of service regulations and 2) by gaining exceptions to the existing regulations. For its future promise, fatigue risk management will replace the existing regulations (and labor management agreements) with sleep-science-derived mathematical models predicting

individual and group performance from sleep/wake history, circadian rhythm phase, and workload derived from personal biomedical status monitoring integrated into rostering and scheduling software. Both the Federal Aviation Administration (FAA) and the International Civil Aviation Organization (ICAO) are putting forward proposals for the transition from hours of service (HOS) rules to fatigue risk management systems (FRMS). In the future, the model, informed by sleep and performance data, promises to become the rule.

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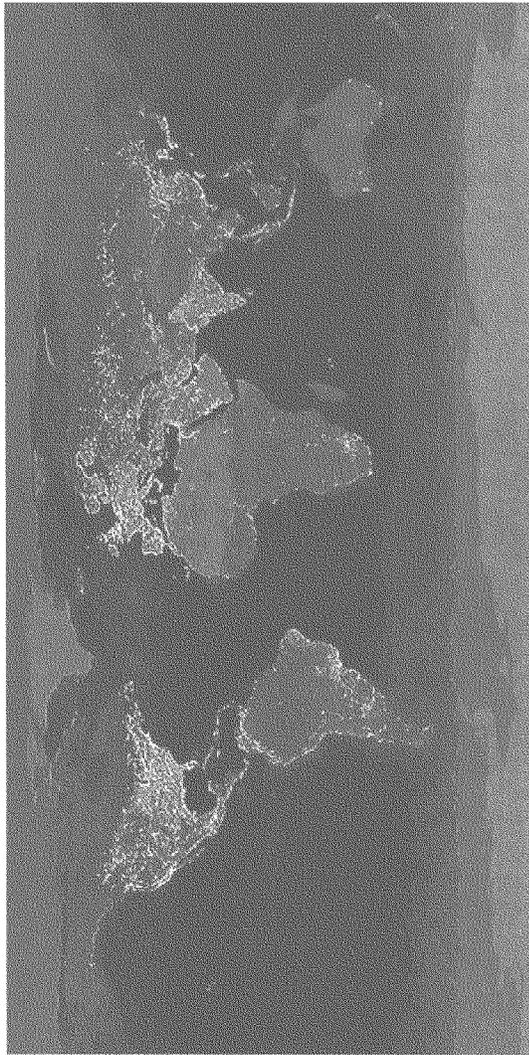
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***Sleep Science and Fatigue Risk Management:
Testimony to the Committee on Transportation and
Infrastructure's Aviation Sub-Committee regarding
the Pilot Flight and Duty Time Rule
Thursday, September 16, 2010
Human Performance***

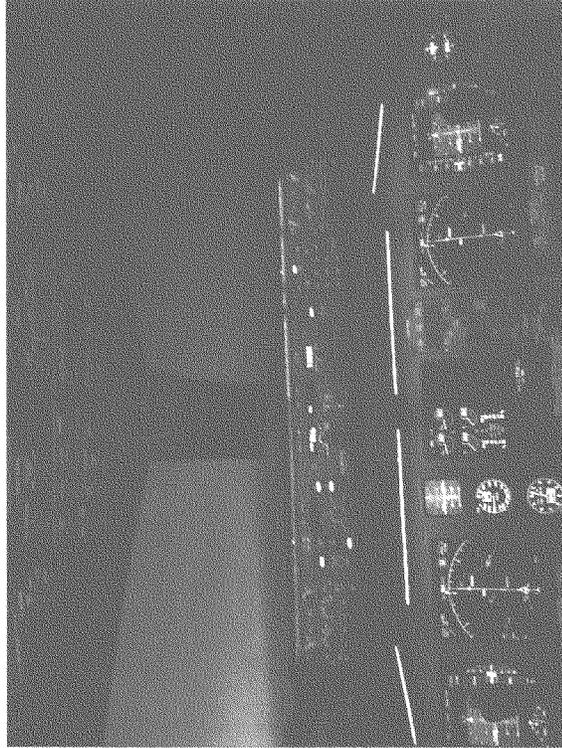
***Gregory Belenky, M.D.
Sleep and Performance Research Center
Washington State University***

 **The Earth at Night:
The Problem of 24/7 Operations**





Newark to Hong Kong – Over the North Pole

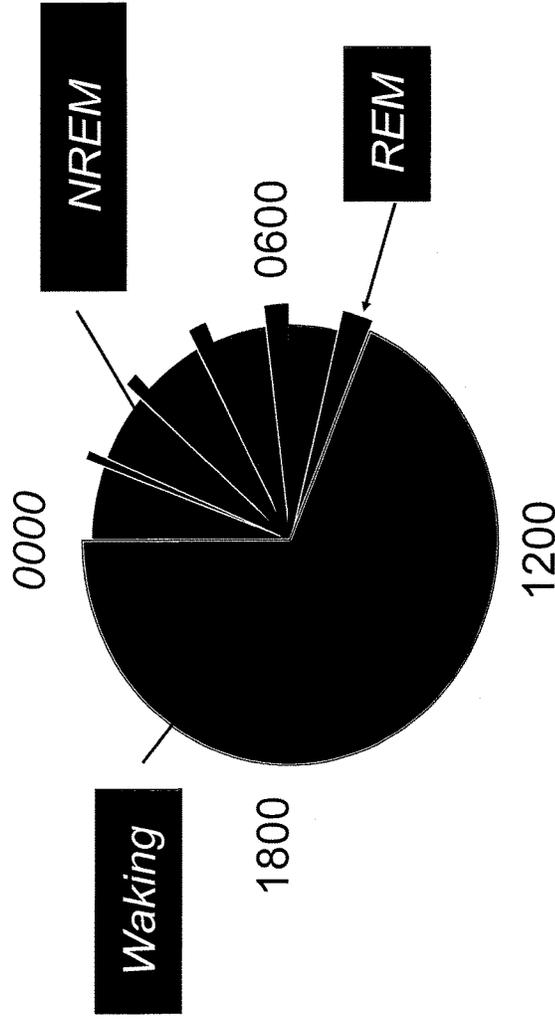


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Washington State University

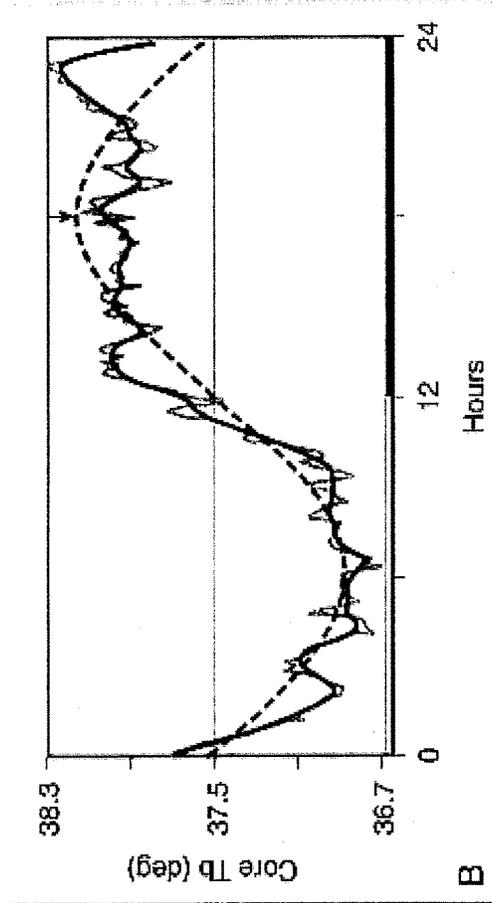


The Sleep/Wake Cycle



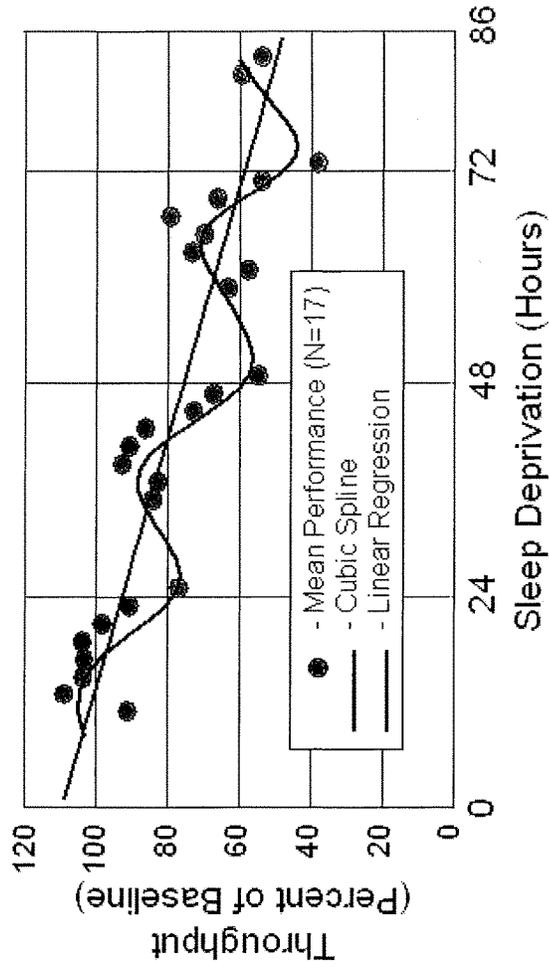


The Internal Body Clock (Circadian Rhythm)



From Kryger, Roth and Dement,
2005

85 Hours of Total Sleep Deprivation: Effect on Performance



Adapted from
Thomas, et al., 2000
Sleep and Performance Research Center

Washington State University

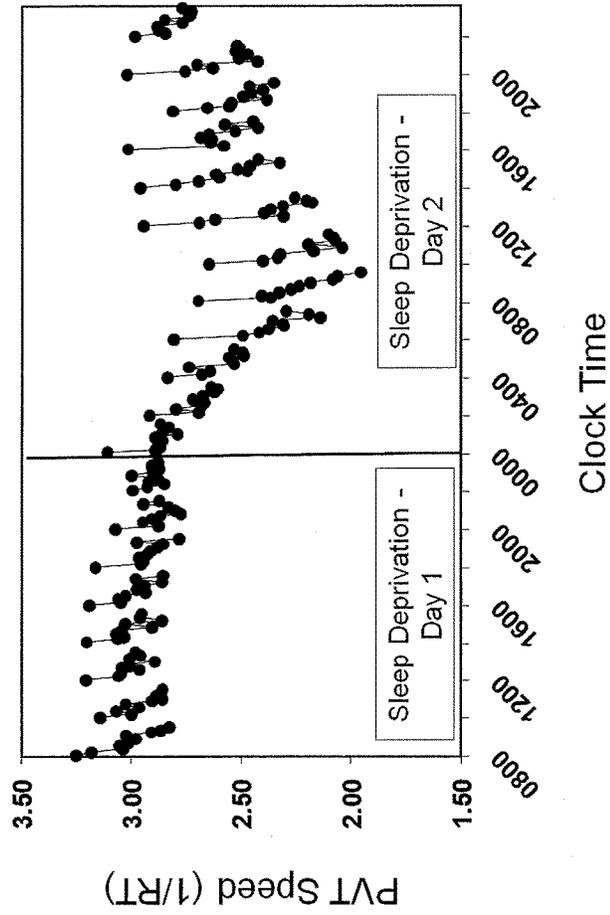


Fatigue and its Components

- *Fatigue operationally defined*
 - *Subjectively by self-report*
 - *Objectively by degraded performance*

- *Fatigue is the final common pathway integrating*
 - *Time awake, sleep/wake history, and sleep loss*
 - *Time on task, task intensity, and task complexity*
 - *Circadian rhythm, time of day*
 - *Individual differences*

 **The Interaction of Time Awake, Time of Day, and Time on Task**



Sleep and Performance Research Center

Adapted from Wesensten et al., 2004



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PILOT FLIGHT AND DUTY TIME RULE HEARING

WRITTEN TESTIMONY

OF

A. OAKLEY BROOKS, PRESIDENT

NATIONAL AIR CARRIER ASSOCIATION

BEFORE THE

SUBCOMMITTEE ON AVIATION

OF THE

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

U. S. HOUSE OF REPRESENTATIVES

SEPTEMBER 16, 2010

National Air Carrier Association (NACA) appreciates the opportunity to submit written testimony on the occasion of the hearing held on September 16, 2010 before the Committee on Transportation and Infrastructure's Subcommittee on Aviation to consider the **Pilot Flight and Duty Time Rule**.

NACA was founded in 1962. Its fifteen current member carriers are: Air Transport International, Allegiant Air, Atlas Air, Evergreen Airlines, Kalitta Air, Miami Air, National Airlines, North American Airlines, Northern Air Cargo, Omni Air International, Ryan Air International, Southern Air, Sun Country Airlines, USA 3000 Airlines, and World Airways.

All NACA carriers are certificated under Title 14 Code of Federal Regulations Part 121. They are a diverse group of air carriers, providing scheduled low-cost passenger service, non-scheduled and on-demand passenger charter service, and all-cargo operations, both scheduled and non-scheduled. NACA members fill a unique niche in the air carrier industry, offering services in response to ever changing demands by the U.S. military, travelling public, and businesses.

NACA carriers are significant partners with the U.S. Department of Defense (DOD) in the Civil Reserve Air Fleet (CRAF) program. NACA airlines currently carry nearly 95% of the military passengers around the world and 40% of the military cargo. All airlines that operate missions for DOD are subject to strict and regular audits by department officials. This includes on-site audits at airlines' headquarters and operating locations, as well as en-route check-rides during actual missions. Airlines must file timely reports detailing any variances from strict procedures, and continual communication and feedback between airlines and the government is a matter of routine. DOD's Air Carrier Survey and Analysis Office is a partner with the Federal Aviation Administration (FAA) in this oversight of CRAF carriers. CRAF missions are operated safely.

NACA has participated in every aviation rulemaking committee (ARC) on the subject of pilot flight and duty time since the early 1990s. That participation included the just completed Flight and Duty Time Limitations and Rest Requirements ARC chartered by FAA in June 2009. NACA submitted an alternate proposal to this ARC, offering that the new rule continue to contain a separate Subpart S, which would apply to non-scheduled passenger and all-cargo carriers, with an additional requirement for a fatigue risk management system (FRMS) for all operators.

Any comments offered to this hearing will have been dramatically affected by the fact that FAA released its Notice of Proposed Rulemaking regarding Flightcrew Member Duty and Rest Requirements to the public on September 10, 2010. The landscape has now changed.

It would be a stretch to expect a detailed review of the NPRM and a considered reflection on its contents for this hearing. The one-hundred and forty-five (145) page notice, total, includes one-hundred and twenty-four pages (124) of background and discussion and twenty-one pages that set out the proposed new Part 117 in Chapter 1 of Title 14 Code of Federal Regulations. There are nearly fifty (50) elements of the proposed rule about which FAA is requesting comment from the public.

(It is also a stretch to expect the community affected by this proposed set of new rules to file meaningful comments within the sixty (60) days called for in the NPRM. NACA believes a period of one hundred and twenty (120) days is essential for meaningful responses; FAA and the public will benefit from well thought-out responses. This will still leave six and one-half months for the agency to write the final rule and comply with applicable law.)

NACA offers these remarks in the present context, following release of the NPRM:

1. NACA continues to support the use of fatigue science, where applicable, in making changes to the current FAA flight and duty time rules. Science in this context is not conclusive, however. The NPRM, itself, states, "As noted previously, sleep science has not been validated in the aviation context." (p. 39). The American Medical Association stated in its position paper submitted to the flight and duty time ARC: "The prescriptive rule-making approach commonly used by regulatory agencies to regulate crew rest and flight and duty times is not derived from the foundational scientific research addressing the interaction of sleep and circadian processes and their effects on performance."
2. NACA continues to believe it is appropriate and necessary to maintain a separate regulatory section similar to the current Subpart S, which governs the non-scheduled passenger and all-cargo operations of U.S. carriers. Subpart S was included in the regulations to recognize differing commercial environments between scheduled and non-scheduled airlines. Those differences continue and justify the basis for treating them separately.

3. FAA provides scant basis for its proposal to depart from current practice and have one set of rules for all types of operations (“one size fits all”), scheduled domestic and international (flag), and non-scheduled. Language in the NPRM makes the simple and we believe incorrect statement that all operations (scheduled and non-scheduled) are becoming similar and the proposed rule provides flexibility. Full stop. It concludes that one size can properly fit all. This, notwithstanding FAA Administrator Babbitt’s comments to the Air Line Pilots Association Safety Forum in August 2009: “...in rulemaking, not only does one size not fit all, but it’s unsafe to think it can.”
4. The NPRM eliminates separate Subpart S rules for non-scheduled carriers, but non-scheduled carriers **continue to have distinctly different operations compared to scheduled ones. The two types of carriers are not at all becoming ‘similar’, and those differences require separate rules.** Consider the following points:
 - Non-scheduled carriers fly fewer hours than scheduled carriers: (a) their aircraft achieve about eight (8) hours per day utilization compared to over thirteen (13) for scheduled airlines; and, (b) non-scheduled crews fly only fifty (50) hours per month compared to seventy-five (75) hours for scheduled airline crews.
 - **Non-scheduled crews may fly long sequences, but they receive much longer sleep opportunities than required by the rules both before and after such extended flight duty periods; this is the key justification for current Subpart S rules and why they should continue: longer flying but longer sleep opportunities;** scientists engaged in fatigue risk management have concluded such long duty/sleep sequences allow pilots to perform their duties safely.
 - Non-scheduled airlines fly when the customer dictates, not the other way around; this means non-repetitive flight segments, often on relatively short notice, to every corner of the globe; the vast majority of CRAF missions, for instance, are booked only three weeks in advance; but, as noted previously, non-scheduled flight crews receive longer sleep opportunities both before and after extended flight duty periods; maintaining flexibility for non-scheduled operations is essential.

5. NACA notes with enthusiasm the requirement in P.L. 111-216, signed into law on August 1, 2010, for all carriers to submit a Fatigue Risk Management Plan (FRMP) to the FAA administrator by October 31, 2010. The administrator has one year to evaluate and approve these plans. Fatigue risk management will be the cornerstone of every carrier's safety management system and will provide flexibility for carriers to perform ultra long range operations by demonstrating equivalent safety.
6. Industry must undertake a careful review of the prospective cost of the new rules. The right balance must be found toward the goal of continuing the highest level of safety at a cost that reflects competitive pressures from carriers worldwide.

In closing, National Air Carrier Association and its fifteen member airlines are committed to working closely with FAA and the entire aviation community to arrive at flight crew duty and rest rules that provide the highest level of safety. Participation in the review of FAA's just-released NPRM provides a timely and unique opportunity for the aviation operating community to craft rules that will take it to the next level of safety. NACA welcomes and looks forward to that process.

STATEMENT OF MARGARET GILLIGAN, ASSOCIATE ADMINISTRATOR FOR AVIATION SAFETY, FEDERAL AVIATION ADMINISTRATION, BEFORE THE HOUSE OF REPRESENTATIVES, COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE, SUBCOMMITTEE ON AVIATION, ON PILOT FATIGUE, SEPTEMBER 16, 2010.

Chairman Costello, Congressman Petri, Members of the Subcommittee:

Thank you for inviting me to appear before you this morning to discuss the Federal Aviation Administration's (FAA) efforts to mitigate the impacts of pilot fatigue to enhance aviation safety. Updating FAA's regulatory requirements on pilot fatigue has been a high priority for Secretary LaHood and Administrator Babbitt. As you know, Administrator Babbitt was formerly a commercial pilot, so his interest in and insights about pilot fatigue have been longstanding, and were helpful in making rulemaking on this matter an Administration priority. Their assistance and guidance on this matter have been invaluable. I am pleased that their focus has enabled the FAA to publish a Notice of Proposed Rulemaking (NPRM) on September 14, 2010, that proposes changes to the current flight duty and rest regulations. The NPRM represents a comprehensive proposal that is the result of extensive outreach to the aviation industry, labor and the scientific community. Unlike the existing requirements, the proposal would establish a single, scientifically-based regulatory approach for all Part 121 operators, including domestic and international passenger and cargo operations, as well as supplemental carriers.

While the publication of this NPRM is a huge step forward, I want to stress that it is the latest step in a long history of FAA efforts to mitigate fatigue. We held symposia on fatigue and worked with aviation industry and the scientific community to gather data to

meet the scheduling demands of the industry (including ultra long-range flights), without compromising safety. As the science of fatigue matured, we worked to educate the industry to mitigate risks as they were identified. The new proposal reflects our drive to reach consensus across different facets of the aviation industry.

In the past, I have said something that is worth repeating now: regardless of what regulatory framework is in place, mitigating the effects of fatigue is a shared responsibility. The FAA has the responsibility to put the framework in place. The air carrier has the responsibility to schedule its flight crews responsibly and in accordance with that framework. The pilot has the ultimate responsibility to use the hours set aside for rest to actually rest, to report for duty in a fit condition, and to notify the airline when he or she is too fatigued or otherwise not fit for duty. Nothing about the latest proposal changes those basic responsibilities.

In the aftermath of the Colgan Air Flight 3407 accident in February 2009, the FAA placed great emphasis on all safety factors that either were, or could have been, a contributing cause to the accident. Secretary LaHood and Administrator Babbitt issued an Airline Safety Call to Action for the foremost aviation safety experts to discuss the best ways to make an already safe industry even safer. Fatigue was clearly a factor of some concern, given that one member of the Colgan flight crew commuted from the West Coast prior to reporting for duty and the evidence suggested that she may not have had sufficient rest.

In addition to the Call to Action, Administrator Babbitt convened an Aviation Rulemaking Committee (ARC) comprised of representatives from airline management and pilot labor unions to review fatigue-related issues and to make specific scientifically-based recommendations that could be the basis of rulemaking. The ARC delivered its report and recommendations in September 2009. The report and recommendations reflected consensus on many issues, but there were a handful of issues where the ARC did not reach consensus. In addition, the ARC was not charged with performing any type of economic analysis, which the FAA must provide in any rulemaking initiative.

The NPRM utilizes accepted assumptions as to what causes fatigue and creates a framework that addresses those risks. For example, it is generally accepted that higher levels of activity cause more fatigue and that most people need eight hours of sleep in a 24 hour period in order to perform effectively and remain alert. It is also acknowledged that an average person needs in excess of nine hours of sleep in order to recover from accumulated sleep deprivation and the quality of the sleep an individual gets is usually affected by the time of day in which it occurs, with nighttime sleeping being more restorative.

Using these assumptions as a basis, the NPRM focuses on the nature of the operation. During a duty period, how many take-offs and landings does the pilot fly? Do the operations involved cross time zones and, if so, how many? Are the operations during the day or at night? The proposal recognizes that basing hourly restrictions solely on the total number of hours of duty time or flight time does not have as much meaning as

factoring in what kind of operations were being flown during that period. Different operations result in different fatigue levels and that reality must be recognized in any new regulatory framework.

The NPRM would impose requirements for rest, flight time, and duty time. There is a proposed nine hour rest requirement prior to flying related duty. In addition, flight time restrictions include limits for every 28-day period, as well as annual limits. The flight time restrictions also reflect all operations flown for the carrier by the pilot, even if some of those flights are ferrying operations or other flights not flown under Part 121. Finally, both the flight time and duty time restrictions proposed would reflect differences in the types of operations flown as well as when they are flown, and require shorter duty periods for certain times of day and quantities of takeoffs and landings.

The proposal would also give carriers the option of integrating a Fatigue Risk Management System (FRMS) into their scheduling systems. FRMS is a carrier-specific method of evaluating how best to mitigate fatigue, based on active monitoring and evaluation by the carrier and flightcrew members. In this case, the carrier would model its schedules to determine where there may be risk from fatigue. The carrier would develop mitigation strategies to eliminate or mitigate that risk. The FAA will determine that the FRMS provides an equivalent level of protection as afforded by the rule and approve the carrier's system. FRMS were strongly supported by both labor and management in the ARC, because it ensures that each schedule is analyzed and proper mitigation is implemented.

This approach has the potential to provide a cooperative and flexible means of monitoring and mitigating fatigue during operations when the prescriptive approach is not optimal. We are seeking public comments about how best to realize that potential. An FRMS requires a carrier to develop numerous processes and structures within an operation. These measures lead to effective management and mitigation of fatigue on the part of both the carrier and its employees that might affect the operation.

One area that I know is of great interest to this Committee is pilot commuting, which our NPRM discusses in the preamble. The ARC made no recommendation on commuting. However, the ARC did point out that pilots are required to report to work fit for duty; and that means rested. Although our proposal does not include specific restrictions on commuting, it does make some modifications to ensure that all pilots, including those who commute, are meeting the existing requirements to report fit for duty.

As I noted at the beginning of this statement, pilot personal responsibility is critical to whatever fatigue rule is ultimately adopted, whether or not commuting restrictions are imposed. Pilots must commute responsibly, but this proposal broadens that responsibility to include the air carrier, who must be aware of how pilots are commuting to work and must make a determination that each pilot is fit for duty. It is unreasonable to assume that a pilot is resting while commuting, either locally or long distance, and our proposal requires air carriers to consider the commuting times pilots need to reach their home base while still receiving the required opportunity for rest. It also calls on co-workers –

other crew members, dispatchers, etc. – to determine that pilots they're working with are fit for duty. We believe mandating this shared responsibility will address the risks posed by a pilot failing to identify that he or she is not sufficiently rested – and therefore not fit for duty.

Finally, one of the most challenging issues we have had to resolve in order to move forward with a new fatigue regulatory proposal is that of the costs associated with a new rule compared with the benefits that are expected to accrue from a new requirement. All of us in government and industry associated with aviation are dedicated to enhancing aviation safety. This is what we work for day in and day out. At the same time, we seek to ensure that rules do not impose excessive, unjustified, or unnecessary costs on airlines, airline employees, and consumers. We are required to provide the public with information about the projected costs and benefits associated with any regulatory proposal. Reducing fatigue, through whatever means, may result in the carriers having to add more pilots to comply with new standards, thus adding costs. We believe, however, that carriers will optimize their crew schedules within any new regulatory requirements to continue to be as efficient as possible.

While we prefer and seek out regulatory options that result in net benefits, there is no absolute requirement that monetary benefits of regulatory proposals outweigh monetary costs. But the benefits, both quantifiable and nonquantifiable, must justify the associated costs. While we have explicitly sought public comments about possible improvements in the proposed rule, we believe it meets that standard. It is important to understand that

increasing airline safety creates a number of important social benefits, some of which are hard to quantify.

Though producing this NPRM did take longer than we expected, we believe we have a solid starting point for a new and better way forward in this area. While this is not the last step in this process, I am extremely proud of the FAA team for this achievement. I would like to thank the many, many members of the Administration, the aviation and labor community, and the scientific community for their tireless efforts to assist Secretary LaHood and Administrator Babbitt in moving forward with the proposed fatigue NRPM. I would also like to acknowledge the support of Congress and the families of victims of the Colgan accident and other family groups in this area.

There is work to be done in order to make the NPRM ultimately into a final rule, but I am confident that this comprehensive proposal is a step forward and I look forward to receiving public comments and to working with all interested parties, including this Committee, to finalize improved flight duty and rest standards that will enhance safety because that is our shared ultimate goal.

Thank you for this opportunity to appear before you. I would be happy to answer any questions at this time.

**Table A to Part 117—Maximum Flight Time
Limits for Un-augmented Operations**

Time of Start (Home Base)	Maximum Flight Time (Hours)
0000 – 0459	8
0500 – 0659	9
0700 – 1259	10
1300 – 1959	9
2000 – 2359	8

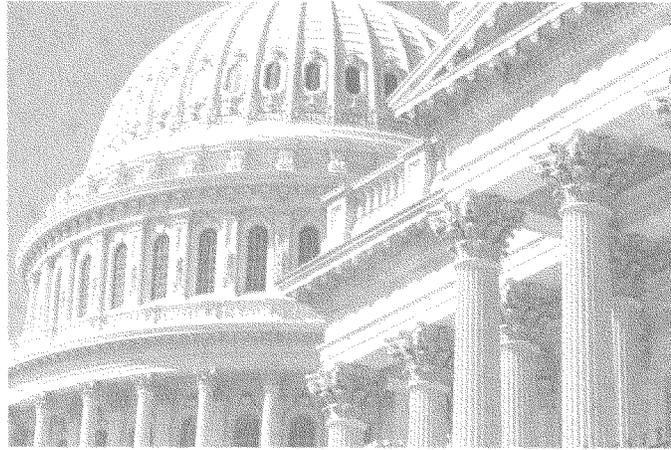
**Table B to Part 117—Flight Duty Period:
Un-augmented Operations**

Time of Start (Home Base or Acclimated)	Maximum Flight Duty Period (hours) for Lineholders Based on Number of Flight Segments						
	1	2	3	4	5	6	7+
0000-0359	9	9	9	9	9	9	9
0400-0459	10	10	9	9	9	9	9
0500-0559	11	11	11	11	10	9.5	9
0600-0659	12	12	12	12	11.5	11	10.5
0700-1259	13	13	13	13	12.5	12	11
1300-1659	12	12	12	12	11.5	11	10.5
1700-2159	11	11	10	10	9.5	9	9
2200-2259	10.5	10.5	9.5	9.5	9	9	9
2300-2359	9.5	9.5	9	9	9	9	9

**Table C to Part 117—Flight Duty Period:
Augmented Operations**

Time of Start (Local Time)	Maximum Flight Duty Period (hours) Based on Rest Facility and Number of Pilots								
	Class 1 Rest Facility			Class 2 Rest Facility			Class 3 Rest Facility		
	3 Pilots	4 Pilots	4 Pilots	3 Pilots	3 Pilots	4 Pilots	3 Pilots	3 Pilots	4 Pilots
0000-0559	14	16	16	13	13	14.5	12	12	12.5
0600-0659	15	17.5	17.5	14	14	15.5	13	13	13.5
0700-1259	16	18	18	15.5	15.5	17	14	14	14.5
1300-1659	15	17.5	17.5	14	14	15.5	13	13	13.5
1700-2359	14	16	16	13	13	14.5	12	12	12.5

Pilot Flight-and-Duty-Time Rule



Statement of Thomas L. Hendricks
Vice President, Operations and Safety
Air Transport Association of America, Inc.
before the
Subcommittee on Aviation
of the
House Committee on Transportation and Infrastructure
September 16, 2010



AIR TRANSPORT ASSOCIATION

Good morning Chairman Costello, Ranking Member Petri and Members of the Subcommittee. My name is Tom Hendricks. I recently became the Vice President of Operations and Safety at the Air Transport Association of America (ATA).

Pilot duty-limit and rest requirements are of the utmost importance. As a captain and professional pilot for nearly 23 years at a major U.S. airline, I understand the critical importance of safe airline operations and the dependency on crew members who are alert and can respond to the demands of flying commercial aircraft. Pilots, airlines and the Federal Aviation Administration (FAA) each have indispensable roles in achieving our common objective of ensuring adequate rest for crew members.

How that objective is achieved is also vital. Appropriate duty-limit and rest requirements must be the product of scientific research and operational experience, be effective and reflect the specific operational environment of each carrier. We must smartly combine data-driven and evidence-based approaches in devising any new regulatory initiatives.

Because ATA and its members recognized the significance of these considerations, we were very active participants in the Federal Aviation Administration Flight and Duty Time Aviation Rulemaking Committee (ARC). The FAA chartered the ARC on July 15, 2009 to recommend revisions to the agency's flight-and-duty-time rule. The ARC met this very compressed September 1, 2009 deadline. That achievement was the result of the collaboration and professionalism of those on the Committee.

While the ARC was active, ATA, the Cargo Airline Association and the Regional Airline Association submitted joint recommendations to the FAA for its consideration in the development of the expected notice of proposed rulemaking (NPRM). These recommendations reflected the diverse operations and experience of mainline, all-cargo and regional airlines.

We express in those recommendations support for a duty-day regulation that appropriately responds to fatigue risks, including circadian cycles, time awake, time on task and acclimation to time zones. Consequently, our recommendations were generally more restrictive than many duty-limit and rest regulations around the world. They will mitigate fatigue risk by reducing the duty time of pilots and expanding the amount of time for scheduled rest opportunities to ensure adequate rest.

Last Friday, the FAA released its flight-and-duty-time NPRM. We want to compliment Administrator Babbitt and Associate Administrator Gilligan for their leadership in shepherding the proposed rule. ATA and its members have not finished reviewing that lengthy and comprehensive document. We will fully respond to the NPRM in the comments that we file in the docket.

In the meantime, however, the concepts that we outlined last year in our joint recommendation indicate the principles that we believe should be embodied in any change to the FAA regulations. In essence, they are as follows:

The new regulation should require each air carrier to adopt an FAA-approved fatigue-mitigation program that contains the carrier's fatigue-mitigation policies and training programs. Means of compliance are now outlined in the recently released FAA Advisory Circular 120-103, which offers more detail and explanatory background than could be included in the proposed regulation. This process will provide flexibility for updating and modifying airline fatigue-mitigation programs as needed.

In addition, the regulation should recognize the wide array of air-carrier operating environments. While the goal for all of us is "one level of safety," this does not mean, and is not accomplished by, one form of regulation. Any new regulation must account for the wide variety of operations, just as it does today.

Nothing in fatigue and sleep research suggests the need for a one-size-fits-all regulation. Indeed, science recognizes that individual differences and operational contexts affect performance. Science-based guidelines, judiciously blended with decades of operational experience, will allow the various air-carrier models to continue to operate with the highest degree of safety for crew members and passengers.

The regulation should clearly state that the crew member is responsible for properly preparing for flight during the prescribed "opportunity for rest." Expressly stating this responsibility will help address pilot commuting issues and will establish the framework from which a carrier can develop fatigue policies.

Finally, any new regulation must confine itself to demonstrably necessary safety-related requirements and avoid issues appropriately left to resolution in collective bargaining.

ATA and its member carriers recognize the importance of this issue. We look forward to participating in the rulemaking proceeding.

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STATEMENT OF
CAPTAIN JOHN PRATER, PRESIDENT
AIR LINE PILOTS ASSOCIATION, INTERNATIONAL
BEFORE
THE SUBCOMMITTEE ON AVIATION
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
UNITED STATES HOUSE OF REPRESENTATIVES
WASHINGTON, D.C.
SEPTEMBER 16, 2010

PILOT FLIGHT AND DUTY TIME RULE

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STATEMENT OF
CAPTAIN JOHN PRATER, PRESIDENT
AIR LINE PILOTS ASSOCIATION, INTERNATIONAL
BEFORE
THE SUBCOMMITTEE ON AVIATION
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
UNITED STATES HOUSE OF REPRESENTATIVES
WASHINGTON, D.C.
SEPTEMBER 16, 2010

PILOT FLIGHT AND DUTY TIME RULE

Good morning Mr. Chairman and members of the Subcommittee. I am Captain John Prater, President of the Air Line Pilots Association, International (ALPA). ALPA is the world's largest pilot union, representing nearly 53,000 pilots who fly for 38 airlines in the U.S. and Canada. ALPA was founded in 1931 and our motto since its beginning is "Schedule with Safety." For more than 79 years, ALPA has had a tremendous impact on improving aviation safety. ALPA is a founding member of the International Federation of Air Line Pilots' Associations (IFALPA) and the U.S. and Canada representative to the Federation which joins the pilots of over 100 nations in safety and security harmonization efforts. Today, ALPA is the world's largest non-governmental aviation safety advocate, protecting the safety and security interests of our passengers, fellow crewmembers, cargo, and aircraft everywhere around the world.

We owe a debt of gratitude to Transportation and Infrastructure Committee Chairman Jim Oberstar, to you, Chairman Costello, Ranking Members Mica and Petri and all of the members of this committee. You steadfastly championed much needed improvements to today's outdated and ineffective flight and duty time regulations, and your labors were rewarded when the President signed your bill, H.R. 5900, into law on August 1st of this year. That law now requires the FAA to publish new pilot flight and duty rules not later than July 31, 2011. We know that you will be watching the agency closely to ensure that it meets that deadline, as will we.

ALPA appreciates this opportunity to discuss the just-released Notice of Proposed Rulemaking (NPRM) on pilot flight and duty time because it is a long-standing flight safety issue. The rules that govern pilot flight and duty time have a significant impact on pilot fatigue, which is as important to aviation safety as the proper functioning of any mechanical component of the aircraft or the aviation system. Pilot fatigue has been a major issue for ALPA since it was founded in 1931 and it has been particularly onerous during the difficult years since 9/11. ALPA has stated many times over the past two decades that we are sorely in need of up-to-date regulations based on science. The regulations that we currently operate under have been in place almost 60 years and are not science-based.

The National Transportation Safety Board issued three recommendations to the Department of Transportation in 1989 following several accidents involving operator fatigue:

1. Expedite a coordinated research program on the effects of fatigue, sleepiness, sleep disorders, and circadian factors on transportation system safety.

2. Develop and disseminate educational material for transportation industry personnel and management regarding shift work, work and rest schedules, and proper regimes of health, diet, and rest.
3. Review and upgrade regulations governing hours of service for all transportation modes to assure that they are consistent and that they incorporate the results of the latest research on fatigue and sleep issues.

The Board did not make a distinction between reforms needed for the rules applicable to passenger and all-cargo operations in its reports and recommendations to the FAA; rather, the Board has recognized that the effect of fatigue is the same whether a pilot is carrying cargo or passengers, or operating a scheduled or non-scheduled flight. Fatigue is an equal opportunity killer.

Pilot fatigue has been on the Safety Board's list of Most Wanted Transportation Safety Improvements since the list's inception in 1990. Other, more specific, recommendations have followed. The Board's current Most Wanted List, published in February 2010, specifies the following objective to reduce accidents and incidents caused by human fatigue in the aviation industry: set working hour limits for flight crews based on fatigue research, circadian rhythms, and sleep and rest requirements.

ALPA's long-standing campaign to change these rules moved forward last year when FAA Administrator Randy Babbitt appointed members of labor, industry, and government to the FAA's Flight and Duty Time Limitations and Rest Requirements Aviation Rulemaking Committee (ARC) and directed the committee to comprehensively review current flight time and duty time regulations and recommend changes to reduce pilot fatigue and improve safety. Administrator Babbitt recognized ALPA's expertise in fatigue and its important role as a key stakeholder in the aviation safety process by appointing seven ALPA pilots to the ARC, representing every sector of Part 121 flying: regional, domestic, international, and cargo airlines.

The ARC completed its review and made its recommendations to the FAA privately on September 1, 2009 in accordance with its charter. The FAA began reviewing the ARC report with an eye toward releasing a notice of proposed rulemaking by the end of 2009. The NPRM was actually published on September 10, 2010, less than one week ago. Our Flight Time/Duty Time (FTDT) Committee is in the process of conducting a thorough review of the rule to see if it meets the criteria mentioned previously, of being scientific-based and addressing the needs of all airline pilots operating in the 21st Century.

ALPA's FTDT Committee has been working for years to promote changes to today's antiquated flight and duty rules and to bring scientific principles to bear. ALPA believes there are three basic principles for any revision to the rule.

First, it must be based on science. There is a large body of sleep science available and there are several recent aviation fatigue studies. Over the past 60 years, scientific knowledge about sleep, sleep disorders, circadian physiology, fatigue, sleepiness/alertness, and performance decrements

has grown significantly. Some of this scientific knowledge, gained through field and simulator studies, confirms that aviators experience performance-impairing fatigue from sleep loss resulting from current flight and duty practices.

The International Civil Aviation Organization (ICAO), a United Nations organization which has 190 member countries including the United States, has mandated that flight limitation rules be based on science and it has recently implemented a new standard for flight time rules which states in part:

“For the purpose of managing fatigue, the State of the Operator shall establish regulations specifying the limitations applicable to the flight time, flight duty periods, duty periods and rest periods for flight crew members. These regulations shall be based upon scientific principles and knowledge, where available, with the aim of ensuring that flight crew members are performing at an adequate level of alertness.”

The United States is bound to comply with this standard. Our current rules are simply not based on science and therefore do not comply with the ICAO standard.

Second, there should be just one level of safety in flight and duty time regulations. Scheduled passenger, all-cargo and charter air carrier operations are no different when it comes to the actual operation of the aircraft. All three types of operations use the same highly qualified pilots, the same aircraft types, the same airspace, and the same airports in the same cities. As such, there is no rational basis for cargo or charter pilots to have different or more liberal fatigue rules than scheduled passenger operations.

As an example of today's regulatory inequities, domestic pilots who carry passengers under FAR Part 121 have a flight time maximum of 30 hours in seven days, while international (Flag) passenger-carrying pilots are allowed up to 32 hours in the same seven days under the current FAA regulations. These current “flight time” limits only account for the time pilots spend actually operating the airplane, not the time pilots spend in pre-flight and post-flight duties, the time spent at airports between flights, the time spent going through security or traveling to and from the airport to hotels, or the time spent in training and other ground-based duties. This additional time, which is not accounted for in the regulations, can lead to significant fatigue on the part of flight crewmembers.

On the other hand, charter and air cargo pilots flying under today's supplemental rules can fly 48 hours in a six-day period or *60 percent more* than domestic passenger-carrying pilots. We believe that these supplemental rules significantly reduce available safety margins and put all-cargo and charter operation crewmembers, passengers and persons on the ground at risk. A uniform modernization of the flight time/duty time rules including harmonized rules for the cargo industry is long overdue, and needed to enhance safety.

Third, any new regulation dealing with pilot fatigue should provide a method for carriers to transition to a Fatigue Risk Management System (FRMS). This is the “gold standard” of pilot fatigue management to ensure that pilots have an adequate level of alertness.

Ideally, it would be a part of a Safety Management System, or SMS. However, FRMS can operate independently of an SMS.

The purpose of an FRMS is to ensure that flight crewmembers are sufficiently alert so that they can operate to a satisfactory level of performance and safety under all circumstances.

An FRMS supplements prescribed flight and duty-time regulations and competent, independent, scientific research-based software scheduling tools by applying safety management principles and processes to proactively and continuously manage fatigue risks through a partnership approach which requires shared responsibility between management and crew members. FRMS can, therefore, only operate in circumstances where all stakeholders — particularly the pilots — support the operation of FRMS. Accordingly, an open reporting system and non-punitive working environment is a prerequisite for FRMS because honest and accurate crew feedback is an essential component of the program. An FRMS must specify the prescriptive regulatory scheme upon which it is based. In the event of suspension, termination or revocation of an FRMS, the carrier's affected operations revert to the baseline prescriptive scheme.

Last month, the FAA published an Advisory Circular (i.e., AC 120-103) entitled Fatigue Risk Management Systems for Aviation Safety. An advisory circular is guidance only and is not mandatory for an operator. Our FTDT Committee is reviewing the AC to determine if it provides adequate guidance and how it can be best applied.

We are very pleased that the FAA has finally published a notice of proposed rulemaking, which is apparently based on scientific principles, to amend our antiquated flight and duty regulations. The proposed rule is long and detailed and asks numerous questions of respondents; a full analysis by ALPA will take some time and we will delineate our comments directly to the FAA. But we would offer some initial observations regarding the apparently favorable aspects of the proposal which:

- Appears to apply scientific principles and recognizes human physiological limitations with increased minimum rest periods, more reasonable duty days, and recognizes the effects of circadian rhythms on fatigue,
- Applies to all FAR Part 121 flying; it would eliminate “carve outs” for supplemental operations,
- Incorporates FAR Part 91 “tag on” or ferry flights within flight and duty time limitations,
- Requires fatigue education and training on a recurring basis at all airlines and provides for implementation of a fatigue risk management program,
- Requires all crewmembers to report rested and fit for duty. Establishes that fitness for duty is a joint responsibility of the crewmember and air carrier,
- Requires airlines to accurately record and set scheduled flight and duty periods based on actual operations. Adjustments must be made if unreliable scheduling is used,
- Makes the decision to extend the duty period a joint responsibility between the pilot in command and the airline and further limits the number of times the duty period may be extended for a flight crew,
- Requires deadhead time (i.e., positioning of crew members) to be counted as duty, and
- Specifically recognizes reserve duty.

After our initial review, we have, however identified a few areas in which the NPRM does not adequately capture the ARC's recommendations:

- Ensuring that the length and quality of rest following a long-range flight across multiple time zones is sufficient before the next flight/duty period.
- Ensuring that the application of augmented flight and duty period tables addresses the circadian disruption that the crewmember may experience in certain types of flying.
- The viability of increasing the amount of block time in a duty period up to 10 hours.

After many fits and starts over many years, and continual advocacy by ALPA and others, the FAA has developed a proposed rule which has the potential to make significant improvements in flight and duty regulations. The ultimate value of the final rule will be dependent upon the application of scientific principles which are tempered by experience gained through use of those rules on the line.

We applaud Administrator Babbitt for his leadership in this regard and we look forward to submitting detailed comments to the FAA in response to the agency's thoughtful and comprehensive notice of proposed rulemaking. We will ensure that this Committee is provided with a copy of our response to the docket.

Thank you for the opportunity to share our views.

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STATEMENT FOR THE HEARING RECORD

CAPTAIN DAVID J. BATES, PRESIDENT
ALLIED PILOTS ASSOCIATION

FOR

THE SUBCOMMITTEE ON AVIATION
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
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September 16, 2010

PILOT FLIGHT- AND DUTY-TIME RULE

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Statement for the Hearing Record

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U.S. House of Representatives Committee on Transportation and Infrastructure,
Subcommittee on Aviation

Hearing on Aviation Safety: Pilot Flight- and Duty-Time Rule

September 16, 2010

On behalf of the 11,000 American Airlines pilots represented by the Allied Pilots Association (APA), we want to thank Chairman Costello, Ranking Member Petri and the other members of this subcommittee for the opportunity to submit written testimony on the issue of pilot flight and duty time.

We likewise want to thank Transportation and Infrastructure Committee Chairman Oberstar, Ranking Member Mica and all of the other committee members. Thanks to your steadfast support of H.R. 5900—which mandates changes to flight- and duty-time regulations within one year—long-overdue changes to these vital regulations are set to become reality.

APA is pleased that the Federal Aviation Administration (FAA) has undertaken the task of updating pilot flight- and duty-time regulations to enhance the margin of safety by applying scientific principles to reduce fatigue. However, after examining the detailed limits and parameters of the FAA's Notice of Proposed Rulemaking (NPRM), we are concerned that crewmembers would remain dangerously exposed to fatigue.

It is critical that new regulations protect crewmembers and the traveling public throughout all operating regimes and times of the day. Simply covering the "majority" of operations or assuming that extra time in a 24-hour window will be available for rest is a fallacy that can lead to disaster. Fortunately, most of these shortcomings can be easily corrected by adjusting the proposed limits while retaining the adopted concepts.

APA was pleased to be represented on the Aviation Rulemaking Committee (ARC) and provided extensive input in crafting what the FAA has proposed. Unfortunately, much of the ARC process turned into an economic negotiation with industry, rather than a collaborative effort to adopt scientifically supported best practices regarding fatigue. The ARC was tasked to examine practices of other regulating agencies around the world, with the primary focus being the British and EU regulations. But instead of adopting those scientifically supported best practices, the NPRM undercuts them for competitive reasons. The result is a regulatory proposal that reduces the margins of safety in many areas and lacks components essential to providing a comprehensive safety umbrella. We need updated regulations and it is essential that we use this opportunity to "get it right." Based on the FAA's own calculations, the expense of doing so would be nominal—around \$.10 more per passenger enplanement than what the airlines incur under the current rules, which we will detail in our NPRM submission.



We strongly support lawmakers' and the FAA's desire to ensure that pilots are adequately rested when reporting for duty. However, APA is alarmed that attempts to regulate pilot commuting may result in significant unintended consequences, such as forcing pilots to commute when they should be resting. The issue of controlling commuting could lead to regulating personal time off.

APA is likewise concerned that much of the data used in the Impact Analysis was provided by the industry. While we understand the difficulty in determining precisely how operations will be affected, we are very concerned about the conflict of interest that industry would clearly have in this area. Additionally, it appears that several important factors were not considered, which we will detail in our written response to the NPRM.

The stated objective of the NPRM is to improve aviation safety by ensuring that pilots are afforded sufficient rest. To that end, we believe the NPRM succeeds in the following areas:

- The provision of "One Level of Safety" recognizes that all pilots are subject to fatigue regardless of what sort of payload is being carried.
- Among the most fundamental improvements represented by this NPRM are the scientifically based *concepts* within the frameworks compensating for when the duty day begins, number of legs scheduled, quality of the onboard rest facility and time zone acclimation.
- The recognition that time spent on duty is the primary driver of fatigue.
- The elimination of transportation time from time that is considered rest, thereby guaranteeing time at the rest facility.
- The recognition that time spent deadheading is not rest.
- Flight-time limits being based upon actual flying time, not scheduled time.
- The inclusion of rest for international pilots on reserve as well as domestic.
- The provision requiring at least one physiological night's rest each week.
- The provision limiting consecutive all-night duty periods.
- The provision that carriers must construct realistic schedules in order to remain compliant.

However, the NPRM undermines its own objectives in the following ways:

- Given this NPRM's stated objective of increasing safety by reducing fatigue, the proposed increased maximums for flight time conflict with the FAA's finding that time on task is the second-biggest driver of fatigue (after time since awake).¹
- Although much attention has been given to an increase in required rest to nine hours, the reality is that in the majority of operations, changing the rest requirement to nine hours



will be a reduction below the current requirements. This is as much as a **50 percent reduction** below currently required levels.ⁱⁱ

- The proposal perpetuates the current practice of allowing for reduction of rest to as little as eight hours. This allowance typically occurs only after extended and particularly demanding duty. The NPRM further erodes current protections by failing to require reduction of the subsequent duty period, in spite of the crewmember receiving inadequate rest.
- The proposal fails to provide for recovery rest after long and/or disruptive duty, inviting sleep loss and cumulative fatigue. The science is clear that additional time is needed to refill one's sleep bank, to re-acclimate and to stabilize the circadian clock to obtain adequate sleep following disruptions such as all-night flying or time-zone displacement.
- The FAA proposes using a Fatigue Risk Management System (FRMS) as a means to obtain relief from the limitations of the regulation. However, no specific guidelines for an FRMS have been established. Without specific guidelines and requirements for action, such a system could just be an avenue for trading safety for profit. APA recommends that specific FRMS guidelines be established and that there always be an underlying regulatory safety floor to prevent circumvention of essential safety provisions.
- Ultra Long Range (flights longer than 16 hours—ULR) requirements should be included in the regulation to ensure that limits are adequate and to ensure that carriers do not use the Ops Spec or FRMS process to compete for the least restrictive provisions, thereby diminishing safety.
- The basic concept of tying flight duty period (FDP) length for non-augmented crews to report time and number of legs flown is an excellent step forward, but the specific numbers within that framework do not provide an adequate margin of safety. APA will provide specific FDP limit recommendations in the written response to the NPRM.
- There is no protection provided against consecutive early starts, which require pilots to awaken in the middle of the night. This was cited as a major factor in a recent incident in Hawaii where both pilots fell asleep at the controls.
- The basic concept of tying FDP length and crew complement for augmented crews to the quality of onboard rest facilities is also excellent. However, the specific numbers within the framework appear to be insufficient to provide a carrier with an incentive to provide crewmembers with anything more than minimal rest facilities.ⁱⁱⁱ
- The thresholds for requiring relief pilots have been degraded.^{iv}
- The NPRM opens the door to the extension of domestic FDPs by means of “augmenting” crews with relief pilots.^v
- The reliability component is based on FDP rather than actual flight time on individual legs. While both are important, individual leg performance is critical to ensuring that the limits contained herein represent actual limits, rather than paper limits.



Appendix A: Testimony of Peggy Gilligan,
FAA Associate Administrator for Aviation Safety

During her oral testimony, Ms. Gilligan made several statements that APA would like to address.

In her opening remarks, Ms. Gilligan stated that the proposal would increase rest by requiring nine hours of rest and requiring that the nine hours be at the rest location. The proposal actually reduces required rest in almost all areas, requiring only nine hours regardless of location, type of operation or length of previous duty. This is a reduction from today's rest requirements of nine to 11 hours for domestic operations and twice the flying time for international operations.

When questioned regarding the FAA's proposed nine-hour minimum rest requirement and the Air Force's 12-hour requirement, Ms. Gilligan's comments included the following: "*As the maximum duty day of 13 hours and a rest period of nine hours, there's still two hours in that 24-hour day. So there's more time in that 24-hour period than we have assigned to either rest or duty.*"

There is a striking flaw in that logic. The inference was that there are additional hours available for rest. There is no basis for this assumption. The reality is that this arrangement allows for consecutive daily start times to be moved earlier by two hours on each subsequent day, saving carriers money. This is contrary to the fatigue science counseling that shortening daily 24-hour cycles contributes to fatigue.

Ms. Gilligan also makes several remarks about the "oversight provision" that is built into the proposal. She refers to "flights" having to meet certain reliability requirements. In reality, the NPRM only addresses flight duty periods, not individual flights. With carriers constantly changing schedules for crewmembers, this is a moving target that is almost impossible to track.

During questioning, Ms. Gilligan stated that "*current pilots will wind up flying more days to fly the same number of flight hours...*"

The reality is that allowing pilots to fly more hours per day as proposed would compress flying, thus allowing pilots to fly fewer days in a month. The proposed reduction in rest period length would further compress flying and possibly further reduce days worked per month. This compression of flying, while potentially causing additional fatigue, would have no effect on the number of pilots required overall.



Appendix B: Endnotes

ⁱ Proposed maximum allowable flight time per day is increased to 10 hours, a 25 percent increase over current regulations, without any scientific basis or validation. No studies have recommended increasing flight hours (workload and time on task) as a way to mitigate fatigue. The NPRM fails to reduce maximum flight time to seven hours on the backside of the clock, even though the consensus position of labor and industry in the ARC was seven hours based on fatigue research. The NPRM removes the weekly flight time limit of 30 hours and proposes instead an FDP limit of 60 hours per week. This would permit 50+/- hours of flight time compared to the existing limit of 30 or 32 in seven days. In two weeks, this number could be close to 100 hours, a staggering amount of flying and hardly conducive to reducing pilot fatigue.

ⁱⁱ Nine hours of rest is the minimum required in all circumstances. Today's domestic rules provide a minimum of nine to 11 hours of rest, while international rules provide as much as 16 to 18 hours, based on flight time.

- Nine hours does not provide an adequate opportunity to get eight hours of sleep, the essential amount agreed upon almost universally throughout the scientific community. There is no time allotted for other normal daily physiological and personal needs such as eating and personal hygiene.
- Science dictates that more rest opportunity is needed to obtain sleep when rest occurs outside of the normal sleep window or following circadian disruption such as the time zone changes and back-side-of-the-clock flying especially prevalent in international operations. Fourteen hours is the minimum recommended in numerous scientific examinations of this arena.
- There is no protection against combining long duty periods with short rest periods, a combination that can lead to dangerous levels of fatigue. Both the EU and British (CAP-371) regulations contain a provision that a rest period can never be shorter than the preceding duty period. The NPRM ignores this precedent.
- Based upon the science and real-world experience, it is our view that anything less than 10 hours of rest fails to provide sufficient recovery from normal operations and that anything less than 14 hours of rest fails to provide for recovery from international operations, but never shorter than the preceding duty period.

ⁱⁱⁱ The FAA has completely removed the requirement that aircraft be equipped with onboard rest facilities that include a bunk for long-range flights. Current rules require a bunk for any flight of greater than 12 hours in length. When compared to a passenger seat, an onboard bunk offers a significantly better rest opportunity due to both improved sleeping position and better isolation from cabin disturbances. Conceptually, the idea was to allow longer flight times when better onboard rest facilities were provided, incentivizing carriers to equip aircraft with better facilities. Instead, because the FDP limits used in the proposal are too close together, there is little incentive to improve facilities and instead, carriers can now perform significantly longer flights with fewer pilots and poorer-quality facilities.



¹⁹ The NPRM proposes that a single relief pilot not be required until as many as 10 hours of flying are scheduled, depending on time of day. This represents a 25 percent increase over the current threshold for a single relief pilot, which is eight hours regardless of time of day. Also, three pilots can fly as many as 15 hours under the NPRM, another 25 percent increase over the current standards.

^v The practice of augmentation was introduced when modern jet aircraft became capable of extended flights beyond eight hours on international routes. The NPRM language regarding acclimation of crews provides a valid concept, but the time specified is far short of that dictated by science. Also, it was never the intent for augmentation to be used as a method to circumvent domestic flight-time limits by keeping a tired crew aloft. It is far safer to provide a fresh, rested crew whenever possible, rather than to rely on in-flight rest.





STATEMENT FOR THE HEARING RECORD

CAPTAIN PAUL ONORATO, PRESIDENT
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FOR
THE SUBCOMMITTEE ON AVIATION
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
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WASHINGTON, DC

September 16, 2010

PILOT FLIGHT AND DUTY TIME RULE

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Statement for the Hearing Record

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U.S. House of Representatives Committee on Transportation and
Infrastructure,
Subcommittee on Aviation

Hearing on Aviation Safety: Pilot Flight and Duty Time Rule

September 16, 2010

Chairman Costello, Congressman Petri, and members of this subcommittee, on behalf of the 28,000 pilots who fly for the member associations of the Coalition of Airline Pilots Associations (CAPA), we want to thank you for the opportunity to comment on the issue of Pilot Flight and Duty Time Rule. CAPA has been working on fatigue and flight and duty time issues since its inception in 1997 and we appreciate your holding this important hearing to lay the issues on the table.

CAPA would also like to extend our appreciation to the Transportation and Infrastructure Committee Chairman Jim Oberstar, Chairman Costello, Ranking Member Mica, and all the members of the committee. Without your unwavering support through the passage of H.R. 5900, which mandates changes to flight time/duty time regulations within a year, these critical changes to the regulations would likely be far on the horizon.

The Federal Aviation Administration's (FAA) just released Flight and Duty Time NPRM, is a step forward toward the critically important goal of mitigating fatigue as a factor in airline accidents. CAPA was pleased to have participated in the recent Aviation Rulemaking Committee (ARC), which allowed industry and labor stakeholders to share their views on the pending regulations. We fully supported the adoption of a science based approach to new regulations on duty time - the primary factor in fatigue; and also on flight time - an important factor related to time on task and workload.

We believe that when scientific based concepts were utilized in the development of the NPRM, real safety enhancements were generated. We do, however, have serious concerns where provisions and offsets were generated without science; to the extent that some of the provisions will have the effect of negating the improvements and safety enhancements of the NPRM. These fundamental concerns must be addressed before this rule becomes final if we are to achieve the goal of mitigating fatigue as a factor in airline accidents. CAPA recognizes the importance of this issue and we look forward to further participation in the rulemaking process.

CAPA is committed to “One Level of Safety” for all commercial flight operations and encouraged that the FAA has chosen to apply the same fatigue rules to both passenger and cargo airlines. There is no scientific evidence that supports different regulations based on what an aircraft is carrying, therefore we do not support any carve-out for cargo operations.

I. CAPA believes to achieve the goal of mitigating fatigue as a factor in airline accidents, the following provisions of the NPRM need to be addressed:

1. In the NPRM, Maximum allowable flight time per day is increased to 10 hours, a **25% increase** over current regulations, without any scientific basis or validation. Also, the NPRM failed to reduce maximum flight time to 7 hours on the backside of the clock, even though both labor and industry recommended 7 hours in their proposals.
 - a. No conclusive studies have been performed on increasing flight hours (time on task) as a way to mitigate fatigue. There is **NO** scientific basis to justify this proposed change to current limitations of flight time limits.
2. The NPRM removes the weekly flight time limit of 30 hours and proposes instead - an on duty limit of 60 hours per week. This would permit 50^{+/-} hours of flight time compared to the existing limit of 30 in 7 days. In two weeks, this number could be close to 100 hours.

The concentration of “time on task” within short periods of time (items 1 and 2) are in excess of 25% daily and 60% weekly above current limitations. These are dramatic increases adding to fatigue and are not science based enhancements, rather productivity enhancements that will negatively impact the goal of the NPRM.

3. Minimum Rest:
 - a. A nine hour break after a full day of flying, regardless of domestic or international, is **insufficient to guarantee proper rest** and mitigate fatigue.
 - i. A nine hour break **does not provide the opportunity for 8 hours of sleep, the minimum dictated by science.** There must be - at a minimum - time to eat, unwind and tend to other physiological needs.
 - ii. For international operations, pilots suffer a dramatic reduction in rest under the NPRM. An 8-hour flight today would require 16 hours rest (twice the flight time off). **The NPRM allows a 44% reduction over today’s current rules.** Science clearly indicates that significantly more time is required to obtain 8 hours of sleep following circadian disruption, multiple time zone shifts and when sleep is required outside the normal sleep cycle.

- iii. Human beings require a minimum of 8 hours of sleep per night. There are more scientific studies to confirm this more than any other aspect of fatigue science. Even if measured from when you reached the rest facility, the 9-hour proposed limit does not allow for 8 hours of uninterrupted sleep. **Any rest requirement of less than 10 hours at the facility is inadequate.**
- iv. Allowing the required Rest Period to be reducible to 8 hours, even with the pilot's concurrence, further degrades the rest opportunity and has no basis in science.

There are circumstances under the current regulations where a pilot would be provided 10 to 16 hours of rest, but under the proposed rules, would never be required to get more than nine hours. **We strongly urge the NPRM be modified to provide for a minimum of 10 hours of rest domestically and 14 hours of rest minimum for international operations.**

- 4. Augmentation (flights requiring relief pilots - 3 or 4 person crews):
 - a. The first augmentation would occur at 8-10 hours, depending on time of day. Today the limit is 8 hours. This is a **25% increase** over today.
 - b. Three pilots could fly as much as 15 hours with a bunk or 14.5 hours with just a rest seat (lie flat or near flat). This is a **25% increase** over today.
 - c. **A bunk would no longer be required** for flights longer than 12 hours. A bunk offers a significantly better rest opportunity over a seat due to both improved sleeping position and better isolation from cabin disturbances.
 - d. Domestic augmentation should never be permitted. Augmentation should only be used when it is not possible to replace crew members on long-haul flights and never as a convenience or as a cost-saving measure. **It is always possible to get well rested crews in the domestic market.**
 - e. The proposed "Four-pilot limit" is set at 16 hours, which would be permitted without a bunk.
 - f. Requirements for flight beyond 16 hours are not spelled out but only require an FRMS and FAA approval. This is an unknown at this point. The ULR requirements should be included so as to avoid carrier lawsuits and to ensure that limits are adequate.

Through its ARC representatives, CAPA made very specific recommendations to the ARC regarding flight and duty limitations, some of which have been incorporated in the NPRM. These are positive enhancements to helping reduce pilot fatigue and CAPA welcomes these proposals in the NPRM.

II. CAPA recommendations included in the NPRM:

1. Reduced maximum time on duty and tailored duty limits to time of day and number of legs. The range is from a low of a 9-hour Flight Duty Period (FDP) on the back side of the clock to a high of 13 hours on the front side (0700-1259 sign-in).
2. Reserve Rest for International Pilots on standby – the rules now are the same for both Domestic and International and Reserve Rest is prescribed for both.
3. Rest Periods are measured based on time at the rest facility, removing transportation from the equation.
4. Weekly rest increased from 24 hours in 7 days to 30 hours off each 168 hours. This provides at least one physiological nights rest each week.
5. Maximum of three consecutive all-night duty periods unless a split duty period rest is provided.
6. Deadhead is classified as part of a Flight Duty Period if it precedes flying in the same Flight Duty Period. Otherwise, it is considered duty only but is not rest.

CAPA is encouraged by the NPRM and views it as a step towards mitigating pilot fatigue. However, much work has yet to be done to create a comprehensive final rule which protects pilots, crewmembers and passengers from the dangerous effects of pilot fatigue.

We look forward to working with the FAA and legislators to create a rule which will genuinely fight fatigue and promote an increase in safety in air carrier transport.

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**U.S. House of Representatives Committee on Transportation and Infrastructure,
Subcommittee on Aviation**

Hearing on Aviation Safety: Pilot Flight and Duty Time Rule
September 16, 2010

Chairman Costello, Ranking Member Petri, and members of the subcommittee, on behalf of the 6,000 pilots who fly for fifteen different airlines, and are represented by the International Brotherhood of Teamsters (IBT), we want to thank you for the opportunity to comment on the issue of Pilot Flight and Duty Time Regulations, and Fatigue. Reducing pilot fatigue has been on IBT's "Top-Five Aviation Safety Concerns" list for decades. It is also of great concern to the other 58,000 mechanics, flight attendants, ramp-workers, and other airline employees, represented by the IBT Airline Division, where similar regulations are likely forthcoming.

The IBT would also like to thank the Transportation and Infrastructure Committee, Chairman Oberstar, Ranking Member Mica, and all of the U.S. Congress, for their unrelenting focus on aviation safety issues and passage of H.R. 5900, which mandates that the FAA write new regulations to mitigate pilot fatigue. Without this swift action by the House of Representatives, pilot fatigue may have gone unaddressed for decades to come.

The Notice of Proposed Rule Making (NPRM) on Pilot Flight and Duty Time Regulations, recently released by the Federal Aviation Administration (FAA), has the potential to greatly reduce the risk of pilot fatigue, and therefore reduce the risk of fatigue related accidents. The IBT was pleased to be part of the Aviation Rulemaking Committee (ARC) that gave the FAA input to help create this NPRM. While the IBT believes that the basic framework of this document is a vast improvement over current regulations, we also have great concern that some of the provisions will have the effect of negating these improvements.

On the positive side, the IBT applauds the FAA for the following:

Requiring these regulations to apply to all CFR 14, Part 121 crew members, regardless of the type operation (passenger, cargo, non-scheduled, C.R.A.F., etc.), adheres to a long held principle by the IBT, and other labor groups, called "One Level of Safety". Most of our troops are flown on non-scheduled carriers and they deserve a level of safety no less than the traveling American public. This concept recognizes that safety enhancements, especially in human factors areas such as fatigue, do not know what is behind the cockpit door. Science-based regulations to mitigate fatigue, study the pilot as a human being. All humans are affected by fatigue equally, regardless of whether they are carrying passengers, freight, etc.

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All members of the ARC were in unanimous agreement that it is a pilot's responsibility to report for duty "fit to fly". Therefore attempting to regulate what a pilot does in his "off-duty" time, whether it is some recreational activity, household chore, or commuting to work, is not practical, nor necessary. The IBT is pleased that the FAA recognized this consensus opinion in the NPRM.

Reducing Flight Duty Periods (FDP) overall, and basing the length of the FDP on report time, number of segments, and crew size, is a much better, science-based approach than the "one size fits all" current regulations. Considering *all* flying as part of this duty period is also a serious improvement to the system. Currently, pilots can fly to the maximum limits, then offload the airplane's revenue, and continue flying unlimited under Part 91. The NPRM does not allow for this practice to continue.

Other considerable improvements accomplished in the NPRM are the monitoring and adjusting of schedule reliability, and acknowledging that a rest period does not begin until the crew member arrives at the rest facility. This list is not complete, but highlights all of the most significant improvements that the NPRM offers.

On the negative side:

Notwithstanding the good intentions upon which the NPRM was developed and which are expressed in the positive provisions outlined above, the NPRM, when read as a whole, reflects an inherent regulatory conflict that has the effect of greatly undermining any safety enhancements that otherwise could have been gained by these proposed regulations. While there are many areas where small improvements could be made, the IBT realizes that this is not practical. Therefore we would like to highlight three provisions of the NPRM that we feel must be changed in order to enhance safety via reducing the risk of pilot fatigue. Not making these changes would subject the flying public to a greater likelihood of another tragic accident where fatigue is a causal or contributing factor.

The most serious problem with the proposed rule is that it allows for an *increase* in the number of hours pilots are permitted to fly. There is neither scientific finding, nor belief from experience or common sense, that indicates increasing the amount of time a pilot is permitted to fly in a duty period, will reduce or mitigate the risk of fatigue. In fact there is science, to which the FAA refers on page 22, paragraph 2, of its own NPRM, clearly indicating that greater workloads accompanied by longer times on a task, result in a greater likelihood of fatigue. And, as the FAA notes, "fatigue leads to an increased risk of making a mistake." Quite simply, fatigue greatly contributes to mistakes and mistakes lead to tragedy.

It is simply counter-intuitive to suggest that in the wake of a multitude of accidents where fatigue was a contributing factor, that the solution to reducing fatigue, is to have pilots fly more hours during a given duty period. The NPRM would increase to ten (10), the number of hours that a crew of two can fly, compared to eight (8) hours currently allowed. These increases become even greater for three (3) and four (4) pilot crews. There is no scientific study that suggests this would reduce the risk of fatigue. To the contrary, however, there are plenty of studies indicating that it would increase the risk. The FAA is familiar with, and has even commissioned some of these studies. The IBT urges the Committee to communicate to the FAA that increasing any of the current limits is unacceptable. It is a provision that is easily changed.

The second serious area of concern relates to carriers' use of augmented crews (pilots in addition to the minimum number required). Augmentation was created when aircraft first became capable of long flights, such as transatlantic crossings. It was intended to provide an added level of safety, by scheduling an additional pilot for operations in which replacing a fatigued crew was not possible. The NPRM would

needlessly allow domestic augmentation where replacing a crew is easily accomplished. The only reason for allowing this is economic. It is a reduction to current safety margins that has no scientific basis.

There are also very significant flight time increases permitted by the proposed rule. In a worst case scenario, a three (3) pilot crew can fly three (3) more hours than currently allowed. This increase takes them into areas where currently four (4) pilots, with segregated bunks for rest facilities, would be required. Again, IBT urges the Committee to instruct the FAA that these increases to a pilot's workload, and improper use of augmentation, will not be acceptable.

Our final, but equal area of concern is "required rest". As pointed out previously, requiring the rest to be in the rest facility, and not including travel to and from the facility, is a positive proposal. However there are other rest provisions in the NPRM that are a serious degradation of safety from current regulations. While it is true that in some scenarios, required rest can currently be as low as eight (8) hours, making nine (9) an improvement, there are other situations, such as flying more than eight (8) hours in a twenty-four (24) hour period, where under current regulations a pilot would get sixteen (16) hours of rest, but under the new rule would never be required to get more than nine (9).

The new rule also retains the ability for a carrier to reduce a pilot's rest to eight (8) hours when unforeseen circumstances have led to a longer than planned day. The IBT understands the need for some flexibility when unforeseen circumstances, such as weather or mechanical issues make a pilot's day longer, but those are the most stressful and fatiguing days and the required rest should increase rather than decrease. A reduction in rest would result in a reduction in the safety margin, and that is unacceptable. It is a provision that is easily changed. The IBT urges the Committee to communicate to the FAA that decreasing the rest a pilot is currently required to obtain, will not be acceptable.

The best way to illustrate how the problems we have highlighted can make an otherwise good document ineffective is to give an example: Currently, three pilots could fly for twelve (12) hours, potentially crossing eight (8) time-zones, and then would get sixteen (16) hours of rest before flying again. Under the proposed rule, and with unforeseen circumstances such as bad weather, or mechanical issues, three pilots could fly up to eighteen (18) hours, perform multiple segments, cross just as many, or more, time zones, have their rest reduced to eight (8) hours (which could be during daylight hours), and then have to fly again that night. This scenario is in fact very likely in the case of transporting U.S. Troops, and also common in cargo operations into hostile areas that require a heightened level of alertness.

The NPRM's provisions allowing for increased pilot flying hours reflect bad policy and, in light of the attendant safety risks, they are inviting a potential disaster. How do we ever convince the flying public that increasing the number of pilots' flying hours reduces pilot fatigue? By instructing the FAA to make the recommended changes, this potential disaster can be averted. Making these few changes turns the NPRM into a landmark aviation safety enhancement, and fulfills the mandate set forth by H.R. 5900 to reduce pilot fatigue.



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U.S. House of Representatives Committee on Transportation and Infrastructure,
Subcommittee on Aviation

Hearing on: Pilot Flight and Duty Time Rule

September 16, 2010

US Airline Pilots Association
Testimony for the Record

Chairman Costello, Congressman Petri, and members of this subcommittee, on behalf of the US Airline Pilots Association (USAPA) and our more than 5,000 professional airline pilots, we would like to thank you for the opportunity to comment on the issue of Pilot Flight and Duty Time Rule. As professional airline pilots, we understand the danger pilot fatigue can pose to the safety of the traveling public.

USAPA would also like to congratulate the Transportation and Infrastructure Committee Chairman Jim Oberstar, Ranking Member Mica, and all the members of the committee for the passage of H.R. 5900, which mandates changes to Flight and Duty Time regulations. Without your valuable support, significant changes to Flight and Duty Time rules would certainly be a distant promise. USAPA recognizes the importance of this issue, and we look forward to further participation in the rulemaking process.

While the FAA's attention to this issue is a step forward, USAPA is very concerned about many components of the NPRM. USAPA pilots believe that if the protection of the traveling public is to be assured, these concerns must be addressed before publication of the final rule. We look forward to being part of the solution that mitigates fatigue as a factor in airline accidents.

We were troubled by the process by which members of the recent FAA Aviation Rulemaking Committee (ARC) on Flight and Duty Time Requirements were chosen. The FAA chose to invite only members of labor and management to participate as members of the ARC. This resulted in a negotiated settlement between the parties, rather than a recommendation based solely on scientific evaluation. Safety should never be a negotiated item. Safety should only be based on sound academic knowledge and proven research, and organizations that possess critical knowledge of fatigue science should have been asked to participate as members at this ARC.

USAPA does support the adoption of a science-based approach to new regulations on duty time. As such, we believe the general construct of the new rules as published within the NPRM will be a step forward as compared to current rules. Specifically, tailoring the length of a Flight Duty Period (FDP) and number of legs allowed within that FDP to the time of day at onset of the FDP

is a valuable improvement. Similarly, the proposal to base rest requirements on actual time at a rest facility, rather than time between flights, will also be a welcome development. However, beyond that, USAPA is extremely troubled by many of the proposals.

As an example, the concentration of actual flight hours known as “time on task” within short periods of time are in excess of 25% daily and 60% weekly above current limitations. These are dramatic increases and are not scientifically-based enhancements; rather, they are productivity enhancements that will induce fatigue in a rule that’s intended to mitigate fatigue and ultimately create unwarranted safety hazards.

To combat pilot fatigue, USAPA believes that the following changes must be made to this NPRM:

- 1) **Maximum flight time within a Flight Duty Period (FDP) should be limited to the current 8-hour total. On the backside of the clock, allowable Flight Time should be reduced from 8 to 7 hours.** In the NPRM, maximum allowable flight time in a FDP is increased to as much as 10 hours, a 25% increase over today, without any scientific basis or validation. Also, there is no reduction below 8 hours on the backside of the clock (window of a pilot’s circadian low), even though both labor and the aviation industry recommended a 7-hour maximum flight time in their ARC proposals.
 - a. No conclusive studies have been performed on the concept of increasing block time as a way to mitigate fatigue. Therefore, there is NO scientific basis to justify this proposed increase in the flight time limits.
 - b. Expanding allowable flight times represents nothing more than a means to provide productivity gains for the industry and negates fatigue-mitigating enhancements, creating additional safety concerns.
- 2) **To further prevent the concentration overwork, the current limit of 30 hours of flying within a 7-day period (32 hours for international flight) should be maintained.** The proposed rule has removed the current flight time limit. The NPRM limit of 60 hours of Flight Duty per week could result in as many as 50+/- hours of flight time, as compared with the current limit of 30 hours in 7 days. **This is a 60% increase in allowable flight time (time on task).** In two weeks’ time, this number could be close to 100 hours of flight time. As stated previously, these dramatic increases induce fatigue.
- 3) **We strongly urge that the NPRM be modified to provide for a minimum of 10 hours of rest domestically and 14 hours of rest for international operations, with no allowable reductions for operational purposes.** The proposed limit of 9 hours of rest after a full day of domestic or international flying is insufficient to guarantee proper rest and mitigate fatigue.
 - a. This limit does not provide the opportunity for 8 hours of sleep after considering all physiological needs, the minimum dictated by science.

- b. Furthermore, allowing this already-insufficient Rest Period to be reducible to 8 hours for operational considerations is a sacrifice of aviation safety for airline economic concerns. For international operations, the NPRM reduction is even more dramatic. Today, an 8-hour international flight requires 16 hours of rest after completion of the FDP (twice the flight time off). The NPRM, as proposed, reduces this to 9 hours regardless of the total flight time. For an international flight, this represents a **44%** reduction in rest over today. Science clearly indicates that more rest time is required following circadian disruption and attempted sleep outside the normal sleep cycle.
 - c. Human beings require a minimum of 8 hours of sleep per night. There are more scientific studies to confirm this than any other aspect of fatigue science.
- 4) **USAPA strongly suggests that the provision allowing a pilot's fitness for duty to be questioned by outside individuals be removed from the proposed rule-making.** The NPRM allows any person to question a pilot's fitness to fly based on suspected fatigue. The pilot in question must then be evaluated by a "trained" company representative prior to flight. This has serious implications regarding non-trained personnel questioning a pilot's fitness for flight
- 5) **The Flight Duty Periods (FDPs) should be shorter, and there should be protection against consecutive back-to-back occurrences to protect against both acute and cumulative fatigue. In all cases, the allowable flight time should be limited to today's 8-hour regulatory limit.** The proposed Flight Duty Period limit tables allow long duty periods with very early start times. In these cases, pilots will have missed a normal nights' sleep opportunity and awakened during their Window of Circadian Low (WOCL).
- 6) **Augmented flights (flights requiring 3 or 4 pilots) should begin after 8 hours of flight time as in current regulation. Augmented flight times should be limited to the present 12-hour limit with 3 pilots, and domestic augmentation should not be permitted.**
- a. In the NPRM, a third flight crewmember is not required until as much as 10 hours of scheduled flight time, depending on time of day. Today the limit is 8 hours. This is a **25%** increase over today.
 - b. Three pilots could fly as much as 15 hours with a bunk or 14.5 hours with just a rest seat (lie flat or near flat). This is a **21% to 25%** increase over today's 12-hour flight time limit.
 - c. A bunk would no longer be required for flights longer than 12 hours. A bunk offers a significantly better rest opportunity over a seat due both to improved sleeping position and better isolation from cabin disturbances.
 - d. **Augmentation should only be used when it is not possible to replace crewmembers on long-haul flights** and never as a convenience or as a cost-savings

measure. In the domestic market, it's always possible to land and have a crew that has been fully rested in a full crew rest facility free of the noise, vibration, and dehydration experienced on an aircraft. Domestic augmentation represents nothing more than productivity gains for the airlines and does nothing to mitigate fatigue or enhance safety.

- 7) **A non-punitive fatigue policy must be the cornerstone of this NPRM.** The lack of a non-punitive fatigue policy places passenger safety in serious jeopardy. A pilot's ability to self-evaluate their own fatigue level and fitness to perform flight duties should not be subject to punitive action by their employer.
- 8) **Schedule Reliability provisions must be based on the current leg-by-leg basis, as opposed to the proposed duty period, or series of legs, basis.** FDPs change weekly at many carriers; this renders a 60-day look back of schedule reliability to an unenforceable provision.

This review of FAA Flight and Duty Time regulations is long overdue. Pilot fatigue has been on the NTSB's top ten "most wanted" list of regulatory changes for two decades. The FAA had to repeal a 14-year-old NPRM to issue this new rulemaking. Many lives have been lost in aviation accidents where fatigue has been cited as a causal or contributory factor. While regulatory changes are necessary, they must be accomplished with a thoughtful, reasoned approach to attack the problem of pilot fatigue, and not inadvertently make the problem worse.

USAPA is encouraged that the FAA put forth a proposal, but the proposed rule falls short of mitigating pilot fatigue, and in many areas may well be a degradation of safety when compared to current regulation. While we do applaud the FAA for creating a single rule of safety for all Part 121 operations, the NPRM, as written, contains significant holes in its proposed safety net. The serious nature of this problem requires a comprehensive final rule that will protect the traveling public, pilots and crewmembers from the dangerous effects of pilot fatigue. We look forward to working with the FAA and legislators to create a rule that will genuinely fight fatigue and promote an increase in safety in air carrier transport.