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ACKNOWLEDGMENT

Dedicated to Ronald and Mary Lamprey.

This thesis was not completed without the effort and support of family, colleagues, friends, and advisors.

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Lastly, I would like to thank my family. Your love and support through successes and failures is the greatest gift I could ask for.
Introduction

An organized and frequently revised safety program enables an organization producing a product or service to determine a realistic balance between occupational safety and the production or progress towards organizational goals. Because air transportation comes under such public scrutiny in the event of an accident or incident, something must be done to show the public what efforts are being undertaken to facilitate the safe and efficient flow of passengers and cargo around the world. In an attempt to create a systematic, logical way of creating this productivity/safety balance, governmental and non-governmental entities have been assembling best practices from safe industries around the globe. What all of these safe industries have in common is the adoption of a Safety Management System.

The use of Safety Management Systems (SMS) at airports will aid in these efforts by increasing the likelihood that airport operators will identify and correct safety hazards before they contribute to an aircraft accident or incident. A Safety Management System also provides a feedback loop to facilitate the continuous improvement of safety procedures. In 2005, the International Civil Aviation Organization (ICAO) amended their operating policies, requiring member states to have all certificated international airports adopt, create, and implement an SMS. The Federal Aviation Administration (FAA) adopted the same policies with specific guidelines provided in Advisory Circular (AC) 150/5200-37A.
This study was conducted at University Park Airport, located in State College, Pennsylvania. University Park Airport is owned and operated by the Pennsylvania State University. University Park Airport (UNV) has one 6700 foot long, 150 foot wide runway (6/24). The airport has an average of 111 aircraft operations per day, comprised of local general aviation and commercial aviation.

What is a Safety Management System? This question depends upon the organization or industry to which it is applied. Broadly, however, an SMS is made of four components: Safety Policy, Safety Risk Management, Safety Assurance, and Safety Promotion. The manual developed for this thesis addresses all four areas as well as how the different components interconnect. All of the responsibility and accountability for safety is addressed. The manual guides the development and objectives of the program as well as determining the duties for different members of the safety team.

The policy section identifies accountable executives and other team members at the airport as well as their roles for maintaining safe operations, regardless of department. The engagement of accountable executives and other team members will help to ensure that the program will continue to evolve and grow to serve the needs of the airport.

The Safety Risk Management section is the core of SMS. The Safety Risk Management (SRM) section collects information on hazards, identifies, and quantifies the associated risks through severity and likelihood, and determine what corrective action is required. A risk matrix was developed to rank and record the different risks at the airport for resolution, monitoring, and reporting. For the purpose of this manual, the SRM
process included seven phases. Phase One is a description of the system being assessed. Phase Two identifies reasonable hazards. Phase Three determines the risks associated with the hazards. Phase Four assesses and analyzes the risk. Phase Five treats the risk. Phase Six is the evaluation of the treatment. Phase Seven is a re-evaluation which restarts the process at Phase One. Worksheets were created in the manual to aid in the classification of severity and likelihood of different risks. The actions to be taken, and the time-frame for these actions to be taken are dependent upon the operator's discretion. The unique component of the SRM portion is the emphasis on proactive actions rather than reactive or corrective actions. Through data collection from airport stakeholders, the user is able to predict or correct hazards before they occur by means of trend analysis based on specific events, types of equipment, or time frame.

An important note on SRM: Safety Risk Management is not focused on negatives. In the trend analysis component, the airport operator was able to identify several items which contribute to the resiliency of the airport system as a whole. A Lessons Learned document was produced and disseminated to airport staff following the conclusion of the risk assessments conducted for 2014. Safety Risk Management is the bulk of the manual that was produced and includes several worksheets and provisions for reporting a variety of safety issues. While not implemented at the time of completion of this thesis, the management of University Park Airport is taking steps toward the implementation of an electronic system to monitor airport operations, security, and safety as a result of the SRM process.
The third component of SMS is Safety Assurance. This section defines the processes that monitor the performance in meeting the standards and objectives established by the safety team that contribute to continual safety improvement. At present, the Safety Assurance element is serving to ensure that SMS procedures and strategies are having their intended effect. At the next review of the SMS Manual, these procedures and strategies will be examined for their efficacy and validity as operating conditions at the airport may have changed. The most important part of Safety Assurance is the establishment of a self-inspection program. Whether comprehensive or simple, these audits produce documentation to determine the status of different areas of the SMS. In order to balance the workload, some inspections are spread out through different times of the year, often when they complement other tasks on the airfield. For example, pavement is inspected on a daily basis prior to flight operations beginning. During this time, airport operations staff may also take time to check the visual functions of lights and signs on the airport. Other inspections that are detailed in the Airport Certification Manual (ACM) are again emphasized in the SMS, and their frequency may be adapted based on the needs of University Park Airport. Annually, a formal safety audit is conducted to produce a formal written report containing any violations of standard as well as suggestions for improvement. These audits throughout the year can be used to conduct trend analysis, explained in the SRM section.

The fourth component of SMS is Safety Promotion. This section details communication and promotion activities as they relate to the safety of the airport. Items
may be added or removed from this section at the discretion of the Airport Director. Examples of such items include quarterly newsletters to staff and tenants, Federal Aviation Administration Safety Team (FAAST) seminars, an SMS webpage, or the distribution of SMS related brochures, posters, and training. Additionally, this final section includes other areas such as Emergency Preparedness and Response Training as well as training in Systems Safety. These and other training are provided at the beginning of employment and recur periodically through the year. While much of the SMS focuses on the airside of airport operations, Safety Promotion can contain provisions for safety awareness training to non-airport personnel including the airlines which service University Park Airport as well as other general aviation tenants. University Park Airport elected to not pursue this function with the airlines at present, but may choose to do so in the future. SMS evolves over time to meet the needs of the airport and its community, and how the overall goals of SMS are relevant to the daily operations of the airport.

The fifth and most easily identifiable component of a safe culture is a preoccupation with failure. Airport operators should be professionally paranoid when it comes to safety. Simple mistakes can have devastating consequences. Air France flight 4590 ended in a crash that killed 113 people. This crash was caused by one metal strip which fell from a Continental Airlines DC-10. The runway inspection required prior to the takeoff of the Concorde was not completed by the French authorities. Both are simple mistakes that if either had been prevented would have saved the lives of those 113 people. Even small airports should be concerned with this type of hazard. Professional
paranoia would dictate an extra or special inspection when an unexpected or unusual
aircraft is visiting the airport. A preoccupation with failure is an sensitivity to small
lapses in procedure as an indicator that something else may be wrong with the system. A
culture preoccupied with failure encourages the reporting of small errors and are wary to
reduce safety margins to temporarily increase production
Method

Research

The first phase of the SMS project was identifying what makes a safe culture. Past performance is not an indicator of safety. Even if it was, University Park Airport did not have a formal safety record retention program, with quantitative data readily available. Anecdotally, the airport staff could recall accidents such as slip and falls to aircraft incidents. With no firm grasp on what a safe culture is, it was necessary to research the quantifiable actions or attitudes that make an organization safe. The terms “safe” and “highly reliable” will be used interchangeably. Weick and Sutcliffe identify five critical areas that safe industries such as nuclear power plants and aircraft carriers have in common (Weick and Sutcliffe, 2001). These areas are deference to expertise, reluctance to simplify, resilience, sensitivity to operations and preoccupation with failure.

Deference to expertise is an important feature of a highly reliable organization because it cultivates a diversity of thoughts and ideas. In organizations with a rigid hierarchical structure this is difficult to achieve. “Errors at higher levels tend to pick up and combine with errors at lower levels, thereby making the resulting problem bigger, harder to comprehend, and more prone to escalation” (Weick and Sutcliffe, 2001, pg 16). The opposite mentality is applied in aircraft carrier operations. At any given time, any crew member on the flight deck of the carrier may halt the entire operation if they suspect something is wrong. Despite the fact that the Navy has a very structured and rigid chain of command, the expertise of a seaman or petty officer on the flight deck can supersede the rank of a captain or admiral. In an airport application, this deference to expertise would relate near identically. Any airport staff member, from the office clerk to the operations staff should have the ability to halt or question the safety of operations on the airfield. Additionally, in the event of an accident or incident, command and control should default to the person with the greatest ability to control or solve the problem at hand, regardless of their position in the hierarchy of the airport's administration.
Reluctance to simplify may seem counter-intuitive. Nuclear power stations and airports are complex systems. Both systems involve many crucial details that may be overlooked in an effort to make someone's job easier. There must be caution exercised in doing so. In coordinated activities, the reduction of one step or component of a job may have ramifications that the user may not see at his or her location in the process. Once again, maintaining diversity of thought and knowledge allows people to see the warning signs of upcoming hazards.

The third component of a highly reliable or safe culture is a commitment to resilience. While most managers and employees would like to believe that the other components would make an organization immune to failure, a truly safe or reliable organization acknowledges the mortality of its situation. Without the ability to recover from errors, an organization would fail. A safe organization is not an organization that is free from errors, but an organization that has the flexibility to recover from and improve processes following errors. Another way to describe resilience is the ability for an organization to learn. Mistakes are inevitable in complex systems. Something will be overlooked at some point, no matter how stringent the rules or how safe the culture. The individuals affected and the organization as a whole have to learn from these mistakes to better identify the warning signs that result in an accident or incident.

Sensitivity to operations is the fourth component of a safe culture. Sensitivity to operations is considered to be an organization's “ongoing concern with the unexpected” (Weick and Sutcliffe, 2001, pg 13). Following the events of September 11, 2001, the
United States as a whole became significantly more concerned with the unexpected. This is evidenced by the creation of the National Incident Management System (NIMS). NIMS was rolled out in March of 2004 as a way to coordinate all levels of government and nongovernmental organizations in incident response. Because it is near impossible to develop an appropriate response to every scenario, what NIMS endeavors to do is to develop a way for different responders to rely on the expertise of each other to handle an incident in the most effective way possible. NIMS components are built in to Safety Management Systems to provide for unexpected or outlandish contingencies.
Surveying and Assessment

To identify the current state of the safety culture at University Park Airport, the operations and office staff were observed in their roles without manipulation or control. No artificial conditions were created and daily work assignments were not changed from what would be considered normal. The assessment of the safety culture is a product of mixed methods. Both quantitative data from staff surveys and qualitative data from verbal histories of past accidents or incidents were used to guide the development of the manual. The manual and risk assessments specifically address points from the surveys as well as revised procedures resulting from past mistakes.

Qualitative Examples:

There are two stories of past accidents that lend credibility to the results of the qualitative survey. The first story, regarding the ability of the airport to restore normal operations following a gear-up landing demonstrates the resilience of the airport. The second story, involving the collision of a Gulfstream wing and a hangar door shows a lack of preoccupation with failure and a lack of reluctance to simplify. Both stories, told by different individuals of the airport provide a more simple method to visualize the results from the surveys that follow.

First, we examine the gear-up landing of a Beechcraft Bonanza on the airports on Runway 6/24, University Park’s only runway. On a normal day, a single pilot forgot to extend the landing gear on his airplane prior to touchdown. As a result, the plane impacted the runway and slid from the touchdown area to Taxiway Charlie, near the midpoint of the runway. The pilot walked away from the accident, but the airport was faced with the problem of removing the aircraft from the runway, inspecting the landing surface for damage, and returning the airport to normal operations. The airport had a plan and
the materials needed to execute it. The local towing company was contacted and the airport deployed its crash response trailer. The aircraft was lifted by the towing company's air bags on to cribbing from the response trailer. The aircraft mechanics were then able to extend the landing gear and tow the aircraft to the maintenance hangar where it was repaired.
This story demonstrates the airport's resilience. A disabled aircraft on the runway stops all takeoffs and landings. The airlines and their passengers would have flights delayed or canceled. Local general aviation aircraft would have to land at alternate airports instead of returning to their base. With the plans and resources in place, UNV was able to restore the airport to normal operations very quickly.

Another story illustrates the airport's deficiencies. On a busy Saturday evening, following a busy day of attending to football game traffic, a line service team member was tugging a Gulfstream 550 to a hangar for an overnight stay. While backing the aircraft in to the hangar, the wing of the aircraft struck the edge of the hangar door, smashing the winglet of the aircraft. The result was a smashed wing, a missed flight, and close to a million dollars in damages. The airport paid its full insurance deductible of $50,000, and their insurance covered the cost of another charter aircraft for the passengers and the repairs to the Gulfstream. There was also an intangible cost: the loss of that customer's confidence.

This situation could have been easily avoided. Had the employee been more reluctant to cut corners, or been more attentive to the need for extra caution, the event would have been avoided. The procedure necessary for backing a large aircraft in to the hangar was not followed completely. There were no other staff used to marshal the aircraft. Most importantly, the employee was not as concerned with the continuing success of that day at the airport.

The second story illustrates the airport's lack of reluctance to simplify, and the
lack of preoccupation with failure. After a very busy day at the airport, the employees should have been on higher alert because they were at the greatest risk for something to go wrong.

Survey Results:

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<tr>
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<th>Score</th>
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<tbody>
<tr>
<td>Deference to Expertise</td>
<td>17.4 / 24</td>
</tr>
<tr>
<td>Reluctance to Simplify</td>
<td>15.7 / 24</td>
</tr>
<tr>
<td>Resilience</td>
<td>17.4 / 21</td>
</tr>
<tr>
<td>Sensitivity to Operations</td>
<td>3.9 / 7</td>
</tr>
<tr>
<td>Preoccupation with Failure</td>
<td>14.1 / 21</td>
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Table 1

Table 1 is the consolidated survey results for all five areas identified above. All of the numbers are an average of the total score for each survey, with full results available in Tables 2 – 6. The surveys were composed of behavioral based questions adapted from the questions provided in Managing the Unexpected (Weick and Sutcliffe, 2001). The questions were answered on a scale of 1 to 3, with 1 being disagree, 2 being neither agree nor disagree, and 3 being agree. The exception is the Sensitivity to Operations survey which was a simple Agree or Disagree, with Agree being assigned a value of 1 and disagree a value of zero. The surveys were administered from May 24th to June 11th and were available online through a Google form.
Deference to Expertise

Table 2

University Park Airport benefits from a diverse group of employees in both age and background. In order to assess to what extent they feel that people are relied upon for their expertise, they were presented with behavioral based questions. The lowest
scoring question from this section was: “If something unexpected occurs, the most highly qualified person, regardless of their rank or position” (Table 2). To address this concern, the management of University Park Airport agreed to adopt a non-punitive reporting policy (Appendix A, Element 1.3) to encourage employees to intervene when the situation would dictate a required action. The adoption of a voluntary non-punitive policy fosters an environment that allows for the open reporting of safety concerns (Transportation Research Board, 2012, pg 32). Additionally, it is anticipated that the FAA will extend protection to the individuals making reports, using lesser or no enforcement actions depending upon the severity of the noncompliance with Federal Aviation Regulations.

The second lowest scores in Deference to Expertise were shared between “People take ownership of a problem until it is resolved” and “People respect the nature of one another's job activities” (Table 2). These two questions are also related. The ownership of a job may wholly depend on the nature of someone's job activities. At a small airport like University Park, most employees fill different roles on different days of the week. The operations staff perform line service duties, operate the front desk, and perform airfield maintenance. The office staff on the other hand is responsible for air service development, grant administration, and accounting. The manual provides the distinction between the two and defines the difference in duties between roles to alleviate this problem (Appendix A, Element 1.4).
Reluctance to Simplify:

<table>
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<tr>
<th>People take nothing for granted.</th>
<th>Questioning is encouraged.</th>
<th>People listen carefully; it is rare that someone's view is dismissed.</th>
<th>We appreciate skeptics.</th>
<th>People generally prolong their analysis to better understand the problem being considered.</th>
<th>People show a great deal of mutual respect for each other.</th>
<th>People at the airport feel free to bring up problems and tough issues.</th>
<th>When something unexpected happens, people are more concerned with listening and conducting a full analysis of the situation than advocating for their view.</th>
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Reluctance to Simplify. Average Score – 15.7. Standard Deviation – 8.72

Table 3
The same method was applied to assess the reluctance of the staff to simplify their tasks over the course of a day. So much of the SMS is dependent on a communication system that provides for the job security of whistle-blowers. This section again proved the need for a non-punitive reporting policy and the need for a system to report concerns. The lowest scoring questions for this survey were, “People listen carefully; it is rare that someone's view is dismissed,” “We appreciate skeptics,” and “People generally prolong their analysis to better understand the problem being considered” (Table 3). These results were communicated with the management. They admitted the guilt of being quick to dismiss the opinions of less experienced staff members due to a perceived lack of knowledge. This statement is underscored by the prolonged analysis question. If there is a way for the airport staff to report information anonymously it solves this problem in a two-pronged attack. Anonymous reporting eliminates the bias of the person reviewing the report based upon the reporter's age, experience, or role in the organization. Second, a reporting system with proper data retention also enables a prolonged analysis with data that can be tracked over a period of time. Element 2.4 in the requires the retention of data in order to “identify trends on functional and physical locations of the airport” (Appendix A, Element 2.4). The anonymous reporting component is not yet implemented at the airport at the time of writing due to Penn State University requirements for software acceptance and implementation. Implementation of a safety reporting software for the tracking or hazard data is expected to be completed in the near future, pending FAA final rulemaking and University Park Airport budget constraints.
The encouraging result from this survey was that “Questioning is encouraged” scored highly along with “People at the airport feel free to bring up problems and tough issues.” The transition from a safety culture which appreciates questioning and the raising of issues to a safety culture which appreciates skeptics and listens to all views is a small one. Over time, as staff members begin to see other staff members report hazards or incidents and remain in their positions, others will be encouraged to do the same. This also requires a continued commitment from the management of University Park Airport, Penn State University, and the FAA to provide these individuals with impunity when trying to correct known hazards.
Resilience:

<table>
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<tr>
<th>I was able to cope with an unexpected situation without the help of a manager.</th>
<th>I was/would be able to fill in for a colleague temporarily.</th>
<th>I consider a problem as a challenge.</th>
<th>I relied on my intuition when faced with a difficult situation.</th>
<th>I try to find alternative solutions to problems.</th>
<th>I achieved a good result through improvisation.</th>
<th>I have the information I need to cope with a complex or difficult situation</th>
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Resilience. Average Score – 17.4. Standard Deviation – 4.58

Table 4

Resilience was objectively the best score among the five surveys. The results illustrate that the staff is flexible, able to fill in for colleagues temporarily. They have a pool of knowledge they can draw from and have been able to cope with a situation without the help of a manager. The only score lacking in this section was “I have the
information I need to cope with a complex or difficult situation” (Table 4). Thankfully, information is one of the easiest problems to fix. The manual section devoted to training. Individuals will be trained in the safety management, emergency preparedness, airfield driving, snow removal driving, and apron safety (Appendix A, Element 4.5-5.1). Along with training in systems safety, employees will be better able to do their jobs every day while maintaining a necessary understanding of why they must be done.
Sensitivity to Operations:

<table>
<thead>
<tr>
<th>There is a daily presence of someone who is paying attention to what is happening and is readily available for consultation if something unexpected happens.</th>
<th>If a problem occurs, someone with authority to act is always available.</th>
<th>Supervisors regularly pitch in when needed.</th>
<th>On an average day, people talk to each other enough to understand the current situation at the airport.</th>
<th>People are familiar with operations apart from their own jobs.</th>
<th>People seek feedback about things that aren't going right.</th>
<th>Managers are mindful of employee workloads and can obtain additional resources if the workload starts to be excessive.</th>
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Table 5

Sensitivity to Operations is the only area surveyed that offered only two options, Agree or Disagree. As previously discussed, “Agree” is valued at 1 point and “Disagree” is valued at 0 points. There are two categories from this section that stand out as
deficient. The first, “Managers are mindful of employee workloads and can obtain additional resources if the workload starts to be excessive,” (Table 5) is indicative of a need for more management flexibility. In hindsight, this question should have been split into two questions. During the administration of the surveys, several staff members remarked that managers were mindful of their workloads, but were not able to obtain resources to alleviate an excess workload.

The unique situation at University Park Airport is the proximity of Penn State University, just four miles down the road. As the largest university in the state with a large alumni network and a love for football, home games can attract an enormous crowd and much higher than normal traffic at University Park Airport. While the airport management plans to have extra crew members on hand for these home games, the actual number of aircraft arriving is not known until the day of the event. To combat this unexpected demand, the airport calls upon its stakeholders. Volunteers from the local Civil Air Patrol squadron may assist with the parking of aircraft. Having volunteers on hand to perform simple tasks such as wing walking or escorting guests to and from aircraft, frees up the airport staff to perform the essential functions of line service: towing, fueling, and servicing the aircraft. While this is not specifically outlined in the manual, a different perspective offered as a result of the survey opened the eyes of management to an underutilized resource on the airfield: the Civil Air Patrol.
Preoccupation with Failure:

<table>
<thead>
<tr>
<th>We make it hard for people to hide any kind of mistakes.</th>
<th>We treat near misses and errors as information about the health of our system to try and learn from them.</th>
<th>We update procedures after experiencing a close call or near miss to incorporate new experience and understanding</th>
<th>People are inclined to report mistakes that have significant consequences even if nobody notices.</th>
<th>Managers seek out and report bad news.</th>
<th>People are rewarded if they spot problems, mistakes, errors, or failures.</th>
<th>People feel free to talk to superiors about problems.</th>
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Table 6

Preoccupation is a sort of professional paranoia that is institutionalized through training and processes. The lowest scores in this section cast doubt on the airport's ability to pick up on weak signals of an impending hazard. “We make it hard for people to hide any kind of mistakes” (Table 6) tied for the lowest score along with “People are rewarded
if they spot problems, mistakes, errors, or failures” (Table 6). These questions are compounded. If an employee could perceive a greater incentive to spot problems, mistakes, errors, or failures, then perhaps they would be more inclined to report them. If people were reporting these mistakes, errors or failures, then it would be harder for people to hide mistakes.

As a result, the manual created a safety award program. The safety award program may award an airport staff member, tenant, or based operator with an award for efforts such as a safe operational history or promoting safety on the airfield (Appendix A, Element 4.4). There is a difficulty in rewarding staff at the airport for their efforts. Due to the organization of labor at the airport, monetary incentives or rewards are not possible due to contract restrictions. What may be explored is preferential treatment, selecting staff members with safe histories and tendencies to attend regional conferences or training sessions, as this is considered to be a non-monetary reward.
Conclusion

The creation of an SMS manual will be a necessary step for most airports in the near future. What remains to be seen is the commitment from the FAA to this process and its support, both technologically and financially, for airports such as University Park endeavoring to improve their safety cultures. This type of assessment surveying, when repeated from year to year, will show the value of implementing a Safety Management System at a small airport. The final rulemaking and release of Advisory Circular 150/5200-37A will likely require changes to the manual created as a result of this study, but the staff and management at University Park Airport are equipped with the understanding required to change the manual to fit the new requirements.
References


University Park Airport

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### Management Commitment

Within Auxiliary & Business Services we recognize that people are our most important asset and their safety is our greatest responsibility. Safety and health are a key component to achieving operational excellence, and as such, are a core value of all of our operations. No job is so important that we cannot take the time to do it properly and complete it safely.

We are committed through management, leadership, and employee participation to:

- Creating and maintaining a safe and healthful workplace.
- Continuously improving our safety program and performance.
- Abiding by all applicable laws, regulations and University Policies.
- Integrating safety into our business planning, decision making, and daily activities.
- Providing resources and training along with continually communicating our safety policy to all employees and affected parties.
- Continuously measuring our progress and making adjustments where necessary.

Each of us plays a vital role in the completion of work in a safe manner. Employee recommendations to improve safety and health conditions are encouraged and all will be given thorough consideration by our safety committee. Our commitment is to foster and support a safety culture that identifies risks and proactively addresses those risks before they become injuries or accidents.

### Safety Culture Development

A safety culture will be attained through the adoption of the four components of SMS and their respective activities:

1. Safety Policy
2. Safety Risk Management
3. Safety Assurance
4. Safety Promotion
COMPONENT 1: SAFETY POLICY

Element 1.1: Safety Policy

1.1.1. The safety of airport personnel is of the utmost importance to University Park Airport. In order to maintain safety, it is necessary to have a robust safety policy in place.

1.2.2. Because of its evolving nature, certain events will trigger immediate review to determine potential amendments to SMS documentation

- The SMS documentation shall be immediately placed under review and updated where necessary when amendments are made to the Airport Certification Manual (ACM) in order to maintain consistency between the two documents.

- In the event of immediate safety concerns brought to the attention of the UNV Director or Safety Coordinator caused by hazardous situations leading to capital loss and/or personal injury and/or loss of life due to conditions such as:
  - incidents or accidents resulting from human error or otherwise
  - adverse weather conditions
  - construction activities
  - mechanical or electronic failures
  - other unusual conditions on the airport

Element 1.3: Non-Punitive Reporting Policy

1.3.1. UNV has adopted a non-punitive safety reporting policy. Therefore, University Park Airport and the Airport Director guarantee that punitive action will not be taken against any employee of the airport for identifying, reporting, and correcting hazards or associated with the University Park Airport. Personnel and tenants involved in the accidental or unintentional destruction of airport property are encouraged to report the extent of their damage to their immediate supervisors or airport officials without fear of punitive action. University Park Airport is primarily concerned with accidents being reported and hazards being identified— not punishing individuals.

1.3.2. However, personnel who participate in negligent, reckless, or illegal behavior will be held accountable. The Airport Director will take appropriate action against an employee who knowingly disguises or hides a known hazard from airport management and supervisors. Such employee actions will be considered a violation of the responsibility each member of the UNV team has for the safety of other team members, airport tenants, and airport facility users. This policy will go into effect 90 days after every employee receives initial safety training in accordance with this SMS.

Element 1.4: Roles, Responsibilities and Employee Involvement

1.4.1. All UNV employees and tenants have a shared responsibility to ensure the safety of personnel and airport property. These responsibilities include, but are not limited to, reporting safety hazards and concerns in an expedient manner, ensuring the safety of their immediate work environment, and complying with safety regulations and policies. All airport employees must be active participants in the airport safety process. Certain personnel will retain specific responsibilities as discussed in this section.
Director

Duties: Develop, implement and maintain a safety environment of the highest standard. Assure compliance with technical, licensing and certification requirements of all governing agencies including FAA, TSA, PennDOT, EPA, DEP, etc. Develop a positive attitude for safety in all employees and assure that all training requirements are met for aircraft fueling, aircraft rescue and firefighting, weather

Element 1.5: SMS Integration

1.5.1. The integration of the airport SMS will involve several activities, including:

- Employee awareness of the SMS via initial and recurrent training
- Development of safety related promotional materials
- Incorporation of SMS practices in employee evaluations
- Engagement of tenants and the airport community

Element 1.6: Safety Goals and Objectives

1.6.1. The Safety Coordinator will: 1) ensure the communication, training, and continuous improvement programs are in place; 2) track assessment metrics, generate reports, observe and analyze data, and make recommendations to the airport director for policy guidance; and 3) bring safety issues to the attention of the airport director. The objective of the University Park Airport administration is continuous improvement in safety. The administration will accomplish this by the following objectives:

- Refine and clarify responsibilities and accountabilities for safety
- Provide all individuals with tools for successful SMS implementation
- Meet or exceed all applicable regulations
- Provide clear lines of communication for all UNV employees
- Monitor progress towards specific safety targets
- Encourage participation among employees, tenants, and other stakeholders
- Promote safety as the airport’s number one priority

1.6.2. Safety goals and objectives will be communicated with employees upon hire and as new goals and objectives are declared. Safety goals and objectives will also be used in safety promotional items.

Element 1.7: Records Management

1.7.1. UNV Management is responsible for correct and current record keeping of all SMS related documentation, including but not limited to: training records, incident reports, safety reporting data and evaluations.

Element 1.8: Organizational Chart

See Appendix A
COMPONENT 2: RISK MANAGEMENT

Element 2.1: Safety Risk Management (SRM)

2.1.1. SRM is the systematic and comprehensive approach for managing safety risk.

the related operation or activity.

4. Assess and analyze the risk. In this phase, the airport personnel estimate the level of risk associated with the operation or activity by using the matrix (Figure 2-3). In order to assess the risk of the accident or incident occurring, severity and likelihood are determined first. Severity is determined by the worst, credible outcome. Less severe effects may be considered, but the most severe effects should be considered. Severity is to be considered in isolation from likelihood and vice versa.

Figure 2-1

<table>
<thead>
<tr>
<th>Criteria</th>
<th>No Safety Effect A</th>
<th>Minor B</th>
<th>Major C</th>
<th>Hazard D</th>
<th>Catastrophic E</th>
</tr>
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<tbody>
<tr>
<td>Effect on Aircraft Operations</td>
<td>No effect</td>
<td>Slight reduction in safety margin or functional capability</td>
<td>Significant reduction in safety margin or functional capability</td>
<td>Large reduction in safety margin or functional capability</td>
<td>Total loss of operation</td>
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<tr>
<td>Effect on people</td>
<td>Inconvenience</td>
<td>Physical discomfort</td>
<td>Physical distress, possibly including injuries</td>
<td>Serious or fatal injury to small number of people</td>
<td>At least one fatality</td>
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<td>Loss of public confidence</td>
<td>Slight to moderate impact</td>
<td>Moderate impact to reputation at community level</td>
<td>Significant impact to reputation at regional level</td>
<td>Significant impact to reputation at state level</td>
<td>Severe impact to reputation at national level</td>
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<td>Environmental Impact</td>
<td>Non-Reportable</td>
<td>Exemptable without fine</td>
<td>Physical damage and fine</td>
<td>Considerable damage to people/facilities/equipment</td>
<td>Loss of people/facilities/equipment</td>
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<td>Financial Loss</td>
<td>Slight damage less than $5000</td>
<td>Noticeable damage between $5,000 and $25,000</td>
<td>Large damage between $25,000 and $100,000</td>
<td>Major damage between $100,000 and $1,000,000</td>
<td>Severe damage exceeds $1,000,000</td>
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Determine the probability that the hazard will cause an accident or incident of the severity assessed previously (Figure 2-2). Probability may be determined quantitatively when historical data is available.

### Figure 2-2

<table>
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<th>Qualitative Definition</th>
<th>Meaning</th>
<th>Value</th>
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### Figure 2-4

**Risk Assessment Criteria**

<table>
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<tr>
<th>High Risk - Requires Risk Management Decision</th>
<th>Medium Risk - Requires Operational Review Before Activity is Performed</th>
<th>Low Risk - Proceed with Activity</th>
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</table>

Prioritized risk levels used in the matrix (Figure 2-3) can be defined as (Figure 2-4):

- **High Risk**: The proposal cannot be implemented or the activity continue unless hazards are mitigated to reduce the risk to a medium or low level. Mitigating controls must be approved by the airport director or airport safety coordinator before being implemented.

- **Medium Risk**: Minimum acceptable safety level; the activity may be implemented and activities may continue, but tracking and management of the process are required.

- **Low Risk**: Target level of risk; Acceptable without restriction or limitation; the identified hazards are not required to be actively managed, but are documented.

5: **Treat the risk.** In this phase, the airport director or airport safety coordinator consider what strategy or action should be employed to address the risk associated with the operation. The majority of risk management strategies address medium and high risk hazards. Low-risk hazards may be accepted after considering the risk involved.

The risk management activity should be identify feasible options to control or mitigate risk. Some options to be considered are:

- System modifications
- Physical guards or barriers
- Warning or alert signals
- Procedural or training modifications
- Airport personnel advisories

6: **Evaluate the solution.** In this phase, the decision made to mitigate the risk is evaluated with the information generated through the tracking and management process. This phase returns the process to the beginning in order to mitigate the most risks possible in a given window of time, budget, or personnel.
Element 2.2: Corrective and Preventative Actions

2.2.1 The airport safety coordinator will document and evaluate the effectiveness of corrective and preventative measures that were implemented as a result of a verbal or written hazard report. Corrective actions will be documented and monitored using self-reporting and monitoring software. The safety coordinator will provide a monthly report.

COMPONENT 3: SAFETY ASSURANCE

Element 3.1: Internal Safety Audits

3.1.1 Internal Safety Auditing and Inspection Program

3.1.1.1 The University Park Airport (UNV) Safety Auditing and Inspection Program surrounds the idea that waiting for an accident to happen and changing policies then is not productive. It is a better use of time to be proactive, rather than to be reactive. Identifying hazards before they create an accident is more productive and better to the bottom line for the airport and its users. The Safety Auditing and Inspection Program is the method for seeking, finding, and fixing hazards that can contribute to a potential accident.

3.1.1.2 Safety audit programs may be conducted by the airport staff or by externally hired or government agents. This section deals with the internal approach to completing the safety assurance component of the SMS. There are three types of safety audits that may be conducted:

- **Comprehensive Audits** are extensive inspections involving internal and external inspectors that cover the entire organization. These audits produce a formal written report.

- **Self audits** are informal periodic inspection accomplished by the airport staff. These inspection result in no report, but a completed checklist that will be filed.

- **Status audits** are sometimes called spot-inspections and are focused on compliance with specific rules for specific areas.

3.1.1.3 The UNV Safety Auditing and Inspection Program incorporates all of these audit types according to a schedule included in this Element. These audits are intended to evaluate weak points in UNV’s safety processes, procedures, and training.

3.1.1.4 Annual (Comprehensive) Safety Audits

3.1.1.4.1 Annual Safety Audits are accomplished during the spring of each calendar year during the first two weeks of April.

3.1.1.4.2 Annual Safety Audits will be led by safety coordinator and include the airport administration team, and representatives from PSU Environmental Health and Safety-related.

3.1.1.4.3 The Annual Safety Audit team will use the checklist guide in Appendix D as a basis for development of an audit guide for the inspection. This guide will be revised, as required, for each progressive annual audit.
3.1.1.4.4 The Annual Safety Audit will produce a formal written report which will be presented to UNV Manager who will present the findings and recommendations of the report to the Airport Director.

3.1.1.5 Self Audits

3.1.1.5.1.4 Several special inspections may be needed during winter storms until the airport is back to a normal operation. Ensure that all foreign objects have been picked up after snow and ice removal operations. Conduct a special sign inspection after snowstorms for signs that may have been damaged by plows or by snow blown by blowers.

3.1.1.5.1.5 Ensure that construction areas are barricaded and lighted properly. Construction equipment is parked in the pre-determined areas, construction FOD is removed and movement areas around construction sites are clearly marked and not confusing to pilots at night.

3.1.1.5.2 Continuous surveillance inspection. Those activities and facilities that have been identified to require continuous surveillance should be inspected any time personnel are in the air operations area. Hazardous conditions may occur at any time and develop rapidly.

3.1.1.5.3 Periodic condition inspection. Periodic condition inspection of activities and facilities can be conducted on a regularly scheduled basis but less frequent than daily. The time interval could be weekly, monthly, or quarterly, depending on the activity or facility.

3.1.1.5.4 Special inspections of activities and facilities should be conducted after receiving a hazard report or when an unusual or unusual event occurs on the airport, such as a significant meteorological event, or an accident/incident. Special inspections should also be conducted at the end of construction activity to ensure that there are no unsafe conditions present related to the construction activity. A special inspection should be conducted prior to construction personnel leaving the airport in an event that corrective actions are necessary. Special inspections should be documented on the appropriate portions of the regularly scheduled inspection checklist.

3.1.1.6 Status-audits

3.1.1.6.1 The Safety Status Audits are accomplished as required by UNV safety personnel

3.1.1.6.2 The Safety Status Audit inspectors will use a checklist created for the subject of the inspection by the inspector. Items for the checklist may be gleaned from the checklists used for self-inspections or annual inspections.
3.1.1.6.3. The Annual Safety Audit will produce a formal written report which will be presented to the UNV Director who will in turn present the findings and recommendations of the report to UNV stakeholders.

3.1.1.7 Processes, Procedures, Analysis, and Training Audits

3.1.1.7.1 The auditor will use a checklist created for the audit. The checklist should determine if the process, procedure, analysis system, or

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**Element 3.2: Airport Emergency Plan (AEP) Managerial Review**

3.2.1. The UNV Airport safety coordinator will direct the review of UNV's Airport Emergency Plan. This review should be incorporated as an assessment in each of the following areas:

- Direction and Control
- Communications
- Alert & Warning
- Emergency Public Information
- Protective Actions
- Law Enforcement
- Fire & Rescue
- Health & Medical
- Resource Management
- Operations & Maintenance
- Tenants
- Standard Operating Procedures
- Checklists

This review should be conducted annually or sooner when necessitated by changes in personnel, organization, or external factors that will affect the Airport Emergency Plan. Upon completion of the review, recommended changes should be reviewed and implemented as soon as possible.

---

**Element 3.3: Emergency Notification**

3.3.1. The following section contains emergency notification telephone lists for a variety of emergency situations that could occur on the airport property. These phone lists are based on the emergency scenarios outlined in the current UNV Airport Emergency Plan and reprinted here. The following appendices may be referenced:

- Appendix E: Emergency Notification Telephone Numbers
  - A directory of important numbers that may be accessed in addition to those listed in the AEP phone list

- Appendix F: Record of Calls
  - Call log to be used by the Airport Director's Office to ensure that certain phone contacts have been made or attempted

- Appendix G: Bomb Threat Information Sheet
  - This may be used to gain important information if a bomb threat is received by the Airport Director's Office
3.3.1.1 Aircraft Accidents

3.3.1.1.1 Response during ATCT hours of operations (0600-2200 local). Per the September 01, 2011, Letter of Agreement between the University Park FAA Contract Tower and University Park Airport Operations, follows.

3.3.1.1.1.1 ATCT will activate the Emergency Phone Circuit and identify...

3.4.2 Sheltering in Place

3.4.2.1.1 When directed, occupants of affected buildings will proceed to an interior room on the building ground level. Follow the directions of emergency responders and be prepared to leave when so directed.

3.4.2.2 Building Evacuation

3.4.2.2.1 When directed, occupants of affected buildings will leave through the nearest safe exit and proceed to the designated meeting area. The designated meeting area for each building is indicated in the Evacuation Plan for each building. Follow the directions of emergency responders. Do not re-enter a building until cleared to do so by the appropriate authority. Be prepared to evacuate the airport property if necessary.

3.4.2.3 Airport Evacuation: Depending on the nature of the incident, various routes may be used to evacuate the airport property. In all cases, evacuees will follow the instructions of emergency responders.

3.4.2.3.1 Airport Evacuation Scenario 1. Airport occupants will depart the airport via Fox Hill Road to the East, then Northbound on Rock Road. At least one officer should be deployed to the intersection of Fox Hill and Rock Road to facilitate traffic flow. Fox Hollow Road and Rock Road to the south will be reserved for emergency vehicles.

3.4.2.3.2 Airport Evacuation Scenario 2. Should a disaster require a triage center, the Aircraft Maintenance hanger will serve in this capacity. Airport occupants will depart the airport via Fox Hill Road to the East and Rock Road to the North. Fox Hollow Road and Rock Road to the south will be reserved for emergency vehicles.

3.4.2.3.3 Airport Evacuation Scenario 3. In the event of a disaster that renders the intersection of Rock Road and Fox Hill Road unusable, alternate plans will be implemented for the evacuation of the airport.

3.4.2.4 Notification of evacuation plans. Building evacuation floor plans will be posted prominently in each building. All persons employed on the airport will be advised to review the plan for the building(s) in which they operate. Other persons with a long term association with the airport (tenants, contractors, etc.) will also be advised of the plans for the building(s) in which they will operate.

3.4.3. This section pending PSU Environmental Health and Safety Evacuation Maps
3.4.4 Suggested verbiage for evacuation notices posted in buildings

- In the event of a fire:
  - Evacuate the building and proceed to the designated meeting area. If able, notify 911 and then the Airport Director's office at 814-865-4042. Follow the direction of emergency responders. Do not reenter the building until cleared to do so by the appropriate authority.

3.5.1.1.2 Record specific information

- Where did the incident occur?
- What are the events leading up to the incident?
- What were the conditions surrounding the incident?
- Draw a diagram or sketch of the scene.
- When did the incident occur?
- Were there any injuries?
- What/who was damaged/injured and to what extent?

3.5.1.1.3 Describe the Accident/Incident

- Who was primarily in control?
- Explain the accident sequence.

3.5.2 Corrective and Preventative Action

3.5.2.1 Prepare Investigation Reporter's

- Complete the Event Reporting Form – Appendix H
- Date the Report
- Return the investigation report to the safety coordinator

3.5.2.2 Determine Corrective Action

- What physical changes are necessary to mitigate the likelihood of this event occurring again?
- What policies or procedures require changes to mitigate the likelihood of this event occurring again?

3.5.2.3 Document the costs involved

- Labor and materials used for clean-up (straight time and overtime)
- Provide documentation of materials and services (invoices and justification.)
- Document other expenses incurred related to the loss from the date of the incident until conditions have been returned to normal.
COMPONENT 4: SAFETY PROMOTION

Element 4.1: Communication

4.1.1. Basic Promotion

4.3.3. The Airport Safety Committee discusses safety issues relevant to the airport. The airport safety manager will work with the airport director in the oversight of the committee. Each representative on the committee is responsible for the dissemination of information discussed in the Safety Committee meeting to his or her section or organization.

Element 4.4: Safety Award Program

4.4.1. In an effort to promote the safe operation of all tenants on the airfield, the airport administration may award a tenant or based operator an award for any of the following:

- Safe Operational History
- Promoting Safety on the Airfield
- Committing a Random Act of Safety
  - This can include, but is not limited to, picking up FOD or reporting inoperable airport equipment

Element 4.5: SMS Training

4.5.1. The airport director through the airport safety coordinator will provide for initial and recurring Safety Management System training. Recurring training will be provided within 9-15 months of the initial training and annually thereafter. Information for developing the training program may be found in AC 150/5200-37A. Both training programs will provide students information on the following topics.

4.5.1.1. Elements of a Safety Management System
  4.5.1.1.1. General
  4.5.1.1.2. Safety Policy
  4.5.1.1.3. Safety Risk Management
    4.5.1.1.3.1. General
    4.5.1.1.3.2. SRM Background Information
    4.5.1.1.3.3. The Six Phases of SRM
  4.5.1.1.4. Safety Assurance
  4.5.1.1.5. Safety Promotion
Element 4.6: Systems Safety Training

4.6.1. There are many elements of a safety program. Every safety program should begin with hazard identification, attempting to correct the hazard, and then sharing information about the hazard with anyone who might reasonably encounter it. Training falls into the final phase of the process. Every safety program should have a training element to be effective. Therefore, UNV will

4.6.4. Specific safety topics for training
- Airport Safety Policy
- Operations and maintenance standards
- The airport's safety record
- What constitutes a reportable accident, incident, hazard, or illness
- How to report accidents, incidents, hazards, or illnesses
- Accident response responsibilities
- Known airport hazards
- Hazardous materials handling
- The Safety Committees
- What to expect during safety inspections and audits and how they are reported
- Safety Awards Program
- Fire Extinguisher training (as applicable)
- Manager safety responsibilities and safe decision making.

4.6.5. Contractor Training

4.6.5.1. Any contractor doing business on the University Park Airport must receive training on their safety responsibilities while on airport property. Ensure contractors are familiar with applicable contents of AC 150/5370-2E, AC 90-07, AC 150/5210-5, AC 150/5340-1, AC 150/5340-18, and AC 150/5200-30

4.6.5.2. This training should be provided to contractor management in sufficient time that the contractor’s employees can be briefed prior to coming on airport property.

Element 4.7: Emergency Preparedness and Response (EPR) Training

4.7.1. The Airport Emergency Plan (AEP) has been approved by the airport director, and coordination has been accomplished with those individuals and agencies listed in the plan. If any emergency situation arises that is not covered by the AEP, the airport director has the authority to direct actions as he or she may deem necessary. The Airport Emergency Coordinator (AEC) shall be the airport director or his or her assigned designee, who shall exercise complete control during emergency or disaster conditions. In the event the airport director is unavailable, the most senior firefighter shall be designated AEC. During an emergency, the agencies/individuals listed within the plan will have responsibility to provide oversight for their respective organizations and/or their organization’s activities. The airport director is responsible for conducting an annual review of the emergency plan, involving all the agencies included in the AEP.
4.7.2. Emergency/Disaster Response

4.7.2.1. The airport director and/or his or her designated representative is responsible to notify agencies and individuals authorized to respond and mitigate the situation, and help in the rescue, evacuation, clean-up, restoration, directing, supporting, and ensuring the safety of airport personnel and other assets.

Element 4.9: Snow Removal Driver Training

Snow removal shall be conducted by authorized UNV personnel only. Those individuals operating snow removal vehicles on the AOA are required to successfully complete the SIA driver’s training program. Please contact the UNV driver training instructor for further information.

The UNV driver’s training program and the snow and ice removal program comply with AC 130/5210-20 and section 13 of AC 150/5200-18C.

Maintenance personnel shall be responsible for the safe condition of the airport during snow removal operations. Effective communication between personnel and the Tower is critical. The snow removal crew should remain vigilant while operating on the airfield.

4.9.1 Snow Removal Procedures: The snow removal crew shall:

- Obtain permission from the Tower to close and clear designated sections of the airfield
- Maintain contact with the Tower at all times while operating on movement areas
- Ensure that snow piles do not block drains, sewer covers, or drainage channels
- Ensure that snow piles do not block airfield signs and markings
- Clear areas around airfield signage to reduce risk of visual disorientation
- Be extra vigilant in the discovery of foreign objects on the airfield
- Issue friction readings obtained from the Dynamic Friction Tester
- Conduct a special sign inspection after snowstorms for signs that may have been damaged by plows or snow thrown by blowers
- Ensure taxiway and runway markings are still visible at or above the minimum standards
- Ensure taxiways and runways are free of surface damage caused by snow removal machinery
- Ensure no snow removal equipment has been left on the AOA
- Ensure drains and drainage channels are functioning and free of debris to permit proper drainage of snow and ice
- In case of a risk of severe icing exists, personnel shall commence clearing as soon as possible in order to prevent buildup

4.9.2 Incursion Prevention: The snow removal crew shall:

- Comply with vehicular requirements for vehicles as defined in the driver’s training program. Vehicles not in compliance will require an escort.
- Mark closed taxiways and runways as described in the Airport Certification Manual
- Remain clear of movement areas when possible
- Utilize service or access roads when possible
4.9.3 In the event of a declared emergency, the snow removal crew shall:
- Stand clear of all runways
- Remove all personnel, vehicles, and equipment from the runway
- Keep lights on all equipment illuminated to increase visual awareness of inbound aircraft

4.9.4 Incidents, accidents, and violations

3.0.6 Penn State home games often require a Temporary Flight Restriction. The flying public who may be visiting KUNV during this time should be made aware of the TFR on the various media available to the UNV management including but not limited to: Facebook, Reservation documents, AirNav website, and email blasts.

3.0.7 All personnel contracted for repair and maintenance work on the airport premises, not funded by a Federal or State grant shall be accompanied by airport personnel who shall be responsible for all the safety issues involving their contracted duties.

Element 5.1: Apron Safety

5.1.1 Currently, the Airport meets guidelines regarding apron safety for an airport. As part of the self-inspection reporting program required by FAR Part 139, apron areas should be inspected for pavement deficiencies, markings, and other general conditions as appropriate. However, with the implementation of the SMS program, the airport can enhance the safety environment of the apron areas by implementing a reporting system. This is accomplished by developing a safety culture that promotes using a reporting system; a non-punitive system to encourage reporting without fear of reprimand. Statistically, non-punitive reporting systems prove to be more effective than punitive systems.

5.1.2 Completely understanding the airport’s risks and hazards requires the best set of data on incidents as possible. The first step is to initiate this through the coordination of the stakeholders, tenants and airport staff through an SMS committee. It is recommended that a Working Committee be established. The Working Committee would include individuals who routinely work on the ramp, interacting with aircraft ground operations, and would include such representatives as Airport Operations, ground handlers, fueling agents, and airport maintenance.

5.1.3 Training that is appropriate for that area should include components such as vehicle and pedestrian activity around aircraft, safety equipment requirements such as reflective vests, and Foreign Object Debris (FOD) control. By identifying components to include in the safety training, hazards and risks would be identified. This should be a collaborative effort with the stakeholders and tenants at the airport. Tying these hazards or risks would help identify if specialized programs would be beneficial to the safety of the apron areas.
5.1.4 Every airport is unique in terms of the combined efforts of all operators on the airfield. As such, unique problems require unique solutions. Targeted training of ground handlers, ramp tenants and agents or any other individuals operating in the vicinity of aircraft on the apron areas is an important component of the Apron Safety plan, which even may be part of the SRM process. Airports in the United States have many parties involved in ground handling services. In the case of UNV, Delta Global Services (DGS) provides the ground handling to all three

**Element 5.2: Safety Inspection Training**

5.2.1 FAR Part 139 requires a certain level training of airport operations personnel. To integrate this training with the Airport's SMS program, it is important to emphasize the following:

- What an SMS program is, and the intent that it enhances safety, minimizes and helps to mitigate hazards and risks, and that it is a proactive program that promotes non-punitive self-reporting.

- Reiterate that it incorporates a policy on safety from management that will flow into the culture of the airport.

- Emphasize what SMS includes that is not covered by the training requirements associated with FAR Part 139.

- Identifying components that are unique to an SMS plan, such as a proactive culture and SRM modeling as it relates to risk mitigation.

- Emphasize how SMS implementation is different than the normal routine of self-inspections. Using self-reporting of incidents and hazards as the foundation for risk tracking, SMS emphasizes being proactive about safety from upper level management through all staff, by working outside formal regulations.

- Realize that the SMS plan will be a living document. It will improve with collaboration of tenants, airport employees, and other stakeholders; recognizing that this effort may be challenging until the plan is in place.

- Ensure that the overall SMS goals and safety policy are incorporated into the training program, recurrent training, collaboration with tenants that utilize SMS or a similar policy, and the development of safety training specific to job functions will enforce the effectiveness of the SMS program.
Element 5.3: Training Effectiveness

5.3.1 Several methods shall be used to gauge effectiveness of training:

- Direct observation of safe behavior and adoption of safe practices
Appendix B SRM Worksheet

1. Describe the activity or operations.

Appendix C SRM Example

Snow Removal Assessment
Snow Removal is an important part of airport operations. Runways must be maintained in accordance with AC 150-5200/30C. “Snow, ice, and slush should be removed as expeditiously as possible. The goal is to maintain runways, high speed turnoffs, and taxiways in a ‘no worse than wet’ condition.”

Prolonged snow events or snow events in rapid succession can diminish the airport’s ability to fulfill this promise due to equipment maintenance and crew fatigue.

Snow Removal is the least risky among the three areas investigated this year. Years of practice have contributed to a better understanding of how the airport operates during periods of inclement weather and as such, the risk levels are considerably lower. During snow removal operations we can expect a slight reduction in safety margin or functional capabilities. During a “perfect storm” scenario, Priority 1 surfaces can be cleared in under the one hour target.
Snow Removal Changes

There are not sweeping changes to be made to the Snow Removal Plan. It serves the airport well in its current state. The following reinforcements are suggested.

Education

Appendix D  Safety Management System Audit Checklist

1. Management Support
   a. Are UNV supervisors and managers visibly involved in supporting the SMS? How?
   b. Does the UNV Safety Coordinator have direct access to management? At what level?
   c. Does the UNV Safety Coordinator regularly attend operational meetings, construction meetings, and planning meetings?

2. Program
   a. Is there a written statement of policy on aviation safety?
   b. Is the SMS reviewed regularly? Has it been distributed? Does anyone know what it contains?
   c. Is there a pre-accident plan? Has it been reviewed and exercised? Is it current?

3. Safety Training
   a. What training is provided to SMS managers?
   b. What safety training is provided to other personnel? How is it documented?
   c. Who has not received training?
   d. Is training provided to those specified in the safety program?

4. SMS Safety Inspection Program
   a. Does an inspection program exist?
   b. Who conducts the inspections?
   c. Are the inspection reports valid? Who acts on them?
   d. Has anything changed as a result of the inspections?
   e. Is there a system in place for follow-ups?

5. Investigations
   a. Are incidents and accidents investigated? By whom?
   b. What is the quality and depth of the investigation
   c. Has anything changed as a result of the investigation?
   d. Who reviews the investigation reports?

6. Hazard Reporting Program
   a. Does a hazard reporting program exist?
   b. Do people use it? How many recent reports are there?
   c. How are reports processed?
   d. Is there feedback provided to reporters?
   e. Who reviews reports?
   f. Who reviews changes generated by the reports?

7. Distribution of Safety Information
   a. How is safety information distributed?
   b. Are there new parties at the airport that would benefit from receiving the information?
8. Airport Safety Committee
   a. Is there an airport safety committee?
      a.i. How often does it meet?
      a.ii. Who chairs it?
      a.iii. Does it have an agenda and keep minutes?
   b. Is it effective?

Appendix E  Emergency Notification Telephone Numbers

1. Airport Personnel

   Bryan Rodgers, Airport Director
   Office: (814) 865-4042
   Cell:

   Ed Foster, Associate Airport Director
   Office: (814) 865-4042
   Cell: (814) 374-0023
   Home: (814) 355-8008

   Brad Eshle, Assistant Airport Director
   Office: (814) 865-4042
   Cell: (814) 777-7891
   Home: (814) 247-8248

2. Centre County Airport Authority
   Jim Meyer, Director
   Office: (814) 237-2011

3. Air Traffic Control
   Tower Cab. (814) 865-1941
   Scott Timko, Tower manager: 865-1215

4. Penn State Contacts
   PSU Public Information Office: (814) 865-7517

5. Local Emergency Services

   PSU EMS
   (814) 865-3772
   Bellefonte EMS
   (814) 355-2907
   Centre Life:
   (814) 237-8163
   Mc. Nittany Medical Center (ALS)
   (814) 231-7000

   PA State Police (Rockview)
   (814) 355-8943
   Terminal Sheriff’s Office
   (814) 494-5710
   Centre County Emergency Management
   (814) 355-0546

6. Local Hospitals

   Mt. Nittany Medical Center
   (814) 231-7000
   Altoona Regional Health System
   (814) 839-2153
   Geisinger Medical Center
   (570) 271-6311
   Lewistown Hospital
   (717) 248-5411
7. Federal Agencies

<table>
<thead>
<tr>
<th>Agency</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBI (State College)</td>
<td>(814) 234-6341</td>
</tr>
<tr>
<td>TSA Federal Security Director</td>
<td>(717) 404-7565</td>
</tr>
<tr>
<td>TSA Watch Center</td>
<td>(202) 493-5102</td>
</tr>
</tbody>
</table>

Appendix F

Record of Calls

Date:___________

Airport Director’s Office notified of situation at ________________ a.m./p.m.

<table>
<thead>
<tr>
<th>Time of Contact</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centre County Emergency Services - 911</td>
<td></td>
</tr>
<tr>
<td>Air Traffic Control Tower</td>
<td></td>
</tr>
<tr>
<td>PA State Police</td>
<td></td>
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<tr>
<td>Federal Bureau of Investigation</td>
<td></td>
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<tr>
<td>FAA Flight Standards District Office</td>
<td></td>
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<tr>
<td>National Transportation Safety Board</td>
<td></td>
</tr>
<tr>
<td>Transportation Safety Administration</td>
<td></td>
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<tr>
<td>Mount Nittany Medical Center</td>
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Appendix G  Bomb Threat Information Sheet

Adapted from the Penn State Emergency Management guide

**Person Receiving Bomb Threat:**

*Obtain as much information from the person making the threat as possible*

- When is the bomb going to explode? _________________________________
- Where is it right now? _________________________________

Appendix I  Glossary

**Acceptable level of risk** – risk that has been reduced to a level that can be endured by the organization having regard to its legal obligations and its own safety policy.

**Accident** – An unplanned event or series of events that results in death, injury or damage to, or loss of, equipment or property.

**Airport Director/Accountable Executive** – A single, identifiable person within the organization who will assume full accountability of the SMS; the Accountable Executive must have adequate control over financial and human resources to respond to organizational safety needs.

**Apron (Ramp)** – means an area on an airport prepared for the purpose of providing aircraft with parking space for the embarkation and disembarkation of passengers, the loading or unloading of mail or cargo, refueling or undergoing maintenance.

**Audit** – Formal reviews and verifications to evaluate conformity with policy, standards and contractual requirements; Can be an internal audit, when conducted by, or on behalf of, the organization being audited, or external audit, when conducted by an entry outside of the organization being audited.

**Aviation Safety** – Safety of activities and processes directly related to the performance of aircraft and flying and servicing personnel.

**Corrective Action** – Action to eliminate or mitigate the cause or reduce the effects of a detected nonconformity or other undesirable situation.

**Corrective Action Plan (CAP)** – an action plan to of one or more activities, procedures or equipment that will be utilized and applied to mitigate an identified risk. The CAP identifies a responsible person, a timeline for completion and a timeline for follow up review for effectiveness.

**Gap Analysis** – Identification of existing safety components, compared to SMS program requirements. Gap analysis provides an operator an initial SMS development plan and a roadmap for compliance.

**Hazard** – Any existing or potential condition that can lead to injury, illness or death to people; damage to or loss of a system, equipment or property; or damage to the environment. A hazard is a condition that is a prerequisite to an accident or incident.

**Incident** – An event that had the potential to lead to an accident.

**Likelihood** – The estimated probability or frequency, in quantitative or qualitative terms, of a hazard’s effect.

**Maintenance** – means all work done in accordance with manufacturer’s recommendations and approved maintenance schedules and includes inspection, adjustments, replacements, rectification, repair, modification, overhaul, and manufacturing.
Oversight – A function that ensures the effective promulgation and implementation of safety standards, requirements, regulations and associated procedures. Safety oversight also ensures that the acceptable level of safety risk is not exceeded in the air transportation system.

Quality Assurance – means all those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy given requirements for safety and quality.

Safety risk control – A characteristic of a system that reduces safety risk (i.e., either or both the risk of an event and its severity). Controls may include process design, equipment modification, work procedures, training or protective devices. Safety risk controls must be written in requirements language, measurable, and monitored to ensure effectiveness.

Safety Risk Management (SRM) – A formal process within the SMS composed of describing the system, identifying the hazards, assessing the risk, analyzing the risk, and controlling the risk. The SRM process is embedded in the operational system; is not a separate/distinct process.

Self-Assessment Plan – A formal, management-approved document that describes an airport operator’s self-assessment activities and how often they occur; provides a schedule for completing the assessments; and identifies the reports to be generated.

Serious Incident – an incident involving circumstances indicating that an accident nearly occurred.

Serious Injury – an injury which is sustained by a person in an accident and which: (1) requires hospitalization; (2) results in a fracture of any bone; (3) involves lacerations which cause severe hemorrhage, nerve, muscle or tendon damage; (4) involves injury to any internal organ; (5) involves second or third degree burns on more than 5% of the body; (6) involves harmful exposure to radiation.

Severity – The consequence or impact of a hazard in terms of degree of loss or harm.

SMS Output – The result or product of an SMS process; in this context, it is the result of a process, which is intended to meet a requirement described in this Manual (e.g., results of safety risk analyses, safety audits, safety investigations, and trend analysis of safety performance indicators).

System(s) – An integrated set of elements that are combined in an operational or support environment to accomplish a defined objective. These elements include people, hardware, software, firmware, information, procedures, facilities, services and other support facets.

Standard Operating Procedure (SOP) – a procedure usually followed when carrying out an operation or dealing with a situation.