THE OODA LOOP

(OBSERVE, ORIENT, DECIDE, ACT)

APPLYING MILITARY STRATEGY TO HIGH RISK DECISION MAKING AND OPERATIONAL LEARNING PROCESSES FOR ON-SNOW PRACTITIONERS.

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ABSTRACT: The OODA Loop strategy is a concept of situational awareness first developed in the mid-1950s, by USAF Colonel John Boyd. While the origins of the OODA Loop lie in strategic military operations, the concept has been applied with great success in the realms of business, litigation, intelligence and information gathering, law-enforcement and even advanced medical treatment.

For the modern risk manager, this concept will seem extremely familiar. The OODA Loop is simply a recurring cycle of reassessment and reaction to unfolding events. Where the OODA Loop process differs from other similar decision making processes is that we are now viewing the snowpack as an opponent, or in the military sense, an enemy, which we must defeat to protect personnel and facilities.

Utilization of the OODA Loop is intended to help direct a team or individuals resources in order to “defeat” the “enemy” and “survive”. In the world of the avalanche forecaster, “victory” is avoiding injury to personnel or damage to facilities and infrastructure. The “Loop” is actually a series of loops that are constantly circulating and interacting throughout “combat operations” and assists in the allocation of energies and resources dependent upon the current phase of the “battle”.

By applying the OODA Loop to risk management programs, there is potential to observe and correct potential deficiencies in the program or, conversely to enhance processes that are efficient and effective. The OODA loop may be equally useful for the individual or operational team settings.

The OODA Loop strategy is a concept of situational awareness first developed in the mid-1950s, by USAF Colonel John Boyd. During the Korean war, Boyd was assigned to observe and assess the reasons for the rate of success of US pilots flying the F-86 Saber to engage and defeat the arguably superior MiG-15. F-86 pilots were credited with shooting down 792 MiGs for a loss of only 78 Sabers, a victory ratio of 10:1. It was Boyd’s conclusions that this was not a result of superior aircraft design but a result of the ability for American pilots to quickly **O**bserve, **O**rient, **D**ecide and **A**ct on their own without being slowed by the need to be oriented by command elements far removed from the scene. This observation resulted in Boyd’s creation of the the OODA Loop concept, wherein those that are most able to quickly orient to their environment, make a decision and act upon it can overcome superior elements through rapid reaction.

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For the modern risk manager, this concept will seem extremely familiar. The OODA Loop is simply a recurring cycle of reassessment and reaction to unfolding events. Where the OODA Loop process differs from other similar decision making processes is that we are now viewing the snowpack as an opponent, or in the military sense, an enemy, which we must defeat to protect personnel and facilities. While the snow and avalanche environment is not something to be viewed as hostile or harboring ill intent, these terms are used to qualify the roles of the snowpack and the decision maker in reference to application of this military strategy.

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forecaster, “victory” is rapidly and properly assessing hazard and reducing risk, therefore reducing the likelihood of injury to personnel or damage to facilities and infrastructure. The “Loop” is actually a series of loops that are constantly circulating and interacting throughout “combat operations” and assists in the allocation of energies and resources dependent upon the current phase of the “battle”.

The objective of the OODA Loop is to process information and choose a plan of action faster than your opponent is able, therefore allowing you to “get inside” of your opponents Loop. This can be achieved both by completing the loop rapidly and acting quickly or, by slowing your opponents loop, most often through distraction, disruptment of information gathering, concealment of information, disinformation or by overwhelming information gathering resources. In a military or financial application, concealment of information and disinformation are some of the most applied tactics. For an on-snow decision maker, the opponent (the snow and weather environment) is slowing the loop by concealing information (e.g. in the depths of the pack), disinformation (e.g. false positive stability tests), disruption of information gathering (e.g poor weather/visibility) or distraction (e.g. harsh environments, heuristics, powder fever, guest/management pressures). In one view, the snow environment could be viewed as a docile opponent as it does not generally “react” to a practitioners actions. In another view the snow environment could be viewed as an extremely powerful opponent as it is a master of slowing and disrupting information, overwhelming information gathering resources and lengthening the decision makers OODA Loop while taxing resources yet, seldom expending any of it’s own. To dominate the battle, it is important to control the tempo, invariably the environment is in control and the decision maker simply reacting.

Defensive OODA Loop

An operation or individual can be identified as being in a “defensive OODA Loop” or “Offensive OODA Loop” dependent upon the pace at which they can complete the steps of “the Loop”. As an example, an individual ski guide may be considered to be in a “defensive loop”. Since that guide is working alone, and has a limited ability to collect widespread **O**bservations and must **O**rient themselves to these **O**bservations while managing many other factors such as client care and navigation problems etc. This person’s loop of **O**bservation, **O**rientation, **D**ecision and **A**ction circulates much more slowly due to energies and resources needing to be allocated to other responsibilities during both the **O**bservation and **O**rientation steps of the loop. An individual guide’s strength lies in their ability to make rapid choices as the sole **D**ecision maker. As a factor of being in a “defensive loop” the individual guide has a limited number of **A**ctions to choose from. The individual guide may **D**ecide on **A**ctions such as specific terrain selection or avoidance, or a variety of travel techniques. The limited scope of **O**bservations coupled with a limited number of possible **A**ctions is what slows this guide’s OODA Loop circulation and causes it to be “defensive”.

Offensive OODA Loop

An operation such as a ski patrol or highway avalanche control team may be considered to be in an “offensive OODA Loop”. With the added manpower of a team, considerably more frequent and quality **O**bservations can be collected. Within a larger operational setting, collection of **O**bservations becomes not only rapid but also of a generally higher quality. Remote instrumentation can provide constantly updated weather data; more observers in the field with the ability to communicate **O**bservations in real time, via radio or digital networks also expedite the collection of quality data. Not only can a larger organization collect quality **O**bservations more rapidly, it can also dedicate personnel to the **O**rientation of this data without those individuals having the distractions that a guide alone with five clients may have. This allows an operation team more ability to apply weight or strength to specific observations. In a large operational setting that is responsible for protecting the recreating public, or keeping travel corridors safe for commerce, **D**ecisions can be considerably more complex although there may be many more options for **A**ction. Not only can a ski patrol dedicate personnel to **O**rient to these **O**bservations but also have a clearly defined operating area with historical data to assist with the **O**rientation of the **O**bservations. A team of experienced experts, instead of an individual, can work together to make the **D**ecisions; this may increase the quality of the **D**ecision, but may possibly also increase the time it takes to choose an **A**ction. Larger operations have the advantage of a wider variety of **A**ctions possible such as terrain control (opening or closing runs or routes), the ability to manipulate the “opponent” (eliciting avalanches by applying munitions) or mechanically compacting the snowpack etc. It is this ability to rapidly collect widespread **O**bservations, **O**rient to them quickly, **D**ecide and **A**ct promptly that allows a team of this nature to be in an “offensive loop”. The disadvantage of a large team is it may take slightly more time to **A**ct due to the need to disseminate a plan of action to an entire team and confirm that all personnel are prepared and ready to **A**ct.

Observations

As with all things in the world of risk management, observations (the first “O” of the system) are key to the functionality of the OODA Loop system. As with any decision making process, quality of observations are always an important factor in the processing of information. An important factor in the OODA Loop system is the filtering of this information, this filtering process happens in the Orientation portion of the process.

Orient

The second O, orientation is our collective personal archive of previous experiences, education, tradition, heuristics, biases and protocol as well as our cultural heritage. All of this is tempered by our personal or teams ability for analysis and synthesis. Orientation is possibly the most important phase of the OODA loop since it steers the way we Observe, Decide and Act.

Decide

At this phase of the loop a decision must be made pertaining to how to react to the insights obtained thus far. In general, there are three options:

- Act immediately- If what you have observed is an actionable event, immediate response is required to take advantage of the opportunity or defend against the threat
- Monitor the situation- If you have only received minor indications that action is warranted, you may need to monitor the situation and research more thoroughly to determine if subtle clues may lead to serious events.
- Do nothing- Not all information or observations require action, some observations have little impact on the overall outcome of the situation. Doing nothing leaves resources free to be applied to more pertinent applications.

Act

Action is an execution of response, actions should be performed quickly and decisively in order to then begin again the process of the OODA loop.

Application of the OODA Loop for an individual

Consider a heli-ski guide flying into high alpine terrain for a day of guiding with a group of advanced athletes. As the heli leaves the pad the guide will begin the observation portion of the loop by considering any available information from the morning forecast about the snowpack and terrain or more specifically, the run that he intends to open the day with. Slope angles, aspect and terrain configuration, terrain traps and avalanche history are all considered. As the intended run comes into view, more direct information about surface conditions, cornice formation, avalanche activity on similar slopes and observable hazards (rocks, crevasses). The guide may choose to seek more information by asking the pilot to fly near other indicator slopes, fly up the route or approach from a different angle in order to continue the process of observation. The orientation portion of the loop involves assessing options and alternatives as well as considering the proximity of other guides in the field able to back him up. At this point the guide has completed a preliminary loop of Observation and Orientation and may now Decide to land and Act by directing the pilot to do so.

As the aircraft is landing the process is beginning again. By observing the amount of rotor wash stirred up by the aircraft, the depth of penetration of the landing gear and looking at the instruments to record elevation and temperature the guide is continuing to Observe the environment. As he launches the aircraft away and the scene quiets down, he is now observing his guests movements and level of comfort as well as his boot penetration, the wind direction and intensities, etc. He now begins to orient himself to his situation by considering past history of descents of this run, both in recent history and past seasons, his guests profiles, his current level of confidence and physical state. At this point the guide makes a decision and decides to act by positioning guests to be “eyes-on” and placing a ski-cut across the start zone of the potential path. From this point, less time is dedicated to orienting to the environment unless new observations draw his attention and require reaction. As information cascades in real time the guide reacts and orients rapidly as his experience and training have taught him to, and the majority of conscious thought is directed to supervising the flow of action and reaction.

Application of the OODA Loop for an operational team

An operational team is likely in a position of greater control with considerably more resources available and numerous options for action. As an operational team begins their day, much data has been collected about the entire operating area and there is a substantial resource bank to take on the tasks of Observation, Orientation, Deciding and Acting. As the process of Observation begins, numerous data sources can be accessed that have been conducting instrumented weather and monitoring during the night. Study plots may be utilized to determine changes in the snowpack depth and structure since the previous operating day. When proceeding to the Orienting portion of the loop, there is considerable advantage in that the operating area is defined and has a

documented history of both areas of concern and zones not requiring attention. The heritage and tradition of that operation will likely play a considerable role in how this team orients to the situation, and their chosen path of action.

Upon completion of standard Observation collection, and once the team has Oriented to the current situation, a Decision is made about an Action or more likely, number of Actions that are then set into motion. A ski patrol or highway control team may Decide to Act by closing certain runs or travel corridors, another action may be to deploy a explosives control team on a mission in an effort to illicit a response from the "opponent".

Upon Acting by closing an area, applying munitions and perhaps eliciting an avalanche, the operational team begins the OODA process again. Now Observations are taken with all of the previous data applied plus the additional information of a resulting avalanche from the control teams actions. At this point considerably more is known about the opponents intentions (instability), likely responses once acted upon(avalanches available for triggering) and the next OODA Loop can be undertaken with more understanding of the opponent and a better ability to control the tempo of the ongoing operational mission by "getting inside" our opponents loop.

Conclusions and uses of the OODA Loop for the on snow decision maker:

The OODA Loop is a system that favors agility over raw power, the ability to be flexible and rapidly adapt to the changing situation will favor a program that allows for rapid advancement through the loop. Controlling the tempo of event development is key to the success of the OODA Loop and it is in this regard that the individual guide or even a more complex control team has the advantage over the slow to change snow and weather environment. If many small, good decisions are made, the need to make one large and high consequence decision is less likely to occur therefore increasing the chance of success or "victory", if these decision are made in a more rapid manner it allows the opportunity to "get inside" the opponents Loop.

It may be worthwhile to utilize the OODA Loop system to take consideration in your own decision making processes. Some key points of each portion of the loop to consider are as follows.

Observation:

When in the observation step of the loop do you only look for obvious indicators or do you also look for those that are more difficult to observe? It is common practice to observe and document easily recognizable factors such as precipitation, temperature, snow depth, pack structure, terrain features and other factors pertinent to avalanche formation and release. It is less common and much more difficult to attempt to observe what may be missing such as, lack of activity on a recently buried surface facet or a forecasted weather event to be subtly different than expected.

Orient:

When orienting to a situation do you or your team consider how tradition, cultural heritage, heuristics, biases or the practice of following habits are influencing your interpretation of observations or determining your decisions and ultimately, course of action? As you orient to the current weather or snowpack state, are you making assumptions based on historical experiences or looking at the current observations in a detached mindset that allows for unbiased assessment? Has complacency been considered and addressed?

Decide:

After making observations and orienting yourself to the current environment, is your decision appropriate for the given situation. Is the situation a high order event needing immediate attention or should you monitor the situation? Is it possible that the best action is to do nothing rather than act immediately? It may be necessary to triage observations and reassess your orientation to the situation in order to choose the best decision option.

Act:

When you act, what responses are you expecting? In the time it has taken to complete the first three steps of the loop, have conditions changed? Upon action, are you ready to begin the process of Observation, Orientation, Decision and Action all over again? Are there steps that you may be able to skip depending on observations obtained?

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