



**STRATEGY
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**A BLESSING AND A CURSE: COMMUNICATIONS AS AN
ENABLER TO MICRO-MANAGEMENT**

BY

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20010430 136

USAWC STRATEGY RESEARCH PROJECT

A Blessing and a Curse: Communications as an Enabler to Micro-Management

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ABSTRACT

AUTHOR: Jared A. Kline

TITLE: A Blessing and a Curse: Communications as an Enabler to Micro-Management

FORMAT: Strategy Research Project

DATE: 09 April 2000

PAGES: 24

CLASSIFICATION: Unclassified

Technical improvements in telecommunications and information management open unprecedented possibilities for mankind, including military applications and effects. Potential advantages are clear, but no less certain is the potential for actually making matters worse if the power of the technology is misapplied. Modern information systems may be used to enable micro-management to a degree unprecedented in history. As the former technical impediments to micro-management disappear, the degree of micro-management applied in a military setting becomes more a matter of choice and decision.

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PREFACE

Micro-management is a common complaint, no less in the military than in civilian industry, and the argument of this paper, that improved telecommunications may lead to increased micro-management, may seem too obvious to even merit close examination. Why read something, which may seem nothing more than a statement of the obvious?

Sometimes, what appears to be obvious is not what is complete and accurate. The phenomenon of micro-management is actually fairly complex, with human, cultural, and technical components. This work seeks to examine a fairly limited part of this phenomenon, and to judge how particular modern developments in telecommunications and information technology may affect it. This work does not presume to be the last word on the subject. If it contributes some small detail to the examination of this issue, then it has done its duty.

What is needed above all is an open mind. The world has changed, and it will continue to change. Our brains are all we have to cope with this circumstance, and the quality of our thinking will determine our success or failure. In the evolving world of physical reality, all life must adapt or die, and it is an uncomfortable fact that we, and our institutions, are subject to this same necessity.

POLITICALLY CORRECT DISCLAIMER. The use of "he," "his," and any other similar words which somebody conceivably might have some issue with, is driven entirely by limitations of the English language, which stubbornly persists in its refusal to refer to human beings by means of "gender neutral" words such as "it" and "its." If the concept clearly applies to both genders, then please safely assume that this is what the author intended.

A BLESSING AND A CURSE: COMMUNICATIONS AS AN ENABLER TO MICRO-MANAGEMENT

The dramatic improvements in the field of telecommunications and computing have fired the imagination of the world. Every corner of the earth is affected. Great sums of money change hands as clever people apply new technology to make things faster, cheaper, and better than was formerly possible. This applies to more than the mere modification of existing products and processes, for the technical improvements themselves bring into being entirely new areas of endeavor, which did not exist before. There is a human tendency towards optimism, and the promise of continuous technical advance reinforces that tendency. Technical developments in the field of telecommunications and information systems do indeed open unprecedented possibilities for mankind, including military applications and effects. Potential advantages are clear, and are being developed and exploited as quickly as human resourcefulness and rapacity allow. As positive as all this appears, and as positive in many ways as it actually is, there are risks associated with these new possibilities. As great as is the potential for good, no less is the potential for mischief and disappointment as this wonderful technology is misapplied or misused.

Our purpose is to examine a tiny segment of this world movement. The modest goal of this work is to consider, in a limited and preliminary way, the effects of modern telecommunications and information systems on the phenomenon of micro-management in military affairs. While there is little public and official support for the concept of micro-management, it will be clear that the tendency towards micro-management remains extraordinarily tenacious of life, and in fact may have been given a new vitality with the development of modern telecommunications and information management technology.

THE WILL TO MICRO-MANAGEMENT

Webster defines micro-management as the act of managing with great or excessive control or attention to details.¹ Seldom has a concept been so universally decried while at the same time being so widely applied. Sound and good reasons exist for this apparent paradox.

Micro-management has its roots in a fundamental psychological feature. The perceived ability to intentionally influence events may well be essential to a person's

individual mental health. Based upon studies conducted in Western industrialized cultures, it appears clear that people who "feel in control" actually live longer.² Experts disagree as to whether having control is a prime motivation in itself for human action, or whether it is an individual difference between people as to degree. What is clear, however, is that control over events plays a significant role in a person's world-view and individual perception of self-worth and well-being.³ People like to believe that they are in control of their lives, and of things affecting their lives.

Command and control has to be understood within the context of this human need. The implementation of command and control, although it relies heavily upon technical means in a modern military organization, is ultimately a very human action whereby human beings in command cause other human beings to carry out their will. As such, it is impossible to ignore the human element and to try and reduce command and control to a sterile and mechanical process. It is a very human tendency for anyone responsible for anything to attempt to be as certain as possible about his area of responsibility. Uncertainty causes doubt and anxiety. When a superior feels that he can trust his subordinates and has confidence in them, this alleviates the anxiety to the extent of this confidence, but where doubt exists the perceived need for control grows. Such natural doubt and anxiety are compounded by the potential personal consequences of a given mistake or mishap. The greater the likelihood of personal misfortune as a result of a mistake or mishap, the greater becomes the tendency to impose control on as many of the factors involved as possible. In a military setting, this tendency would reach a sort of ideal perfection if a circumstance could be imagined in which the commander could know not only everything about his enemy, but everything about the overall environment, and everything about his own forces, all the time. To know every detail about every component of a situation, whether it be friendly, enemy, neutral, natural, man-made, real, or imaginary, represents a platonic ideal of micro-management. "The quest for certainty, in other words," observes historian Martin Van Creveld, "will logically end only when there is nothing left to be certain about."⁴

TRADITIONAL IMPEDIMENTS TO MICRO-MANAGEMENT

The ideal of micro-management, in spite of its appeal to human insecurity and desire for control, has been stymied to a greater or lesser extent in the real world of military

operations. Micro-management has proven generally too inflexible and, when applied on a large scale, too bureaucratic for the demands of military operations against a living enemy. Writing in the 1860s, the master *Feldmarschal* Helmut von Moltke observed that “the most unfortunate of all supreme commanders is the one who is under close supervision, who has to give an account of his plans and intentions every hour of every day. This supervision may be exercised through a delegate of the highest authority at his headquarters or a telegraph wire attached to his back. In such cases all independence, rapid decision, and audacious risk, without which no war can be conducted, ceases...Frequent and rapid decisions can be shaped only on the spot according to estimates of local conditions.”⁵ Moltke was writing about his experience at the strategic and operational level of command in the Prussian Army, but the need for speed and flexibility have been recognized to apply all the more so at the tactical level.

Moltke's sentiments are not limited to the time and place of a strategist of the European industrial age. The writings of the ancient Chinese masters of strategy support the *Feldmarschal* and his position. Over two millennia prior to the dawn of the Industrial Age, Sun Tzu observed, “there are occasions when the commands of the sovereign need not be obeyed.”⁶ The ancient Chinese commentator on Sun Tzu, Chang Yue, pointed out that King Fu Ch'ai instructed, “when you see the correct course, act; do not wait for orders.”⁷ Chia Lin, another ancient Chinese commentator in full agreement, stated baldly, “the advance and retirement of the Army can be controlled by the general in accordance with prevailing circumstances. No evil is greater than commands of the sovereign from the court.”⁸ There is nothing in Sun Tzu to contradict this.

Auftragstaktik, or “mission tactic,” has come to represent the military rebuttal to micro-management. The idea of *Auftragstaktik* is that subordinates should be given instructions clearly emphasizing the overall goal of the mission, with sufficient latitude as to how the goal may actually be realized to account for any unforeseen obstacles or circumstances. The subordinate, within this arrangement, is given relatively more freedom of judgement and action in accomplishing his mission, and is expected to do what is needed to succeed. *Auftragstaktik* was, and is, a popular idea, particularly with the subordinates being so empowered. After all, it plays to the psychological need of the subordinate to perceive that he is in control of his area, and so reinforces this aforementioned human tendency towards control that paradoxically might steer this same subordinate towards the

micro-management of *his own* subordinates. Additionally, and in a practical sense most importantly, *Auftragstaktik* has actually given relatively better results in military history than micro-management has. Its main strength is that it allows the subordinate carrying out the mission to immediately react and modify his plan in the face of unforeseen developments. Without this flexibility, the result could be delay at best and failure at worst, while the subordinate tarries in frustration, awaiting decisions and communications from higher headquarters.

An examination of military history reveals several reasons for the relative inefficiency of micro-management, as compared against *Auftragstaktik*. These reasons have traditionally impeded micro-management and effectively limited it. First, communications in the past were not advanced enough to allow real-time, or even near-real-time, awareness of distant developments. By the time a senior commander learned of a significant development, in many cases the result of the new development had already been decided, for better or for worse, by those directly engaged in it. Second, the sheer amount of information affecting a large action, even if it could be somehow instantly conveyed, could be too much for a single person to manage. An important subset of this information problem is the concept of "span of control." The idea that a limit existed to the number of people a leader may effectively directly control was popularized in 1922 by British General Sir Ian Hamilton. Hamilton's thesis was that a leader can directly control no more than three to six persons, dependent upon the size of the organization involved. Hamilton concluded that generals should have no more than three persons directly reporting to them, while lower level officers should be able to handle up to six.⁹

These span of control limitations collide with the human tendency towards micro-management, often to the severe detriment of an organization's effectiveness. The results are evident in civilian industry, no less than in military organizations. As an example, a 1995 University of Louisiana study of civilian entrepreneurs found an overwhelming tendency towards micro-management among the civilian managers studied. Only sixteen percent of the civilian managers included in the study believed that "top managers cannot deal with all problems personally."¹⁰ Professor Lawrence Lauch, co-author of the study, concluded that fear of losing control was the driver behind micro-management. Managers try "to do everything and to supervise everyone. All decisions must come from them."¹¹ Civilian studies have shown that the resulting micro-management ruins morale among subordinates

and impedes decision making and flexibility. Fred Nichols, a senior consultant and expert on the subject, warns that in an environment of micro-management "people won't act or are even afraid to act. Then problems don't get worked out, and everything gets escalated to the top. Eventually, you're not going to be able to respond."¹²

The limitations of span of control are well known to military theorists, and militate against micro-management in most official doctrine. The United States Marine Corps doctrinal publication Command and Control gives a very eloquent analysis of the entire issue, essentially agreeing with the limitations observed by Sir Ian Hamilton. "Although a reasonable span of control varies with the situation, as a rule of thumb an individual can effectively command at least three and as many as seven subordinates...however, as the number increases, at some point we lose the ability to effectively consider each unit individually and begin to think of the units together as a single inflexible mass."¹³ The effect upon the organization depends upon how this limitation is addressed. "Narrowing span of control—that is, lessening the number of immediate subordinates—means deepening the organization by adding layers of command. But the more layers of command an organization has, the longer it takes for information to move up or down. Consequently, the organization becomes slower and less responsive. Conversely, an effort to increase tempo by eliminating echelons of command, or flattening an organization, necessitates widening the span of control. The commander will have to resolve the resulting tension that exists between organizational width and depth."¹⁴ The Marine Corps concluded that the best solution is that "we should use mission command and control as much as the situation allows," and "mission command and control relies on the use of *mission tactics*, in which seniors assign missions and explain the underlying intent but leave subordinates as free as possible to choose the manner of accomplishment."¹⁵ In other words, the Marines are advocating *Auftragstaktik*. This is the solution to the span of control problem, in the view of the Marine Corps and the mainstream of American military theory. "Why? Mission command and control deals better with the fundamental problems of uncertainty and time. Since we recognize that precision and certainty are unattainable in war anyway, we sacrifice them for speed and agility. Mission command and control offers the flexibility to deal with rapidly changing situations and to exploit fleeting windows of opportunity. It provides for the degree of cooperation necessary to achieve harmony of effort, yet gives commanders at all levels the latitude to act with initiative and boldness."¹⁶

Moltke, and geniuses like him, chafed at the very idea of waiting for permission to do something perfectly self-evident to the commander on the ground. As Moltke observed, waiting for a decision risked losing an opportunity. Therefore, since micro-management could not work anyway, it was far better to train subordinates to work on the basis of *Auftragstaktik*, so that they would do a better job at the critical point. Modern military theory, as exemplified by the Marine Corps, agrees that *Auftragstaktik* is clearly more effective than micro-management. As practically effective as this view has been in practice, it never entirely erased the will to micro-management, although it did suppress it to a greater or lesser extent, dependent upon individual factors.

APPARENT BREAKDOWN OF THE TRADITIONAL IMPEDIMENTS TO MICRO-MANAGEMENT

The developments of computer communications and applications have wrought great changes on a world-wide scale. There is scarcely a point on the globe that has not felt the rays, however locally diffused, of the dawning information age. Instant communications are possible via the Internet, which makes communications across the globe subjectively as easy, and as cheap, as communications across the street. News video is broadcast in real-time, around the clock. Instead of waiting for weeks, days, or even hours to learn of critical events, today it is possible to actually observe critical events unfolding on a distant continent. Powerful tools serve the modern commander. Satellite imagery lets him see the ground occupied by his enemy, and informs him of conditions to a fine degree of accuracy. Signals Intelligence and other sources inform him of the enemy's intentions. Position locating and reporting equipment displays the locations of subordinate elements on the move and at rest. Instant communications down to a very low level, even to the individual soldier if need be, give him the ability to personally involve himself from a distance in any segment of any military operation he chooses. He can virtually see any part of the complex whole. To a great extent, communications no longer limit a commander's ability to directly manage or control any piece of any military action, no matter how small. The communications network covers the world of military operations "from the fox hole to the White House." In short, the modern telecommunications and information management infrastructure is a true network, technically non-hierarchical and ideally seamless.

This is a profound and momentous fact. The great military theorists, from Sun Tzu, to Clausewitz, and all the way to the end of the Twentieth Century, lived in an environment of delayed and essentially hierarchical communications. Their thoughts, theories, and achievements had to be accomplished within that environment. That environment is slipping away. Tactical video-teleconferencing allows a corps commander in Heidelberg, Germany to speak virtually face to face with a brigadier general hundreds of miles distant on the banks of the rising Sava River in Croatia, to see for himself the appearance of the riverbank area, the fatigue of those working there, and the overall action on the spot. In minutes the decision is made to send more bridging equipment from Germany, preempting a scheduled rail transport of something else that very day. The instructions are sent at once to the officer in charge of rail transportation and to the commander of the bridging unit, and the change is made.

In former times, such a decision and response would have required a much longer time, and could not have been so effectively made on the spot in Heidelberg. Yet, in this example, Heidelberg is exactly the proper place to make the decision, for the bridging equipment is coming from Germany, and the trains are being loaded there. The bridge is completed and the Americans cross the Sava on time. In a sense, the corps commander in Heidelberg is himself simultaneously on the Sava River. He can see the situation with his own eyes, and he can see and speak face to face with the commander on the ground. The effects of uncertainty and time are mitigated, or even virtually eliminated in this example.

The integration of position locating and reporting equipment, sensors, video-teleconferencing equipment, maneuver control systems, unmanned aerial vehicles, reconnaissance satellites, and the entire array of computer applications within the overarching telecommunications network, provide more immediate information about the disposition of friendly forces and assets, as well as enemy forces and assets, than has ever been possible in human history. A plethora of interrelated and integrated systems exist for this purpose, and more are being developed all the time. In addition to strictly military systems, commercial industry develops applications for its own purposes at an even faster rate than the military does. Many civilian applications are directly translatable to military use, without previous military investment. Much has been written about the idea that human society is making a fundamental shift from an "industrial age" to an "information age," and this idea has also been applied to military affairs. General Gordon R. Sullivan, writing from

his position as Chief of Staff of the Army in 1994, predicted that "spans of control will grow larger while organizations become flatter and 'process action teams' play an increasingly important role."¹⁷ This recalls the span of control problem. As an organization becomes flatter, the span of control increases. Yet, in the Sava River example, one sees a circumstance in which very high level direct involvement, with an ongoing action on the ground hundreds of miles distant, allowed the overall mission to proceed on time, and better than would otherwise have been the case.

The question becomes, have the great improvements in telecommunications and information management changed the fundamental command and control situation to such an extent that uncertainty and span of control need no longer limit the will to micro-management? Is it time to reconsider the usefulness of micro-management as applied to command and control?

HAS MICRO-MANAGEMENT BECOME A GOOD THING?

One result of the information age is the demand for speed and detail in reports. The speed and ease of communications makes it fast and easy to ask questions, and this affects society as a whole. Cable News Network (CNN) and other agencies make a business of transmitting current news around the clock. The practical concern of these news entities is to fill twenty-four hours of broadcast time with twenty-four hours of material. This leads to a great appetite on their part for detail, for details help them to fill the twenty-four hours. Political leaders in a modern democratic setting, such as the United States, often feel compelled to address all media questions, and so their own perceived need for detail grows greater, just as a result of media queries. In some respects, this part of the chain is dependent upon the self-confidence of the political figures, and part (obviously not all) of this self-confidence depends upon their trust or lack of trust in their military subordinates. American political figures, driven in some cases either by media queries or the fear of media queries, have come to expect strategic level military leaders to account for actions taken at the lowest tactical level. As mass media shows pictures of infantry squads on peacekeeping operations, these simple squads assume a relatively inflated political importance, as compared to their former more modest role in public life. The current practice of allowing or even encouraging soldiers in units to answer media questions on the spot transforms a

squad leader into a quasi-official spokesman for the military establishment. A senior military leader may find himself being held responsible for what an interviewed soldier says. This creates an almost irresistible requirement for a senior leader to involve himself in matters traditionally far below his normal scope of responsibility. An unfortunate and inevitable result of this is to re-direct some of the senior leadership's attention away from those higher level functions that they are still responsible for, and which may suffer as a result. This is, once again, related to the same limitation that span of control addresses. There is a physical limit to how much a single person can accomplish in a given amount of time. A political environment which demands of its senior leadership personal and instant accountability for individual low level details, rather than a focus on overall results, must tend to drive commanders to micro-management. There is a sort of Darwinian quality to the phenomenon. The military serves political purposes, and if that political purpose requires micro-management, then only micro-managers will meet the requirement. This political tendency towards micro-management is reinforced by the available technology to support it. Marine Corps doctrine notes that "the reality of technological development is that equipment which improves the ability to monitor what is happening may also increase the temptation and the means to try to direct what is happening."¹⁸

Additionally, certain military management practices have arisen which further strengthen micro-management, and which tend to require greater centralization affecting lower levels. A procedure which speeds up the decision cycle at a higher level, and which achieves theoretically the most efficient disposition of scarce resources, may have the unintended result of impeding flexibility and speed at lower levels. Joint operations are inherently complex, and rigid control is often imposed to prevent fratricide, as well as to maximize measurable effects upon the enemy. One example of this is the Air Tasking Order. A more centralized arrangement for the management of air power could scarcely be imagined. It is a sort of perfect embodiment of the "command-by-plan" concept.¹⁹ All air missions in a theater are coordinated and ordered by means of this central document, which is prepared at theater level and which applies to the entire theater. In the Vietnamese War, the Air Tasking Order was published on a 24-hour cycle. By the 1990s, this had expanded to 72 to 96 hours.²⁰ To the extent that operations on the ground must be synchronized with operations in the air, the very structure of the Air Tasking Order requires tactical operations on the ground to be coordinated with the theater level command at least three or four days in advance. The centralized nature of the Air Tasking Order fits perfectly with the United

States Air Force's "system of systems" concept.²¹ This may be good for the overall efficiency of air power, but this good efficiency comes at a cost. It might be instructive to consider the subjective effectiveness of air power from the viewpoint of soldiers on the ground who only just realized that they will be finished if they do not have an air-strike to assist them in the coming thirty minutes, but who were not included in the Air Tasking Order forecast three days ago. Now, there are good and clear justifications for the Air Tasking Order arrangement, and it is not intended to hold it up as a faulty practice. What is intended is to point out that it is very centralized, and its importance and significance on the battlefield is such that it forces a certain centralization of the ground operations requiring air support. It trades "flexibility for focus."²² It forces a degree of "command-by-plan" on these ground operations, and it creates another organizational tendency toward micro-management.

The problem with the morale of those subjected to micro-management lies in the same psychological factors which tend to encourage micro-management in the first place; namely, the need for control. The frustration expressed by Moltke and other authorities considering the consequences of detailed instructions from distant superiors is compounded by the human need or desire to be in charge of his own destiny. If the superior "feels good" because he has more control, the subordinate chafes because he has less. This affects morale, quite apart from operational consequences. As an example, US Army studies attempting to account for high attrition among Army captains cited "excessive micro-management" as a key reason for company grade officers to leave the service.²³ In February 2000, the Vice Chief of Staff of the US Army wrote, "we increasingly hear from these captains that they are frustrated by what they perceive as a 'zero defect' mentality and a resulting culture of micro-management. They came into the Army to lead soldiers and to willingly shoulder the immense responsibility that goes with command; however, they tell us that this responsibility has been taken away from them by leaders more concerned with making sure nothing goes wrong on their watch. And most importantly, they are frustrated because they feel we, as senior leaders, are either unwilling or unable to understand and address their concerns."²⁴ This underscores the almost uniformly bad effect on morale among the micro-managed, as noted in both military and civilian contexts.

Individual initiative suffers as well as morale. As already noted, the general guidance implicit in *Auftragstaktik* leaves room for a subordinate to apply judgment to a given situation, and to quickly react to changing conditions. Micro-management tends to an

opposite result. As an example, the President has the ability today, given modern telecommunications, to influence tactical decisions thousands of miles away and to monitor development on a by-minute basis. A commander in battle, having to focus both on the matter at hand as well as upon the "assistance" and guidance being offered or forced from above, faces a tension. Depending upon his personality, character, and training, the commander on the ground may feel compelled to react in an understandable but unfortunate way. There is a tendency, in the presence of such detailed orders directing specific actions, to conclude that the higher authority has actually assumed responsibility for direction of the force. That the higher authority, in this example the President, might have access to better intelligence from national assets, could reinforce the tendency for the subordinate commander to conclude that the higher authority actually is better placed than he is to make decisions.²⁵

CONCLUSION

It is clear that the will to micro-management exists as a part of a basic psychological need for control, and that this is modified by subjective anxiety on the part of the leaders and by the availability of means for micro-management. It is equally clear that micro-management does not effectively handle the span of control problems inherent in a flat organization. Micro-management, as is ordinarily applied, stymies low-level initiative and corrodes morale. However, as in the Sava River example, micro-management can, at times, achieve a decisive positive result.

Telecommunications and information systems advances have significantly reduced the traditional technical impediments to micro-management, and it is possible that the remaining technical impediments will virtually disappear as the technology matures. However, improved telecommunications and computers have not solved the span of control problem, nor have they changed basic human nature and the limitations of human attention. People do not ordinarily like to be micro-managed, and they may abandon the entire enterprise as a result of their frustration. Micro-management on a higher-level degrades the senior leadership's ability to properly address the overall operation as it devotes its attention to details. On the other hand, and in spite of these known disadvantages, political micro-management inevitably begets military micro-management, with the degree of political micro-management depending upon the self-confidence of the political administration, and

its confidence in its military establishment. In an environment of political micro-management, the military leader is forced to micro-manage in spite of his best intentions, muttering "no, it is not right, but it is necessary."

More than ever before, micro-management is a choice. Technological advances have broadened the area where that choice may be applied, making it possible to micro-manage under conditions of geographical dispersion which would have precluded it in former times. To imagine that micro-management may somehow go away is a dream, for the human will to micro-management persists, as does the potential for political impetus to micro-management. The centralized nature of key processes, such as the Air Tasking Order already alluded to, is also likely to remain a feature of the military environment. So, at the end of the day, micro-management is in the hands of leadership, both political and military. As senior political and military leaders weigh the options, it is well for them to consider the pithy wisdom of modern Marine Corps doctrine.

"Just because our technology allows us to micro-manage does not mean that we should."²⁶

WORD COUNT = 4725

ENDNOTES

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- ² Encyclopedia of Human Behavior, 1994 ed., s.v. "Control," by Beth A. Morling and Susan T. Fiske.
- ³ Ibid.
- ⁴ Martin Van Creweld, Command in War, (Cambridge: Harvard University Press, 1985) p. 267.
- ⁵ Daniel J. Hughes, ed. Motke on the Art of War, trans. Daniel J. Hughes and Harry Bell (Novato, California: Presidio Press, 1993), P.77.
- ⁶ Sun Tzu, The Art of War, Samuel B. Griffith, trans. (London: Oxford University Press, 1963)., p. 112.
- ⁷ Ibid.
- ⁸ Ibid, p. 81.
- ⁹ Mark Henricks, "Span Control: How Many Employees Directly Reporting to You is too Many?", January 2001, available from http://www.interpreneur.com/Magazines/MA_SeqArticle/0,1539,285040----2-,00.html , Internet. Accessed 3 February 2001.
- ¹⁰ Ibid.
- ¹¹ Ibid.
- ¹² Ibid.
- ¹³ Department of the Navy, Command and Control, MCDP 6 (Washington, DC, Secretary of the Navy, 1996). P.91.
- ¹⁴ Ibid., p. 92.

¹⁵ Ibid., p. 109.

¹⁶ Ibid.

¹⁷ General Gordon R. Sullivan and Colonel James M. Dubik, War in the Information Age (US Army War College, Strategic Studies Institute, 6 June 1994).p.8.

¹⁸ Department of the Navy, op. cit., p. 137

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²⁰ Chuck Spinney, Date: March 15, 2000, Subject: WHY SYNCRONIZATION DUMBS DOWN YOUR OODA LOOP <http://www.infowar.com/iwftp/cspinney/>

²¹ Czerwinski, op.cit

²² Ibid.

²³ Dr. Mike Matthews, "Captain Attrition at Fort Benning," briefing slides, Army Research Institute, Infantry Forces Research Unit, Fort Benning, GA, 13 OCT 1999

²⁴ AUTODIN Message: R 151038Z FEB 00, FM VCSA WASHINGTON DC TO AIG 7406, AIG 7446, ARSTAF INFO RUEAHOF/CDRPERSCOM ALEXANDRIA VA <file://TAPC-OPZ-A/>file://TAPC-OPZ-A// RUEAHOF/DIR OPMD PERSCOM ALEXANDRIA VA//TAPC-OPZ-A//

²⁵ Frank M. Snyder, Command and Control: The Literature and Commentaries, (Fort Lesley J. McNair, National University Press, 1993), p.89.

²⁶ Department of the Navy, op.cit., p.138.

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Vice Chief of Staff of the Army, AUTODIN Message: R 151038Z FEB 00, FM VCSA WASHINGTON DC TO AIG 7406, AIG 7446, ARSTAF INFO RUEAHOF/CDRPERSCOM ALEXANDRIA VA <file://TAPC-OPZ-A//>file://TAPC-OPZ-A// RUEAHOF/DIR OPMD PERSCOM ALEXANDRIA VA//TAPC-OPZ-A//