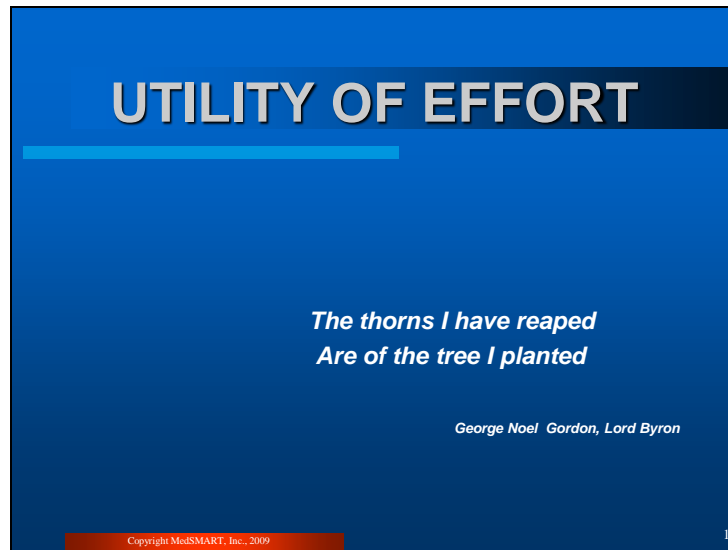


**Dag von Lubitz, Ph.D., M.D.(Sc)**  
**Lecture at Stephenson Disaster Management Institute**  
**Louisiana State University**  
**Baton Rouge, 13<sup>th</sup> March 2009**



The present lecture is based on experience – over 30 years of it, in fields as distant from each other as molecular neuropathology and theory of leadership, with everything in between. Experience from the lab, field operations, decks of ships, and the chairman’s office. Hence, what follows is not a lecture but rather a reflection on the cumulative impact of everything I have done, on personal conclusions derived from those experiences, and on the personal vision of the future. The title has been shamelessly adapted from the book by Sir Rupert Smith, with the word “Utility” used in the same sense that Dr. Hirschheim used when addressing the issue of what constitutes useful research in Information Systems in his “paradigm paper.” of 2000.

Indeed, long live the paradigm of pragmatism, especially in the field of disaster management for so long dominated by functionalistic philosophy. Many will surely disagree with me, but, personally, I consider the paper by Goles and Hirschheim the essence of philosophy behind both research and practice of disaster management. The book of Sir Rupert shows clearly why much of what we do in homeland defense and security fails. Finally, the concept of Teams of Leaders developed by another General – Frederic Brown - points toward the way forward. This is, indeed, a personal view of the field, and hence – at the purely personal level – I will allow myself to consider these three works to belong among the most significant for the field despite the fact that none carries the words “emergency management” in their title.

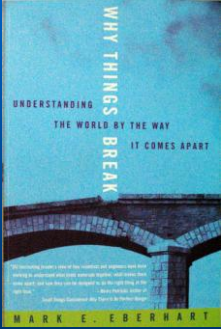
Slide 2



The world today exists and operates as a tightly coupled system. Worse – it is a tightly coupled system in an unstable equilibrium. Tight coupling, i.e., interdependency of systems within the “system of systems” is the source of that instability: a failure of one element induces destructive reverberations within the environment which, unless promptly addressed and eliminated, will have sufficient force to overcome the tenuous ability of the system to resist. As a result, the equilibrium will be lost, and its loss will induce further, exceedingly destructive and potentially irreversible consequences.

Slide 3

**“THE CALAMITY RULE”**



**“Catastrophic destructuring is not an exception anymore, but a norm built into all super-complex, tightly coupled systems.”**

*Lagadec, 1995*

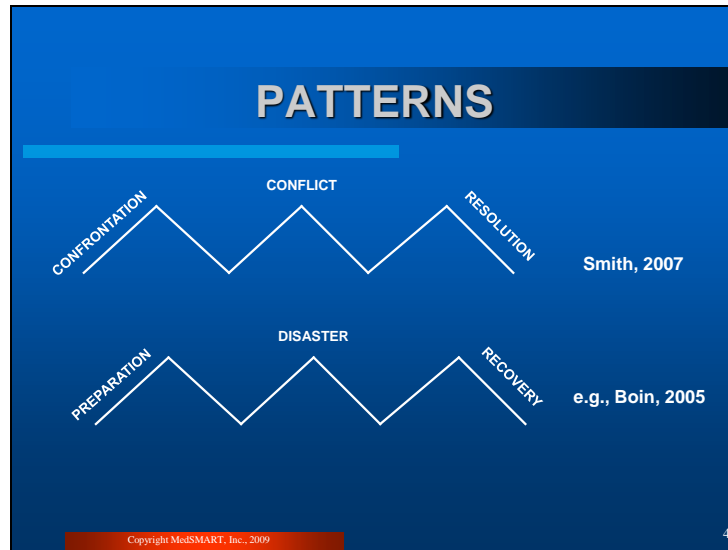
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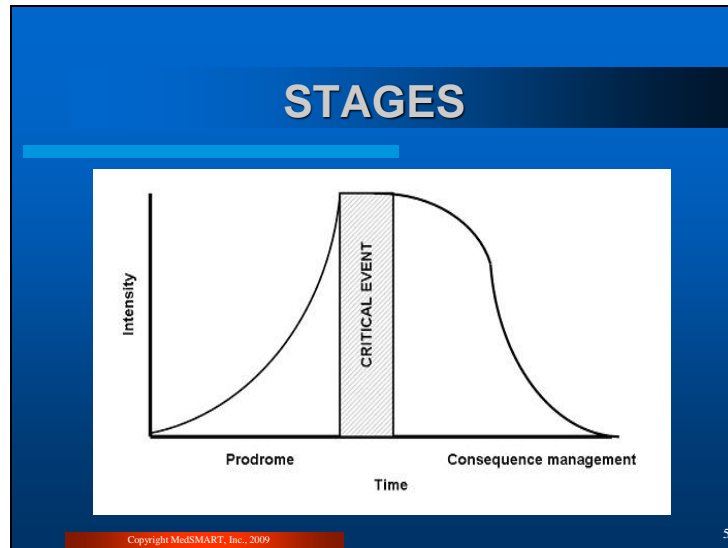
The image shows a slide with a blue background. At the top, the title "THE CALAMITY RULE" is written in white, bold, sans-serif font. Below the title is a horizontal line. To the left of the center is a book cover for "Why Things Break" by Mark Eberhart. The cover features a photograph of a bridge with a large section missing, and the text "WHY THINGS BREAK" written vertically. To the right of the book cover is a quote in white, bold, sans-serif font: "Catastrophic destructuring is not an exception anymore, but a norm built into all super-complex, tightly coupled systems." Below the quote is the name "Lagadec, 1995" in a smaller, italicized font. At the bottom left of the slide, there is a small red box containing the text "Copyright MedSMART, Inc., 2009". At the bottom right, the number "3" is displayed.

Since catastrophes can reach the extinction level (or, more directly, end the existence of humans at best, and at worst terminate all advanced life forms on earth), it is not surprising that in the recent years there has been an explosion of studies devoted to the “rule of calamity” affecting all super complex, tightly coupled systems. From engineers to social scientists, and explorers of crisis, all agree – “catastrophic destructuring” is a built-in property rather than a theory unlikely to become the reality.

Slide 4



Catastrophic destructuring, whether manifesting as war or natural disaster displays a very similar pattern of increasing instability, followed by the critical event, then resolution in form of either diminishing tensions or recovery.



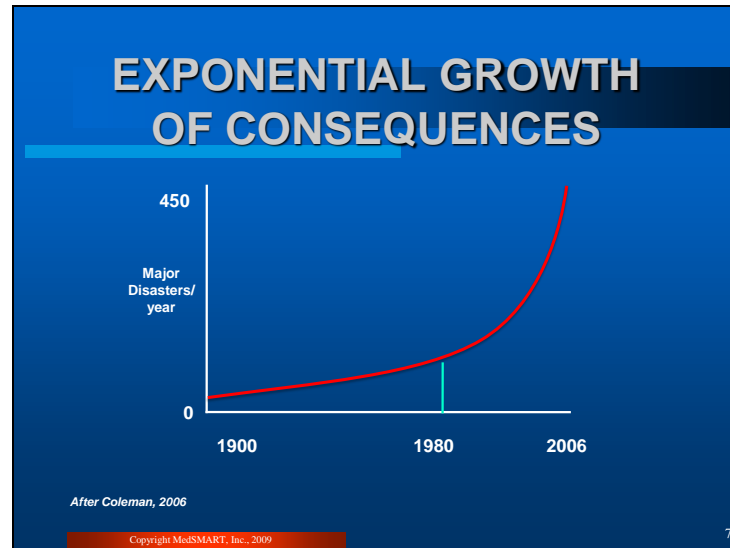
These stages can be expressed as the prodrome – where tension grows exponentially and stresses the system beyond its capacity to resist, through the critical event during which the system loses its coherence, followed by the stage of consequence management.

The initial recovery is quite slow – the level of destruction is overwhelming and hinders the immediate efficacy of the recovery effort. With time, more and more tasks are accomplished, and the progress becomes increasingly faster. Toward the end, however, priorities change: the reconstructing forces are withdrawn, and the bureaucratic process wins the upper hand. The speed of the recovery slows down to a glacial crawl. Post-Katrina New Orleans provides one of the best examples of such sequel.

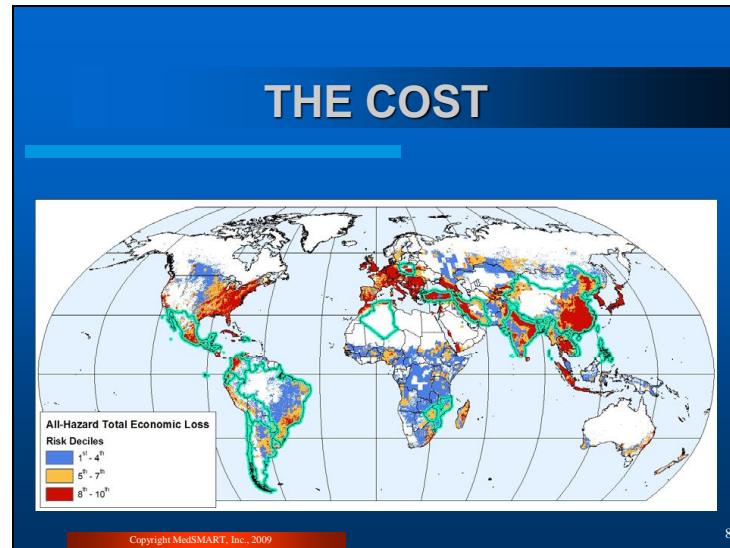


Historically, each time a major disaster or crisis took place, a charismatic leader emerged, united the people, organized the effort, gave it cohesion and meaning, and led the followers to a stunning success. The sheer willpower of the man or woman ready and able to lead was instrumental in converting defeat into moments of the national pride.

## Slide 7



The increasingly tight coupling of modern world is mirrored by the exponential raise in the frequency of disasters related to human activity. Significantly, the incidence rate of catastrophic events escalated dramatically in the 80ies, i.e., at the same time the continuously fragile and easily disrupted computer technologies (IT/telecommunications) started to play the ever-dominant role as facilitating and controlling tools in business, politics, transportation, industry, etc. Based on this state of affairs, our demand for charismatic leaders of superb ability should show similar exponential growth. Unfortunately, the reports of spectacular failures in dealing with major disasters indicate the collapse of yet another market whose trading commodity – the charismatic leader – is close to extinction.

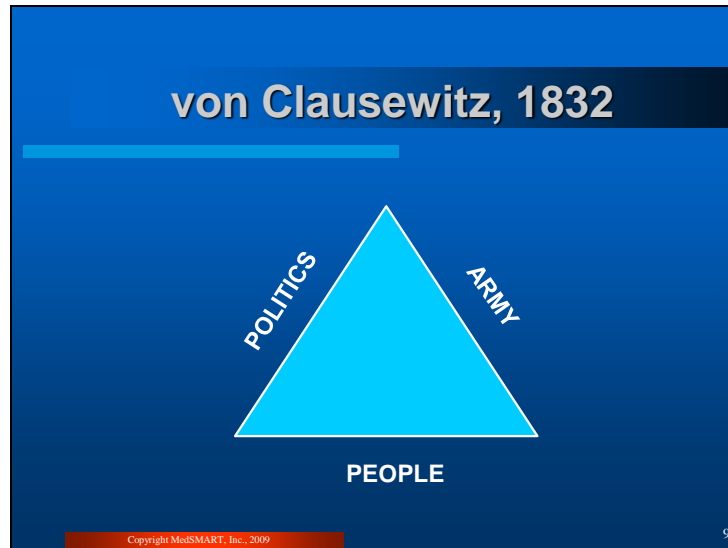


The issue is by no means trivial. Repercussions of major disasters have increasingly global range, and what happens in the US can and often will have a major impact on EU, China, or Africa. Equally, distant events may have an indirect but still forceful influence on vital US interests at home and overseas.

Reverberations within tightly coupled and largely stochastic systems spread in often highly unpredictable even erratic patterns that are hard to predict, and with a constantly changing force. While the current preoccupation with global terrorism dominates newspaper front pages, TV news, and academic activities, the economical and social consequences of natural disasters are not less worrying, and may have far more substantial repercussions. Thus, in the absence of the bulwark afforded the rest of us by charismatic leaders, where do we turn for the measure of needed protection?



Slide 9



In mid 19<sup>th</sup> century the Prussian general Carl von Clausewitz wrote a monumental treatise that changed our perceptions of war and, in many ways, also influenced the way we interpret relations within the modern society.


Clausewitz argued that the emergence of the French Republic, the associated rule of the people, and the introduction of levee en masse as the means to build her armies, changed the societal balance. The stability of the nation and its relationships with neighbors ceased to depend on the royal whim. Instead, it was assured through the balancing influence of three elements: people, politics, and the army - the guardian of national safety and interests. Within the triad people influenced politicians, politicians directed the army, the army under the direction of politicians defended the interests of the nation, i.e., people, and the people exercised pressure on the politicians depending on their satisfaction with the way the army (consisting of the people) performed in serving the interests of the nation. As long none of the constituents of the triangle abrogated its role, the balance was maintained.



The Clausewitzian concept of social relations can be readily applied to the realm of homeland defense and security: people demanding security and defense against threats exercise pressure on politicians who, by creating appropriate legislation, provide direction and purpose to governmental agencies. The latter develop a strategy whose aim is to attain politically determined objectives, i.e., the nature, extent, and the degree of protection demanded by the people. The people regulate their pressure on the politicians depending on their satisfaction with the effectiveness of agencies. The triangle closes, and the pressures within the system remain in equilibrium, assuring the optimum level of preparation and maximally efficient and effective responses to eventual threats.

However, these are the ideal circumstances existing in the ideal society.

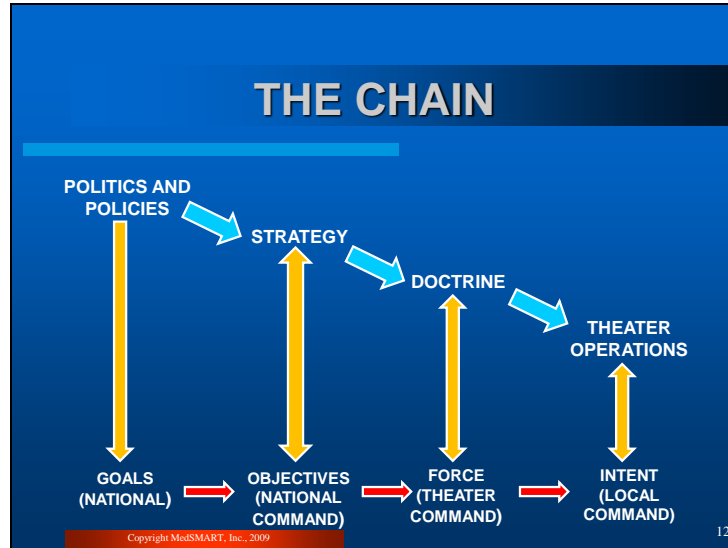
## PEOPLE



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11

In reality, under the pressure of other influences, people have largely abandoned their role in directing politics governing management of homeland defense and security. The threat of foreclosure is far more imminent than the seemingly remote danger of a terrorist triggered nuclear device exploding near MY neighborhood, or a hurricane flattening MY house. In essence, therefore, the two remaining actors who are now responsible for the maintenance of national safety are the politicians, and the agencies they have created. The triangle of von Clausewitz became greatly unbalanced, and the outcome of political wrangling now determines whether MY house stands long enough for the bank to foreclose it. As a matter of fact, it may even determine whether I live through the next disaster.



Politics and policies that emerge from political debate define national goals attained through the implementation of national strategy. Note, however, that the very same goals will also influence the manner in which strategy is formed.

Strategy that is only loosely coupled to the aims it is supposed to attain will invariably fail.

Implementation of strategy is therefore based on the doctrine which governs all actions within the “theater of operations” defined as the totality of physical, political, and societal environment in which these actions are performed (the definition differs significantly from its military counterpart). Strategic objectives determine the nature, size, and combined strength of the force needed to attain them.

The doctrine has a profound influence on the structure of the force to be used (force means in this context the totality of resources human, material, and technological to be employed in the execution of a specific task.) Therefore, divergence between the nature of the force and the doctrine which specifies how the force is to be used within the theater of operations will nullify the utility of employing that force (even if at times quite useful, firefighting will hardly affect post-hurricane recovery. Heavy lifting units will).

The objective will not be reached. In sum, the doctrine governs how all activities are performed within the theater, and how the force is applied toward attainment of politically predefined strategic objectives. In the reality of disaster management all actions are local (“all disasters are local”). Hence, the local commanders must understand the intent of their superiors – the actions at the local level are subordinate to the overall objective (intent), but the execution of these actions is the prerogative of the local commander rather than subject to rigid orders from above. In essence, it is the success of the local “ground effect” that, cumulatively, leads to victory. The “ground effect” is, however, contingent on the clarity and coherence of all the preceding steps.

A weak link within these tightly orchestrated relationships is always the source of failure, and Hurricane Katrina serves as an excellent example of absent coherence of the initial recovery effort that led to consequences that could have been easily averted.

**POLITICS**

- What are they?
- Who are the major actors?
- Do they have coherence?
- What is their influence?
- What is their utility?

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Politics have thus a major impact on disaster management. It is therefore essential that all professionally engaged in disaster management are clearly aware of what these politics are, who are the major actors, and whether there is coherence between politics at the national level and the interests of the major actors involved in the field (in other words - do national level politics serve materially the interests of local emergency management). Such understanding becomes absolutely critical in international disaster management operations.

Understanding the impact politics may or will have on the conduct of field operations is absolutely critical – apparent coherence notwithstanding, the reality of politics is often clearly different from the reality on the ground (UN disaster relief operations are a glaring example of this rule.) Moreover, politically influenced actions may be (and often are) ballasted with elements that make them without any ground utility whatever: legislative loopholes and exemptions will entirely deflect the original intent.

## POLICIES

- Is there a policy-based strategy?
- What is its utility
- Are objectives linked to strategy?
- Are theater actions:
  1. Strategy aligned?
  2. Relevant?
  3. Adequate?

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Policies are the tangible result of politics. Ideally they should provide a clear definition of political aims to be attained. Hence, policies define the strategy. Policy-based strategy must, however, have a clear utility: it has to be specific, coherent, with precisely and unambiguously defined objectives, and define with equal clarity the means of how these objectives are to be attained. It is, unfortunately, quite common for legislatures and administrations to debate “strategies” without any content and/or linkage to identifiable aims. Whatever passes for the latter is not defined on the basis of objective evaluation, but based on partisan ideologies which may be largely irrelevant to the currently adopted strategy.

**STRATEGY**

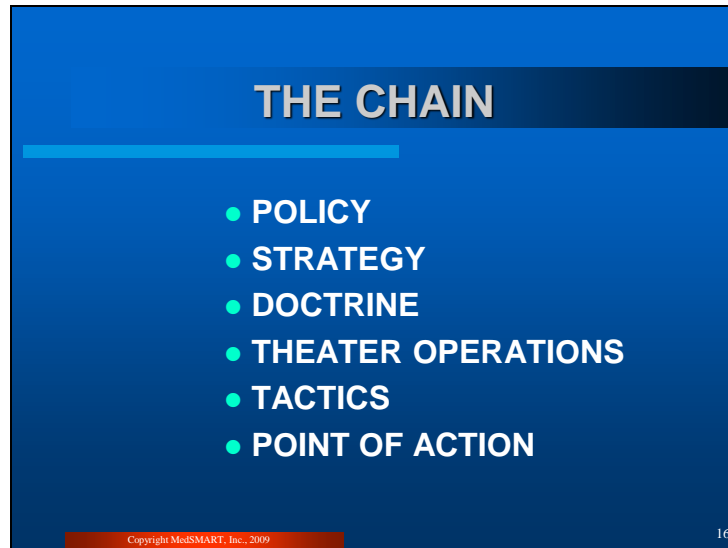
- *Expression of the aim and its links to the overall purpose and context of the effort together with limitations on action that flow from that political purpose...*

*Sir Rupert Smith, 2007*

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15

Since “strategy” has such pivotal role, it needs a precise definition, and, with its origin in the military thought, the best definition is the military one, here provided by the British general, Sir Rupert Smith.



And to recapitulate the structure of mutual dependencies, let us restate the chain of defining concepts which emerge from the political debate:

- Politics (and policies) define the strategy
- Strategy shapes the doctrine
- Doctrine defines the nature of theater operations that depend on
- Tactics which are employed
- at the Point of Action

Curiously enough, the same thought process and even terminology are applied by both the military and business – the two oldest forms of human activity, and both essentially based on one of the most fundamental biological instincts: competition for resources and the assurance of survival.



**STRATEGY**

- **“All Hazards Response”**

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In the realm of the US disaster management (and to a large degree foreign as well), the defining strategy is that of “all hazards response”: the ability to respond to any and all threats whenever such threats materialize, with the response based on common elements that characterize such threats regardless of their nature and origin.

**DOCTRINE**

- **National Response Framework**

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18

The strategy-defined doctrine of response is contained in the National Response Framework (NRF) providing specifics of the way in which all actors interact, collaborate, and participate in the overall effort. Like with any other doctrine, the purpose of NRF is to assure maximum efficiency of effort while minimizing interagency friction, lack of collaboration, or lack of administrative interoperability.

**THEATER OPERATIONS**

- **National Incident Management System**

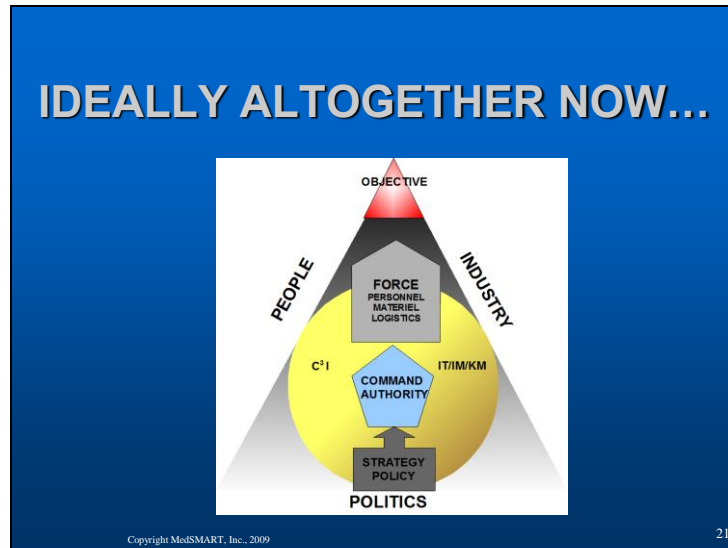
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NRF’s effectiveness is contingent on the manner in which theater operations are conducted, and National Incident Management System (NIMS) provides the required coordinating guidance. NIMS specifies the manner in which often highly complex assets are amassed, deployed, and employed. It also defines the level and nature of interactions, and the way in which overall theater command and control are executed. To maintain military/business convention of terminology, NIMS can be compared to “grand tactics” of von Clausewitz.

The slide features a blue background with a dark blue horizontal bar at the top containing the title 'TACTICAL OPERATIONS' in white, bold, uppercase letters. Below the title is a thin light blue horizontal line. A single bullet point, consisting of a small light blue circle followed by the text 'Incident Command System' in white, is centered on the slide. At the bottom, there is a dark red horizontal bar containing the copyright notice 'Copyright MedSMART, Inc., 2009' on the left and the number '20' on the right.

All activities at the “point of action” of every incident, disaster, or even a catastrophe, are conducted under the umbrella of Incident Command System (ICS) which specifies local level command structure, defines the local commander, his staff, their roles, interaction among the individual subcomponents of the responding force, and the manner in which individual commands interact with each other, cross-jurisdictionally, and with higher echelons of the unified command. ICS defines tactical actions – in a sense, it serves as the “company command manual.”

Slide 21



We have then the entire system, consisting of people who shape politics which lead to policies that govern activities of relevant agencies in charge of developing the strategy that shapes the structure and power of the command authority required to assemble, deploy and employ event-appropriate force tasked with the attainment of a political objective through the execution of command and control facilitated by maximally focused and appropriate use of information technology needed to make all activities of the employed force attain their full utility. Like all bureaucratic mouthfuls, this one too has its consequences...

## THE SYSTEM AT WORK

**Incident Commander**  
System

**Incident Management Team**  
(Incident Lead)

**Primary Response**

**Secondary Response**

**Support/Commander**  
Support Policy/Commander

**Base of Operations**  
Agencies of  
JPL/UC/Caltech/MSU  
JPL/UC/Caltech/MSU  
Department of Energy  
JPL/UC/Caltech/MSU  
Department  
JPL/UC/Caltech/MSU  
Department of Health and  
Human Services  
JPL/UC/Caltech/MSU  
Department of Justice  
JPL/UC/Caltech/MSU  
Department of Transportation

**Base of Operations**  
JPL/UC/Caltech/MSU  
Department of Energy  
JPL/UC/Caltech/MSU  
Department of Health and Human Services  
JPL/UC/Caltech/MSU  
Department of Justice  
JPL/UC/Caltech/MSU  
Department of Transportation

**Base of Operations**  
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Department of Justice  
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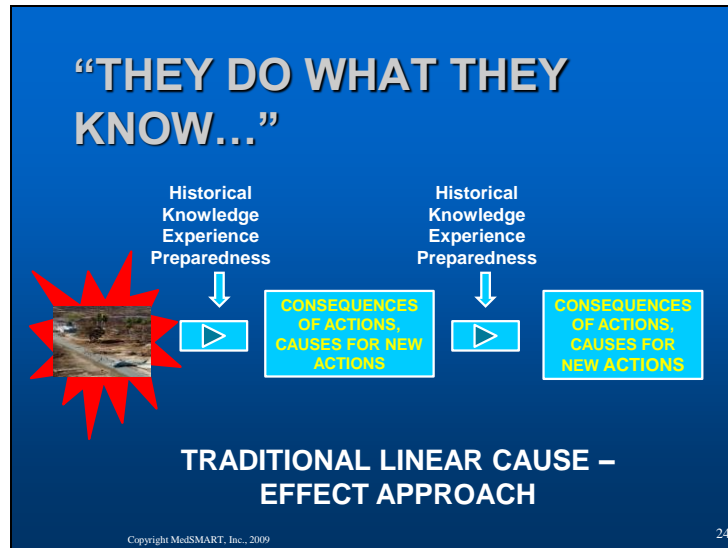
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22

When the disaster strikes, we pull out the PLAN, constitute and activate the required chains of command, initiate appropriate actions, and execute them on the ground through the employment of local forces directed by the relevant local command posts...




And the results are invariably dismal: 4 days after the passage of a hurricane, New Orleans citizens wait helplessly to be rescued, 3 weeks after the roof of her house has been torn off by a tornado, a Missouri woman waits for the protective tarpaulin to be put on the still standing walls, and 2 years after the devastating explosion of Buncefield oil depot in UK, the owner of the damaged house continues to live in a government-paid hotel room with the cumulative rental fees now exceeding the cost of the needed house repairs.



Conflicts and disasters are habitually approached as linear events. Based on prior knowledge, experience and the resulting level of preparedness we respond – and never or very rarely respond as we should. But we learn from the failure, incorporate lessons in the next set of preparedness rules, and, when the next disaster comes, the same occurs again... The French general Bechelet aptly described this phenomenon when discussing France during the two world wars: “In 1914 we were totally unprepared. In 1940 we were fully prepared. For 1914.” Actors participating in major disaster management operations **DO WHAT THEY KNOW**. They have prepared, they have carefully created response plans, and based on such preparedness they have intensely trained their actions. Or, if a modification of Kaplan’s Law were to be applied, regardless of context they do what they do best.



**TOULOUSE, NOVEMBER 2007**



**AIRBUS 340  
FULL POWER TEST**

**WRONG CHOCKS!!!**

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25

The influence of “doing what one knows” is provided by the example of the full power test of a new aircraft performed at Toulouse airport rather than the habitually used manufacturer’s test facility. Ground personnel, unused to such tests (normally performed just before the takeoff at the end of the runway) placed standard wheel chocks rather than the extra heavy and tall ones used at the Airbus factory. The ground crew did what they were both prepared for (placing the chocks against the wheels of the aircraft) and knew (chocks to be placed in front of the main landing gear truck assembly) – as the result the aircraft jumped the chocks, crashed into a 5 m barrier, and ended as a constructive total loss. 9 people in the cockpit and in the front part of the aircraft were injured, 5 seriously. The aircraft cost: USD 250 million.

**PREPAREDNESS**

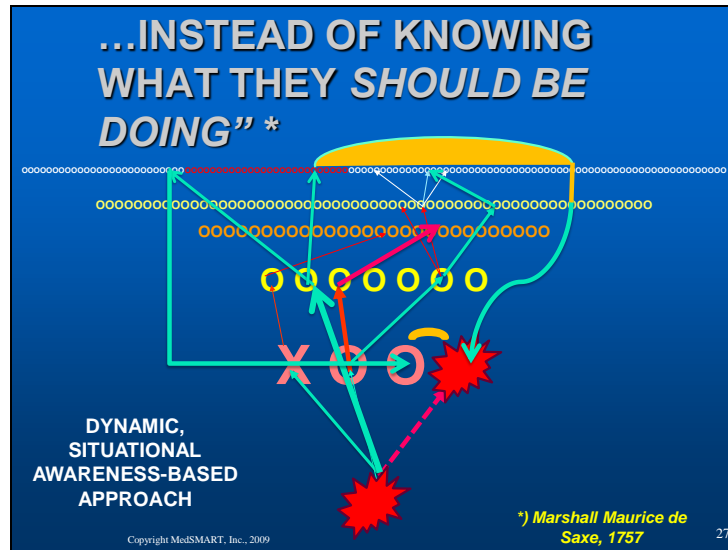
- *the availability (prepositioning) of all resources, both human and physical, necessary for the implementation of a strategy, its operational management, and the management of all random events or event complexes whose potential emergence has been foreseen during theoretical stages of strategy development, and for the management of consequences caused by such events.*

Von Lubitz, 2006;2008

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26

As indicated by this definition, preparedness is a critical element of disaster management (or, for that matter, any other management in an organization dealing with complex events, e.g., major international corporations, military, global healthcare, etc.). Without preparedness, the chances of success are indisputably zero. But preparedness also introduces a self-deceptive state of smugness, of willingness to face and deal with “all-comers.” Consequently, when “what comes” is either outside the realm of our prior experience or of what we foresaw as highly probable, the calamity strikes with the double force.



Disasters, and for that matter, all crises and conflicts, are complex stochastic events where chains of interactions are unpredictable, and where consequences often lead to secondary disasters associated with their own, typically unexpected and sudden, consequences. In words of an insurance TV commercial “Life comes at you fast,” and unless the response is equally fast and correct, life may actually annihilate you. To be prepared is simply not enough. Yet, because responders are conditioned to act that way, most do what they know INSTEAD OF KNOWING WHAT THEY SHOULD BE DOING.

**READINESS**

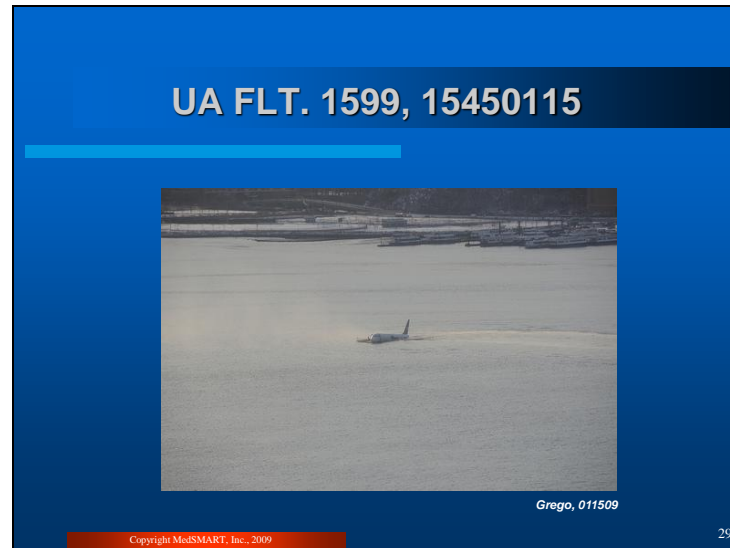
- *Instantaneous ability to respond to a suddenly occurring, entirely unforeseen and unpredictable event or crisis based solely on the immediate and locally available/un-prepositioned and/or already mobilized countermeasure resources.*

Von Lubitz, 2006, 2008

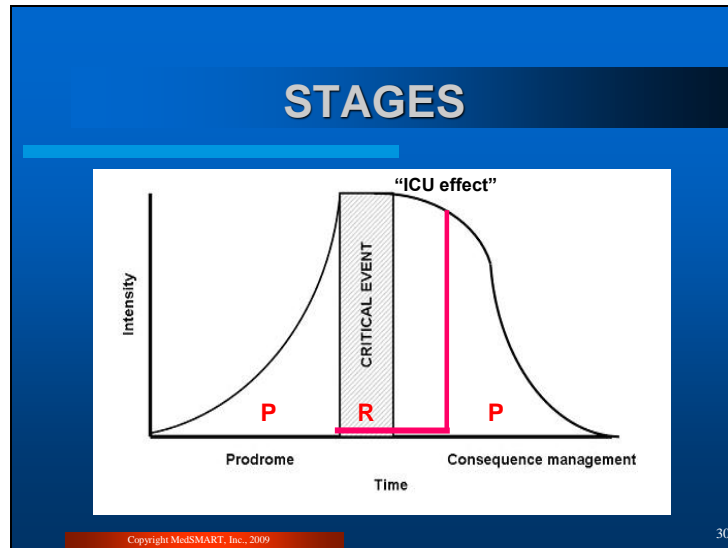
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28

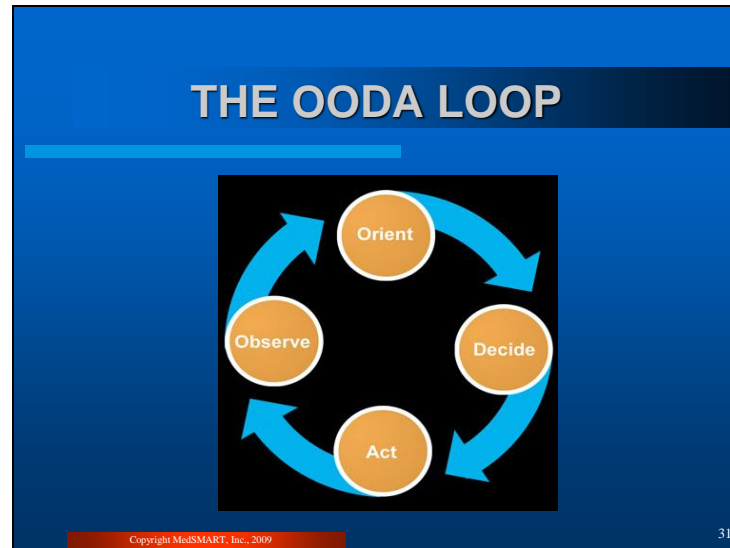
Knowing what one SHOULD be doing under conditions of extreme stress induced by events unfolding with total unpredictability constitutes the state of READINESS. It is the state that is completely different from preparedness. Unfortunately readiness and preparedness are used synonymously, and, therefore, while an enthusiastic declaration “WE ARE READY” is made, in reality we are merely PREPARED. When the unexpected happens, the lack of readiness amplifies the magnitude of the disaster – again Hurricane Katrina.



Contrary to preparedness which is largely the function of administrative approach and solutions to foreseeable problems, readiness depends predominantly on the mental state of the actor. Hence, it can be taught. Development of readiness is the result of intensive training in which the trainee is exposed to increasingly more complex tasks that are presented unpredictably, and often in logically confusing combinations. Together with task complexity its intensity is also gradually elevated, and so is the number of either simultaneous or near simultaneous events that need to be addressed. Some events are critical, while others merely appear to be so, and vice versa. The trainee (or a group of trainees) is expected to select appropriate actions, appropriate sequence(s) of actions, and appropriate targets for these actions, while coping with sensorial and cognitive information overloads typical of crisis and disaster environments. Time is always a critical factor, and so is communication. The effect? It was because of such training that the passengers and crew walked away from the aircraft ditched in Hudson River. Had the crew been merely prepared, the aircraft would have crashed either during ditching maneuver, or worse, into the populated part of New York.



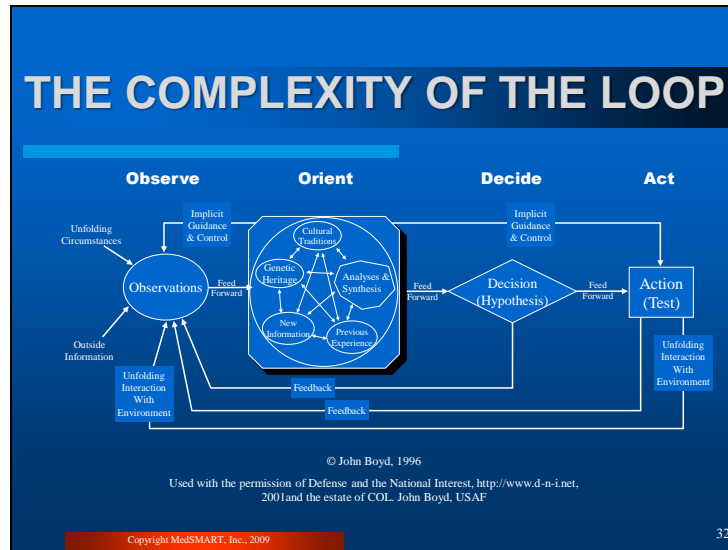
Looking then at the temporal sequence of a critical event, the prodrome stage comprises essentially of developing and building increasingly higher level of preparedness. During the critical event, readiness is the ruling state of mind and action, with preparedness becoming increasingly predominant during the consequence management stage, when all activities are based on the adequacy of pre-crisis developed preparedness. However, immediately after the crisis, a curious state of "ICU effect" predominates: although the immediate crisis is over, the possibility for a flare up caused by its ramifications cannot be excluded, and maintenance of high readiness level is paramount. The patient survived major surgery, but is not stable enough, and the management team must still be ready for a sudden deterioration of status.



The state of readiness is highly contingent on the ability to perceive, analyze, structure and respond to the rapidly changing environment. The process has been formalized by Boyd as the OODA Loop consisting of the sequence of four consecutive stages: Observation-Orientation-Decision-Action. The end of the 4-stage sequence (i.e., Action) initiates the next revolution of the Loop.

The cycle revolves in time, and the speed of its revolutions dictates the tempo of action. However, since Action will affect the nature of the environment and change its characteristics, the next cycle begins with the Observation of the environment that is different from one seen during the preceding cycle. Information extracted from the changed environment necessitates new sequence of analysis and synthesis (Orientation), and the results provide foundation for the Decision on the best form of response to changes confronting the actor. Decision is then implemented through Action and the next cycle of the Loop begins.

The Loop provides structure to rapid sequence interactions with unpredictable, competitive, and/or adversarial environments. Unsurprisingly, Loop-based thinking found its practical applications in business, military, medicine, and recently, in homeland defense and security.





Boyd recognized the paramount significance of intangible factors and their impact on interactions with rapidly changing environments: experience, physiology (“genetic heritage”), social elements (“cultural traditions”), etc., can bias perception toward subjective interpretation of the surrounding reality and provide the source of operational “observation/conclusion distortion,” i.e., seeing what one wants to see. Cross referencing all inputs at the Orientation Stage provides the crucial “objectivity filter” (Implicit Guidance and Control) that assures undistorted Orientation outputs (“what is”) needed to guarantee the correctness of the subsequent Decision (“what needs to be done”). The ensuing Action is then fully commensurate with the “operational picture” and “operational intent” that have been formulated at the Orientation and Decision stages.

“Implicit Guidance and Control” are critical in operations conducted in chaotic environments. Their implementation is contingent on preparedness developed during the prodrome stage, the existence of mutual trust among the actors, and a thorough understanding of “commander’s intent,” i.e., the mission and its goals. Once these are in place, “Implicit Guidance and Control” serves as probably the most powerful tool in “mission execution”: the local commanders “know what they should be doing” in order to attain the overall goal, rather than doing “what they know.”



## CURRENT EDUCATION

- Specialist (medicine) 
- Generalist (business) 

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The manner in which OODA Loop is implemented depends to a large extent on the possessed knowledge and experience of the actor. The manner in which the actor has been educated is therefore of paramount significance.

The process of education can be divided into two major streams that lead either to the production of specialists (of which medicine is typical) or generalists (business and military education). Specialists start with a broad base which is rapidly narrowed to often very narrow sub-specialty (e.g., maxillofacial surgery), while generalists start with a relatively narrow basis, which expands into broad, often multi-domain knowledge and familiarity with a wide range of fields. As a result of these two differing approaches one is not surprised to find accounting graduates in charge of major Level 1 trauma centers, and former infantry generals serving as bank executives. However, no trauma surgeon attained yet the rank of a CEO in a shipping company.



The manner in which education has been attained determines the way in which the actor facing a Domain-of-Domains setting such as disaster environment will respond to it.

The specialist will expertly deal with all aspects that are familiar (e.g., a trauma surgeon will expertly set up triage stations), and show significant competence in dealing with elements that are professionally familiar (e.g., setting up temporary dispatch system based on the general knowledge of its functions at the local emergency department.) However, a specialist will be largely incapable of dealing effectively and efficiently with problems that are outside the range of considerable familiarity.

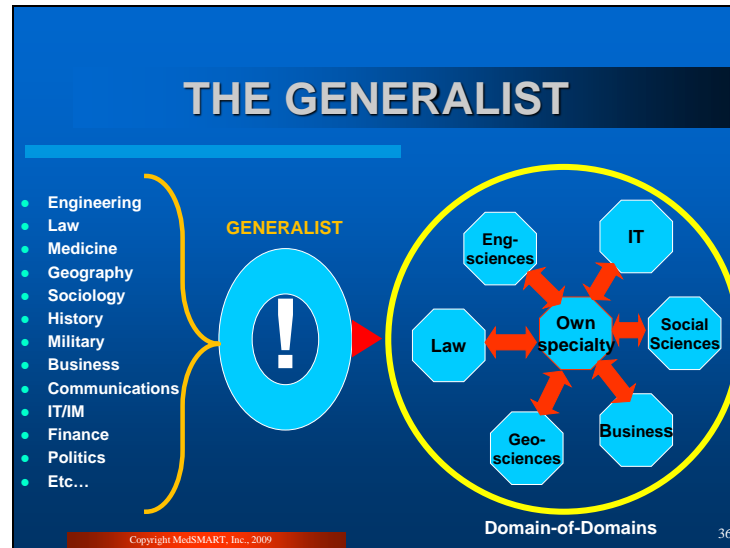
**SPECIALIST**

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**PROFESSIONAL SPECIALIST**  
*and*  
**A LIFE-LONG, SINGLE-DOMAIN  
LEARNER**

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The specialist is thus a person with professional specialization sustained by proactive life-long learning centered essentially one and the same professional domain.



The Generalist has, in addition to expert-level specialization, at least a working multi-domain knowledge combined with the exposure to a wide range of other fields: being an engineer does not preclude knowing sociology nor does specialization in public health exclude familiarity with geology.

While functionalist attitudes in higher education lead to ever narrower sub-specializations, there is a significant amount of both anecdotal and academic evidence which indicates that broad-based, generalist level of knowledge is among the typical characteristics of successful executive and strategic leaders. The finding is not surprising: at that level the range of multiple factors that critically affect one's functions is very broad. Hence, the awareness of the inherent attributes of these factors and their potential interactions is essential in large-scale efforts involving participation of experts representing different specialties, agencies or even nations, all characterized by their own cultures, points of view, and preferred ways of "doing things."

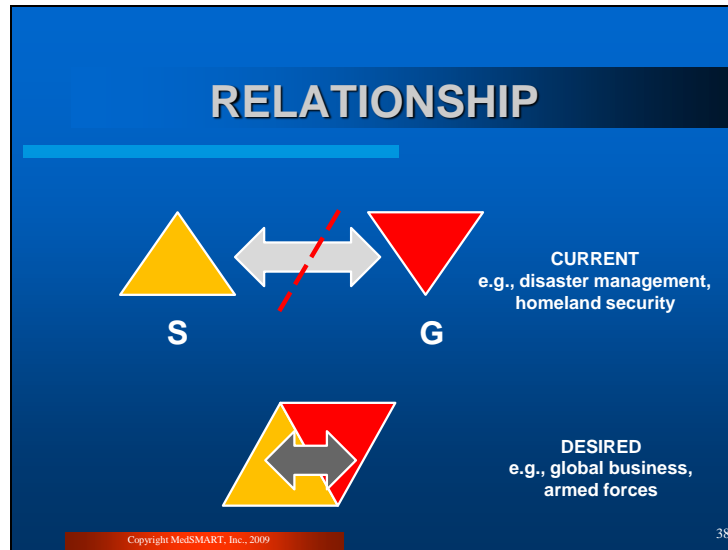
**GENERALIST**

**PROFESSIONAL SPECIALIST**  
*and*  
**A LIFE-LONG, MULTI-DOMAIN  
LEARNER**

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The generalist is thus a specialist whose expert knowledge of own specialty is supported by a life-long process of multi-domain learning and expansion of knowledge into other, often unrelated fields.

Knowledge expansion does not need to lead to expertise, but must be sufficient to offer the basis for unhampered communication with members of other professions outside the generalist's own. In comparison to a specialist, the generalist interacting with a complex environment is significantly better equipped to perceive arising operational crises, identify the need for additional expertise and resources, and effectively employ the required operational support before the initially minor disturbance becomes a disaster. A generalist provides a pre-emptive force that a specialist, lacking the "bird's view" of the entire territory cannot. Unsurprisingly both "generalist" and "general" have the same entymological root – *generalis* or "relating to all."



The relationship between specialists and generalists is an uneasy one in the world dominated by universalist attitudes. Specialization is the preferred state. In the world of public administration and academy, the epithet of “generalist” is very close to a curse, maybe even the curse itself. Consequent to such attitude governmental agencies like DHS/FEMA are staffed by civil service career specialists who are often unable to communicate with each other. In the world of global business and military affairs the situation is dramatically different. While frictions do exist, overall the relationship between specialists and generalists is close and collaborative. Either group is clearly aware it would not perform with full efficiency without the other, and the resultant cooperation is the source of a vastly increased utility of effort. The reasons the dramatic difference between most of the governmental entities and the world of business and military are multiple, but one of them appears to be the vast historical tradition and experience of the two latter disciplines that throughout centuries showed that “what is needed” (domain of a generalist) must combine with “how to do it” (domain of a specialist) in order for the effort to be fully successful.

**EMERGENCY MANAGEMENT:  
DOMAIN OF DOMAINS**

- **Homeland Defense and Security Management**
- Business (management, marketing, ISDS, )
- Law (multijurisdictional operations, JIIM)
- Geo sciences (operations, sociogeography)
- Healthcare (casualties, public health, epidemiology)
- Social sciences (race, status, education, etc.,)
- Military sciences (C<sup>3</sup>I, materiel, logistics)
- History (sociopolitical background)
- Public administration (management and governance)
- NGO operations (“people to people”)
- Etc...

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In the Domain-of-Domains context such as disaster management, the role of a generalist is paramount: the range of contributing disciplines is vast, each of them highly complex, and largely unrelated to any other of the constituent disciplines.

The significance of the generalist comes to the fore during major catastrophic events where, despite Presidential Directives containing instructions for the relevant agencies to “coordinate their efforts” and “collaborate”, chaos reigns. Within the vast number of the involved organizations, individual tasks are handled with expertise. Yet, the cumulative effect of these actions is an ever growing disorganization: there are no generalist-leaders able to coalesce the fragmented assembly of actors into a task force which can be rapidly deployed and employed with maximum ground utility.

The fact that we do practically nothing to educate the badly needed generalist leaders endowed with the necessary skills and knowledge makes the situation even worse.

**DESIRED EDUCATION PATH**

- 1. Specialist (BSc)**
- 2. Specialist + Basic Generalist (MSc; PhD)**
- 3. Specialist + Advanced Generalist (PhD + )**

- 1. Typical disaster management/homeland security education*
- 2. Typical level in most fields*
- 3. Typical advanced business and military education*

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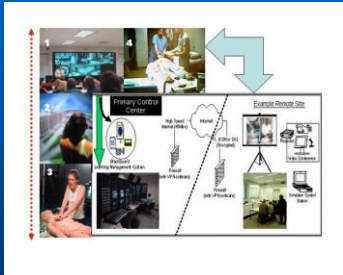
The currently practiced education promotes increasingly narrow specialization dictated by a narrowly perceived “market need.” As a result, changes in trends result in overproduction of highly specialized experts whose level of general education is too limited to allow them to readily move in another direction.

In the field of homeland disaster management colleges and universities begin to produce vast numbers of alumni endowed with essentially tactical level education who, after the bottom tier of available positions will have been filled, will become either unemployable or occupy higher positions despite their essentially unchanged intellectual background. The consequences of this trend will be disastrous with the executive posts occupied by personnel deprived of the essential knowledge foundations required for advanced leadership.

The preferred sequence is therefore specialist education at the BS level, followed by the expansion of specialist knowledge supported by the exposure to other related disciplines (basic generalist), and culminated by further honing of specialist and extensive generalist education through a doctoral degree supplemented by additional, often quite intensive, education. Business and military have very readily adopted the third stage as a self-evident necessity, and currently the prominent upper management/executive education centers and military staff colleges offer some of the best mind-expanding programs available.



## PREPAREDNESS AND LEADER DEVELOPMENT: "KNOW AND ACT"

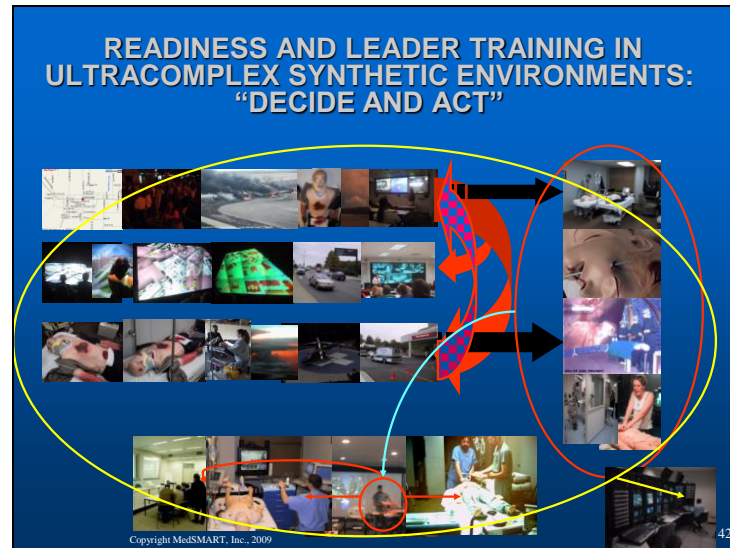


- Collaborative learning
- Problem-based learning
- Training in synthetic environments
- Experiential learning

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41

Teaching the ability to Determine and Act is not easy, and goes significantly beyond what traditional academic education offers. To achieve this goal, highly advanced educational methods need to be introduced (and “advanced” does not mean “on-line” in its simplest and commonly practiced version!), together with the abandonment of the traditional didactic style practiced both in the lecture hall and on line. Assessment methods need to be modified correspondingly, and incorporate not only evaluation of the acquired knowledge (tests), but also evaluation of the ability to function as members of larger “task forces,” i.e., functioning within the setting typical of homeland defense and security environments. Hence, the emphasis on collaborative and experiential learning should be increased, and supported by training conducted, whenever possible, in synthetic environments such as gaming, simulation, or VR-based training.



It is even more difficult to provide students with a meaningful, real life “readiness developing practice” as an inherent part of their disaster management education. Currently, such training is limited to table top sessions conducted at the tactical-level by specialists with typically limited experience in higher homeland defense staff or theater level leadership. Inclusion in “on the ground” exercises is hampered by security considerations precluding attendance without proper clearance. The exercises may also pose either unacceptable physical dangers or simply encumber the participating professional personnel. In the end, each time participation in formal exercises and training is allowed, students turn into passive observers relegated, at best, to the bottom-level support functions (coffee distributors!). There is no doubt the issue of “readiness development” through advanced training, and the exposure to decision-making and leadership in complex multi-agency environments requires urgent attention. Such “staff college” level of practice can be approached with sufficient intensity and frequency only through simulation in synthetic environments with capstone practice centered on complex scenarios. It will allow direct exposure to the complexity of interactions, conflicting requirements, cultures, approaches, doctrines, and even operational stress. The results of such training are readily quantifiable, can be readily analyzed, and presented either as subsequent debriefings or formal reports. Most importantly, this is the only environment in which error can be effectively used as a teaching tool by showing its ultimate consequences and the means of both avoidance and rapid recovery.

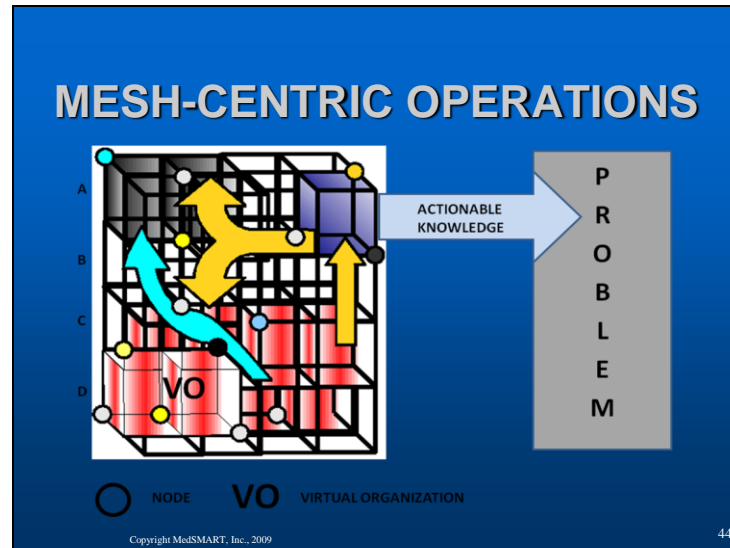




The United States has probably the world's longest tradition in Joint Interagency, International, Multinational (JIIM) disaster management operations. It is therefore surprising that, with the exception of the State Department and the Armed Forces University, *the US has no academic entity which formally and consistently prepares US personnel for JIIM activities.*

Moreover, the involved agencies fail to realize that advanced, large scale emergency management consists, in the end, of nothing else but large scale business operations conducted under extreme pressure, in extreme environments, and with extreme and unpredictable demands by personnel predominantly short of the required knowledge, experience, and ability to act in multi-domain environments.

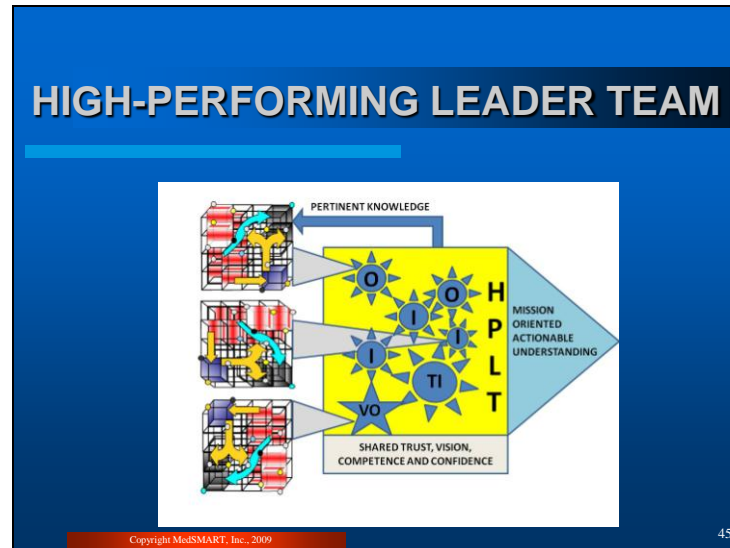
This paradoxical state can be averted, at least in part, by the intense use of IT as the platform for joint national and international education and training that maximizes extraction of "lessons learned" from business, particularly its global range aspects.



The contemporary world of disaster and crisis management, particularly in the context of the prodromic stages, is increasingly “information heavy.” Surprisingly, and contrary to homeland security, implementation of IT in disaster management continues to lag behind, partly because the involved actors at both federal and state levels are hampered by legacy systems, unclear policies, and the deficient IT arms, and also because of narrowly defined function/specialty-specific use of the available resources.

Major organizational difficulties in ERP implementation across multiple entities with largely discrepant operational profiles contribute to the problem. Hence, even if the transition to advanced methods such as grid/cloud computing or network-centric/network-enabled operations will eventually occur, the operational outputs will continue to represent agency-specific *actionable knowledge* suitable for addressing only a restricted part of a larger and complex problem.

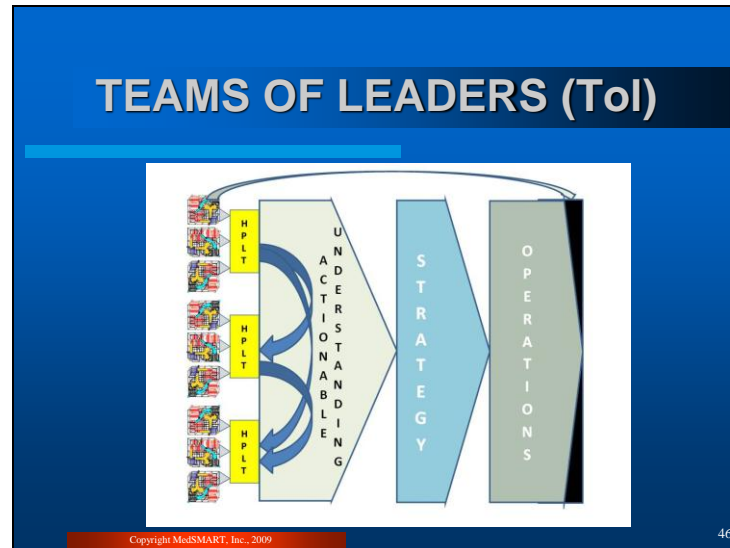
Among the most serious consequences of those difficulties is the potential for creating a distorted view of field activities, erroneous shifts of thrust, and the potential for degradation of the tenuously maintained cohesiveness among the individual components of the disaster management spectrum. Moreover, there is the real danger for the amplification of chaos both during the disaster and during the immediate post-event recovery stage.



Faced with IT difficulties similar to those affecting DHS/FEMA, the US Army developed the concept of Teams of Leaders in which concerted, collaborative action of High Performing Leader Teams (HPLTs) provides the means of addressing complex, multi-organizational tasks. The Teams consist of individuals (I), organizations (O), and, if required, virtual organizations (VO) united by shared skills, knowledge, and attitudes. All interactions among individual team members are intensely collaborative, purpose-oriented, and based on/facilitated by maximum, platform independent use of all available IT/IM/KM resources. Mutual trust, vision, and confidence rooted in shared competence rapidly emerge.

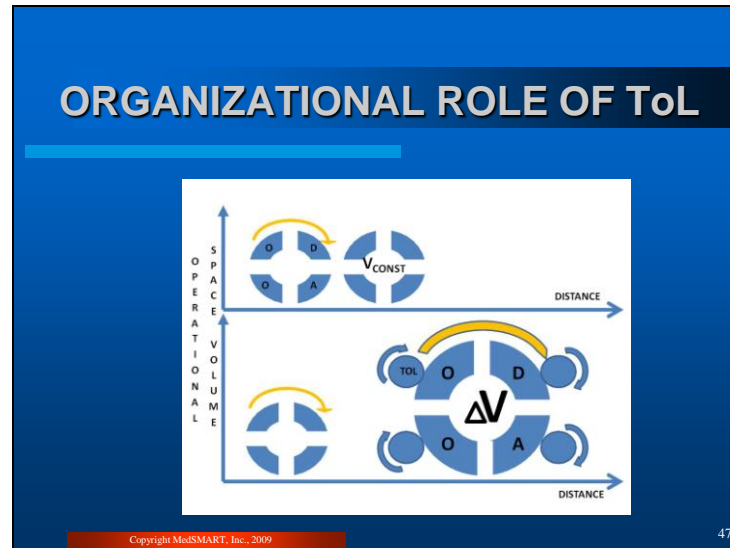
Operations of HPLTs convert actionable knowledge possessed by *individual* team members into mission-oriented *actionable understanding* shared by *all* members of the team. In the process of that conversion, new knowledge is generated and fed back (bottom-up generation) into the world of computing clouds, grids, nets, and Web, where it is transformed into increasingly more comprehensive body of knowledge to be re-distributed (top-bottom) back into the HPLT “universe.”

The entire process serves as a closed loop of continuous, real time interactions and exchanges made possible only through the intense use of all available IT/IM/KM tools and resources. The wide variety of high-level expertise characterizing HPLTs serves as the principal facilitator in access to, acquisition, and transformation of multi-domain information and knowledge into a unified, mission-relevant body of knowledge which supports the development of *mission-oriented actionable understanding* as the principal output of team activity.



Individual multi-, inter-, and trans-disciplinary HPLTs are capable of joining into mission-oriented “swarms” whose actions are guided by shared actionable understanding. The combination of hierarchical and peer-to-peer dissemination of outputs generated by HPLTs solidifies mutual trust and confidence, and promotes generation of universally shared actionable understanding across all involved entities and actors. As the result of these actions, a coherent, joint strategy evolves rapidly. The latter can be then implemented as precise, simultaneous, and focused (“effect-oriented”) theater operations. Actionable understanding that emerges as the consequence of ToL-based activities has been shown as one of the critical elements for the development of strategy-based, comprehensive and long-range solutions to “Domain-of-Domain” problems seen in humanitarian relief and nation building, global business, healthcare, or military operations. Moreover, mounting evidence indicates that the absence of such understanding was among the principal causes of compounding failures following Hurricane Katrina.)

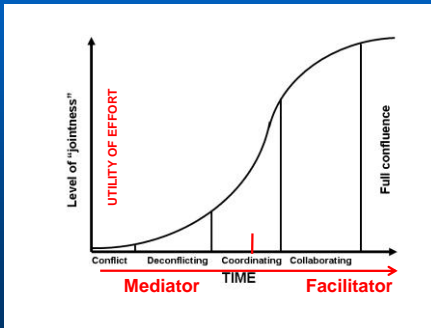
Recognizing the importance of ToL in large scale crisis and disaster management, and to facilitate transition to fully civilian settings, the US Army recently published a manual of ToL implementation.



One of the least known attributers of ToL, and one that is particularly important in disaster management operations, is its impact on the speed of the OODA Loop. In a fast paced, largely unpredictable environment of crisis or disaster, the Loop revolving at constant speed (upper part of the figure) may be too slow to anticipate very sudden changes. Implementation of ToL at each stage of the Loop shortens the duration of that stage by providing several parallel venues for sorting, analysis, and synthesis of information. Overall time needed for a complete revolution of the Loop is reduced, and its velocity increases ( $V_{\text{delta}}$ ). Since all activities performed within the ToL environment are by definition inter-, trans-, and multi-domain, the volume of the sampled and analyzed also significantly greater. The overall effect of ToL is increased tempo and precision of actions, enhanced responsiveness to sudden and unpredictable changes within the operational environment, enhanced precision of operational forecasts, and significantly decreased time needed to reach the objective.



## TEAMS OF LEADERS AND DEVELOPMENT OF "JOINTNESS"



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48

The current world of disaster management at both national and international level continues to be the confusing universe of rivalries, dissonances, and strategic level operations conducted with tactical mentality. The consequent utility of effort is therefore far less than it could be. As a series of pilots conducted by EUCOM in bureaucratically harsh international environments of the European Community demonstrated, ToL provides a tool that converts confrontation into cooperation and serves both as a facilitator of progress and a force multiplier.

Implementation of ToL principles engenders almost by a fiat the mutual trust, sharing, and intensive collaboration and cooperation – the issues that adversely affect most large scale disaster management efforts.

Currently, the field of emergency management is fractured into small and largely isolated entities that continue to be adversely impacted by inter- and intra-agency rivalries and debates on mutual dependencies and subordination (e.g., DHS and FEMA). Preparedness continues to be inadequate, responses chaotic and disorganized, while the process of recovery moves with the velocity of a glacier. In the end, the ultimate victims of such frictions are not the agencies but the disaster victims

Whenever it has been implemented, ToL changed the negative environment of confrontation and even open into cooperation, resolved conflicts, and increased speed of positive and effective action. ToL simply enhanced the utility of effort.

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The list is by no means exhaustive; it contains merely the minimum of the essential papers and books used as sources during the preparation of this lecture. While the fundamental works are given in yellow font, each of the listed sources provides a rich selection of additional resources.

## ABOUT...



Dag K.J.E. von Lubitz, Ph.D., M.D.(Sc.) Internationally recognized author of over 200 peer-reviewed papers, book chapters, and books spanning neurology and trauma, knowledge management, advanced technology, disaster management, homeland security, and leadership. Following distinguished research career at several major universities in EU and US, and at the US National Institutes of Health, from 2001 served as the Chairman and Chief Scientist at MedSMART, Inc, and also as the Adjunct Professor at the College of Health Sciences at Central Michigan University. As a scientist and administrator von Lubitz led several multi-million projects in basic and applied sciences, and numerous field operations involving US and NATO armed forces, US 1<sup>st</sup> Responders, and US and foreign medical and technical personnel. Laureate of major awards including the Smithsonian Institution Award, Laval Prize in Medicine, and Telecom Italia/SSGRR Award, von Lubitz is a frequent key-note speaker on decision-making in unpredictably changing environments, civilian and military leadership, network-centric operations, and application of information and knowledge management systems in crisis and disaster management. Member of several professional organizations, and editorial boards, von Lubitz also advises governmental and private organizations on management of complex projects, technology-based operations, national defense and security, and on distributed simulation-based education and training.