Safety Management System
Installation Guide

V1.2
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Introduction:

This guide is designed to help you take the SMS information you have learned elsewhere and turn it into a functioning program. Without first reading the ALEA/IHST SMS Toolkit and attending some type of formal SMS training, it is likely that you will find it difficult to understand this manual. References to the Toolkit will be made throughout this document in orange text. The toolkit can be downloaded for free on the ALEA website:

SMS Toolkit (Historical) and IHST Maintenance Tool Kit

No SMS document can be applicable to all organizations. SMS is dependent on the organization structure. It will be a little different for every unit, and will change as the organization changes. SMS is also more than a single document (a.k.a. the traditional 'Safety Program Binder' or policy section), or even a collection of documents. In addition to policies and documents, SMS is a process of conducting operations and risk management simultaneously and seamlessly. This document is intended to be a guide with suggestions on how you can set up your own program. You will need to edit the files and suggested policies to make them fit your organization. The attached documents are not specific requirements for an SMS, they are intended to give you examples of how to complete the processes required for an SMS. They can be modified to suit your organization, or you can create new ones. In many cases, it is better to modify an existing document at your organization in order to make the transition to the new SMS smoother for everyone involved.

You will also find references to the Public Safety Aviation Accreditation Commission (PSAAC) standards. They are written in RED, for example: [03.01.01]. Although these references and samples are in compliance with the PSAAC Standards for the purpose of accreditation, they do not guarantee approval for that purpose. The references and samples are intended to guide the unit through the process of developing and establishing a safety program in compliance with the SMS Standards for public safety aviation units. However, approval of the SMS program for the purpose of accreditation is dependent upon the unit providing evidence of the SMS

program's implementation, and demonstrating the its overall functionality and operational effectiveness in accordance with SMS Standards.

ALEA will be posting additional documents, webinars, online training and meetings to help you use this guide. If you have any questions, comments or feedback, please contact the ALEA Safety Manager. Good luck!

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Outline of Installation Plan:

Phase 1: Set the foundation for your

Safety Management System

Before you can start doing real risk mitigation at your unit, you have to set the foundation for the program. You cannot fly until you build the aircraft first. This step is largely the building of that vehicle. It may not seem like the most fun part of the process and will likely involve a lot of work for you in the form of reviewing and writing policy, creating forms, etc. It is approximately half of the text in this document. The steps afterwards will be different in nature, allowing you to do the more meaningful and dynamic safety work. Take heart, once you finish this part, it will make the rest of the process that much easier and more effective.

Depending on your situation, one of the most frustrating parts of this phase will be knowing what needs to be done, but lacking the support, finances, understanding or cooperation of other unit members and agency leadership to get them done. Take heart, this is typical. On average, it takes about a year before a new SMS starts to gain real traction, and up to three years to be fully functional and healthy. The main reason for this delay is the need to make significant changes in safety culture and competency of other unit members (including management) to participate in the system. It also takes a while before you start producing data to complete the final steps of this systematic process and close the loop on the program.

When you do your GAP analysis you will find that you already have many elements in place. You will also see that some elements are almost there, or could be easily implemented. A few high priority items may need to be pushed for immediate implementation if need be. Start with what you have, and do what you can do with that. Look for risks targets that can be attacked with the tools you already have at your disposal to show everyone how the system can work. Keep a list of the items you need to change, include or update and work them in as the opportunity becomes available. You can inform everyone that you are working on a new program, but to make it one that meets industry standards you will eventually need these additional items.

In many ways, even if you had the authority, finances and support to install a complete SMS on day one, it would not be an effective way to start up your new program. There would be too many changes all at once. People would be irritated, confused and/or overloaded with information to the point where you would have unacceptable employee participation. Phase 7 has additional advice on taking 'baby steps'. Again, for now, do what you can to get your policy manual set up as best as possible. Don't stop the process because someone is not yet ready to accept these new ideas.

(For more reading, refer to the SMS Toolkit, p. 73 – 74)

Step 1 - Do a GAP analysis

A GAP analysis is simply an audit. Note what items you already have in place, and mark those that need to be created. There are two sample GAP analysis forms included in the 'ALEA SMS Documents' folder.

Another resource is to use the ALEAC (PSSAC) accreditation standards as a GAP analysis: http://alea.org/standards-download (ALEA member login required for standards download)

The checklists on pages 42-46 and 75-79 of the SMS Toolkit also provide a good list of SMS related elements to look for during a GAP analysis.

Tip: It is helpful to have other unit members do a GAP analysis in addition to yours. You can have someone else do the complete audit in addition to yours and see what things you may have missed, or break it up according to responsibilities (i.e. give the maintenance section to the unit maintenance manager, etc.), or have a shorter version of it for all members to fill out. Whatever works for you, it is good to have additional input. This also helps to establish a positive view of the new SMS program as something that belongs to the whole unit and not just the safety officer.

If possible, have an outside source fill out the audit as well. This can even be a safety officer from a neighboring agency.

You may find policy items that still need to be added or changed. The audit will uncover operational items that need to be addressed. If you do not find these things, you have not looked hard enough. Risk is never gone from our operations, our goal is to lower it as much as possible. There will always be risk to find.

Your findings will become an implementation checklist for setting up the Safety Management System. You can make the checklist a separate document, or just add columns to the GAP analysis detailing what needs to be done, and when (this can done on the attached sample GAP analysis form #1).

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Step 2 - Setting up SMS Policy
(SMS Toolkit, p. 9, 15-26)

Safety policy should be established in the standard operational procedures manual (SOP), or equivalent, for the unit. While there will be specific safety sections created within the SOP, they should not be a separate document stored in a separate location. This is the best way to ensure that safety management and operations do not conflict and allows safety to have a direct and effective influence on how business is actually conducted. [03.01.01]

Written policy does not require that the specific <u>methods</u> of risk management be explained in detail. This information should be included in training materials or an appendix. Going into detail about the risk management process and philosophy adds unnecessary bulk to the policy section of the manual. This lowers the likelihood that employees will be familiar with the document or use it on a regular basis.

How you write your SOP will be unique to your operation. The following sections are steps to checking your current SMS for required components. Add in each section as applicable to your operation. There is a sample SMS attached with examples of how to write these sections.

The SOP should establish the following elements as specific policies [03.02.00]:

1. That the unit will use risk management to lower risk to the lowest acceptable level. [03.02.01] (SMS Toolkit, p. 55)
2. Just Culture will be used in all disciplinary actions and incident investigations. [03.02.01] (SMS Toolkit, p. 56-59)
3. Define the position of Aviation Safety Officer (or Manager), placement within chain of command, responsibilities and authority, selection process and training requirements. [01.01.02]
4. A hazard and occurrence (accident/incident) reporting system will be made available to all employees. An option for anonymous reporting will be in place. [03.03.01]
5. A list of documents to be maintained (see below) [03.02.05]
6. Risk Management driven changes to unit operations will be enacted through a Safety Committee.
7. A means of Safety Assurance will be in place to track the performance of risk management efforts. [01.01.04]
8. Management of Change (MOC) systems will be used for new equipment, personnel, tactics. [03.04.02]
9. Fatigue management policies will be in place and apply to all unit members, not just flight crews. [02.01.05]
10. Requirement for Emergency Response Plan [03.02.04]
11. Unit members will receive initial and recurrent training on risk management. [01.02.06, 03.05.01]
12. A safety library and bulletin board will be maintained [01.01.04, 03.05.02]
13. A schedule of safety management tasks to be routinely completed (see below)

14. Weather limitations: day, night (aided and unaided), out of area, special operations (hoist, firefighting, tactical transport) [02.02.02, 02.03.02]
15. PPE requirements (helmets, flight suits, HEEDS, etc. as required) [02.01.03, 02.01.04, 02.01.08]
16. Operational limitations are established for: fatigue, currency, training requirements, minimum altitudes, etc. [02.02.02, 02.03.02]

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Step 3 - Setting up SMS Policy
Unit Commander's Safety Statement
(SMS Toolkit, p. 15-16 – *under 'safety intentions'*)

The policy section of the SOP should include, at the beginning, a safety statement from the unit's accountable executive. An additional statement from the agency head (Chief, Sheriff, etc.) is advisable as well. Another option would be to have the agency head sign the accountable executive's safety statement, if those positions are filled by two separate people. The policy statement addresses all unit operations, not just specific risk management actions. It should include the following items: [01.02.02 Unit Commander's Operational Policy, 03.02.01 Commander's Safety Policy]

1. Commitment to reducing risk to the lowest acceptable level (ALARP As Low As Reasonably Practicable) as a means of conducting day-to-day business.
2. The statement should clarify that doing business requires accepting certain risks, but only those risks that are absolutely required for agency designated operations.
3. Guarantee to apply Just Culture to any disciplinary actions or occurrences (accident, incident, unsafe act, etc.).
4. It should be signed and dated, preferably once a year.
5. Confirmation of employee's right to refuse performing a task due to safety concerns.
6. Both empower and establish a responsibility for employees to report hazards and occurrences (incidents).

Example:
While no operation can be completely risk free, all operations conducted at Gotham PD Aviation will be done in the safest manner possible. No mission

is so important as to require deviation from safety policies, procedures, industry standards, or the prudent judgment of our aircrew. GPD Aviation management is committed to providing a safe and accident free working environment to for the health of our employees and to ensure equipment and personnel are ready to respond to calls for our services. A Safety Management System will be utilized to manage risk in support of our safety objectives. The goal of our SMS is to bring all unit employees together in order to conduct missions while keeping risk at the lowest level possible. The risk that is taken will be done so knowingly, and only when required to carry out our defined missions. Unnecessary risk will not be an accepted part of our unit. Just Culture will be applied to all aspects of the operation.

Step 4 - Setting up SMS Policy
Aviation Safety Officer
(SMS Toolkit, p. 18-22)

The policy section must include a definition of the Aviation Safety Officer position, including how the person is assigned, training required and designated tasks. [03.02.03-1]

- **Position in chain of command**

It is recommended that the safety officer have direct access to the training officer so they can work together on safety controls. The safety officer also needs direct access to the person responsible for setting and changing unit policy (Unit Commander) for the same reason.

If personnel are available, the safety officer position should held by someone other than the lead training officer and/or unit manager. This is to separate the distinct roles and responsibilities of those three positions.

In extreme cases, it is necessary that the safety officer have the authority to contact a supervisor that is above the level of their immediate supervisor(s). Often there is reluctance to establishing this authority in writing. It is recommended that the conditions in which the safety officer would exercise this authority be specifically listed so management is more comfortable with the situation and the safety officer has a clear idea of when this last-resort should be considered. Some examples would be:

1. Only if the risk being addressed is rated as 'high' according to the unit's risk matrix.

2. Only after documented (perhaps two or more) attempts to resolve the issue with the direct supervisor have been unsuccessful.
3. Only if the unsuccessful resolution of the high scoring risk was due to supervisor unwillingness to address it (not due to true lack of funds, etc.).
4. Only with the approval of one or more additional members of the safety committee.

- **Responsibilities and authority of the Safety Officer**

The safety officer must have their responsibilities and authority codified into the policy manual so everyone knows what is expected of the person assigned to that position. This includes:
1. Direct communication with all employees, including training and management
2. Investigation of hazard and occurrence reports
3. Development of recommendations for risk controls
4. Tracking of unit operations to verify the performance of safety initiatives

The safety officer generally does NOT have the authority to:
1. Set policy
2. Make final decisions on procedure changes
3. Determine discipline

- **Selection process**

There are many methods to selecting a safety officer. It is recommended that:
1. The selection process be voluntary, to ensure the person is interested in doing the job.
2. The safety officer has experience as a pilot, and preferably other roles in the unit (TFO, maintenance, training, etc.)
3. Preference is given to interested parties with prior, formal safety training.
4. The decision be made (or at least discussed and recommended by) the Safety Committee

- **Training for Safety Officers**

In order to function effectively as a safety officer, some formal training is required. The policy should outline:

1. The requirement to attend an initial class within the first year of being assigned to the job (unless already completed).

2. The requirement that the safety officer be provided additional, currency training on a regular basis (annually, every two years, etc.). This requirement could be easily filled by attending ALEA regional seminar or annual expo roundtables and presentations.

Step 5 - Setting up SMS Policy
Safety Committee

The Safety Committee is a very important part of the SMS. This is where the safety program gets [03.02.03-2]:
1. Beneficial input on hazard information from all areas of the operation
2. Feedback on the performance of existing risk controls
3. A coordinated effort in analyzing hazards and creating risk controls

Through the Safety Committee the ASO is able to have:
1. Access to management for any policy or procedure changes that may be required
2. Access to the training officer for any training needs that a risk control may require.
3. The avenue to delegating tasks to other units members as applicable

The safety committee must be composed, at a minimum of:
1. Someone responsible for unit management and policy setting
2. Someone responsible for training
3. Someone responsible for maintenance (or tracking maintenance if it is not done in-house)
4. The Safety Officer
5. Line level employees to represent the different roles in the unit (pilot, TFO, medic, etc.)

In some cases, this may mean that everyone in the unit is part of the safety committee. That is completely acceptable.

The safety officer's role within the safety committee is to collect and process hazard information for the committee members to consider. It is the responsibility of the committee to:

1. Make a final determination of risk
2. Decide which risks are unacceptable and must be mitigated
3. Which risk controls will be implemented
4. The performance goals for those risk controls
5. Assign tasks and timeframes

Furthermore, the safety committee will be responsible for:
1. Reviewing incident/accident/occurrence reports
2. Determining (or suggesting to management) proper disciplinary action and/or where the employees' actions fit into the unit's Just Culture chart.
3. Selecting new safety officers

All of the elements listed above must be codified into your policy manual. See the attached SOP for examples.

- ## Management of Change and the Safety Committee [03.04.02]
  (SMS Toolkit, p. 61-64)

Another required task for the Safety Committee is to evaluate new changes in the unit using a management of change procedure. The safety officer may initiate this process and do much of the prep work to facilitate the efficiency of the committee. However, the final review should be done by the committee members.

Management of Change (MOC) should be initiated anytime there is a major change in the operation, procedures, policy, mission, equipment, operational environment or personnel. A MOC form will help guide the process. There is a sample MOC form included here. The requirement for MOC should be added to your SOP and a formal MOC form added to your SMS documents.

The requirement to use a MOC process should be specified in the unit's operations manual, either in the safety section or the administrative section.

- ## Safety Committee Meetings [03.02.03(2c)]

The safety committee should meet on a regular basis. It is recommended that the committee meet every quarter. The Safety Officer should prepare a report for the meeting and provide minutes of the meeting to all unit members. Those minutes should include:
1. The hazards discussed
2. Risk assigned to each hazard
3. Planned risk controls, goals, and timeframes
4. Outcome of investigations

A sample meeting agenda template is included.

The committee may also meet on an as needed basis in response to major occurrences or high-risk concerns.

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Step 6 - Setting up SMS Policy
Additional Safety Related Policies

The following policies need to be included somewhere in the operations manual, not specifically in the 'safety' chapter, though that is an option.

- **Crew Rest – Fatigue Policies** [02.15.05]

    1. Unit policy must set maximum daily on-duty limits for all unit members. This includes TFO's, medics and <u>maintenance personnel</u>.
    2. For flight crew personnel, there should be an additional maximum flight hour requirement.
    3. Maximum flight hours should be adjusted for nighttime operations. The use of NVGs and staring into computer monitors (thermal imagers, mapping systems) has a more significant impact on fatigue, limiting the time a flight crew is effective, and safe, at night.
    4. There must be a requirement for a minimum number of off-duty hours between shifts.
    5. The ability for flight crewmembers to mitigate fatigue with short naps is an industry standard and solid safety practice. It is often difficult for law enforcement personnel not educated on flight safety and fatigue to accept this idea. For that reason, if your agency chooses to allow short naps on duty, it should be codified in your policy manual. If not, there will be nothing to protect unit personnel should someone from outside of the unit decide to pursue disciplinary action. Also, naps that are longer than 1-2 hours may create 'sleep inertia', which means that the person will need up to 20 minutes (or more) to completely wake up. This is incompatible with units that respond to calls on an 'alert' status. Codifying the napping policy will help to define what your unit has decided is acceptable.
    6. For a fatigue policy to be effective there needs to be a means of complying with it when someone is outside of the defined limits. It is not a perfect world. If a unit member admits that they did not get the required amount of rest for any reason, what can the unit do? Responses may include: leaving the shift open, calling in another crewmember or staffing the unit with an additional person. Whatever your unit decides, this must be part of the policy.
    7. Many units are not staffed 24/7 and respond to calls during off duty hours on a call out basis. In such cases, it is tempting to call an employee back to work only a few hours after completing a full workday. This situation also affects maintenance staff who may be called out at night to deal with unscheduled maintenance problems. There are several means to mitigate this fatigue risk. For example, if your daily on duty limit is X hours, then only schedule employees to

work X minus 3-4 hours so time is left over for a call out before the employee is completely exhausted. Require a certain number of hours of rest before an employee can be called back. If an employee is called out in the middle of their off time, adjust the start time for their next shift so they can get proper rest before coming back in or staff it with other personnel, if available.

8. Resources:
   i. NTSB Recommendation A-11-56
   ii. CFR 91.1057

- **Emergency Response Plan** [03.02.04]

  The ASO must establish and/or maintain an Emergency Response Plan (ERP) if one is not already in place. An example is included here. For now, just make sure your policy manual lists the requirement for the ERP. We will discuss the specifics of the plan and drills in a later section of this SMS Installation Guide.

- **Documents**

  Somewhere in the policy manual, state that certain documents are required. A list of those documents should be kept in an appendix. Examples of the following documents are included in this guide: [03.02.05 SMS documentation and records, 01.02.11 – Appendix]

  o Survey [03.03.01]
  o Hazard/Occurrence Reports [03.03.01]
  o Assurance Inspection Reports (Follow up documents) [03.04.01, 03.04.03]
  o Emergency Response Plan [03.02.04]
  o Annual Audit [03.03.01, 03.04.01, 03.04.03]
  o Flight Risk Assessment Tool [03.03.01]
  o Risk Mitigation Planning Form [03.03.02]
  o Safety Committee Meeting outline and minutes [03.04.03]
  o Safety Officer Quarterly Report (may be same/similar to Annual Audit) [03.04.03]
  o Training Forms [03.05.01]
  o Management of Change (MOC)[03.04.02]
  o OSHA documents (if required by your state/agency https://www.osha.gov/dcsp/osp/) [03.02.03.g]
  o PPE Inspection Forms [02.01.04]
  o Survival Kit inventory [03.02.04]
  o Safety Training Records [04.01.04]
  o Mitigation Training Development Guide

- **Calendar**

Your SOP should have a list of calendar items that will help keep your program on schedule. It is acceptable to have those items listed individually with each specific item. However, it is helpful to have those items compiled in a list either in the SOP or as an attachment in the appendix. Items to be included (with suggested time frames in *italics*) are:

1. Safety Committee Meeting (*quarterly*)
2. Safety bulletin board update (*monthly*)
3. Accountable executive re-sign safety statement to affirm continued dedication (*annually*)
4. Safety Assurance report - inspections of risk mitigation program performance (*based on timeframe given each mitigation strategy – a general review of all mitigations to be given annually*)
5. Safety Officer currency training (*annually*)
6. Unit member safety currency training (*annually*)
7. Unit member task specific refresher training - pilot, TFO, maintenance, etc. (*annually at a minimum*)
8. Safety Survey (*annually*)
9. Internal Audit (annually)
10. External Audit (*every 2-3 years*)
11. ERP drill (*annually*)
12. PPE Inspection (*dependent on specific gear. At least annually for basic gear*)
13. Survival gear in aircraft (*semiannually*)
14. Safety equipment in hangar, office space (*semiannually*)

- **Personal Protective Equipment**

    1) Hearing and Eye Protection [02.01.03]
    During flight and ground operations all employees should be required to wear, and have available, hearing and eye protection. Not only is this necessary inside the aircraft, but also during maintenance runs, engine washes, external power starts, etc. This equipment should be an item in your routine safety audit checklist. This equipment should be kept in a readily accessible location near where it will be used in order to increase the chances that it will be utilized when needed.

    2) Aircrew PPE [02.01.04]
    Flight crew PPE should be something that you monitor. This equipment will wear out and lose its protective qualities over time. For that reason, you need to ensure that PPE is a regular item in the budget so replacements can be purchased in a timely manner [01.01.03]. Check with the manufacturer of your PPE for inspection guides and information.

    3) Safety Inspections

These PPE items should be in your safety inspection form:
1. Flightsuits and gloves – monitor condition and budget for replacements
2. Helmets – Be aware of inspections points on the shell, retention straps, chin strap, etc. Also, visors that are scratched are less likely to be utilized by flight crews.
3. Rescue Air (i.e. HEEDS) – Should be part of a routine safety audit. Establish a means of replenishing the bottles, either in house or through an outside source. Often an agency rescue diver team or marine unit will be able to help. Use of this equipment must be addressed with initial and routine training. [02.01.08]
4. Survival vest – condition of vest, including straps, buckles and load bearing loops. You should also have a list of minimum survival gear to be carried in the vest.

- **Safety Library**
  You should start working on putting together a safety library. At this point, ensure that the policy manual has a requirement for the library. The library can be traditional printed materials, electronic materials, or a combination of both. It should include materials on:
  1) General safety and risk management
  2) Pilot related flight safety
  3) Crew resource management (CRM)
  4) Physiology as related to flight operations
  5) Maintenance related safety
  6) Hazardous material information (OSHA documents if required by your agency. State and local governments are exempt from OHSA requirements unless the individual state decides to voluntarily have OHSA oversight. To see if your state requires OHSA documents, check here: https://www.osha.gov/dcsp/osp/)
  7) Applicable accident reports
  8) Any other safety related materials you feel should be included
     a. (*A number of sample materials are included)
     b. Resources that you may consider for your library are:
        - www.IHST.org
        - www.ALEA.org
        - http://www.skybrary.aero/index.php/Main_Page
        - http://asrs.arc.nasa.gov/publications/callback.html
        - http://helihub.com/Safety/
        - http://aviation-safety.net/investigation/aaibs.php

Tied closely to the Safety Library is a **Safety Bulletin Board**. The bulletin board should include the most recent safety related information as well as the status of hazards and mitigations that are currently being addressed through the safety program. A printout of the summary page of the ALEA Risk Management Excel form is an example of something that would be good to include. Also, it is helpful to have

safety related news, stories, accidents reports, etc. that target those current hazards. For example, if there is a targeted effort to address seasonal weather, look for information related to weather related accidents, safety suggestions, etc. Many bulletin boards keep a rotating list of emergency procedures for aircrews to review and stay current on. You should include the procedures that all aircrew members should follow in each emergency,

not just the pilot. Finally, it is always helpful to include some humorous cartoons or interesting pictures to liven up the board. There are numerous law enforcement and aviation related cartoons are available on the Internet.

Somewhere near the bulletin board is usually a **Safety Drop Box**, where employees can drop off hazard/occurrence reports anonymously. This is a *must-have* item for your SMS. It is likely that it will be rarely used, if ever. However, the means to submit reports anonymously needs to be made available. The box should be solid in construction and locked in some manner. Usually a supply of blank forms and sealable envelopes should be placed nearby.

An alternative is an electronic 'drop box' of some sort. An electronic format must ensure that the report cannot be tracked back to the owner.

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Step 7 - Setting up SMS Policy
Training

The coordination between safety officers and training officers is where the SMS will turn analysis and paperwork into real impact on safety. Training is the vehicle that safety information uses to lower risk. Even in cases where policy change is recommended, training is still needed to let members know why the change was made and how to comply with it. The safety officer and training officer should work together to develop and deliver the following:

Employee Training: [03.05.01, 04.01.00]

1. Initial and currency SMS training for unit members (SMS Toolkit, p. 67) [03.05.01-2 – Indoc Training], to include:
    i.   Risk Management philosophy and process
    ii. Risk Assessment and scoring (using a chart)
    iii. SMS structure
    iv. Personal Protective Equipment
    v.   Employee's role in SMS (pilot, flight crew, maintenance, management, administrative) [04.01.01 – Unit Manager Initial Training, 04.02.01 - TFO]
2. Water egress and rescue air use [02.01.08][04.02.01-3]
3. Survival (offsite landing, water, first aid, etc)
4. Crew Resource Management [04.02.01-3]
5. Firefighting – aviation specific (engine fire, fuel fires, aspects of burning composites, etc.)
6. Refueling procedures [02.01.10]
7. Emergency Response Plan for unit mishaps [03.02.04]
8. Training required by specific Risk Mitigation Planning [03.05.01-1] (This would be the training that is required when the Safety Committee chooses a risk control to implement)
9. Aeromedical Issues (fitness, medication use, fatigue, etc.)

The Safety Officer must also coordinate with the training officer on flight training associated with risk management issues. [04.02.01-3] [03.05.01]

1. Inadvertent Instrument Meteorological Conditions (IIMC) [02.02.03][02.03.03] – *Sample is available on the ALEA website.*
2. Flight crew emergency training
3. In-flight risk assessment
4. Pilot Incapacitation Training (a.k.a. 'Pinch Hitter' flight training)

For now, put the requirements in your policy manual, wherever they fit in the best, for these training programs. Once the requirements are in place, begin to fill the gaps with appropriate syllabuses if you do not already have them. Many

organizations have training available in seminars, conventions or online that will satisfy all or part of your training needs. Those organizations include: ALEA, IHST, FAA (Wings program), AOPA, HAI, EAA, OSHA and others.

You will want to start with developing some initial training for employees on the new SMS. This training should include:

- What SMS is.
- Why the unit is going to employ it.
- How it works
- What policy/procedure changes have been made to accommodate the needs of the SMS (with an important emphasis on the fact that most of the elements needed for the SMS were already in place…hopefully).
- What the employees' role is in the SMS (information reporting, participation in the process, carrying out new safety procedures and policies (interventions/mitigations) reporting the performance of those interventions, and sharing ideas and feedback)
- What Just Culture is and how it will be used.

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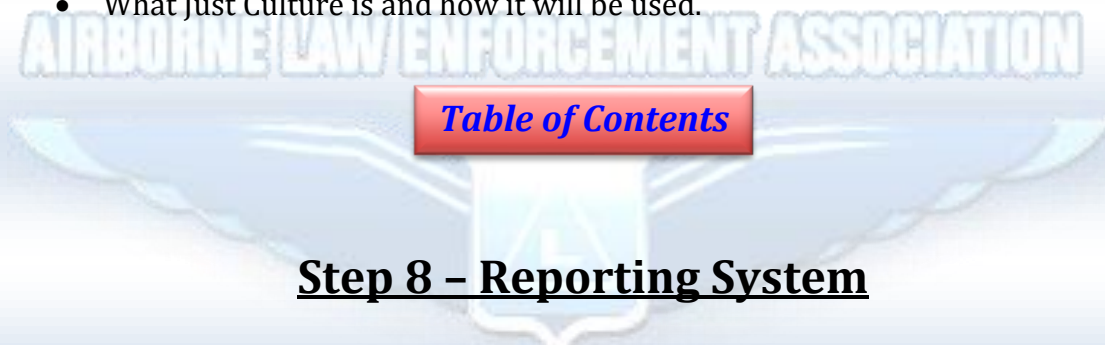
Step 8 – Reporting System

Information is the fuel that your SMS needs to run. You cannot run an effective SMS with only the information that you come up with. You need a reporting system. Fortunately, this is established with many of the documents you have already included in your policy (see above), for which many examples are included. The reporting system should include:

- Hazard Report (a.k.a. safety report)
- Incident Report (a.k.a. occurrence report.) This may be combined with the hazard report for simplicity.

These reports should be available to everyone in the unit.
- Hard Copies in an easily accessible location (the safety bulletin board is a good place)
- Digital option for filing out the form (intranet, common unit folder, etc.)

There must be a means of submitting the reports anonymously. That can be as simple as the drop box mentioned above. A means of submitting the report anonymously in a digital format would be ideal. Set up the forms for now. More on this in step 3 of the next phase.

Phase 2: Collect the Data – Hazard Identification

Congratulations! You have finished the most tedious part of setting up your SMS. Now that the foundation has been placed, you can get to work on the actual process of identifying hazards, assessing risk, targeting elements to be mitigated and monitoring the performance of your efforts. Risk management within a Safety Management System is a process. To start this process, hazard information must first be obtained. (SMS Toolkit, p. 32-34)

The next step is to use the information collection systems you've put in place to get some raw data on the actual hazards at your operation.

Step 1 - Finish GAP analysis

If you have not already done so, complete your GAP analysis on what components are missing from your SMS. As suggested in step 1, have other unit members responsible for various sections of the operation complete GAP analysis of their respective areas as well. Collect a list of the items that are missing and place it in a list (i.e. Excel list).

Step 2 – Safety Survey
(SMS Toolkit, p. 47-49)

Distribute the safety survey to all unit members. This includes maintenance, part-time members, managers, etc. An example is included here in addition to the examples in the SMS Toolkit. At first, keep it simple. It is suggested that it be one page only. In addition to asking what the person's safety concerns are, also ask what they think is the associated risk (high, medium, low) and what they think a good mitigation would be. This will give you some ideas that you did not think of and keep comments that are baseless complaints to a minimum. It will also allow you to take ideas that are suggested by the unit members and employ them through the

safety program. This increases employee 'buy-in' by showing that the program not only addresses their concerns, but also utilized their ideas on how to fix problems.

The safety officer may wish to refrain from filling out a survey, and announcing that they did not fill one out. This allows the safety officer to promote employee investment in the safety program by ensuring that the issues being addressed are those that the employees themselves have indicated are their biggest concerns.

Aviation Section Safety Program

Survey

Please fill out the following questionnaire and return it to Bryan Smith's mailbox in the attached envelope.
If you wish to add your name, that will help with follow-up. All responses will be kept anonymous

1. What are your top three Safety Concerns at the Aviation Section?

a. _____

b. _____

c. _____

2. What do you think is most likely to lead to the next accident here if not addressed?

_____

3. What makes you feel the safest at our operation?

A simple question gauging how comfortable each employee would feel reporting an incident will give you a baseline on the safety culture and belief in the Just Culture doctrine at the unit. Additional questions are on pages . The number of employees who fill out the survey will also give you a baseline of safety culture that you can compare future survey participation to. After you get the initial responses and record that level of participation, it is helpful to have the unit manager then require everybody to fill out one.

The survey can be filled out by hand or electronically. Either way, it is important that each member can submit the survey anonymously if desired. We will discuss what to do with the data in step 3.

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Step 3 – Hazard Reporting

- **Hazard Reports**

Make sure that everyone has access to, and training on utilizing, hazard reporting forms. There are many names for these forms: safety report, incident report, occurrence or incident form…. The name is really not important. There simply needs to be a place where people can report something that happened, something that almost happened, and/or something that they feel is a hazard that will lead to an incident if not addressed. Again, the forms should be short and simple. This is to increase the probability that the form will be utilized. Once submitted, the safety

officer can do follow up to get all of the pertinent details. Asking for every conceivable piece of data on the initial form will prevent wide usage of the form.

Often, at first, employees will fail to utilize the forms when applicable. The safety officer should fill out the forms for the employee, or with them, when they see an occurrence that they feel should have been documented. This will give you a few reports to start out with and use as examples. Once employees see how the system works, they will slowly start doing it on their own. So, in the beginning, find a few recent issues and fill out the forms either yourself or with a unit member. Use of the form can also be made into a requirement in the unit policy manual.

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Step 4 – Historical Information

Collect information on major incidents that have happened in the past:
- Two years - for minor damage, injury
- Five years - for major damage or injuries

Collect what information you can about what happened, and why. You will use this information in phase 3 of this guide.

Step 5 – Maintenance History

Standard maintenance 'write ups' or 'squawks' for items that need repair are good information for a safety officer to track. Some items are just normal wear and tear that comes from flying aircraft. However, you may identify trends in this data that reveal safety issues with contributing factors other than 'normal' maintenance

issues. Newer aircraft with electronic monitoring systems (i.e. HUMS, FDM) can be an excellent source of this type of information.

Step 6 – Inspections and Inventory

Your own observations will uncover issues that need to be addressed. Perform inspections/inventories on:

- PPE
- Safety equipment in aircraft
- Safety equipment in the hangar/office space

A sample safety inspection form is included

Once you have completed these steps, and compiled the information somewhere, you are complete with this step and ready to move on to Phase 3.

_____

Phase 3: Analyze the Data

So, we have a foundation of an SMS and a pile of data to work with. Next we need to analyze that data so we can do something with it. Before going any further, we want to be sure to assess risk.

Step 1 – Hazard Analysis

Some hazards may seem complex, or contain multiple, latent factors. This is often the case with incident and accident reports (a.k.a. occurrence reports). In these cases you need to do a hazard analysis, also called a root cause analysis, to uncover these individual factors. Once you have done this, you will see that the individual factors have varying influence on the overall risk. Treat these individual factors as hazards, calculate the risk with each one (see below) and target the ones with the highest risk that also offer the most feasible risk controls.

An easy way to do a hazard analysis is with the '5-Whys' model used by professional accident investigators. Simply take a real, or predicted, unfavorable event and ask, "Why did it happen?" taking your answer to that question, ask, "Why?" again. Keep doing this until you simply cannot answer your question any more. It does not need to be exactly 5 times. This worksheet is attached and will help guide you through the process.

List the factors (hazards) and your estimation of their risk on your risk management spreadsheet as well (Step 4).

Step 2 –Risk Assessment Foundation

Risk is a function of the likelihood and severity associated with a hazard. The 'likelihood', is the probability of the hazard actually causing an event (incident, accident, etc.). The 'severity' is the level of damage that a possible event related to the hazard would most likely cause.

This is a critical step that safety programs often overlook. We need to estimate the risk associated with a hazard in order to decide which hazards we want to spend our limited time, resources and employee patience for safety material on. By simply responding to every hazard we identify we will cripple our SMS with overload because there will simply be too many to deal with. Our resources will get spread too thin. Or, our unit members will lose interest in our program as we spend time on hazards that in actuality have very low risk in our operation.

Fortunately, a risk analysis is relatively easy to do. Have a risk matrix in your SMS so risk estimations are uniform throughout the program. For example:

			Likelihood				
			1	2	3	4	5
			Frequent	Probable	Occasional	Remote	Improbable
Severity	1	Catastrophic	2	3	4	8	12
	2	Critical	3	5	6	10	15
	3	Marginal	7	9	11	14	17
	4	Negligible	13	16	18	19	20

The matrix can have a higher score for high risk, or vice versa. It really doesn't matter. Also, you can have more categories in each axis than the ones given in this example. The important thing is to make it uniform.

		Likelihood				
		5	4	3	2	1
		Frequent	Probable	Occasional	Remote	Improbable
5	Catastrophic	25	20	15	10	5
4	Critical	20	16	12	8	4
3	Marginal	15	12	9	6	3
2	Negligible	10	8	6	4	2

Other advantage to using a risk matrix is that it helps you track performance. By putting a number to the original risk score, you can return at a later date and see if you have changed either the likelihood or severity score. The updated risk score gives you the means to show a change in risk over time that can be tracked quantitatively. Using numbers to define risk, and changes in risk, is better understood and received by upper management.

A key to the estimation of risk is maintaining a certain level of 'reasonableness'. Any hazard has the potential to cause a fatal accident if we play devil's advocate long enough. However, what is the most likely probability and/or severity? One way to

maintain this level of reasonableness is to define each level on your scale, for example:

Severity	Catastrophic = death, permanent injury, damage over $100,000
	Critical = Major injury, aircraft damage over $50,000
	Etc……..
Likelihood	Frequent = Potentially happens every flight
	Probable = Potential exists at least once a week
	Etc…….

Another way to maintain a reasonable perspective on risk estimation is to use historical data. Has the hazard in question ever happened before? If so, what was the most common damage inflicted? Use these numbers to establish what the most likely scores should be.

You can also substantiate risk estimations by the frequency a hazard is mentioned in survey or hazard reports, HUMS data and other resources.

Use the attached Risk Assessment form to set the numbers for your risk levels and define the parameters of each level.

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Step 3 – Assess Risk
Survey Information

Take the responses and group them into similar categories. Usually you will find that multiple people are worried about the same basic issues, though the specific details may vary. By grouping topics together you help to establish the probability of the risk associated with each hazard. You also are able to remove many of the identifying factors of each entry so they can be relayed to the rest of the unit without calling attention to the individual who reported their concern.

Sometimes you will get reports or survey entries that are not true 'safety' concerns, or are baseless complaints made by people looking to vent personal problems. The two worst things you can do with reported hazard information, legitimate or not, are to:

- Burn the data – *ignore it*
- Burn the reporter – *call out the reporter with the intention of disregarding the information based on who said it.*

Either of these two things will delegitimize the SMS. Employees will see this as an indication that the safety manager will only address those issues they deem worthy of response, and only from certain members of the unit. However, going through effort to respond to baseless complaints will alienate everyone else in the unit and the SMS will be seen as only a tool to satisfy personal grievances and agendas. What is a safety officer to do? Estimate risk. By doing so you remove any personal agenda from the equation. 99% of these complaints will score very low on the risk scale, either because they are really personal issues or management issues not related to safety. You can list the hazard on your form and either defer action due to the low score, or through the safety committee move it over to management (and out of the safety officer's realm) where it can be more appropriately dealt with.

Step 4 – Record Hazards and Risk
Hazard Tracking Form

All hazards (or hazard groups) should be entered into your risk management tracking system as identified hazards. For example:

Hazard	Report #	ID Date	Original Risk Level	Risk Control	Implementation Date	Next Follow Up Check
IIMC Training	Survey14001	1/1/15				
TFO EP training	Survey14002	1/1/15				
Bird Strikes	Survey14003	1/1/15				
Pilot pay	Survey14004	1/1/15				

ALEA Safety Management System Worksheet

As you can see, 'pilot pay' is listed here as an identified hazard that might be included on a safety survey, which, as mentioned above, is not really a safety issue.

Once the hazards are listed, calculate the risk as described above. For example:

ALEA Safety Management System Worksheet

Hazard	Report #	ID Date	Original Risk Level	Risk Control
IIMC Training	Survey14001	1/1/15	15	
TFO EP training	Survey14002	1/1/15	15	
Bird Strikes	Survey14003	1/1/15	8	
Pilot pay	Survey14004	1/1/15	3	

Notice the risk assessments show two in the red, high-risk category, one in the yellow, and one in the green. This will help direct which ones you will attack first, and why.

Include the hazards you have identified from all your sources of data: incident reports, GAP analysis, Inspections, past incidents, etc. When including your own hazard information, only include those that you have assessed as having a medium to high risk. Leave out the lower risk items to avoid unnecessary bulk in your list.

Once you have a list of identified hazards and estimated risk you are done with this step and ready to move on to Phase 4.

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Phase 4: Mitigate the Risk

Up to this point we have established the foundation for the program, collected data, analyzed that data and assessed risk, and recorded the information we uncovered in some sort of spreadsheet or list. It is time to make a plan of attack. This is where the Safety Committee comes into play.

Step 1 –Safety Committee Meeting Report

Before going to the meeting, you need to put all of your information together. The report should include:

- The list of identified hazards and associated risk
- Copies of hazard (accident, occurrence, safety) reports
- Your Hazard Analysis of those reports (*mitigation strategy template – attached*)
- Results of GAP inspections, audits, and inventories
- Your proposed mitigation strategies and supporting material (*See step 2*)

An example meeting outline is included

For mitigations you are suggesting which may cost more than petty cash levels of funding, you may want to do a Return on Investment calculation (*See step 5*) as part of this packet in order to substantiate your suggestion.

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Step 2 –Mitigation Strategy
Targeting

Determining how to target a risk is one of the most important tasks the safety program performs. There is some guidance that can be given, but in the end there is a certain amount of 'art' involved in coming up with a plan that will work, and will be carried out by unit members as intended.

- **Targeting Severity/Probability**

First, the intention is to lower risk. Risk is determined by the likelihood (probability) and or severity of the 'unfavorable event' associated with that hazard. So, our goal is to lower the likelihood and/or severity of that event. By doing so we give our safety interventions a specific goal.

For example, if we are concerned about bird strikes, the use of helmets with visors down can lower the severity of this risk, even if we cannot find a way to lower the likelihood of hitting a bird. Conversely, using a 'wing walker' or spotter when moving aircraft in and out of the hangar can lower the likelihood of an aircraft hitting the hangar structure, lowering the risk even though the severity of the event, should it occur, has not changed. Ideally, we will think of way to lower both severity and probability.

- **Objective vs. Subjective focus**

Again, we also give ourselves a means to track the performance of our safety program in a quantitative (with numbers) manner. For example, assume we are using the risk matrix below and we have a hazard with a risk that scores a 1 on Severity and a 3 on Likelihood, giving us a risk score of 4. If we successfully employ a mitigation tactic that lowers the severity from 1 to 2 on that scale, our risk number changes from 4 to 6.

			Likelihood				
			1	2	3	4	5
			Frequent	Probable	Occasional	Remote	Improbable
Severity	1	Catastrophic	2	3	4	8	12
	2	Critical	3	5	6	10	15
	3	Marginal	7	9	11	14	17
	4	Negligible	13	16	18	19	20

That may not seem like much, but a numeric value is objective, which is much better than saying, "We are more or less safe, because I think so," which can be regarded as subjective opinion. Opinion makes for weak arguments when discussing safety. Quantitative tracking will also give you definitive evidence showing if the mitigation strategy is working or not.

- **Broad vs. Pinpoint Targeting**

In addition to lowering either the severity or likelihood, you need to target a specific element of the hazard that you have a realistic means of influencing. Simply telling people not to hit a bird, or to avoid flying into fog, etc. will not be effective in lowering risk. However, after analyzing the hazards we can find an element, such as training, mission profile, or equipment requirements that can be influenced.

Try to think of an element that can be counted. "It is happening 6 times a year", "It occurs 5 times a day, on average", "The conditions exist for it to happen twice a month." etc. Then, design a way to change this number with a risk control. By doing this, you can track how your control is working.

- **Choices, choices, choices**

When it comes to controlling a risk, the choices available to you are numerous. In many cases, you will be targeting human error. Do not be too committed to one solution, you may need a two or more options to attack the problem from different angles.

In many cases, you will be targeting human error. Human decision-making is a complex process. Simply telling someone not to do understand why the error is occurring, where the likely failure points are, and then fit in reasonable solutions. It is important to understand if you are dealing with a failure in the analytical or naturalistic decision-making process emergency procedure response with an analytical solution will not be effective. When able, use an 'environmental' barrier, which is a physical barrier to prevent the human error from occurring. Physical stops, shields, alarms, lights, etc. all fit into this category. Remember that audible alarms are one of the least reliable preventive measures.

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Step 3 –Mitigation Strategy
Management of Change
(SMS Toolkit, p. 61-64)

Here is a good time to use the Management of Change (MOC) form. You are suggesting implementing something that could possibly effect all operations at your unit. Take the time to analyze what changes, both positive and negative, the suggested mitigation will have on the entire operation. Will it draw personnel, money or attention away from other critical tasks? Will it cause new possible hazards, oversights or opportunities for error? A form will help guide the process. It is suggested that the MOC form be completed, or reviewed, in the Safety Committee so there is opportunity for more unit members from various parts of the operation to give their input.

A Sample MOC form is attached

Step 4 –Mitigation Strategy
Return on Investment

If there is a cost involved in the suggested risk mitigation, you may consider doing a Return on Investment calculation. Return on Investment (ROI) calculations can be as simple or complex as you want to make them. Stay reasonable, if the cost of the mitigation is small, you may want to skip this step. If cost is a minor concern, do a simple ROI. If there is significant cost, do an in depth ROI adjusted for Probability of Success (POS).

	Hazard	Potential Cost per Occurrence	Risk Control	Estimated Cost of Control	ROI - Estimated (basic)
3	Hazard				
4	Dynamic rollover on dolly	$3,000,000	Add additional screws	$ 5,000.00	$ 2,995,000
5	Unsafe IIMC preparation	$5,000,000	Begin IIMC training	$ 10,000.00	$ 4,990,000
6	Pilot Currency - General Aeronautical Knowledge		Refocus training on objectives		$ -
7	Aircraft damage during movement in/out hangar	$20,000	Repaint lines	$ 500.00	$ 19,500
8	Tools accidently left in aircraft	$300,000	Foam boxes, outline tools on wall	$ 50,000.00	$ 250,000
9	Aircrew EP Currency		EP review cards		$ -

ALEA Safety Management System Worksheet   Note: Scroll dow

Hazard	Report #	ID Date	Original Risk Level	Risk Control	Implementation Date	Next Follow Up Check	ROI Estimated	ROI Actual
Dynamic rollover on dolly		9/1/14	20	Add additional screws	10/1/14	1/1/15	$ 2,995,000.00	
Unsafe IIMC preparation		11/20/14	15	Begin IIMC training	2/15/15	7/1/15	$ 4,990,000.00	
Pilot Currency - General Aeronautical Knowledge		11/20/14	15	Refocus training on objectives				
Aircraft damage during movement in/out hangar		11/20/14	20	Repaint lines	12/1/14	1/1/15	$ 19,500.00	
Tools accidently left in aircraft		11/20/14	8	Foam boxes, outline tools on wall			$ 250,000.00	
Aircrew EP Currency		11/20/14	20	EP review cards	1/1/15	7/1/15		
TFO inability to respond to								

Probability of Success (POS) is an estimation of how likely the risk control will actually control the risk. Not all plans are guaranteed to be 100% successful. POS will consider things such as if a similar plan has been carried out at the unit before, is there anyone trained to do it, are resources and funding available, etc. This function is included in the attached spreadsheet. Your return on investment calculation can then be adjusted for the probability of success, which will be a number between 0-100. This makes your ROI estimate more realistic.

Probability of Success										
							For Each Category Enter 1-5 (5 being the highest)			
			Prior Experience			Resources				
Hazard	Potential Cost per Occurrence	Risk Control	Estimated Cost of Control	ROI - Estimated (basic)	ROI Using PoS	ROI% Using PoS				Time require control desig implementa training and on day-to-da schedule ha allotted for
Dynamic rollover on dolly	$3,000,000	Add additional screws	$ 5,000.00	$ 2,995,000	$2,341,545.45	46809%			4	
Unsafe IIMC preparation	$5,000,000	Begin IIMC training	$ 10,000.00	$ 4,990,000	$3,356,909.09	33536%			4	

ROI is reduced by 22% (100%-78%)

Step 5 –Safety Committee Meeting

The structure of the committee is established in your policy already. Again, it is important to have someone on the committee who is administratively in charge of the unit as well as the person responsible for training. You need access to these two people to get real safety results. This meeting is not about everyone sitting there and listening to your analysis and strategy for attack. The action plan that comes out of the meeting must be the decision of the committee. It is not the safety officer's role to set policy or procedure or determine training. However, you can certainly play a major role in helping the unit manager and training manager decide what those changes and plans should be. The committee should be a group effort based on input from everyone.

Based on the risk assessment, the committee should:

1) Choose which hazards to mitigate
2) Accept which risks to leave as they are (*document this, including the explanation*)
3) Determine how to mitigate targeted hazards
4) Define what the training and policy/procedure elements are for each mitigation strategy
5) Do a Management of Change (MOC) analysis for those changes

6) Assign tasks and due dates (*see Step 6*)
7) Set dates for future meetings

Also, the Safety Committee may review incidents and suggest disciplinary measures based on the Just Culture structure set by unit policy. Many unit members will not have the background needed to perform these tasks very well. It will be the safety officer's role to guide these discussions and provide input on risk management techniques in order to make sure the committee's actions are in the best interests of safety.

Step 6 –Action Items

The end of this process is the assignment of Action Items to responsible unit members. Every risk control should include a training element and a policy/procedure element.

The training element can be as simple as an email or memo to unit members explaining how to comply with the new safety control measure, or it could be as complex as a formal training program with live exercises and bookwork. Existing training may need to be changed, adjusted or verified to be complete in order to meet the goals of the risk control in question. The training officer should be directly involved in this aspect of the plan.

The policy/procedure element could be only a review of the current unit policies/procedures to ensure they are compatible with the proposed risk control. It may also require something as major as a new written policy/procedure or change of current SOPs. The unit commander/manager must be directly responsible for this part of the action plan.

Once both assignments are made, there must also be a follow up date and proposed goal for the targeted risk element. Enter everything into the spreadsheet and set a reminder to check the status of the plan at the specified dates.

While not directly responsible for these action items, the safety officer is responsible for tracking the performance and assisting those who are assigned the tasks as much as necessary.

Risk Control	Implementation Date	Next Follow Up Check	ROI Estima
d additional screws	10/1/14	1/1/15	$ 2,995,00
gin IIMC training	2/15/15	7/1/15	$ 4,990,00
focus training on objectives			
paint lines	12/1/14	1/1/15	$ 19,50
am boxes, outline tools on wall			$ 250,00
review cards	1/1/15	7/1/15	

Phase 5: Additional Elements

Now that we have the SMS running through some risk controls, lets take the time to add on a couple critical items.

I - Emergency Response Plan

The implementation of an ERP involves several steps:
1) Writing the plan
2) Tabletop exercise
3) Initial live exercise
4) Distributing the plan (including training)
5) Regularly exercising the plan

Step 1 – Writing the Plan

The written plan should have two sections to cover searching for a missing aircraft and handling an accident scene once the missing aircraft is found. Remember to lay everything out as best as possible so people who have no background in aviation will be able to understand the plan. This includes phone numbers, checklists and definitions where aviation specific terms must be used. It also should include instructions on how to conduct a search for a missing aircraft so the search can be started while other aviation personnel are responding to the scene. A sample ERP is attached. The sample included in this packet has been utilized in several actual law enforcement aviation accidents.

(http://www.alea.org/images/Safety_First_SMS_Toolkit/Emergency_Response_Plan_-_Public.pdf)

Components of your ERP should be:

1) Overview of ERP and tasks
2) Missing Aircraft Response
    i) When to initiate ERP
    ii) Phone number list
        (a) Unit Members
        (b) Air Traffic Control
        (c) Surrounding SAR resources (USCG, CAP, other agencies, etc.)

    (d) Fire, airport authority, marine units…

  iii) Specific Tasking – Checklists (for example):

    (a) Communications Center

    (b) Patrol Supervisor

    (c) Aviation Supervisor

    (d) Chief Pilot

    (e) Safety Officer

    (f) Director of Maintenance

    (g) Public Information Officer

  iv) Search Plan (instructions and guidance on how to search for a missing aircraft)

3) Accident Scene Response

  i) Specific Tasking – Checklists (for example):

    (a) Communications Center

    (b) Patrol Supervisor

    (c) Aviation Supervisor

    (d) Chief Pilot

    (e) Safety Officer

    (f) Director of Maintenance

    (g) Public Information Officer

    (h) First Responder

      (i) Instructions on securing aircraft (shutting down engine, etc.)

      (ii) Instructions on setting accident scene, perimeter.

  ii) Accident Investigation Kit

  iii) Recovery Plan (getting the aircraft out of the scene area)

4) After Incident Action

    (a) Incident Investigation

    (b) Safety Stand Down

    (c) Mental Health Provisions

Step 2 – Tabletop Exercise

When you are satisfied with your plan, bring everyone together for a few tabletop exercises. This will allow you to run through the plan with the people who will be involved in carrying it out in real life. Running the plan through its paces in this format will offer you opportunity to make changes to the ERP before distributing the plan and incurring the costs of a live exercise.

Step 3 – Live Exercise

After you have run through a tabletop exercise, or two, it is time to set up a live exercise. You should consider scheduling more than one exercise so you have the chance to run more people through the ERP and there is opportunity to apply lessons learned from the initial run to a second drill.

There are several theories on how to conduct an ERP exercise. Should you let everyone know it is coming, or have a 'surprise' drill with no announcement? The argument for both sides requires more space than I wish to allow here. It is suggested that the initial ERP drills be announced and planned. If you have never ran a drill before, it is unlikely that the organization will perform well in an unannounced format. The goal is to show everyone how the drill should be conducted properly. It is likely that even with notice and pre-planning, there will be plenty of mistakes to be had. Once it has been demonstrated how to perform the ERP properly, it is up to your unit if you want to conduct non-notice drills in the future. Take video and photos of the exercise(s) so you can use them in training materials later.

Step 4 – Distribute the Plan

The next step is to distribute the plan. It should be made available several ways so that responsible parties can access it immediately. Examples include:

- Agency intranet link
- Laptop, iPad, smartphone links
- Paper hard copies in strategic locations

The initial distribution of the plan should include some training on why the ERP exists and what each person's responsibility should be.

A link to an ALEA presentation on this topic can be found here (http://www.alea.org/images/Safety_First_SMS_Toolkit/Emergency%20Response%20Planning%20online%20v.4.pptx)

Step 5 – Exercise the Plan

Finally, schedule follow-up drills. Table top exercises can be conducted annually. Depending on the complexity of your live drills, you should do them every 1-2 years.

Additional ERP Notes:

✓ It is recommended that the safety officer receive formal accident investigator training in the event that they are required to perform the investigation. The NTSB often turns over public aircraft accidents to the agency.

✓ The ERP should have guidance for the public information officer on what to say to the media following an incident.

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II - Flight Risk Assessment Tool (FRAT)

The other SMS feature we are going to initiate in this step is the FRAT. We are not going to spend time here talking about why we should use a FRAT, this document is intended to focus on how we are going to do it. If you want more info on the 'why', refer to this IHST Safety Bulletin:
http://www.ihst.org/portals/54/IHST_News/FRAT%20GRAT%20Bulletin2014.pdf

- Start with a FRAT provided to you through a vendor or educational source. You can use the ALEA FRAT, which was created in conjunction with the IHST/EHEST teams:
  http://www.alea.org/images/Safety_First_SMS_Toolkit/ALEA_FRAT_2.1.xls

- Your FRAT should be unique to your operation. Remove the questions in the FRAT that do not apply to your operation. Now, consider some of the hazards that you identified in earlier steps and are now in your hazard spreadsheet (or list). Can any of those hazards be mitigated by putting them on the FRAT? Give extra consideration to those that score high on the risk assessment scale.

- The FRAT should be filled out with input from the entire flight crew (not just the pilot).

- It should have a function in it that allows the crew to discuss ways to mitigate risks and lower the risk score if possible.

- If the risk score is in the red, there should be a policy that flights are prohibited. This protects the crew from themselves, but also from management that wishes to push a crew to fly when they should not.

- If the risk score is in the yellow, the crew should be required to talk to another person who understands law enforcement aviation and can discuss with the crew the mitigations that should be used in order to fly the mission. That person should preferably be a manager, safety officer or training officer.

- One suggestion is to call the FRAT a flight, or mission briefing…because that is what it really is.
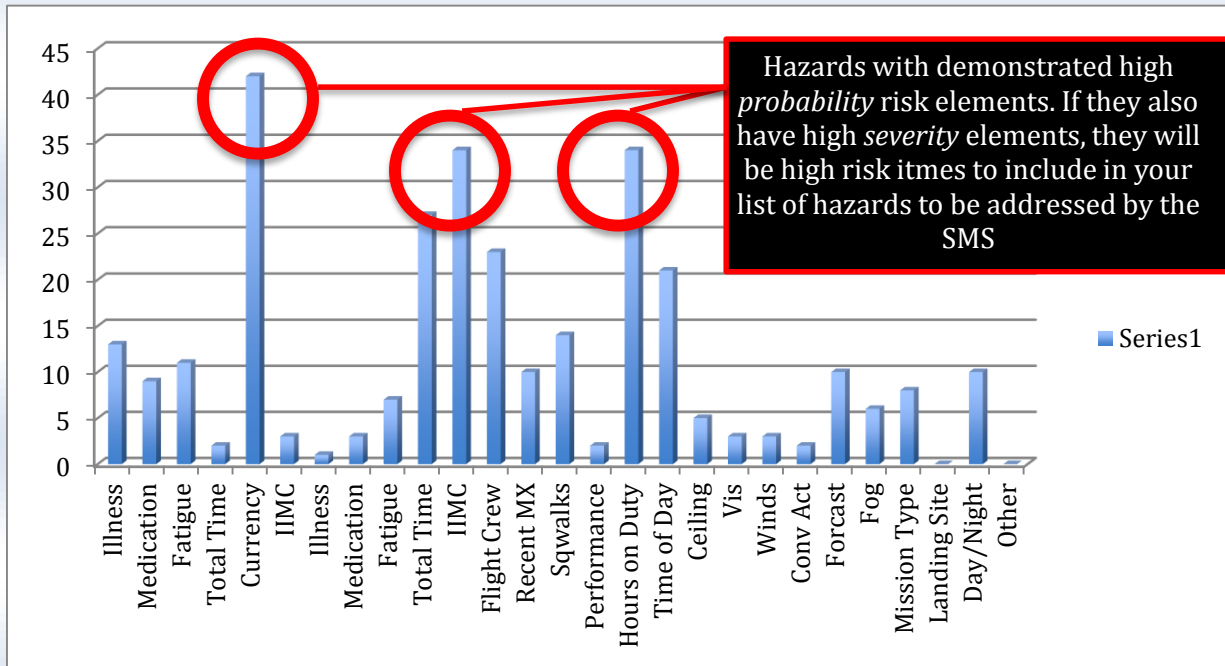

Initial Risk Score

Mitigation (Risk Control) and updated score

All Aircrew Included

The safety officer should record the FRAT scores, specifically the high scoring items. Those areas consistently scoring high can be used to direct safety program efforts later on. The scores can also be used to adjust the FRAT periodically so it best serves the unit. A sample Excel form for tracking FRAT scores is attached.

Hazards with demonstrated high *probability* risk elements. If they also have high *severity* elements, they will be high risk itmes to include in your list of hazards to be addressed by the SMS

- **FRAT for every flight, or every shift??**

Ultimately, it is up to your agency if you will require a FRAT for every flight, or one for each shift. Generally, it is advised to do an individual FRAT for pre-planned missions, especially cross country and 'special ops' types of calls such as hoist rescues, firefighting, SWAT insertion, etc. However, for operations where the crew staffs a shift, during which they answer calls or go on patrol flights as needed, filling out an entire, individual FRAT for each flight is not recommended. It is a better practice to fill out the majority of the items at the beginning of the shift and then check the few variable items just before the flight.

Some items will normally be consistent throughout a normal shift, such as crew experience, recent training, aircraft condition, illness, etc. These are 'Static' items and can be entered into a FRAT at the beginning of the work day. Some items will vary, such as weather, time of day, etc. These are dynamic items, and need to be filled out just before a flight. Fortunately, these items are fewer in number.

- **One FRAT fits all?**

A separate FRAT for training flights is included in the ALEA format no the website. It gives examples of items unique to flight training that should be included in a risk assessment prior to conducting a training flight.

Another consideration is to make a GRAT (Ground Risk Assessment Tool) to be used for maintenance tasks. The risk assessment tools are based on increasing awareness of risk, and mitigating that risk which can be lowered. Nothing about a risk assessment tool makes it specific to operations done in the air. Maintenance tasks can benefit from the same process.

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Phase 6: Performance Analysis
(SMS Toolkit, p. 28-29)

We are ready for the final link in the process. There is no way of knowing if your safety program is being effective unless you do some sort of follow up. The simple absence of an incident or accident is not an absolute indicator that your risk identification, analysis or controls are effective. It may only be a result of good fortune. Performance tracking is not only the way we confirm things are working, but also confirm what things are not working so we can have justification for eliminating ineffective policies, procedures or spending.

If you have installed the previous sections of your SMS according to the guidelines listed above, this step will actually be very simple.

Step 1 –Specific Risk Control Performance

Each identified hazard that you target with a specific mitigation will have a predetermined follow up date. You will have specified a goal according to a factor that can be measured (number of times X occurs, number of flights terminated because of X, decrease in % of training completed…..). At the predetermined date, simply look at this factor and determine what the change has been. If it is moving towards your goal, continue the mitigation. If not, you need to change something.

Where we wanted to be

Good or Bad?

Where we started

Where we are

Goal Date (Follow Up Date)	Hazard	Risk Control (means of meeting the goal)	Original number	Goal	New number	Risk Control Performance Good = 1 Poor = 2	Original R
1/1/15	Dynamic rollover on dolly	Add additional screws	1	2	2	1	20
7/1/15	Unsafe IIMC preparation	Begin IIMC training	0	100%	20%	2	15
	Pilot Currency - General Aeronautical Knowledge	Refocus training on objectives	0	6 per year	4	1	15
1/1/15	Aircraft damage during movement in/out hangar	Repaint lines	0	2	2	1	20
	Tools accidently left in aircraft	Foam boxes, outline tools on wall	75%	100%	75%	2	8
7/1/15	Aircrew EP Currency	EP review cards	0	2X/WEEK	2	1	20

You then need to update the risk level for the hazard. Have the probability and/or severity changed? This is an important factor in determining the performance of your system. Sometimes the change in risk is not reflective of how well the risk control was implemented. You may have done all the training or installed the equipment you purchased, yet risk stayed the same or increased. Or, the risk control may have not been completed as planned, yet risk went down. It is important to understand what is happening to risk, and why. We do not want to assume.

Hazard	Original Risk Assessment			Updated Risk Assessment*		
	Likelihood (1-5)	Severity (1-4)	Risk Level	Likelihood (1-5)	Severity (1-4)	Risk Level
Dynamic rollover on dolly	5	4	20	1	4	4
Unsafe IIMC preparation	3	5	15	3	5	15
Aeronautical Knowledge	5	3	15	2	1	2
movement in/out hangar	5	4	20	2	4	8
Tools accidently left in aircraft	2	4	8	3	5	15
Aircrew EP Currency	4	5	20	2	5	10
Incapacitation in-flight	4	5	20	3	5	15
No follow up on action plans	3	3	9	2	3	6

The attached forms have some suggestions based on industry standards:

Risk Control Performance

Training risk control current status:

1. Is this the goal? ☐Yes ☐No

2. If not, is the data moving towards the goal? ☐Yes ☐No

3. Has the Risk Assessment Score for the original hazard improved? ☐Yes ☐No

4. Estimated Return on Investment

5. Recommendation (see below*):

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*Safety Performance Analysis and Recommendation

1. If the answer to both 1 and 2 is 'no' and 3 is 'no' = Implementation is poor. Consider a new plan to implement the risk control in order to meet the goal, or change the risk control to one that is more likely to be carried out.

2. If the answer to both 1 and 2 is 'no' and 3 is 'yes' = Your targeted hazard/element (or means of measuring it) is not an accurate measure of the risk associated with the original hazard. Consider changes to one or both. [If the targeted hazard/element seems valid, start with a new means of measurement first]

3. If the answer to either 1 or 2 is 'yes' and 3 is 'yes' = Continue risk control

4. If the answer to either 1 or 2 is 'yes' and 3 is 'no' = The risk control is not effective, change it.

1) Enter this information into your hazard tracking form/spreadsheet.

2) Include this information in the next Safety Committee Meeting agenda so appropriate action can be taken, if required.

ew number	Risk Control Performance Good = 1 Poor = 2	Original Risk Level	New Risk Level [calculate on Risk Assessment tab]	Risk Level Change Good = 1 Poor (or same) = 2	Recommended Action A [KEY below]	Recommended Action B [KEY below]	Recommended Action C [KEY below]	Recommended Action D [KEY below]
2	1	20	4	2		B		
0	2	15	15	2				D
1	1	15	2	2		B		
2	1	20	8	1	A			
0	2	8	15	2				D
2	1	20	10	1	A			

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Step 2 –Overall Program Performance Monitoring

There are several ways to monitor the overall performance of safety management at your organization.

1) Performance of all mitigations
   a. Look at the individual risk controls, as mentioned above.

Recommended Actions		
A		Continue with control. If risk level and the number associated with your risk control stabilize, consider if the control is still needed
B		The control method is not effective. Consider a new one
C		Your Targeted Risk Factor (or means of measuring it) is not an accurate measure of the risk associated with the original hazard. Consider changes to one or both. [If the Targeted Risk Factor seems valid, start with a new means of measurement first]
D		Implementation is poor. Consider a new plan to implement the risk control in order to meet the goal, or change the risk control to one that is more likely to be carried out.

   b. Add the initial risk scores for all identified hazards on January 1st at the beginning of the year and then add the final risk evaluation for those risk scores on December 31st.
   c. Add together all Return on Investment calculations you have made for your risk controls. You can also calculate the total cost of the safety program and compare it to the cost of: any actual incidents that have occurred at your unit in recent years, the cost of any

hazard or incident that motivated the creation of a safety control(s), the cost of incidents at similar agencies in the recent year.

Hazard	Report #	ID Date	Original Risk Level	Risk Control	Implementation Date	Next Follow Up Check	ROI Estimated	ROI Actual	Updated Risk Level
Dynamic rollover on dolly		9/1/14	20	Add additional screws	10/1/14	1/1/15	$ 2,995,000.00		4
Unsafe IIMC preparation		11/20/14	15	Begin IIMC training	2/15/15	7/1/15	$ 4,990,000.00		15
Pilot Currency - General Aeronautical Knowledge		11/20/14	15	Refocus training on objectives					2
Aircraft damage during movement in/out hangar		11/20/14	20	Repaint lines	12/1/14	1/1/15	$ 19,500.00		8
Tools accidently left in aircraft		11/20/14	8	Foam boxes, outline tools on wall			$ 250,000.00		15
Aircrew EP Currency		11/20/14	20	EP review cards	1/1/15	7/1/15			10
TFO inability to respond to pilot Incapacitation in-flight		11/20/14	20	Begin pinch hitter training					15
No follow up on action plans		11/20/14	9	board, minutes	1/1/15	6/1/15			6
Post crash fire protection - hands not protected		11/20/14	20	purchase flight gloves		6/1/15	$ 500,000.00		6
No suitable landing option available in case of engine failure on takeoff/landing		11/20/14	15	Use runway/taxiway when able	1/1/15	5/1/15			10
Survival Equipment not available after accident		11/20/14	10	Inventory vests and purchase missing/damaged equipment	2/1/15	6/1/15			3
Failure to pass on Important info		11/20/14	12	Monitor board useage, report missing information	2/1/15	6/1/15			8
First Aid Kits not stocked	15-01	3/24/15	9	Purchase equipment			$ 20,000.00		6
									0
Total			193				8774500		108
Average			27.57						14.4

INITIAL overall total and average of identified hazards

UPDATED overall total and average of identified hazards

2) Goals and Objectives
   a. At the beginning of each year you should have established objectives aimed at bringing the unit towards the safety goals.
   b. If you can find a way to quantify the progress towards that goal, this assessment will be more valid.
   c. Your assessment of the progress towards meeting these objectives may be connected to some of the individual hazards you are addressing and tracking.
   d. These findings should be part of your Safety Committee reports.
   e. The assessment should also be used to guide future safety initiatives.

3) Safety Culture (SMS Toolkit, p. 68-69)
   a. Observable and measurable changes in Safety Culture will be a good assessment of the performance of your SMS.

b. One measuring stick is to look at unit member participation in the safety program. An example would be to compare the number of hazard reports that unit members submitted from year to year.
c. Other examples could be: the number of people returning a safety survey, the number of times a management of change form was included in the planning process, the amount of safety related training conducted, or completed, etc.
d. Other indicators to use can be found on the list provided on page 69 of the SMS Toolkit.

4) Scheduled audits and inspections. There are a couple ways we can use these processes to assess the SMS.
   a. Simply count the number, or percentage, of items on the audit/inspection that met the predetermined standards.
   b. Another way is to look at the number of unsatisfactory items from a previous inspection that have been changed to satisfactory.

**Note: Caution must be exercised in using 'unsatisfactory' items as a measuring stick for SMS performance. Finding things that could be improved are not necessarily indications that the safety system is performing poorly. If an audit does not turn up anything that can be made better, it is likely you did not look hard enough or are not being honest about the reality of your organization, and its potential.

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Step 3 – Performance Reporting

Whatever methods you choose to monitor performance, you should report your findings in two places, both of which must be made available to all unit members:

1. Quarterly SMS reports on individual risk controls (usually in conjunction with Safety Committee meetings)
2. Annual (and possibly semi-annual) overall SMS performance reports

**Note: Remember that safety is likely far more interesting to you than it will be to the other people in your unit. While numerous pages of safety data may be something you think is important to read, you cannot force people to read it. It is likely that a number of people in your unit will not make it past the first page or two. It is also highly probable that the people who do not read your entire report are exactly the ones who need to read it the most. Make the first page of your report a summery of all of the most important information you need to pass on. You can reference additional pages or sections for more information. This type of format is sometimes referred to as an, 'executive summary'. Unfortunately, that

first page may be the only thing you have to get your message across to those who need to hear it most.

Step 4 – Complete the Loop

Your performance information is more than just a measuring stick, it is the information you should use to guide the future of the program. Using this information:

1. Identify new hazards that should be addressed (i.e. FRAT items consistently scoring high, a risk control that failed to perform due to a previously unidentified issue, etc.)
    a. Enter the items into the Hazard Tracking form/spreadsheet
    b. Adjust FRAT items and scores

2. Determine future training. Meet with the training officer and determine how to best focus training efforts on those items consistently creating the highest risk to the organization. Also, change or cancel training that does not seem to be working.

3. Guide budget planning. Add an item to your next Safety Committee meeting agenda to decide how SMS data can be used to decide where to direct funding (or cease funding) for training, equipment, operational expenses, etc. in order to decrease risk.

4. Review your safety library and bulletin board, decide what materials need to be added in light of the performance information you have compiled.

5. Safety Program focus. SMS performance data should guide what your program will focus on, which risk controls will continue and which need to be changed, what components are working (hazard ID, audits, etc.) and what should be adjusted, etc.

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Phase 7: The 'Living' Program

Safety management is a tough job. It is difficult to get line level employees on board, and often more difficult to get management behind the program. About the time you get management and employees involved in the program, you manager is transferred out and you get new employees, none of which have ever heard of SMS. If they have heard of "risk management", they think it involves OSHA regulations, slips-trips-n-falls reports and reviews of on duty vehicle crashes. It is not an exact science and often the perceived subjective nature of the safety program's conclusions make it easy to discredit them, especially on the most important items which usually cost money, time and effort. Once you have a program set up, it takes continuous effort to keep it going.

Remember that it usually takes about a year, at minimum, to set up and get a new SMS off the ground. Even then you are only flying a few feet off the deck in ground effect. Be patient, diligent and dedicated. You are protecting the protectors and it is a worthy effort.

Safety in numbers:

The best advice I can offer any safety officer is: do not do it alone. There are groups of safety minded aviators that are happy to share ideas and help with the challenges you face. IHST, HAI, AOPA, FAASTeam...and most of all ALEA, are all here for you. Here are some of the tips, tricks and techniques that I have picked up over the years working as a safety officer and communicating with these groups. This is a list I plan on adding to periodically. Hopefully you will send me another item to be added here.

Justifying Just Culture:

Just Culture is critical, and difficult to get employees to believe in...and bosses to adhere to. The key is to codify it. Include a chart of some sort in the policy manual when you write the safety policy. Do not be shy about referring to it.

The second thing you need is a good example. As you start your program there will likely be serious (or perceived to be serious) issues that unit members have been arguing over, brooding about, or keeping to themselves for some time. Your SMS may have been initiated as a result of an incident. Whatever the case, find one that would normally carry the possibility of creating conflict between members, management, etc. It is also best to find one that is perceived to be a 'personal' problem (i.e. a problem with one person, or a couple people) and is not seen as the 'system' problem that is really is. This example will often be one that would lead to disciplinary action. Use this example to show how Just Culture is applied to avoid punishment (as long as it is not warranted, per the Just Culture chart) and also

uncover underlying issues affecting the whole unit so they can be addressed for everyone's safety. Slowly, people will begin to believe in it.

You may have problems getting management to believe in the system. First, show your manager that employees who are violating policy intentionally or acting recklessly will still be recommended for discipline by the SMS program. Also, use the example suggested above, or others (ask the group of safety officers I suggested you get involved with) and show two specific benefits:

1. Return on Investment – show the ROI for not only avoiding future incidents through uncovering 'system' problems instead of beating up one person, but also the cost of training a new person if the responsible party is removed from the program unnecessarily.
2. Effect on safety – Illustrate how Just Culture will increase employee involvement in the program, leading to better hazard identification, more effective risk control design, and increased employee adherence to policies and procedures. This will decrease costs and risk while increasing operational effectiveness.

Baby Steps:

Starting a Safety Management System will be a big change for your employees and managers. Do not try to do it all at once. Take your time and add components a bit at a time. Start with policy writing and hazard identification. A safety survey early on will give the employees a chance to be involved with the new SMS by telling the safety officer about all the safety concerns and complaints they have. It will make the new SMS about them, not you.

Use their input. Get permission from employees to publically give them credit for offering ideas or hazard information. Continue to give them credit as improvements are made.

Ask for feedback. "What do you all think of this…?" goes a long way in getting employee 'ownership' of the program. After asking, make changes when you can, and give credit to show that employee input does shape the SMS.

Get a success story. Pick a couple hazards that you feel you can easily address successfully. It should be something that you can get funding for easily, if it is needed at all. It should be something that a number of unit members have complained about. The risk control should not be something too controversial, leaving a bad taste in the mouths of employees. It should be one that is easy to track with numbers so your success story is verified by something more than your opinion that things are 'safer'.

Do not disregard employee input. Sometimes it is hard, because they may use the safety program to try and address issues that are not safety related (i.e. personal issues with other members, desire for higher pay, etc.). There are a couple tricks to addressing these issues:

1. Use a Risk Assessment Matrix. Most complaints or non-safety issues will score low. This allows you to respond to it objectively, but does not require you to take unnecessary action.
2. On Hazard ID forms, ask what the person reporting the hazard thinks the risk is (put the matrix right on the form) and what they think a suggested risk control should be.

Respect Employee Intelligence and Authority:

The SMS should not be seen as an instrument to remove the authority for employees to make important decisions. This is especially important for pilots, as pilot in command authority is not only important, but sacred. When employees feel that policy and procedures are making their decisions for them, they will tend to stop thinking through the decision and just apply the rule. That application of the rule may not be correct due to various reasons.

The SMS should be marketed as a means to help employees make those decisions better, not for them. It should offer tools, techniques and information. It should be seen as the result of the collective intellectual effort of the whole operation, not just one or two people.

Feedback:

Do not be shy about letting all employees know what is going on with the program. Performance information is key to getting employee buy-in. Let them know what is working, and how you know that. Post your hazard tracking log on the hazard board. Let them know what is not working, and that you are making changes according to that knowledge. Give credit where credit is due.

A final note:

Being right is not good enough. A risk control is only effective if people do it when they are supposed to. A hazard ID form is only good if people use it. An SMS is only beneficial if it actually lowers risk and helps your operation get business done. At times, you will come up with a great plan, and you will be right about it being a great idea...and nobody will do it. At that point you will have a simple choice, do you want

to be right, or be effective? The organization is not there to serve the SMS; the SMS is there to serve the organization.

Good luck. Your efforts will not go unnoticed by the fate of the world.

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