MIT Technology and Policy Program

The 25 Failures, the Technology Deception, and What to Do About Them

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Desourdis
Summary bio

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- Senior systems architect
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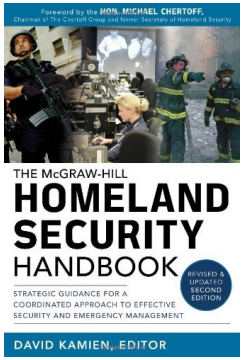
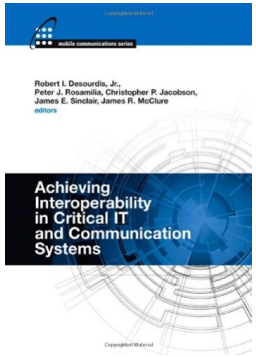
- M.S. electrical engineering, Worcester Polytechnic Institute, 1979
- M.S., Worcester Polytechnic Institute, 1977

Created or invited



2012



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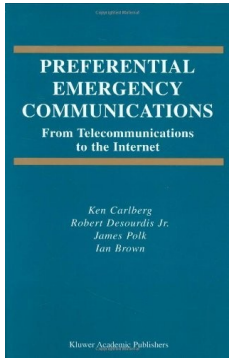

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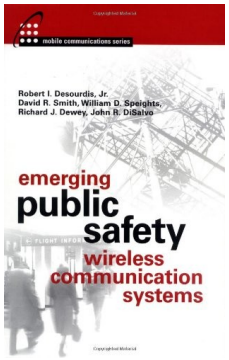

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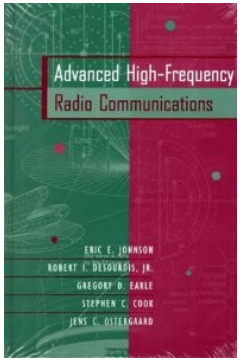
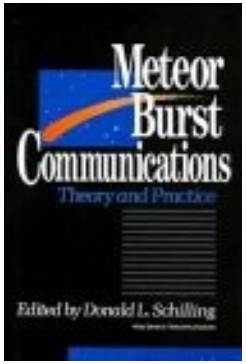


1996



1993

How to Build Successful Wireless Networks
Artech House
Norwood

2014

Desourdis
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Pearl Harbor "Planning Deficiencies"
The cause: Who or what was to blame?

- **Editor Dorothy Thompson, 8 December 1941**

  "And I will tell you where the ultimate responsibilities lies, … for Hawaii and for everything else. It lies with us.

  For a whole generation the American idea has been to get as much as it could for as little effort. For a whole generation the American motto has been, '*I guess its good enough* ' [emphasis added].

  I accuse us. I accuse the twentieth-century American. I accuse me."

- **Senators Homer Ferguson and Owen Brewster, 1946**

  "One cannot understand the defeat which the United States suffered on December 7, 1941, by attempting to analyze it in terms of economics, sociology, technology, or any other of history's neat pigeonholes. It arose from the *nature of the men involved*. In our opinion, the evidence before this committee indicates that the tragedy at Pearl Harbor was primarily a *failure of men* and not of laws or powers to do the necessary things, and carry out the vested responsibilities. [emphasis added]"

Image Credit: U.S. Navy

"A Failure of Men"
Pearl Harbor Planning Deficiencies

#	Deficiency	Description
1	Organization	Multiple parallel organizations with ambiguous authority
2	Assumption	Information sharing is taken for granted or assumed
3	Omission	Information distribution is incomplete, people and entities excluded
4	Verification	Commands/information sent, no follow-up to ensure understanding and action
5	Supervision	Close supervision to verify understanding and predictable action not provided
6	Alertness	Heightened alert is believed undermined by repeated training and exercises
7	Complacency	Vigilance relaxes from the day-to-day lull of "business as usual"
8	Intelligence	Distributed intelligence sources with limited dissemination
9	Attitude	Superiors do not engage in open dialogue with peers and subordinates
10	Imagination	Worst-case scenarios not included in preparedness and response planning
11	Communications	Information exchanged is ambiguous, convoluted, or contradictory
12	Paraphrase	Messages altered according to assumption with no verification
13	Adaptability	Conventions not altered despite unforeseen environment

Pearl

"East Wind, Rain"

Sabotage?

Air raid, Pearl Harbor! This is not a drill!

Image credit: US Navy

"A Failure of Men"
Pearl Harbor Planning Deficiencies

#	Deficiency	Description
14	Disclosure	Intelligence so protected that it is inaccessible to those who urgently need it
15	Insight	Inadequate understanding of the threat make risks poorly estimated
16	Dissemination	Information is not provided to subordinates who need to know
17	Inspection	Leaders do not know or understand their personnel and critical systems
18	Preparedness	Prepare for consequences of what a threat might do, instead of what it can do
19	Consistency	Official direction is contradicted by unofficial speculation from authorities
20	Jealousy	Individual or organizational one-upmanship for real or perceived self-benefit
21	Relationship	Personal friendships inhibit identification and resolution of deficiencies or gaps
22	Priority	Failure to prioritize critical needs over day-to-day activities
23	Reporting	Supervisors and subordinates fail to fail to share situational awareness
24	Improvement	Failure to identify gaps, particularly in worst-case scenarios, and correct them
25	Delegation	Responsibility is delegated with no authority to act

USS Shaw

USS Maryland and *USS Oklahoma*

USS Arizona then

… and now

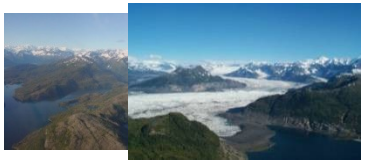
Image credit: US Navy

“A Failure of Men”
Same planning failures repeated since 1941

Same planning deficiencies demonstrated in testimony from

- 1990 Wreck of the Exxon Valdez report
- 2001 Columbine Review Commission report
- 2004 9-11 Report
- 2006 Katrina Report
- 2009 Mass Shootings at Virginia Tech (VT) Addendum
- 2010 Presidential Commission Report on Deepwater Horizon
- 2012 Police in major Urban Area Security Initiative (UASI) region

Arizona memorial 2010



2000 Prince William Sound (Exxon Valdez)

Ground Zero, NYC

New Orleans 2001

2007 VT graduation

"A Failure of Men"
1. Deficiency of Organization

- **1946 Pearl Harbor Congressional Report**: The pyramiding of *superstructures of organization cannot be inducive to efficiency* and endangers the very function of our military and naval services.
- **2004 9-11 Report**: The U.S. government *did not find a way of pooling intelligence* and using it to guide the planning and assignment of responsibilities for joint operations involving entities as disparate as the CIA [Central intelligence Agency], the FBI, the State Department, the military, and the agencies involved in homeland security.
- **2006 Katrina Report**: DoD [Department of Defense], FEMA [Federal Emergency Management Agency], and the state of Louisiana *had difficulty coordinating* with each other, which slowed the response
- **2007 Virginia Tech Report:** Although various individuals and departments within the university knew about each of these incidents, the university did not intervene effectively. *No one knew all the information and no one connected all the dots*.
- **2011 Deepwater Horizon Commission Report**: … the mingling of distinct statutory responsibilities — each of which required different skill sets and fostered different institutional cultures — *led inevitably to internal tensions and a confusion of goals* that weakened the agency's effectiveness …

"A Failure of Men"
2. Deficiency of Assumption

- **1946 Pearl Harbor Congressional Report**: The testimony of many crucial witnesses contains an identical note: 'I thought he was alerted;' 'I took for granted he would understand;' 'I thought he would be doing that.' … How often *similar phrases signal tragedies in every field of life.*
- **2004 9/11 Report**: The attorney general said he therefore *assumed the FBI was doing what it needed to do*. He acknowledged that in retrospect, this was a dangerous assumption. He did not ask the FBI what it was doing in response to the threats and did not task it to take any specific action.
- **2006 Katrina Report**: In these cases, *no immediate action was taken because FEMA officials assumed the state would follow up* the verbal requests with official written requests.
- **2007 Virginia Tech Report:** At this point, the police may have made an error in *reaching a premature conclusion* that their initial lead was a good one or at least in conveying that impression to the Virginia Tech administration.
- **2011 Deepwater Horizon Commission Report**: … there appears to have been a *working assumption within both the agency and the industry* it was charged with overseeing that technological advances had made equipment remarkably reliable.

FEMA = Federal Emergency Management Agency

"A Failure of Men"
3. Deficiency of Omission

- **1946 Pearl Harbor Congressional Report**: … Kimmel and Short *should have been informed* concerning the consular intercepts in regard to Pearl Harbor and the other military installations on Oahu.
- **2004 9/11 Report**: The NYPD's 911 operators and Fire Department, New York City (FDNY) dispatch *were not adequately integrated* into the emergency response. …. These operators and dispatchers were one of the only sources of information for individuals at and above the impact zone of the towers. The FDNY ordered both towers fully evacuated by 8:57 a.m., but this *guidance was not conveyed to 911 operators and FDNY dispatchers*, who for the next hour often continued to advise civilians not to self-evacuate …
- **2006 Katrina Report** The preparation for and response to Hurricane Katrina show we are still an analog government in a digital age. We must recognize that we are *woefully incapable of storing, moving, and accessing information* …
- **2007 Virginia Tech Report:** The *police did not tell the Policy Group* that there was a chance the gunman was loose on campus or advise the university of any immediate action that should be taken such as canceling classes or closing the university.
- **2011 Deepwater Horizon Commission Report**: The first test Halliburton conducted showed once again that the cement slurry would be unstable. The Commission *does not believe that Halliburton ever reported this information* to British Petroleum.

"A Failure of Men"
7. Deficiency of Complacency

- **1946 Pearl Harbor Congressional Report**: But the American soldier, sailor, and airman … in *maintaining his alertness to anything or nothing*, he has to fight his own instincts. Yet that is his job.
- **2004 9/11 Report**: In sum, the domestic agencies *never mobilized* in response to the threat. They *did not have direction*, and *did not have a plan* to institute. The *borders were not hardened*. Transportation *systems were not fortified*. Electronic *surveillance was not targeted* against a domestic threat. State and local law enforcement *were not marshaled* to augment the FBI's efforts. The *public was not warned*.
- **2006 Katrina Report**: … top officials in the aftermath of Katrina … *did not even break from their vacations* to attend to the disaster. While [the Department of Homeland Security] had all been briefed on August 28th of the possibility of a levee failure, [the] Secretary … made a trip to Atlanta to visit the CDC to discuss avian flu on the 29th, the day of landfall…
- **2007 Virginia Tech Report:** The police did not have the capability to send an emergency alert message on their own. The police *had to await the deliberations of the Policy Group*, of which they are not a member, even when minutes count.
- **2011 Deepwater Horizon Commission Report**: … the business culture succumbed to a false sense of security. The Deepwater Horizon disaster exhibits the costs of a *culture of complacency*

CDC = Centers for Disease Control and Prevention

"A Failure of Men"
8. Deficiency of Intelligence

- **1946 Pearl Harbor Congressional Report**: The country has thousands of dedicated intelligence gatherers but, "above the gathering level, it just bogs down every single time. *It is not absorbed, it is not delivered*."
- **2004 9/11 Report**: Those working counterterrorism matters did so despite limited intelligence collection and strategic analysis capabilities, a *limited capacity to share information both internally and externally*, insufficient training, perceived legal barriers to sharing information, and inadequate resources.
- **2006 Katrina Report**: The federal government is the largest purchaser of information technology in the world, by far. One would think we could share information by now. But *Katrina again proved we cannot*.
- **2007 Virginia Tech Report:** …the VTPD [Virginia Tech Police Department] … knew that Cho had been cautioned against stalking—twice, that he had threatened suicide, that a magistrate had issued a temporary detention order, and that Cho had spent a night at St. Albans as a result of such detention order. The Care Team *did not know the details* of all these occurrences.
- **2011 Deepwater Horizon Commission Report**: As a result, individuals often found themselves making critical decisions *without a full appreciation for the context in which they were being made* (or even without recognition that the decisions were critical).

"A Failure of Men"
10. Deficiency of Insight

- **1946 Pearl Harbor Congressional Report**: There is great danger of being *blinded by the self-evident* … For years the U.S. Army and Navy had conducted war games against a Japanese air attack on Pearl Harbor. But apparently this idea had been for so long a cliché of training exercises that *the reality, when it came, surprised all concerned* as much as if the idea had never crossed their minds.
- **2004 9/11 Report**: … the paper identified a few principal scenarios, one of which was a "suicide hijacking operation." The *FAA [Federal Aviation Administration] analysts judged such an operation unlikely*. because "it does not offer an opportunity for dialogue to achieve the key goal of obtaining Rahman and other key captive extremists. … A suicide hijacking is assessed to be an option of last resort."
- **2006 Katrina Report**: Northern Command *does not have adequate insight into state response capabilities* or adequate interface with governors, which contributed to a lack of mutual understanding and trust during the Katrina response.
- **2007 Virginia Tech (VT) Report:** While continuing their investigation, they [VT police] did not take sufficient action *to deal with what might happen* if the initial lead proved false.
- **2011 Deepwater Horizon Commission Report**: The *failure to properly conduct and interpret* the negative-pressure test was a major contributing factor to the blowout.

"A Failure of Men"
18. Deficiency of Preparedness

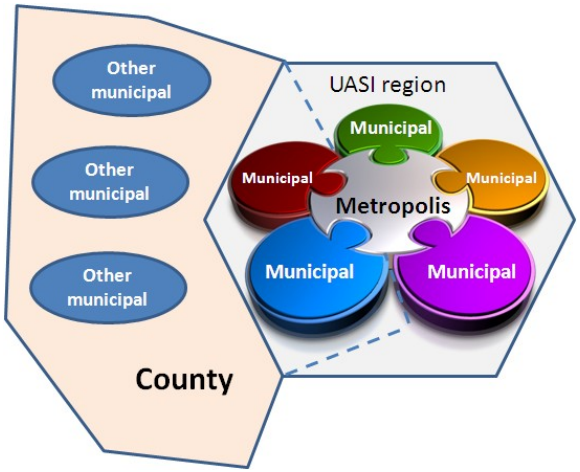
- **1946 Pearl Harbor Congressional Report**: U.S. military leaders in 1941 were far too concerned with what Japan might do, *not with what it was able to do*. Yet history has shown that if an enemy can launch a certain kind of attack, in all probability he will do exactly that.
- **2004 9/11 Report**: The methods for detecting and then warning of surprise attack that the U.S. government had so painstakingly developed in the decades after Pearl Harbor *did not fail; instead, they were not really tried*. They were not employed to analyze the enemy that, as the twentieth century closed, was most likely to launch a surprise attack directly against the United States.
- **2006 Katrina Report**: Despite extensive preparedness initiatives, DHS [the Department of Homeland Security] *was not prepared to respond* to the catastrophic effects of Hurricane Katrina.
- **2007 Virginia Tech Report:** The Emergency Response Plan of Virginia Tech … *did not include provisions for a shooting scenario* and did not place police high enough in the emergency decision-making hierarchy [and] had the wrong name for the police chief and some other official.
- **2011 Deepwater Horizon Commission Report**: Some Transocean crews complained that the safety manual was "unstructured," "hard to navigate," and "not written with the end user in mind;" and that there is "*poor distinction between what is required and how this should be achieved*."

"A Failure of Men"

Day-to-day planning failures in a major UASI* region

Same planning deficiencies in major UASI area

- Comments from Police Chief in typical municipality in county adjacent to major metropolitan area – all contained in major UASI area with all modern systems
- Demonstrates "technology-over-people" and lack of preparedness even for day-to-day police work in 2012



- UASI = Urban Area Security Initiative
- DHS = Department of Homeland Security

1. ***No governance mechanism*** for municipalities – DHS sees the county as "local government"
2. County moment-to-moment situatio***nal awareness is not shared*** with municipals
3. ***No closed-loop alert*** to officers of approaching danger
4. County dispatches for fire service, but ***does not inform police*** of possible fire need for police support within the police agency's jurisdiction
5. ***No standard operating procedures*** exist among the municipalities, the county, and Metropolis
6. County suggests specific ***channel monitoring for 911-awareness not realistic*** for police engaged in other operations
7. ***Data availability for recent crimes/incidents*** delayed from county to municipals, but timely data flow in the opposite direction is strongly promoted
8. ***Municipal officers cannot speak*** directly to Metropolis officers though sharing a common border

The Deception of Technology

Correcting the deficiencies – the Technology Deception

- Technology imparts "manmade effects at a distance" – a "tool" not a "solution"
  - Extends/replaces human senses and actions (for example, unmanned vehicles, prosthetics, radar, ultrasound, etc.)
  - Allows precise/guided actions (for example, machine tools, power tools, GPS navigation aids, etc.)
  - Speeds analysis and decisions (computers, embedded processors, controls)
  - Provides special-purpose materials (for example, composites,
  - Increases scope of our actions (for example, passenger liners, earth-moving equipment, cranes, wingsuits, parachutes, etc.)
  - Impacts cells, germs and viruses (for example, medicines, disinfectants, gene therapy, etc.)
  - Communications (for example, fiber, TCP/IP, Big Data, wireless, etc.)
  - …
- Nonlinear impact – small input can affect huge output, or the reverse: either "+" or "-"
- Deception – "the latest technology alone solves problems"
  - Believed by nontechnical "management" to be "all we need"
  - Believed by technologists (perhaps the "engineer syndrome") to be the "solution"
  - People and government grants and programs all focused on "buying the next capability"
  - Manufacturers and vendors: "Just buy as much as you can – whatever you do with it"
  - The newest "stuff" is the best – we must have it

GPS = Global Positioning System TCP/IP = Transmission Control Protocol /Internet Protocol

The Deception of Technology

"It's the people, not the stuff"

- People envision, design, engineer, manufacture, sell, buy, deploy, train, use, sustain, and dispose of the products of "technology" – it's ALL people
  - If a technology or system fails, it's not the "technology's fault"
  - All too often, those in "management" versus "leadership" (see Tom Peter's "Passion for Excellence")
    - Often have no idea how to do the job they have accepted
    - Don't know best practice practices (next slide)
    - Surround themselves with those who have like deficiencies
  - People form bureaucracies like "tribes"
    - Any group or unit of three or more people becomes a bureaucracy
    - Bureaucracies evolve resilient methods of self-preservation no matter their cause
    - There are "good" people in "bureaucracy," but they are "beaten down" by those around them
- People, process and (then) tools
  - Technology provides the tools, not the house, car, weapon, etc.
  - Processes exist to solve engineering problems, learn and use them
  - People do what they perceive moment-to-moment is in their own personal best interest
    - Priority is themselves, their office, their division, their organization, concentric from center, …
    - Fail to see "what's good for all is good for me" – unless a "last resort"
    - Exceptions – volunteers, first responders, soldiers in combat (including "live and let live"), teachers, etc.

How to Fix It

Learn and use (tailor) best practices

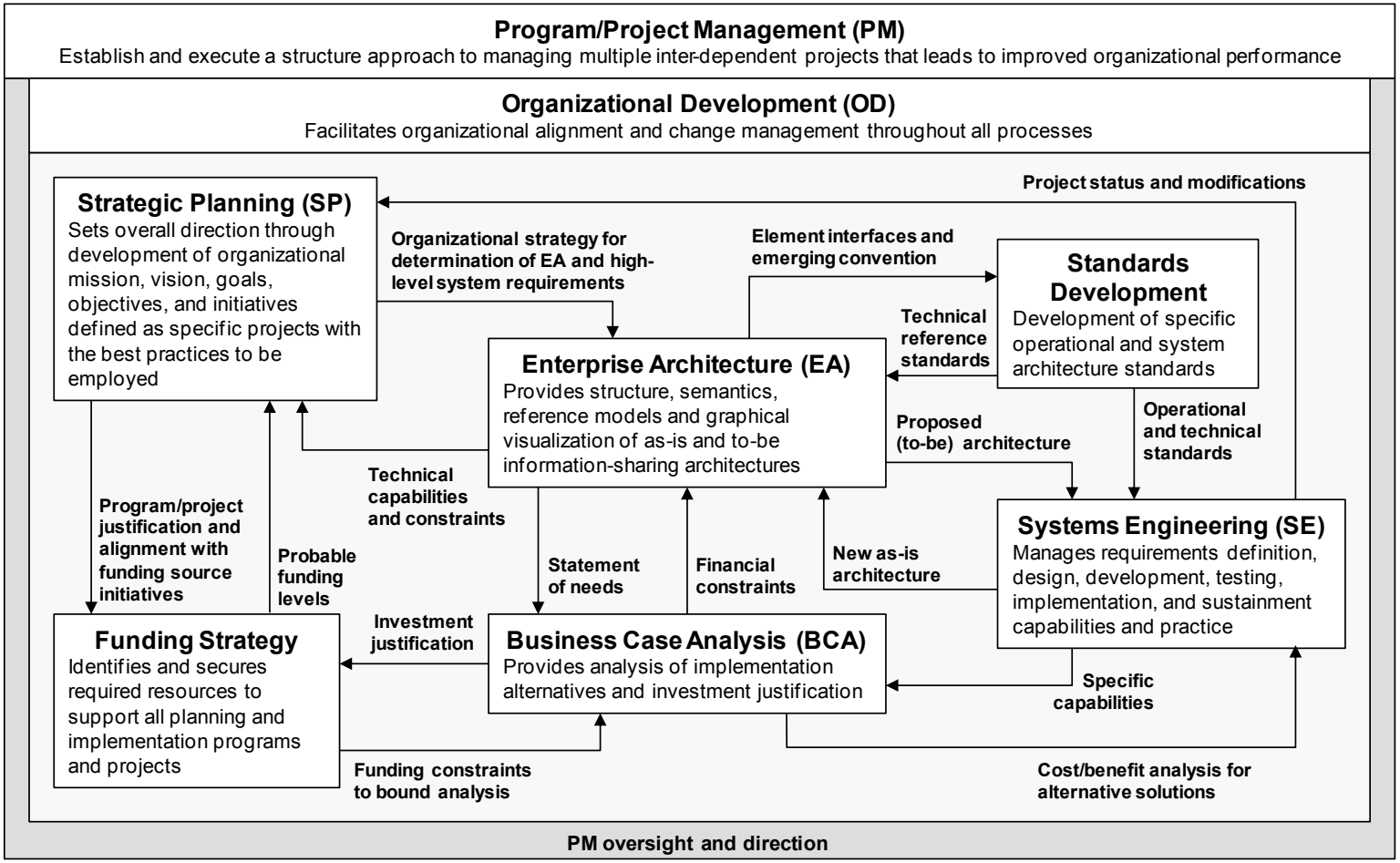


Figure 4.1 Best practices for interoperability success planning.

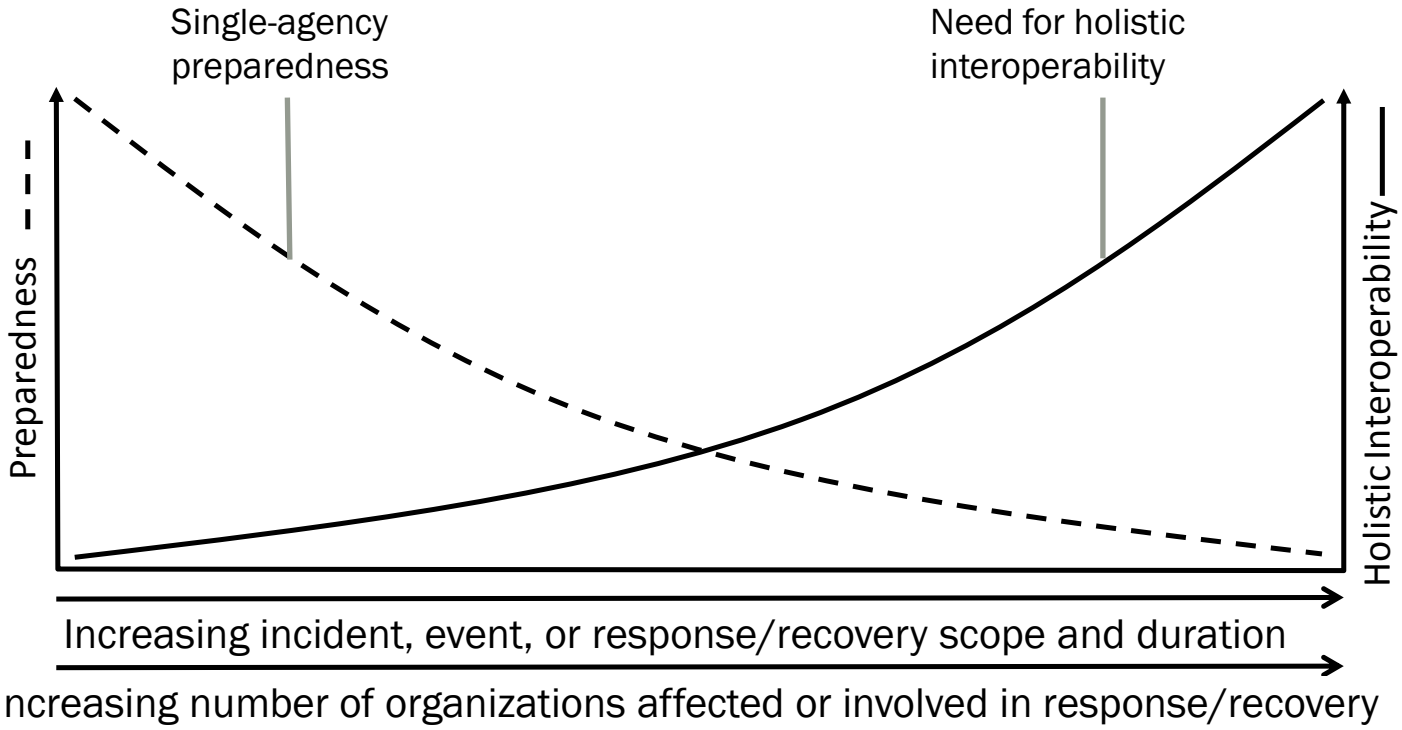
1. *Achieving Interoperability*, p. 109.

How to Fix It

The holistic interoperability "dichotomy*"

The cause

- **Single-organization preparedness decreases with incident/event scope and duration**
- **Need for holistic interoperability because trusted and predictable collaboration is not institutionalized**



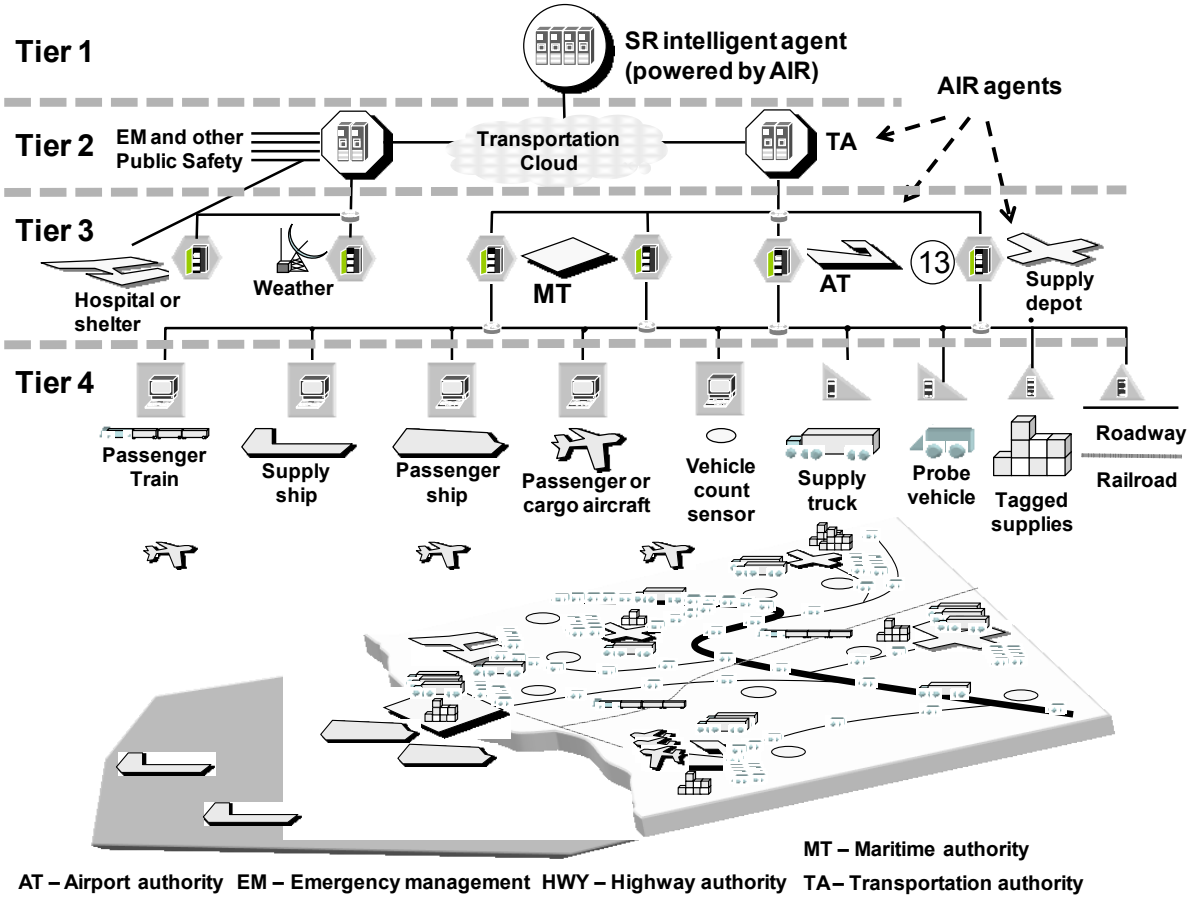
* The author credits John M. Contestabile for contributing this concept as an important factor in the cause of deficient planning.

How to Fix It

"Sense & Respond" vs. "Publish and Subscribe"

Sense-and-respond architecture

- Tier 4 reports status data to Tier 3 and receives Tier 4 direction to tailor and relay
- Tier 3 integrates reports for transmission to Tier 2 and directs Tier 4 assets
- Tier 2 receives direction from Tier 1 while Tier 1 receives situational assessment from Tier 2



* Derived from Figure 8.3 of *Achieving Interoperability*

How to Fix It
Correcting the deficiencies – the "lessons of history"

- In all these "failures of men"
  - People had the necessary technology to avoid disaster becoming tragedy
    - In-place systems and experience provided early warning
    - Available technology could have avoided the disaster or minimized consequences
  - Ineffective leadership and planning were to blame – it's the people and not the stuff
  - Don't see technology as the *solution* – it is only a tool
    - The many "disasters turned tragedies" were not technology failures
    - Plan technology as a tool to help people and process – not as an end in itself
    - Avoid technical and technology *chauvinism*
- Avoid the "failures of men"
  - Read and understand the major investigations of disaster turned tragedy
  - Identify the many "failures of men" in these tragedies in your own organizations and among/between your sister organizations
    - Never assume anything: inspect, ask, listen, verify
    - Work through day-to-day, infrequent, and rare scenarios of your operations
    - Determine who will provide what information to whom in support of what actions
      - Work through step-by-step scenarios
      - Identify specific messages to be used and when to use them
      - Institutionalize this planning behavior and these scenario-based roles
      - Never apologize for repeating yourself

“A Failure of Men”

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"A Failure of Men"

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Thank You

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