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## HUMAN FACTORS

### QUARTERLY

#### WHY CAN'T MORE GOVERNMENT SOFTWARE RUN LIKE GOOD SOCIAL MEDIA

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I recently did an article for AMT Magazine (April 2016) that asked, "What is your favorite app?" I received a lot of great feedback indicating that people want some good aviation maintenance safety applications. The material below is from the AMT article.

When you ask someone about their favorite application (app) you usually get an enthusiastic answer. Ask why they like the app and they will continue talking. No matter the age or occupation, nearly everyone has a few favorite software applications on their smart phone or computer. This article considers why certain applications, or websites, are most popular and why users like them. Finally, I'd like to know, why don't we do that in aviation?

#### **Favorite App Answers**

I like to ask the favorite app question to a room full of senior AMTs at an Inspection Authorization Seminar. The first reaction is dead silence! One might think that senior

aviators don't have iPhones or their equivalent. Then, one respondent begins, and the room lights up. One example of such a conversation starter referenced The Weather Channel® app: "My favorite app is the Weather Channel. It knows where I am or keeps my other favorite destinations. It shows the data as I want to see it: video, data table, pictures, and a variety of maps. It warns me if bad weather is coming to my location."

Let's look at a few more examples. TripAdvisor® is another that is mentioned as a favorite. The information provided on the site is provided by users and makes it easy to find details about a country, state, or neighborhood. If you like the reviewers you can rate them high. By seeing the author's ratings you have some idea if the reviews are helpful. If the reviews are incorrect or unfair, there is a way to comment accordingly. If you search for something like "Hot Dog Stands," Trip Advisor will keep you posted on new

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**Figure 1.** There's an app for seemingly everything these days.

stands in your area. That site rates reviewers, follows your interests in food and other destinations, and keeps you informed. Trip Advisor will also help you find, reserve, and even purchase flights, cars, hotels, and more. It uses video, still pictures, and more.

Shoppers tend to like Amazon® and call it the, "ultimate shopping site". Sites like Amazon®, E-Bay®, TripAdvisor®, and many more go far beyond a simple application. They provide a lot of information, user experience, and virtual automatic customer service. These sites involve the user by permitting sellers and buyers to rate and comment on one another. In that sense you are involved as a user and can be a digitally responsible participant.

More than one of our meeting attendees said that Starbucks is their favorite app. Why? The app provides relevant, real-time information about store locations daily specials and even wait times. Again, simplicity of use and real-time access to relevant information make the app possible.

The commuting crowd tends to like WAZE®. This app capitalizes on crowdsourcing to keep drivers apprised of traffic information along their route of travel. WAZE® gives the best route based on current traffic and can alert you to road hazards. Like many of the apps mentioned in this article, feedback from users indicates that the real-time,

relevant information makes it an ideal tool for drivers. Users say its adaptability, ease of use, and high value information allows the app to be interactive. Many WAZE® drivers are so enthusiastic about the app that they start WAZE® before starting the engine.

Everyone wants to know how much that house on the corner is selling for. There's an app for that: Zillow®. Users like it because of the relevant information, the simple displays, the pictures, video, maps, and more. You can, sell, buy, rent, arrange financing, and furnish your housing right from that app. By the way, AutoTrader® has the same features for cars, trucks, motorcycles, and boats.

### Features Summary

I have tried to list the features that make popular applications favorable to the user, as shown below

- Easy to use
- Delivers information specifically relevant to the user
- Links the user to related data/information sources
- The user sees information the very moment that it is submitted by a public user
- Permits the user to exchange of pictures, audio, video, etc.
- Gets the user involved in submitting information back to site
- Summarizes the data for the user
- Presents summary data to users in a multitude of ways
- Lets the user rate other user submissions or the submission value
- Knows the users interests and information requirements
- Has broad capability, likely beyond the immediate requirements of the user (predictive)
- Engages the user with relevant special interest groups
- The user is involved and enthused

### Apps for Aviation Safety

I have posed the favorite app question to many audiences with sizable attendance. In that time, I have never heard a responder say that a government app that is on the favorite list. That's most likely because there isn't one. While there are a lot of safety-related websites from FAA, NTSB, ASRS, and DOT on the government side and industry organizations like AOPA, NBAA, A4A, ARSA, and AEA all have websites that contain excellent information, these websites do not have many of the design features of the common favorite apps. These websites, while evolving, are products of conventional design and software development practices and would not lend themselves well to transitioning to an app platform.

Most conventional/legacy websites can hardly be called "apps." They are generally repositories to dump data, using a standard format. In many cases the data that you submit must be reviewed or edited by website administrators before it is posted. That process can take days if not weeks. Most of the data on conventional websites are compiled by the site owner and are not conducive to fast intuitive searches. In many cases one must speak with designated website data technicians, or even a committee, to achieve a meaningful search. I am especially amused when data site owners tell you that they cannot assist you because they do not like your query and they question the motives of your search. An app provides accessibility to real-time data that would possibly negate the need for oversight by a gate-keeper.

One site that falls into the "conventional/legacy category" is the FAA Service Difficulty Reporting System (SDRS). That system has been

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## WHY CAN'T MORE GOVERNMENT SOFTWARE RUN LIKE GOOD SOCIAL MEDIA (CONT...)

a digital database for about 20 years. There are also paper files dating to the mid- 60s. It is a reflection of late 80s – early 90s dated database and interface. It has been revised twice as database and interface technologies have evolved. The SDRS has about 1.1 million reports, with nearly 3,000 reports pending a 45-60 day lag period. Although a small group of motivated industry and FAA experts have been able to use SDRS existing reports, the system makes inquiry time consuming and difficult even for the savviest of users. Despite this, these data are extremely important to aviation safety. Therefore, accessing them should be much easier.

### A Modern App for SDRS?

What if the SDRS could be modernized? What would it look like? What would be the features/capabilities? What are the design specifications? How could that be done? There are a lot of questions that are great fodder for speculation here.

A new SDRS would have the simple look and feel of the “favorite apps” described above. Increasing user interaction with the app as well as providing many of the features listed above are key to the success of a modern SDRS app. The app would also be linked to the legacy system to ensure users could easily access information from multiple platforms. Such an app would be useful to designers, manufacturers, maintenance organizations, pilots, owners, regulators, and anyone with an interest in aviation safety.

A new SDRS would be highly interactive. Data would flow two-ways, easy and fast to get it in and easy and fast to get it back. If they choose to register, users would be able to add information, comment on other reports, and start building a credibility rating for their inputs. Registered users could add any kind of written or

multimedia data into the system. It would “go live” as soon as they push enter. Automatic software would do an initial screen for the simple things, like appropriate language. The real screening would start when other users rate the quality/validity/reliability of user inputs. Immediate peer-to-peer comments would establish the credibility of information submitted to the system. If a user receives poor ratings it will impact their credibility on subsequent reports. There could be a way for users to alarm the data gatekeepers if something needs immediate attention. Most data exchange, however, would be in real time, never waiting for gatekeeper review/approval. Each of these elements would allow users to be full-scale participants on the site. Having features such as these would mirror the desires expressed in the feedback I’ve received whenever I have asked the favorite apps question.

How will software designers know what capabilities the app should have? Unlike an archaic list of software specifications, the new SDRS app would rely on tried and true usability testing. One such method is the development of user stories, or vignettes, that describe the characteristics of a particular user and their needs. Typically, a team of multi-disciplinary industry and government users with early public involvement would create these stories. One example of a user story would be: *“As an aviation maintenance technician, I want to search all the Advisory Circulars on a specific aircraft while conducting the annual inspection.”* Hundreds of user stories could define the initial SDRS app, which would be built using the iterative design process. Iterative design allows for refining the app while still deploying it for use. This process enhances the product by releasing updates as they are developed to continuously refine and

improve the app. After first launch users will have on-going opportunity to add features that were not conceived of at the time of initial specification.

The SDRS ideas above sound like a Ph.D.’s or software engineer’s dream of a modern Government-produced safety app. It is not a dream. It can happen. The right team of industry and FAA are not only dreaming but also meeting to plan a new and modern way to promote aviation data exchange. I can envision such an app now. Call it the Aviation Data Exchange, AVDEX for short. Stay tuned.

**Comments** – Send comments to Dr.

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## U P C O M I N G   A D V I S O R Y   C I R C U L A R   O N M A I N T E N A N C E   H U M A N   F A C T O R S   T R A I N I N G

FAA is grinding the gears of writing, editing, and distributing, for internal and external approval, a new Advisory Circular (AC) to replace AC 120-72 (AC Maintenance Resource Management Training). The new document is entitled Maintenance Human Factors Training. The new AC will emphasize the right references to HF training rather than offer outlines and sample materials. The original AC 120-72 used the term MRM and emphasized the organizational issues of human factors. The new takes the user to the traditional topics that fulfill current international training requirements as well as evolving topics like SMS, voluntary reporting, and the FAA compliance philosophy.

Reference sections are divided in the sections of Human Factors, HF and Industrial Safety Websites, Instructional System Design, and ICAO References. The entire document will be out for public review the summer of 2016. However, we have included the current list of Human Factors Documents below. If you have favorite documents that should be added to the list, please Email the reference to [bill-dr.johnson@faa.gov](mailto:bill-dr.johnson@faa.gov).

### From the New AC 120-72A

The Documents below focus on a variety of general as well as maintenance-specific human factors materials. Many are available at no cost from FAA and other National Aviation Authorities. We have pulled out some of the most useful references included in the new AC and divided them into three sections; training material, relevant technical documents, and general reference material. It is our hope that by doing so, we provide our readers with up-to-date references with which to use as a guide in your maintenance organization. Readers are encouraged to submit their own references to [bill-dr.johnson@faa.gov](mailto:bill-dr.johnson@faa.gov).

### Resources to help build or modify your Human Factors Training Course

1. Aircraft Technical Books Company (2016). *Module 9 Human Factors Training*. Colorado, Tabernash. Available at: <http://www.actechbooks.com>
2. Civil Aviation Authority (2009). *Aviation Maintenance Human Factors*, EASA Part-145 (CAP 716). West Sussex, UK. Available at: <http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=275>
3. Civil Aviation Safety Authority of Australia (2013). *Safety Behaviours: Human Factors for Engineers. A Multi-Media Training System*. Available by request from: [safetyproducts@casa.gov.au](mailto:safetyproducts@casa.gov.au)
4. Federal Aviation Administration (2000). *AC Maintenance Resource Management Training*. (Advisory Circular 120-72). Washington, DC: Federal Aviation Administration. Federal Aviation Administration (2013). *Fatigue Education and Awareness Training Program*. (Advisory Circular 117-2). Washington, DC: Federal Aviation Administration.
5. infoWerk-Media (2016). *Training for Human Factors and Fatigue Risk Management* [computer software]. Zirl, Austria. Available at: <http://infowerk.at>
6. Johnson, W. B. (2007). *The Maintenance Human Factors Presentation System*. Available at: <http://www.mxfatigue.com>

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## U P C O M I N G   A D V I S O R Y   C I R C U L A R   O N M A I N T E N A N C E   H U M A N   F A C T O R S   T R A I N I N G ( C O N T . . . )

7. Johnson, W. B. (2010). *Grounded*. Available at: <http://www.mxfatigue.com>
8. Johnson, W. B. (2013). Maintenance Human Factors Training: Time for Curricula Renewal. *FAA Aviation Mx Human Factors Quarterly Newsletter*, 1(4), 2-4. Available at: <http://www.mxfatigue.com>
9. Johnson, W. B. (September, 2013). Need HF Training? Look Down Under. *Aircraft Maintenance Technology Magazine*, 36-40. Available at: <http://amt.epubxp.com/i/173697-sep-2013>
10. Johnson, W. B. and Avers, K (Eds.) (2014). *The Operator's Manual for Human Factors in Aviation Maintenance*. Washington, DC: Federal Aviation Administration Office of Aerospace Medicine. Available at: <http://www.mxfatigue.com>
11. Lufthansa Technical Training (2016). *Computer-based Training for Human Factors* [computer software]. Frankfurt, Germany. Available at: <http://www.ltt.aero>

### Relevant AC's and Technical Documents for Maintenance Human Factors:

1. Federal Aviation Administration (2005). *Crew Resource Management Training*. (Advisory Circular 120-51). Washington, DC: Federal Aviation Administration.
2. Federal Aviation Administration (2005). *Repair Station Training Program*. (Advisory Circular 145-10). Washington, DC: Federal Aviation Administration.
3. Federal Aviation Administration (2007). *Volume 3: General Technical Administration, Chapter 55: Part 145 Repair Stations, Section 1: Review and Approve a Part 145 Repair Station's Training Program in Flight Standards Information Management System*. (FAA Order 8900.1 CHG 220). Washington, DC: Federal Aviation Administration.
4. Federal Aviation Administration (2010). *Basics of Aviation Fatigue*. (Advisory Circular 120-100). Washington, DC: Federal Aviation Administration.
5. Federal Aviation Administration (2010). *Fatigue Risk Management Systems for Aviation Safety*. (Advisory Circular 120-103). Washington, DC: Federal Aviation Administration.
6. Federal Aviation Administration (2012). *Fitness for Duty*. (Advisory Circular 117-3). Washington, DC: Federal Aviation Administration.
7. Federal Aviation Administration (2014). *Training Requirements for Maintenance Repair Stations*. (14 CFR 145.163). Washington, DC: Federal Aviation Administration.

### General Human Factors Resources for Maintenance Operations:

1. Dekker, S. (2006). *The Field Guide to Understanding Human Error*. Burlington, VT: Ashgate Publishing.
2. Federal Aviation Administration (1998). *The Human Factors Guide for Aviation Maintenance and Inspection* (Version 3) [computer software]. Available by request from: <http://www.hfskyway.com>
3. Federal Aviation Administration (1998). *FAA Human Factors in Aviation Maintenance and Inspection*. Available at: <http://www.hfskyway.com>
4. Hobbs, A., Avers, K. B., and Hiles, J. J. (2011). *Fatigue Risk Management in Aviation Maintenance: Current Best Practices and Potential Future Countermeasures*. (Technical Report DOT/FAA/AM-11/10). Washington, D.C.: Federal Aviation Administration Office of Aerospace Medicine.
5. Johnson, W. B. (March, 2015). Two Countries Apply Trusted Human Factors Model to Manage Safety. *FAA Aviation Mx Human Factors Quarterly Newsletter*, 3(1), 1-4. Available at: <http://www.mxfatigue.com>
6. Johnson, W. B. (August, 2015). Human Factors Training: How FAA Trains Airworthiness Inspectors. *Aircraft Maintenance Technology Magazine*, 30-31. Available at: <http://amt.epubxp.com/i/557831-aug-2015>
7. Johnson, W. B. (2015). A Human Factors Program Health Checklist. *FAA Aviation Mx Human Factors Quarterly Newsletter*, 3(3), 1-5. Available at: <http://www.mxfatigue.com>

# ARTICLES PUBLISHED IN THE AVIATION MAINTENANCE HUMAN FACTORS NEWSLETTER 2013-2015

We recognize that some of our readers are newer and some of our readers wish to know where an article of interest is in our previous newsletters. In an effort to provide you with a one-stop resource, we've linked each article title (since 2013) to the issue in which the article can be found. Happy reading!



<a href="#">A Human Factors Program Health Checklist</a>	William B. Johnson, Ph.D.
<a href="#">A Revisit of Top Modern Maintenance Human Factors Challenges</a>	Bill Johnson, Ph.D.
<a href="#">Aging, Hearing, and Managing Risk</a>	James Allen, MD, MPH
<a href="#">Alcohol and Other Drugs (AoD) in Aviation Maintenance</a>	Joy Banks, MA, LPC
<a href="#">An Obese Workforce: Is Aviation Safety Compromised?</a>	James Allen, MD, MPH
<a href="#">Aviation Maintenance Safety tips from the FAASTeam to Counter Fatigue</a>	Phil Randall
<a href="#">Confessions of a Potential Lack-of-Sleepaholic</a>	Joy Banks, MA, LPC
<a href="#">Do You Qualify To Work As A Human Factors Trainer?</a>	Bill Johnson, Ph.D.
<a href="#">Exposures in the Workplace: LMEC for the Aging Workers</a>	James Allen, MD, MPH
<a href="#">Ground Operations Line Operations Safety Audits</a>	Kevin P. Crowley
<a href="#">Groupness Gone Bad</a>	Roger Hughes
<a href="#">How Good is Your Hearing?</a>	James Allen, MD, MPH
<a href="#">Human Factors Training for FAA Airworthiness Inspectors</a>	Bill Johnson, Ph.D.
<a href="#">Industry-Government Group Shows how to Insure That OEM Instructions Work for You</a>	Bill Johnson, Ph.D.
<a href="#">Keepin' It Real! Stories From our Readers</a>	Anonymous
<a href="#">Maintenance Fatigue is on the Radar</a>	Bill Johnson, Ph.D.
<a href="#">Maintenance Human Factors Training: Time for Curricula Renewal</a>	Bill Johnson, Ph.D.
<a href="#">Maintenance Human Factors. Does it all Sound the Same to You?</a>	Bill Johnson, Ph.D.
<a href="#">Maintenance Line Operations Safety Assessment (M-LOSA) is Gaining Popularity Around the World</a>	Maggie Ma, Ph.D. & Bill Rankin, Ph.D.
<a href="#">Measuring The Workplace: The P Worksheet</a>	James Allen, MD
<a href="#">My Personal Experience of Managing Fatigue on Graveyard Shift</a>	Maggie Ma, Ph.D.
<a href="#">New HF Training Materials From Down Under</a>	Bill Johnson, Ph.D.
<a href="#">Presbyopia: Why Near Vision is Important to the Safety Management System</a>	James Allen, MD, MPH
<a href="#">Protect Your Hearing</a>	James Allen, MD, MPH
<a href="#">Relationships Between Human Factors, Safety Management Systems, and Safety Culture in Maintenance</a>	Bill Johnson, Ph.D.

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<a href="#">Safety Data from Multiple Sources</a>	Maggie Ma, Ph.D.
<a href="#">The Aging and Obese Workforce, Latent Medical and Environmental Conditions</a>	James Allen, MD, MPH
<a href="#">The First Signs Of Hearing Loss</a>	James Allen, MD, MPH
<a href="#">The Human Hazard in Aviation Maintenance</a>	Jim R. Hein
<a href="#">The New "Compliance Philosophy" and its Relationship to Safety Management</a>	Bill Johnson, Ph.D.
<a href="#">Two Countries Apply Trusted Human Factors Model to Manage Safety</a>	Gareth McGraw & Bill Johnson, Ph.D.
<a href="#">Up With This I Will Not Put! Lessons For Documentation Design</a>	Colin Drury, Ph.D.
<a href="#">Use Of Event Report Data To Improve Safety</a>	Brenda Wenzel, Ph.D.
<a href="#">Using NASA ASRS Information to Improve Maintenance Safety and Efficiency</a>	David Wichner & Linda Connell
<a href="#">We Can't Maintain Planes Without People. And People Make Mistakes, Right?</a>	D Smith
<a href="#">What If? How Would a Maintenance Human Factors Facilitator Return to the Operational Environment?</a>	David Paterson
<a href="#">You and Your Aviation Inspector</a>	Bill Johnson, Ph.D.

### Flight Deck Human Factors Lab Update

As many of you might know from seeing Dr. Michelle Bryant out and about, we are in the midst of collecting data from over 300 maintenance technicians across the nation. The current study is a follow up from a fatigue study published by Dr. Bill Johnson, Dr. Steven Hall, and Jean Watson in 2001. You can find that report by clicking [here](#). The primary recommendation from that study indicated that there was a need for a Sleep Culture among maintenance organizations. As a result, the Flight Deck Lab produced a flurry of documents and training focused on the importance of sleep and the impact of fatigue. You can find these resources by clicking [here](#). Now, we are interested to see if there have been any changes across the industry. We have currently collected data from almost 150 maintenance personnel across the industry and expect to complete all 300 by July of this year. In a future newsletter, we'll update you on how we have collected data, what our participants do in the study, and the anticipated date when results will be available. Thank you to the maintenance community for welcoming our researchers into your hangars. We couldn't do our work without you.



### A Fond Farewell

This will be my last Aviation Maintenance Human Factors Newsletter as co-editor. I have thoroughly enjoyed working with Bill Johnson and the team to publish what I hope have been quality and informative newsletters over the past year. My work on the newsletter helped me land a position as the writer/editor for the Civil Aerospace Medical Institute, an opportunity about which I'm very excited. Crystal Rowley will continue as co-editor, so I know you have many great newsletters ahead!

Gena Drechsler



## [www.humanfactorsinfo.com](http://www.humanfactorsinfo.com)

The FAA maintenance human factors site was launched in the late nineties. For over 10 years, it has served not only as a way for human factors professionals to share what we know and have learned, but also as a valuable resource for the maintenance community on the whole. As we continue to research topics related to human factors maintenance safety, we update and improve the resources available. Feedback on the usefulness of these resources continues to be overwhelmingly positive. You can find a great deal of ready-to-use information by visiting today. As always, comments and suggestions on improving these resources are welcomed too. Please reach out to us by emailing the editorial staff with your questions or comments. We strive to continue to provide the best and most useful resources in the aviation maintenance community. Don't forget to share with your colleagues!



### **We want to hear from you!**

Our newsletter team loves to hear from our readers. Your emails are poignant and reflect an operational knowledge of maintenance human factors. The overwhelming positive feedback you've provided has encouraged us to continue writing, researching, and publishing articles worthy of your interest and time. Please take a moment and write to us regarding your thoughts and experiences. Letters can be published anonymously.

### **See something missing?**

Are you a regular reader of our Mx HF Newsletter? Do you see something we're missing? Please let us know! If you have ideas for future articles or would like to contribute, please contact our newsletter staff at: [crystal.rowley@faa.gov](mailto:crystal.rowley@faa.gov).