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FAA-03-14951-9

14 Creekwood Court  
Danville, CA 94526  
October 10, 2003

U. S. Department of Transportation (DOT)  
Office of Dockets and Media Management  
Room PL-401  
400 7th Street, S.W.,  
Washington, DC 20590

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MAIL ROOM

CERTIFIED MAIL - RETURN RECEIPT

SUBJECT: Request for Reconsideration

This is to request reconsideration of my complaint submitted to the Federal Aviation Administration (FAA) on January 15, 2003, received by that agency on January 24, but not acted upon until April 15, 2003, after DOT/FAA was ordered to do so by the Office of Management and Budget (OMB).<sup>1</sup>

My complaint (incorporated here in full by reference) requested that the FAA

immediately, and on its own authority: 1) disavow all the earlier "statistical" representations of increased risk above age 60 proffered in support of its age 60 rule as methodologically flawed; 2) publicly and explicitly disavow the 1983 Golaszewski Flight Time Study as methodologically flawed, and its results inappropriate for age 60 rule analysis; 3) remove all four of the OAM Research Task AAM-00-A-HRR-520 reports from its CAMI website; 4) post in their place an explanation of the reason for their flawed results as well as the reason for their removal, and other actions as set forth in the CONCLUSION, below.

As is clear from the first sentence of this complaint,

This complaint is submitted under the Paperwork Reduction Act of 1995 (44 USC §§ 3501 *et seq.*) and Data Quality Act of 2001 (44 USC § 3516 (Note)).

the complaint was submitted under the Paperwork Reduction and Data Quality Acts.

The initial review of this complaint was not performed by the proper office and officer within DOT/FAA.

<sup>1</sup> Assigned Docket No. FAA-2003-14951-1

The FAA's response to my complaint dated September 9th (postmarked September 11th, received September 13th), is signed by Dr. Jon H. Jordan, Federal Air Surgeon. A response to this complaint by the Federal Air Surgeon is unacceptable. This is particularly true, as the documents, policies, and practices complained of originate in the Federal Air Surgeon's office and remain under his authority and responsibilities.

As the complaint was submitted under the Paperwork Reduction and Data Quality Acts, the initial review and response should have been performed by the FAA's (or DOT's) officially designated Chief Information Officer, not by the Federal Air Surgeon. Section IV of the OMB produced government wide guidelines require as much.

1. Agencies must designate the Chief Information Officer or another official to be responsible for agency compliance with these guidelines.
2. The agency shall respond to complaints in a manner appropriate to the nature and extent of the complaint.<sup>2</sup>

The initial response to this complaint ignored its clear focus, introduced an irrelevant subject, and relied upon an incorrect - and irrelevant - standard of review.

Dr. Jordan's response offered to insert a caveat into revised versions of CAMI Reports 3 and 4. This is unacceptable, because, as discussed more fully below, no simple caveat noting a "potential impact" can redeem studies as fundamentally flawed as these. Dr. Jordan also mentioned withdrawal or change to the age 60 rule. No such request or suggestion appeared in my complaint, thus the subject irrelevant. Dr. Jordan defended the Golaszewski Flight Time Study as supported by U.S. Circuit Court decisions. These rulings have no bearing on Data Quality Act review, and are to be rejected.<sup>3</sup>

The correct standards by which the conduct of the FAA should be judged in its reliance on and dissemination of the documents complained of - statistical or statistics related all - should be those of the Data Quality Act. These standards require that the FAA, in its dissemination and reliance on these documents, act to "ensure and maximize" the " quality, objectivity, utility, and integrity of the information (including

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<sup>2</sup> 67 Fed.Reg. 8452-8460, 8459. Feb. 22,2002.

<sup>3</sup> While understandable that the FAA would want to invoke the highly deferential standards of appellate (judicial) review (arbitrary and capricious, abuse of discretion), it is inappropriate - and disingenuous - for the FAA to do so here. (Note the lengthy discussion, page 2, of the Jordan response). Dr. Jordan's further discussion of withdrawal or modification of the age 60 rule was similarly inappropriate in that it introduces a subject - again with a different and unrelated standard of review - not raised in my complaint. The focus and objective of my complaint of January 15th was not change in the rule, but rather to again urge - require by reliance on the Data Quality Act, if you will - some measure of honesty and integrity by the agency in its defense of that rule.

statistical information)" disseminated and relied upon in its regulatory activities.<sup>4</sup>  
Under OMB produced guidelines, "quality" is defined as:

an encompassing term comprising utility, objectivity, and integrity.

"Utility" is further explained:

"Utility" refers to the usefulness of the information to its intended users, including the public. In assessing the usefulness of information that the agency disseminates to the public, the agency needs to consider the uses of the information not only from the perspective of the agency but also from the perspective of the public. ...

"Objectivity" involves two distinct elements, presentation and substance:

"Presentation"

includes whether disseminated information is being presented in an accurate, clear, complete, and unbiased manner. This involves whether the information is presented within a proper context. ... Also, ... in a scientific, financial, or *statistical context*, [the agency needs to identify] the supporting data *and models*, so that the public can assess for itself *whether there may be some reason to question the objectivity of the sources*.

"Substance"

involves a focus on ensuring *accurate, reliable, and unbiased information*. In a scientific, financial, or *statistical context*, the original and supporting data shall be generated, and the analytic results shall be developed, *using sound statistical and research methods*.  
(Emphasis - italics - added.)

For these reasons, these documents and studies, and the use to which the FAA puts them, stand as clear violations of the requirements established by the Office of Management and Budget under the Data Quality Act.

With regard to analysis of risks to human health, safety and the environment maintained or disseminated by the agencies, agencies shall either adopt or adapt the quality principles applied by Congress to risk information used and disseminated pursuant to the Safe Drinking Water Act Amendments of 1996 (42 U.S.C. 300g-1(b)(3)(A) & (B)).<sup>5</sup>

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<sup>4</sup> Ref: Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies; Notice; Republication. 67 Fed.Reg. 8452-8460, Feb. 22,2002.

<sup>5</sup> Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies; Notice; Republication, 67 FR 8452-8460, 8458, Feb. 22,2002

These standards require that, to the degree that its regulatory practices are based on science, the agency must use:

... (1) *the best available, peer-reviewed science and supporting studies conducted in accordance with sound and objective scientific practices*; ...<sup>6</sup>

and:

*in a document made available to the public in support of a regulation [to] specify, to the extent practicable- (i) each population addressed by any estimate [of applicable risk effects]; (ii) the expected risk or central estimate of risk for the specific populations [affected];*<sup>7</sup>

(Emphasis - italics - added.)

All of the documents and statistical studies disseminated to the public by the FAA, and relied upon by the FAA in support of its age 60 regulation and identified in my complaint of January 15 violate these strictures of the Data Quality Act, the clearly enunciated Congressional intent as interpreted and described by the OMB in its government wide guidelines.

The documents identified in my complaint of January 15 are not only invalid for any purpose, they are invalid for the only purposes for which the FAA promotes them.

The documents I criticize in my complaint of January 15th - purportedly statistical studies all - suffer two, fundamental, underlying flaws that render them not only invalid for any purpose, but false, misleading, and deceptive for the only purpose for which the FAA endorses, relies upon, and disseminates them - support for its 40-plus year-old age 60 rule.

The statistical studies identified in my complaint of January 15th are invalid for any purpose because the single population to which their results are generalized differs dramatically from the sample from which the generalizations were made.

A first underlying flaw that renders the FAA's favored studies invalid for any purpose is that they compute a single risk profile using aggregated data from several different classes of pilots, each with widely differing risk characteristics. This scheme violates the first principles of inferential statistics: homogeneity in the data analyzed, and the relevance of that data to the trait(s) examined.

... [A]ppropriate techniques of inferential statistics are used to estimate the values of population parameters from sample statistics. If the sample is properly selected, the sample statistics will often give a good estimate of the

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<sup>6</sup> *Id.*, at 8457.

<sup>7</sup> *Ibid.*

parameters of the population from which the sample is drawn; if the sample is poorly chosen, erroneous conclusions are likely to occur. Thus, whether you are doing your own research or reading about that of someone else, you should always check to be sure that the population to which the results are generalized is proper in light of the sample from which the results were obtained.<sup>8</sup>

Applying this principle, the statistician in the massive Hilton Systems Age 60 Project<sup>5</sup> refused to examine and report on pilot populations of mixed medical certificate classes, explaining:

A number of principles guided the analyses. First, it was inappropriate to aggregate data across medical classes, because this created heterogeneous groups with misleading accident rates. For example, Class I pilots had relatively few accidents and relatively high flight hours. If the medical class of the pilots was ignored in forming groups, the accident rates of the groups would have reflected differences in the proportion of Class I pilots in the various groups.<sup>10</sup>

Not only did Dr. Kay refuse to aggregate pilot groups across medical classes, but to more precisely identify medical Class I pilots actually flying as air carrier pilots in Part 121 air carrier operations - thus subject to the FAA's age 60 rule - he winnowed the total medical Class I population down with seven increasingly precise database queries. Reviewing the averaged results of four of these iterations is illustrative of the disparities in risk experienced by the different classes, categories, and experience levels of pilots - all with Class I medical certificates:<sup>11</sup>

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<sup>8</sup> Welkowitz et al., Introductory Statistics for the Behavioral Sciences, 3 ed., Harcourt Brace, 1982, at 6.

Two clearly invalid non-aviation related examples to illustrate the point are:

To estimate the height of NBA basketball players you measure that of all U.S. men and women.

To estimate the intellectual abilities and social achievements of freshmen at all U.S. colleges and universities, you measure those traits in the freshman classes at Harvard or Yale - or at both.

<sup>9</sup> Age 60 Project, Contract No. DTFA-02-90-90125

<sup>10</sup> Kay, et al., Age 60 Project, Consolidated Database Experiments, Final Report, Hilton Systems Technical Report 8025-3C(R2): CAMI Contract No. DTFA-02-90-90125, at 4-1.

<sup>11</sup> Unlike other researchers, Kay provided excellent documentation on for his various calculations. In Section 3, Kay gave a full and detailed explanation of his consolidated database construction processes. He identified the five different databases from which his consolidated data was derived, and the correlation parameters used to guarantee both

<u>Pilot Class</u> <sup>12</sup>	<u>Risk</u>
All medical Class I pilots	1.00 accidents/100k flight hours
Class I w/ <250 recent hours	0.68
Class I w/ <700 recent hours	0.56
Class I, ATP, Part 121 air carrier pilot	0.06

Even greater disparities are seen when Kay's all three medical class groupings are similarly examined (same age range 30-59):

<u>Pilot Class</u> <sup>13</sup>	<u>Risk</u>
All medical Class III pilots	10.58 accidents/100k flight hours
All medical Class II pilots	6.55
All medical Class I pilots	1.00
Class I, ATP, Part 121 air carrier pilot	0.06

Given the massively disparate risks experienced by these various classes of pilots, a single (averaged) risk profile resulting from the aggregation of data from any two or more of these pilot groups can not accurately reflect the risk characteristics of either/any of them. And it is not merely incorrect, but disingenuous to suggest that they do.

Even where risk is expressed by operational classifications (Part 121, Part 135, Air Taxi, General Aviation, etc.) and not by pilot category, the disparities in computed (averaged) risks are enormous. An official source against which the Kay results can be compared appears in the FAA's Statistical Handbook.<sup>14</sup> Relevant data for all classes of flight operations is presented in Tables 9-4, 9-8, 9-9, and 9-10, and are summarized here:

<u>Type Operation</u>	<u>Risk</u>
General Aviation/Part 91 <sup>15</sup>	8.51 accidents/100k flight hours
Air Taxi <sup>16</sup>	3.98

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completeness and accuracy in its construction. In his Appendix B, Tables B-1 through B-17, Kay provided not only the separate accident and pilot queries for data extraction in the separate risk calculations, but also the specific data - age, flying time, and accident counts - so extracted and used for each.

<sup>12</sup> Tables B-1, B-3, B-5, B-6, respectively

<sup>13</sup> Tables B-8, B-7, B-1, B-6, respectively.

<sup>14</sup> Data (accident count and aircraft - not pilot - flight hours) spans the years 1987-1996. Kay's data spans the years 1976-1988 (less 1986). Available online at: <http://www.api.faa.gov/handbook96/toc96.htm>

<sup>15</sup> Table 9-10. Part 91 encompasses two types of flying - recreational and business, not common carriage for hire. Recreational flying requires only a private pilot license and a Class III medical certificate. Business not common carriage for hire requires a commercial license and a valid Class II medical certificate.

Part 135 common carriage <sup>17</sup>	0.76
Part 125 common carriage <sup>18</sup>	0.31

Here, too, the disparities in computed (average) risks are so extraordinarily diverse as to make a single (averaged) risk profile derived from the aggregation of any two or more of these types of flight operations invalid for any/either. And it is not merely invalid, but disingenuous for the FAA to suggest as much.

The statistical studies identified in my complaint of January 15th are invalid for age 60 rule analyses because the study populations are demographically altered at the precise point of interest - age 60 - by the age 60 rule, itself.

The second underlying flaw that renders the studies criticized in my Data Quality Act complaint as invalid for age 60 rule analysis is that the populations in most of them - the FAA's most favored - are demographically altered at age 60 by the age 60 rule, itself. Thus, any change in the risk profile generated by these studies that occurs precisely at age 60 is compromised by the effect of the age 60 rule, itself.

It is this age 60 rule induced change in averaged risk for either "all" pilots or "all professional" pilots that the FAA promotes to prove an age-risk relationship for the ultra-safe air carrier pilots - none of whom can fly past age 60.

In the FAA's preferred analyses, the computed risk for the composite groups under age 60 is depressed by the inclusion of hundreds of thousands of ultra-safe air carrier pilot flight hours in the denominators of the risk equations without a corresponding change in the numerator values. The relationship between the accident count and flight hours - in raw numbers - can be observed in the data from the FAA's Statistical Handbook.<sup>19</sup>

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<sup>16</sup> Table 9-9. Pilots in Air Taxi operations operate in common carriage and must have a commercial license and a valid Class II medical certificate.

<sup>17</sup> Table 9-8. Generally considered flown by medical Class II pilots with either a commercial or ATP license. (*But see* Air Taxi data, immediately above.)

<sup>18</sup> Table 9-4. Generally considered reserved to medical Class I pilots with an ATP license. (*But see* Kay data by Class I medical certificate, above.)

<sup>19</sup> See Footnotes 13-17 and associated table, above.

<u>Type Operation</u>	<u>Flight Hours</u> <sup>20</sup>	<u>Accident Count</u> <sup>21</sup>	<u>Rate</u> <sup>22</sup>
General Aviation/Part 91	253,458	21,569	8.51
Air Taxi	22,422	892	3.98
Part 135 common carriage	23,660	180	0.76
Part 121 common carriage	122,385	279	0.23
TOTALS	421,925	22,920	5.43
Total (Less Part 121 data)	299,540	22641	7.56

As can be seen here, the Part 121 pilot data contributes 29% of the denominator values in the rate equations (253,458 / 421,925), while their accident count contributes only 1.22% of the total value (279 / 22,920) to the numerators. It is this disproportionate presence of ultra-safe air carrier pilot flight hours in the denominators that depresses the computed rate for the aggregated group of pilots below age 60 - providing a value (5.43 accidents/100k hours) that is not representative of any of the groups separately. And it is the loss of these ultra-safe air carrier flight hours from the age 60 and over denominators that creates the false appearance of an increase in risk (5.43 - 7.56) when the air carrier pilots are forced to retire at age 60.<sup>23</sup>

It is this false change in *computed* risk when going from the under to the age 60 and over pilots - *the direct result of the loss of the ultra-safe air carrier pilot flight hours from the denominators of the rate equations* - that the FAA has knowingly and intentionally promoted to a world-wide audience for well over two decades to "prove" its false and misleading message of an increase in risk for pilots aged 60 and above.<sup>24</sup>

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<sup>20</sup> Aircraft Flight Hours (000).

<sup>21</sup> Accident Count.

<sup>22</sup> See Footnotes 13-17 and associated table, above

<sup>23</sup> The above analysis does not assess pilot performance by age brackets as do the studies promoted by the FAA for age 60 rule analysis. However: 1) on a visual inspection, its results correspond quite well with those of Kay (the only investigator to similarly segregate his data into discrete groups); 2) the robustness of the data is enhanced by a 10-year time span; and 3) the differences in risk between the different groupings of pilots - particularly between "all" pilots and air carrier pilots - is so large as to minimize the risk of misinterpretation.

In any event, the analysis is not presented to define actual risks, but rather - using real data from an official FAA source - to illustrate the consequences of ignoring the fundamental principles of inferential statistics as presented at the beginning of this appeal.

<sup>24</sup> The FAA's false presentations of pilot-age-related risk cannot be defended as either truth or myth, and only possibly as fiction. They are far from true; myth is an untrue statement believed by the speaker to be true; and fiction an untrue statement understood by both speaker and hearer to be untrue. Given the widespread, longstanding, and uniform criticisms of the data and manipulations underlying these four Reports, and the implausibly flawed

Dr. Jordan's suggestion that the FAA will insert a caveat concerning removal of the "ultra safe" flight hours from the rate equations in CAMI Reports 3 and 4 is unacceptable, and must not be permitted.

Dr. Jordan's suggestion for adding a caveat noting the potential impact of removing the ultra safe flight hours from the rate equations in CAMI Reports 3 and 4 is deceptive, producing a result that is invalid for any purpose. First, the caveat will be buried in a mass of tedious technical discussion - or worse, in a footnote. In this way, the false and misleading *presentation* of an increase in risk beginning at age 60 remains unchanged and prominently displayed in the Reports. Second, even if the "ultra safe" hours were actually removed from the rate equations, and full re-analyses were made, the Reports would falsely imply that the single risk profile derived from a heterogeneous mass of non air carrier pilots was representative of air carrier pilots. Third, the only purpose of the entire CAMI project would be thwarted. The directive of the Senate Appropriations Committee, clearly stated, was for the FAA to address the question of

... whether there was any scientific or medical reason why the United States should not "cautiously increase the retirement age to 63" like other countries have for commercial aviation.<sup>25</sup>

Removing the "ultra safe" air carrier pilot flight hours from the rate equations of Reports 3 and 4 would - perhaps - remove the demographic changes effected at age 60 by the age 60 rule, but would not resolve the heterogeneity flaw. The result would still be a single risk profile in each Report, unrepresentative of any of the several classes of non-air carrier pilots included - and absolutely unrepresentative of the air carrier pilots *not* included.

### CAMI Report 1

The FAA's CAMI Report 1 seriously misrepresents the state of knowledge concerning the age-risk relationship among pilots in general - and air carrier pilots in particular.

The FAA's CAMI Report 1 (Schroeder, et al.) is a web of misinformation suggesting that the question of whether air carrier pilots become unsafe with increasing age - specifically above age 59 - is complex and unsettled. It is neither. Because the Report is far too extensive in detail to address all of it here, the following touches only the high points.

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results they obtain, it would require a level of wishful thinking rising to that of willful ignorance for the FAA to actually believe its official position on the older pilots' risks.

<sup>25</sup> Department of Transportation and Related Agencies Appropriations Bill, 2000. 106th Ccong. 1st Sess., May 27, 1999. S.Rep. 106-55, at 79.

**Origin of the rule:** Report 1 misstates both the historical facts and rationale underlying the age 60 rule. Only two official reports relating to pilot age in air carrier operations predated the FAA's initiation of the rule: 1) The Airport and its Neighbors, Report of the President's Airport Commission, May, 1952 and 2) the Flight Safety Foundation Reports 1 & 2, 1958.

The Report of the President's Airport Commission, in an unsolicited comment, suggested that the "Aero-medical Association" (now Aerospace Medical Association) examine the issue of the aging air carrier pilot. In response, the Association formed a committee to do so. The only committee report extant (Report of the Committee on Pilot Ageing [*sic*] and Allied Problems, 1954) reviewed the (then) existing literature and identified existing research relevant to the question. The committee's only firm recommendation was that flight simulators be used to evaluate "pilot ability on a more objective basis."

The Flight Safety Foundation Report 1 evaluated non-flying airmen (air traffic controllers and tower operators). It recommended that, because of the nature of the work and stress levels involved, age limits should be considered for these positions.

Flight Safety Foundation Report 2 evaluated flight personnel (pilots). It found that no change in the medical certification for pilots was needed, even considering the imminent introduction of the first turbojet-powered transport aircraft.

A study by Orlady (1966)<sup>26</sup> revealed that in the decade preceding the rule's enactment, no accident or incident had resulted from pilot "failure," even though there had been six pilot deaths while "at work" during that time. Moreover, the ages at which these pilots had died - 28, 36, 44, 47, 50, and 52 - defined no age-related pattern, certainly none implicating either old age generally, or age 60 specifically. In each of the in-flight pilot deaths, the other pilot had continued the flight safely - as the FAA readily admits the multiple-pilot, fail-safe air carrier system is designed for.<sup>27</sup> The FAA even admitted this lack of an accident record on which the rule could be justified in its official press release accompanying formal promulgation of the rule on December 5, 1959.<sup>28</sup>

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<sup>26</sup> Or lady, H., ALPA Views on Pilot Selection, Monitoring and the Criteria for Release from Duties Involving Flying, Presented at the Flight Safety Foundation International Air Safety Seminar, Madrid Spain, November 17, 1966

Confirmed in a later, peer reviewed study: Buley, L.E., *Incidence, Causes and Results of Airline Pilot Incapacitation While on Duty*, Aerospace Medicine, January 1969, 40(1):64-70

<sup>27</sup> Testimony of Quentin Taylor, Deputy FAA Administrator during hearings on Age Discrimination Against Airline Pilots before the Select Committee on Aging, House of Representatives, 96th Cong., 1st Sess., March 21, 1979. (At 53).

<sup>28</sup> Questions and Answers accompanying the formal press release (FAA-59-#100, Dec. 5, 1959) announcing promulgation of the rule.

As reported by Ruppenthal,<sup>29</sup> three pilot grievances at three carriers (American, TWA, and Western) during the years immediately preceding imposition of the rule challenged the unilateral imposition of mandatory age 60 retirement rules by some of the airline companies. All three grievances were decided against the carriers and their rules. Two (American and Western) were decided in the years preceding the rule, the last (TWA) immediately after its enactment. One airline (Western) defended on the safety issue. The neutral arbitrator ruled, however, that neither the carrier had failed to show that older pilots were less safe than younger pilots. Western acquiesced to the arbitrator's decision. American refused to return its grieving pilots to work.

The only documentary evidence from that era that can even plausibly explain the rule's initiation in 1959 is personal correspondence from C.R. Smith, Chairman of American Airlines to Lt. Gen. (ret.) Elwood Quesada, newly appointed Administrator of the newly created FAA.<sup>30</sup> In these letters and notes, Smith described his loss in arbitration on the retirement issue and capitulation after a 20-day strike over the Christmas-New Years holidays (1958-59), and asked (suggested the need for) a federal regulation to achieve his business objective:

February 5, 1959

Dear Pete,

During the course of our recent negotiations with the pilot's association we found it unwilling to agree to the company's policy concerning retirement of air line pilots at age 60.

I have no specific recommendation to make to you at this time. It appears obvious that there must be some suitable age [sic] for retirement. It appears equally obvious that as men become older the result of the usual physical examination becomes less conclusive.

It may be necessary for the regulatory agency to fix some suitable age for retirement.

Sincerely yours,

s/ CR  
C.R.Smith<sup>31</sup>

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<sup>29</sup> Ruppenthal, K.M., *Compulsory Retirement of Air Line Pilots*, 14 Indus. & Lab. Rel. Rev. 528, (1961).

<sup>30</sup> Smith and Quesada were long-time military friends, both having worked for General (now President) Eisenhower during WWII. When Quesada retired from the FAA in 1961, he was immediately appointed to the Smith's Board of Directors at American Airlines.

<sup>31</sup> Letter, C.R. Smith (personal letterhead) to General Elwood (Pete) Quesada, FAA, dated 5 February 1959.

In less than 2 weeks, a preliminary "medical" rationale had been prepared by Quesada's FAA, and just 9 months later - to the day (December 5, 1959) the rule was officially promulgated, with age 60 as the mandatory date for airline pilots and medical uncertainties as the stated rationale.<sup>32</sup>

A thirteen year search by this complainant has found no other documents or any personal recollections that raise an even *possibly* plausible some *other* explanation for the FAA's now 42-plus year old age 60 rule.

**The FAA Georgetown Clinical Research Institute Study:**<sup>33</sup> The last sentence in Report 1's first paragraph identifies this GCRI study as an FAA effort "underway in the summer of 1959 to initiate a research program ... that would result in the development of a 'Physiological Aging Rating Schedule'." Unstated is the fact that the FAA's GCRI effort was apparently focussed on air traffic controllers, and only incidentally - and fortuitously by its timing with respect to the C.R. Smith request - on pilots.<sup>34</sup> And terminated in disgrace after 6 years with no results and a total waste of \$1.2 million.

Actually, the FAA had earlier (also in 1959) contracted with the Lovelace Foundation of Albuquerque, N.M. for a preliminary study with which to develop a protocol for an in-house study to produce a "Physiologic Aging Profile" for pilots.<sup>35</sup> This Lovelace report focussed exclusively on pilot and piloting, and was not delivered to the FAA until roughly a year after the agency had begun its Georgetown project. Furthermore, following its delivery, the FAA rejected the Lovelace detailed, 7-point program in total - including the extensive and innovative use of flight simulators:

6. Using its own research and aviation facilities, the Federal Aviation Agency [*sic*] should begin a program to perfect a quantitative method of evaluating flight simulator performance in highly skilled pilots to serve as a psycho-physiological instrument for validating the significance of a pure medical index, e.g., a Profile Aging Ration (PAR), as a true index of deteriorating performance capabilities with advancing age.

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A copy of this letter, from the Federal Air Surgeon's files, was delivered to the firm of Haley, Bader, & Potts in 1984 in settlement of a suit initiated under the FOIA.

<sup>32</sup> 24 Fed. Reg. 9767 (Dec. 5, 1959) Final Rule, Maximum Age Limitations for Pilots.

<sup>33</sup> Conducted by the FAA as an FAA project in rented quarters at the Georgetown Medical Research Institute, 1960-1966. Not in any way related to that prestigious institution.

<sup>34</sup> Recall that in its 1958 Report 2 the Flight Safety Foundation had recommended no change in pilot certification. Recall, too, that in Report 1 the Foundation had recommended that the agency consider a maximum retirement age for air traffic controllers.

<sup>35</sup> Lovelace Foundation for Medical Education and Research, Research Planning Study of Aging Criteria, Final Report, FAA Project No. FAA-904, July 31, 1961.

Instead, the FAA rejected the Lovelace recommendations, having begun (a year before the Lovelace report was delivered) its own ill-fated Georgetown (FAA-GCRI) program with tests more suited to the air traffic controller's environment, and with air traffic controllers in its study population:<sup>36</sup>

... The FAA also has a serious interest in reassessing its retirement policy with regard to air traffic controllers. At present, controllers are under the regular Civil Service retirement system, but FAA has reasons to believe that a more flexible retirement policy is needed. The FAA-GCRI project is specifically aimed at this problem.

...

FAA-GCRI studies all classes of civil aviation medical certificates, most of whom are not pilots, but are air traffic controllers.<sup>37</sup>

Intended initially to be a 30-year longitudinal study, FAA voluntarily terminated this study in 1966 during investigations by both the GAO and the House Committee on Government Operations. These investigations concluded that, after 6 years and an expenditure of \$1,200,000, the agency had neither accumulated any useable data or developed the ability to analyze such data if it had been available.<sup>38</sup>

Despite having been terminated in disgrace and producing absolutely nothing of value, the FAA identified this study to the GAO in 1989 as one of seven "major" studies it had relied on over the years in defending its age 60 rule from challenges.<sup>39</sup>

Given this historical record, Schroeder's reference to the FAA's GCRI project as the final sentence of the first paragraph detracts from, rather than adds credibility to Report 1 and the FAA's total defense of its age 60 rule.

**The 1981 NIH/NIA Report on the Experienced Pilots Study:**<sup>40</sup> In the second paragraph of Report 1, Schroeder mis-characterizes both the focus and findings of the "NIA blue ribbon panel" that examined the mandatory retirement issue in 1981.

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<sup>36</sup> Recall the recommendation contained in the Flight Safety Foundation Report 1.

<sup>37</sup> House Report No. 2080, Better Management Needed of Medical Research on Aging, Committee on Government Operations, 89th Congress, 2d. Sess., September 26, 1966. Appendix C, Statement of HEW, at 22, 23

<sup>38</sup> House Report 2080, at 3, 4.

<sup>39</sup> GAO Fact Sheet, Aviation Safety, Information on FAA's Age 60 Rule for Pilots, GAO/RCED-90-45FS, November 1989, at 13.

<sup>40</sup> Report of the National Institute on Aging Panel on the Experienced Pilots Study, Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Aging, Bethesda, MD, August 1981. (NIA Panel report.)

Pub.L. 96-171 ordered the National Institutes of Health to examine the retirement age issue and answer 5 specific questions. NIH assigned this duty to NIA, who contracted with IOM to perform the actual study. Following three public hearings and review of scores of written comments on the IOM's report and the questions posed, a nine member panel of experts convened under the auspices of NIH and NIA reported its findings and conclusions as required by the statute. In this NIA Report, the NIH/NIA panel concluded unambiguously, as had the IOM committee, and stated repeatedly that

there is no convincing medical evidence to support age 60, or any other specific age, for mandatory pilot retirement for air carrier pilots.<sup>41</sup>

This was a definitive finding by the panel, declared by it in three different places in the report - not a mere "indication" that it saw "no special" significance to this age. Moreover, although the panel did not identify a test or set of tests with which to address the issue, it did provide its own detailed protocol for that purpose - which the FAA promptly ignored. (See below.)

The NIA panel's recommendation to temporarily retain the rule derived - at least in part - on misleading material provided to it by the FAA.<sup>42</sup> From this FAA data, the NIH/NIA panel erroneously concluded that risk of accident increased above age 60 for general aviation pilots whose experience most closely paralleled that of professional pilots:<sup>43</sup>

The data of Booze ... indicate that general aviation pilots with high total and recent experience (those pilots whose experience most closely parallels that of professional pilots) have declining accident rates until the age of 60, after which those trends reverse. The rise in accident rates ... in the 60- to 69-year age group with recent high recent experience (over 200 hours/6 months) is striking.<sup>44</sup>

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<sup>41</sup> NIA panel report at pp. 1, 2, and 10.

<sup>42</sup> Figure 2, p. 5 of the NIA panel report presented two risk profiles selectively extracted from data in a 1997 CAMI study. (Booze, CF, An Epidemiological Investigation of Occupation Age, and Exposure in General Aviation Accidents, FAA Office of Aviation Medicine, AM-77-10, March 1977.) The two profiles - high total time and recent flight times - depicted the false and misleading, *appearance* of a dramatic reversal from a declining to an increasing trend in risk occurring precisely at age 60.

In both cases, the underlying data were corrupted by the Age 60 Rule Effect - the inclusion of air carrier pilots in the study populations forced by the age 60 rule to retire at age 60. For high total flight time pilots (Table 5), the pilot count (denominator value) declined 79% from ages 50-59 to 60-69. For recent time pilots (Table 7), the count declined 92% across the same two age brackets.

<sup>43</sup> NIA panel report, Figure 2, page 5.

<sup>44</sup> NIA panel report, pp. 2, 4.

On this observation and the fact that it found no other valid information on which it could rely, the panel recommended that the rule be retained temporarily, but that exemptions be granted to select pilots for the collection of the data necessary for an informed recommendation on the controversial subject.<sup>45</sup> Moreover, for this purpose, the panel *provided a detailed protocol for the collection of that data as recommended.*<sup>46</sup>

But even more misleading in this second paragraph, certainly so for present purposes, is Schroeder's omission of the NIA panel's harshest criticism of the FAA - its failure to assist and cooperate in the Congressionally mandated study:

Both the IOM Committee and this panel have attempted, by every means available to them, to secure and utilize data directly relevant to the questions at hand. This undertaking met with only limited success for three reasons: 1) adequate data have not been collected; 2) in instances where data have presumably been gathered, they are not available; and 3) some relevant data -- gathered for other purposes -- have not been analyzed in line with the questions facing this panel.<sup>47</sup>

It must be noted here that this observation was made 21 years after inauguration of the rule, two years after the Congressional mandate to review its continuing validity, and after the more immediate and searching enquiry and report by the IOM.

**The Golaszewski Flight Time Study (1983):**<sup>48</sup> Rather than grant the exemptions as recommended by the NIA panel, FAA, instead, contracted for a new study to replicate the "favorable" finding it had extracted from the 1977 Booze study (*i.e.*, risk of accident rising dramatically at ages 60 and above) and presented to the NIA panel.<sup>49</sup>

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<sup>45</sup> Two former Directors of the NIA (Butler and Williams) and one panel member (Schaie) have since declared (Williams under oath) that the panel recommended retention of the rule *only* because the FAA had promised to grant the exemptions as sought by the panel.

<sup>46</sup> NIA panel report, pp. 22-25.

<sup>47</sup> NIA panel report, p. 17.

<sup>48</sup> Golaszewski RS, The Influence of Total Flight Time, Recent Flight Time and Age on Pilot Accident Rates, Acumenics Research and Technology, Inc., Bethesda, Maryland, Order No. DTRS57-83-P-80750, June 30, 1983.

<sup>49</sup> Except where noted, the statements, charges, and allegations I make are supported by documents I have in my possession, or from personal knowledge and/or experience. This statement is one of those exceptions. However, I've seen nothing in any context or record to call it into question, and some 20 years of FAA conduct - discussed below - affirm and support the charge.

As noted by Schroeder (page 1), FAA issued an ANPRM in June 1982 to invite comments on the NIA panel's suggestion for waivers from the rule.<sup>50</sup> At the same time, it issued the contract to Golaszewski, with delivery made on June 30, 1983 - with results replicating those the FAA had presented to the NIA panel. Less than a year after receipt of this new, supportive, Golaszewski revalidation, FAA withdrew its ANPRM.<sup>51</sup>

Unfortunately (for the FAA), however, the Golaszewski study was rejected as a final product and publication refused by the very office and officer within FAA that had supervised and provided technical support to the author.

Dear Mr. Woolsey:

. . . It should be noted that [the Golaszewski Flight Time Study] is unofficial because it was never formally published by the [FAA] . . .

Under my management and technical direction, the analysts with Aviation Safety and contractor employees . . . supported Operations Research Branch in the development of the concepts and information relating to accident rates and pilot experience. We have not formally accepted this study as a final product because there are major data deficiencies. Other problems with the study have been discussed by experts in the aviation field as well as within my office. . . .

Your use of this study to support any position may be questionable at best. . . .

*s/ Kenneth M. Chin*

Executive Officer

Office of Assistant Administrator  
for Aviation Safety<sup>52</sup>

Given this negative endorsement, Schroeder's statement - without an exculpatory caveat - on page 2 of Report 1 should be considered:

The work of Golaszewski is most commonly cited. He found that older Class I and Class II pilots exhibited higher accident rates at all levels of total flight time between 101 and 5,000 hours.

First, Golaszewski does not present data on Class I and Class II pilots. Instead, the work presents hours flown data on Class III and "all" pilots (ages <20 to >70) (denominator values), but, apparently, only general aviation accident data from the NTSB (or Class III pilots) for numerator data. To provide the Class I and II pilot data, Golaszewski explained in Footnote 5, page 10:

Accident rate data for Class I and Class II pilots (as a group) are derived from [*sic*] subtracting the Class III pilot data from that [*sic*] for all pilots.

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<sup>50</sup> 47 Fed. Reg. 29782 (Jul. 8, 1982) ANPRM, Crewmembers; Limitations on Use of Services.

<sup>51</sup> 49 Fed. Reg. 14692 (Apr. 22, 1984) Withdrawal of ANPRM, Flight Crewmembers; Limitations on Use of Services

<sup>52</sup> Letter, Kenneth Chin (FAA) to Samuel D. Woolsey dated July 24, 1991.

As can be seen, only those data for the Class III pilots is even possibly homogeneous. All other data for all other pilot classifications are heterogeneous amalgamations of several different kinds and classes of pilots and piloting. Moreover, in every class and experience levels examined (except those of Class III pilots), the groups were demographically altered at age 60 when the air carrier pilots were forced to retire by the age 60 rule on their 60th birthday. The result - a dramatic but false and misleading appearance of an increase in risk for the highest experienced pilots beginning precisely at age 60 - is predictable. And produced from the Footnote 5 data for Class I and II pilots, 5001+ total (cumulative) flight hours (Tables A-10 - A-15):

<u>Age Brackets</u>	<u>Flight Hours</u> <sup>53</sup>	<u>Accident Count</u> <sup>54</sup>	<u>Rate</u> <sup>55</sup>
Ages 50-59	33574.9	716	2.1
Ages 60-69	3594.5	194	5.4
Change (50-59 - 60-69):	- 89.3%	- 73%	+ 157%

Schroeder is correct in Report 1. The work *is* the most commonly cited. But for two dramatically different reasons.

Despite its patently false and misleading results - and the FAA's own rejection and refusal to publish upon delivery in 1983 - The FAA has repeatedly promoted this 1983 Golaszewski study to a world-wide audience as "the best scientific evidence" that risk of pilot-related accident increases at ages 60 and above. Among them:

- In 1989, as it had for its disastrous FAA-GCRI study, FAA also identified this rejected and discredited study to the GAO as one of seven "major" studies on which it had relied over the years to defend its age 60 rule.<sup>56</sup>
- In 1990, FAA created two new charts from Golaszewski's Footnote 5 data, presenting them to the 7th Circuit Court of Appeals as "the best available statistical analysis found regarding the relationship between experience and age to aviation accident rates while accounting for exposure."<sup>57</sup> (Failure to reveal that the study had been widely discredited, and rejected and refused publication by the agency, itself, could well have constituted a fraud upon the court.)

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<sup>53</sup> (000).

<sup>54</sup> Actual count.

<sup>55</sup> Accidents / 100k flight hours.

<sup>56</sup> GAO Fact Sheet, Aviation Safety, Information on FAA's Age 60 Rule for Pilots, GAO/RCED-90-45FS, November 1989, at 13.

<sup>57</sup> Brief of Respondents, Baker v FAA, No. 89-2524, at 8. (Decided Baker v FAA, 917 F.2d 318 (7th Cir., 1990).)

Also submitted was the Figure 2 chart (Booze Tables 5 and 7 data) from the FAA's submission to the NIA panel, and 3 charts selected from Golaszewski's study.

- Also in 1990, the FAA's Associate Administrator, Anthony Broderick, presented these results to a nation-wide (world-wide?) audience on the ABC News show 20/20.<sup>58</sup> Broderick also declared the Golaszewski results to be "the best scientific evidence that tells us whether or not it is reasonable to expect that pilots who are over age 60 have a higher tendency than those under age 60." After the moderator, Stone Phillips, described the flaws and resulting errors embodied in it, Broderick chose not to respond. But the author, Golaszewski, also present, conceded the point, declaring in his defense "But you have to realize, in fairness, that I never set out to answer this question about the performance of airline pilots."
- Also in 1990, the FAA created yet another chart using the Footnote 5 data, presenting it and the prior two charts - now 3 - to the ICAO Air Navigation Commission as "statistical data on how pilot accident rates vary with age."<sup>59</sup>

On the other hand, independent reviewers with no "stake" in the rule or allegiance to the FAA have uniformly criticized the study, describing and explaining its fundamental flaws. Even though under contract to the FAA, the explanations of Kay (1991) are repeated above.<sup>60</sup> Another criticism - more descriptive - illustrates:

Only one study covering the period 1976 to 1980 [Golaszewski] compared aircraft accident rates of over-60-year-old pilots with those of younger pilots. . . . The accident rate of 60 to 69 year-old-pilots with a Class I medical certificate . . . was found to be two times higher than that of 50 to 59-year-old pilots. The comparison is, however, problematic. While the accident rate for 60-69 year old pilots was calculated by the number of accidents in general aviation divided by the number of pilot hours flown in general and small commercial aviation aircraft, the accident rate for 50-59-year-old pilots was calculated differently. In the latter case, in addition to hours flown in general aviation and small commercial aircraft, pilot hours flown in large commercial aircraft were also included in the calculation of the accident rate. This results in an underestimation of the accident rate in 50-59-year-old pilots.<sup>61</sup>

The Golaszewski Footnote 5 message was presented to the Industrial Relations Court of Australia<sup>62</sup> by a Dr. Charles Billings<sup>63</sup> as scientific evidence that pilots over age 60 had increased risk of accident. Rejecting the argument in its entirety, the court observed:

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<sup>58</sup> ABC News 20/20, February 9, 1990.

<sup>59</sup> Reported in Discussion Paper No. 1 Related to AN-WP/6538 29 April, 1991. At Appendix A.

<sup>60</sup> Page 5.

<sup>61</sup> Stuck et al., *Multidimensional Risk Assessment versus Age as a Criterion for Retirement of Airline Pilots*, *Journal of the American Gerontological Society*, 40:526-532, 527, 1992.

<sup>62</sup> *Christie v Qantas Airways Ltd.*, No. NI. 879 of 1994, decided 12 May, 1995.

Given the amount of time and effort that has been expended in America in examining the justification of the Age 60 Rule, it is remarkable to say so; but it seems to me that none of the cited studies supports any conclusion about the relationship between that rule and safety.<sup>64</sup>

With respect to Billings' credibility as an expert witness on this question, the court further observed:

... I have already noted Dr. Billings' sincerity. I found him to be a likeable, and generally impressive person. But he has long been a staunch advocate of the Age 60 rule; to the point where it must be very difficult for him to give open-minded consideration to an alternative approach. I am not persuaded that he has been able to do this.<sup>65</sup>

**Office of Technology Assessment (OTA) (1990) review:** The OTA review was a politically motivated, minimal operation (3 persons, 2 weeks) in an apparent effort to lend support to the Boeing Co.<sup>66</sup> under challenge for relying on the age 60 rule as a BFOQ defense of its mandatory retirement policies for test pilots.<sup>67</sup> It was here (1988-89) that Billings, as an expert defense witness for Boeing, extracted flight hour data from Golaszewski's discredited and rejected 1983 ("major data deficiencies") document, merging it with NTSB accident data from a different era. Billings provided his Boeing charts to OTA for inclusion in their memorandum - without change or analysis - labeling it a NASA-Ames product. Both NASA-Ames and Billings have denied this pedigree. OTA, however, refused to correct the error.

Neither OTA nor Billings have revealed either Billings' data extraction or analytical techniques. Thus, not only is the OTA memorandum unsupported and unsupportable, its presentation is patently corrupted by the Age 60 Rule effect - thus not merely

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<sup>63</sup> A physician employee of NASA Ames in 1995.

While a NASA-Ames employee, Billings was hired in 1989 as an expert witness by the Boeing Co defending an age discrimination charge brought by EEOC on behalf of Boeing's test pilots then challenging the company's mandatory age 60 retirement policy. In that capacity, Billings produced analyses using the 1983 Golaszewski flight time data and (then) more recent NTSB accident data. It was this data that was so criticized by the Australian court in Christie.

Although Billings has consistently refused to reveal either his data extraction or analytical processes, his analyses have received wide distribution as support for the rule. See discussion re: OTA memorandum and Mortimer, below.

<sup>64</sup> *Id.*, at 57.

<sup>65</sup> *Id.*, at 77.

<sup>66</sup> Opinion based on the totality of the circumstance, but not supportable as fact.

<sup>67</sup> EEOC v Boeing, 843 F.2d 1213 (9th Cir., 1988)

useless for any purpose, but an "official" endorsement of a patently false and misleading presentation.

**Mortimer (1991):**<sup>68</sup> Ignoring the 5-year accident rates Golaszewski derived for his Class III pilots (1976-7980), Mortimer used Golaszewski's mean flight times as exposure estimates to apply to 1986 FAA data to derive his risk estimates. *However*, when Kay (1993) examined FAA's data for the years 1976-1988, he found that massive numbers of 1986 pilot records had been lost by the FAA, and were unretrievable. Further, Kay had previously examined Mortimer, and dismissed that study as unreliable. (Kay (1993) at 2-4.) Mortimer, like OTA and other so-called "statistical" studies relying on the 1983 Golaszewski study for their data, is - and can only be - garbage.

**Experimental vs Observational Studies:** As observed by Guohua Li in 1994, studies of risk in aviation could be categorized into two main categories: experimental and observational (non-experimental). The difference between these two is that an experimental study [*e.g.*, Yesavage, Taylor, et al., etc.] involves planned intervention on factors influencing the event or phenomenon under study, whereas an observational study [*e.g.*, Li, Baker, etc.] does not.

... [Experimental] studies are important in exploring the effects and mechanisms of specific factors. Their findings are not, however, necessarily generalizable to the real world. Safety performance in the real world; *i.e.*, the risk of being involved in a crash, is always the result of the interaction of many factors, and must be based on crashes and exposure to flight. [Observational] methods are especially useful for this assessment. These studies are more relevant to policies and programs of crash control and prevention than are experimental studies under laboratory conditions.<sup>69</sup>

Many of the studies cited by Schroeder in Report 1 fall into one or the other categories. But most, if not all, are not so identified. Thus, the potential for extrapolating their results into the real world of air carrier flight operations - the only venue to which the age 60 rule applies - is compromised. Thus, Schroeder's cursory descriptions of the cited studies in Report 1, without more, make them essentially worthless for age 60 rule, Part 121 air carrier flight operational application.

**Simulator performance vs "real world":** An extensive PubMed search back into the 1960s reveals only one study out of, perhaps, thousands, that sought to correlate

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<sup>68</sup> Mortimer, R.G., Some Factors associated with pilot age in general aviation crashes. Proceedings of the 6th International Symposium on Aviation Psychology, Columbus, OH., 1991.

<sup>69</sup> Li, G, Pilot-Related Factors in Aircraft Crashes: A Review of Epidemiologic Studies, Aviat., Space & Environ. Med., 1994 Oct;65(10):944-952.

simulator performance with actual flight.<sup>70</sup> And that study concluded that "extrapolation of simulator data to the flight environment must be approached with considerable caution." This deficiency/difficulty places another burden on the extrapolation of the findings in experimental studies (such as those of Yesavage and Taylor) to real-world operations. Certainly not impossible, but certainly, too, not obviously relevant. Here, too, Schroeder's cursory descriptions of the cited studies in Report 1, without more, make them essentially worthless for age 60 rule, Part 121 air carrier flight operational extrapolations.

**Standard for judging "acceptably safe":** For the entire 40-plus year life of the age 60 rule, the FAA has steadfastly refused to define a standard by which it would judge a showing of "safe" performance. By this one ploy - and it is/has been nothing more than a ploy - that the FAA has survived every challenge to either the rule, itself, or its refusal to grant a single exemption from it. But such a standard already exists within the FAA, and should be recognized - and accepted - as applicable to age 60 rule analysis by the agency. That standard is described in Chapter 3 of the FAA System Safety Handbook, version December 30, 2000. The standard is defined in a two-dimensional matrix inversely balancing the severity of any result against its likelihood of its occurrence. For example, an event with potentially catastrophic consequences can still be considered relatively safe if its likelihood of occurrence is sufficiently remote. The "remoteness" standard beyond which even potentially catastrophic events may be judged acceptably safe without additional system controls is defined in the System Safety Handbook as "less likely" than once in  $10 \times 10^9$  opportunities. The FAA has adopted this standard as the certification criteria for the most critical of aircraft mechanical systems - a wing attach bolt - for example.

Two studies, Lane (1971)<sup>71</sup> and Chapman (1984)<sup>72</sup> (Chapman reviewed here in Report 1), cited to and referenced this particular FAA "safety" standard. Because real-life accident events are so scarce, both resorted to a combination of observational and experimental data. Both studies surveyed the international air carrier pilot populations (IFALPA) for pilot "failure" information (kinds, occurrences), then fashioned and performed additional studies based on the survey results. Both then compared these results with the real-life risk of pilot failure to estimate real-life accident risk.

Merging exposure data from the international air carriers, incapacitating events (world-wide) from pilot surveys as reported by other investigators, and U.S. ALPA loss of (medical) license insurance claims, Lane concluded:

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<sup>70</sup> Billings, CE et al., Comparisons of pilot performance in simulated and actual flight, Aviat., Space & Environ. Med., 1975 Mar;46(3):304-308.

<sup>71</sup> Lane, J.C., *Risk of In-flight Incapacitation of Airline Pilots*, Aerospace Medicine, December 1971, 42(12):1319-1321.

<sup>72</sup> Chapman, J.C., *The Consequences of In-Flight Incapacitation in Civil Aviation*, Aviat., Space & Environ. Med., June 1984, 55(6):497-500.

The actual incidence of disease-induced, incapacitating events is about one-third to one twentieth that set for the aircraft [design] performance requirements, ...<sup>73</sup>

Working with British Caledonian Airways' training department, Chapman devised two separate series of pilot incapacitation simulator exercises to replicate his survey pilot failure results. The first (500 consecutive exercises) involved the subtle incapacitation of one pilot (captain or co-pilot at a "critical" moment of flight) coincident with another major aircraft system failure. The second series (800 exercises) involved only the subtle incapacitation of one pilot - but still at a critical moment of flight. Integrating the results of these two series with IATA reported exposure (pilot-years) and in-flight incapacitation data, Chapman concluded:

In airworthiness terms, the risk of catastrophe due to all causes of pilot incapacitation should lie between 1 in 100 million and 1 in 1000 million [flight] hours (10<sup>-8</sup> to 10<sup>-9</sup>), and the risk due to cardiac incapacitation should not exceed 10<sup>-9</sup>. Two conclusions flow from this. The first is that the 'crash' rate now being achieved in commercial operations (10<sup>-10</sup>, see above) is at least 10 times better than is required by airworthiness criteria for comparably vital aircraft systems. The second, logically, suggests the possibility of changing existing attitudes toward medical assessment.<sup>74</sup>

These results are 10 times better (*i.e.*, result in lower risk) than the FAA's System Safety Handbook certification standard requires for acceptance of remote possibility for the most catastrophic of events.

The FAA has never adopted, indeed, does not appear ever to have considered for adoption **any** standard by which an age-related risk of accident might be objectively assessed - including its own widely accepted, proven, and clearly defined aircraft System Safety Handbook standards.

It should be required to do so.

### **Conclusion: Report 1**

Through serious misstatements of fact, incomplete and inaccurate summaries of the various studies described, no acknowledgement of the fundamental statistical principals involved, and omission of any discussion or description of the various *kinds* of studies abstracted - and their relative merits and applicability to air carrier operations and the age 60 rule - the FAA's CAMI Report 1 seriously misrepresents the state of knowledge concerning the age-risk relationship among pilots in general and air carrier pilots in particular. As such, it can serve no useful purpose in a public dissemination of information regarding that rule and those flight operations, and is non-responsive to the

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<sup>73</sup> Lane, at 1321.

<sup>74</sup> Chapman, at 499.

Appropriations Committee's directive under which it claims its authority. The CAMI Report 1 should thus be removed from the CAMI website.

The discredited, rejected, and publication refused 1983 Golaszewski Flight Time Study - and its various parasitic derivatives - and the FAA's 20-year, conscience-less promotion of their most grievous - statistical - flaws are particularly troubling. Not only should this so-called "study" be removed from circulation so far as the FAA can do so, but the FAA has a moral, if not statutory, obligation to correct its unfortunate, but now 20-plus year legacy of wide distribution and unqualified endorsement..

### **CAMI Report 2**

CAMI Report 2 bears no relevance to the request contained in S. Rep. 106-55. Its true purpose can only be inferred from its contents. The first half is an "analysis" of a *Chicago Tribune* article of July 11, 1999.<sup>75</sup> The second half presents a lengthy, highly technical discussion of the statistical principles that will/should properly govern analyses of risk.

In its first half, Report 2 does not, as it declares, analyze the *Tribune* article. Instead, it analyzes a quite different analysis by a different author (Savage) with different data than that of the *Tribune* piece.<sup>76</sup> Moreover, it does so with additional, invalidated "found" data - which source is not identified.

A more problematic - and misleading - change in Report 2, however, is its refusal to acknowledge the over-age-60 commuter carrier pilots included in the *Tribune* analysis. Indeed, the entire focus of the *Tribune* piece was to reveal that even the FAA found the older pilots more safe: "FAA data find older hands are steadier." The *Tribune* piece reported on 1,977 pilots over age 60 - identified in a footnote as commuter pilots - with an accident risk of 4.55/100k flight hours. These 1,977 airmen were excluded from Report 2's "statistical" analyses, and relegated to the last sentence in a multi-subject footnote in the Report's Appendix A.

Because of the major changes in the data the author manufactured for this analysis, no real comparison can be made with the actual *Tribune* article. This deficiency not only makes the Report's *title* a lie, but its results irrelevant, indeed, inapplicable, to the very purpose underlying the Appropriations Committee's directive - and claimed to be the driving force for these Reports.

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<sup>75</sup> Schmeltzer, J., *FAA data find older hands are steadier: Pilots near retirement have fewer accidents*, *Chicago Tribune*, Sunday, July 11, 1999.

<sup>76</sup> The CAMI author made three adjustments to find the age 55-59 more safe than the original *Tribune* piece: 1) merge 5-year age cohorts into 10-year; 2) increase the "total estimated pilots" during the study period (increase the denominator); and 3) exclude 25 accidents/incidents (reduce the numerator of the rate equation).

In its second half, Report 2 presents what appears to be a carefully reasoned discussion of the statistical principles that will/should properly govern analyses of risk in aviation accident arena. Instead, it stands as a flawed and incomplete introduction - actually a back-door justification - of the flawed Golaszewski methodology the author will employ in Reports 3 and 4.

Fatally missing from this scholarly sounding dissertation is any discussion of the fundamental principle of inferential statistics introduced at the beginning of this paper: homogeneity in the data analyzed, and the relevance of that data to the trait(s) examined.

... [A]ppropriate techniques of inferential statistics are used to estimate the values of population parameters from sample statistics. If the sample is properly selected, the sample statistics will often give a good estimate of the parameters of the population from which the sample is drawn; if the sample is poorly chosen, erroneous conclusions are likely to occur. Thus, whether you are doing your own research or reading about that of someone else, you should always check to be sure that the population to which the results are generalized is proper in light of the sample from which the results were obtained.<sup>77</sup>

As illustrated above (basketball players and college freshmen, see Footnote 8), if the populations analyzed are not carefully chosen to fairly represent both the population and characteristic of interest, the statistical (numerical) manipulations can be perfectly performed, but their results would still be invalid - totally unrepresentative of the intended trait. This is true, whether the results are presented as "descriptive" (as in Golaszewski (1983)) or "inferential," as in Reports 3 and 4.

Criticisms of the FAA's past efforts ignoring these principles by choosing heterogeneous populations demographically skewed at age 60 by the age 60 rule as a ruse by which to justify that rule are widespread and authoritatively presented. For the FAA to ignore or deny their relevance here would require a level of wishful thinking rising to that of willful ignorance - not an option under the constraints of the Data Quality Act and OMB guidelines promulgated pursuant thereto.

Absent an admission of the importance of this fundamental principles in statistical analyses, and their direct application to the question at hand in this second half of Report 2, it stands as nothing more than a half-truth - the worst kind of deception.

**Conclusion, Report 2:** Since neither half of Report 2 is credible as it stands or defensible under any valid theory of statistical procedure, both stand as clear violations of the commands of the Data Quality Act and OMB guidelines, and neither relevant to

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<sup>77</sup> Welkowitz et al., Introductory Statistics for the Behavioral Sciences, 3 ed., Harcourt Brace, 1982, at 6.

the question it claims to address - the Appropriations Committee directive - it should be removed from the FAA/CAMI website forthwith.

### **CAMI Report 3**

It is difficult to discern why CAMI Report 3 was produced. Since it does not assess the population identified in the Appropriations Committee's directive, it is not relevant, as claimed, to that order. On the other hand, by restricting the population of interest to

... accidents occurring under 14 CFR §121 and §135 to annual hours flown by professional pilots holding Class 1 medical and ATP certificates ...<sup>78</sup>

the analysis takes a welcome step toward a less diverse - but not acceptably homogeneous - study population as ordered by the Committee, or examined in Report 4. The study does not, however, admit the relevance or incorporate protections to insure demographic consistency of the sample population between the "under 60" and "60 and over" pilot cohorts. Further, because the analysis aggregates data from pilots in both Part 121 (air carrier) and Part 135 (commuter) operations, the averages derived are not representative of either. Recall the data (above) extracted from Tables 9-4 and 9-8 of the FAA's Statistical Handbook:

<u>Type Operation</u>	<u>Flight Hours</u> <sup>79</sup>	<u>Accident Count</u> <sup>80</sup>	<u>Rate</u> <sup>81</sup>
Part 135 common carriage	23,660	180	0.76
Part 121 common carriage	122,385	279	0.23
TOTALS	146,045	459	0.31
Total (Less Part 121 data)	23,660	180	0.76

As is apparent, the overall differences are narrowed considerably. But the average rate for the two classes combined (0.31 accidents/100k flight hours) is not representative of either Part 121 or 135 flight operations. Moreover, even if the Part 121 data is removed, leaving only Part 135 data (0.76 accidents/100k flight hours) remaining, that result is not representative of the target population of interest - identified by the Appropriations Committee - air carrier pilots subject to the age 60 rule.

Moreover, the change in rules effective in year 2000 making many former Part 135 pilots subject to the age 60 rule are not and can not be represented by this data. The reason is that these Part 135 data were collected under the pre-2000 Part 135 controls thus are not representative of the post-2000 Part 121 controls under which these former Part 135

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<sup>78</sup> Report 3, Executive Summary, page 2.

<sup>79</sup> Aircraft Flight Hours (000).

<sup>80</sup> Accident Count.

<sup>81</sup> See Footnotes 13-17 and associated table, above

pilots now operate. That these differences are significant in both cause and result is fully recognized within the FAA:

In 1995, 1,546 Part 135 regional aircraft flew 3,033,773 hours at a cost of 11 accidents with a rate of 0.43 accidents per 100,000 flight hours as compared to Part 121, where the accident rate was 0.27 per 100,000 flight hours. FAR part 119, which applies the regulatory requirements of Part 121 to regional aircraft now [*i.e.*, post-2000] operating under Part 135, created higher safety standard requiring changes in flight crew qualifications, cabin safety equipment and materials, airplane performance requirements, aircraft dispatching, and maintenance. However, the regional airline operational environment still differs from the operational environment of "long-haul" carriers, and these important differences seemingly affect regional airline safety, as evidenced in the different accident rates.<sup>82</sup>

**Conclusion, Report 3:** No portion of Report 3, and no iteration of its data - with or without those of Part 121 pilots - is or can be representative of the risks suffered by pilots subject to the age 60 rule. For this reason, no portion of Report 3, and no iteration of its data can stand as a basis for change in that rule. As this underlying question posed by the Senate Appropriations Committee:

... whether there was any scientific or medical reason why the United States should not "cautiously increase the retirement age to 63" like other countries have for commercial aviation.<sup>83</sup>

is the only justification for these studies, and the studies' flawed and misleading results do not satisfy the " quality, objectivity, utility, and integrity of the information (including statistical information)" standards required by the Data Quality Act and OMB guidelines, the entire study should be removed from the CAMI website. Further, the FAA should be prohibited from relying upon this study's results - or any iteration thereof - in any of its regulatory activities.

#### **CAMI Report 4**

All of the criticisms of Report 3 presented above apply to Report 4 as well. But with increased significance because:

- Report 4 aggregates its data for a far more diverse study population than Report 3;

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<sup>82</sup> Task 5, Part (b) of General Aviation Human Factors Research Program: Performance Assessment Tools and Training Systems; Aeromedical Research Resume Research Project Description Subtask for FY00.

<sup>83</sup> Department of Transportation and Related Agencies Appropriations Bill, 2000. 106th Cong. 1st Sess., May 27, 1999. S.Rep. 106-55, at 79.

- because the population is more diverse, the single computed risk profile is less representative of any constituent segment; thus
- the results reported here - a greater and more dramatic increase in computed risk beginning precisely at age 60 - are the most flawed and misrepresentative of any produced; and
- the authors - and the FAA - have shown greater reliance on this Report and given it wider distribution than it has the others.

I submitted an extensive criticism of Report 4, and of the FAA's presentation of extracts from Report 4 to the Association's annual meeting of 2001, to the President of the Aerospace Medical Association on November 20, 2001. The letter is available online at:

[http://www.age60rule.com/asma\\_web\\_letter.html](http://www.age60rule.com/asma_web_letter.html)

This letter is incorporated by reference into this appeal in its entirety.

Report 3 examines only professional pilots holding Class 1 medical and ATP certificates and operating in Parts 121 and 135 operations. Report 4, on the other hand, purports to examine "all professional" pilots without reservation. As this population includes thousands of corporate, executive, test, ferry, radio & TV traffic report, fire-fighting, aerial photography, banner towing, agricultural application, heavy-lift helicopter, pipeline patrol, sightseeing, and parachute lift pilots that fly everything from Piper Cubs to Boeing B-747s under Part 91, in addition to pilots in Parts 121 and 135 operations, it is not in the least representative of any one of them. Moreover, as these different kinds and classes of pilots operate different aircraft under different controls and in different environments (low/high altitudes, day/night, VFR/IFR, single/multiple engine, single/multiple pilot, etc.), their underlying risks are all different. Although not perfect, the medical Class I and II data of Kay (1993), extracted and reproduced above illustrate the disparities in risks encountered:<sup>84</sup>

<u>Pilot Class</u> <sup>85</sup>	<u>Risk</u>
All medical Class II pilots	6.55 accidents/100k flight hours
All medical Class I pilots	1.00
Class I, ATP, Part 121 air carrier pilot	0.06

Because of this increased variability, the FAA's disregard of the well known and previously acknowledged effects that different levels of operational controls have on

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<sup>84</sup> The data for medical Class III pilots is excluded because to fly professionally (*i.e.*, for hire), the pilot must have either a Class I or II medical certificate.

The data from the FAA's Statistical Handbook (see Footnotes 18-21) are less representative here because those of the many "professional" pilots operating under Part 91 can not be segregated from the recreational flight conducted there.

<sup>85</sup> Kay (1991), Tables B-7, B-1, B-6, respectively.

safety (*see* Footnote 76 and associated text, above), the effort here to broaden the study population is disturbing. Given the FAA's and the authors' prior knowledge of these effects - the description quoted above w/ Footnote 82 is extracted from the actual work statement that authorizes these four Reports: OAM research task AAM-00-A-HRR-520 - the statements appearing in this Report 4:

The analysis reported in this study are based on a sample that is very similar to the working population of airline pilots subject to the Age 60 Rule.<sup>86</sup>

and:

By including pilots aged 60-63, our analysis found that the statistical trend for older pilots holding ATP or commercial and first- or second-class medical certificates was toward higher accident rates.<sup>87</sup>

are not merely invalid, they are bizarre.

Moreover, the choice of the agency to promote (disseminate) Report 4's results to the world-wide audience of the 2001 Aerospace Medical Association's annual meeting (Reno, NV), is disturbing.

The authors' favorable comparisons to the rejected, discredited, and unpublished 1983 Golaszewski study suggest an agenda incompatible with the directives of the Data Quality Act:

... The results of the three analyses reported in this study are consistent with the conclusions reported by Golaszewski (1983; 1991; 1993; *see* Figure 7) although the methodologies differed significantly ...<sup>88</sup>

The methodology employed in Report 4 is a virtual replication of the Footnote 5 data of the discredited, rejected, and unpublished 1983 Golaszewski Flight Time Study. The same flaws of heterogeneity and demographic distortions at age 60 by the age 60 rule plague both. Both flaws are violations of the fundamental strictures of inferential statistics, and both studies are insults to the clear prohibitions of the Data Quality Act and consequent OMB guidelines.

Report 4's repeated criticisms of Kay (1993) for his failure to provide data for medical Class I pilots above age 60 suggest either an inadequate understanding of the Kay report, ignorance of the fundamental principles of inferential statistics, ignorance of the rules under which air carrier pilots operate, or the directives of the Appropriations Committee under which this Report is produced. The more likely FAA purpose underlying these Reports is, however, a specific intent to recreate - and thus revalidate - the flawed and misleading results of the 1983 Golaszewski study under the new

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<sup>86</sup> Report 4, p. 47.

<sup>87</sup> Report 4, p. 46.

<sup>88</sup> Report 4, p. 44.

authority of the Appropriations Committee, excused - or justified, if you will - by a willful ignorance of the above

**Conclusion, Report 4:** For all the reasons given above, Report 4, like Reports 1, 2, and 3, should be removed from the CAMI website. And further, because this, and the other reports are so fundamentally flawed and misleading in their findings and presentations, the FAA should recognize at least a moral responsibility, if not legal duty, to post in their place a notice that they should no longer be considered valid to support any position with respect to pilot-related risk of aircraft accident in general, or the age 60 rule in particular.

### **FAA Responsibility w/ Respect to Age 60**

The above discussion reveals a disturbing pattern of FAA misfeasance - if not actual malfeasance - in its now 40-plus year defense of its age 60 rule.

In 1981, the IOM Report and NIA Panel on the Experienced Pilot Study rejected the FAA's (then) 20+ year defense of the rule as a medical issue. Denied that preferred defense, the FAA turned to a "statistical" defense. But, as the above discussion reveals, the agency has chosen to champion - disseminate and rely upon - so-called "statistical" creations supportive of its claims, but flawed to their core.

For this reason, if only to remove the appearances of mis- and malfeasance, responsibility for the administration of this rule - or at the very least, critical review of its arguments in support - should be assumed by DOT. If not DOT, then assigned to some other executive branch agency (OMB, EEOC, BTS (or one of the 13 other major Federal statistical agencies), etc.) for review and validation.

And further, because of the patently flawed results of the Booze (1977) data, the Golaszewski (1983) data, and now the four CAMI Reports, particular scrutiny should be given to those departments within the FAA for having chosen for the past 20-plus years to champion those patently flawed products.

Nothing less can restore any sense of credibility to this agency.

Thank you.



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