

# Human Factors

## Working to Red



Photograph by PH2(SW) John Collins

By Dan Steber

I attended the World Aviation Congress conference in Seattle, Wash., on Sept. 11, 2001. This gave me the chance to go to several seminars on human factors in maintenance (HFIM). Despite the forum being marred by events of 9-11, the presentations by commercial airlines, aircraft manufacturers, and military services were enlightening. This article is the first in a series on HFIM, and I want to share information with maintainers about the various programs and initiatives that are underway to improve safety and readiness.

Before I can address current initiatives, some background information is necessary. Five years ago, senior leaders in naval aviation established a Human Factors Quality Management Board (HFQMB) to look at ways to reduce the increasing trend of flight, flight-related and aircraft ground mishaps caused by human error. The board's charter was to cut human error by 50 percent over a 10-year period. The HFQMB initially focused on aircrew error and used a three-pronged approach: climate safety assessment, mishap-data analysis, and best-practice benchmarking. This aircrew-oriented effort was highly successful and consequently led to formation of an Aviation Maintenance Working Group (AMWG) to review maintenance-mishap factors.

Using a strategy similar to that of the HFQMB, the AMWG developed three initiatives to reduce maintainer error:

- ⌚ Maintenance Climate Assessment Survey (MCAS), which captures maintainer's feelings about safety
- ⌚ Human Factors Analysis and Classification System – Maintenance Extension (HFACS-ME), which tracks and analyzes human-factor errors
- ⌚ Ground-Crew Coordination Training (GCT) concept, which promotes maintainer teamwork

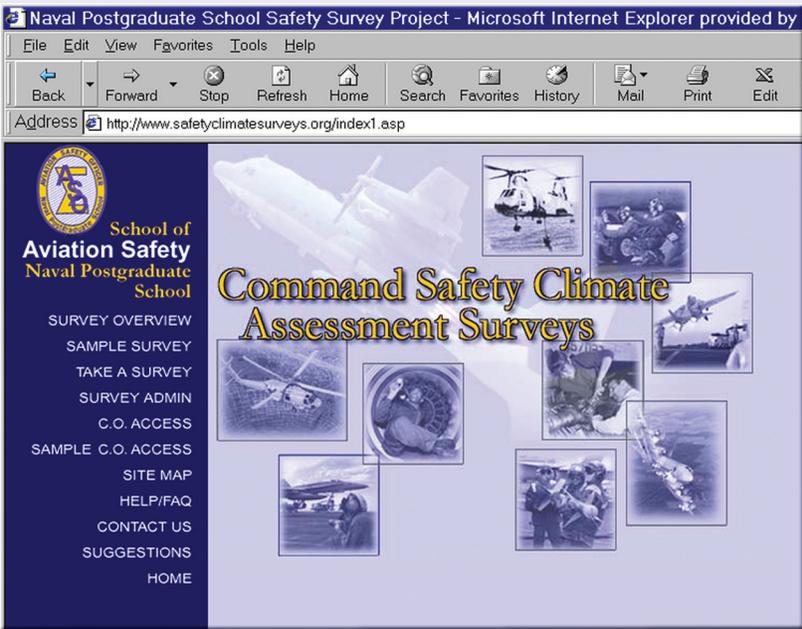
The AMWG continues to support and promote these efforts; however, they felt it was critical to use today's technology to push them out to the fleet.

Cdr. John Schmidt of the Naval Safety Center staff covered these points at the conference. He headed a team that previewed Internet-based efforts to address HFIM issues. At the conference, the team outlined three critical components of the Navy's on-going HFIM program:

- ⌚ Develop a web-based MCAS program to make it easier to gather, analyze, view, and publish maintainer's safety concerns.
- ⌚ Construct a Maintenance Error Information Management System (MEIMS) to support maintainer-error investigation, analysis and intervention.
- ⌚ Design a Safe Maintenance and Readiness Training (SMART) Center to provide a remote-education program (online training) for maintenance-resource management (MRM, the new name for the old GCT program).

During the WAC, Dr. Bob Figlock, a retired Marine Colonel, gave a thorough brief on the automated MCAS, which enables a commanding officer to evaluate his maintenance-safety climate.

# in Maintenance: Reduce Errors



Via this home page, more than 24,000 personnel from 270 squadrons have participated in the survey.

The MCAS survey taps into six organizational factors:

- Process auditing, for reviewing and updating maintenance and safety procedures.
- Reward systems that recognize individual and group safety achievements, using incentives.
- Quality assurance, for promoting high-quality maintenance and standards.
- Risk management, an effort to identify potential hazards associated with maintenance activities.
- Command and control, which gauges the ability to manage or control maintenance activities.
- Communications and functional relationships which coordinate actions between workcenters.

MCAS now is an easy-to-use, accessible, on-line system that lets participants anonymously take the survey, using any web browser. The MCAS has 10 questions to gather statistics and vital information about survey users, 43 questions related to maintenance-opinion items, and two open-ended questions.

This survey gives the CO access to tabulated

MCAS results immediately after the unit has completed the survey. It generates a set of basic statistics and graphs each response, which gives the command a distribution analysis. The overall results also can be used to check for trends by type aircraft, community and service.

These are highlights from over 17,000 naval-aviation maintainers who took the MCAS:

○ 75 percent agree “Supervisors discourage SOP, NAMP or other procedure violations and encourage reporting safety concerns.” But this means 25 percent think their supervisors encourage shortcuts and don’t promote reporting problems.

○ 47 percent agree “The command recognizes individual safety achievement through rewards and incentives.” Yet 53 percent don’t believe their command is openly grateful for safe maintenance.

○ 70 percent agree “My command has effective passdown between shifts.” Incredibly, 30 percent of those surveyed don’t think the shift passdown is adequate.

○ 42 percent agree “Based upon my command’s current assets or manning, it is not over-committed.” Not an easy issue to fix, 58 percent of maintainers believe the op-tempo and workload is excessive.

Some readers may think the number crunching

Pull-down menus allow you to complete the survey in 15 minutes.

**SAMPLE SURVEY**  
(MCAS Survey sample)

**PART I. DEMOGRAPHIC INFORMATION**  
The following survey is a SAMPLE. No actual responses will be recorded. For the actual survey, no individual's demographic data will be made available to any CO.

Your rank:

Total years aviation maintenance experience:

Your work center:

Your primary shift:

Your current model aircraft:

Your status:

Your service:

Your parent command:

Your unit's location:

**PART II. TAKE SURVEY**  
The following survey is a SAMPLE. No actual responses will be recorded.

1. The command adequately reviews and updates safety procedures.

Strongly Disagree     Disagree     Neutral     Agree     Strongly Agree     N/A  
 Don't Know

2. The command monitors maintainer qualifications and has a program that targets training deficiencies.

Strongly Disagree     Disagree     Neutral     Agree     Strongly Agree     N/A  
 Don't Know

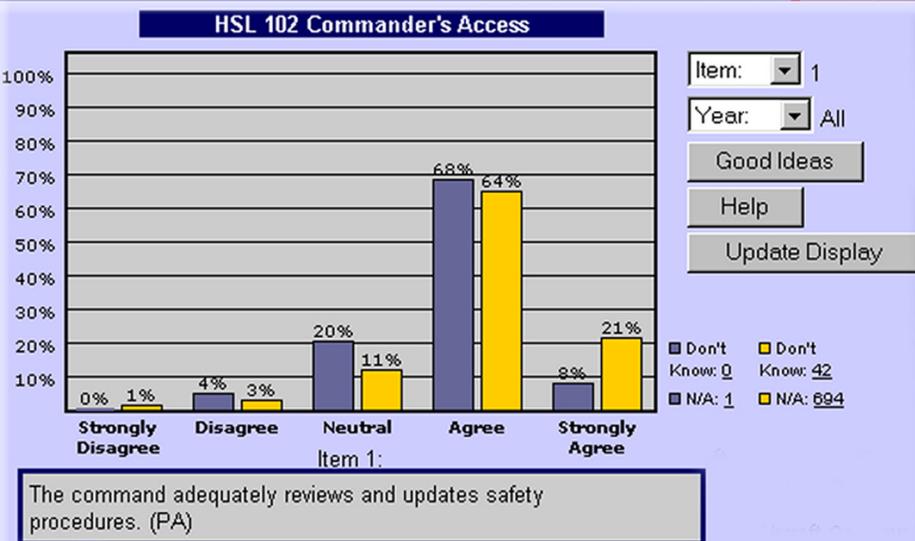
# HFIM Strikes Gold in Forty-Niner Country

described in this story is too much, but a quote by a panel member during a session on how to prevent maintenance errors explained why hard data is important. He said, "We measure what we value!"

The most important asset in the Navy is its people. I find the work being done by the Navy on HFIM to be very interesting and know it will help to lower mishap rates. I'll continue with a series of articles on these programs to educate the fleet, to try to reduce mishaps, and to keep maintainers safe. 

For more information on the climate survey, visit the MCAS website at [www.safetyclimatesurveys.org](http://www.safetyclimatesurveys.org). For general information about MRM ("GCT" is the term still used on our website) or HFACS-ME, visit the Naval Safety Center's website at [www.safetycenter.navy.mil](http://www.safetycenter.navy.mil).—Ed.

Here's how you can display squadron-survey data for a specific question.



The 16th Human Factors in Aviation Maintenance Symposium was held April 2-4, 2002 in San Francisco. The forum brought international experts together for informative presentations, panel discussions, and interactive workshops. This year's theme was "Enhancing Human Performance" and each session covered processes and products to enhance performance of aviation maintenance and inspection tasks. Seminar topics included five key areas:

- Ensuring health and readiness for safe performance
- Measuring performance and implementing change
- Identifying optimal procedures and processes
- Demonstrating programs to ensure safety and quality
- Showcasing proven methods based on industry success

Dr. Barbara Kanki of NASA Ames Research Center chaired a session on "Human Performance Tools." Cdr. John Schmidt of the Naval Safety Center presented his work on the Human Factors Analysis and Classification System for Maintenance Incident Reporting. He also gave a hands-on demonstration of the Navy's HFACS-ME program—aided by Dr. Bob Figlock and Mr. John Lawson of the Naval Postgraduate School. That session showcased military and civilian training materials, case studies, and a prototype maintenance-error, information-management system.

To learn more about the symposium and the Human Factors in Aviation Maintenance and Inspection program put together by the Flight Standards Service of the FAA, check out their website at: <http://hfskyway.faa.gov>. 

