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THE IMPORTANCE AND PRACTICABILITY OF THE OPERATIONAL RISK MANAGEMENT IN THE MILITARY FLIGHT LINE

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Abstract:
In this study I've tried to emphasis the significance and aplicability of the ORM in the RO Air Force flight line.Using the ORM theory (purpose, goals, principles and steps of the process) I explained how that process is implemented in romanian military aviation. To undestand the practicability of the process I have been presented the main cathegory of mishap that could appear in flight or in the flight line emphasize on how we implemented the diminution or removing measures. I presented the responsabilities of Air Force staff at all level of command, tools used for implementation and also the conclusion.

1. Introduction

All ROU Air Force missions, operations or daily training implies risks. All actions, both on- and off-duty, require decisions that include risk assessment as well as risk management. Each commander and supervisor, along with every subordinate, is responsible for identifying potential risks and adjusting or compensating appropriately. Risk decisions must be made at a level of responsibility that corresponds to the degree of risk, taking into consideration the significance of the mission and the timeliness of the required decision. Risk should be identified using the same disciplined, organized, and logical thought processes that govern all other aspects of military endeavors. The ROU Air Force aim is to increase mission success while reducing the risk to personnel and resources to the lowest practical level in both on- and off-duty environments.

2. The Operational Risk Management definition, purpose and scope

2.1. Definition

Operational Risk Management is a decision-making process to systematically evaluate possible courses of action, identify risks and benefits, and determine the best course of action for any given situation.[1]

2.2. Purpose

The main purpose of the ORM in the military flight line, for an individual or section, is to accomplish their missions no matter whether it is doing maintenance on the aircrafts, is loading aircrafts weapon or is flying a helicopter, jet or turboprop airplane for training or combat. The ORM has a very useful tools and techniques which allows wing commanders and subordinates to obtain more substantial results in combat or in daily

[1]AFI 90-901, Page 1, Section A

training overcome the traditional methods utilized to mission accomplishment who are usually empirical.

1.3. Scope

"Everyone" (commanders, maintainers, pilots, logistic assurance personnel), to reduce all assumed risk by applying a methodic and appropriate process could use the ORM. In addition, the risk management could be applied to **"everywhere"** in the military flight line (runway, aprons, taxiways) or in immediate vicinity of them.

3. GOALS OF OPERATIONAL RISK MANAGEMENT

The ultimate objective of any organization within the ROU Air Force is to maximize the combat capability. The most important element of this objective is to protect the personnel and to conserve combats weapon systems and their support equipment. Preventing mishaps and reducing losses is an important aspect of conserving these resources. Like is state in AFI 90-901, *Operational Risk Management*, gives four goals. That aims have applicability in ROU Air Force too.

3.1. Enhance mission effectiveness at all levels, while preserving assets and safeguarding health and welfare.

In RO Air Force that is in my opinion the ultimate goal but in the following order: life of the pilot's or other personnel have the higher priority after that the preservations of the main assets (aircrafts or other equipment used in flight line).

3.2.Integrate ORM into mission processes, ensuring decisions are based upon assessments of risk integral to the activity and mission.

In this matter there were few steps implemented by the Safety Officer (SO) at wing level. SO identify the main risks that could appear in the flight line and brief daily the appropriate personnel.

3.3.Create an Air Force in which every leader, airman, and employee is trained and motivated to manage risk in all their on- and off-duty activities.

That statement has applicability in RO Air Force because all pilots, maintainers or logistic assurance personnel from the flight line are trained in their field and everyone takes appropriate measure to diminish risks and to enforce the flight safety.

3.4.Identify opportunities to increase Air Force war fighting effectiveness on the battlefield and in the operational aerospace environment, helping to ensure decisive victory in any future conflict at the least possible cost.

Unfortunately, that goal could be reached only by the states that have very valuable assets in terms of mission capabilities. ROU Air Force has to improve his air combat fleet in order to achieve that goal. For instance, the F-16 has a Terrain Fallowing Radar (TFR) pod who allows pilot flying at very low altitude, out of radars range, using autopilot too. In this case the threat raise by the low level flight and enemy radars was considerable diminished by the techological development of the asset.

Risk management contributes to mishap prevention and therefore to combat capability by minimizing risks due to hazards consistent with other cost, schedule, and mission requirements. Beyond reducing losses, risk management also provides a logical process to identify and exploit opportunities that provide the greatest return on our investment of time, money and personnel.

4. OPERATIONAL RISK MANAGEMENT PRINCIPLES

Every process has to have principles that govern him. Those principles perform guidance within decision-making process. Operational Risk Management is no different. There are four principles that govern all actions attached to the management of risk. All these principles if we refer to the timeframe of the task or operation could be applied before, during or after each action.

The four principles, well known in the ORM theory are as fallow:

4.1. Accept No Unnecessary Risk.

This principle has to be interpreted that you could take a decision to assume the risk that could endanger in some way the safety of the assets (aircrafts) or personnel (pilots, airman) but you still reach the mission accomplishment as well. For example F-16 has MESL (Mission Essential Subsystems List) where is state that you could use specific weapon system (e.g. bombs) in order to accomplish specific task even other subsystems of the weapon system (e.g. missile) are out of order or not present. In this case, the safety of flight is not endangered, the aircraft could fly and the pilots are able to hit the enemy using bombs but the risk exists in case of the air-to-air attack. In the RO Air Force is written in the "Maintenance regulation L 11-2" that we could use in flight an aircraft with minor discrepancies if those not put in danger the safety of flight. Unfortunately the MESL`s for each type of RO military aircrafts are on going. This principle applies to the RO carrier aircraft in Otopeni Air Base. The commanders have to make the best choice in taking a decision putting in balance the results obtained while the assets, pilots or airman's are exposed to an acceptable risk.

4.2. Make Risk Decisions At The Appropriate Level.

Taking decision at a particular level allowed us to account the risks and establish the responsibility zone for every chain of command. The successful or unsuccessful of the mission is accountable too. This way of thinking, to delegate responsibility to specific decisional factor, allows decision-making process to be very smoothly and agile. Who knows better the field situation or the particularity of the mission or operation? The answer is my opinion: the commander of the unit, section or the person in charge.Related to this aproch, in the flight line, the final decision if an aircraft will fly or not is taken by the Fligt Director (a pilot with experience) appointed by the commander of the unit, using imputs from the tower, maintenance, logistic assurance or other source direct connected to the flight. If we are speaking about maintenance, the person in charge to make decision, that an aircraft could fly or not without putting in danger the safety of flight ,is the Logistic Director (has to be an aviation engineer with a very good professional background), appointed by the Chief of Logistic who receive information about the aicraft "healty" from the maintenance chief of flight section.

4.3. Accept Risk When Benefits Outweigh The Costs.

The acceptation of this statement is to take in balance what we gain and what we could loose if we accept a risk. Even a high-risk appears commanders or supervisor could assume that risk if the benefits or opportunities are better than the added costs. In the RO Air Force maintenance field, the "Maintenance regulation L 11-2" allowed flying an aircraft to the overhaul with one or more parts out of service if that not endanger the flight safety. The level of decision in this case is to RO AF Logistic Division. I put in place this example to emphasize relation between benefits and costs because it cost more to replace the bad spare parts with good one in comparison to send the aircraft and bad parts to refurbish.

4.4. Integrate ORM Into Operations And Planning At All Levels.

Integration of the risk management in the operation and planning will confer in my opinion the best manner to conduct a mission. The risk assessments actions for an operation add value to mission accomplishment. The assessment of the risk has to be a normal *way of conducting a mission, not an add-on process performed by people not otherwise involved*[2].

5. OPERATIONAL RISK MANAGEMENT SIX-STEP PROGRAM

Like every process, the ORM has steps that have to be followed in order to achieve the purpose and goals of risk management. ORM is a systematic decision-making process that is consisting of six steps. If we take into considaration the nature and pressure of the situation, these steps have to be fallowed in a split-second manner as the pilots are flying a jet.The six ORM steps are described in fact in *AFPAM 90-902, Operational Risk Management (ORM) Guidelines and Tools* and those explanations are fitted to RO Air Force flight line missions too. The ORM process is a cyclic one and have to have feed-back to regulate the system in a proper way.

The ORM six steps used in theory, but very strong related to practice, presented in Fig.1 are:

1.Identify the Hazard.

This step in my opinion is the most important stair of the ORM process, dealing with appropriate hazard identification technique. The easiest technique that could be used is to ask "What if?" questions. In this case we could create scenarios in which a danger may occur. E.g. "What if the power supply generator goes down?", "Could the aircraft accomplish the mission using the back up supply system or have to land immediately?". This step is specific all level of command and is based on observation of the entire flight line activity. The hazard occurred in the flight line could be real or potential. Both cases involves appropriate measure.

2.Assess the Risk

Measuring the risk should give to the flight line supervisors the image about the immediate or potential danger of an activity or mission. The exposure to a hazard has to be measured both quantitative and qualitative.

3.Analyze Risk Control Measures

Step number three is dealing with appraisal of particular strategies and controls that diminish or eliminate risk. The risk that could appear in the flight line has to be analyzed by Safety Officer first if the risk involves the security of the pilots or by the maintenance officers if the risk endangers aircrafts or the healt and wellfare of mainteiners. Three risk components have to be taken into consideration: probability, severity and exposure. We could use in this case the risk matrix.

4. Make Control Decisions

In an RO Air Force base, every month representative personnel direct related to the flight line have a scheduled meeting where they analyze the risks appeared in that month that could affect safety of flight. After risk analyze and weighting benefits and opportunities against costs, the committee take the appropriate decision to control the menace. In case of immediate actions the meeting takes place unscheduled.

5. Implement Risk Controls

After the control procedure have been selected we have to put it in practice in order to diminish or eliminate all risk appeared in the flight line.

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[2] AFI 90-901, Page 2, para 3.4.

6.Supervise and Review

This step implies the leader supervisions throughout the risk control implementation. Commanders or representative have to assure themselves the measures taken was putted in place proper and timely.

They should decide if it needed to make corrections to the previous stages of ORM to ensure effectiveness and supportiveness of the mission or activity. The process has to be periodically evaluated.

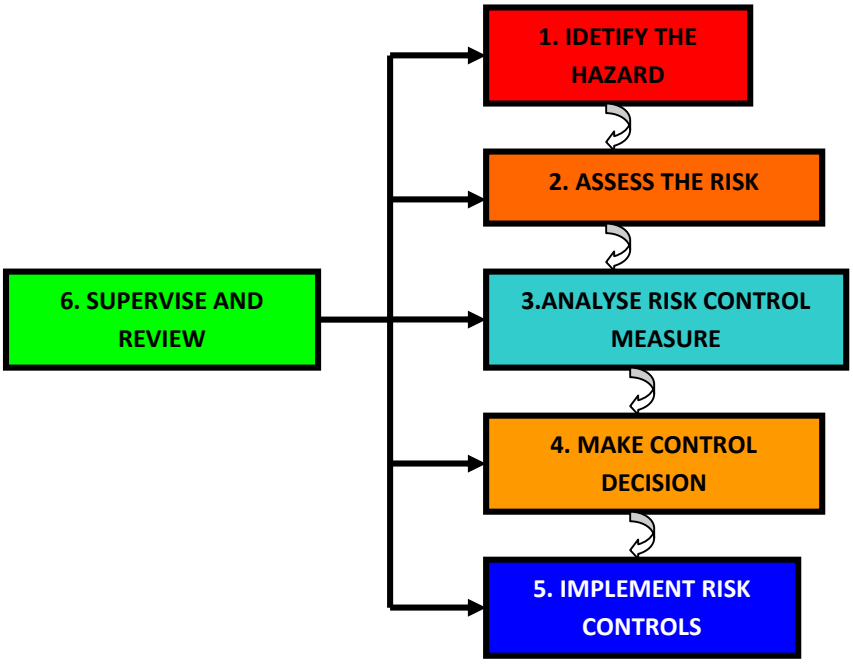

Figure 1, The ORM Six-step Process

6. TYPE OF FLIGHT LINE HAZARDS, RESPONSABILITIES AND MEASURES

6.1.Air hazard

-*Mid air collision of the aircrafts*: The responsibility to avoid this type of risk goes to Air Traffic Control Operation Officers that should be aware to air traffic nearby to the base runway. They have to have proper schedule for take-off or landing of the assets. Pilots should be provided with appropriate maps showing the on-base routes.

-*Severe weather conditions* (rain, blizzard, snow, powerful wind, high temperature, fog): Meteorologist officer have to predict the weather and brief daily the commander about the severity and future evolution of this type of hazard. Air base commander is responsible in approval or not the flight. In day-by-day operations if the weather condition became worse in some areas the aircraft commander that is flying on that route have to inform immediately the ACT and Flight Director about the danger using communication equipment. In that case all pilots who are flying have to be warned.

-*Aircraft in-flight emergencies* : Flight Director or commander of the aircraft judge the severity of the danger and they decide if the mission could continue or not. The aircraft with in-flight emergencies has maximum priority for landing.

-*Bird aircraft strike hazard*: Base Safety Officer is in charged to manage the BASH program. In day-by-day operations responsibility goes to Duty Meteorologist Officer and birds hunters like is states in ROU Air Force regulations FAv -1.

6.2.Ground hazard

-*Aircraft ground operation* (engine run, refueling or defueling the aircraft, towing, taxiing the aircraft with engine run): The entire responsibility and management of the operations belongs to Logistic Director.

-*Movement of flight line vehicle or emergency-response auto vehicle* (towing vehicle, fuel vehicle, firefighting vehicle, ambulance, crash and rescue vehicle):The Chief Auto Means is direct responsible to manage the safety vehicle movement in the entire flight line.

-*Movement of personnel in the flight line*: This is the Force Protection responsability at the ingate and outgate of the flight line.

-*Foreign object*: All personell from the fligt line are responsible with.The SOF is in charge to manage the FOD (Foreign Object Damage) program.

-*Dropt object*: All personell from the fligt line are responsible with.The SOF is in charge to manage the DOP (Dropt Object Program).

6.3.Weapon hazard

The biggest danger into the flight line for the aircrafts and personnel are the aicrafts weapon itself. To reduse the eventual personnel casualties or assets damage when the mainteners are loading, unloading a weapon (bombs, missile or rockets) or sign off a weapon system discrepancies, the place where the jets are armed should be diffrent than the flight line production. To avoid the number of casualities or damage in that area in case of improper use of ammo or a malfunction of weapon system, only the appropriate personell (mainteiners, pilot's or auxiliary personell) and specific number of the aircrafts have permission to stay.To avoid hazard if a missile, gun bulet or rocket were released accidentaly all aircraft from the weapon loading zone have to have the nose oriented to less or whithout any obstacle (e.g. buildings, equipment, pesonnel).All this safety measures are putting togedher in a ORM plan called Risk File. In the ROU Air Force that kind of actities was very well implemented after an catastrophic accident who take place in Craiova Air Base at 9 July 1997 when a bomb, that was for the first time tested, exploded accidentaly. In that accident were 18 casualties consist of 16 deads and 2 hard injury.

7. ROU AIR FORCE RISK MANAGEMENT IMPLEMENTATION

7.1.Roles and Responsibilities

7.1.1. Air Force HQ

The Air Force HQ Safety Office is the ultimate responsible section that account and track all hazard appeared in the ROU military flight line. This office is in charge to issue directives, plans and orders direct related to safety of flight or safety of personnel in the flight line. They provides also command level training (scheduled meetings) and guidance for field trening.This office supervise, controls and regulates the implementation and sustenament of the ORM program in the ROU Air Force.

7.2.2. Air Base

Safety Officer

At the unit level the focal point in this matter is Unit Safety Office.The chief of this unit is a pilot who has a colonel rank. He has responsability to account and track all events direct related to the safety of flight. He brief daily the commander of the Air Base about the flight or ground event or what it could be happen "If" an specific hazard apear and also

present measure and posible way to avoid or eliminate the mishap. He brief daily, when a flight was scheduled, all personnel who will partipate to sorties generation into the flight line.

Commander

Since ORM is not a "one-size-fits-all" program, commanders must tailor ORM application and techniques to accommodate the unique mission needs of their organization. In addition, they develop and maintain ORM implementation and sustain plans for their organization that direct the integration of ORM into all operational decision-making processes.

7.2. Tools for Implementation

The first line commanders have a great opportunity as well as the responsibility to pass on ORM to the troops. In order to do this they have many tools at their disposal. Some are for imparting and some are for documenting but all are valuable in implementing their ORM plan. Although not an exhaustive list, a few of them are listed below:

1. Safety briefings and directives
2. OJT (on-job-training) programs
3. Employees safety records
4. Material Safety Data Sheets (MSDS)
5. Technical Safety Data
6. Safety Orders
7. Other units/Subject matter experts (Safety, Bioenvironmental Engineering)

8. Conclusion

The fundamental goal of risk management is to enhance mission effectiveness at all levels while preserving assets and safeguarding health and welfare. Starting to that statement the ORM is appropriate techniques that guide us to obtain the best results with less costs and losses.

The assessment of the risk has to be a normal *way of conducting a mission, not an add-on process performed by people not otherwise involved*[3].

The ORM principles and the steps of that process are well implemented in ROU Air Force but from my point of view, we need to create database with lesson learned and risk case scenarios. To create this database we have to motivate the all flight line personnel to fill in a timely manner reports that could have the design like in Appendix 1.

We implemented very well in the RO Air Force the flight safety, ground safety and weapon safety programs but we have to implement also system safety programs were appropriate.

References:

[1] Secretary of the Air Force , *AFI 91-202*, 1998, 73 (vizible at www.e-publishing.af.mil);

[2] Secretary of the Air Force , *AFI 90-901*, 2000,7 (visible at http:// afpubs.hq.af.mil);

[3] Civil Air Patrol National Headquaters , Maxwell AFB AL, *Operational Risk Management advanced level course*, 2010, 64;

[4] Civil Air Patrol National Headquaters , Maxwell AFB AL, *Operational Risk Management intermediate level course*, 2009, 36;

[5] Frederic Bouder, David Slavin & Ragnar E. Löfstedl, *The Tolerability of Risk, Earthscan,* 2007, 159.

[3] AFI 90-901, Page 2, para 3.4.

Appendix 1

Operational Risk Management Worksheet

Operational Risk Management Worksheet **Conditions Assessment of Activity:**										**ACTIVITY: ____________________**	**Date:____________________**		
STEP 1 **ANALYZE THE HAZARDS**	**STEP 2** **ASSESS THE RISKS**										**STEP 3 & 4** **ANALYZE THE RISKS& DECIDE HOW TO CONTROL THEM**	**STEP 5** **IMPLEMENT RISK CONTROLS**	**STEP 6** **SUPERVISE**
Brainstorm	**How likely is the hazard?**					**How severe would it be?**				**Rack & stack**	**Control Options** Which would you use?	**Turn Controls Into Good habits**	**Monitor & Tweak**
List all potential hazards. The order you list them does not matter.	FREQUENT	LIKELY	OCCASIONAL	SELDOM	UNLIKELY	CATASTROPHIC	CRITICAL	MODERATE	NEGLIGIBLE	**First,** look at the risk matrix to determine the risk level. **Second,** list the risks under the corresponding risk level.	What would you do? 1. Engineer 2. Guard 3. Improve Task design 4. Limit Exposure 5. Select Personnel 6. Train & Educate 7. Warn 8. Motivate 9. Reduce Effects 10. Rehabilitate	What do you need to keep in mind as you implement each?	What symptoms of success or inefficiency might there be for each risk?
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